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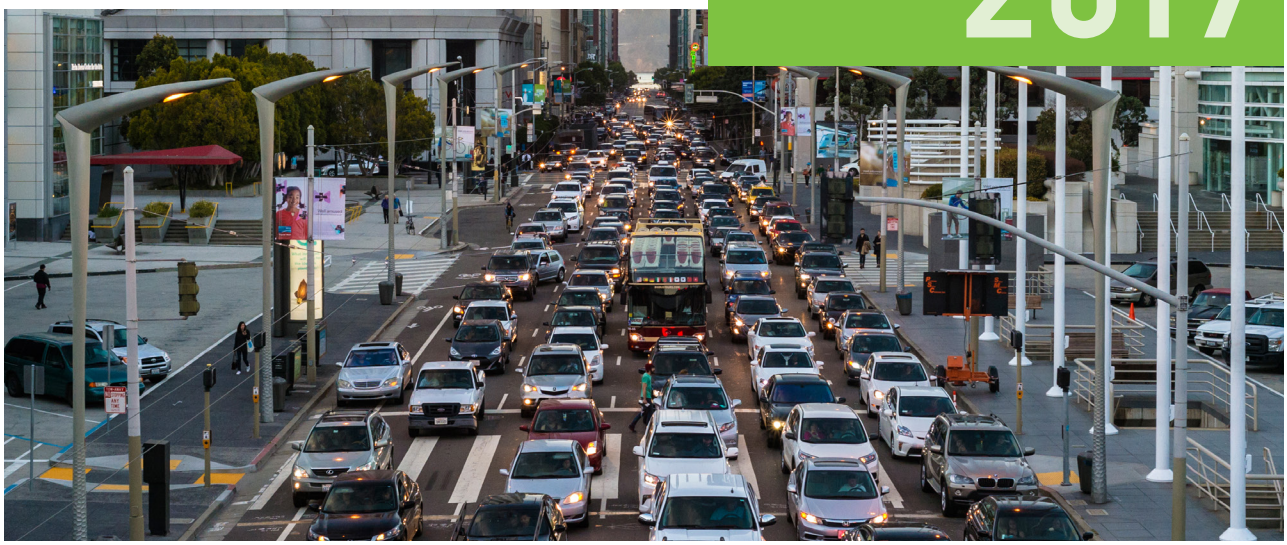

CONGESTION MANAGEMENT PROGRAM

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

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APPENDICES

CHAPTER ONE

BACKGROUND AND PROGRAM OVERVIEW

KEY TOPICS

- CMP Background
- Legislative Requirements
- Legislative Intent and Application to San Francisco
- Congestion Management in San Francisco

1.1. Background

1.1.1 | Purpose of the CMP

As the Congestion Management Agency (CMA) for San Francisco, the San Francisco County Transportation Authority, (the Transportation Authority) is responsible for preparing a Congestion Management Program (CMP) update biennially. As mandated by state law, the purposes of the CMP are to:

- Define San Francisco's performance measures for congestion management;
- Report congestion monitoring data for San Francisco county to the public and the Metropolitan Transportation Commission (MTC);
- Describe San Francisco's congestion management strategies and efforts; and
- Outline the congestion management work program for fiscal years 2017/18 and 2018/19.

1.1.2 | Organization and Approach

This document follows MTC's Guidance for Consistency of Congestion Management Programs with the Regional Transportation Plan, per MTC Resolution 3000, last revised October 2015.[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 Transportation Authority Board will adopt any revisions developed during fiscal years 2017/18 and 2018/19 as amendments to the 2017 San Francisco CMP.

The 2017 CMP updates information from the 2015 CMP and reflects several important developments since 2015. The Transportation Authority prepared most of the 2017 CMP. The data in Chapter 4 (Multimodal Performance) is derived from a report prepared by Iteris, Inc. on behalf of the Transportation Authority. In preparing the CMP update, the Transportation Authority has consulted with the San Francisco Municipal Transportation Agency (SFMTA) and other partner agencies to update policies and compile system performance data.

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

1.1.3 | Origins and Intent of the CMP Legislation

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

The 1989 state legislation directs the regional agency (MTC) to not program any surface transportation program funds and congestion mitigation and air quality funds for a project in a local jurisdiction that has been found to be in nonconformance with a congestion management program unless the project is found to be of regional significance. The goal of the legislation is to strengthen and coordinate local transportation funding and land use decisions by requiring preparation of long-range countywide transportation plans (see the 2017 San Francisco Transportation Plan update, recently adopted in October 2017) every four years, and monitoring of local transportation conditions every two years.

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

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

1.2. 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

[2] In December 2009, the San Francisco Board of Supervisors designated all then-eligible areas within the City and County of San Francisco as an IOZ. Please refer Appendix 3.

representing a majority of the population in the incorporated area of the county." For the complete text of the CMP statutes see Appendix 2.

1.3. Legislative Intent and Application to San Francisco

One of the main objectives 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 the CMP law vests significant authority and responsibility in 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[3]. CMAs therefore act as a policy forum and technical resource to guide and help coordinate local and regional congestion management efforts.

1.4. Congestion Management in San Francisco

1.4.1 | Applicability of the Concept

By statute, congestion management agencies must report on the roadway level of service (LOS) for its countywide network of regionally significant streets and highways (the Metropolitan Transportation System). However, San Francisco's 40 year Transit First policy places greater value on promoting walking, bicycling and taking transit, and correspondingly higher densities through transit-oriented and infill development. For this reason, the Transportation Authority began measuring transit performance, e.g. bus travel times and the ratio of bus to automobile travel times on the CMP network, in 2006. Moreover, by acting upon SB1636 in 2009 to designate San Francisco an infill opportunity zone and enable the county to identify alternative performance metrics to LOS, San Francisco indicated the desire to more formally move away from LOS and toward alternative measures of system performance that emphasized the movement of people and goods, not private vehicles. San Francisco's 3-part Transportation Sustainability Program (TSP) implemented this new approach. Among other things, the TSP involved replacing LOS with Vehicle Miles Traveled (VMT) as our city's local traffic impact measure under CEQA, following passage of SB743 in 2013. The reform was adopted by San Francisco Planning Commission in March 2016.

1.4.2 | 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

[3] If a county opts out of preparing a CMP, per ABE 2419 (Bowler), MTC will work with the appropriate agencies to establish project priorities for funding.

- 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 Capital Improvement Program (CIP);

2. A common database and method to analyze impacts of local land use decisions on the CMP network; and

3. A designated CMA for the county.

1.4.3 | Key Changes from 2015 CMP

The following sections highlight the most significant updates included in the 2017 CMP.

CHAPTER 4: This chapter has been restructured to present the multimodal performance monitoring data in a more streamlined manner. In addition, emphasis has been placed on more visuals to summarize the data as opposed to tables and text.

CHAPTER 5: The Transportation Demand Management (TDM) Element has been updated to reflect recent changes to planning code requirements, advancements to San Francisco TDM strategies, including new policies requiring TDM measures.

CHAPTER 7: This chapter reflects amendments made to the CIP.

CHAPTER 8: The Transportation Authority's San Francisco Travel Demand Forecasting Model has undergone improvements since 2015, which are discussed in this chapter.

1.4.4 | Public Input

The Draft 2017 San Francisco CMP is scheduled for public review at the November 29, 2017 meeting of the Transportation Authority's Citizens Advisory Committee. The Transportation Authority Board is also scheduled to consider approval of the 2017 CMP on December 5 and 12, 2017.

CHAPTER TWO

CONGESTION MANAGEMENT AGENCY ROLE & RESPONSIBILITIES

KEY TOPICS

- San Francisco County Transportation Authority

2.1. The San Francisco County Transportation Authority

2.1.1 | Designation and Composition

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

2.1.2 | Roles and Responsibilities

The Transportation 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 Transportation Authority administers, prioritizes, and programs Proposition K revenues. These revenues also leverage large amounts of State and Federal funds for transportation investments in San Francisco.

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

In its capacity as the CMA for San Francisco, the Transportation 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 Transportation Authority's dual responsibilities – administering the local half-cent transportation sales tax, 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 as well as local development impact fees are examples of the efficacy of this process. The San Francisco Transportation Plan improves the effectiveness of this process by linking transportation objectives and policies to a specific list of transportation investments, prioritized across a long-range planning horizon. The CMP's 7-year CIP and the Authority's Prop K Five-Year Prioritization Programs serve as the main implementation tools for the San Francisco Transportation Plan.

As the CMA, the Transportation Authority served as the lead coordinator for San Francisco involvement in the regional process to develop a Sustainable Communities Strategy (SCS) and update the Regional Transportation Plan (RTP). Plan Bay Area, which integrates the SCS and RTP into a single regional plan, was adopted in July 2013. As required by SB 375 (Steinberg), passed in 2008, Plan Bay Area integrates long-range land use, housing, and transportation planning in the region to reduce greenhouse gas emissions from motor vehicles.

In 2011, the Transportation Authority deepened our role in congestion management on Treasure Island. Assembly Bill No. 981, the Treasure Island Transportation Management Act, authorizes the Board of Supervisors (BOS) of the City and County of San Francisco to designate a board or agency to act as the transportation management agency (TMA) for Treasure Island and implement the Treasure Island Development Program's comprehensive and innovative transportation plan, which includes congestion pricing. In October 2011, the Transportation Authority Board recommended to the Board of Supervisors and the Treasure Island Development Authority (TIDA) that the Transportation Authority be designated as the Treasure Island Mobility Management Agency (TIMMA). Subsequent resolutions tasked the Transportation Authority with advancing agency formation documents, planning, and tolling.

In addition, acting as the CMA, the Transportation Authority plays a key role in reviewing and supporting transportation analyses for major local transportation projects and land use policies that may affect the performance of the transportation system.

The Transportation Authority takes 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 Transportation 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 (now part of Muni Forward), Better Market Street, the Transit Core Capacity Study, and the Transportation Sustainability Program that involves the following three components:

- Invest: Transportation Sustainability Fee – Invest in our transportation network by having developers pay their fair share to help offset the growth created by their project (signed into law November 2015).

- Align: CEQA Reform – Replace LOS with VMT to analyze impacts of new development on transportation system, so it better aligns with the City's longstanding environmental policies, like reducing greenhouse gas emissions (adopted by the Planning Commission March 2016).
- Shift: Transportation Demand Management – Require new developments to provide on-site amenities that prioritize sustainable alternatives to driving (signed into law February 2017).

This approach allows the Board to anticipate potential problems, instead of reacting when congestion impacts reach crisis proportions and require hasty actions.

2.1.3 | Relationship to City Agencies

State law mandates that the Transportation Authority, acting as CMA, 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 Transportation 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. At the same time, the Transportation Authority's approach is to act as a resource, maximizing coordination with the City departments responsible for planning and implementation of transportation actions, so that such actions may be evaluated for congestion management impacts before they are put in place.

2.1.4 | Relationship to Regional Planning/Programming Agencies

As the Congestion Management Agency for San Francisco, the Transportation Authority plays a key sub-regional planning and funding 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 Transportation Authority coordinates local input into MTC's Regional Transportation Plan (RTP) through the development of the San Francisco Transportation Plan, which establishes the overall vision and priorities for long-range transportation development and funding for San Francisco, and through San Francisco's portion of the Regional Transportation Improvement Program (RTIP). In these ways, San Francisco influences 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 THREE

CMP-DESIGNATED ROADWAY NETWORK

KEY TOPICS

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

3.1. Legislative Requirements

California Government Code Section 65089(b)(1)(A) requires that performance standards be established for a system of highways and roadways designated by the agency, and that this designated Congestion Management Network include at least all state highways and principal arterials. No highway or roadway designated as part of the system may be removed from the system. The statutes do not define 'principal arterial.'

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

3.2. San Francisco CMP Roadways

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

3.2.1 | Selection Criteria

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

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

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

3.2.2 | Segmentation Method

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 determined 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.

3.2.3 | Current Network

The complete CMP roadway network for San Francisco consists of 233 directional miles on both arterials and freeways.

Table 3-1: 2017 Monitored Segment Miles

ROADWAY TYPE	TOTAL DIRECTIONAL MILES
Arterial	198.4
Freeway	34.9
Total	233.3

Performance monitoring was conducted in 2017 for the entire CMP network. A complete list and description of all arterial and freeway segments in the CMP network can be found in Appendix 3.

3.2.4 | 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 segmentation changes were made in the 2017 CMP. Appendix 3 lists all CMP arterials where segmentation changes have been made since 1991, including a technical justification.

From time to time the Transportation Authority may also monitor additional segments that are not part of the official CMP network. These do not constitute official changes to the CMP network, but may be included to support current planning and system management efforts. The Transportation Authority has not monitored any additional segments in 2017.

Figure 3-1: Spring 2017 Monitored Segments

3.2.5 | Relationship to the MTS

San Francisco's CMP roadway network is broadly consistent with the Metropolitan Transportation System (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 Transportation 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 6).

3.2.6 | Non-Automobile Networks

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

3.3. Work Program Items

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

CHAPTER FOUR

MULTIMODAL PERFORMANCE

KEY TOPICS

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

This chapter presents the 2017 CMP multimodal performance results, including analyses of traffic congestion, transit, and non-motorized performance measures. It combines the traffic Level of Service (LOS) and multimodal performance elements required under state CMP legislation, reflecting the legislation's requirement that LOS be included as one of several multimodal performance measures. This approach is also consistent with San Francisco's urban, multimodal environment. Vehicular traffic congestion remains an important metric of transportation performance in San Francisco, but the City and County's Transit First policy and emphasis on person mobility place higher priority on the performance of alternative modes including transit, bicycles, and pedestrians than on private vehicle speeds.

4.1. Legislative Requirements

4.1.1 | LOS Monitoring

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

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

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

In accordance with CMP legislation, the county and city governments are required to show that CMP route segments within their jurisdiction are operating at or above the CMP traffic LOS standard for all segments outside of any designated Infill Opportunity Zone (IOZ). Section 65089(b)(1)(B) states that "In no case shall the LOS standards established be below the LOS E or the current level, whichever is

farthest from LOS A except when the area is in an infill opportunity zone. When the level of service on a segment or at an intersection fails to attain the established level of service standard outside an infill opportunity zone, a deficiency plan shall be adopted pursuant to section 65089.4". CMP route segments located within an IOZ are exempt from the minimum LOS standards and deficiency plan requirements mandated elsewhere by the CMP legislation.

Senate Bill 1636 (Figueroa), passed in 2002, authorized local jurisdictions to designate IOZs. IOZs must meet eligibility criteria to ensure they are compact, mixed-use areas that are well-served by transit. In December 2009, the San Francisco Board of Supervisors designated all then-eligible areas within the City and County of San Francisco as an IOZ (Appendix 4). Descriptions of further changes to the definition of IOZs, and a map of San Francisco IOZs can be found in Chapter 6.

4.1.2 | Multimodal Performance Monitoring

The CMP legislation also requires a multimodal performance element. AB 1963 in 1994 requires 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," and identifies performance measure requirements.

4.2. Legislative Intent and Application to San Francisco

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

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

Consistent with State law, the 2017 San Francisco CMP distinguishes between two categories of performance measures. Legislatively required measures include roadway LOS plus three transit service performance measures: routing, frequency, and inter-operator service coordination. These are the elements of congestion and multimodal performance measurement that are explicitly required by State congestion management statutes. Section 4.4 details the Legislatively required metrics.

Local performance measures include multimodal metrics that are not used for determination of CMP conformance under State legislation but reflect performance goals for alternative modes in the City of San Francisco. The local measures are used for planning purposes and to track trends over time. Transit measures included in the 2017 CMP include transit speeds, transit-to-auto speed ratios, and transit speed

variability (reliability). In addition to these, we also include the service standards and milestones reported by the SFMTA and other transit providers, which include measures of transit crowding, transit on-time performance, and bunches and gaps in transit service. Non-motorized metrics include multi-modal volumes, bicycle network completeness, and pedestrian and bicyclist injuries and fatalities. These measures are discussed in further detail in Section 4.5.

4.3. Applications of Multimodal Performance Measures

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

- CMP conformance determinations
- CIP amendments
- Deficiency plans
- Land use impacts analysis

4.4. Legislatively Required Performance Measures

4.4.1 | Roadway Level of Service (LOS)

The CMP legislation defines roadway performance primarily by using the LOS traffic engineering concept to evaluate the operating conditions on a roadway. LOS describes operating conditions on a scale of A to F, with "A" describing free flow, and "F" describing bumper-to-bumper conditions. The CMP-mandated traffic LOS standard for San Francisco 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. In addition, because much of San Francisco are an Infill Opportunity Zones, most CMP segments in San Francisco are exempt from minimum LOS standards. However, continued monitoring of automobile LOS is useful for a variety of reasons. As the most extensive historical dataset available, LOS allows for the monitoring of traffic conditions over a long period of time. Congestion is also an important factor in the performance of surface-running transit service: where transit operates in mixed traffic, increased congestion will slow transit. Finally, ongoing monitoring of both automobile and transit speeds within the same corridor facilitates the assessment of relative modal performance.

MONITORING APPROACH

The Transportation Authority uses INRIX data, a commercial dataset which combines several real-time GPS monitoring sources with data from highway performance monitoring systems, as the primary source for official speed and LOS calculations. INRIX data is supplemented with floating car data where INRIX data is not available. This method was adopted in the 2013 CMP after an initial study conducted as part of the 2011 CMP found that results calculated from INRIX were appropriate for use in speed and LOS

calculations. The INRIX and floating car data were collected in April and May, 2017, which is the typical CMP monitoring period for San Francisco. The methodology and results of the 2017 LOS Monitoring effort are detailed in Appendix 5.

SUMMARY OF 2017 LOS MONITORING RESULTS

Table 4-1, below, presents the change in CMP network average travel speeds, calculated as time-mean speed, between 2015 and 2017 for the AM and PM peak periods (7:00 to 9:00 a.m. and 4:30 to 6:30 p.m., respectively).

Table 4-1: CMP Network Average Travel Speed Change

CATEGORY	TIME PERIOD	TIME-MEAN TRAVEL SPEED		
		2015	2017	PERCENT CHANGE
Arterial	AM	14.6	13.6	-7%
	PM	12.7	12.2	-4%
Freeway	AM	38.8	35.8	-8%
	PM	26.2	26.4	1%

Average travel speeds on the CMP network have decreased since 2015 for most measured time periods and road types. Average arterial travel speeds have decreased -7% from 14.6 mph to 13.6 mph in the AM peak and decreased -4% from 12.7 mph to 12.2 mph in the PM peak. The average travel speed on freeways decreased -8% from 38.8 mph to 35.8 mph in the AM peak. However, in the PM peak, the average travel speed for freeways slightly improved by 1% from 26.2 mph to 26.4 mph. While the overall declines in speeds between 2015 and 2017 indicate a continuing degradation of roadway performance, these declines were less significant than the declines between 2013 and 2015, which are documented in the 2015 CMP report. Overall roadway performance has been declining since 2009.

