SAN FRANCISCO
PLANNING DEPARTMENT

TRANSIT EFFECTIVENESS PROJECT
Final Environmental Impact Report

Volume 1B – Chapters 4 to 7

City and County of San Francisco Planning Department
Case No. 2011.0558E

State Clearinghouse No. 2011112030

Draft EIR Publication Date: July 10, 2013
Draft EIR Public Hearing Date: August 15, 2013
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FINAL ENVIRONMENTAL IMPACT REPORT
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List of Acronyms and Abbreviations

Acronym or Abbreviation	Definition
ABAG	Association of Bay Area Governments
ADA	Americans with Disabilities Act
ADRP	archeological data recovery plan
AMP	archeological monitoring program
AQTR	Air Quality Technical Report
ARB	California Air Resources Board
B20	20 percent biodiesel blend
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
BCDC	Bay Conservation and Development Commission
bgs	below ground surface
BMPs	best management practices
BRT	Bus Rapid Transit
BSM	DPW Bureau of Street Use and Mapping
CAA	Clean Air Act
CAAQS	California ambient air quality standards
Caltrans	California Department of Transportation
CAS	Climate Action Strategies
CCSF	City College of San Francisco
CEQA	California Environmental Quality Act
CH_4	methane
CMUTCD	California Manual of Uniform Traffic Control Devices
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CTCDC	California Traffic Control Devices Committee
CUPA	Certified Unified Program Agency
dB	decibel
dBA	A weighted decibel
DBI	Department of Building Inspection

Acronym or Abbreviation	Definition
DPH	San Francisco Department of Public Health
DPM	diesel particulate matter
DPW	San Francisco Department of Public Works
ERO	Environmental Review Officer
FTA	Federal Transportation Administration
FY	fiscal year
HCM 2000	Highway Capacity Manual 2000
Hz	hertz
Ldn	day-night sound level
Leq	hourly equivalent sound level
LID	low-impact design
Lmax	maximum noise level
LRV	light rail vehicle
MEI	maximally exposed individual sensitive receptor
MLP	maximum load point
MTC	Metropolitan Transportation Commission
MUTCD	Manual on Uniform Traffic Control Devices
Muni	San Francisco Municipal Railway
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NOP	Notice of Preparation of an Environmental Impact Report and Notice of Public Scoping
NOx	nitrogen oxides
NSR	New Source Review program
OPR	Governor’s Office of Planning and Research
OWE	Overhead Wire Expansion
PDF	Portable Document Format
PDR	paleontological discovery report
PM_{10}	particulate matter less than 10 microns in diameter

Acronym or Abbreviation	Definition
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
POP	Proof of Payment Group in the Security Operations Unit of SFMTA
PPV	peak particle velocity
PSD	Prevention of Significant Deterioration
RMS	root mean square
ROG	reactive organic gases
RPD	San Francisco Recreation and Park Department
RTPs	regional transportation plans
SCI	Systemwide Capital Infrastructure
SEIR	Subsequent Environmental Impact Report
SEL	Sound Exposure Level
SFBAAB	San Francisco Bay Area Air Basin
SF-CHAMP	San Francisco County Transportation Authority Chain Activity Modeling Process (the official travel forecasting tool for San Francisco)
SFFD	San Francisco Fire Department
SFMTA	San Francisco Municipal Transportation Agency
SFPD	San Francisco Police Department
SFPUC	San Francisco Public Utilities Commission
SO_2	sulfur dioxide
SoMa	South of Market Area
TACs	toxic air contaminants
TASC	Transportation Advisory Staff Committee
TDM	Travel Demand Management
TEP	Transit Effectiveness Project
TIS	Transportation Impact Study
TOG	total organic gases
TPS	Transit Preferential Streets
TSP	Transit Signal Priority
TTPI	Terminal and Transfer Point Improvements
TTRP	Travel Time Reduction Proposals
UB	urban bus

Acronym or Abbreviation	Definition
UCSF	University of California, San Francisco
US EPA	United States Environmental Protection Agency
v/c	volume to capacity ratio
VdB	vibration decibel
WHO	World Health Organization
ZEB	zero-emission bus

GLOSSARY

Term	Definition
Alignment	The ground plan of a roadway, rail line, transit route, or other facility, showing the alignment or direction as distinguished from a profile, which shows the vertical element.
All Way Stop	An intersection for which every approach is controlled by stop signs.
All-door boarding	When passenger boarding is permitted at multiple doors and not just the front door of the transit vehicle.
a.m. peak	The morning commute period in which the greatest movement of passengers occurs, generally from home to work or school; the portion of the morning service period where the greatest level of ridership is experienced and service provided, generally between 7 a.m. and 9 a.m.
Biodiesel fuel	Biodiesel refers to a vegetable oil- or animal fat-based diesel fuel. Biodiesel is typically made by chemically reacting lipids (e.g., vegetable oil, animal fat (tallow) with an alcohol producing fatty acid esters). Biodiesel is meant to be used in standard diesel engines and is thus distinct from the vegetable and waste oils used to fuel *converted* diesel engines. Biodiesel can be used alone, or blended with petrodiesel.
Boarding and alighting	To get on and off a transit vehicle.
Bypass lane	A lane that allows transit vehicles to bypass general traffic congestion approaching an intersection. Applications at signalized intersections may include an exclusive traffic signal phase to allow transit vehicles to move through the intersection ahead of general traffic. See also “queue jump.”
Bypass wires	Overhead wires used by a trolley coach to bypass a second trolley coach.
California Traffic Control Devices Committee (CTCDC)	This committee advises the California Department of Transportation (Caltrans) about standards and polices for official traffic control devices in California. Through this committee, Caltrans fulfills its obligation to consult with local agencies and the public, before adopting rules and regulations prescribing uniform standards and specifications for all official traffic control devices used in California.
Capital improvement project	A project that requires changes to physical infrastructure.
Capital infrastructure	Physical structures or devices that provide long-term support to the operation of transit service.

Term	Definition
Capital investment	One-time change to physical infrastructure for improvement, either to replace worn out infrastructure or to add new infrastructure. Contrasts with operating and maintenance investments and expenses, which are on-going.
Center lane	A travel lane located in the middle of the roadway, beyond the curb lane and, in roadways with two or more travel lanes in each direction, the innermost lane.
Community Connector Van Service	Community Connector service provided by smaller vehicles such as vans or shuttle buses.
Community Connectors	Low-ridership bus routes that circulate through San Francisco’s hillside residential neighborhoods and fill in gaps in coverage to connect customers to the core network.
Contraflow lane	A lane in which restricted traffic flows in the opposite direction of the adjacent lanes, limited to certain vehicle types such as transit or carpool vehicles.
Corridor	A broad geographical band that follows a general directional flow or connects major sources of trips. It may contain a number of parallel streets and highways and many transit lines and routes.
Couplet	A pair of parallel streets that operate one-way in opposite directions.
Crosswalk	Legally designated location for pedestrians to cross from one side of a roadway to the other. Present at all intersections that intersect at approximately right angles; may be marked or unmarked.
Curb cut	Location where the sidewalk curb is depressed to the level of the roadway for a curb ramp, driveway, or other feature.
Curb lane	The lane of traffic closest to the curb, which may or may not have parking adjacent to it. (Opposite of center lane).
Curb ramp	Location where the curb is depressed to the level of the roadway to provide a flush transition from the sidewalk to the roadway to enable accessible street crossing or movement.
Curbside	The side nearest to the curb; in a divided 4-lane road, the curbside lane is the right lane.
Customer	A person who rides a transportation vehicle, excluding the driver.
Dedicated turn lane	A lane from which a vehicle is required to turn left or right.

Term	Definition
Diesel hybrid-electric motor coaches	Diesel hybrid-electric buses or motor coaches are electric buses that get their electricity from a small diesel engine. The diesel engine powers a generator that, together with traction batteries that store the energy, supplies the necessary electrical energy to move the bus through the streets of San Francisco. A diesel hybrid-electric bus can also recover and store braking energy. This increases the vehicle's fuel economy and brake life.
Duct bank	A conduit, typically installed underground, used to run power supply and other wired infrastructure from one point to another.
Dwell time	The time when a bus is stopped to load and unload customers at a transit stop.
Expanded alternative	The Expanded Alternative for the TTRP corridors employs TPS Toolkit elements that may have a greater potential to trigger additional physical environmental effects, such as substantial changes to traffic, bicycle, or pedestrian circulation or similar impacts, whereas the Moderate Alternative is expected to have fewer physical environmental effects due to the nature of the TPS Toolkit elements chosen for each TTRP corridor.
Express service	Service operated non-stop over a portion of an arterial in conjunction with other local services. The need for such service arises where customer demand between points on a corridor is high enough to separate demand and support dedicated express trips.
Farside of intersection	The second or furthest side of the intersection encountered when passing through. Contrasts with nearside of intersection.
Flag stop	A transit stop where the bus or LRV stops within a traffic lane without a designated curbside transit zone, often adjacent to parked vehicles. Often marked with a sign or painted marking noting the transit route.
Frequency of service	The amount of time scheduled between consecutive buses or trains on a given route segment; in other words, how often the bus or train comes (also known as Headway)
Headway	The scheduled time interval between any two revenue transit vehicles operating in the same direction on a route.
Implementation schedule	The planned dates and durations of time during which the proposed project would be carried out.

Term	Definition
Inbound direction	Unless otherwise defined, inbound means headed toward Embarcadero Station or Downtown. It is the opposite of outbound direction. Routes that do not go to the Embarcadero Station or Downtown or serve Embarcadero / Downtown mid-route have explicit definitions for inbound and outbound (e.g. 22 Fillmore is defined as heading inbound to the Marina and outbound to Potrero Hill; the F Market & Wharves is defined as heading inbound to Fisherman's wharf and outbound to Castro).
Key Stop	Light Rail Transit Service stops that include high floor boarding platforms for accessibility.
Lane modifications	Lane modification proposals would change the configuration of travel and parking lanes within the existing right-of-way, typically with striping and signage. Proposed lane modifications include creating transit-only lanes, creating transit queue jump/bypass lanes, creating dedicated turn lanes, and widening mixed-flow lanes by reducing the number of mixed-flow lanes. *[see IS, pp. 41-46.]*
Layover	A layover is a period of time included in the schedule at the end of a trip that typically takes place at a transit terminus. It serves two major functions: recovery time for the schedule to ensure on-time departure for the next trip and, in some systems, operator rest or break time between trips. Layover time is often determined by labor agreement, requiring "off-duty" time after a certain amount of driving time.
Light rail vehicle (LRV)	Light rail vehicles are a form of urban rail public transportation that generally has a lower capacity and lower speed than heavy rail and metro systems, but higher capacity and higher speed than traditional street-running tram systems. The SFMTA's fleet of 151 Breda light rail vehicles (LRV) are used in the operation of the six Muni Metro Lines (J, K, L, M, N and T). The vehicles operate in conditions which range from level boarding and exclusive right-of-way in the Muni Metro Subway segments, to high-floor semi-dedicated right-of-way segments on some surface segments, to low-floor, mixed-flow operation on a variety of streets and street types.
Limited Service or Limited Stop Service	Faster train or bus service where designated vehicles stop only at transfer points or major activity centers, usually about every 1/3 to 1/2 mile. Limited stop service is usually provided on major trunk lines operating during a certain part of the day or in a specified area in addition to local service that makes all stops. As opposed to express service, there is not usually a significant stretch of non-stop operation.

Term	Definition
Local Network	Bus routes that complement and connect to the Rapid Network to create the core network, allowing customers to get to most destinations in San Francisco with no more than one transfer.
Local service	A type of operation that involves frequent stops and consequent longer travel times, the purpose of which is to deliver and pick up transit customers as close to their destinations or origins as possible.
Maximum load point	The location along a transit route with the greatest ridership demand.
Midblock Stop	A transit stop where customers may alight or board that is not at an intersection of two streets.
Moderate alternative	The TTRP proposals with the more limited TPS Toolkit elements that are expected to have fewer physical environmental effects than those of the Expanded alternative TTRP corridor proposals due to the nature of the TPS Toolkit elements chosen.
Motor coach	A bus powered by a diesel engine that can typically utilize biodiesel fuel as an energy source.
Nearside of intersection	The first or nearest side of intersection encountered when passing through. Contrasts with farside of intersection.
Network	The configuration of streets or transit routes and stops that constitutes the total transportation system.
Network enhancements	Changes to the transit network which will improve reliability and efficiency. For example, providing transit signal priority.
Network restructuring	Changes made to the network after evaluation to improve reliability and efficiency, including creation of new routes, changes to route alignment, elimination of underutilized existing routes or route segments, changes to the frequency and hours of transit service, changes to transit vehicle type on specific routes, changes to mix of local/limited/express services on specific routes.
Operational improvements	Changes made to procedures and transit operations that do not result in changes to infrastructure.
Optimizing transit stop	Locating the transit stop on one side or the other of an intersection for greater efficiency.

Term	Definition
Outbound direction	Unless otherwise defined, outbound means headed away from Downtown or Embarcadero Station. This is the opposite of inbound direction. Routes that do not go to Downtown or Embarcadero Station have explicit definitions for inbound and outbound (e.g. 22 Fillmore is defined as heading inbound to the Marina and outbound to Potrero Hill).
Overhead wires	Wires suspended over streets and rail tracks to provide electric power to trolley coaches and LRVs.
Owl Service	Service that operates during the late night/early morning hours or all night service, usually between 1:00 a.m. and 6:00 a.m.
Paratransit	Transportation service for individuals with disabilities who are unable to use fixed-route transit service. The service must be comparable to the fixed-route service and is required by the Federal Americans with Disabilities Act.
Parking restriction	Where the ability to park is limited in duration, type of vehicle, type of use, type of driver, or is forbidden.
Peak period	The hours in the morning or evening when most commuters are commuting and the travel system carries the largest number of passengers (transit) or vehicles (traffic). The morning peak period is generally between 7 a.m. and 9 a.m. and the evening peak period is generally between 4 p.m. and 6 p.m., although these hours may change over time. If not specified, evening commute hours are usually meant.
Pedestrian bulb	A sidewalk extension at a non-transit stop that improves pedestrian visibility and minimizes pedestrian exposure to vehicular traffic and minimizes street-crossing distances.
Pedestrian refuge island	Raised median installed in the center of a roadway that provides a safe place for pedestrians to stop while crossing a street.
Platform	Area of pavement raised above a road or railbed where passengers can board or alight from transit vehicles.
Platform Display System	LED (light-emitting diode) electronic display panels on platforms in Metro stations.
p.m. peak	The afternoon commute period in which the greatest movement of transit passengers occurs, generally from work or school to home; the portion of the afternoon service period where the greatest level of ridership is experienced and service provided, generally between 4 p.m. and 6 p.m.

Term	Definition
Project variant	Several options or “project variants” are under consideration by the SFMTA to allow for flexibility in the phasing and implementation of the TEP. Proposed Service Improvement variants would modify portions of routes or change the type of vehicle used on routes. TTRP variants would modify the locations of one or more TPS Toolkit elements along the corridor. For areas where more than one variant is proposed, only one variant would be implemented.
Protected turn	At signalized intersections, where traffic from a dedicated turn lane is shown green arrow to indicate when vehicles may safely complete that turn while being protected from conflicting vehicles and pedestrians.
Queue jump	A type of roadway geometry and striping that allows transit vehicles to move around vehicles stopped at an intersection, could be combined with a special signal phase to allow transit vehicles to proceed through the intersection in advance of general traffic. See also “bypass lane.”
Rapid Network	Frequent, heavily used bus routes and rail lines that make up the backbone of the Muni system.
Real-Time arrival signage	LED panels in transit shelters that provide next arrival and emergency messaging; however, these units are also sparingly used to advise customers of service and event-related information and other topics of importance, such as major issues and public input opportunities.
Right-of-way	A right-of-way is a strip of land that is granted, through an easement or other mechanism, for transportation purposes, such as for a pedestrian path, sidewalk, driveway, rail line or highway.
Route	A specified path taken by a transit vehicle usually designated by a number or a name, along which customers are picked up or discharged.
Service Improvements	Network restructuring that includes the creation of new routes, changes to route alignment, elimination of underutilized existing routes or route segments, changes to the frequency and hours of transit service, changes to transit vehicle type on specific routes, changes to mix of local/limited/express services on specific routes.
Service management	Improving service delivery on Muni by vehicle and infrastructure maintenance, operator availability, supervision, and traffic management.
Service Policy Framework	Policies and action items for implementing future transit service changes, including changes proposed as part of the TEP.

Term	Definition
Service reliability	How often transit vehicles meet planned schedules of stops.
Service-related Capital Improvements	Physical improvements to the transit system that support, or are in some cases necessary, to implement the TEP Service Improvements, including Terminal and Transfer Point Improvements (TTPI), Overhead wire expansions (OWE), and Systemwide Capital Infrastructure (SCI).
Sidewalk widening	Where the width of the pedestrian right-of-way is increased at the expense of a street or other transportation right-of-way.
sight distance	The distance from which an object at eye level remains visible to an observer. Stopping sight distance is defined as the distance needed for drivers to see an object on the roadway ahead and bring their vehicles to a safe stop before colliding with the object.
Span of Service	The span of hours over which service is operated (e.g., 6 a.m. to 10 p.m.). Service span often varies by weekday, Saturday, or Sunday.
State of Good Repair	Federal Transportation Agency (FTA) defined program that seeks to improve the condition of transit capital assets in order to improve transit performance and reliability.
State of Good Repair Investment	An SFMTA project that replaces or rehabilitates transportation capital assets in order to improve the condition of capital assets and improve system performance and reliability.
Stop spacing	The distance between consecutive transit stops. If a bus stop occurs on every block, the stop spacing is every block.
Supplemental service	Service provided that is not daily or weekly. Examples of supplemental service include bus service for professional sports games, or school-day only services for middle schools and high schools. [See http://www.sfmta.com/getting-around/transit/schedules-trip-planners/supplemental-services]
Switches	A switch is a mechanical installation enabling LRVs or Trolley Coaches to be guided from one track or set of overhead wires to another, such as at a railway junction or where a spur or siding branches off.
Terminal	The point where a transit route starts or ends, where vehicles stop, turn or reverse, and wait before departing on their return journeys.
Tow-away Zone	A lane in which private vehicles, if stopped or parked, can be removed and the owners fined.

Term	Definition
Traffic calming measure	Roadway devices or practices that encourage drivers to proceed slowly through the use of visual or actual roadway narrowings, horizontal or vertical shifts in the roadway, or other features.
Traffic circle	Generally circular raised areas in the center of an intersection that force vehicles to go slowly around them, provide space for landscaping, and slow traffic by visually narrowing the roadway.
Traffic Control Device	These include markings, signs, and signal devices used to inform, guide and control the orderly, uniform and efficient movement of all roadway users.
Transfer	A point or location where two or more transit routes come together at the same time to allow passengers to efficiently connect between intersecting transit routes. A short layover may be provided at timed transfer points to enhance the connection.
Transit boarding island	Raised area with a transit stop within the roadway that provides a safe place for customers to board and alight, allowing transit vehicles to use center lanes without having to pull over to the side of the roadway for customers to board.
Transit bulb	Curb extension at a transit stop designated for passengers to wait for, board to and alight from transit vehicles. A transit bulb allows transit vehicles to board and alight passengers without pulling in and out of traffic.
Transit service efficiency	A measure of how quickly transit trips are completed, how many transit rides are offered, and the cost to provide transit rides.
Transit signal priority	A name for various techniques to speed up transit at intersections with traffic signals. Transit vehicles signal their impending arrival via radio systems and, on their arrival at the intersection, receive green lights.
Transit stop	Where transit vehicles cease movement to permit customers to alight and board.
Transit stop changes	Transit stop changes adjust the size, location, or type of a transit stop. Transit stop changes reduce travel time by changing the distance between stops, making boarding and alighting easier for customers, reducing transit dwell time, and/or reducing the time it takes for a transit vehicle to move in and out of traffic.
Transit travel time	A measure of the amount of time for transit vehicles to move between two points along a transit route.

Term	**Definition**
Transit Travel Time Reduction Proposals (TTRP)	The transit corridors along which TPS Toolkit elements are proposed to be applied are 17 of the Rapid Network Corridors.
Transit vehicle	A vehicle used for public mass transit, including Cable Cars, LRVs, Motor Coaches, Hybrid electric/diesel motor coaches, Streetcars, and Trolley Coaches.
Transit zone	A zone along a curb where no vehicles aside from transit vehicles may stop or park, and where the transit vehicle allows passengers to board and alight. A transit zone allows room for a transit vehicle to approach a curb for customer boarding and alighting.
Transit-only lane	A travel lane that is dedicated for the exclusive use of transit vehicles (with some exceptions for taxis).
Travel lane	The right of way in which a vehicle may travel.
Trolley coach	Trolley buses (also known as "trolley coaches" or "trackless trolleys") are rubber-tired vehicles with motors powered by electricity from overhead wires. "Trolley" refers to the trolley poles on the roof of the bus that are used to transmit the electricity from the overhead wires. Thus, "Electric trolley bus" is a redundant term, but must be used occasionally to differentiate real trolley buses from the faux trolley cars and cable cars that are actually small buses.
Turn lane	A secondary lane from which a turn may be made. Contrast with a no-turn lane.
Turn pocket	A short zone carved out of a lane or curb parking, permitting vehicles to make a turn at a given intersection. Most often used to prevent turning vehicles from blocking non-turning vehicles.
Turn Restrictions	Signs limiting vehicles from turning, which reduces the blockage of transit vehicles and other traffic. Turn restrictions can be part-time or full-time.
v/c ratio	The ratio of flow rate to capacity for a transportation facility.
Wayfinding signage	Directional signage located on the sidewalk, used to help pedestrians orient themselves and locate nearby destinations

CHAPTER 4: ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

4.1 INTRODUCTION

Chapter 4, Environmental Setting, Impacts, and Mitigation addresses the environmental effects of the proposed Service Policy Framework (Policy Framework) and Transit Effectiveness Project (TEP) that were identified as potentially significant in an Initial Study prepared to establish the scope of the EIR for the proposed project. The Initial Study for the proposed project was published in January 23, 2013, and circulated for public comment from January 24 through February 22, 2013. The Initial Study is presented as Appendix 2 to the EIR on the accompanying Appendix CD. This Section 4.1, Introduction, of Chapter 4 explains which environmental topics are included in the EIR and which were fully addressed in the Initial Study, presents the organization and format of the topic sections of the chapter, summarizes the overall approach to the analyses, and summarizes the land use setting for the transit system.

The Initial Study determined that project and cumulative impacts of the Policy Framework and the program-level and project-level components of the TEP would have no impacts or would have less-than-significant impacts with or without mitigation incorporated in certain topic areas; therefore, these topics do not need to be evaluated in this EIR. These topics are Land Use and Land Use Planning, Aesthetics, Population and Housing, Cultural and Paleontological Resources, Greenhouse Gas Emissions, Wind and Shadow, Recreation, Utilities and Service Systems, Public Services, Biological Resources, Geology and Soils, Hydrology and Water Quality, Hazards and Hazardous Materials, Mineral and Energy Resources, and Agricultural and Forest Resources.

The Initial Study determined that the proposed project could result in potentially significant impacts in the following topic areas: Transportation and Circulation, Air Quality, and Noise. These topics are discussed and the impacts are evaluated in detail in this chapter of the EIR.

4.1.1 FORMAT OF THE ENVIRONMENTAL ANALYSIS

Chapter 4, Environmental Setting, Impacts, and Mitigation contains three topic sections: Section 4.2, Transportation and Circulation; Section 4.3, Noise, and Section 4.4, Air Quality. Each of these sections includes the following subsections: Introduction, Environmental Setting, Regulatory Framework, and Impacts and Mitigation Measures.

The Introduction subsection for each topic briefly describes the types of impacts that are analyzed, references the Initial Study section and the pages in the Initial Study that address the topic, and identifies issues under that topic that are fully addressed in the Initial Study and therefore, will not be addressed in the EIR.

The Environmental Setting subsection describes existing physical environmental conditions at the time that the Notice of Preparation of an Environmental Impact Report (NOP) was issued by the Planning Department, in November 2011. The existing conditions serve as the baseline for the analysis of environmental impacts that would result from implementation of the proposed project, subsequently presented in the Impacts and Mitigation Measures subsection. The Environmental Setting subsection also presents fundamental details about the particular topic to assist in understanding the technical analyses presented in the Impacts and Mitigation Measures subsection.

The Regulatory Framework subsection summarizes federal, state, and local laws, regulations and ordinances that are applicable to the environmental topic being discussed.

The Impacts and Mitigation Measures subsection presents the significance thresholds used by the Planning Department to assess the severity of environmental impacts for the topic. An explanation of the approach to the analysis of each topic is provided. The Approach to Analysis explains technical parameters, assumptions and methodologies used in the analysis, and may include a brief summary of project features particularly relevant to the topic being analyzed. The Impact Evaluation discussion in this subsection presents impact statements that relate to the significance thresholds. Each impact statement is keyed to its subject area using an abbreviation for that topic and a number. For example, the first impact statement in the Transportation and Circulation topic is Impact TR-1. Mitigation measures identified that would reduce or eliminate a significant impact of the proposed project, when feasible, are correspondingly identified with “M” and the letters and number of the impact statement: M-TR-1 for a mitigation measure that corresponds to Impact TR-1. Improvement measures that would further reduce impacts identified as “less than significant” are identified with an “I,” the topic code, and a letter, beginning with “A” (e.g., I-TR-A for the first transportation improvement measure). If there is more than one mitigation measure for the same impact statement, the mitigation measures each end with a lowercase letter suffix: M-TR-1a and M-TR-1b for two separate mitigation measures under transportation Impact TR-1.

Each impact statement describes the impact as it would occur without mitigation. The level of significance of the impact is indicated in parentheses at the end of the impact statement, using the following terms:

- **No Impact** – No adverse changes (or impacts) to the environment are expected.

- **Less-Than-Significant Impact** – Impact that does not exceed the defined significance criteria or would be eliminated or reduced to a less-than-significant level through compliance with existing local, state, and/or federal laws and regulations.

- **Less-Than-Significant Impact with Mitigation** – Impact that is reduced to a less-than-significant level through implementation of the identified mitigation measure(s).

- **Significant and Unavoidable Impact with Mitigation** – Impact that exceeds the defined significance criteria and can be reduced through compliance with existing local, state, and federal laws and regulations and/or implementation of all feasible mitigation measures, but cannot be reduced to a less-than-significant level.

- **Significant and Unavoidable Impact** – Impact that exceeds the defined significance criteria and cannot be eliminated or reduced to a less-than-significant level through compliance with existing local, state, and federal laws and regulations and for which there are no feasible mitigation measures.

Cumulative impacts are discussed in a separate subsection of each topic following the complete analysis of the proposed project for that topic. Cumulative impact statements are numbered consecutively, where more than one impact statement is presented, with a similar combined alpha-numeric code, beginning with a “C” to signify that it is a cumulative impact. For example, C-TR-1 refers to the first cumulative impact for Transportation and Circulation.

4.1.2 APPROACH TO ANALYSIS

The Policy Framework would be applied to Muni’s transit system as a whole, and is not a development proposal. The Policy Framework establishes service delivery objectives and identifies actions to be taken to fulfill these objectives. Therefore, the Policy Framework would not result in direct physical changes for any topic in the EIR. As explained in the Introduction to the Evaluation of Environmental Effects in the Initial Study (p. 176 in Appendix 2 to this EIR), the Policy Framework could cause indirect physical changes to the environment from implementation of actions taken to fulfill its objectives.

The TEP projects provide a reasonable representation of the type and scope of physical changes that would be expected to occur as a result of implementing the Policy Framework. Therefore, the analysis of the environmental impacts of the TEP project components for a topic provides a good understanding of the indirect impacts of the Policy Framework for that topic.

The TEP is a program of transportation infrastructure projects that would be implemented in phases. The TEP is also not a typical development project and does not involve changes to land use or development at a single particular location. In addition, the TEP has project-level components that have been defined in sufficient detail to be fully analyzed at a project level of detail, and program-level components that are less well defined.

As explained in Chapter 2, Section 2.5.1, certain components of the TEP, such as the Service Policy Framework, some of the Service-related Capital Improvements, and some of the TTRPs for which specific detailed designs have not yet been developed, are described at a more general, program level. Other components are described at a project level of detail. For some of the program-level TEP components sufficient detail is not available to provide a project-level analysis of transportation impacts; these components are analyzed at a program level of detail in the Transportation and Circulation section, and are presented before the discussion and analysis of the project-level components. Because the level of detail needed to conduct an impact analysis varies somewhat depending on the impact, some program-level TEP components are analyzed at a project–specific level where sufficient detail is known. Except for TTPI.3 - E Line Independent Terminal at Beach and Jones streets, the program-level components of the TEP are sufficiently well-defined to allow analysis of all noise and air quality impacts at a project level of detail. This is explained in more detail in the Introduction and Project Features subsections in these two topic sections.

For eight of the 17 TTRPs the analysis provided in this EIR presents a range of alternatives designed at a project level of detail. The range of TTRPs analyzed in the EIR bracket a moderate option, referred to as the TTRP Moderate Alternative, and an expanded option, referred to as the TTRP Expanded Alternative. The two alternatives are presented and analyzed at an equal level of detail in the EIR topic sections. In general, the TTRP Expanded Alternative would include elements with greater potential to result in significant physical environmental impacts than the TTRP Moderate Alternative, particularly with respect to transportation impacts. This is primarily the result of reductions in capacity for private passenger vehicles in order to prioritize transit operations provided under the TTRP Expanded Alternative scenario. In Section 4.2, Transportation and Circulation, the impacts of the two alternatives are presented separately and compared. In Sections 4.3, Noise and Vibration, and 4.4, Air Quality, the approach to analysis considered worst-case conditions with regard to the topic area in order to address potential environmental effects that may result from either the TTRP Expanded Alternative or the TTRP Moderate Alternative. The discussion explains that impacts of the two project alternatives would be similar and would be less than significant for both air quality and noise and vibration. Overall the analyses in Chapter 4 adequately disclose the potential environmental effects of the range of alternatives.

Twelve of the Service Improvement routes include Service Variants—modifications of a segment of the proposed route or changes to the type of transit vehicle that could be used in implementing the Service Improvement for a particular route. All of the Service

Improvements, including their variants, are analyzed at a project level. Where impacts of the Service Variants have the same level of significance as those of the Service Improvements, they are discussed together under one Impact Statement; where the impacts would result in a different level of significance for a Service Variant, the variant is discussed separately. Three of the eight project-level TTRPs also have variants that propose different TPS Toolkit elements at some locations along a segment of the route than are proposed with these three TTRPs. These TTRP variants are analyzed at a project level in the environmental topics that follow, as part of the analysis of the eight project-level TTRPs. As with the Service Variants, where a TTRP Variant would have the same level of significance for a particular impact as the TTRP, both are discussed together in one Impact Statement; where the level of significance for a particular impact from a TTRP Variant would be different, a separate Impact Statement and discussion are provided.

Approach to Cumulative Analysis

In general, San Francisco uses a plan-based approach to cumulative analysis; that is, a summary of growth projections in an adopted general plan or other similar planning document as outlined in *CEQA Guidelines* §15130(b)(2)(B). The cumulative impacts of the proposed project are analyzed in this EIR based in part on forecasts of growth that have been included in the SF-CHAMP travel demand forecasting model developed by the San Francisco County Transportation Authority (SFCTA). For future 2035 conditions, this model includes projections prepared by the San Francisco Planning Department of population and employment growth throughout the City and foreseeable changes in the transportation system (for example, construction and implementation of the Van Ness and Geary Bus Rapid Transit projects), and accounts for regional growth projections prepared by the Association of Bay Area Governments. Thus, the cumulative transportation analysis uses a plan-based approach. Insofar as the air quality analysis uses future transportation information to assess the impacts of the proposed project, cumulative impacts also uses a plan-based approach. Construction-generated noise and vibration are more localized impacts; therefore, the cumulative construction noise and construction vibration discussions acknowledge other known, and expected to occur, projects in the public right-of-way and employ a list-based approach (see *CEQA Guidelines* § 15130(b)(1)(A)). Insofar as the operational noise analysis includes noise from future vehicular volumes on the representative street segments analyzed, the cumulative noise impact analysis uses a plan-based approach, as for the cumulative transportation analysis.

4.1.3 LAND USE SETTING

The geographic setting for the Policy Framework and the TEP is San Francisco, the City as a whole. The Initial Study found that this transportation infrastructure project would have less-than-significant land use and land use planning impacts and would not conflict with any applicable land use plan or policy adopted for the purposes of avoiding or mitigating an environmental impact. The proposed project would not affect local zoning regulations. Therefore, this topic is not included in the EIR. This subsection provides a brief summary of land uses in the City as background and context for the impact analyses presented in the EIR.

The TEP projects would be constructed and operated primarily within the existing, established street rights-of-way in the City. Many of the streets where changes to the transit system are proposed are lined with residential uses of varying densities. Some of the proposed improvements would occur in neighborhood commercial areas that have ground-floor retail uses. The streets in the greater downtown area generally have ground-floor retail uses with either commercial and office uses or residential uses above the ground floor. The northern waterfront area and northern portion of the northeast quadrant of the City have a concentration of tourist-oriented uses and hotels. The southern portion of the northeast quadrant of the City including the South of Market area (SOMA), and various areas in the southeast quadrant include light and heavy industrial uses and production, distribution and repair uses along some streets. In the majority of the residential neighborhoods, and throughout the greater downtown, buildings extend to the sidewalk, with small or no front yards.

The transit system provides connections between residential areas and neighborhood commercial and retail uses, between residential areas and employment locations such as downtown and SOMA, between residential and commercial areas and government services in the Civic Center area, and between residential and commercial areas and entertainment locations such as the performance spaces in Civic Center and the theaters on Market Street and Geary Street in downtown. Transit routes run adjacent to and through many of the major parks and open spaces in the City, providing access to open space, including Golden Gate Park, the Presidio, Dolores Park, Harding Park, and McLaren Park. The transit system is intended to support travel between various land uses, pursuant to the City's Transit First policy.

4.2 Transportation and Circulation

4.2.1 INTRODUCTION

This section analyzes the potential project-level, program-level, and cumulative impacts on transportation and circulation resulting from implementation of the TEP projects and project variants as well as indirect transportation and circulation impacts resulting from the Policy Framework. Transportation analysis of project-level Travel Time Reduction Proposal (TTRP) Moderate and Expanded Alternatives, as well as TTRP variants, was conducted at an equal level of detail. Transportation-related issues of concern that are addressed include traffic on local and regional roadways, transit, bicycles, pedestrians, parking, loading, and construction-related activities. This section provides an overview of existing transportation conditions, a description of applicable transportation regulations and policies, methodologies and assumptions used in the impact analysis, and impact assessment and mitigation measures. This section is based on information and analysis contained in the San Francisco Transit Effectiveness Project (TEP) Transportation Impact Study (TIS) and the supplemental memorandum for transportation analysis of the project-level TTRP.L, TTRP.9, and TTRP.71_1 projects.[1]

4.2.2 ENVIRONMENTAL SETTING

The transportation study area includes all aspects of the City's transportation network that may be measurably affected by the proposed project. The transportation study area is defined by travel corridors and facilities such as bus stops/transit stations. It includes street intersections, primarily along 17 corridors where the TTRPs have the potential to affect intersection operations. No freeway segments were analyzed because the proposed project would not measurably affect the operation of the freeway system.