Figure 4-1: CMP Network Average Travel Speed Change

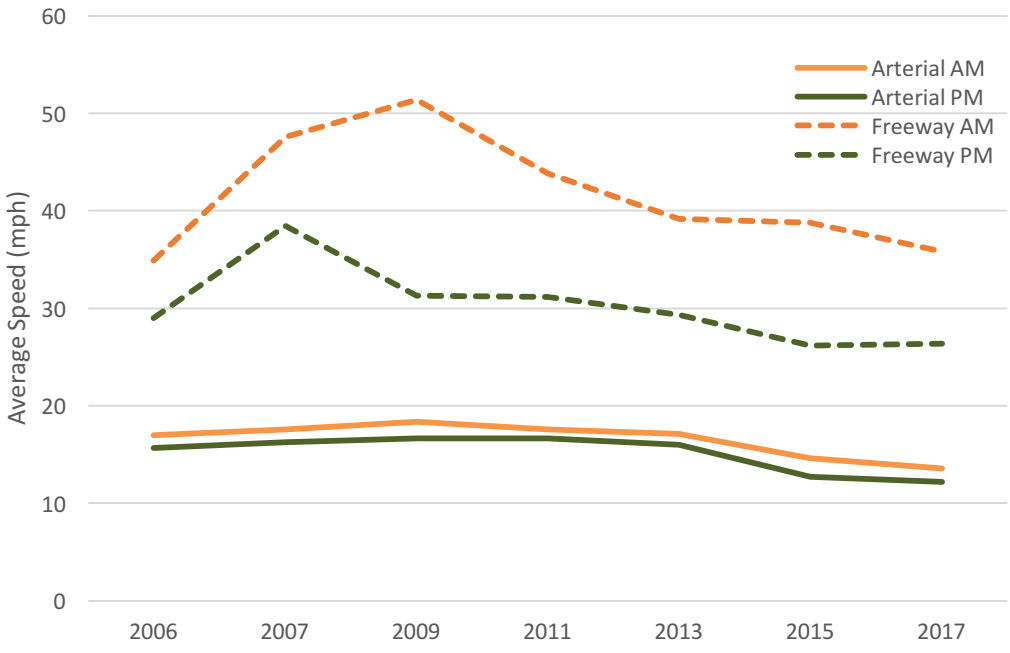


Table 4-2 documents the slowest CMP segments in the AM and PM peak periods. Virtually all of the slowest segments are in the northeast quadrant of the city. In the AM peak the slowest segment was 6.5 miles per hour, while in the PM peak it was 3.5 miles per hour, which is slightly faster than walking.

Table 4-2: Slowest Auto Speed CMP Segments in 2017

AM PEAK PERIOD (7AM -9AM)			PM PEAK PERIOD (4:30 PM – 6:30 PM)		
CMP SEGMENT	DIR.	SPEED (MPH)	CMP SEGMENT	DIR.	SPEED (MPH)
Pine: Market to Kearny	W	6.5	5th St: Brannan to Market	N	3.5
Folsom: 1st to Embarcadero	E	7.0	1st St: Market to Harrison	S	4.3
Drumm: Washington to Market	S	7.0	Broadway: Montgomery to Powell	W	4.6
Oak: Fillmore to Laguna	E	7.1	Montgomery: Broadway to Bush	S	5.0
Market/Portola: Drumm to Van Ness	W	7.1	Harrison: Embarcadero to 1st	W	5.3
Octavia: Fell to Market	S	7.5	Pine: Market to Kearny	W	5.4
Market/Portola: Van Ness to Drumm	E	7.5	Market/Portola: Drumm to Van Ness	W	5.6
Mission/Otis: 3rd to Embarcadero	N	7.5	Pine: Leavenworth to Franklin	W	6.0
Kearny: Market to Columbus	N	7.5	Golden Gate: Franklin to Market	E	6.2
4th St/Stockton: Harrison to Channel	S	7.6	Oak: Fillmore to Laguna	E	6.2

Table 4-3 identifies the segments that experienced the greatest declines in speed between 2015 and 2017. Note that some of these segments are not in the dense northeast quadrant, indicating that other areas of the city are also experiencing degradation in roadway speeds.

Table 4-3: CMP Segments with Highest Percent Decreases in Auto Speeds

CMP SEGMENT	DIR.	2015 AUTO SPEED (MPH)	2017 AUTO SPEED (MPH)	CHANGE (MPH)	PERCENT CHANGE
AM PEAK PERIOD (7AM -9AM)					
Oak: Fillmore to Laguna	E	12.90	7.10	-5.80	-45%
Folsom: 1st to Embarcadero	E	12.20	7.00	-5.20	-43%
Potrero: 21st to Division	N	19.46	11.70	-7.76	-40%
Market/Portola: Drumm to Van Ness	W	11.80	7.10	-4.70	-40%
Broadway: Embarcadero to Montgomery	W	17.08	10.80	-6.28	-37%
PM PEAK PERIOD (4:30 PM – 6:30 PM)					
Oak: Fillmore to Laguna	E	12.40	6.20	-6.20	-50%
5th St: Brannan to Market	N	6.50	3.50	-3.00	-46%
Harrison: 1st to 4th	W	13.10	7.80	-5.30	-40%
Market/Portola: Drumm to Van Ness	W	9.40	5.60	-3.80	-40%
19th Ave/Park Presidio: US-101 to Lake	S	38.00	22.80	-15.20	-40%

Figure 4-2 and Figure 4-3 show the Level of Service by roadway segment for the AM peak and PM peak, respectively. Full LOS monitoring results can be found in Appendix 5. Interactive versions of these maps can be found on the SFCTA's website at cmp.sfcta.org.

Figure 4-2: 2017 Roadway LOS on CMP Network Segments, Weekday AM Peak

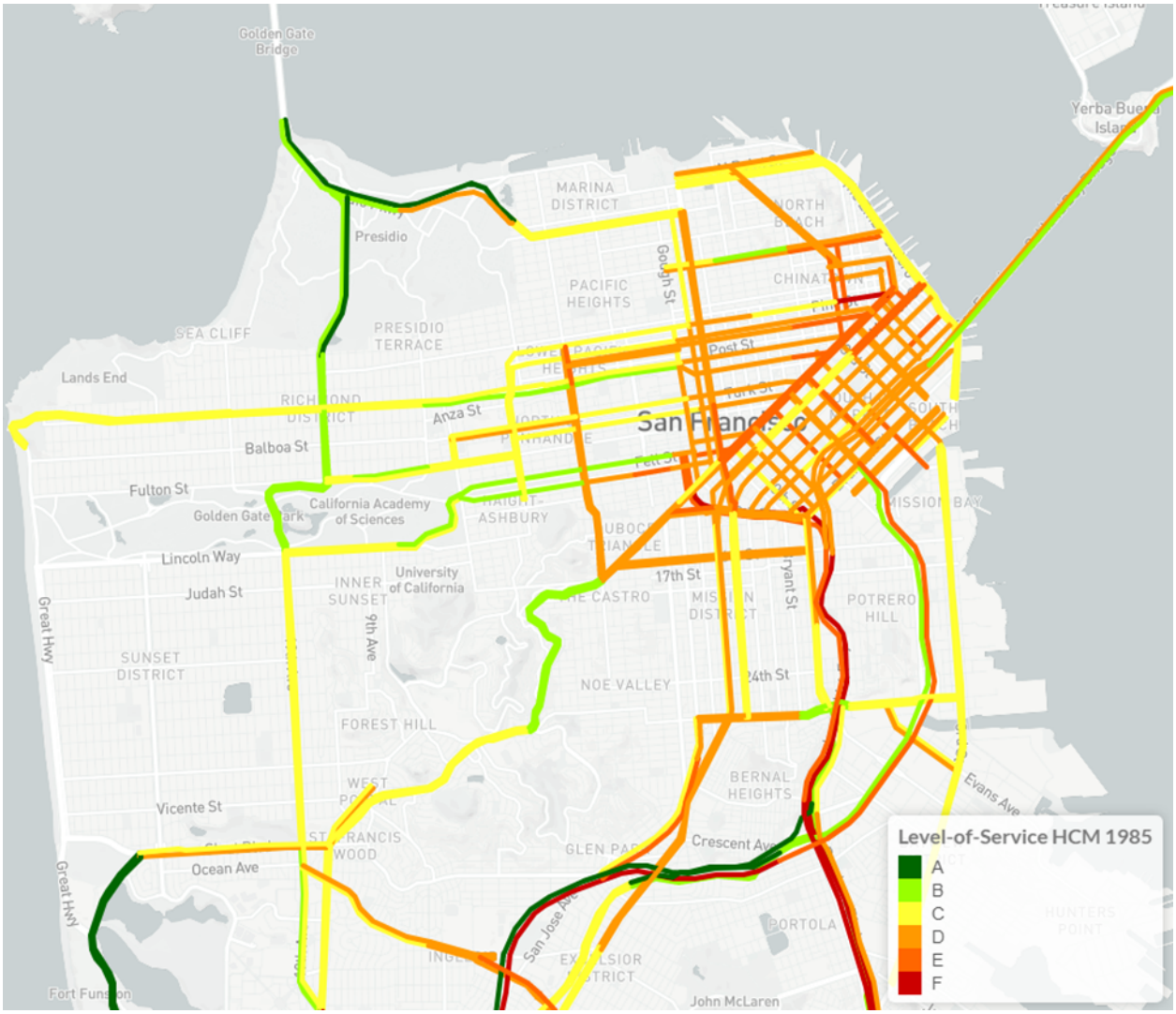
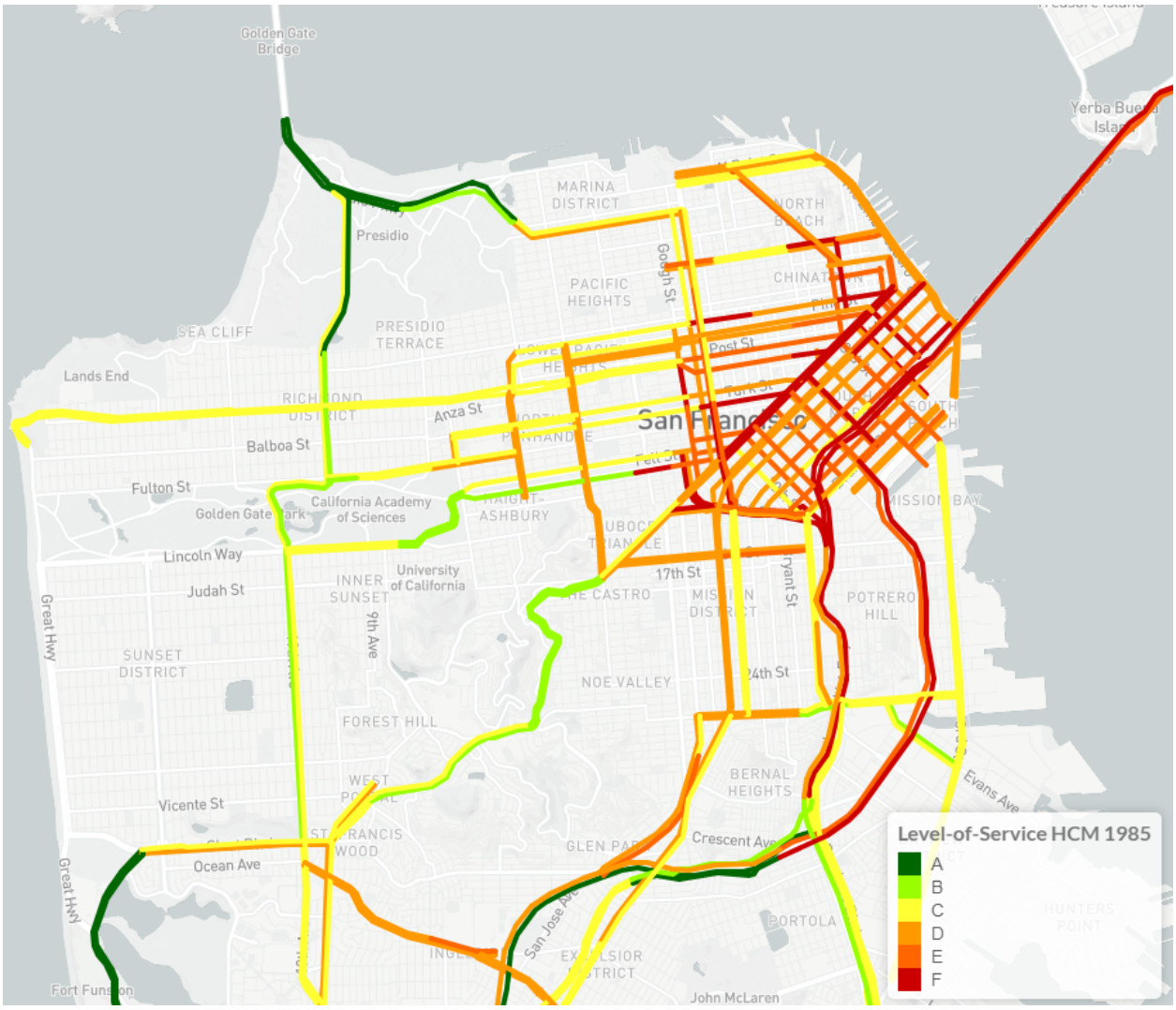


Figure 4-3: 2017 Roadway LOS on CMP Network Segments, Weekday PM Peak



DEFICIENCY PLANNING

Since all segments measured at LOS F in the 2017 monitoring were exempt and did not represent a deficiency, and since San Francisco was not found to be deficient for any of the Legislatively Required transit performance measures, no deficiency planning process is triggered by the 2017 CMP. A section describing the exempt statuses of segments measured at LOS F in 2017 can be found in Appendix 5. For a detailed discussion regarding the CMP deficiency planning process, see Appendix 6.

4.4.2 | Transit Coverage/Routing

This refers to the pattern and hierarchy of the transit route network (e.g., radial/grid, rapid/local, etc.) and the service area covered (e.g., percent of total population served within one-quarter mile; or percent of total urbanized area served). San Francisco County has the most extensive transit coverage of any Bay Area county. Figure 4-4 shows key transit service routes in San Francisco operated by Muni including Rapid, Metro, and Cable Car services. Detailed information about coverage and routing standards adopted by Muni and other transit operators serving San Francisco is in Appendix 7.

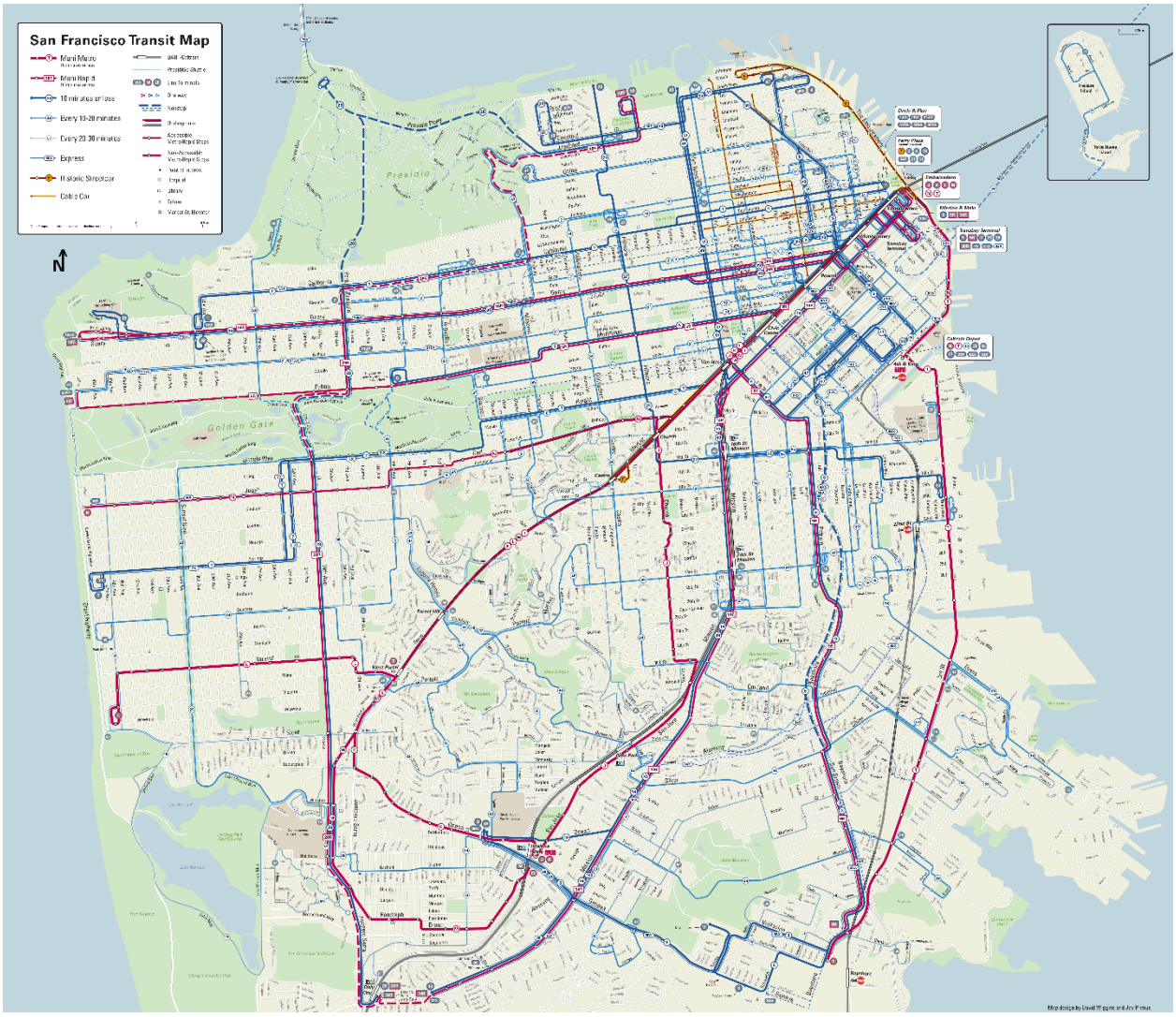
4.4.3 | Transit Frequency

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). Detailed information about transit frequency standards adopted by Muni and other transit operators serving San Francisco is in Appendix 7.

4.4.4 | 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. 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. SB 1474, passed in 1996, 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.

Figure 4-4: Muni San Francisco Transit System Map



4.5. Local Performance Measures

In measuring performance, we are measuring the ability of the system to satisfy the transportation needs of all San Franciscans, and we must therefore measure performance with reference to all types of transportation system users, including transit users, bicyclists and pedestrians. While LOS is well-established as a performance measure for autos, there are few established standards for measuring system performance for transit riders, bicyclists, and pedestrians. Multimodal performance data is increasingly needed for system performance measurement pursuant to updates of the San Francisco Transportation Plan and congestion management planning as well as for project planning, 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.

The CMP includes seven types of local multi-modal performance measures:

- Average Transit Speeds
- Transit Speed Variability
- Transit / Auto Speed Ratio
- Bicycle Volumes
- Multimodal Volumes
- Bicycle Network Connectivity
- Pedestrian and Bicycle Safety

4.5.1 | Average Transit Speeds

Transit speeds are based on the San Francisco Municipal Transportation Agency's (SFMTA) automatic passenger counter (APC) systems, which are used to collect robust, real-time data on bus performance and ridership. For the 2017 CMP the LOS monitoring, consultants (Iteris) processed two months of APC data collected on Muni's bus (diesel and trolley coach) fleet. Muni light rail vehicles are not currently equipped with APCs, and were thus not included in the analysis. The APC dataset is from April and May of 2017, the same period as the roadway LOS monitoring effort. 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 AM and PM peak time periods were as used as in the LOS Monitoring (7:00am-9:00am and 4:30pm-6:30pm). A detailed description of the APC data collection and analysis methodology can be found in Appendix 8.