A total of 78 intersections throughout San Francisco were identified as the intersections most representative of intersections likely to be affected by the proposed project. All intersections were analyzed for weekday p.m. peak hour (generally between 5 and 6 p.m.) of the peak period (4 to 6 p.m.) conditions, and 20 of the 78 study intersections were also analyzed for weekday a.m. peak hour (generally between 7:45 and 8:45 a.m.) of the peak period (7 to 9 a.m.)

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[1] Fehr & Peers and LCW Consulting, *San Francisco Transit Effectiveness Project Transportation Impact Study*, July 10, 2013. Fehr & Peers and LCW Consulting, *TEP TIS – Supplemental Analysis for TTRP.L, TTRP.9 and TTRP.71_1*, Final Memorandum, December 30, 2013. Copies of these documents are available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

conditions. Additionally, the study intersection of Winston Drive/19th Avenue was analyzed for weekend (Saturday) midday peak hour (1:45 to 2:45 p.m.) of the weekend (Saturday) midday peak period (1 to 3 p.m.) because it serves as the main access point for the Stonestown Galleria, a shopping mall that generates higher amounts of traffic during the weekends than weekdays (and for which changes are proposed as part of the TEP). Figure 24 presents the study

SOURCE: FEHR & PEERS, LCW Consulting

■ AM and PM Peak Hour Study Intersection

● PM Peak Hour Study Intersection

TRANSIT EFFECTIVENESS PROJECT

FIGURE 24 - PROJECT STUDY INTERSECTIONS

intersections and indicates which ones were analyzed for weekday p.m. peak conditions only and which intersections were analyzed for both weekday a.m. and p.m. peak conditions.

4.2.2.1 REGIONAL AND LOCAL ROADWAYS

This section includes a discussion of the existing roadway network serving the study area.

Regional Access

U.S. 101 and Interstate 80 (I-80) provide the primary regional access to the project area. U.S. 101 serves San Francisco and the Peninsula/South Bay and extends north via the Golden Gate Bridge to the North Bay. Within the City, portions of U.S. 101 follow the local street network, primarily along Van Ness Avenue and Lombard Street west of Van Ness Avenue. Van Ness Avenue and Lombard Street are part of the Citywide Pedestrian Network outlined in the Transportation Element of the *San Francisco General Plan* (*General Plan*). I-80 connects San Francisco to the East Bay and points east via the San Francisco-Oakland Bay Bridge. Within San Francisco, I-80 generally has eight lanes (four lanes in each direction).

I-280 provides regional access to San Francisco from the South Bay and Peninsula, and to and from downtown San Francisco. I-280 is generally a six-lane freeway. I-280 terminates in the South of Market area at King Street. State Route (SR) 1 is an arterial street on the western side of San Francisco that includes 19th Avenue, Crossover Drive through Golden Gate Park, Park Presidio Boulevard, and Veterans Boulevard, and joins U.S. 101 at Doyle Drive in the Presidio. SR 35 is an arterial street that includes Skyline Boulevard and Sloat Boulevard and primarily serves the southwest portion of the City.

Local Street System

Most San Francisco roadways are aligned on a grid system. The typical block in the South of Market area is four times as large as the typical block North of Market. The grid offers multiple route options for getting from place to place, although aberrations in the grid (particularly along Market Street and in the vicinity of hills) can result in some connectivity challenges. The *General Plan* contains definitions and regulatory requirements for a variety of roadway classifications that make up the City’s street network.

City roadway designations include (listed in the order of potential capacity) Freeways, Major Arterials, Transit Conflict Streets, Secondary Arterials, Recreational Streets, Collector Streets, and Local Streets. Each of these roadways has a different potential capacity for mixed-flow traffic and for changes that might alter traffic patterns on the given roadway. The

General Plan also identifies certain Transit Preferential Streets from among the City's various roadways, each of which is identified as a Primary Transit Street – Transit Oriented, Primary Transit Street – Transit Important, or Secondary Transit Street.[2] The Pedestrian Network is a classification of streets throughout the City used to identify streets developed to be primarily oriented to pedestrian use, and includes Citywide Pedestrian Network Streets[3] and Neighborhood Pedestrian Streets.[4]

Intersection Operations

Existing intersection operating conditions were evaluated for the weekday p.m. peak hour (generally between 5 and 6 p.m.) of the p.m. peak period (4 to 6 p.m.) for 78 study intersections throughout San Francisco. Of the 78 study intersections, 20 study intersections were also evaluated for the weekday a.m. peak hour (generally between 7:45 and 8:45 a.m.) of the a.m. peak period (7 to 9 a.m.). The study intersection of Winston Drive/19th Avenue was analyzed for weekday a.m. and p.m. peak hour conditions, as well as for the weekend (Saturday) midday peak hour (1:45 to 2:45 p.m.) of the weekend (Saturday) midday peak period (1 to 3 p.m.). Section 4.2.4.2 presents information on traffic volume data collection and intersection analysis methodology.

Traffic conditions at the study intersections were evaluated using the Level of Service (LOS) methodology described in the *Highway Capacity Manual 2000* (HCM2000). LOS is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with severe congestion. In San Francisco, LOS D or better conditions are considered acceptable. Section 4.2.4.2 presents the traffic analysis methodology and LOS designations for signalized and unsignalized intersections; it defines each of the levels of service and shows the correlation between average control delay and LOS.[5]

Existing operating conditions for the study intersections are presented in Tables 16 and 17, pp. 4.2-180 to 4.2-186. During the period that traffic analysis was conducted (Fall 2011/Fall

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[2] City and County of San Francisco, *San Francisco General Plan*, 2007 Transportation Element, Table 1, Classification of Elements in the Vehicle Circulation Plan, and Table 4, Transit Preferential Streets Classification System. Available online at: http://www.sf-planning.org/ftp/General_Plan/I4_Transportation.htm. Accessed April 12, 2013.

[3] City and County of San Francisco, *San Francisco General Plan*, 2007 Transportation Element, Map 11 Citywide Pedestrian Network Streets. Available online at: http://www.sf-planning.org/ftp/General_Plan/images/I4.transportation/tra_map11.pdf. Accessed April 12, 2013.

[4] City and County of San Francisco, *San Francisco General Plan*, 2007 Transportation Element, Map 12 Neighborhood Pedestrian Streets. Available online at: http://www.sf-planning.org/ftp/General_Plan/images/I4.transportation/tra_map12.pdf. Accessed April 12, 2013.

[5] Control delay is the component of delay that a driver experiences at an intersection that results from the type of control (for example signal or stop sign) at an intersection.

- 2012 and Spring/Summer 2013), which constitutes the baseline or existing conditions for this environmental review, most study intersections were found to be operating acceptably, with the following exceptions (all intersections are signalized unless otherwise noted):
    - 13th Street/Duboce Avenue/Mission Street/Otis Street operates at LOS F in the a.m. peak hour and LOS E in the p.m. peak hour;
    - Market Street/Church Street/14th Street operates at LOS F conditions during the p.m. peak hour;
    - Randall Street/San Jose Avenue operates at LOS E conditions during the a.m. peak hour;
    - Silver Avenue/San Bruno Avenue operates at LOS E conditions during the p.m. peak hour;
    - The worst approach at the intersection of Felton Street/San Bruno Avenue (unsignalized) operates at LOS E conditions during the p.m. peak hour, although p.m. peak hour traffic volumes do not meet peak hour signal warrant criteria[6];
    - Arleta Avenue/San Bruno Avenue/Bayshore Boulevard operates at LOS E conditions during the p.m. peak hour;
    - The worst approach at the intersection of Geneva Avenue/Cayuga Street (unsignalized) operates at LOS E conditions during the p.m. peak hour, and p.m. peak hour traffic volumes meet peak hour signal warrant criteria;
    - Geneva Avenue/I-280 Northbound On-ramp operates at LOS F conditions during the a.m. and p.m. peak hours;
    - Geneva Avenue/I-280 Southbound Off-ramp operates at LOS E conditions during the p.m. peak hour;
    - Winston Drive/19th Avenue operates at LOS E in the a.m. and p.m. peak hours;
    - Fulton Street/Stanyan Street operates at LOS E in the p.m. peak hour.

[6] A signal warrant is a condition that an intersection must meet to justify a signal installation. There are different warrants, which examine factors such as the volume of vehicles, bicyclists, and pedestrians, the signal system, collision statistics, as well as the geometric/physical configuration of the intersection. Even if a signal warrant is not met under the strictest interpretation, the determination to signalize an intersection could be made based upon the city traffic engineer's professional judgment of intersection operations.

4.2.2.2 TRANSIT SERVICE

Local transit service within the city limits is provided by Muni, the transit division of the San Francisco Municipal Transportation Agency (SFMTA). The Bay Area Rapid Transit District (BART), Alameda-Contra Costa Transit District (AC Transit), and ferries provide regional transit service to and from the East Bay; Golden Gate Transit buses and ferries provide service to and from the North Bay; and Caltrain, SamTrans, and BART provide service to and from the Peninsula and the South Bay.

Local Muni Service

Muni provides transit service within the City and County of San Francisco, including bus (both biodiesel and electric trolley), light rail (Muni Metro), cable car, and electric streetcar lines. Figures 1a through 1d on pp. 2-3 to 2-6 in Chapter 2, Project Description, show the existing Muni transit routes by City quadrant.

The existing Muni system is located within the public right-of-way, and most bus routes run within mixed-flow travel lanes. However, within San Francisco there are a number of transit-only lanes that enable transit vehicles to bypass congestion caused by vehicular traffic and eliminate transit vehicle re-entry delay when attempting to leave curbside bus stops (for example, on Third, Clay, and Geary streets). A description of the existing transit-only lanes within San Francisco is provided in Article 600 of the San Francisco Transportation Code.[7]

Sources of Existing Delay to Muni. Based on professional experience and various performance studies conducted by the SFMTA, it has been observed that Muni bus routes, and light rail and historic streetcar lines are subject to various delays at intersections and along corridors, even where transit-only lanes are provided. Based on SFMTA experience and studies, the following are examples of sources of transit delay[8]:

- Passenger/Loading delay – Delay associated with passengers boarding and alighting the transit vehicle is generally the greatest source of delay for Muni vehicles. Loading delays are experienced throughout the system and can largely be attributable to fare payment and queuing and opposing directions of boarding and alighting riders. To alleviate some of this delay, Muni has recently instituted an all-door boarding policy on

[7] City and County of San Francisco, *San Francisco Transportation Code, Article 600*. Transit-Related Restrictions. (SFMTA Board Resolutions No. 08-151, 8/19/2008; No. 09-172, 9/15/2009).

[8] San Francisco Municipal Transportation Agency (SFMTA), San Francisco Transit Effectiveness Project Service Evaluation Report (December 2008) and Better Market Street Existing Conditions and Best Practices Report, Part 1.2 Multi-Modal Operations (December 2011). Copies of these reports are available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

all routes/lines. Many of the TPS Toolkit elements are targeted at further reducing loading delay. For example, by providing a spacious and elevated area to queue and dismount adjacent to the transit vehicle, transit boarding islands are designed to speed up both boarding and alighting.

- Intersection delay – Delays of Muni vehicles at intersections is typically the second largest source of delay for Muni vehicles. At signalized intersections, converting nearside transit stops to farside transit stops generally reduces transit delay and improves transit travel times because the transit stop relocation precludes buses from having to pull into a nearside transit stop during a green phase of the traffic light and continue to dwell nearside at the intersection during the red phase after all passengers have exited and boarded. Similarly, removing stop signs on the transit approaches at all-way stop-controlled intersections, installing transit queue jump phases, and implementing transit signal priority at intersections also serve to reduce transit delays at intersections.

- Congestion delay – Vehicular congestion generally constitutes the third largest source of delay for Muni vehicles. In general, congestion is worst during the a.m. and p.m. peak commuting periods, although some streets regularly experience congestion throughout the day. Congestion delay may sometimes be difficult to quantify because it often slows down transit vehicles (for example, forcing them to change lanes due to a vehicle queue or double-parked vehicle, etc.) without necessarily causing them to stop. Transit-only lanes and approaches, as well as wider lanes in which Muni vehicles operate, reduce transit delays from congestion.

- Turning vehicle delay – Vehicles waiting to turn can block passage of the transit vehicle. Often the vehicles waiting to turn right are waiting for pedestrians in the crosswalk to clear, while vehicles waiting to turn left are waiting for a gap in the opposing traffic as well as for pedestrians in the crosswalk. Therefore, vehicle turn restrictions at select intersections on transit streets can reduce transit delays.

- Narrow travel lanes – Narrow travel lanes (that is, travel lanes narrower than 11 feet where Muni is operating adjacent to parking or another travel lane in the same direction, or narrower than 10 feet adjacent to a bicycle lane) slow down buses due to friction with parked cars and commercial or large vehicles, as well as with other vehicles and bicyclists, particularly on streets with one travel lane in each direction. On streets with two or more narrow travel lanes in each direction, buses often straddle two travel lanes. Widening travel lanes to 12 feet, and/or providing 12-foot-wide transit-only lanes would reduce friction with other vehicles and eliminate the need for buses and other large vehicles to straddle two travel lanes.

Transit Ridership and Capacity Utilization. The transit analysis was conducted by calculating the existing capacity utilization (riders as a percentage of capacity) at the maximum load point (MLP) (the point of greatest demand) along a particular route. Ridership and transit fleet information was obtained from the SFMTA and is based on ridership data collected in 2010/2011. Table 12, pp. 4.2-122 to 4.2-128, and Table 13, pp. 4.2-129 to 4.2-135, present the existing and estimated Existing plus Project ridership and capacity utilization at the MLP for all Muni routes/lines that provide service during the weekday a.m. and p.m. peak hours, respectively. Muni's established capacity utilization standard for peak period operations is 85 percent. It should be noted that the 85 percent utilization includes seated and standing loads, so at 85 percent utilization all seats are taken and there are many standees. Section 4.2.4.2 presents a description of the transit capacity utilization methodology. During both a.m. and p.m. peak hours, the majority of the routes/lines operate within the 85 percent capacity utilization standard under Existing Conditions, except for the following:

- F Market & Wharves (outbound in the p.m. peak hour)
- K Ingleside (inbound in the a.m. peak hour, outbound in the p.m. peak hour)
- N Judah (inbound in the a.m. peak hour)
- 10 Townsend (outbound in the a.m. peak hour and both directions in the p.m. peak hour)
- 19 Polk (outbound in the a.m. peak hour)
- 21 Hayes (inbound in the a.m. peak hour)
- 30X Marina Express (inbound in the a.m. peak hour and outbound in the p.m. peak hour)
- 43 Masonic (inbound in the a.m. peak hour)
- 71 Haight-Noriega/71L Haight-Noriega Limited (outbound in the p.m. peak hour)

Regional Service Providers

East Bay: Transit service to and from the East Bay is provided by BART and AC Transit. BART operates regional rail transit service between the East Bay (from Pittsburg/Bay Point, Richmond, Dublin/Pleasanton and Fremont) and San Francisco, and between San Mateo County (Millbrae and San Francisco Airport) and San Francisco. AC Transit is the primary bus operator for the East Bay, including Alameda and western Contra Costa counties.

AC Transit operates 37 routes between the East Bay and San Francisco, all of which terminate at the (temporary) Transbay Terminal.[9]

South Bay: Transit service to and from the South Bay is provided by BART, SamTrans, and Caltrain. SamTrans provides bus service between San Mateo County and San Francisco, including 14 bus routes that serve San Francisco (12 routes serve the downtown area).[10] In general, SamTrans service to downtown San Francisco operates along South Van Ness Avenue, Potrero Avenue, and Mission Street to the Transbay Terminal. SamTrans cannot pick up northbound passengers at San Francisco stops. Similarly, passengers boarding in San Francisco (and destined to San Mateo) may not disembark in San Francisco. Caltrain provides commuter heavy-rail passenger service between Santa Clara County and San Francisco. Caltrain currently operates 38 trains each weekday, with a combination of express and local service.[11] The San Francisco Caltrain terminal is located at Fourth and Townsend streets.

North Bay: Transit service to and from the North Bay is provided by Golden Gate Transit buses and ferries. Between the North Bay (Marin and Sonoma Counties) and San Francisco, Golden Gate Transit operates 22 commute bus routes, nine basic bus routes, and 16 ferry feeder bus routes, most of which serve the Van Ness Avenue corridor or the Financial District.[12] Golden Gate Transit also operates ferry service between the North Bay and San Francisco. During the morning and evening peak periods, ferries run between Larkspur and San Francisco and between Sausalito and San Francisco. The San Francisco terminal is located at the Ferry Building, at The Embarcadero and Market Street.

Local and Regional Transit Screenline Analysis

Muni Screenline Analysis. The availability of Muni service capacity was analyzed in terms of a series of screenlines, which are comprised of various transit corridors (which are in turn comprised of grouped Muni routes/lines). The concept of screenlines is used to describe the magnitude of travel to or from the greater downtown area and to compare estimated transit volumes to available capacities. See Section 4.2.4.2 for a description of the transit

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[9] *The 34th America's Cup and James R. Herman Cruise Terminal and Northeast Wharf Plaza Final EIR*, December 2011, p. 5.6-23. A copy of this EIR is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2010.0493E.

[10] Ibid, pp. 5.6-23 to 5.6-24.

[11] Ibid, p. 5.6-24.