Transit speeds on the CMP network declined slightly since 2015, although this decline was less than the decline in roadway speeds on the CMP network. Compared to 2015, the average transit speed (collected for buses only) in 2017 on the CMP network in the AM peak declined 2% from 8.26 to 8.13 mph. In the PM peak period also transit speed declined 1% from 7.40 to 7.34 mph. Table 4-4 shows the change in average transit speeds. Figures 4-5 illustrates average bus speeds on CMP segments in the AM and PM peak periods between 2011 and 2017. Appendix 8 contains the full results from all transit segments.

Table 4-4: CMP Network Average Transit Speed Change

CATEGORY	TIME PERIOD	TIME-MEAN TRAVEL SPEED		
		2015	2017	PERCENT CHANGE
Arterial	AM	8.26	8.13	-2%
	PM	7.40	7.34	-1%

Figure 4-5: Overall Average Transit Speeds Trend for CMP Network

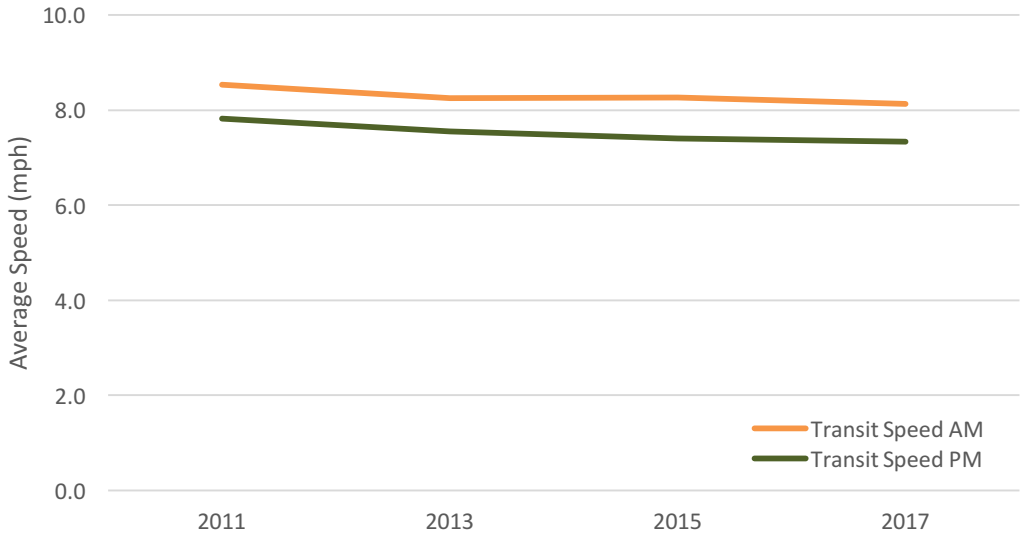


Table 4-5 shows CMP segments with the slowest bus speeds in 2017. Table 4-6 identifies the CMP segments with the greatest relative changes in average bus speeds in the AM peak period. In both the AM and PM Peaks, the slowest bus speeds were reported on Mission in the southbound direction between 9th Street and 14th Street. On this segment in the PM Peak, the average transit speed was slower than a typical walking speed. This same segment also experienced the largest relative decline in average transit speeds between 2015 and 2017, as shown in Table 4-6. Figure 4-6 and Figure 4-7 show 2017 monitored transit speeds by segment for the AM peak and PM peak, respectively.

Table 4-5: Slowest Bus Speed CMP Segments in 2017

AM PEAK PERIOD (7AM -9AM)			PM PEAK PERIOD (4:30 PM – 6:30 PM)		
CMP SEGMENT	DIR.	SPEED (MPH)		DIR.	SPEED (MPH)
Mission/Otis: 9th to 14th	S	3.6	Mission/Otis: 9th to 14th	S	2.1
Market/Portola: Guerrero to Van Ness	E	4.6	5th St: Brannan to Market	N	2.8
Geneva: Paris to Cayuga	W	4.8	Broadway: Montgomery to Powell	W	3.5
Main: Mission to Market	N	4.9	Mission/Otis: 14th to 9th	N	3.8
Castro/Divisadero: Geary to Pine	N	5.1	Market/Portola: Guerrero to Van Ness	E	3.8
Van Ness/S VanNess: Washington to Lombard	N	5.1	Van Ness/S VanNess: Golden Gate to 13th	S	4.2
Van Ness/S VanNess: Golden Gate to 13th	S	5.2	O'Farrell: Gough to Mason	E	4.6
16th St: Market to Mission	E	5.3	5th St: Market to Brannan	S	4.6
Geneva: Cayuga to Ocean	W	5.4	Main: Mission to Market	N	4.8
5th St: Brannan to Market	N	5.5	Ocean: Howth to Miramar	W	4.8

Table 4-6: CMP Segments with Highest Percent Decreases in Bus Speeds

CMP SEGMENT	DIR.	2015 BUS SPEED (MPH)	2017 BUS SPEED (MPH)	CHANGE (MPH)	PERCENT CHANGE
AM PEAK PERIOD (7AM -9AM)					
Mission/Otis: 9th to 14th	S	6.8	3.6	-3.2	-47%
Main: Mission to Market	N	8.0	4.9	-3.1	-39%
Sloat: Junipero Serra to Skyline	W	14.0	10.5	-3.5	-25%
Bayshore: Industrial to Cesar Chavez	N	9.0	7.0	-2.0	-22%
Market/Portola: Guerrero to Van Ness	E	5.9	4.6	-1.3	-22%
PM PEAK PERIOD (4:30 PM – 6:30 PM)					
Mission/Otis: 9th to 14th	S	5.6	2.1	-3.5	-63%
Junipero Serra: County Line to Brotherhood	N	13.2	6.6	-6.6	-50%
O'Farrell: Gough to Mason	E	8.0	4.6	-3.4	-43%
Doyle/Lombard/Richardson: Lyon/Francisco to Van Ness	E	12.5	8.2	-4.3	-34%
Pine: Market to Kearny	W	8.9	6.0	-2.9	-33%

Figure 4-6: 2017 Average Muni Bus Speeds on CMP Network Segments, Weekday AM Peak

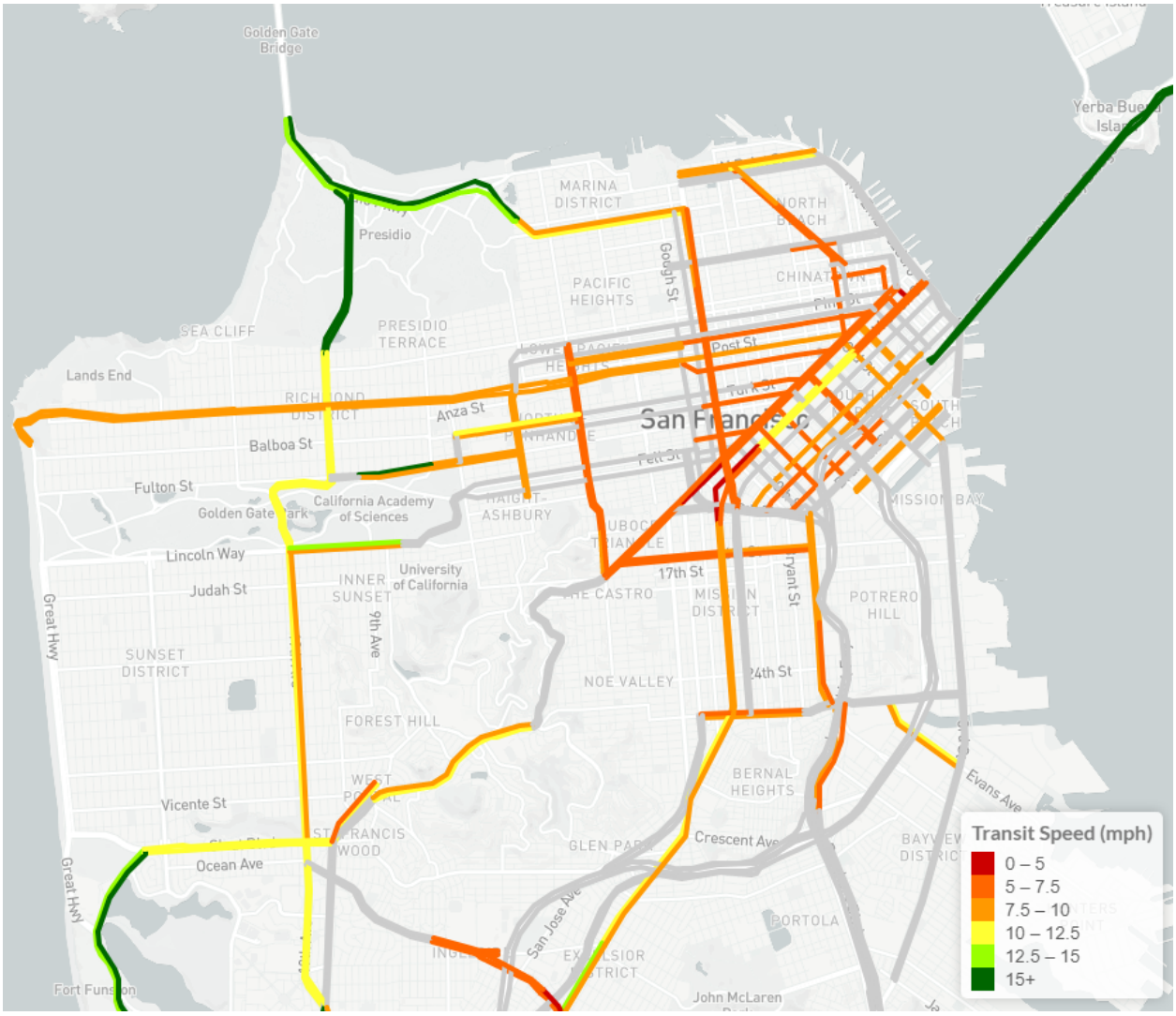
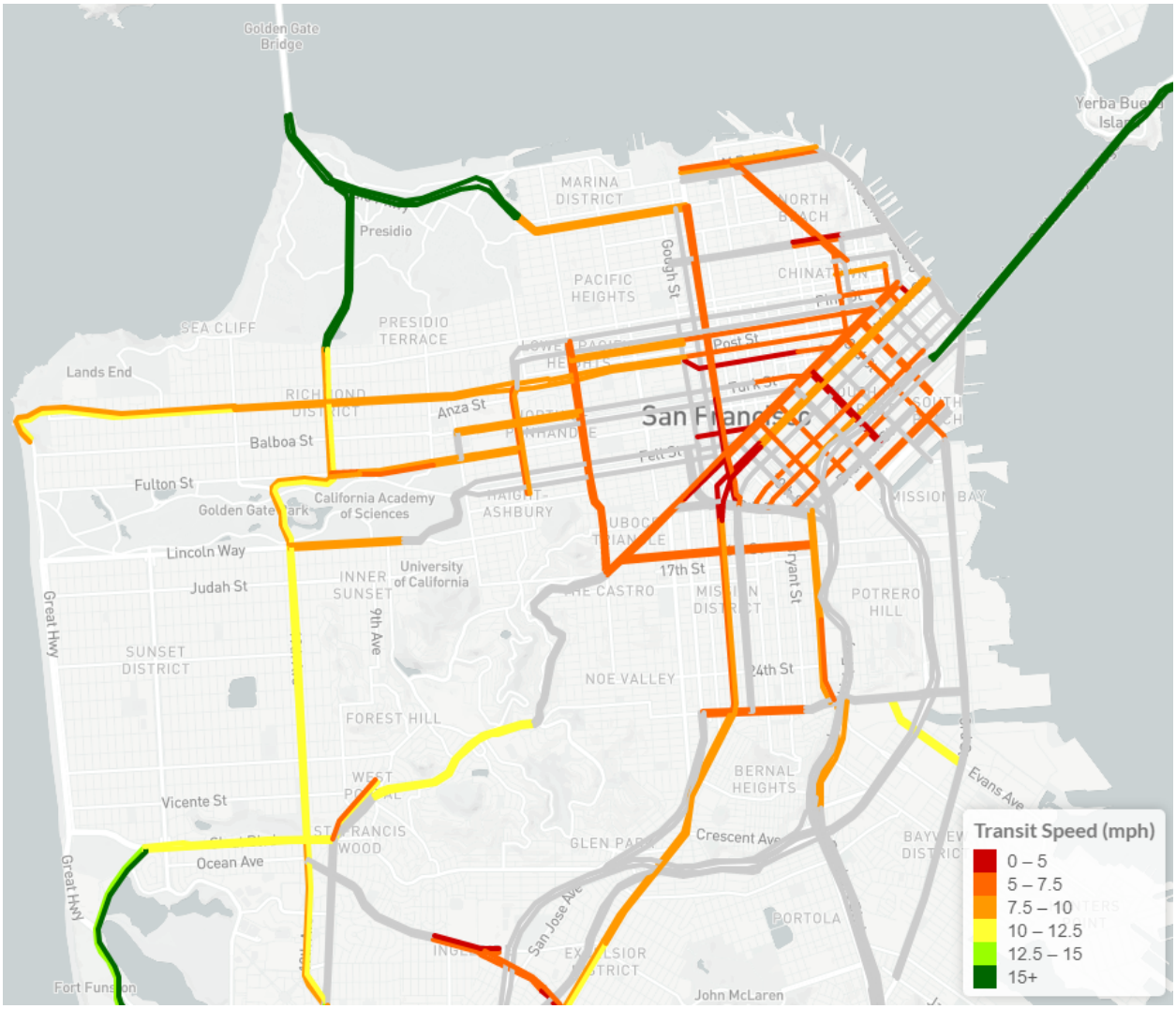


Figure 4-7: 2017 Average Muni Bus Speeds on CMP Network Segments, Weekday PM Peak



4.5.2 | Transit Speed Variability

Transit speed variability measures are also based on the same data derived from San Francisco Municipal Transportation Agency's (SFMTA) automatic passenger counter (APC) systems as was used to calculate average transit speeds. A detailed description of the APC data collection and analysis methodology can be found in Appendix 8. The standard deviation and coefficient of variation of travel time provide indicators of how reliable transit vehicle travel times are for a given segment. The standard deviation provides an absolute measure of variability, and indicates in minutes how far from the mean speeds typically range. The coefficient of variation (CV) is calculated by dividing the standard deviation by the average speed, thereby normalizing the results to compare relative variability between faster and slower segments. The CV is expressed as a percentage of the mean speed. A lower percentage indicates more reliable transit speeds

Transit speed variability is relatively low for the transit system overall, and has remained consistent in recent years, after improving significantly between 2011 and 2013, as shown in Table 4-7 and Figure 4-8. The most unreliable segments have coefficients of variation of 25% to 30%. For a segment with the highest CV of 61% and an average speed of about 10 mph, approximately one third of the time the speeds on the segment either exceed 16 mph or are less than 4 mph. Table 4-8 lists the least reliable transit segments in the AM peak and PM peak, indicating that transit speeds are less reliable in the PM peak. Appendix 8 contains the full results from all transit segments. Figure 4-9 and Figure 4-10 illustrate transit reliability by segment for the AM peak and PM peak, respectively.

Table 4-7: CMP Network Average Transit Speed Variability (Coefficient of Variation)

	Transit Speed Variability			
	2011	**2013**	**2015**	**2017**
AM	29%	16%	16%	16%
PM	31%	16%	18%	18%

Figure 4-8: Overall Transit Speed Variability Trend for CMP Network

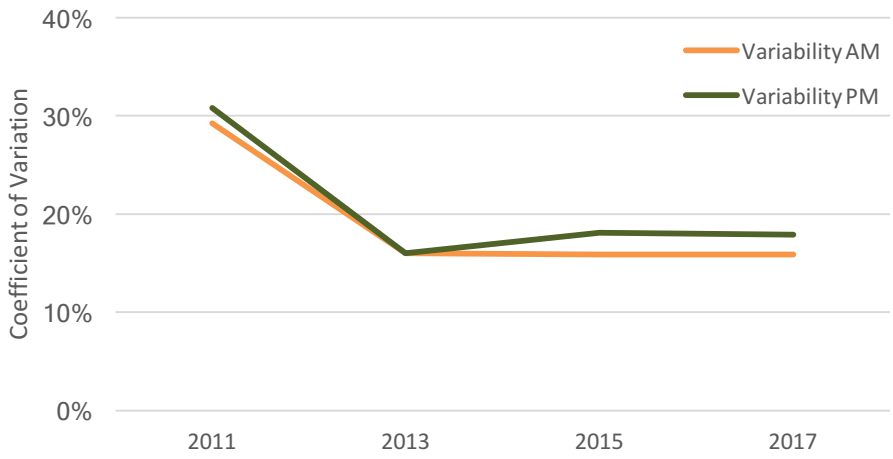


Table 4-8: Least Reliable Transit Segments in 2017

SEGMENT	DIR.	AVG. TRANSIT SPEED (MPH)	TRANSIT SPEED STANDARD DEVIATION (MPH)	COEFFICIENT OF VARIATION
AM Peak Period				
Mission/Otis: Sickles to Ocean	N	9.9	6.0	61%
O'Farrell: Mason to Market	E	6.4	3.5	55%
Mission/Otis: 14th to 9th	N	6.5	3.4	52%
Mission/Otis: Embarcadero to 3rd	S	6.4	2.4	38%
Turk: Market to Hyde	W	6.4	2.2	34%
O'Farrell: Gough to Mason	E	6.8	2.1	31%
Junipero Serra: 19th to Brotherhood	S	23.8	6.7	28%
Mission/Otis: 3rd to Embarcadero	N	6.1	1.7	28%
Market/Portola: Guerrero to Castro	W	5.6	1.5	28%
Geary: Kearny to Gough	W	8.9	2.2	25%
PM Peak Period				
O'Farrell: Mason to Market	E	5.3	3.1	58%
North Point: Columbus to Embarcadero	E	7.5	3.3	44%
Geary: Great Hwy to 25th Ave	E	12.3	5.0	41%
Broadway: Montgomery to Powell	W	3.5	1.4	41%
Junipero Serra: 19th to Brotherhood	S	14.7	6.0	40%
O'Farrell: Gough to Mason	E	4.6	1.8	38%
Columbus: Greenwich to Montgomery	S	5.7	2.1	37%
Mission/Otis: 14th to 9th	N	3.8	1.3	34%
Fulton: 10th Ave to Arguello	E	7.5	2.4	31%
Evans: 3rd to Cesar Chavez	N	12.4	3.9	31%

Figure 4-9: 2017 Average Muni Bus Speed Variability on CMP Network Segments, Weekday AM Peak