[12] Ibid, p. 5.6-24.

screenline analysis and location of the four Muni screenlines, as well as the Muni routes/lines included within each screenline and corridor.[13]

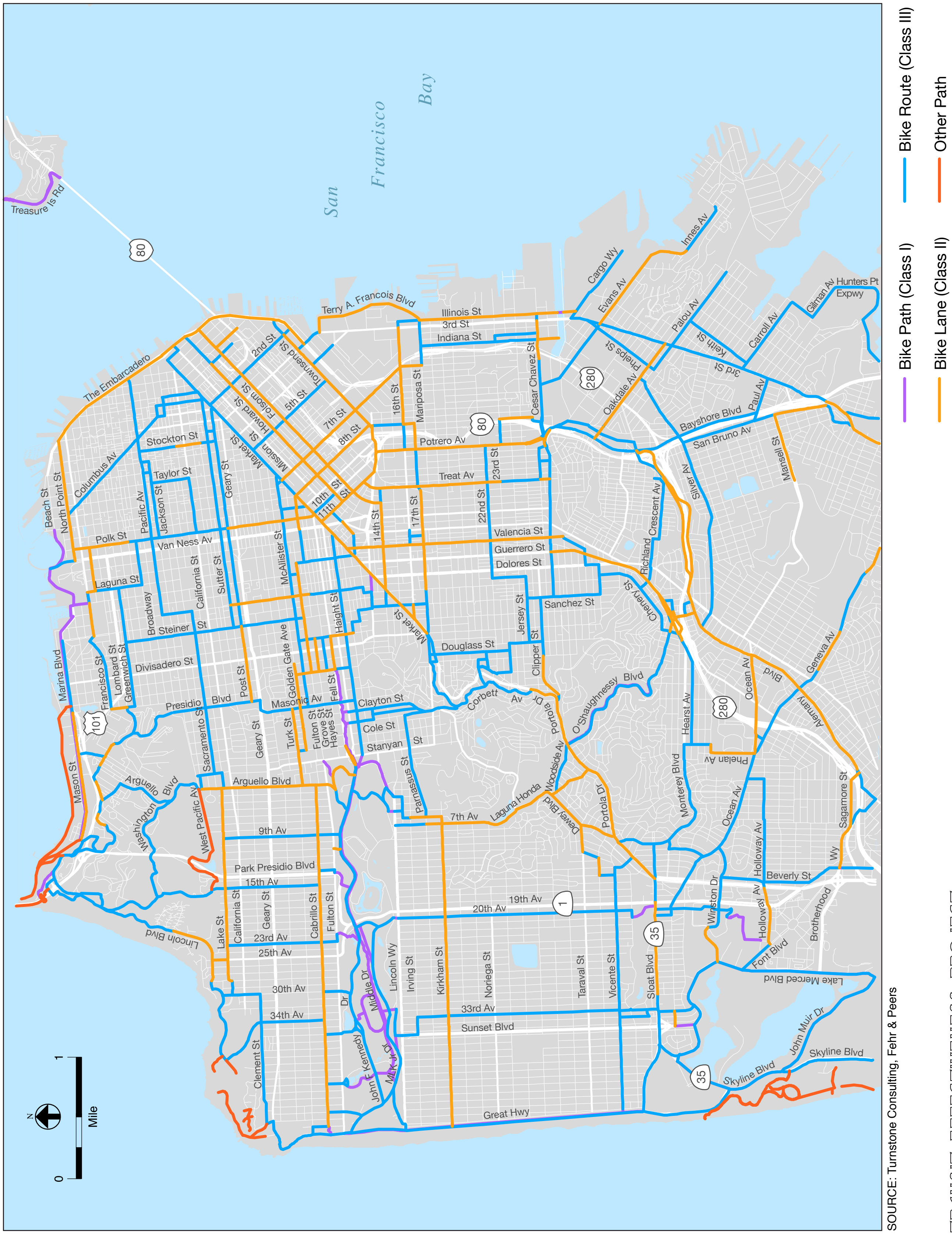
The existing transit passenger load, capacity and capacity utilization at each screenline and screenline corridor during the weekday a.m. and p.m. peak hour are presented in Table 14, p. 4.2-172, and Table 15, p. 4.2-173. About 20,170 passengers crossed the four Muni screenlines during the weekday a.m. peak hour, and about 18,400 passengers during the weekday p.m. peak hour. During the a.m. peak hour, the majority of trips (62 percent) cross the Southwest (34 percent) and Northwest (28 percent) screenlines, while during the p.m. peak hour, the majority of trips (62 percent) cross the Northwest (29 percent) and Southwest (33 percent) screenlines. Capacity utilization of the screenlines during both the a.m. and p.m. peak hours ranges between 60.2 and 78.8 percent. Overall, with the exception of the subway lines within the Southwest screenline during the a.m. peak hour, all corridors are currently operating below 85 percent capacity utilization, and could accommodate additional passengers. The subway lines within the Southwest screenline (K Ingleside, L Taraval, M Ocean View, and N Judah) operate at capacity utilization of 85.9 percent during the a.m. peak hour.

Regional Screenline Analysis. Similar to the Muni screenlines, the availability of regional transit service into and out of San Francisco was also evaluated in terms of a series of screenlines. However, while Muni screenlines are evaluated based on capacity utilization (percent of total capacity used), regional transit providers are evaluated based on load factors (percent of total seats used). Regional providers have a load factor standard of 100 percent. See Section 4.2.4.2 for a description of regional screenlines. Tables 22 and 23, p. 4.2-277, present the peak-hour ridership and capacity information for each regional screenline for the existing weekday a.m. (inbound into San Francisco) and p.m. (outbound from San Francisco) hours, respectively. All regional transit providers operate at less than their load factor standards of 100 percent, which indicates that seats are generally available.

4.2.2.3 BICYCLE NETWORK

The designated bicycle route network within San Francisco is presented on Figure 25.

[13] The Muni bus routes and light rail and historic streetcar lines included in the screenlines and corridors were revised in December 2012, in consultation with the SFMTA, to represent current operating conditions as compared to the route groupings of the Muni screenlines included in the 2002 *SF Guidelines*.



SOURCE: Turnstone Consulting, Fehr & Peers

FIGURE 25: BICYCLE ROUTE NETWORK

Bikeways are typically classified as Class I, Class II, or Class III facilities.[14] Class I bikeways are bicycle paths with exclusive right-of-way for use by bicyclists. Class II bikeways are bicycle lanes striped within the paved areas of roadways and established for the preferential use of bicycles, while Class III bikeways are signed bicycle routes that allow bicycles to share the travel lane with vehicles.

Specific elements of the proposed project would occur on roadways currently designated as bicycle facilities, as follows:

- TTRP.5: 5 Fulton and 5L Fulton Limited has Bicycle Route 20 on McAllister Street between Masonic Avenue and Market Street (Class III). Bicycle Route 20 continues west of McAllister Street on nearby streets (Class II), including Golden Gate Avenue and Turk Street between Baker Street and Arguello Boulevard, and Cabrillo Street between Arguello Boulevard and La Playa Street.

- TTRP.8X: 8X Bayshore has Bicycle Route 90 on Geneva Avenue (Class II and Class III), and Bicycle Route 5 on Bayshore Boulevard and San Bruno Avenue (Class II and Class III).

- TTRP.9: 9 San Bruno and 9L San Bruno Limited has Bicycle Routes 25 and 30 on 11th Street, Potrero Avenue, and Bayshore Boulevard as Class II and Class III routes, depending on the TTRP segment.

- TTRP.14: 14 Mission, 14L Mission Limited, and 14X Mission Express has Bicycle Route 30 on Mission Street between Tenth and McCoppin streets (Class II and Class III).

- TTRP.22_1: 22 Fillmore along 16th Street has Bicycle Route 40 (Class II) on the proposed realignment on 16th Street between Kansas and Third streets.

- TTRP.28_2: 28L 19th Avenue Limited has Bicycle Route 25 on Van Ness Avenue between Beach and Lombard streets (Class II and Class III).

- TTRP.30_1: 30 Stockton has Bicycle Route 2 on North Point Street from Van Ness to Columbus avenues (Class II), Bicycle Route 11 on Columbus Avenue from North Point Street to Broadway (Class III), and Bicycle Route 17 on Stockton Street from Broadway to Post Street (Class II and Class III).

[14] Bicycle facilities are defined by the State of California in the California Streets and Highway Code Section, 890.4. Available online at: http://www.leginfo.ca.gov/cgi-bin/displaycode?section=shc&group=00001-01000&file=890-894.2. Accessed April 12, 2013.

- TTRP.71: 71L Haight-Noriega Limited and 6 Parnassus has Bicycle Route 30 on Haight Street between Pierce and Scott streets (Class III).

- TTRP.J: J Church has Bicycle Route 45 on 30th Street between Church and Dolores streets (Class III).

- TTRP.K: K Ingleside has Bicycle Route 84/90 on Ocean Avenue (Class II and Class III).

- TTRP.L: L Taraval has Bicycle Route 50 on the segment of Ulloa Street between 15th and Forest Side avenues (Class II).

- TTRP.M: M Ocean View has Bicycle Route 75 on 19th Avenue, and Beverly Lunada, and Randolph streets (Class III).

Other TTRP corridors, including TTRP.1, TTRP.22_2, TTRP.28_1, TTRP.30_2, and TTRP.N do not have any designated bicycle facilities along the proposed TTRP segment. The SFMTA has implemented numerous bicycle projects from San Francisco's 2009 *Bicycle Plan*, including bikeways and bicycle parking citywide. Approximately 72 percent of the planned bicycle lane miles and 68 percent of the planned sharrow miles identified as part of the Bicycle Plan near-term projects have been completed (as of September 2012). The citywide bicycle network has expanded to include over 65 miles of lanes and 64 miles of sharrows, and it continues to grow, as near-term and long-term Bicycle Plan projects are implemented. A map showing the locations of the near-term and long-term Bicycle Plan projects is available online at the SFMTA Web site: http://www.sfmta.com/sites/default/files/projects/BicyclePlan_ExecSummary_Handout_November_2008.pdf.

4.2.2.4 PEDESTRIAN NETWORK

Sidewalks are provided on most City streets on both sides of the street. Sidewalk widths generally range from 8 to 15 feet in width along most streets, and to 30 feet or more along major pedestrian corridors such as Market Street and The Embarcadero. However, the effective width of each sidewalk is often less due to obstructions such as street trees, lamp posts, overhead wire poles, bus shelters, newspaper racks, and other objects. Most intersections with substantial pedestrian activity are signalized, and include crosswalks with pedestrian signals. San Francisco has been installing pedestrian countdown signals citywide, which improve safety by alerting pedestrians of the remaining time to cross the street.

Pedestrian activity levels vary throughout the day citywide, but generally peak during the weekday morning and afternoon commute periods and the noon hour, particularly in downtown. Pedestrian activity levels may also peak during non-peak hours related to specific adjacent land uses. Major pedestrian corridors often coincide with major transit and bicycle corridors; for example, Columbus Avenue, Market Street, and Mission Street. Mission Street and Columbus Avenue, which are included in proposed TTRP corridors, are designated as Citywide Pedestrian Network Streets, and have a high volume of pedestrians throughout the day.

The San Francisco Better Streets Plan, which was adopted in 2010, creates a unified set of standards, guidelines, and implementation strategies to govern how the City designs, builds, and maintains its pedestrian environment. A key goal of the Better Streets Plan is to prioritize the needs of walking, bicycling, transit use, and the use of streets as public spaces for social interaction and community life, following San Francisco's *General Plan*, *Transit First* Policy, and Better Streets Policy. Within downtown, the Public Realm Plan of the Transit Center District Plan includes widening of the sidewalks on Mission Street between Main and Annie streets.

Based on information provided in SFMTA's San Francisco 2010–2011 Collisions Report, Muni reported fatal and injury collisions between Muni vehicles and pedestrians citywide declined over the last five years, from 195 collisions in 2006, to 103 in 2011.[15] Muni reported bus and rail collisions involving pedestrians also declined between 2006 and 2011, from 47 in 2006 to 32 in 2011.[16] In comparison, during the same time period, pedestrian-vehicle collisions have remained relatively the same, and in fact, increased slightly between 2010 and 2011.

4.2.2.5 LOADING

Freight delivery and service vehicle demand in San Francisco is served via off-street facilities within buildings, as well as at on-street commercial loading spaces (i.e., yellow curb). On-street commercial loading spaces are provided to allow commercial vehicles (typically trucks and service vehicles) to park along the curb to unload or load goods. These spaces are frequently used by building service vehicles, contractors, and delivery vehicles for buildings with no supply of off-street parking. Commercial loading spaces are generally regulated by meters with 30-minute to one-hour time limits in effect Monday through Friday (or Saturday) with various start and end times. In general, on-street commercial loading spaces are typically well-utilized throughout the day, with periods of higher usage during the early mornings (primarily deliveries to restaurants and stores) and during the midday period (primarily package and mail deliveries).

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[15] SFMTA, San Francisco 2010-2011 Collisions Report, August 28, 2012. Available online at: http://www.sfmta.com/about-sfmta/reports/2010-2011-san-francisco-collisions-report. Accessed June 4, 2013.

[16] Ibid.

Passenger loading/unloading zones (i.e., white zones) provide a place to load and unload passengers for adjacent businesses and residences, and are intended for quick passenger drop-off and pick-up. These zones require a permit be issued by SFMTA and renewed annually.

As noted above in the discussion of delays to buses, violations of the on-street commercial loading spaces are routine, including usage of the spaces for non-delivery vehicles (such as passenger pick-ups/drop-offs, short-term parking, or expired meters). As a result, there can be a shortage of available commercial loading spaces in areas of high demand along busy downtown and neighborhood commercial streets such as Mission and 24th Streets. When commercial loading spaces are not available or not convenient to the delivery location, delivery/service vehicles have been observed to double-park in the adjacent travel lane. During these times, minor congestion occurs causing adverse effects on traffic, transit, and bicycle flows as vehicles attempt to maneuver around the stopped truck. In addition, delivery/service vehicles also stop within red zones (such as near intersections or fire hydrants) or at bus stops, affecting bus operations and resulting in additional delays and decreasing safety at intersections.

4.2.2.6 EMERGENCY VEHICLE ACCESS

The existing roadway network enables emergency vehicle response to all areas and emergency vehicles often identify and use multiple routes (dependent on time of day, traffic conditions, etc.) to travel to different parts of the City. Peak period traffic congestion generally does not result in delay for emergency vehicles, which have right-of-way and often use multi-lane major arterials for access. Emergency vehicles are permitted to use transit-only lanes or other vehicle-restricted lanes, if needed.

As part of the SF*go* program, the SFMTA has been investigating the potential for implementing signal priority for transit vehicles and signal preemption for emergency vehicles on a much larger scale throughout San Francisco.[17] The selection of technology appropriate for San Francisco and design of the system will not likely be made for one to two years, and implementation would require a substantial investment in signal controller replacements or upgrades.

[17] SF*go* is the SFMTA's Integrated Transportation Management System. In about 2005, the SFMTA received a federal grant to implement traffic signal preemption at 30 intersections in the vicinity of five fire stations. The intersections were selected based on the travel corridors used by emergency vehicles, and locations where congestion levels have the potential to interfere with emergency responses. This project was completed in 2009. In the same year, the SFMTA received an additional grant to expand this project to 23 more intersection in the Tenderloin neighborhood. This project was completed in December 2012.

4.2.2.7 PARKING

Parking conditions vary throughout the City, depending upon the location. Most San Francisco streets include on-street parking, and metered parking is typical in downtown and in commercial districts throughout the City. On-street parking in many residential areas is controlled through the SFMTA's Residential Permit Parking (RPP) program, which limits long-term parking in designated RPP zones, except for RPP permit holders. Otherwise, on-street parking is uncontrolled, with the exception of posted street-sweeping limitations. Off-street parking facilities (surface lots, above-ground, and below-ground parking structures) are available downtown and in some shopping areas, where demand is highest. Most off-street parking facilities charge a fee for parking.

San Francisco's streets with on-street parking include parallel parking, diagonal parking, or perpendicular parking configurations. On-street parking can be prohibited during the peak periods (for example, typically 7 to 9 a.m. and/or 3 to 6 p.m., but may vary) on certain streets, so that additional travel lanes, including transit-only lanes, can be provided or to provide for additional travel lane width on streets with narrow lanes. The SFMTA has estimated that there are about 282,000 on-street parking spaces and 26,000 metered parking spaces in the City.[18]

4.2.3 REGULATORY FRAMEWORK

This section provides a summary of the plans and policies of the City and County of San Francisco and regional, state, and federal agencies that have policy and regulatory control over the proposed project site. These plans and policies include the *San Francisco General Plan*, the *San Francisco Bicycle Plan*, and the *Transit First* Policy, and the *Better Streets Plan*.

4.2.3.1 FEDERAL, STATE AND REGIONAL REGULATIONS

There are no regional transportation regulations applicable to the proposed project.

Manual of Uniform Traffic Control Devices (MUTCD)

The MUTCD defines the standards used by road managers nationwide to install and maintain traffic control devices on public streets, highways, bikeways, and private roads open to public traffic. The MUTCD is published by the Federal Highway Administration (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F. As of January 13, 2012 the California Department of Transportation (Caltrans) has adopted the California Manual on

[18] SFMTA, San Francisco Transportation Fact Sheet, November 2012. Available online at: http://www.sfmta.com/about-sfmta/reports/2012-transportation-fact-sheet. Accessed June 4, 2013.

Uniform Traffic Control Devices (CA MUTCD) 2012 edition, to provide for uniform standards and specifications for all official traffic control devices in California. This action was taken pursuant to the provisions of California Vehicle Code § 21400 and the recommendations of the California Traffic Control Devices Committee. Caltrans requested and has received a letter to confirm substantial conformance with the MUTCD from the Federal Highway Administration for CA MUTCD 2012 edition.[19]

The MUTCD and CA MUTCD are updated periodically to accommodate the nation's and California's changing transportation needs and to address new safety technologies, traffic control tools and traffic management techniques.