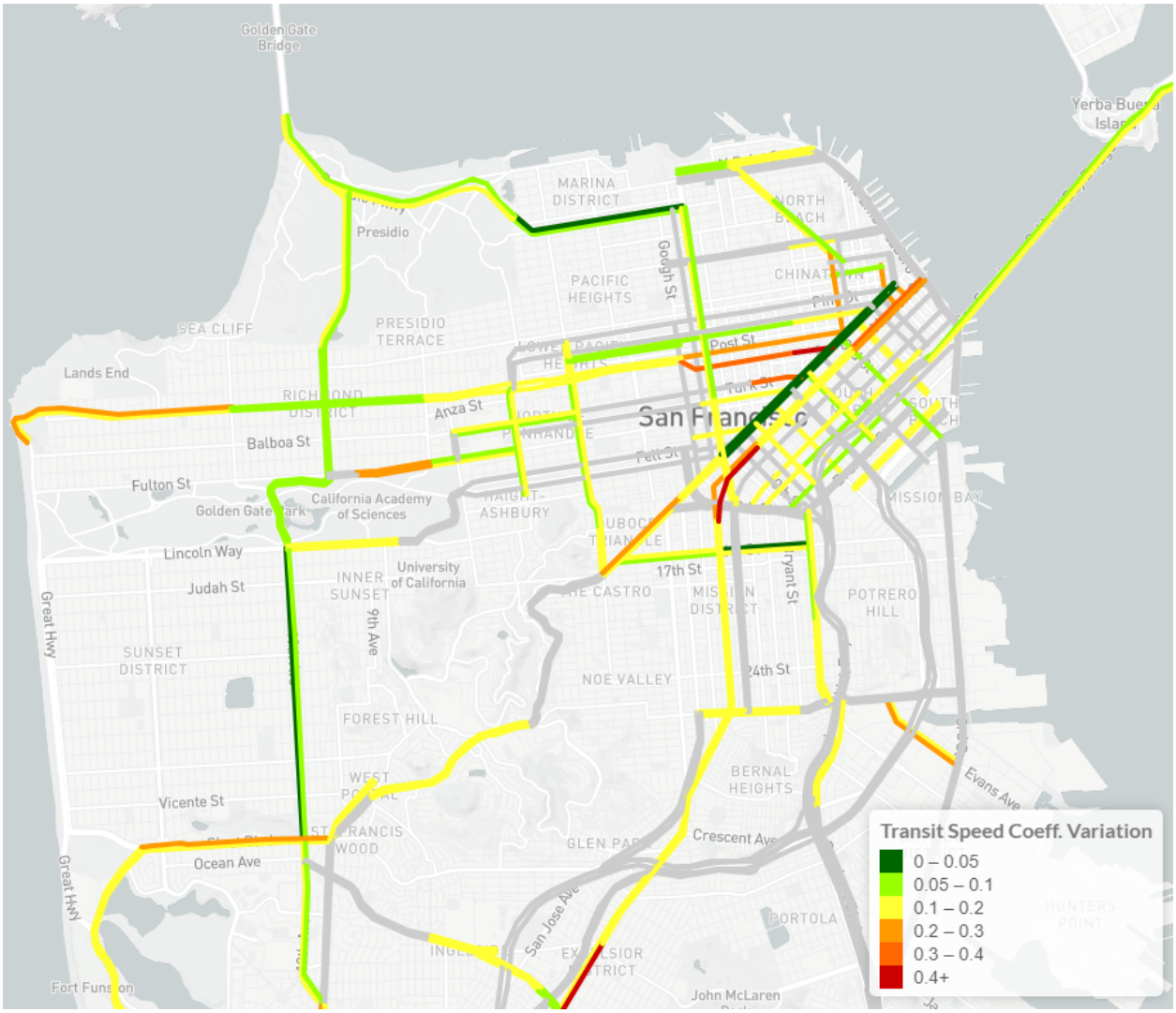
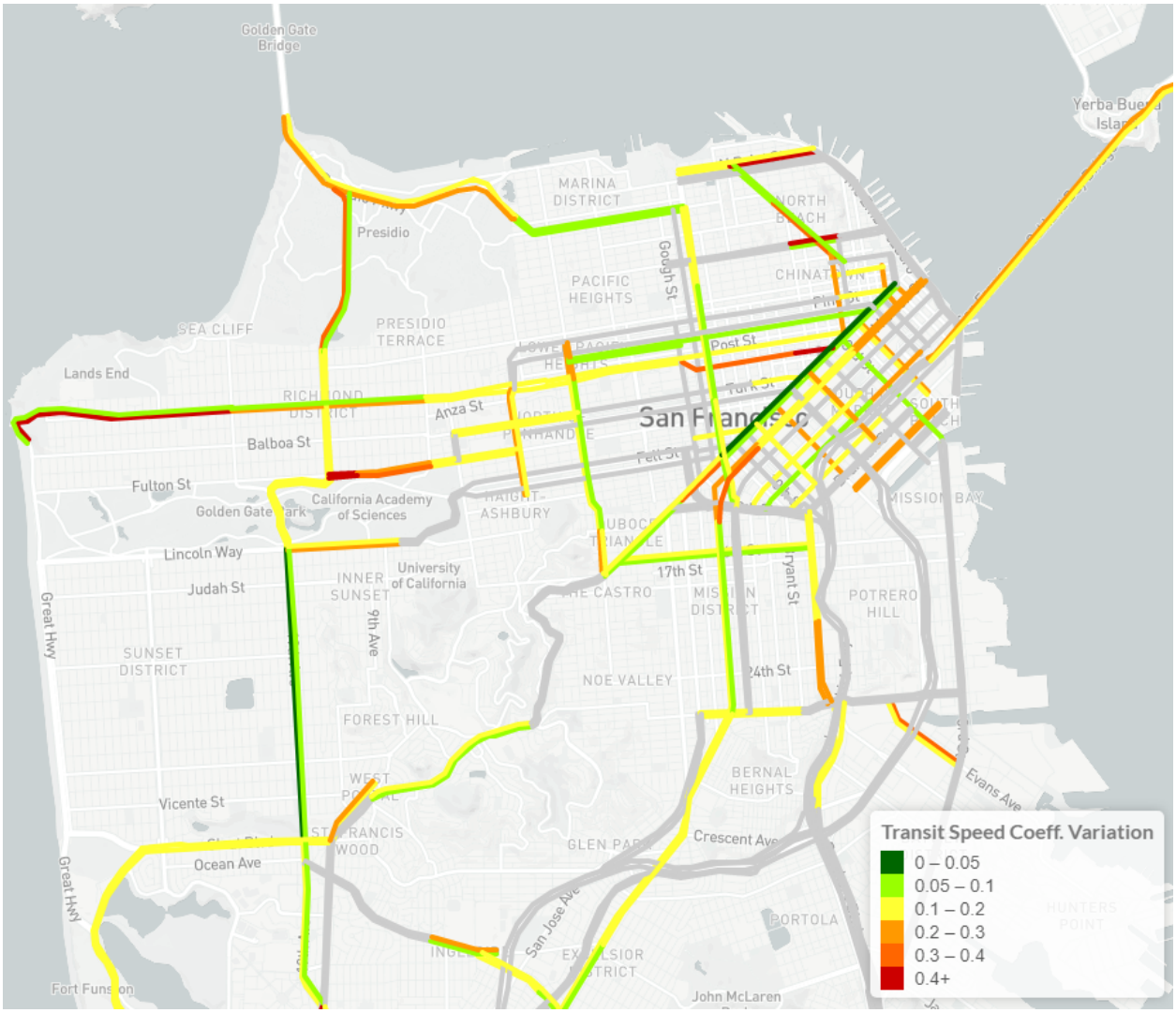


Figure 4-10: 2017 Average Muni Bus Speed Variability on CMP Network Segments, Weekday PM Peak



4.5.3 | Auto / Transit Speed Ratio

In order to assess the competitiveness of transit with driving, the ratio of auto to transit speeds is calculated by comparing auto to transit speeds on the portions of the CMP network for which Muni data was available. Roadway speeds are derived from the Inrix data used for LOS monitoring and transit speeds are derived from the APC data and. The APC dataset is from April and May of 2017, the same period as the roadway LOS monitoring effort. For each segment, the ratio of auto-to-transit speed was calculated. A ratio of 2 would indicate that, for a particular segment, on-board transit travel time is twice that of auto travel time. As shown in Table 4-9, transit speeds continued the trend of improving, relative to auto speeds, in 2017. Between 2015 and 2017 the average auto-to-transit speed ratio improved from 1.77 to 1.67 in the AM peak and 1.72 to 1.66 in the PM peak. Table 4-10 shows the ten segments with the highest auto-to-transit speed ratios for the AM peak and PM peak, indicating where driving is significantly faster than taking transit. Auto-to-transit speed ratios are generally worse in the PM peak than in the AM peak. Appendix 8 contains the full auto-to-transit speed results from all transit segments. Figure 4-12 and Figure 4-13 show auto-to-transit speeds by segment for the AM peak and PM peak, respectively.

Table 4-9: CMP Network Auto/Transit Speed Ratio Change

TIME PERIOD	Auto-to-Transit Speed Ratio			
	2011	2013	2015	2017
AM	2.06	2.07	1.77	1.67
PM	2.13	2.12	1.72	1.66

Figure 4-11: Overall Auto-Transit Speed Ratio Trend for CMP Network

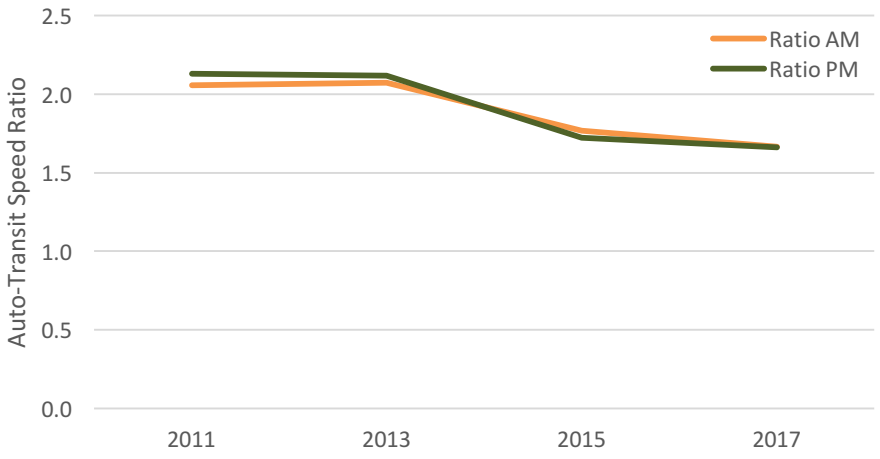


Table 4-10: Largest CMP Segment-level Auto-to-Transit Speed Ratios, AM Peak

CMP SEGMENT	DIR.	AVG. AUTO SPEED (MPH)	AVG.TRANSIT SPEED (MPH)	AUTO/TRANSIT SPEED RATIO
AM Peak Period				
Mission/Otis: 9th to 14th	S	10.5	3.6	2.9
Geary: Arguello to Gough	E	19.6	7.8	2.5
West Portal: Ulloa to Sloat	S	15.8	6.3	2.5
Bayshore: Jerrold to Industrial	S	19.3	7.7	2.5
Sloat: Junipero Serra to Skyline	W	24.9	10.5	2.4
Geneva: Santos to Paris	W	18.4	8.3	2.2
Market/Portola: Guerrero to Castro	W	12.4	5.6	2.2
Bayshore: Industrial to Cesar Chavez	N	15.1	7.0	2.2
Market/Portola: Guerrero to Van Ness	E	9.9	4.6	2.2
19th Ave/Park Presidio: Sloat to Junipero Serra	S	24.9	11.8	2.1
PM Peak Period				
Mission/Otis: 9th to 14th	S	10.5	2.1	5.0
Market/Portola: Guerrero to Castro	W	15.4	5.5	2.8
Junipero Serra: 19th to Brotherhood	S	37.3	14.7	2.5
Mission/Otis: 14th to 9th	N	9.2	3.8	2.4
Market/Portola: Guerrero to Van Ness	E	9.1	3.8	2.4
Main: Mission to Market	N	11.0	4.8	2.3
West Portal: Ulloa to Sloat	S	13.0	5.7	2.3
Van Ness/S VanNess: Washington to Lombard	N	15.5	6.8	2.3
Sloat: Junipero Serra to Skyline	W	24.6	10.8	2.3
Geary: Arguello to Gough	E	17.6	7.9	2.2

Figure 4-12: 2017 Auto-to-Transit Speed Ratios on CMP Network Segments, Weekday AM Peak

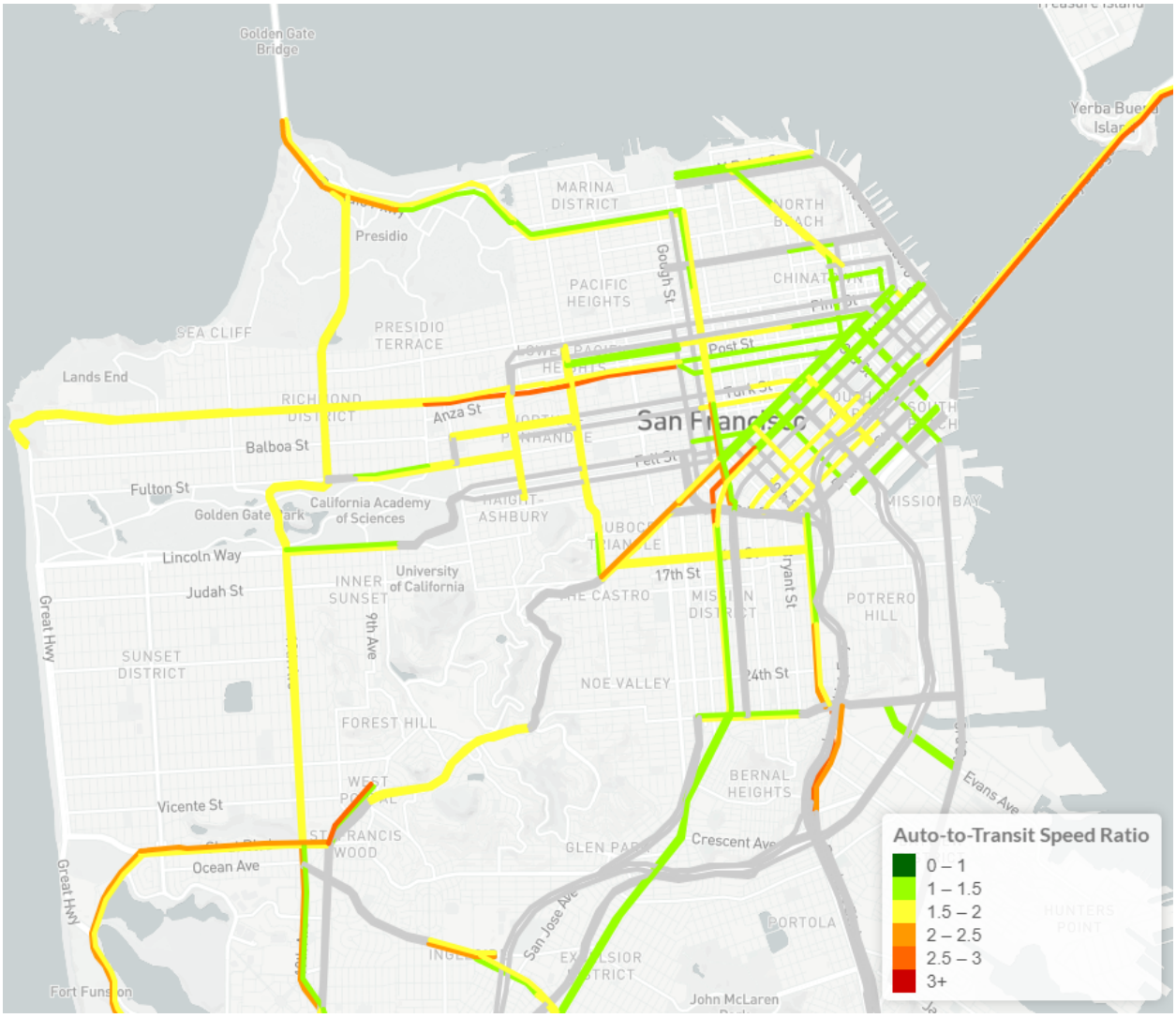
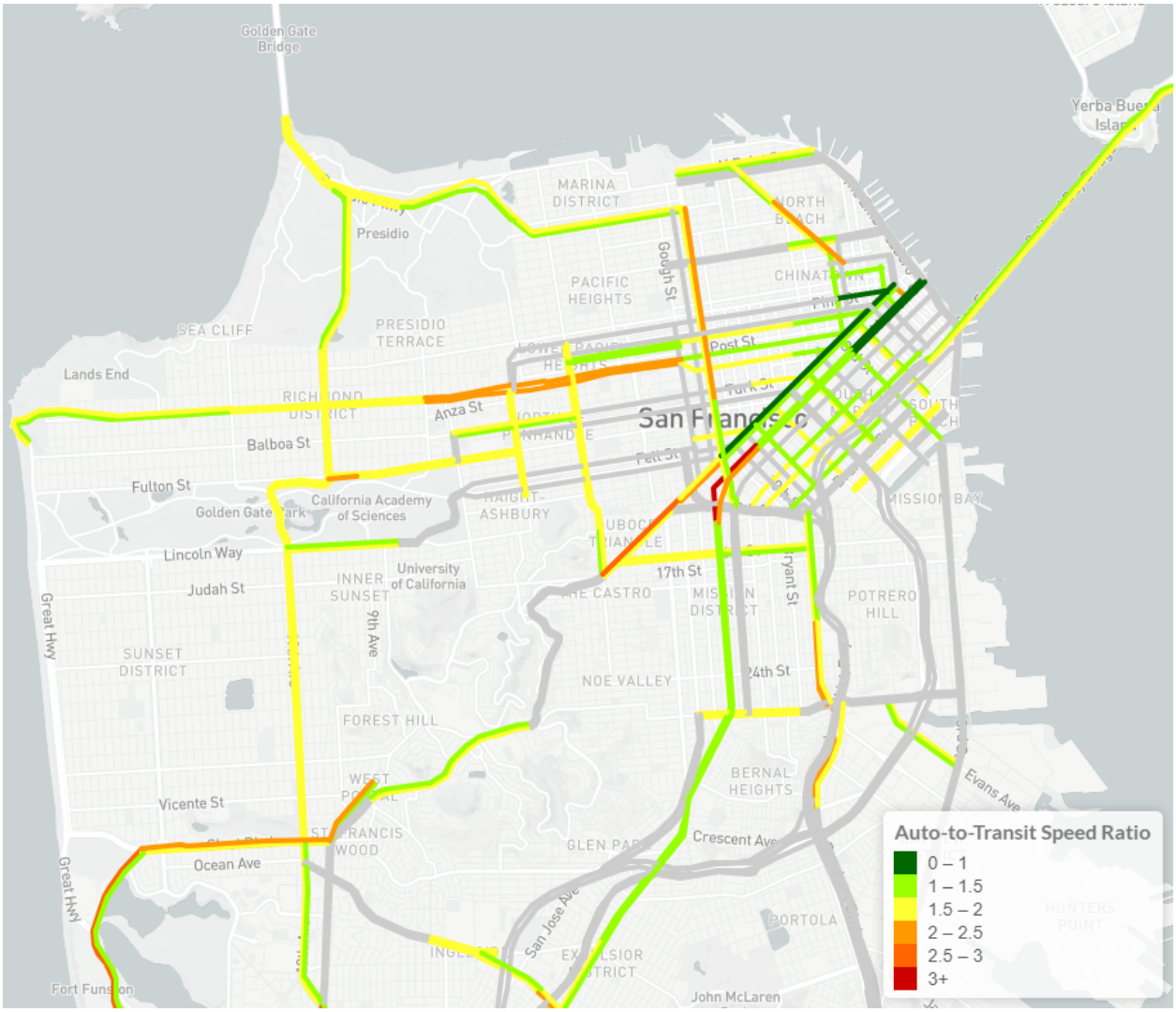


Figure 4-13: 2017 Auto-to-Transit Speed Ratios on CMP Network Segments, Weekday PM Peak