4.2.3.2 LOCAL REGULATIONS

San Francisco General Plan

The Transportation Element of the *San Francisco General Plan* is composed of objectives and policies that relate to the eight aspects of the citywide transportation system: General Regional Transportation, Congestion Management, Vehicle Circulation, Transit, Pedestrian, Bicycles, Citywide Parking, and Goods Management. The Transportation Element references San Francisco's *Transit First* Policy in its introduction and contains the following objectives and policies that are directly pertinent to consideration of the proposed project:

Objective 2: Use the transportation system as a means for guiding development and improving the environment.

Policy 2.1: Use rapid transit and other transportation improvements in the city and region as the catalyst for desirable development, and coordinate new facilities with public and private development.

Policy 2.4: Organize the transportation system to reinforce community identity, improve linkages among interrelated activities, and provide focus for community activities.

Objective 9: Improve bicycle access to San Francisco from all outlying corridors.

Policy 9.2: Where bicycles are prohibited on roadway segments, provide parallel routes accessible to bicycles or shuttle services that transport bicycles.

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[19] California Manual of Uniform Traffic Control Devices. Available online at: http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/ca_mutcd2012.htm. Accessed June 4, 2013.

Objective 11: Establish public transit as the primary mode of transportation in San Francisco and as a means through which to guide future development and improve regional mobility and air quality.

Policy 11.1: Maintain and improve the Transit Preferential Streets program to make transit more attractive and viable as a primary means of travel.

Objective 14: Develop and implement a plan for operational changes and land use policies that will maintain mobility and safety, despite a rise in travel demand that could otherwise result in system capacity deficiencies.

Policy 14.2: Ensure that traffic signals are timed and phased to emphasize transit, pedestrian, and bicycle traffic as part of a balanced multimodal transportation system.

Policy 14.3: Improve transit operation by implementing strategies that facilitate and prioritize transit vehicle movement and loading.

Policy 14.4: Reduce congestion by encouraging alternatives to the single-occupancy auto through the reservation of right-of-way and enhancement of other facilities dedicated to multiple modes of transportation.

Policy 14.7: Encourage the use of transit and other alternative modes of travel to the private automobile through the positioning of building entrances and the convenient location of support facilities that prioritizes access from these modes.

Objective 18: Establish a street hierarchy system in which the function and design of each street are consistent with the character and use of the adjacent land.

Policy 18.2: Design streets for a level of traffic that serves, but will not cause a detrimental impact on, adjacent land uses or eliminate the efficient and safe movement of transit vehicles and bicycles.

Policy 18.4: Discourage high-speed through traffic on local streets in residential areas through traffic "calming" measures that are designed not to disrupt transit service or bicycle movement…"

Objective 20: Give first priority to improving transit service throughout the City, providing a convenient and efficient system as a preferable alternative to automobile use.

Policy 20.1: Give priority to transit vehicles based on a rational classification system of transit priority streets.

Policy 20.3: Develop transit preferential treatments according to established guidelines.

Policy 20.9: Improve inter-district and intra-district transit service.

Policy 20.13: Create dedicated bus lanes and Bus Rapid Transit (BRT) lanes to expedite bus travel times and improve transit reliability.

Policy 21.2: Where a high level of transit ridership or potential ridership exists along a corridor, existing transit service or technology should be upgraded to attract and accommodate riders.

Objective 23: Improve the city's pedestrian circulation system to provide for efficient, pleasant, and safe movement.

Policy 23.2: Widen sidewalks where intensive commercial, recreational, or institutional activity is present and where residential densities are high.

Policy 23.3: Maintain a strong presumption against reducing sidewalk widths, eliminating crosswalks, and forcing indirect crossings to accommodate automobile traffic.

Policy 23.6: Ensure convenient and safe pedestrian crossings by minimizing the distance pedestrians must walk to cross a street.

Objective 24: Improve the ambiance of the pedestrian environment.

Objective 28: Provide secure and convenient parking facilities for bicycles.

Policy 28.3: Provide parking facilities which are safe, secure, and convenient.

Objective 35: Meet short-term parking needs in neighborhood shopping districts consistent with preservation of a desirable environment for pedestrians and residents.

Policy 35.1: Provide convenient on-street parking specifically designed to meet the needs of shoppers dependent upon automobiles.

Policy 35.2: Assure that new neighborhood shopping district parking facilities and other auto-oriented uses meet established guidelines.

Transit First Policy

In 1998, the San Francisco voters amended the City Charter (Charter Article 8A, § 8A.115) to include a *Transit First* Policy, which was first articulated as a City priority policy by the Board of Supervisors in 1973. The *Transit First* Policy is a set of principles that underscore the City's commitment that travel by transit, bicycle, and on foot be given priority over the private automobile. These principles are embodied in the policies and objectives of the

Transportation Element of the *General Plan*. All City boards, commissions, and departments are required, by law, to implement *Transit First* principles in conducting City affairs.

San Francisco Bicycle Plan

The *San Francisco Bicycle Plan* describes a City program to provide the safe and attractive environment needed to promote bicycling as a transportation mode. This plan identifies the citywide bicycle route network and establishes the level of treatment (i.e., Class I, Class II, or Class III facility) on each route. The plan also identifies near-term improvements, as well as policy goals, objectives, and actions to support these improvements. It also includes long-term improvements and minor improvements that would be implemented to facilitate bicycling in San Francisco.

Better Streets Plan

The Better Streets Plan focuses on creating a positive pedestrian environment through measures such as careful streetscape design and traffic calming measures to increase pedestrian safety. The Better Streets Plan includes guidelines for the pedestrian environment, which it defines as the areas of the street where people walk, sit, shop, play, or interact. Generally speaking, the guidelines are for design of sidewalks and crosswalks; however, in some cases, the Better Streets Plan includes guidelines for certain areas of the roadway, particularly at intersections.

4.2.4 IMPACTS AND MITIGATION MEASURES

4.2.4.1 SIGNIFICANCE CRITERIA

The Planning Department’s Initial Study Checklist Form provides a framework of issues to be considered in evaluating a project’s impacts under the California Environmental Quality Act (CEQA). Implementation of a project could have a potentially significant impact related to transportation and circulation if the project were to:

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

- Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, established by the county congestion management agency for designated roads or highways (unless it is practical to achieve the standard through increased use of alternative transportation modes);

- Result in a change in air traffic patterns, including either an increase in traffic levels, obstructions to flight, or a change in location, that causes substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses;
- Result in inadequate emergency access; or
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., conflict with policies promoting bus turnouts, bicycle racks, etc.) regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities, or cause a substantial increase in transit demand which cannot be accommodated by existing or proposed transit capacity or alternative travel modes.

Below is a list of significance criteria used by the San Francisco Planning Department to assess whether a proposed project would result in significant transportation impacts. These criteria are organized by mode to facilitate the transportation impact analysis; however, the transportation significance criteria are essentially the same as the ones presented above.

- The project would have a significant effect on the environment if it would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, resulting in unacceptable levels of transit service; or cause a substantial increase in delays or operating costs such that significant adverse impacts in transit service levels could result. With the Muni and regional transit screenlines analyses, the project would have a significant effect on the transit provider if project-related transit trips would cause the capacity utilization standard to be exceeded during the peak hour.
- The operational impact on signalized intersections is considered significant when project-related traffic causes the intersection level of service to deteriorate from LOS D or better to LOS E or LOS F, or from LOS E to LOS F. The operational impacts on unsignalized intersections are considered potentially significant if project-related traffic causes the level of service at the worst approach to deteriorate from LOS D or better to LOS E or LOS F and peak hour signal warrants would be met, or would cause peak hour signal warrants to be met when the worst approach is already operating at LOS E or LOS F. The project may result in significant adverse impacts at intersections that operate at LOS E or LOS F under existing conditions depending upon the magnitude

of the project's contribution to the worsening of the average delay per vehicle. In addition, the project would have a significant adverse impact if it would cause major traffic hazards or contribute considerably to cumulative traffic increases that would cause deterioration in levels of service to unacceptable levels.

- The project would have a significant effect on the environment if it would result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.

- The project would have a significant effect on the environment if it would create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjoining areas.

- A project would have a significant effect on the environment if it would result in a loading demand during the peak hour of loading activities that could not be accommodated within proposed on-site loading facilities or within convenient on-street loading zones, and would create potentially hazardous conditions or significant delays affecting traffic, transit, bicycles, or pedestrians.

- A project would have a significant effect on the environment if it would result in inadequate emergency access.

- Construction-related impacts generally would not be considered significant due to their temporary and limited duration.

- A project would have a significant effect on the environment if it would result in a substantial parking deficit that could create hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians and where particular characteristics of the project or its site demonstrably render use of other modes infeasible.

The impacts of the TEP project construction and operations related to the following significance criteria were addressed in the Initial Study, which is attached as Appendix 2 to this EIR.

- **Result in change in air traffic patterns.** Due to the nature and scope of the proposed project, implementation of the proposed project does not have the potential to change air traffic patterns. In addition, the proposed project would not involve the installation of structures that could interfere with air space or result in changes to air traffic patterns. Therefore, as described in the Initial Study, this criterion is not applicable to the proposed project, and is not discussed further.

- **Substantially increase hazards due to a design feature or incompatible uses.** As described in the Initial Study, with the exception of painting transit-only lanes red, the proposed project would not introduce design features that have not already been used throughout the City. The Policy Framework and design of the TPS Toolkit elements that would be included in the TTRP projects, the Service-related Capital Improvements, and the Service Improvements would comply with all San Francisco Department of Public Works (DPW) and SFMTA design standards, specifications, and review procedures, and changes to the intersection controls at signalized and unsignalized intersections (i.e., changes to stop-controlled and signalized intersections) would meet requirements in the CA MUTCD; therefore, the proposed project would not substantially increase hazards due to a design feature or introduce an incompatible use. There would be no significant impact with respect to this criterion, and therefore it is not discussed further.

4.2.4.2 APPROACH TO ANALYSIS

This section presents the methodology for developing Existing plus Project, 2035 Cumulative No Project, and 2035 Cumulative plus Project conditions, and the approach to the travel demand forecasting and impact analysis. This section describes:

- Approach to impact analysis, including analysis years and analysis methodology;
- Methodology for development of Existing and future year 2035 Cumulative conditions traffic and transit ridership forecasts.

1. Approach to Impact Analysis

CEQA allows different elements of phased projects, such as the TEP, to be analyzed at either a program level (a more conceptual level) or a project level (a more specific level) of analysis, depending on the extent of the details known about a particular element or phase of a project at the time that the environmental review is conducted. In addition, program-level analysis is appropriate for the environmental review of the issuance of rules, plans, or other general criteria to govern the conduct of a continuing program, such as the role of the SFMTA transit Policy Framework. Since the proposed TEP project includes a Policy Framework as well as detailed and conceptual TEP proposals, this environmental review draws on both program- and project-level analysis to assess the physical environmental effects of the proposed project. Specifically, the Policy Framework, five of the Service-related Capital Improvements, and the application of the TPS Toolkit elements on nine TTRP corridors described in Section 2.5.1, pp. 2-15 to 2-56, are analyzed at a program level for the Transportation and Circulation topic through this environmental review. When additional project details are developed for these five program-level Capital Improvements and nine program-level TTRPs, additional environmental review may be required. The remainder of the TEP proposals, including the Service Improvements, seven project-level Service-related Capital Improvements, and 11 project-level TTRP proposals, will receive project-level clearance for the Transportation and Circulation topic through this environmental review.

As described in Chapter 2, Project Description, Section 2.5.1.1, pp. 2-19 to 2-23, the SFMTA proposes a transit Policy Framework that sets forth transit service delivery objectives and identifies actions needed to fulfill these objectives. The objectives in the Policy Framework support the SFMTA Strategic Plan goals, which set forth the vision, mission, goals and objectives of the SFMTA , including providing a faster and more reliable transit system in support of the City's *Transit First* Policy.[20] The Policy Framework is intended to guide the planning and implementation of the TEP as well as to guide other future Muni plans and programs. Its objectives include the effective allocation of transit resources, the efficient delivery of service, the improvement of service reliability and reduction in transit travel time, and an improvement in customer service. A variety of actions are identified to implement these objectives.

Because the Policy Framework is a policy document with objectives and actions developed to guide the provision of reliable and efficient transit service throughout the City, it would not result in direct physical changes to the transportation environment. Indirect physical effects of the Policy Framework could result from the implementation of projects developed pursuant to these policies. The TEP projects provide a representative example of the types of projects, both in size and scope, which may be proposed under the Policy Framework. Thus, the analysis of these proposed TEP projects informs the analysis of the potential indirect effects of the Policy Framework on the transportation network, and representative TEP projects are therefore referenced as examples in the analysis. However, the implementation of the Policy Framework over time may also result in transit projects other than TEP. Such future projects, once developed, would require additional environmental review.

With respect to the TEP, indirect effects of the Policy Framework could result from implementation of the Service Improvements, the Service-related Capital Improvements, and the TTRPs. Thus, the indirect effects of the Policy Framework that may result from the TEP were analyzed as part of the transportation assessment conducted for the TEP and summarized below. Correspondingly, if the project-level analysis for a particular component of the TEP demonstrates that there would be no significant impacts with respect to elements of the transportation analysis (for example, transit, traffic, pedestrians, bicycles, loading,

[20] SFMTA, *SFMTA Strategic Plan, FY2013-FY2018,* January 3, 2012. Available online at: http://www.sfmta.com/about-sfmta/reports/sfmta-strategic-plan-fy-2013-fy-2018. Accessed June 4, 2013.

emergency vehicle access, and construction), then it is reasonable to conclude that there would be no significant indirect impacts with respect to the Policy Framework related to the same component. Therefore, as it is implemented, the future improvements proposed to meet the Policy Framework objectives could result in impacts similar to those analyzed in this EIR under Impact TR-7 through Impact TR-58, with respect to potential impacts on transit, traffic, pedestrians, bicycles, loading, and emergency vehicle access.

The transportation impacts of the proposed project were analyzed using the guidelines set forth in the City of San Francisco Planning Department's 2002 *Transportation Impact Analysis Guidelines for Environmental Review* (*SF Guidelines*), modified to account for the unique citywide character of the project (i.e., the proposed TEP is a program of changes to the existing transit network throughout the City and not a land use development project).[21] The *SF Guidelines* provide direction for analyzing transportation conditions and identifying the transportation impacts of proposed projects within the City of San Francisco.

The transportation analysis of the proposed project was conducted for Existing and 2035 Cumulative conditions. Existing plus Project conditions assess the near-term impacts of the proposed project. A 2035 Cumulative plus Project analysis was conducted to assess the long-term impacts of the proposed project in combination with other future development and planned transportation infrastructure projects.

Project impacts were assessed by comparing existing conditions with the proposed project to existing conditions without the proposed project. For future year conditions, the proposed project impacts for transit and traffic conditions were assessed by comparing 2035 Cumulative conditions with the proposed project to 2035 Cumulative conditions without the proposed project (i.e., the 2035 Cumulative No Project condition), and, as appropriate, the contribution of the proposed project to future year 2035 Cumulative transportation conditions was determined. Pedestrian, bicycle, loading, and parking impacts for 2035 Cumulative conditions were also qualitatively assessed. Year 2035 was selected as the future analysis year because when the environmental review of the proposed TEP was initiated, the year 2035 was the latest year for which travel demand forecasts were available from the San Francisco County Transportation Authority (SFCTA) travel demand forecasting model.

For both Existing plus Project and 2035 Cumulative plus Project conditions, the analysis was conducted for Service Improvements only and for Service Improvements plus the two TTRP project alternatives – a Moderate Alternative and an Expanded Alternative. This allowed for isolation of transportation impacts caused by these three components. Further, for several of

[21] San Francisco Planning Department, *2002 Transportation Impact Analysis Guidelines for Environmental Review*, October 2002. Available online at: http://www.sfplanning.org/Modules/ShowDocument.aspx?documentid=6753. Accessed April 12, 2013.

the proposed service planning changes and TTRPs, a number of variants were evaluated at the same level of detail. A description of the two alternatives and the variants is included in the Chapter 2, Project Description, in Section 2.5.2.3, pp. 2-110 to 2-159.

Transit Analysis

The transit impact analysis of the proposed project was conducted for the weekday a.m. and p.m. peak hours for both inbound and outbound directions of travel for all existing and proposed bus routes and rail lines. The impact analysis was also conducted for transit corridors and screenlines for inbound (towards downtown) during the a.m. peak hour, and outbound (away from downtown) during the p.m. peak hour. In addition, because this project is proposing systemwide changes to service, the analysis also assessed the ability of individual lines to accommodate the overall ridership. The individual line analysis was informative in illuminating how travel behavior between various lines was affected by the implementation of Service Improvements and TTRPs and could inform future transit service adjustments made by SFMTA. However, for purposes of CEQA analysis, which examines capacity utilization and transit delay, this EIR identifies impacts of the project on the corridor and screenline basis. This approach is appropriate because TEP is a Citywide project that is attempting to address the efficiency of the entire transit network. This approach is also consistent with transit analysis conducted for projects in and outside of the downtown area, where the downtown screenlines are utilized or transit lines and their corresponding capacity utilization are grouped into corridors and screenlines for analysis purposes. It is also consistent with the transit impact analysis methodology set forth in the *Transportation Impact Analysis Guidelines*.