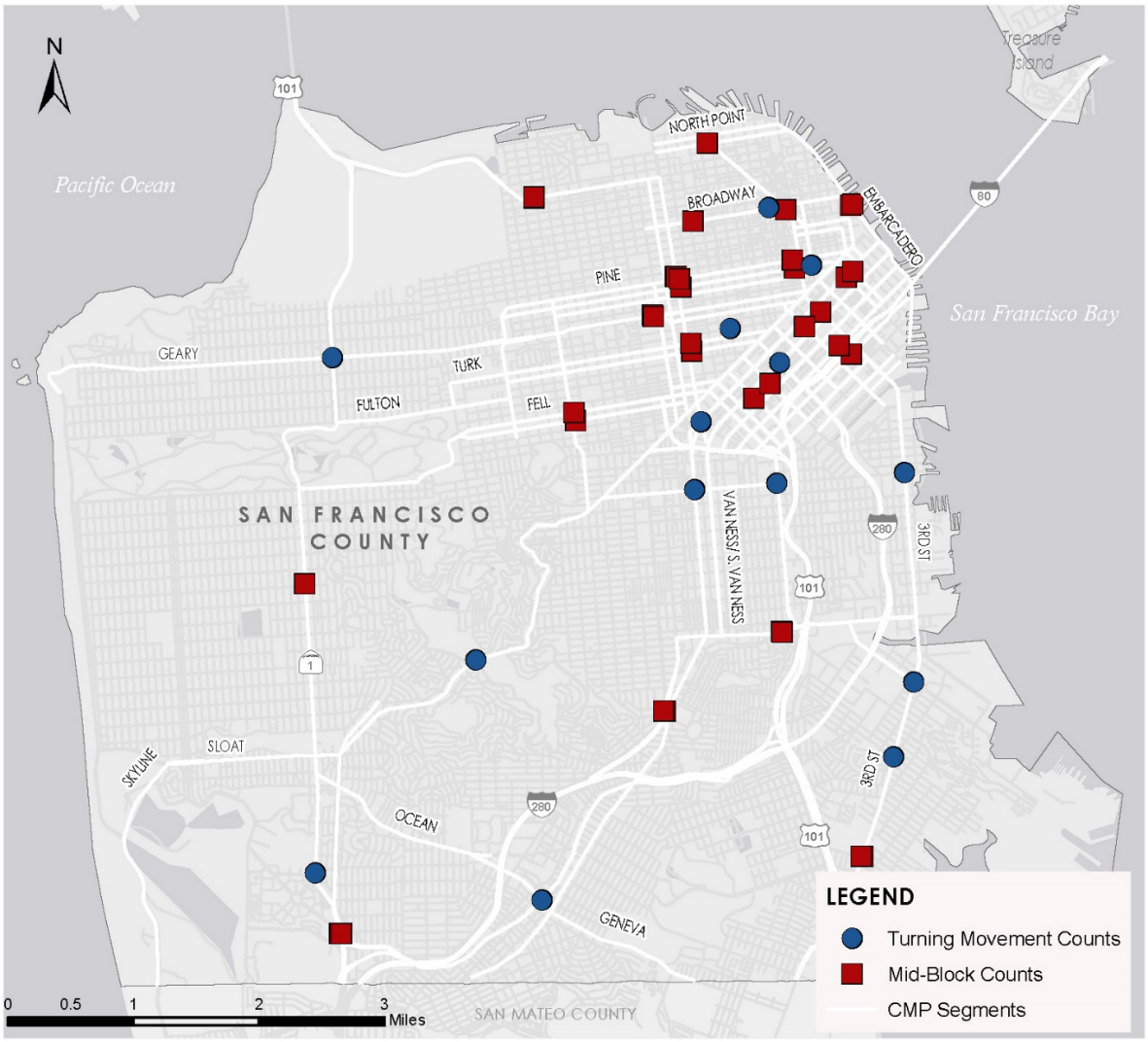
4.5.4 | Multimodal Volumes

Congestion on city streets is the outcome of several factors including the number of cars driving; the roadway capacity available; construction, lane blockages, and other special events; allocation of signal green-time to various competing modes and movements. Similarly, crowding on transit is also a result of several factors including the number of riders; vehicle size, frequency of service, origin-destination demand patterns. These factors can be roughly classified into supply-side and demand-side. In order to understand the latter, and create a set of data that can be analyzed longitudinally by various modes, beginning with the 2015 CMP and continuing with the 2017 CMP, the Transportation Authority supported a multimodal volume monitoring program which collected mainline auto volumes at 28 locations and intersection auto, bike, and pedestrian counts at 14 locations.

The City and County of San Francisco has placed a high priority on shifting travelers' modes to increase the number of trips made by walking and bicycling. Unlike automobile and transit volumes, increasing volumes of pedestrian and bicycle traffic are a direct indicator of system performance because increased use of these modes alleviates, rather than causes, traffic congestion and transit crowding. Walking and bicycling are space-efficient, healthy, and environmentally beneficial ways to travel, and have minimal negative impact on surrounding communities. Little data has historically been available to measure the numbers of trips made by walking and bicycling, but City and County agencies are now working together to collect volume data for both modes on a more regular basis. Bicycle and pedestrian volumes are reasonable proxies for the "performance" of these non-motorized modes of travel. Auto volumes are also collected for relative comparison and to indicate trends.

Figure 4-14 shows locations where counts were collected. The mainline counts are continuous 3-day midweek counts (including two locations where weekend counts were also collected) for vehicles only. The intersection counts were conducted on one day, with 2-hour AM peak and 2-hour PM peak counts, totaling 4-hours of counts at each location for not both pedestrians and bicyclists in addition to vehicles. By collecting volume at a fixed set of locations on a biennial basis, we may gain insights into trends over time.

Figure 4-14: Locations of Turning Movement and Mid-Block Counts



Data Sources: Iteris, Inc. & 2015 SFCTA LOS Monitoring

This map is for planning purposes only.

VEHICLE COUNTS

Vehicle counts are collected at both intersections and mid-block locations. It is expected that this database will grow over time and provide information about long term performance trends just like LOS monitoring. Figure 4-15 shows the results of total vehicle volumes traversing through all intersection count locations and Figure 4-16 shows results from mid-block/mainline counts collection. The mainline counts were processed to obtain the average daily traffic (ADT) for a typical weekday. Appendix 9 contains detailed count information.

In total, vehicle volumes changed little between 2015 and 2017. Intersection counts in both the AM peak and the PM peak declined by 1%. Similarly, mainline counts in the AM peak declined by just over 3.5% and about 3% in the PM peak. The slightly larger relative drop in mainline volumes is partially attributable to the reduction in capacity along Van Ness, associated with the implementation of the Van Ness bus rapid transit (BRT) project.

Figure 4-15: SFCTA Intersection Vehicle Counts 2015-2017

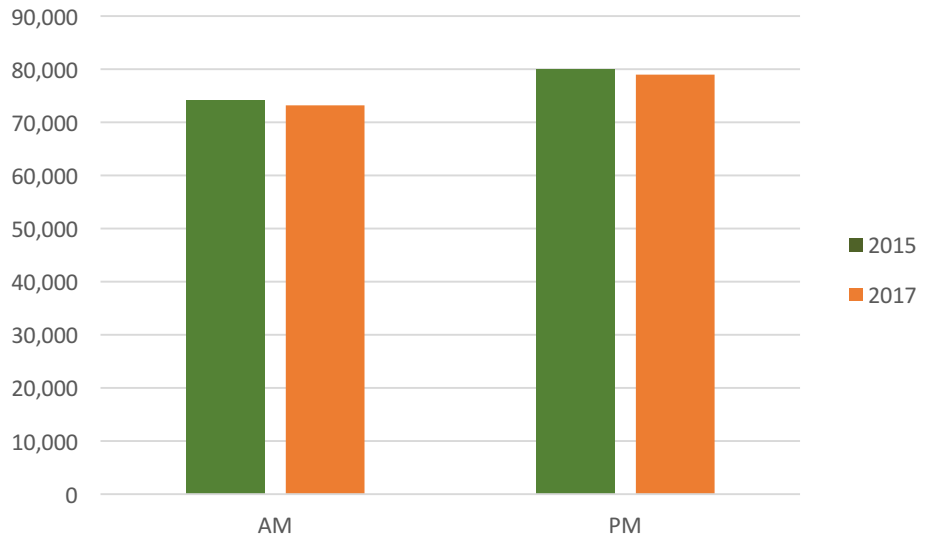
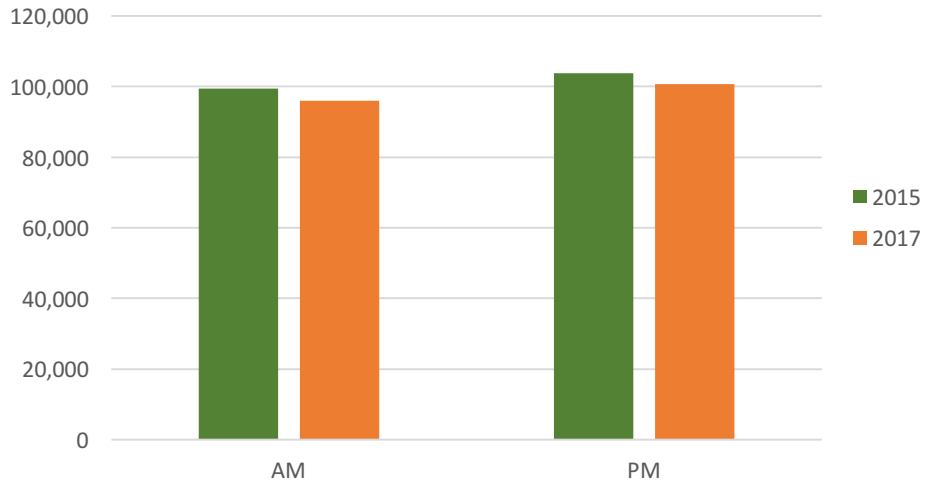


Figure 4-16: Weekday Mainline/Average Daily Traffic (ADT) Counts 2015-2017



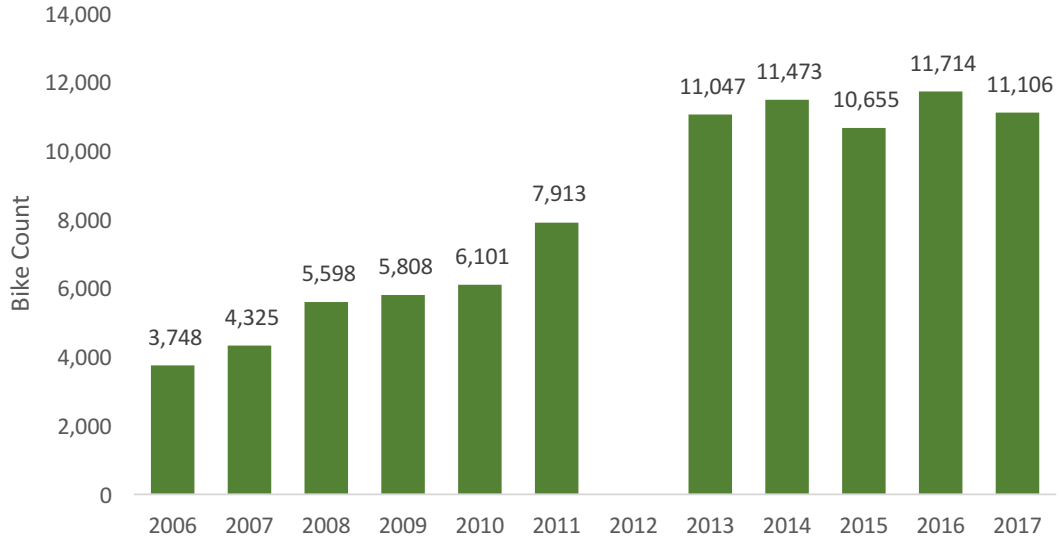
* Volumes represented are at the same locations for all years.

BICYCLE COUNTS

SFMTA has conducted citywide bicycle counts at key intersections and corridors since 2006. The number of bicycle count locations had been growing over the years – 21 in 2006, 40 in 2011 to 80 locations in 2015. However, for past two years the number of count locations has been reduced (19 in 2016 and 27 in 2017). Counts are conducted for a 2-hour period during the PM peak (4:30 pm – 6:30 pm). They are usually conducted in Fall (between August and September) each year. Figure 4-17 shows bicycle counts from 2006 through 2017. It must be noted that the set of count locations monitored may vary a little each

year and the figure shows counts from a subset of the same 19 counters for all years. The most recent data suggests that bicycle ridership has remained steady over the past five years.

Figure 4-17: SFMTA Manual PM Period Bicycle Counts 2006-2017

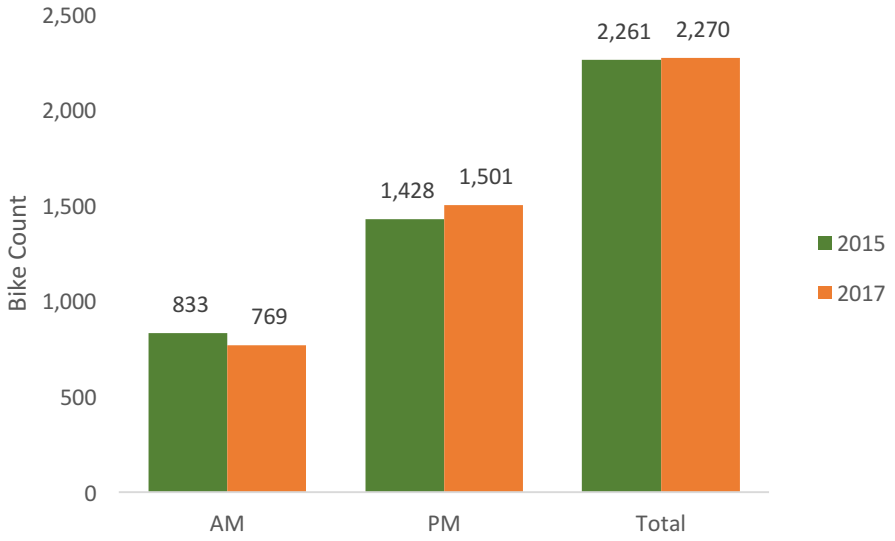


* Volumes represented are at the same 19 locations for all years shown. No data collected in 2012.

Source: SFMTA

In addition to the SFMTA, SFCTA has continued to collect manual bike counts as part of the multimodal counts effort at intersection locations (see Figure 4-14). Bicycle counts were recorded for 2 hours each in the AM (7AM – 9AM) and PM (4:30PM – 6:30PM) peak periods at 14 intersections around the city between April 25 and April 26 2017. Figure 4-18 shows total counts for all locations for both 2015 and 2017. Like the SFMTA bicycle counts, these counts, too, suggest that bicycle ridership is stable in San Francisco.

Figure 4-18: SFCTA Manual Bicycle Counts 2015-2017

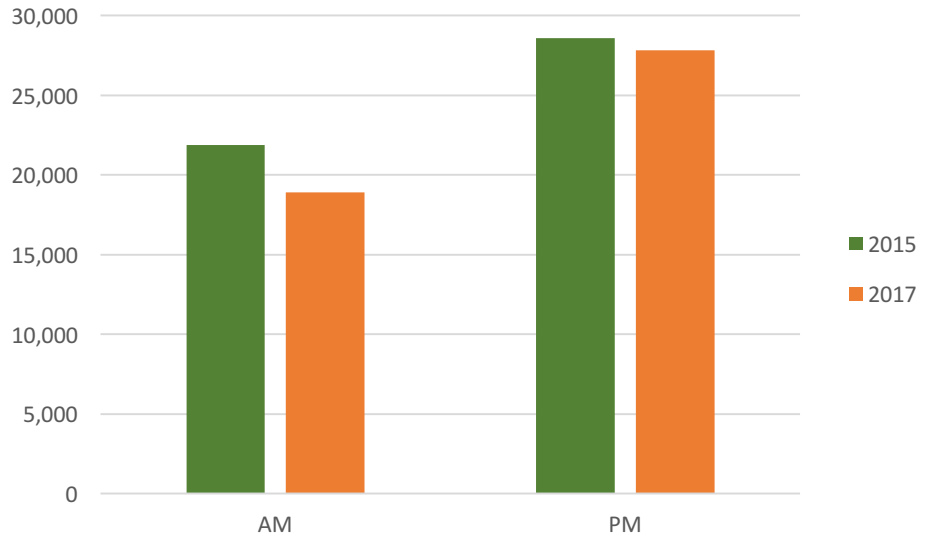


* Volumes represented are at the same 14 locations for all years.

PEDESTRIAN COUNTS

Finally, pedestrian counts are also collected at intersections in addition to vehicle and bicycle counts. Figure 4-19 shows the aggregate counts for both 2015 and 2017. Unexpectedly, these counts show significantly lower pedestrian volumes. In the AM peak, pedestrian volumes at the monitored intersections were 14% lower in 2017 than in 2015, and in the PM peak pedestrian volumes were 3% lower in 2017.

Figure 4-19: SFCTA Intersection Pedestrian Counts 2015-2017



* Volumes represented are at the same 14 intersections for all years.

4.5.5 | Bicycle Network Connectivity

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

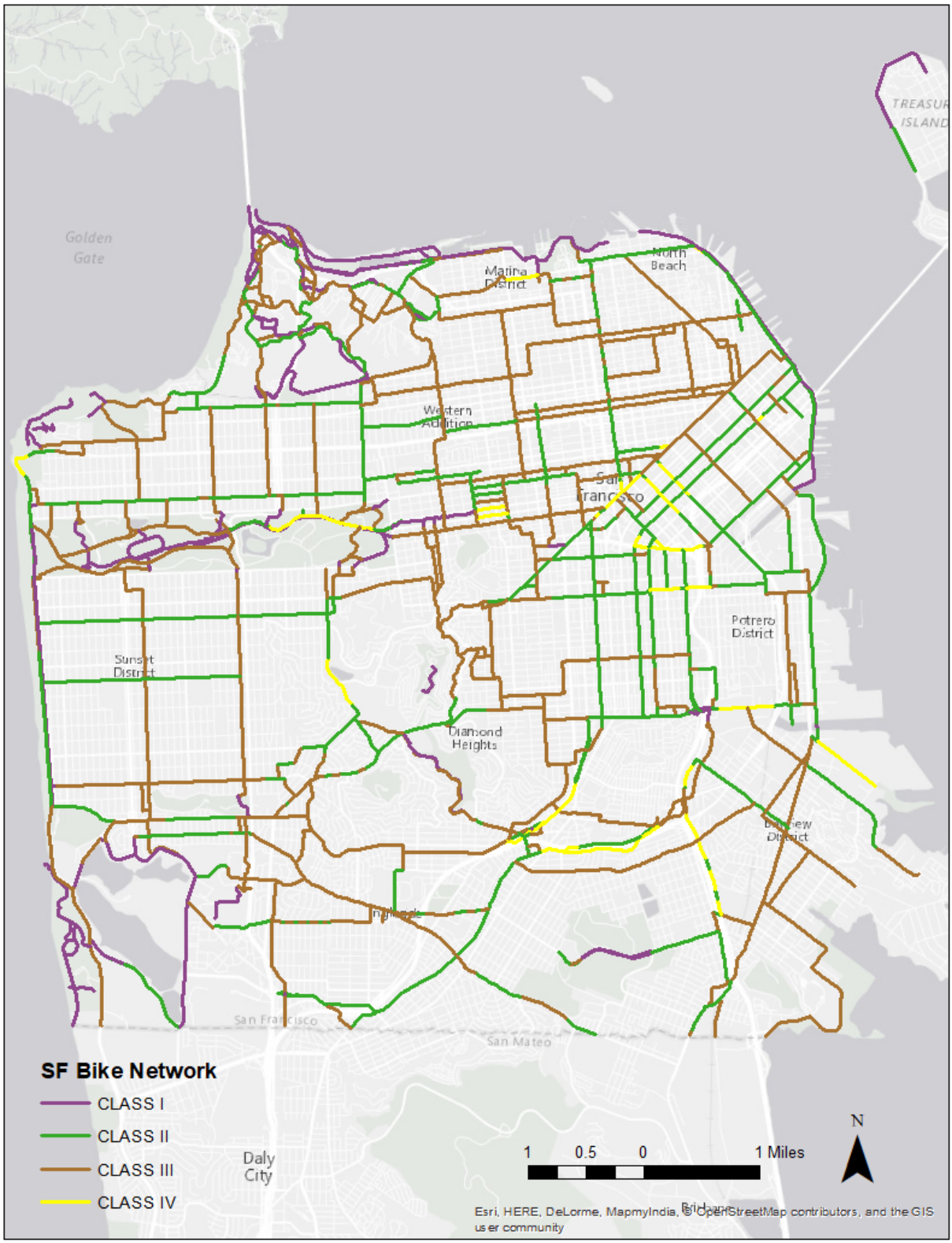
Table 4-11 summarizes length of bicycle facilities by type. As of November 2017, the completed network included 429 miles of bike routes, of which 16% were Class I paths and 32% were Class II designated bicycle lanes. The rest are Class III signed routes in shared lanes, many of which have wide shoulders or are marked with sharrows. There are also 16 miles of Class IV bike facilities that are separated by a vertical element from the rest of traffic.

Table 4-11: Miles of San Francisco Bicycle Facilities by Type, 2013 to 2017

	2013	2015	2017
Bicycle Path (Class I)	60	60	62
Bicycle Lane (Class II)*	125	133	137
Bicycle Route (Class III)	213	214	214
Separated Bikeways (Class IV)**	15	16	16
Total	413	422	429

* includes bike lanes and buffered bike lanes (paint only). ** includes bike lanes with vertical barrier element. Source: SFMTA

Figure 4-20: San Francisco Bicycle Network



4.5.6 | Pedestrian and Bicycle Safety

Safety for pedestrians and cyclists are key measures of non-motorized transportation performance, and a critical policy priority for the city of San Francisco. The City and County of San Francisco adopted Vision Zero as a policy in 2014, committing to build better and safer streets, educate the public on traffic safety, enforce traffic laws, and adopt policy changes that save lives. The goal is to create a culture that prioritizes traffic safety and to ensure that mistakes don't result in serious injuries or death.

The California Statewide Integrated Traffic Records System (SWITRS) maintained by the California Highway Patrol compiles all local collision reports into a unified database. Fatalities from traffic collisions are tracked, and collisions resulting in injury are classified by severity of injury. Table 4-12 displays injury and fatality statistics by involved party for the most recent decade for which traffic collision data has been analyzed (2006-2016).

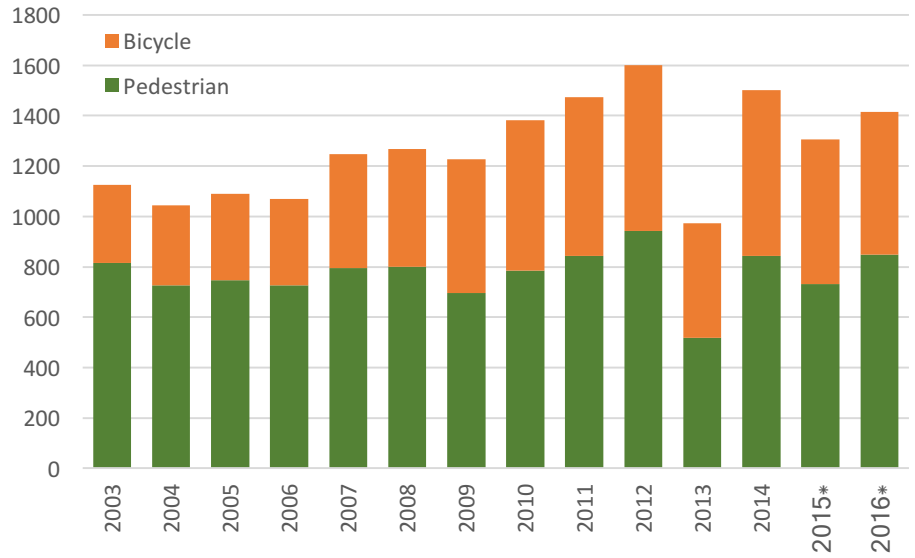
Although bicyclist injury collisions increased by 65% over the past decade, the totals from the most recent years are lower than the peak years of 2012 and 2014. This increase is likely due to the overall rise in bicycling activity observed in recent years. Figure 4-21 and Figure 4-22 show that the proportion of bicyclist injuries and fatalities has been going up too. Pedestrian fatalities were lower than the high observed in 2015, although pedestrian injuries increased since 2015. Figure 4-23 and Figure 4-24 respectively show the locations pedestrian injuries and fatalities and bicyclist injuries and fatalities for 2014, the latest year for which finalized SWITRS data are available.

Table 4-12: Traffic Collision Injuries and Fatalities by Involved Party, 2006-2016

	YEAR	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*
Injury Collisions	Pedestrians	726	796	799	695	784	844	942	518	843	731	849
	Bicyclists	343	451	468	531	599	630	658	454	657	574	566
Fatal Collisions	Pedestrians	15	24	13	17	14	17	16	21	18	25	18
	Bicyclists	2	1	3	1	1	4	2	4	2	4	3

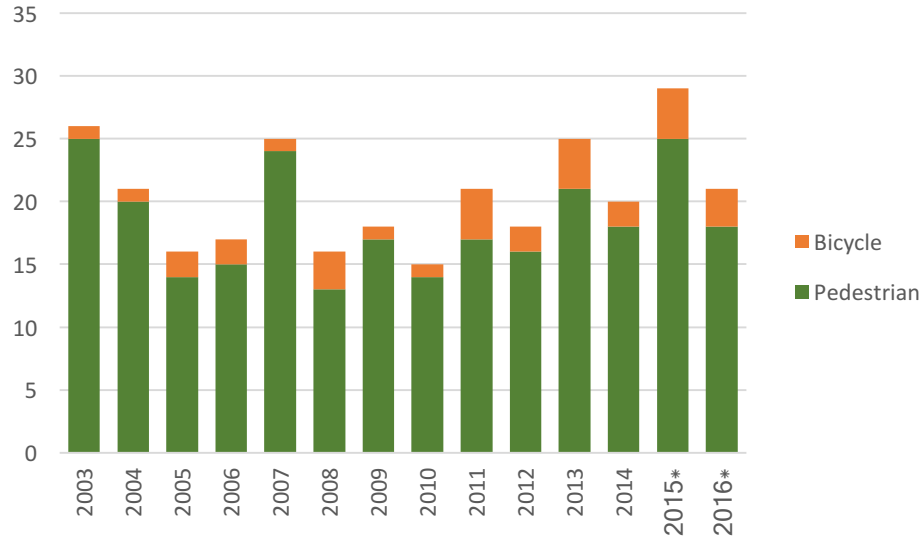
Source: California Highway Patrol SWITRS; * provisional data

Figure 4-21: Injury Collisions Involving Pedestrians and Bicyclists in San Francisco



* provisional data.

Figure 4-22: Fatal Collisions Involving Pedestrians and Bicyclists in San Francisco



* provisional data.

Figure 4-23: 2014 Pedestrian Collisions by Severity

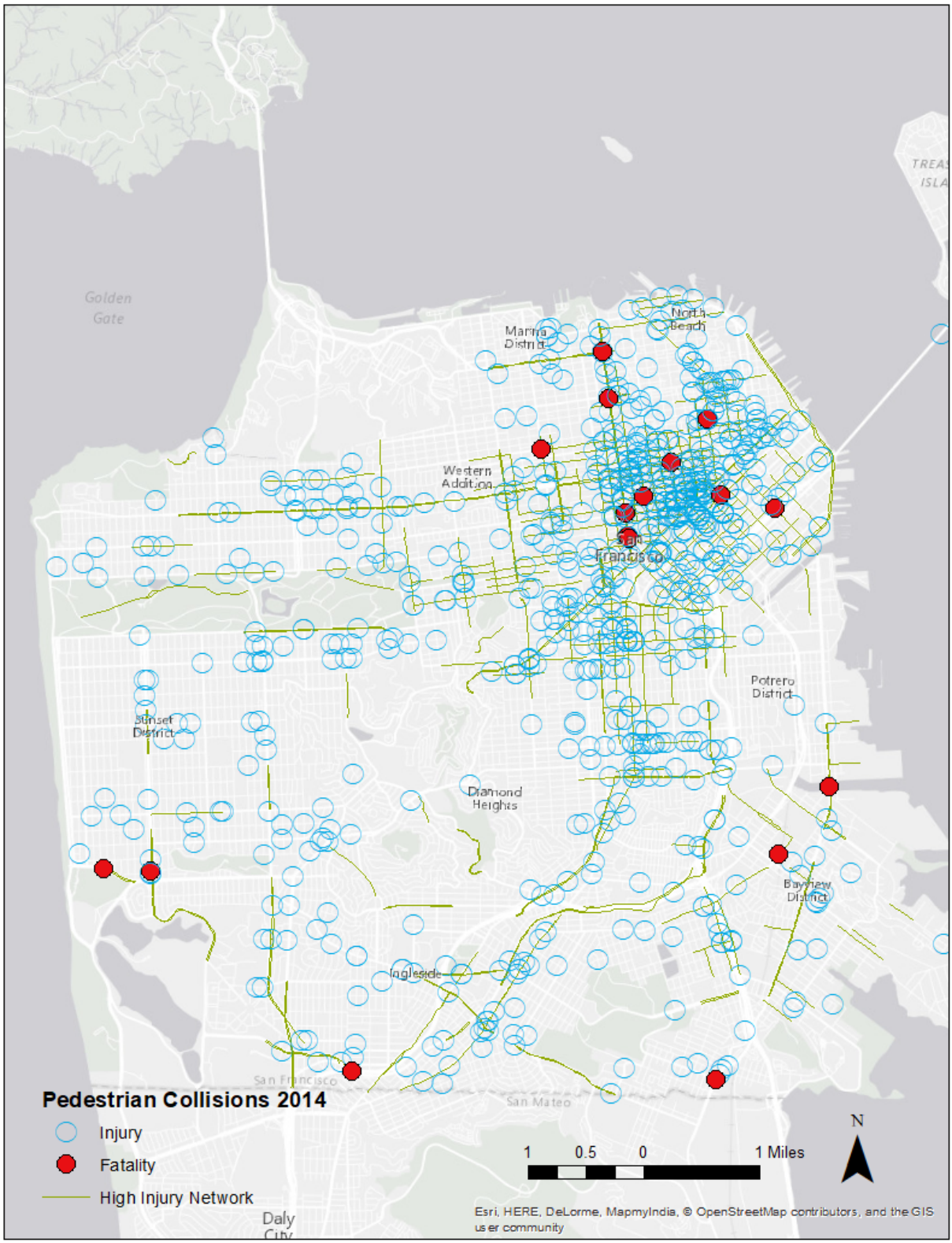
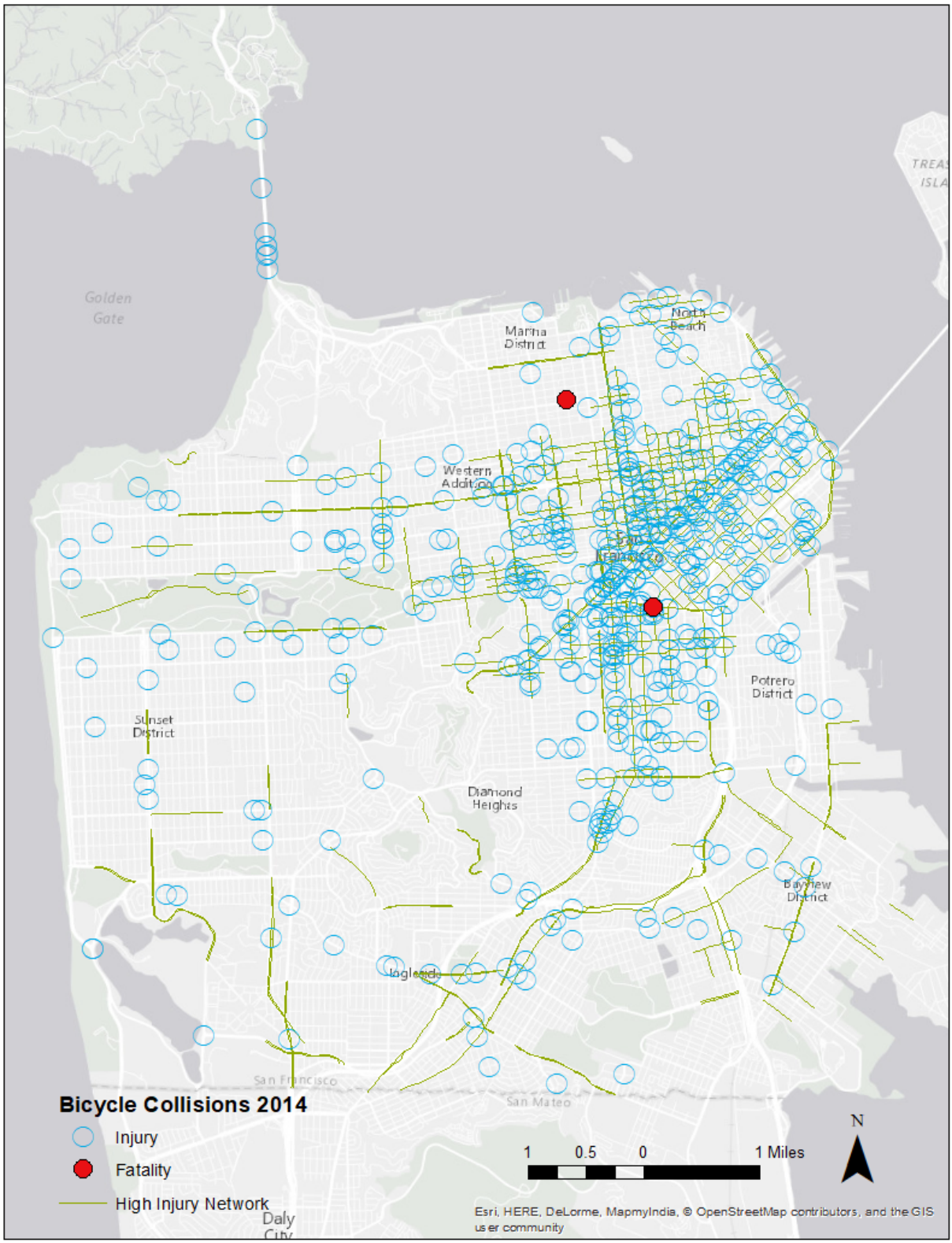


Figure 4-24: 2014 Bicycle Collisions by Severity



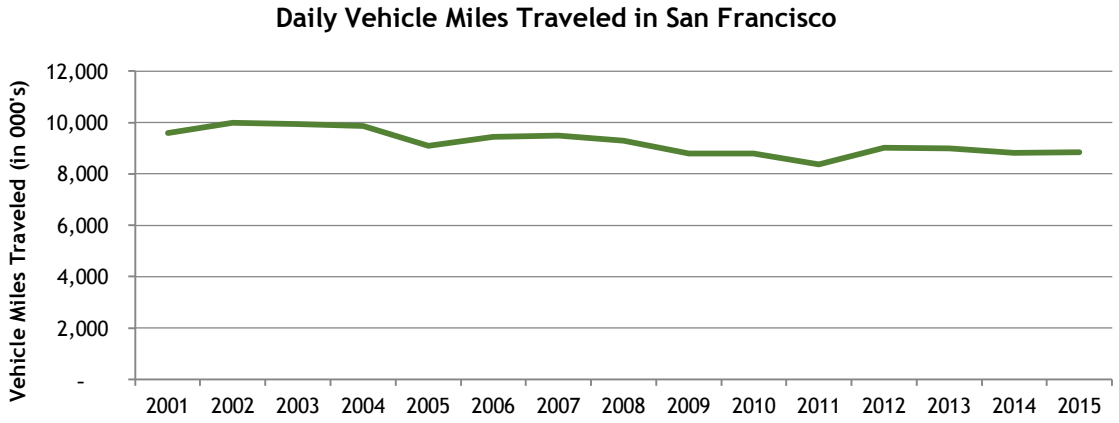
4.5.7 | Other Indicators

In addition to the legislatively required performance measures and the local performance measures, a number of other metrics help provide background and context for changes observed in transportation system performance.

VEHICLE MILES TRAVELED

In 2016, the San Francisco Planning Commission adopted new guidelines for evaluating the transportation impacts of new projects. Critically, additional automobile delay as measured by level-of-service (LOS) is no longer considered an environmental impact, and environmental impact determinations now use vehicle miles travelled. Figure 4-25 illustrates the trend in estimated VMT on San Francisco roadways. It shows that VMT has remained relatively unchanged in recent years, and is about 10% lower than the peak VMT observed from 2002 to 2004.

Figure 4-25: Daily Vehicle Miles Traveled in San Francisco

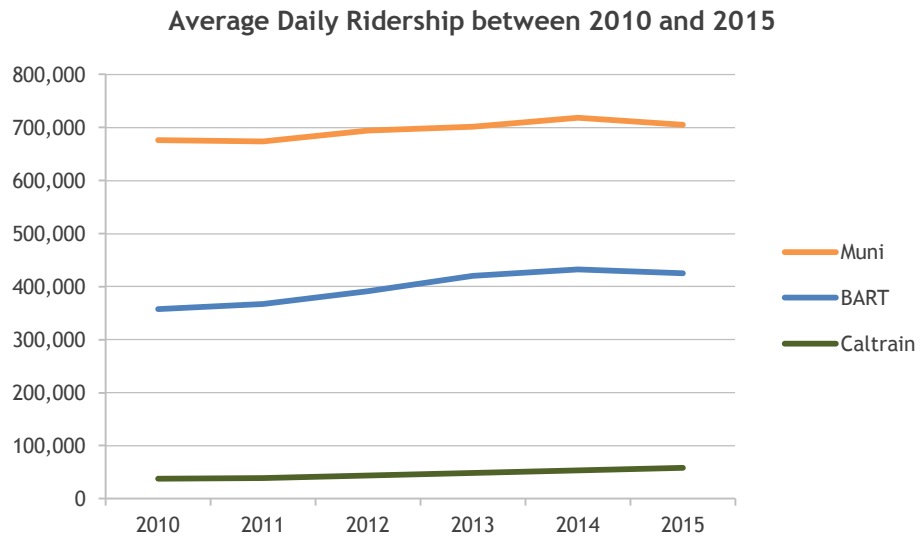


Source: Caltrans

TRANSIT RIDERSHIP

Transit Ridership refers to the total boardings occurring on transit services. Figure 4-26 shows recent ridership trends for the three largest transit systems serving San Francisco. Muni carries the greatest number of trips in San Francisco, approximately 700,000 on a typical weekday. In the past five years, Muni has experienced limited growth of approximately 5% total, while BART systemwide ridership increased by 20% between 2010 and 2015, and Caltrain ridership increased almost 50% during this same time. Both Muni and BART show slight declines in the number of total systemwide boardings between 2014 and 2015, while Caltrain continues to experience strong growth, with ridership increases of almost 10% during this same year.