Muni Capacity Utilization. Capacity utilization relates the number of passengers per transit vehicle to the design capacity of the vehicle. The capacity per vehicle includes both seated and standing capacity, where standing capacity is somewhere between 30 to 80 percent of seated capacity (depending upon the specific transit vehicle configuration). For example, the capacity of a light rail vehicle (LRV) is 119 passengers, the capacity of a historic streetcar is 70 passengers, and the capacity of a standard bus is 63 passengers. Tables 12 and 13 in Section 4.2.4.6 contain the capacity utilization calculations for the Muni routes/lines during the weekday a.m. and p.m. peak hours.

Local and Regional Transit Screenline Analysis. Four screenlines have been established in San Francisco to analyze potential impacts of projects on Muni service: Northeast, Northwest, Southwest, and Southeast, with corridors within each screenline. Three regional screenlines have been established around San Francisco to analyze potential impacts of projects on the regional transit agencies: East Bay (BART, AC Transit, ferries), North Bay (Golden Gate Transit buses and ferries), and the South Bay (BART, Caltrain, SamTrans).

Muni Screenline Analysis – The availability of Muni service capacity was analyzed in terms of a series of screenlines. The concept of screenlines is used to describe the magnitude of travel to or from the greater downtown area, and to compare estimated transit volumes to available service capacities. Screenlines are hypothetical lines that would be crossed by persons traveling between downtown and its vicinity and between other parts of San Francisco and the region. The bus routes and light rail lines used in this screenline analysis are considered the major commute routes to/from the downtown area. Other bus routes, such as “community connector” routes and routes with greater than 10-minute headways between buses are not included in this screenline analysis because of their generally lower ridership.[22]

The screenline analysis generally compares the total ridership on routes crossing a given screenline with available service capacity. It should be noted that the points of measurement for the screenline analysis do not actually follow the alignments of the schematic screenlines drawn for graphical representation themselves. Rather, the screenline analysis utilizes the ridership data at the maximum loading point (MLP) for each Muni line that crosses one of the screenlines. The MLP for each individual line may occur at some point on either side of the screenlines. Muni’s established capacity utilization standard for peak period operations is 85 percent.

Regional Screenline Analysis – A screenline analysis was also performed on the regional transit carriers (AC Transit, BART, Caltrain, Golden Gate Transit and SamTrans) in order to determine the current service volumes and capacity during both the a.m. and p.m. peak hours. As a means to determine the amount of available space for each regional transit operator, capacity utilization is also used. For all regional transit operators, the capacity is based on the number of seated passengers per vehicle. All of the regional transit operators have a one-hour load factor standard of 100 percent, which would indicate that all seats are full. Regional screenlines discussion is provided for informational purposes only because the TEP project would not substantially affect transit capacity or ridership on regional transit routes at the screenlines (e.g. Muni routes that serve regional transit hubs, such as the 1 California, 30X Stockton Express, and the 71L Haight-Noriega Limited experience only modest ridership increases under the project scenarios during the a.m. and p.m. peak periods). Furthermore, some regional ridership is captured within the Muni screenlines and corridors, as these riders also transfer to regional transit; however, the project-related ridership increases related to these Muni routes that serve regional transit would not be substantial because these trips tend to be much longer and the changes in overall travel time associated with the proposed project would be small in relation to the length of the entire trip (i.e., not enough to generate a

[22] Community connector routes include lightly used bus routes that circulate through San Francisco’s hillside residential neighborhoods and fill in gaps in coverage to connect customers to key transit hubs.

substantial change in travel mode). Potential operational impacts on regional transit routes within San Francisco were assessed qualitatively.

Muni Impact Determination. The transit impact determination is primarily based on the transit screenlines and on the corridors within the screenlines.

The proposed project was determined to have a significant impact if the change in ridership and/or capacity resulting from its implementation would cause the transit screenlines and/or corridors to exceed 85 percent capacity utilization, or if its implementation would contribute considerably to a screenline or corridor already operating at greater than 85 percent capacity utilization. In evaluating the Service Improvements, if an individual line exceeds SFMTA's capacity utilization threshold, further review of adjacent lines was conducted to ascertain whether overall capacity existed on the corridor. Under 2035 Cumulative plus Project conditions, the proposed project was determined to have a significant cumulative impact if its implementation would cause the capacity utilization at the Muni screenlines and/or corridors within the screenlines to exceed 85 percent, or if its implementation would contribute considerably to a screenline or corridor projected to operate at greater than 85 percent capacity utilization under 2035 Cumulative No Project conditions. Screenline level analysis, rather than a line-by-line analysis, is appropriate for assessing project transit impacts in San Francisco, where multiple lines tend to serve similar City areas (for example, the 1 California and the 38 Geary run relatively close and parallel to each other). The evaluation of screenlines and corridors is appropriate given the Citywide nature of the project and provides an indication of whether the transit system would adequately accommodate passenger growth projected with the project and under 2035 Cumulative conditions. While transit agencies conduct review of performance of their systems on an annual basis and make adjustments to service to reflect changing conditions, an analysis of the overall system such as the TEP is typically conducted to ensure that systemwide performance meets the agency's goals and objectives.[23]

Transit Operational Assessment. In order to determine the TTRPs' effect on the transit operations of the Muni lines and routes that travel on the corridors where TTRPs are proposed, the travel time of the respective lines and routes during the a.m. and p.m. peak

[23] The TEP is intended to address the needs of the transportation network based on the 2011 demand baseline, and keeping in consideration the estimated 2035 transit service and demand baseline. It is not expected that the TEP improvements alone would meet the estimated 2035 transit service demand needs. The SFMTA will likely develop other projects and programs, as described in Chapter 2, in addition to routine service planning exercises, which over time incrementally adjust service in response to transit service demand needs. These ongoing changes are not necessarily represented in the estimated 2035 transit service baseline discussed in this EIR analysis because they have either not yet been contemplated or they are in the early stages of development and it would be speculative to include them.

periods under Existing plus Service Improvements conditions was compared to the travel time under Existing plus Service Improvements and the TTRP Moderate Alternative, and Existing plus Service Improvements and the TTRP Expanded Alternative conditions. The travel times for the lines and routes were obtained from the San Francisco County Transportation Authority's (SFCTA's) travel demand model (SF-CHAMP) runs. Additionally, the traffic operations during the a.m. and p.m. peak hours under Existing plus Service Improvements conditions, as well as under Existing plus Service Improvements and the TTRP Moderate Alternative, and Existing plus Service Improvements and the TTRP Expanded Alternative conditions were compared to determine if, when implemented, the Existing plus Service Improvements, Existing plus Service Improvements and the TTRP Moderate Alternative, or Existing plus Service Improvements and the TTRP Expanded Alternative would improve or degrade traffic operations and thus have a secondary effect on the transit operations of lines and routes that travel along or intersect the TTRP corridors, including regional routes. If the traffic operations at a study intersection were found to degrade when the Existing plus Service Improvements, Existing plus Service Improvements and the TTRP Moderate Alternative, or Existing plus Service Improvements and the TTRP Expanded Alternative were implemented, the increase in delay, or in the case of intersections already operating at LOS E or LOS F, the increase in the volume-to-capacity (v/c) ratio was noted, and the possible effects on the transit operations of affected lines/routes was discussed.[24]

The transit operational assessment of Existing plus Service Improvements conditions only was conducted qualitatively based on the changes in delay at the study intersections.

Intersection Analysis

The analysis of study intersections was conducted using a method documented in the HCM2000 with the Synchro traffic analysis software. For signalized intersections, this HCM2000 methodology uses various intersection characteristics (for example, traffic volumes, lane geometry, and signal phasing and timing) to estimate the capacity for each lane group approaching the intersection, and to calculate the average delay experienced by motorists traveling through the intersection. The LOS is based on average delay (in seconds per vehicle) for the various movements within the intersection. A combined weighted average delay and LOS are presented for the intersection. Increases in traffic volumes at an intersection usually result in increases in the overall intersection delay. However, if there are increases in the number of vehicles at movements with lower delays for a given intersection, the average weighted delay per vehicle presented for that intersection may remain the same or decrease. For unsignalized intersections, average delay and LOS operating conditions

[24] Volume-to-capacity (v/c) ratio is the ratio of flow rate to capacity for a transportation facility.

are calculated by approach (for example, northbound) and movement (for example, northbound left-turn), for those approaches and movements that are subject to delay. For purposes of this analysis, the operating conditions (LOS and delay) for unsignalized intersections are presented for the worst approach (i.e., the approach with the highest average delay per vehicle). Table 11 presents LOS definitions for signalized and unsignalized intersections. The traffic impact determination is based on the intersection LOS analysis.

Under Existing plus Project conditions, the proposed project was determined to have a significant traffic impact at an intersection if it would cause an intersection operating at LOS D or better under Existing conditions to operate at LOS E or LOS F, or intersections operating at LOS E under Existing conditions to deteriorate to LOS F conditions. At signalized intersections that operate at LOS E or LOS F under Existing conditions and would continue to operate at LOS E or LOS F under Existing plus Project conditions, the change in traffic volumes was reviewed at the critical movements to determine whether a resulting increase in traffic volumes would contribute considerably to unacceptable levels of service.[25] An increase of a few buses on each approach along a transit route at an intersection operating at LOS E or LOS F would generally not contribute considerably to critical movements that operate unacceptably. For example, at a signalized intersection with a critical movement operating at LOS E or LOS F conditions and 100 vehicles per hour, the proposed project would need to add five or more transit vehicles to the critical movement during the a.m. and/or p.m. peak hour to result in a significant contribution and, therefore, a significant traffic impact. The proposed Service Improvements would generally not add more than approximately five transit vehicles per hour to any critical movement at any study intersection. Due the headways proposed in the Service Improvements, four routes (2 Clement east of Presidio, 10 Sansome, 11 Downtown Connector and 49L Van Ness-Mission Limited), would add five or more transit vehicles (up to eight vehicles) during the a.m. and/or p.m. peak hour. However, transit routes do not always travel through an intersection's critical movements, and if they do, most intersections (and critical movements) operating at LOS E

[25] The critical movement, with respect to an intersection analysis, is the movement or lane for a given signal phase (for example, northbound/southbound versus eastbound/westbound) that requires the most green time, and is determined for each phased based on flow ratios calculated using the HCM2000 intersection operations methodology. The movement or lane with the highest flow ratio for each phase is the critical movement. The critical movements are determined in the quantitative calculations conducted for the study intersections, taking into consideration the available geometric conditions (for example, number of lanes), signalization conditions (for example, cycle length, green times), and traffic conditions (for example, traffic volumes, pedestrian flows, heavy vehicle percentages). The critical movements, using the HCM2000 methodology, were identified by the Synchro intersection analysis software/traffic model developed for the analysis.

Table 11: Level of Service Definitions for Signalized and Unsignalized Intersections

Control/LOS	Description of Operations	Average Control Delay (seconds per vehicle)
Signalized		
A	Insignificant Delays: No approach phase is fully used and no vehicle waits longer than one red indication.	≤ 10
B	Minimal Delays: An occasional approach phase is fully used. Drivers begin to feel restricted.	> 10.0 and ≤ 20
C	Acceptable Delays: Major approach phase may become fully used. Most drivers feel somewhat restricted.	> 20.0 and ≤ 35
D	Tolerable Delays. Drivers may wait through no more than one red indication. Queues may develop but dissipate rapidly without excessive delays.	> 35.0 and ≤ 55
E	Significant Delays: Volumes approach capacity. Vehicles may wait through several signal cycles and long queues form upstream.	> 55.0 and ≤ 80
F	Excessive Delays: Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections.	> 80
Unsignalized		
A	No delay for stop-controlled approach.	≤ 10
B	Operations with minor delays.	> 10.0 and ≤ 15
C	Operations with moderate delays.	> 15.0 and ≤ 25
D	Operations with some delays.	> 25.0 and ≤ 35
E	Operations with high delays and long queues.	> 35.0 and ≤ 50
F	Operations with extreme congestion, with very high delays and long queues unacceptable to most drivers.	> 50
Note: LOS = Level of Service		

Source: Transportation Research Board, 2000. Highway Capacity Manual – Special Report, Washington, DC.

or LOS F conditions have substantially more than 100 vehicles per hour on the movements to which transit service would contribute. Therefore, a traffic volume increase of five or more buses each hour would not contribute considerably to poor operating conditions.

At intersections that operate at LOS E or LOS F under Existing conditions, where the proposed project would convert a mixed-flow travel lane to a transit-only lane and thereby reduce capacity for autos and trucks, the overall intersection v/c ratio was reviewed. If the project resulted in an increase in the overall intersection v/c ratio by more than 10 percent from the Existing (i.e., the No Project) conditions, a significant impact would occur.

Under 2035 Cumulative plus Project conditions, the proposed project was also determined to have a significant cumulative impact if it would cause an intersection operating at LOS D or better to operate at LOS E or LOS F, or intersections operating at LOS E to deteriorate to LOS F conditions. At signalized intersections that operate at LOS E or LOS F under 2035 Cumulative conditions and would continue to operate at LOS E or LOS F under 2035 Cumulative plus Project conditions, the proposed project would have a significant impact if it would contribute considerably to delays at intersections operating at LOS E or LOS F. The increases in project-related vehicle trips were reviewed at the critical movements to determine whether these increases would contribute considerably to the critical movements. At locations where the TEP project would convert mixed-flow travel lanes to transit-only lanes, the change in the overall intersection v/c ratio was reviewed to determine if the project would result in a worsening of more than 10 percent. If so, then the impact would be considered a significant cumulative impact. In addition, if it was determined that the proposed project would have a significant project-specific traffic impact at an intersection under Existing plus Project conditions, then the impact would also be considered a significant cumulative impact under 2035 Cumulative conditions.

Pedestrian Analysis

The pedestrian impact analysis includes a qualitative assessment of changes to the pedestrian conditions with implementation of the various TEP elements. Pedestrian conditions were assessed as they relate to the existing sidewalks, intersection controls, safety and right-of-way issues, and conflicts with vehicular traffic.

Bicycle Analysis

The bicycle impact analysis includes a qualitative assessment of changes to the bicycle route network and bicycle facilities with implementation of the proposed project. Bicycle conditions were assessed as they relate to established bicycle routes, bicycle lanes, safety and right-of-way issues, and conflicts with transit and auto traffic.

Loading Analysis

The commercial loading analysis was conducted by identifying changes to the on-street curb parking regulations as they relate to commercial vehicle loading/unloading activities, and the on-street loading spaces supply that would be removed or added with implementation of the proposed project. The proposed project would not result in an increase in loading demand. The removal of some commercial loading spaces would not be considered a significant impact when other loading spaces would remain in the vicinity, or the loading spaces could be relocated nearby. However, removal of multiple commercial loading spaces could reduce the overall loading supply such that loading activities could not be accommodated within convenient on-street loading zones resulting in potentially hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. Such a circumstance would be considered a significant commercial loading impact.

Identified changes to passenger loading/unloading (white) zones due to project-level TEP proposals are described. In addition, to the extent that information is available, changes to passenger loading/unloading (white) zones are described. Where passenger loading/unloading zones would not be affected under program- and project-level TEP proposals, they are not discussed. Passenger loading/unloading zones provide a place to load and unload passengers for adjacent businesses and residences and are intended for quick passenger drop-off and pick-up. These zones require a permit from SFMTA, and the permits require annual renewals. Similar to commercial loading spaces, the design of the TEP proposals considered the potential relocation of passenger loading/unloading zones. However, while the loss of passenger loading/unloading zones may be an inconvenience, it would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles; therefore, the loss of passenger loading/unloading zones would be considered a less-than-significant impact.

Emergency Vehicle Access Analysis

Potential project-related changes to emergency vehicle access were assessed qualitatively. Specifically, the analysis assessed whether any of the proposed project elements would preclude adequate emergency vehicle access.

Construction Analysis

Potential short-term and temporary construction impacts related to transportation were assessed qualitatively. The potential for overlapping construction of project elements as well as construction of project elements in combination with other cumulative projects was also assessed qualitatively. The construction impact evaluation addresses the construction duration and construction activities that could affect sidewalks, bicycle lanes, or mixed-flow and transit-only travel lanes.

Parking Analysis

A parking assessment was conducted by identifying project-related changes to on-street parking regulations and parking supply that would be removed or added with implementation of the proposed project. For each TTRP corridor analyzed at the project-level, the net parking change was determined. The parking supply affected by the TEP proposals includes metered, unmetered, and Americans with Disabilities Act (ADA) on-street parking spaces. As part of the design of the TEP proposals, ADA parking spaces would be relocated.

Parking conditions are not static, as parking supply and demand varies from day to day, from day to night, from month to month, etc. Hence, the availability of parking spaces (or lack thereof) is not a permanent physical condition, but changes over time as people change their modes and patterns of travel. While parking conditions change over time, a substantial deficit in parking caused by a project that creates hazardous conditions or significant delays to traffic, transit, bicycles or pedestrians could adversely affect the physical environment. Whether a deficit in parking creates such conditions will depend on the magnitude of the shortfall and the ability of drivers to change travel patterns or switch to other travel modes. If a substantial deficit in parking caused by a project creates hazardous conditions or significant delays in travel, such a condition also could result in secondary physical environmental impacts (e.g., air quality or noise impacts cause by congestion), depending on the project and its setting.

The absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, induces many drivers to seek and find alternative parking facilities, shift to other modes of travel, or change their overall travel habits. Any such resulting shifts to transit service or other modes (walking and biking), would be in keeping with the City's *Transit First* Policy and numerous *San Francisco General Plan* Polices, including those in the Transportation Element. The City's *Transit First* Policy, established in the City's Charter Article 8A, § 8A.115 provides that "parking policies for areas well served by public transit shall be designed to encourage travel by public transportation and alternative transportation."