Figure 4-26: Average Daily Transit Ridership by Operator

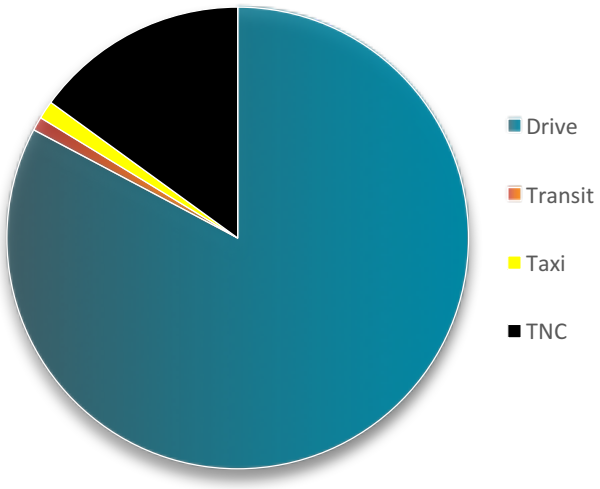


TRANSPORTATION NETWORK COMPANIES

Transportation network companies (TNCs) such as Uber and Lyft have become an increasingly visible presence on San Francisco streets, but until recently, there has been no comprehensive data source to help the public and decision-makers understand how many TNC trips occur in San Francisco, how much vehicle travel they generate, and their potential effects on congestion, transit ridership, and other measures of system performance. In 2017, the SFCTA released a report, TNCs Today: A Profile of San Francisco Transportation Network Company Activity, that revealed that there are a significant number of TNC trips occurring within San Francisco – over 170,000 on a typical weekday and over 220,000 on Fridays and Saturdays. In addition, the report showed that these trips primarily occur in the most congested parts of the city, at the most congested time of day. Subsequent research by the SFCTA seeks to quantify the extent to which these TNCs are affecting traffic congestion, transit ridership, and other measures of transportation system performance.

The SFCTA estimated two types of TNC trips: vehicle trips and person trips. The number of TNC vehicle trips is important because more vehicle trips generally leads to increased congestion and conflicts with other street users, while more person trips may indicate enhanced mobility. The shares of "Vehicle trips" shown in Figure 4-27 refers to movements by motor vehicles with origins and destinations entirely within San Francisco. Vehicles may carry different numbers of people, or may be public transit vehicles or taxis. Trucks are excluded. Figure 4-27 indicates that approximately 15% of these trips are by TNCs.

Figure 4-27: Mode Split for Intra-San Francisco Vehicle Trips



Person trips refers to movements by people with origins and destinations in San Francisco. Person trips are different than vehicle trips because person trips include walking and biking trips (which don't require motor vehicles), and also because private vehicles, public transit vehicles and taxis may carry more than one person. For TNCs and taxis, vehicle trips were converted to person trips using an assumed occupancy rate of 1.66, based on observed taxi data. Figure 4-28 indicates that TNCs comprised about 9% of all intra-San Francisco person trips.

Figure 4-28: Mode Split for Intra-San Francisco Person Trips

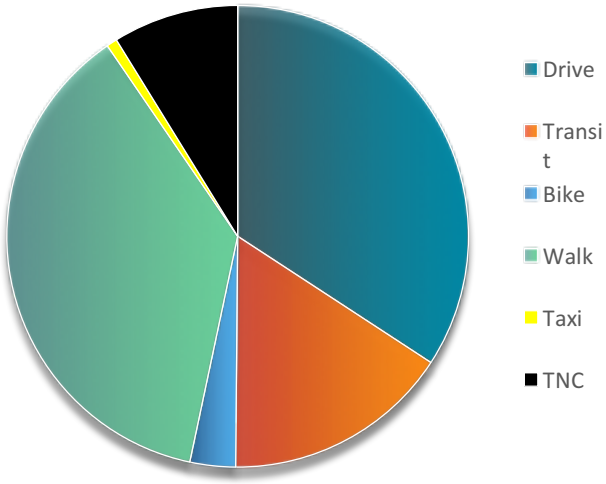


Table 4-14 shows the estimated TNC share of total vehicle trips by supervisor district. It indicates that for districts in the core, such as District 6, TNCs may comprise about 25% of total vehicle trips during peak periods.

Table 4-14: TNC Share of Total Vehicle Trips by Supervisor District

Supervisor District	% AM	% PM
1	8%	7%
2	20%	17%
3	19%	20%
4	4%	3%
5	14%	13%
6	25%	26%
7	5%	4%
8	10%	8%
9	10%	9%
10	7%	7%
11	3%	2%

Figure 4-29 shows a heatmap showing the intensity of TNC pickup activity on a typical weekday, and illustrates how most of the activity is concentrated in the downtown, South of Market, and Mission neighborhoods, and along key transit corridors.

Figure 4-29: TNC Typical Weekday Pickup Heatmap

4.5.8 | Muni Service Standards and Milestones

In November 1999, San Francisco voters passed Proposition E which, among other changes, amended the City Charter to require the creation of service standards and milestones for Muni to attain. The SFMTA Board of Directors updates these periodically. Historic service standards and milestones that directly pertain to the improvement of Muni performance can be found in Appendix 7

Muni's recent progress to achieving these standards can be found in Table 4-15. On-time performance as measured by arrival times against published schedules is unchanged since the last CMP update, though the 60% is well below the goal of 85%. The proportion of scheduled service hours delivered is also unchanged since the last CMP update at 99%, slightly exceeding the goal of 98.5%. Bunching, as measured by the percentage of transit trips with <2 min bunching on Rapid Network, worsened slightly from 5.4% to 6.0%, while gaps in service, as measured by the percentage of transit trips with +5 min gaps on Rapid Network, also increased from 16.9% to 18.9%.

Table 4-15: Muni Service Standards and Goals 2013-2017

STANDARD	FY 12/13 Goal	FY 12/13 Actual	FY 13/14 Goal	FY 13/14 Actual	FY 14/15 Goal	FY 14/15 Actual	FY 15/16 Goal	FY 15/16 Actual	FY 16/17 Goal	FY 16/17 Actual
Vehicles that run on time	85%	60%	85%	59%	85%	57%	85%	61%	85%	60%
Scheduled service hours delivered	98.5%	97%	98.5%	97%	98.5%	98%	98.5%	99%	98.5%	99%
Vehicles too full to board	<4%	AM: 5.9% PM: 7.1%	<4%	AM: 7.4% PM: 8.6%	<4%	AM: 4.7% PM: 5.6%	<4%	AM: 3.4% PM: 4.1%	<4%	AM: 2.1% PM: 2.5%
Actual headways vs. scheduled	Replaced by Bunching / Gapping	Replaced by Bunching / Gapping	Replaced by Bunching / Gapping	Replaced by Bunching / Gapping	Replaced by Bunching / Gapping	Replaced by Bunching / Gapping	Replaced by Bunching / Gapping	Replaced by Bunching / Gapping	Replaced by Bunching / Gapping	Replaced by Bunching / Gapping
Percentage of transit trips with <2 min bunching on Rapid Network	Measure in Development	4.0%	Measure in Development	4.0%	Measure in Development	4.8%	Measure in Development	5.4%	Measure in Development	6.0%
Percentage of transit trips with +5 min gaps on Rapid Network	Measure in Development	17.8%	Measure in Development	18.6%	Measure in Development	17.2%	Measure in Development	16.9%	Measure in Development	18.9%
Vehicle availability	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP	TBD in Next SRTP

Sources: San Francisco Municipal Transportation Agency Short Range Transit Plans, Prop E Annual Reports, Monthly Strategic Plan Metrics Reports.

4.6. Work Program Items

Work program items consist of those intended to improve the City's performance monitoring as well as initiatives targeted at improving system performance. Transportation Authority work program elements intended to continue and enhance performance monitoring include:

- Monitor CMP network speeds and LOS in Spring 2017.
- Collect vehicle, transit, pedestrian, and bicycle count information to understand longitudinal trends in demand.
- Monitor transit travel times and reliability on the CMP network and Muni Rapid Network, and work with SFMTA to further develop and establish regular spatial reliability data reporting.

- Work to include transit ridership in future monitoring results in order to estimate person-throughput on the CMP network.
- Coordinate with City departments to improve the availability and collection of data about level of service and performance of all modes. Examples of modal performance analyses include SFMTA's planned bicycle network comfort index study to inform project prioritization.
- With OEWD, SFMTA, and other partner agencies, support development of a data monitoring practice for all-night transportation as part of the Late Night Transportation Study.
- Coordinate with the SFMTA on bicycle counting and pedestrian counting projects.
- Collaborate with other City agencies to refine and standardize metrics for bicycle and pedestrian performance.

In addition, the Transportation Authority and City agencies will continue to engage in planning efforts and implement projects to improve performance of the transportation system. The San Francisco Transportation Plan, adopted in December 2013 and then updated in October 2017, focuses on prioritizing projects and programs and developing strategies to improve system performance. The Transportation Authority will, as part of its efforts to improve performance:

- Continuously improve the San Francisco Model's capability to model all modes of transportation, including bicycle and pedestrian trips.
- Work with SFMTA to identify Transit Performance Initiative priorities (the City's long range priorities for BART, Caltrain, and Muni Metro). Fund a Long Range Transit Network Development study to identify solutions to Muni Metro system bottlenecks and include solutions that would improve the travel time and reliability of Muni Metro tunnel operations.
- Continue to participate in multimodal corridor improvement efforts such as the Better Market Street Project and BRT projects.
- Through a partnership with the region, counties, and Caltrans, identify and promote San Francisco's priorities for the regional freeway network. Set a vision for the management of the City's freeway management through the Freeway Performance Initiative.
- Continue to participate in citywide pedestrian safety initiatives, including through the Pedestrian Safety Task Force, by coordinating with other City agencies to implement the WalkFirst investment strategy, and by supporting the City's traffic calming program.
- Coordinate with SFMTA on development and implementation of the bicycle network.
- Dedicate Prop K funds to the design and implementation of complete streets enhancements that "Follow the Paving."

CHAPTER FIVE

TRAVEL DEMAND MANAGEMENT ELEMENT

KEY TOPICS

- Legislative Requirements
- Legislative Intent and Application to San Francisco
- TDM Policy Framework
- TDM Strategy and Workplan
- TDM Policies, Requirements, and Programs
- TDM Studies and Plans
- Work Program

5.1. Legislative Requirements

The Congestion Management Program legislation[4] requires that the CMP include a travel demand management (TDM) element. TDM refers to tools and strategies that can reduce congestion and driving alone while encouraging travel by walking, bicycling, transit, carpooling, and other modes of travel. TDM can include policies, requirements on new development, and information/outreach programs designed to facilitate the use of sustainable transportation options. This chapter describes San Francisco's TDM Policy Framework, Strategy and TDM programs.

5.2. Legislative Intent and Application to San Francisco

The CMP legislation's requirement for a TDM element encourages local policy and programs to promote travel behavior changes to reduce congestion and associated impacts identified in the CMP.

5.3. TDM Policy Framework

San Francisco has several guiding policy documents that shape the development of TDM activities. These include:

- **Transit First Policy.** 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

[4] California Government Code Section 65098 (b)(3). Please refer to Appendix 2.

First Policy is documented in the City Charter, the Transportation Element of the City's General Plan, the Planning Code, and other City ordinances.

- **San Francisco General Plan.** The San Francisco General Plan includes multiple objectives relevant to TDM (included in Appendix 10). In addition, many of the city's recent area plans, including the Transbay Transit Center District Plan (2009), the Eastern Neighborhoods Transportation Implementation Planning Study (2011), the Central Corridor Plan (Draft – 2013), and others, also include TDM objectives.
- **San Francisco Transportation Plan (SFTP).** Every four years, the Transportation Authority updates the city's long-range transportation plan. The SFTP outlines how transportation funding in the city will be prioritized through 2040, with consideration for citywide goals as well as expected and potential revenues. The Transportation Authority adopted the most recent SFTP update in October 2017.
- **Regional TDM Requirements - Transportation Control Measures.** San Francisco is subject to regional air district requirements to implement TDM measures (also referred to as Transportation Control Measures) to address air quality issues. As required by the California Clean Air Act (CAAA), the Bay Area Air Quality Management District (BAAQMD) developed and adopted a revised Plan, the *2017 Bay Area Clean Air Plan*, which provides updated guidance to San Francisco. Appendix 10 provides more details about regional TDM requirements and Appendix 11 lists the currently adopted regional TCMs, and discusses how San Francisco's congestion management strategies contribute to, or reinforce, these measures.

5.4. TDM Strategy and Work Plan

San Francisco is an attractive place to live, work, and play because it offers so much to such a wide variety of people. As a vibrant, busy city, San Francisco faces challenges with how to accommodate expected growth within the constraints of a world-class location that has already developed most of its available land. As the city increases in density, transportation and land-use planners are looking to make the city work better for the people who are already here as well as for those who will be here in the future. Due to the costs of building major infrastructure, San Francisco is looking to do more with our existing system, while focusing on key important projects like the Central Subway and Van Ness Bus Rapid Transit. In order to succeed, an ambitious transportation demand management program is needed to meet the challenge of maintaining mobility and access within the city.

In 2014, City agencies developed an *Interagency Travel Demand Management Strategy* outlining the city's approach to TDM, including activities related to (1) Implementing new TDM Policies, (2) Enforcement of existing policies, and (3) Developing supportive programs and services.

In 2017, city agencies developed a joint *San Francisco TDM Plan: 2017-2020*. This workplan, based on the 2014 strategy, identifies the policies, projects, and programs the city can implement to accomplish its TDM goals. The plan was collaboratively developed by the four major agencies that implement TDM in the city – the Transportation Authority, SFMTA, the San Francisco Planning Department, and the San Francisco Department of the Environment. The plan identifies which agencies have the lead and support roles for element of the plan.

5.5. TDM Policies, Requirements, and Programs

San Francisco has a range of TDM policies and requirements to promote sustainable modes of transportation. These efforts can be broadly grouped in the following categories:

- **Policy:** TDM policies, including the Commuter Benefits Ordinance and the Commuter Shuttle Policy.
- **Programs for Existing Development:** TDM programs including the on-street carsharing pilot program, bicycle sharing program, residential outreach program, parking management, and others. The strategies behind these programs are described in the *San Francisco TDM Plan: 2017-2020*.
- **Policies, Requirements, and Programs for New Development:** TDM requirements on new development, including planning code requirements, requirements in area plans and development agreements. The Transportation Sustainability Program (TSP) is the city's comprehensive effort to accommodate the transportation impacts of new growth. It consists of three components, all of which were updated or approved in the past two years:
    - **Invest: Transportation Sustainability Fee (TSF):** signed into law in November 2015, the TSF invests in our transportation network by having developers pay their fair share to help offset the transportation impacts of growth created by their project.
    - **Align: CEQA Reform:** in March 2016, the Planning Commission changed how the city analyzes impacts of new development on the transportation system under the California Environmental Quality Act (CEQA). These new practices better align with the City's longstanding environmental policies, such as reducing greenhouse gas emissions.
    - **Shift: Transportation Demand Management Ordinance:** signed into law in February 2017, the TDM Ordinance requires new developments to provide on-site amenities that prioritize sustainable alternatives to driving.

Each of these categories of TDM requirements, policies, and programs are described in detail in Appendix 10.

5.6. TDM Studies and Plans

As outlined in the *San Francisco TDM Plan: 2017-2020*, several city agencies and departments are conducting numerous TDM activities, studies, and plans.

This section identifies studies and planning efforts that were led by the Transportation Authority, completed recently, and that are relevant to TDM. More detailed descriptions of these studies and plans can be found in Appendix 10.

- **BART Smart Travel Rewards Pilot (BART Perks):** the Transportation Authority and BART jointly ran a six-month test program to explore new ways to reduce crowding on the BART system. The goal was to see if small incentives could effectively encourage people to ride outside of the morning rush. Initial evaluation results suggest the program was effective at incentivizing some riders (about 10% of participant peak hour travelers) to shift their commute times.

- **Travel Demand Management (TDM) Ordinance:** The SFMTA, City Planning Department, and SFCTA partnered to introduce TDM requirements for new developments as a part of TSP (Shift). This includes a web-based toolkit to aid developers design an appropriate TDM program using a consistent approach.

- **Parking Supply and Utilization Study (PSUS):** adopted in 2016, the PSUS evaluated the feasibility of several parking-related strategies for reducing congestion by shifting trips from auto to non-auto modes or shifting trips to less congested time periods. The evaluated parking strategies performed modestly in mitigating area-wide congestion and were less effective than the preferred cordon pricing scenario examined in the 2010 *Mobility Access and Pricing Study*.

- **Child Transportation Survey Report**: completed in 2016, this report provided more in-depth and comprehensive information on school transportation issues in San Francisco and identified potential solutions to help mitigate school commute difficulties.

- **Lombard Street: Managing Access to the Crooked Street:** completed in March 2017, this study focused on the neighborhood at and around the "crooked street" block of Lombard Street. The study identified and evaluated a options to manage visitor access and circulation on and around the Crooked Street while maintaining the character and livability of the residential neighborhood and avoiding spillover effects into adjacent streets and neighborhoods.

- **Bayview Moves Pilot Project**: this pilot program, supported by Prop K funds, began in January 2016 and concluded in June 2017. The pilot program partnered with three Community Business Organizations (CBOs) to provide ride matching, ride sharing and general mobility management to the Bayview Community. At the conclusion of the pilot, the Transportation Authority supported CBO efforts to develop an ongoing program that will sustain successful elements of the pilot.

5.7. Inter-Agency Work Program

The Transportation Authority will continue to work jointly with city partners to further transportation demand management policies, requirements, and program, including numerous efforts based on the *Interagency Travel Demand Management Strategy* and described in the *San Francisco TDM Plan: 2017-2020*. Specifically, the Transportation Authority will:

- Update the SFTP, including components focused on Travel Demand Management.
- Support enforcement of TDM-related developer commitments and planning code requirements.
- Complete the evaluation of the BART Perks Pilot program and support BART's effort to implement a follow-up.
- Pursue a comprehensive mobility management program on Treasure Island, including congestion pricing, parking management, and transit affordability pass development.
- Complete a Freeway Corridor Management Feasibility Study and initiate a Caltrans Project Study Report to develop US101 managed lanes, in coordination with San Mateo and Santa Clara Counties.
- Complete development of the Lombard Crooked Street Congestion Management System, including a reservations and pricing system to manage auto access to the street.

- Pursue efforts to manage congestion related to school transportation.
- Evaluate the effectiveness of individual TDM programs.
- Continue all other ongoing TDM programs and activities.
- Continue to work on regional TDM initiatives, coordinating with both regional entities (BAAQMD and MTC), and neighboring local agencies.

CHAPTER SIX

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
- Transportation Impact Analysis
- Work Program

6.1. Legislative Requirements

The California Government Code section 65089(b)(4) requires that Congestion Management Programs (CMPs) include a program to analyze the transportation system impacts of local land use decisions. These analyses must measure impacts using CMP performance measures, and estimate the costs of mitigating the impacts.

The CMP legislation also requires the Transportation 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). The Transportation 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 Transportation Authority has an activity-based travel demand forecasting model used in combination with the uniform database. This is further detailed in Chapter 8 and Appendix 21.

In September of 2002 the legislature passed SB 1636, which is intended to "remove regulatory barriers around the development of infill housing, transit-oriented development, and mixed use commercial development" (65088(g)) by enabling local jurisdictions to designate "infill opportunity zones." These zones (IOZs) are defined as areas with compact, transit-oriented housing and mixed use in close proximity to transit service. The CMP network segments within a designated IOZ are exempt from CMP traffic level of service (LOS) standards. SB 743 revised the definition and requirements related to IOZs, are discussed in section 6.3.4.

On September 27, 2013, the governor signed into law SB 743, which revised the criteria for determining the significance of transportation impacts within transit priority areas. Transit priority areas are defined as areas within a half mile of a major transit stop, either existing, or planned, which in San Francisco comprises most of the city. The text of SB 743 specifically eliminates automobile delay as measured by level of service as a significant impact on the environment in transit priority areas. Parking impacts from

infill development also shall not be considered significant impacts on the environment. The Governor's Office of Planning and Research identified vehicle miles traveled as the most appropriate measure of transportation impacts.

6.2. Legislative Intent and Application to San Francisco

As CMA for San Francisco, the Transportation Authority ensures that the City complies with CMP requirements including land use impact monitoring. 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. Details about the City's land use development process within this framework can be found in Appendix 12. 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 Transportation Authority to prepare a countywide transportation plan, and to coordinate City Departments. In 2013, the Transportation Authority adopted a comprehensive plan, now known as the San Francisco Transportation Plan (SFTP), in December of 2013. The Transportation Authority adopted the 2017 SFTP Update in October 2017.

The Transportation Authority has already begun work on the next update of the SFTP. An Interagency Project Charter for San Francisco Long Range Transportation Planning Program, executed in December 2015, between the Transportation Authority, the SFMTA, and the Planning Department, outlines roles and responsibilities for developing the next Countywide Transportation Plan. This interagency effort, now known as ConnectSF, is developing a long-range vision that will serve as the underpinning of the next SFTP. Further details on the consistency of SFTP with long term strategic goals of the General Plan can be found in Appendix 12.

6.2.1 | 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 (RTP), which links long-range planning for transportation investment with estimates of land development based on regional demographic growth and economic development.

UNIFORM METHODOLOGY

The Transportation 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 Transportation 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. A model consistency report is developed during each CMP monitoring cycle to demonstrate this (see Appendix 21).

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. It also informs decision-making in the reverse direction: as CMA, the Transportation 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. With the passage of California Senate Bill 743 and the future use of Vehicle Miles Traveled as a primary metric for determining traffic related environmental impacts, review of land use project will be more consistent with other goals in the SFTP and related City documents.

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

6.3.1 | 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. The Expenditure Plan directs the Transportation 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."

6.3.2 | 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. The Transportation Authority focuses on the following activities to help integrate transportation and land use decisions:

- Prioritize transportation planning funds and capital investments that support coordinated land use and transportation development;
- Provide technical guidance and assistance with the planning process to partner agencies, communities, and project sponsors;
- Promote legislative activities that encourage smart growth, more sustainable transportation and development-related investment decisions by the City and developers, and also more efficient travel decisions by all transportation system users;
- Coordinate county-level input into the regional Sustainable Communities Strategy (SCS), the RTP, and related regional land use planning efforts;
- Conducts project and program delivery oversight to ensure efficient use of funds and effective project delivery.

More details about the coordination between CMA and regional land use can be found in Appendix 12.

6.3.3 | Plan Bay Area and Priority Development Areas

ABAG and MTC encourage compact, transit-oriented development through the identification of Priority Development Areas (PDAs) or Priority Conservation Areas (PCAs). San Francisco has identified twelve

PDAs, which collectively make up 25% of San Francisco's land area and have the capacity to take on approximately 80% of the forecast housing growth and 60% of the forecast job growth. San Francisco's PDAs are shown in Figure 6-1. San Francisco has also identified four Priority Conservation Areas (PCAs), and ABAG approved three additional regional PCAs that touch San Francisco.

Figure 6-1: Priority Development Areas in San Francisco

As a part of Plan Bay Area, the region has begun to identify more robust funding incentives for PDAs and PCAs through the One Bay Area Grant (OBAG) framework. Details on the OBAG funding framework, and on local PDA planning projects in San Francisco can be found in Appendix 12.

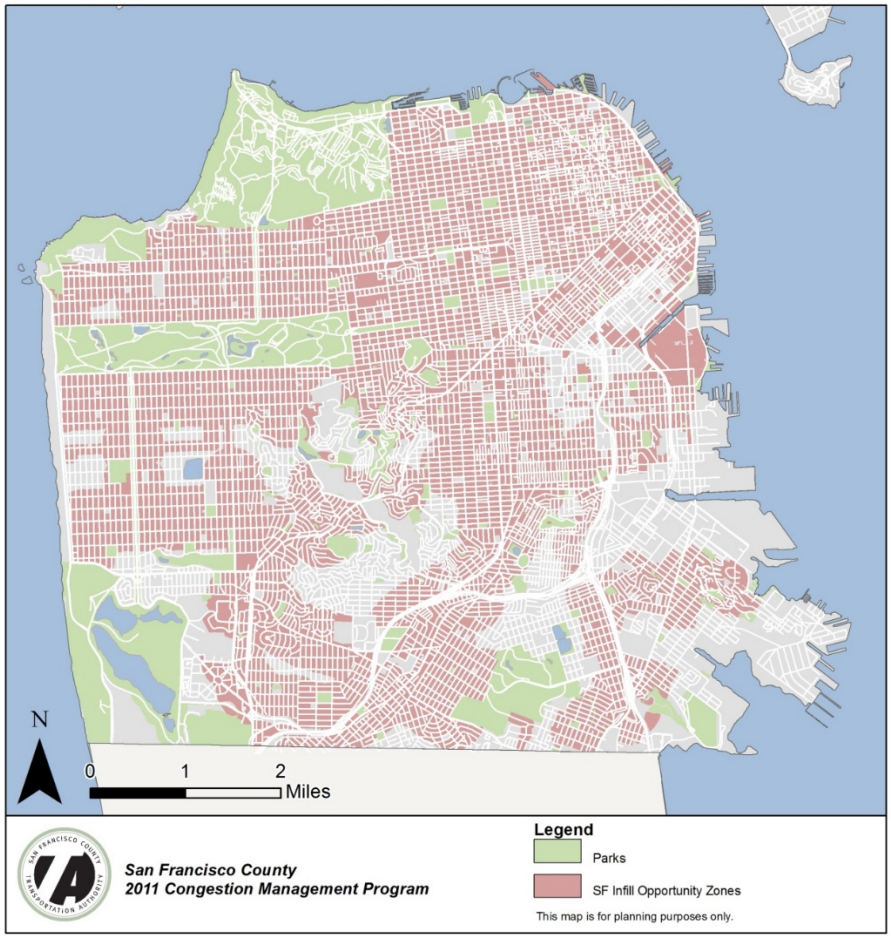
6.3.4 | Infill Opportunity Zones

Senate Bill 1636 (Figueroa), passed in 2002, granted local jurisdictions the authority to designate Infill Opportunity Zones (IOZs) in areas meeting certain specified requirements. Within a designated IOZ, the CMA is not required to maintain traffic conditions to the automobile level of service (LOS) standard. The San Francisco Board of Supervisors adopted San Francisco's IOZ on December 8, 2009. Recent changes allow jurisdictions to designate an IOZ in any area:

- That is within a half mile of a major transit stop or corridor that is included in the RTP;
- That is within a designated transit priority area within the regional SCS; and
- Where an IOZ would be consistent with the jurisdiction's General Plan and any applicable Specific Plan.

Under the new criteria, the Board of Supervisors designated new IOZs. The Board resolution on the IOZs can be found in Appendix 4. A map of the current IOZ areas in San Francisco is shown in Figure 6-2.

Figure 6-2: San Francisco IOZs



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

6.3.5 | Regional Land Use Forecasts

For most forecasting activities, the Transportation Authority is required to use regionally-adopted projections of future Bay Area land use growth, including the distribution and nature of that growth across the region's individual jurisdictions. In 2017, ABAG adopted its most recent regional land use forecast, which indicates that San Francisco will absorb over 113,000 additional households between 2010 and 2040, bringing the number of households to 471,600. Employment in San Francisco is projected to increase by over 252,000 jobs between 2010 and 2040, bringing the total to more than 864,000 jobs located in the city. These assumptions underlie CMP land use analyses.

6.4. Neighborhood Transportation Planning

The Transportation Authority supports community-based transportation improvements by leading and funding neighborhood-focused transportation planning studies. These efforts help address community transportation concerns and engage community leadership in the transportation planning process, especially in underserved and disadvantaged communities. Over the last decade, the Transportation Authority, working with other agency partners, has completed several neighborhood transportation plans, many of which were funded with grants from the Metropolitan Transportation Commission's Community Based Transportation Planning (CBTP) program, which focuses planning resources in minority and low-income communities.

The Transportation Authority also manages the Neighborhood Transportation Improvement Program, a Proposition K funded program established to support community-based neighborhood scale planning efforts in San Francisco neighborhoods, especially in underserved neighborhoods and areas with vulnerable populations (e.g. seniors, children, and/or people with disabilities). The goal of the program is help neighborhoods in each supervisorial district 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.

A list of plans developed with the support of the Community Based Transportation Planning program and the Neighborhood Transportation Improvement Program can be found in Appendix 12.

6.5. 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 its Transportation Impact Analysis Guidelines for Environmental Review (see Appendix 13). The Transportation Authority is currently partnering with the Planning Department and other City agencies to improve the City's CEQA transportation impact analysis methodology and process, by advancing a measure consistent with SB 743 for assessing transportation impacts. The SFCTA is coordinating with other San Francisco agencies to development consistent transportation and land use impacts through a number of efforts including development and implementation of:

- Uniform Land Use Analysis Methodology
- Transportation Sustainability Fee
- CEQA Transportation Impact Analysis and Impact Fee Mitigation Reform

Detailed descriptions of these efforts can be found in Appendix 12.

6.6. Work Program

The Transportation 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 Transportation Authority will:

- Support the development of the regional land use model.
- Continue to develop applications of land use data within the GIS and model databases to conduct multimodal performance measurement and analysis (e.g., the relationship of land use patterns to transit usage and coverage).
- Participate in statewide, regional, and local SB 375 implementation activities by coordinating San Francisco input and advocating for San Francisco priorities in such activities as the setting of targets and preparations for the next RTP/SCS.
- Coordinate with appropriate City departments to reform transportation impact analysis in San Francisco through participation in the Transit Sustainability Fee Nexus Study and follow-up efforts.
- Continue development of the Neighborhood Transportation Improvement Program's efforts to support planning and capital projects.
- Coordinate with city partners to regularly update the Transportation Investment in Growth Strategy (last updated in 2017), to show how the city can accommodate equitable and affordable housing growth around strategic transportation investments.
- Coordinate with appropriate city departments as part of ConnectSF to define a 50-year vision of San Francisco's future and guides plans for the city and its transportation system, and to work towards the next update of the San Francisco Transportation Plan.
- Continue to review and provide technical support to ongoing area plans and land use studies under development, including PDA projects, on an as needed basis.

CHAPTER SEVEN

CAPITAL IMPROVEMENT PROGRAM

KEY TOPICS

- Legislative Requirements
- Relationship to Other Plans
- Relationship to City Department Activities
- Funding and Programming
- Amendment
- Project Delivery

7.1. Legislative Requirements

California Government Code 65089(b)(5) requires that the CMP contain a seven-year Capital Improvement Program (CIP), developed by the Congestion Management Agency (CMA), the Transportation Authority for San Francisco, 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.

7.2. Relationship to Other Plans

7.2.1 | Regional Transportation Plan and Countywide Transportation Plan

The CMP statute requires that each CMP be consistent with the long-range Regional Transportation Plan (RTP), and each county's component of the RTP must be supported by a long-range countywide transportation plan (San Francisco Transportation Plan, or SFTP), developed by the CMA. The CIP is intended to serve as a short or medium-range implementation vehicle for investment priorities as prioritized in the long-range plans. Additional details on the RTP and SFTP can be found in Appendix 15.

7.2.2 | Prop K and AA Expenditure Plans

Prop K extended San Francisco's existing half-cent sales tax for transportation and adopted a new 30-year Expenditure Plan. The 30-year Expenditure Plan directs $2.35 billion (in 2003 $'s) to a list of transportation projects that were developed through the first SFTP. In 2010, San Francisco voters approved Prop AA, authorizing an additional $10 vehicle registration fee on motor vehicles registered in San Francisco. Prop AA revenues fund projects in a 30-year Expenditure Plan and are meant to complement Prop K funds.

7.2.3 | Bay Area Clean Air Plan

The Transportation Authority ensures that the CIP conforms to air quality mitigation measures for transportation-related vehicle emissions, as detailed in the Bay Area Air Quality Management District's (BAAQMD) Clean Air Plan and related documents. This also raises San Francisco projects' competitiveness for external funds, since the MTC gives priority to proposed projects that support or help implement the mitigation measures outlined in the Clean Air Plan. BAAQMD recently developed and adopted a revised Plan, the *2017 Bay Area Clean Air Plan* in April 2017. See Appendix 11 for San Francisco's trip reduction efforts in relationship to the regional mitigation measures.

7.2.4 | Other Capital Plans and Short Range Transit Plans

Each City department develops its own capital investment plans for inclusion in San Francisco's ten-year Capital Plan. In addition to the citywide Capital Plan, the SFMTA has multiple short-term and long-term processes to prioritize its capital needs, including its 2017-2021 Capital Improvement Program, Strategic Plan, Transit Fleet Management Plan, Short Range Transit Plan, 2017 Facilities Framework, and an Enterprise Asset Management System under development. Five regional transit operators that serve San Francisco also develop their own capital plans and Short Range Transit Plans: BART, AC Transit, SamTrans, Golden Gate Transit, and Caltrain. The Transportation Authority considers these plans as an input into its programming process to facilitate better coordination of San Francisco programming decisions with citywide and regional priorities in compliance with CMP requirements. Also see Section 7.3: Relationship to City Department Activities.

7.2.5 | 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 Transportation Authority's CIP programming process. If necessary, projects in the CIP may be submitted to the Planning Department for a General Plan consistency check. However, in practice, this is not typically required as the SFTP is consistent with the General Plan.

7.3. Relationship to City Department Activities

Each City department or other eligible project sponsor develops its own capital investment plans. The Transportation Authority steers the overall multi-agency programming strategy and analysis of trade-offs, with a particular focus on the fund sources included in this CIP. The Transportation Authority review process, described in Section 7.5, uses information already developed by project sponsors. The most significant value added by the Transportation Authority's review process is in providing an overall context for transportation programming strategy and system performance to facilitate Transportation Authority Board decisions. Key roles and responsibilities of the City departments and the Transportation Authority in the transportation programming process are summarized below.

City Departments

1. Prepare plans, prioritize capital improvement programs and develop financial plans on an annual or biannual basis

2. Use financial constraints and strategies imposed by external agencies in addition to those established by the Transportation 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 Transportation Authority, and obtain Transportation Authority Board approval or administrative review
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

Transportation Authority

1. Develop, adopt, and update the CMP and its CIP
2. Process CIP amendments according to the established procedures
3. Provide input into the MTC, state, and federal agencies' process for the preparation and updates of the Regional, State, and Federal Transportation Improvement Programs (RTIP, STIP, and TIP) in coordination with sponsors
4. Provide Prop K and Prop AA revenue estimates and advise on financial strategies
5. Develop Prop K and Prop AA Strategic Plan and 5YPP 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 Prop K, the Prop AA, and the local (40%) portion of the TFCA funds, as well as discretionary funds as directed by the MTC, state, and federal agencies

7.4. Funding and Programming

Listed below are major CIP funding sources administered by the Transportation Authority. Importantly, as described in the Relationship with Other Plans section, the Transportation Authority ensures that all CIP projects, as well as the programming and project selection processes, are consistent with the RTP, SFTP, and other requirements attached to the funding. Detailed descriptions of each funding source listed can be found in Appendix 15:

- Surface Transportation Program / Congestion Mitigation Air Quality Program
- State Transportation Improvement Program
- Prop K Transportation Sales Tax
- Prop AA Vehicle Registration Fee
- Transportation Fund for Clean Air
- Lifeline Transportation Program
- Senate Bill 1 Local Partnership Program Formulaic Shares

7.5. Amendment

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 CIP projects must therefore first be assessed by the Transportation Authority for potential effects on the system performance. Because project viability can be affected by changes in any component of its funding package, the requirement for Transportation Authority review applies to all funding components of CIP projects, whether they are directly programmed by the Transportation Authority or not. There are two kinds of CIP amendments: policy level and administrative level. These types amendments are described in detail in Appendix 15, which also described the applicability of CIP amendments, and the amendment process.

7.6. Project Delivery

One of the key purposes of the CMP is to establish the link between 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, to San Francisco, and/or to 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 Transportation Authority has mechanisms in place for tracking Prop K and Prop AA project delivery (i.e., the Strategic Plan, 5YPPs, the Portal, MyStreetSF.com, and ongoing project management oversight activities). As a CMA, the Transportation Authority continues to work with the MTC and Caltrans to monitor project delivery rates for projects programmed in the RTIP and federal TIP, and serve as a resource to facilitate and advocate for San Francisco sponsors.

CHAPTER 8

TRAVEL DEMAND MODEL AND UNIFORM DATABASE

KEY TOPICS

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

8.1. Legislative Requirements

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

8.2. Legislative Intent and Application to San Francisco

Congestion management legislation was enacted in part to help transportation planning agencies identify the source of the transportation impacts of land use decisions. All Bay Area counties except San Francisco include multiple local jurisdictions each of which has authority over land use within its boundaries. The transportation impacts of decisions made in one local jurisdiction are felt across local jurisdictional boundaries. The travel demand model is intended as a technical tool to analyze land use impacts across local jurisdictions from a uniform technical basis.

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

8.3. Technical Approach

The Transportation Authority continually updates and refines their travel demand forecasting model, San Francisco Chained Activity Modeling Process (SF-CHAMP). 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 detailed description of the SFCTA's technical approach to modeling can be found in Appendix 21.

In 2014, the Transportation Authority completed SF-CHAMP 5.0, which was calibrated using Census 2010 and The California Household Travel Survey (CHTS) 2010-2012. Previous model versions used earlier Census and household travel survey data. The Model Consistency Report for CHAMP 5.0 is included as Appendix 21. In 2016, the Transportation Authority updated their model to SF-CHAMP 5.2, which includes an updated bicycle route choice model, and more accurate representation of parking prices and better sensitivity to them. SF-CHAMP was also partially recalibrated using CHTS data reweighted to match 2015 control totals.

The Transportation 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 Transportation 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 Transportation Authority's integrated model and GIS allow the ready presentation of data using graphics and maps.

A detailed description of the SFCTA's technical approach to modeling can be found in Appendix 21.

8.4. Work Program Items

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

- Continue to apply the model to assess impacts of policy and transportation changes on local and regional trip making behavior and network conditions. ConnectSF, the Freeway Corridor Management Study, and the Treasure Island Mobility Management Agency Study, and other ongoing projects will depend heavily on modeling support.
- Incorporate Transportation Network Companies (TNCs) into the SF-CHAMP model framework.
- Continue to apply and develop the citywide Dynamic Traffic Assignment model.
- Continue the development of a Dynamic Transit Assignment model to better represent individual transit route choice decisions, the aggregate impact of those decisions on transit performance (particularly in regard to reliability), and the feedback of transit performance into transit route choice.