The transportation analysis accounts for potential secondary effects, such as cars circling and looking for a parking space in areas of limited parking supply, by assuming that all drivers would attempt to find parking at or near the project site and then seek parking farther away if convenient parking is unavailable. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to others who are aware of constrained parking conditions in a given area, and thus choose to reach their destination by other modes (i.e. walking, biking, transit, taxi). If this occurs, any secondary environmental impacts that may result from a shortfall in parking in the vicinity of the proposed project would be minor, and the traffic assignments used in the transportation analysis, as well as in the associated air quality, noise and pedestrian safety analyses, would reasonably address potential secondary effects.

The TEP project would not generate a parking demand because it would not introduce new land uses, but it would result in part-time (through tow-away zones) and permanent on-street parking changes along transit corridors. In evaluating whether a parking deficit is substantial and thus, could result in hazardous conditions or delays, the following was considered: if the parking demand resulting from elimination of on-street spaces could not be met either with other on-street spaces or existing off-street parking facilities within 1/2–mile of the project area; and whether the project area is adequately served by other modes of transportation (i.e., taxis, Muni, regional transit providers, bicycle and pedestrian facilities). The analysis also considers whether the potential loss of parking, or shortfall in parking is temporary or intermittent. Generally, if the parking loss is not substantial, it is anticipated that it would not create hazardous conditions or significant delays to other modes. In situations where a parking deficit is considered substantial, potential hazardous conditions related to the parking loss were considered. For the TEP, the potential hazards or delays considered included: whether the parking loss would lead to additional traffic circling in the area that could result in vehicles double parking in a bicycle lane or in mixed-flow/transit-only lanes, particularly when it is a one-lane roadway in each direction; whether vehicles would substantially increase instances of blocking the sidewalks and/or driveways in an attempt to locate parking; and, whether vehicles could form a queue in a mixed-flow/transit-only lane in an attempt to enter off-street parking facilities.

2. Existing and Future Year 2035 Cumulative Transit and Traffic Forecasts

Forecasts of transit ridership for the Muni routes and traffic volumes at the study intersections under conditions with the proposed project were developed via a process that utilized the SFCTA's SF-CHAMP model. The SF-CHAMP model is an activity-based travel demand model that has been validated to represent transportation conditions in San Francisco. The model predicts travel patterns based on current and projected population, demographics, employment, and the transportation network.

Project Scenarios. The SF-CHAMP model was used to forecast transit ridership and traffic volumes for eight scenarios (referred to as model runs), including two 'no project' and six 'project' model runs:

- Existing conditions (i.e., the No Project condition);
- Existing plus Service Improvements only;
- Existing plus Service Improvements and the TTRP Moderate Alternative;
- Existing plus Service Improvements and the TTRP Expanded Alternative;
- 2035 Cumulative No Project;
- 2035 Cumulative plus Service Improvements only;
- 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative; and
- 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative.

Existing plus Service Improvements only and 2035 Cumulative plus Service Improvements only conditions, as projected in the SF-CHAMP model runs, reflect traffic volumes and transit ridership projections considering the addition of new routes, route elimination, changes to route alignments, changes to headways, and changes in transit vehicle type (e.g., from standard 40-foot motor coach to 60-foot articulated motor coach, or from 30-foot motor coach to van), as detailed in Table 8.

A range of potential combinations of the elements in the TPS Toolkit is being considered for the TTRPs in order to reduce transit travel time. The range of TTRP treatments being analyzed has been bracketed by: (1) a moderate option referred to as the TTRP Moderate Alternative; and (2) an expanded option referred to as the TTRP Expanded Alternative. The two alternatives are presented and analyzed at an equal level of detail. In general, the difference between these two alternatives is that the TTRP Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental effects due to substantial changes to traffic, bicycle, or pedestrian circulation, whereas the TTRP Moderate Alternative is expected to have fewer physical environmental effects due to the nature of the TPS Toolkit elements chosen.

Based upon the results of the project and no-project model runs from the SFCTA's SF-CHAMP model, the transit ridership by route, intersection traffic turning movement volumes, and roadway segment volumes were reviewed to ensure that the magnitude and direction of ridership and roadway changes were logical, given the changes proposed by the project. After a thorough review of the model output to ensure that the travel demand model appropriately reflects the TEP proposals, the raw model outputs were processed to obtain transit ridership and traffic volume forecasts for use in the impact analyses. Transit travel time savings estimated for each TPS Toolkit element was based on generalized research assembled by the SFMTA and the overall limitations of the existing travel corridors (i.e., without transit-only lanes, transit is limited to the travel speeds of surrounding vehicle traffic).

Because it was anticipated that the TTRP proposals would not only reduce transit travel times, but also make Muni travel more reliable, a second set of SF-CHAMP runs were produced in which enhanced transit reliability factors were incorporated into the model. This sensitivity test was conducted because the SFMTA market assessment of passengers conducted in 2007 determined that reliability is one of the most important variables in the equation of whether or not a potential patron chooses to travel via transit, or select another mode, such as walking or driving a car.[26]

The model runs in which both travel time savings and reliability enhancements were applied to the project scenarios produced greater increases in ridership than those without the reliability enhancements. The two model runs, without and with applying the enhanced reliability factor, present a likely lower and upper range for the increases in transit ridership for the TTRP Moderate Alternative and TTRP Expanded Alternative conditions, respectively; therefore, future ridership information is presented as a range. The transit impact significance determination is based on the upper range (i.e., assumes enhanced reliability factor) because that constitutes a more conservative representation of impacts as it relates to higher ridership and potential crowding. In other words, when the enhanced reliability factor is assumed, there is a greater mode shift from vehicles (private auto) to transit, resulting in potentially more crowding on the Muni system. Conversely, there would be more vehicles on the road when the enhanced reliability factor is not applied because the mode shift from vehicles to transit is not as large. Therefore, the Service Improvements, the TTRP Moderate Alternative (which includes the Service Improvements), and the TTRP Expanded Alternative (which includes the Service Improvements) model runs, all without the enhanced reliability factor, were used to develop intersection turning movement volumes. Traffic impact determinations, therefore, were based on the lower range (i.e., assuming no enhanced reliability factor). As a result, the impact analyses for both transit and traffic conditions are conservative.

In summary, the transportation analysis presents two potential outcomes of implementing the Service Improvements and TTRPs: 1) a modest mode shift from private autos to transit (used for the traffic impact determination) and 2) a higher mode shift from private autos to transit with the increased ridership effects of improved Muni service reliability (used for transit impact determination). Both outcomes are presented, because while there is a clear linkage between ridership and improved travel time, there is uncertainty as to the extent that improved reliability would result in additional ridership increases. The preliminary analysis

[26] SFMTA, DRAFT San Francisco Transit Effectiveness Project Market Assessment, February 2009. A copy of this draft report is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

conducted for the Church Street Transit-only Lane Pilot Project indicates that reliability will likely increase with the implementation of such improvements.

Ridership on the regional transit screenlines was based on both Existing conditions and 2035 Cumulative ridership projected by the SF-CHAMP model, and regional transit capacity obtained directly from the various regional operators.

2035 Cumulative Land Use and Transportation Network Assumptions. For analysis of future year 2035 Cumulative conditions, the SF-CHAMP model incorporates projections for housing and employment growth in San Francisco and the nine-county Bay Area (i.e., the Projections 2011 – Focused Future scenario).[27] Between Existing conditions and the 2035 Cumulative year, San Francisco is projected to experience a growth of an additional 69,000 residential units (a 20 percent increase over Existing conditions) and 161,000 jobs (an increase of 30 percent over Existing conditions).

The future year 2035 Cumulative analysis assumes completion of certain planned and reasonably foreseeable traffic, pedestrian, transit, and bicycle changes, such as those listed below, that although not part of the proposed project, could affect circulation. These include but are not limited to:

- Transit Center District Plan Public Realm Plan;
- The Presidio Parkway (which will replace Doyle Drive as the southern access to the Golden Gate Bridge);
- Build-out of the Mission Bay roadway network;
- A new interchange at U.S. 101/Geneva Avenue/Harney Way and the corresponding extension of the 28L 19th Avenue Limited into the Candlestick Point and Hunters Point Shipyard areas as a bus rapid transit service;
- Infrastructure consistent with the San Francisco *Bicycle Plan* (for example, bicycle lanes on Masonic Avenue);
- Central Subway service between South of Market and Chinatown;

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[27] The projections include major land use projects such as the Transit Center District Plan, Treasure Island Development Plan, Candlestick Point – Hunters Point Shipyard Development Plan, Park Merced Redevelopment Plan, Market-Octavia Area Plan, Eastern Neighborhoods Area Plan, Western SoMa Community Plan, Presidio Development Plan, and California Pacific Medical Center Long Range Development Plan.

- Caltrain electrification; and,

- The Van Ness Avenue and Geary Boulevard bus rapid transit (BRT) projects.

Diversions. Due to diversions, minor redistribution of traffic volumes, or conversion of private auto trips to transit trips as determined by SF-CHAMP, there may be small differences in traffic volumes between scenarios, even at intersections where no physical changes are proposed. For example, with Service Improvements, there would be a small change in traffic volumes making an eastbound right turn from the I-80 off-ramp at the intersection of Mission/13th/Duboce/Otis streets, compared to Existing conditions without the Service Improvements. This is because the Service Improvements result in a relatively modest, but citywide, change in travel patterns. Generally, this change would result in more people using transit and an overall decrease in traffic volumes; however, there may be some instances where traffic volumes at a particular location increase slightly. Overall, these effects would be minor.

As a result, some peak hour intersection operating conditions may improve or degrade slightly with Service Improvements when compared to Existing conditions. In addition, particularly under the scenarios with TTRPs (the TTRP Moderate Alternative and the TTRP Expanded Alternative), where traffic capacity is proposed to be reduced on some streets, there is a potential that traffic patterns may shift more substantially. The SF-CHAMP model output was used to determine the potential for the TTRPs to generate diversion of vehicles to other streets when implemented. For each link in the road network, the daily roadway traffic volumes from the baseline SF-CHAMP model runs (for example, Existing, 2035 Cumulative No Project) were subtracted from the daily traffic volumes for the Existing plus Service Improvements and the TTRP Expanded Alternative conditions.[28] These differences in daily roadway traffic volumes were displayed on a map of the street network and examined for each quadrant of San Francisco, from which the comparative effect of diversions could be assessed. The TTRPs that led to the highest diversion rate were those that directly prohibited turning movements at intersections or through movements on roadways (for example, as illustrated in the TTRP.14 Expanded Alternative, northbound Mission Street from Cesar Chavez Street to 13th Street), followed by those TTRPs that converted mixed-flow travel lanes to transit-only lanes (for example, as illustrated in the TTRP.14 Expanded Alternative, southbound Mission Street from 13th to Randall streets). In these instances, study intersections on parallel roadways were also selected for analysis to assess the effects of diversion on a.m. and/or p.m. peak hour intersection levels of service.

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[28] Sensitivity testing showed that the Existing plus Service Improvements and TTRP Expanded Alternative resulted in modestly higher rates of vehicle diversion than Existing plus Service Improvements and TTRP Moderate Alternative, thus the TTRP Expanded Alternative SF-CHAMP model runs were used for the vehicle diversion assessment.

4.2.4.3 SUMMARY OF TEP TRANSPORTATION IMPACT ANALYSIS

The TEP is a complex project consisting of many different types of transit-related improvements, ranging from changes to individual routes, stop locations, and frequencies; policies and strategies to improve transit service throughout San Francisco; a general toolkit as well as specific packages of improvements designed to improve travel time and reliability on individual transit corridors (TTRPs); and capital improvements designed to support all of the above. Moreover, some specific TTRPs are being analyzed at a project level because specific design solutions have been identified, while others are analyzed at a program level because they require further refinement. To ensure that an adequate range of alternatives are considered, two options of the TTRPs have been proposed for 11 of the Rapid Network corridors, a TTRP Moderate Alternative and a TTRP Expanded Alternative, with both including the same proposed Service Improvements. The proposed Service Improvements impacts are also analyzed separately at a project level. The difference between these two TTRP alternatives is that the TTRP Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental effects due to substantial changes to traffic, bicycle, or pedestrian circulation, whereas the TTRP Moderate Alternative is expected to have fewer physical environmental effects due to the nature of the TPS Toolkit elements chosen. Specifically, the TTRP Moderate Alternative does not include implementation of roadway capacity-reducing TPS Toolkit elements that would result in significant traffic impacts at various intersections throughout the City. The TTRP Expanded Alternative, on the other hand, would implement elements of the TPS Toolkit, such as transit-only lanes, that would reduce travel lane capacity and consequently result in significant and unavoidable traffic impacts.

The TEP is a complex project that is designed to help ensure that the proposed program of transit improvements is comprehensive and effective, but also flexible enough to respond to changing conditions throughout the City over time. As a result, the transportation impact analysis discussion for the project is similarly complex. Therefore, this Transportation and Circulation summary subsection has been provided to present a high-level overview of the types and locations of transportation and circulation impacts expected as a result of the TEP. A more detailed discussion and presentation of all impact statements (including less-than-significant impact statements not included here) is provided in later sections, beginning with Section 4.2.4.4, on p. 4.2-66. The following summary discussion highlights the types of impacts that are expected to occur for the Service Improvements, Service-related Capital Improvements, and the TTRPs, for both the TTRP Moderate and TTRP Expanded Alternatives. For each project type (Service Improvements and Service Variants, Service-Related Capital Improvements, and TTRP and TTRP Variants), this section provides a summary of near-term, project-specific impacts associated with transit, traffic, bicycles, pedestrians, loading, and parking. Emergency vehicle access and construction impacts for all project types are summarized at the end of this section.

Service Improvements and Service Variants

As noted elsewhere, the TEP proposes a series of transit service changes that would allocate resources more cost-effectively, better serve Muni passengers, reflect changing travel patterns within San Francisco, provide improved connections to regional transit, and streamline routes for improved reliability and reduced delay. These Service Improvements and Service Variants would include developing new routes, modifying existing routes, or adding transit service to streets currently without transit service; eliminating underutilized existing routes or route segments; changing the transit vehicle type operating along a route; changing the frequency and span of service; changing the mix of local/limited/express service offered along a particular route; and other changes, such as adding new express service stops, expanding limited-stop service to include Sundays, and expanding other service by adding days of operation. Overall, the Service Improvements or Service Variants would add up to 380,000 service hours annually to the current (2011) service level of 3,500,000 service hours – an approximate increase of 10 percent.

Although some specific routes would exceed SFMTA's crowding (capacity utilization) threshold of 85 percent, sufficient capacity would be available on nearby routes on the same corridor and passengers would be able to redistribute themselves accordingly. Service Improvements or Service Variants would introduce increases in transit traffic to some streets, but these would be relatively minor and therefore, impacts to traffic, pedestrians, and bicycles would not be substantial. Service Improvements or Service Variants would not likely affect commercial loading, such that a net loss of commercial loading spaces would occur. Thus, the impact assessment determined that transportation and circulation impacts associated with the Service Improvements or Service Variants would be less than significant.

Transit Impacts. The Service Improvements or Service Variants would provide additional capacity on existing routes, realign 25 routes, introduce service on six new lines and routes (E Embarcadero, 5L Fulton Limited, 11 Downtown Connector, 32 Roosevelt, 49L Van Ness-Mission Limited, and 58 24th Street), and discontinue service on two routes (3 Jackson and 12 Folsom-Pacific).[29] Route maps showing the proposed changes for each route are included as Appendix A to the Initial Study and attached as Appendix 2 to this Draft EIR.

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[29] Routes where alignment changes are proposed as part of the TEP include: 6 Parnassus, 8X Bayshore Express, 8BX Bayshore Express, 10 Sansome, 16X Noriega Express, 17 Parkmerced, 18 46th Avenue, 19 Polk, 22 Fillmore, 23 Monterey, 27 Folsom, 28 19th Avenue, 28L 19th Avenue Limited, 29 Sunset, 33 Stanyan, 35 Eureka, 36 Teresita, 37 Corbett, 43 Masonic, 47 Van Ness, 48 Quintara-24th Street, 52 Excelsior, 54 Felton, 56 Rutland, 76 Marin Headlands, and 91 Owl.

With the Service Improvements or Service Variants, transit ridership on the Muni system would increase compared to Existing conditions on a daily basis, and during the a.m. and p.m. peak hours.

Generally, transit would become less crowded on the majority of the lines and routes during the a.m. and p.m. peak hours. Although, in some instances, because of a decrease in transfers between lines, capacity utilization (i.e., crowding) would increase compared to Existing conditions, but would remain within Muni's 85 percent capacity utilization standard. Still, with the Service Improvements or Service Variants, capacity utilization would be greater than 85 percent on the F Market & Wharves historic streetcar line, K Ingleside light rail line, 16X Noriega Express route, 21 Hayes route, and the 71L Haight-Noriega Express route. For routes and lines where capacity exceeds the 85 percent threshold during the a.m. and p.m. peak hours, alternate transit service with available capacity would be available in the same corridor (for example, the 6 Parnassus, other light rail, and the 71L Haight-Noriega Limited), and passengers would be able to redistribute themselves between multiple routes in the same corridor.

During both a.m. and pm. peak hours, with the additional transit ridership on the Muni routes plus the additional capacity associated with the Service Improvements or Service Variants, the capacity utilization on the screenlines would be less than the 85 percent capacity utilization standard for the entire system and for each of the screenlines and corridors. Therefore, impacts of implementing the Service Improvements or Service Variants on transit capacity and operations would be less than significant.

Traffic Impacts. The Service Improvements or Service Variants would increase transit service along some routes, which would increase the potential for conflicts between transit vehicles and other vehicular traffic. However, the addition of transit vehicles on existing routes, even at intersections operating poorly under Existing conditions (that is, intersections operating at LOS E or LOS F conditions), would not increase overall traffic volumes as to substantially adversely change traffic conditions along the route.

The proposed Service Improvements or Service Variants would also introduce transit service onto streets that did not previously have transit running on them. The introduction of transit service would add relatively small numbers of transit vehicles to roadways in relation to the amount of traffic currently on the streets, and as a result, would not substantially affect traffic operations, and the impacts of the Service Improvements or Service Variants to traffic operations would be less than significant.

Pedestrian Impacts. The proposed changes in transit service headways as a result of the Service Improvements or Service Variants could result in an increase in the number of buses along the routes affected by the TEP proposals, which could result in an increased potential for pedestrian, bicycle, and transit conflicts; however, this increased service would not result in hazardous conditions for pedestrians because it would not result in substantial overcrowding on public sidewalks or create potentially hazardous conditions, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas.

As noted above, the Service Improvements or Service Variants would include a number of route realignments, which could increase the distance and physical effort required for some transit riders to reach transit relative to Existing conditions and, as such, may present a challenge to them. The SFMTA recognizes that passengers, including the elderly and disabled, may have differing concerns with respect to transit stop location. Some may depend on transit to meet their needs for efficient travel, while others prefer more frequent stops to minimize walking distances. While stop removal or consolidation may increase the physical effort required to reach a particular transit stop location the TEP would also include components to improve overall pedestrian and disabled access conditions, such as the installation of curb ramps, pedestrian bulbs, and accessible platforms. With respect to assessment of pedestrian impacts under CEQA, the proposed route realignment would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas. Therefore, the impacts of the Service Improvements or Service Variants on pedestrians would be less than significant.

Bicycle Impacts. Service Improvements or Service Variants would typically increase the number of transit vehicles along a route; however, an increase of a few buses an hour along a route would not be noticeable and would not substantially affect bicycle travel along the route. Route realignments may introduce transit onto streets that currently do not have any transit; however, streets are designed to accommodate all users, and the presence of both transit and bicycles on the same street is not considered a safety hazard. Therefore, the impacts of the Service Improvements or Service Variants on bicycle facilities and operations would be less than significant.

Loading Impacts. Changes associated with the Service Improvements or Service Variants would generally affect streets that currently have transit service and would not change the existing on-street commercial loading supply. In instances where new routes or route realignments require new transit stops or extended terminals,[30] up to five parking spaces may be removed (and in most locations only one to two parking spaces may be removed). In most cases, this parking removal would not affect commercial loading spaces, or loading

[30] The terminal for a route is where the bus and driver wait at the end of a route before proceeding with another run.

could be relocated adjacent to its existing location. Therefore, the impacts of the Service Improvements or Service Variants on loading would be less than significant.

Parking Impacts. Parking changes associated with the Service Improvements or Service Variants would generally affect streets that currently have transit service and would not change the existing on-street parking supply. In some instances, new routes or route realignments may introduce transit onto streets that currently do not have any transit, requiring new or relocated transit stops or extended terminals. Up to five parking spaces may be removed (and in most locations only two parking spaces may be removed) in order to accommodate the new or relocated transit stops or the extended terminals. In other locations, due to transit service relocation or transit stop removal, on-street parking may be added. Although the loss of parking may be an inconvenience to private auto drivers in some locations, the parking removal associated with the Service Improvements or Service Variants to accommodate new or relocated transit stops or extended terminals, would be minor and this impact would be less than significant.

Service-related Capital Improvements

Service-related Capital Improvements include:

- **Terminal and Transfer Point Improvements** to accommodate better transfer points for passengers, improved layover space for buses, and access to restroom facilities for bus operators. These projects would consist of the installation of new switches; bypass rails (for the E-Line); transit bulbs; and overhead wiring, and poles, and associated underground wiring; the expansion of transit zones for bus layovers; the reconfiguration or elimination of on-street parking; and possible sidewalk modifications.

- **Overhead Wire Expansion Projects** to support rerouting of bus routes served by electric trolley coaches, and these would include the installation of overhead wire infrastructure such as poles, electrical duct banks, overhead wires and bypass wires, etc.

- **Systemwide Capital Infrastructure**, which would include construction of the Sansome Street Contraflow Lane Extension and additional accessible platforms along the surface portion of the light rail system.

As with the TTRPs, the Service-related Capital Improvements consist of projects assessed at both the program-level and project-level. This summary is an overview of the impact assessment of all Service-related Capital Improvements. Overall, implementation of the

Service-related Capital Improvements would have less-than-significant impacts to transportation and circulation.

Transit Impacts. The program-level and project-level Service-related Capital Improvements are infrastructure improvements necessary to support the Service Improvements or Service Variants. These projects would not, in isolation, result in any new transit trips and therefore, would not increase transit demand or ridership. Because these improvements would not affect transit capacity or operations, the impact of the program-level and project-level Service-related Capital Improvement projects on local and regional transit would be less than significant.

Traffic Impacts. The program-level and project-level Service-related Capital Improvements would include roadway striping of bus stops and the construction and installation of transit bulbs, pedestrian bulbs, new bypass rails, track turnouts, track switches, and overhead wiring and poles that would be part of the three terminal and transfer point improvement (TTPI) projects.[31] These Service-related Capital Improvement projects would not result in a reduction in mixed-flow lanes nor substantially affect existing travel lane operations at nearby intersections. Construction of new accessible platforms would also not remove any travel lanes nor substantially affect existing travel lane operations along the existing rail lines.

However, implementation of the project-level SCI.2 project, the Sansome Street Contraflow Lane extension, would reduce the number of northbound travel lanes on the segment of Sansome Street between Washington Street and Broadway from three lanes to two lanes. Intersections along this segment would operate at acceptable LOS C or better during the p.m. peak hour, with implementation of the proposed project. Therefore, the impact of the program-level and project-level Service-related Capital Improvement projects on traffic operations would be less than significant.

Pedestrian Impacts. Improvements associated with the program-level and project-level Service-related Capital Improvement projects would facilitate transfers between routes and make transit terminal locations more easily recognizable (TTPI projects); would allow Muni passengers with mobility impairments to better utilize the light rail system through the installation of additional accessible platforms (SCI.1); and, with construction of transit and pedestrian bulbs as part of the TTPI projects, would also improve pedestrian safety in the area by shortening the street crossing distance, improving the pedestrian visibility, reducing the speed of turning traffic, and providing additional space for pedestrian queuing at transit stops. These elements would provide safer access to transit.

[31] A track turnout is a short stretch of rail track used to store rail vehicles or enable rail vehicles on the same line to pass.

Implementation of new overhead wiring would place overhead wire poles within the portions of the adjacent sidewalks that already include roadway infrastructure (for example, traffic lights, traffic control boxes, and overhead wire poles) as well as other furniture (for example, newspaper stands and mailboxes), and as a result, the poles would not materially affect the existing pedestrian environment. Therefore, impacts of the program-level and project-level Service-related Capital Improvements on pedestrians would be less than significant.

Bicycle Impacts. Implementation of the program-level and project-level Service-related Capital Improvement projects would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility (the ability of bicyclists to access various destinations). Most project locations are not along a designated bicycle route, and because the proposed improvements could be accommodated without substantially affecting adjacent travel lanes or bicycle lanes, bicycle conditions with implementation of Service-related Capital Improvements would not change substantially from Existing conditions.

At some locations, transit bulbs are proposed adjacent to a bicycle lane (for example, program-level TTPI.4 on Potrero Avenue), and, with implementation of the transit bulbs, buses would be stopped within the bicycle lane. Under these conditions, bicyclists would be able to pass a bus, conditions permitting, or would need to wait behind the bus. Implementation of transit bulbs adjacent to bicycle lanes would not reduce existing conflicts between buses and bicyclists; however, transit-bicycle conflicts would not substantially increase over Existing conditions. Therefore, the impact of the program-level and project-level Service-related Capital Improvement projects on bicycle facilities and operation would be less than significant.

Loading Impacts. Implementation of the program-level and project-level Service-related Capital Improvement projects would not generate additional commercial loading or vehicular passenger loading space demand. Implementation of the new bus stops, transit bulbs, new overhead wiring, and bypass rail and related track work associated with these improvements may affect on-street commercial loading and vehicular passenger loading spaces in the vicinity of the projects, depending on the final design. However, for each Service-related Capital Improvement project, the extent of the impact would be limited, and any commercial loading spaces affected would be relocated within 250 feet of the existing spaces. Therefore, impacts of the program-level and project-level Service-related Capital Improvement projects on loading would be less than significant.

Parking Impacts. Implementation of the new bus stops, transit bulbs, new overhead wiring, and bypass rail and related track work associated with these Service-related Capital Improvement projects would typically remove up to six on-street parking spaces in the vicinity of the projects, depending on the final design. However, for each project, the extent of the impact would be limited because the number of parking spaces removed would be relatively small within the context of overall parking supply in the vicinity of the improvements. Therefore, impacts of the program-level and project-level Service-related Capital Improvement projects on parking would be less than significant.

TTRPs and TTRP Variants

The SFMTA has utilized the TPS Toolkit to develop project-level TTRPs and TTRP Variants for 11 of the 17 transit corridors on the Rapid Network. These projects are designed to reduce transit travel time and improve transit reliability. For nine of the 17 transit corridors on the Rapid Network that are being analyzed as program-level TTRPs, the SFMTA will also utilize the TPS Toolkit elements to develop similar project-level TTRPs in the future. These projects will be developed with the same goals of reducing transit travel time and improving transit reliability. This section summarizes the combined impacts of these treatments.

The range of TTRP treatments analyzed is bracketed by: 1) a moderate option referred to as the TTRP Moderate Alternative, and 2) an expanded option referred to as the TTRP Expanded Alternative. The difference between the two alternatives is that the TTRP Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental effects due to substantial changes to traffic, bicycle, or pedestrian circulation, whereas the TTRP Moderate Alternative is expected to have fewer physical environmental effects due to the nature of TPS Toolkit elements chosen. Specifically, the TTRP Moderate Alternative does not include implementation of roadway capacity-reducing TPS Toolkit elements that result in significant traffic impacts at various intersections throughout the City. The TTRP Expanded Alternative, on the other hand, would implement elements of the TPS Toolkit, such as transit-only lanes, that would reduce the number of travel lanes and consequently result in significant and unavoidable traffic impacts. The TTRP.14 Moderate Alternative, TTRP.22 Expanded Alternative, and TTRP.30 Expanded Alternative each have two variants.

Under Existing plus Project conditions, the TTRP Moderate Alternative and TTRP Variants would have less-than-significant impacts on transit capacity and operations, pedestrian circulation, bicycle circulation, and traffic operations. However, the TTRP Moderate Alternative and TTRP Variants would have significant impacts on commercial loading supply, specifically on the TTRP.14 corridor along Mission Street and TTRP.30_1 corridor along Stockton and North Point Streets. Mitigation measures to find replacement commercial loading spaces within 250 feet may not be feasible on these corridors, and the commercial loading impacts due to implementation of the TTRP Moderate Alternative and TTRP Variants would be significant and unavoidable.

Under Existing plus Project conditions, the TTRP Expanded Alternative and TTRP Variants would also have a less-than-significant impact to transit capacity and operations, pedestrian circulation, and bicycle circulation. However the TTRP Expanded Alternative and TTRP Variants would have significant impacts to five study intersections, for which feasible mitigation measures are not available. Therefore, the TTRP Expanded Alternative and TTRP Variants' impacts to traffic operations would be significant and unavoidable. Similar to the TTRP Moderate Alternative and TTRP Variants, the TTRP Expanded Alternative and TTRP Variants would also result in significant impacts to commercial loading supply (for the same corridors as discussed in the paragraph above). For the same reasons as for the TTRP Moderate Alternative and TTRP Variants, these impacts would be significant and unavoidable.

Transit Impacts. Overall, implementation of the TTRP projects would improve conditions for transit, and the TTRP projects' impacts on transit would be less than significant. Both the program-level and project-level TTRPs would be comprised of TPS Toolkit elements with minor environmental impacts on transit, as described below. Installing transit bulbs and transit boarding islands, optimizing bus stop lengths, and removing or consolidating stops would improve transit travel times and reduce transit delays by reducing the number of times transit vehicles stop at intersections and by eliminating or reducing the need for buses to exit and re-enter the flow of traffic. Converting flag stops to bus zones would provide bus operators with a clear line-of-sight to see waiting passengers and to pull alongside the curb, thereby improving transit accessibility and passenger convenience because passengers would no longer step into the street to board or to exit the bus.

Implementation of transit-only lanes and widening mixed-flow lanes would improve conditions for transit by providing exclusive transit-only right-of-way through intersections, avoiding delays associated with mixed-flow lanes. At locations where travel lane reductions would provide for wider mixed-flow lanes (rather than for a transit-only lane), buses would be able to operate at faster travel speeds, and the reduction in friction with vehicles in adjacent lanes would reduce the potential for sideswipe collisions. Dedicated left-turn lanes and right-turn pockets would also reduce the impact of congestion on transit by preventing turning vehicles from blocking transit vehicles and other traffic as they move through the intersection.

Replacing stop signs with traffic signals can reduce transit travel times by allowing transit vehicles to take advantage of planned transit signal priority improvements that reduce signal delay for approaching transit vehicles. At some intersections that are all-way stop-controlled, the stop signs on the street with transit can be removed to reduce transit travel time by allowing transit vehicles to proceed through intersections without coming to a complete stop.

Pedestrian bulbs at signalized intersections and widened sidewalks can reduce transit travel time by reducing the roadway crossing distance, which can provide flexibility in traffic signal timing and reduce the likelihood of transit vehicles arriving on a red signal indication. Pedestrian refuge islands can reduce transit travel time by shifting travel lanes toward the curb and eliminating the need for buses to exit and re-enter the flow of traffic to access curbside transit stops.

Both the TTRP Moderate Alternative and TTRP Variants and the TTRP Expanded Alternative and TTRP Variants would reduce delays to transit along the identified routes, as well as other Muni and regional routes traveling within those corridors. Travel times along the TTRP portion of the routes would decrease, by approximately 2 to 30 percent, with the greatest reduction in travel times occurring on the N Judah, 22 Fillmore, and 28L 19th Avenue Limited routes. Therefore, transit operations along the TTRP corridors would improve compared to Existing conditions, with implementation of the TTRPs.

With implementation of the TTRP proposals, transit ridership on the Muni system would increase compared to Existing conditions due to the Service Improvements or Service Variants. That is, the Service Improvements or Service Variants would provide additional capacity on existing routes, route restructuring and new routes in combination with the TTRP proposals. Specifically, in consideration of the improvements to prioritize transit on the TTRP corridors, the capacity utilization at the MLP on the routes using the TTRP corridors would be less than the 85 percent capacity utilization standard with implementation of eight of the 11 TTRP projects (including project variants) for the TTRP Moderate Alternative conditions, and nine of the 11 TTRP projects (including variants) for the TTRP Expanded Alternative conditions. This means that of the 11 TTRP corridors, three routes under TTRP Moderate Alternative conditions and two routes under TTRP Expanded Alternative conditions would exceed the 85 percent capacity utilization standard, as described in the paragraph below.

With implementation of the TTRP.5 Moderate Alternative, capacity utilization on the 5 Fulton would be less than the 85 percent capacity utilization standard during the p.m. peak hour. However, during the a.m. peak hour the capacity utilization on the 5 Fulton would be 87.4 percent in the inbound direction and would therefore, exceed the 85 percent capacity utilization standard. Because capacity would be available on the 21 Hayes to the south to accommodate additional passengers (i.e., with a capacity utilization of 72.8 percent during the a.m. peak hour), the impacts of the TTRP.5 Moderate Alternative on capacity utilization along this transit corridor would be less than significant.

With implementation of the TTRP.8X Moderate Alternative and the TTRP.8X Expanded Alternative, capacity utilization on the 8X Bayshore Express and 8BX Bayshore Express would be less than the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours; however, the capacity utilization on the 8AX Bayshore Express would exceed the 85 percent capacity utilization standard during the a.m. peak hour (but would be less than 85 percent during the p.m. peak hour). Because capacity would be available on the 8BX

Bayshore Express to accommodate additional passengers during the a.m. peak hour, the impacts of the TTRP.8X Moderate Alternative and TTRP.8X Expanded Alternative on capacity utilization of the 8AX Bayshore Express would be less than significant.

- With implementation of the TTRP.71_1 Moderate Alternative and TTRP.71_1 Expanded Alternative, capacity utilization on the 6 Parnassus would be less than the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours. However, the capacity utilization on the 71L Haight-Noriega Limited would exceed the 85 percent capacity utilization standard during the p.m. peak hour. Because capacity would be available on the 16X Noriega Express to accommodate additional passengers during the p.m. peak hour, the impacts of the TTRP.71_1 Moderate Alternative and TTRP.71_1 Expanded Alternative on capacity utilization along this transit corridor would be less than significant.

- With implementation of the Service Improvements in combination with the TTRP Moderate Alternative, capacity utilization would continue to exceed the 85 percent capacity utilization standard on lines/routes not on the project-level TTRP corridors, including the F Market & Wharves, and the K Ingleside lines, and the 1 California route during p.m. peak hour in the outbound direction. Capacity would be available on the E Embarcadero and M Ocean View lines to accommodate additional passengers from the F Market & Wharves and K Ingleside lines. On the 1 California route, capacity would be available on the 1AX California Express and 1BX California Express. Because capacity would be available on alternative routes, the impacts of the Service Improvements, in combination with the TTRP Moderate Alternative, on lines/routes not on the TTRP corridors would be less than significant.

- With implementation of the Service Improvements in combination with the TTRP Expanded Alternative, capacity utilization would continue to exceed the 85 percent capacity utilization standard on lines/routes not on the project-level TTRP corridors, including the F Market & Wharves, and the K Ingleside lines, and the 1AX California Express route during a.m. peak hour in the inbound direction, and on the 43 Masonic route during the a.m. peak hour in the inbound direction. Capacity would be available on the E Embarcadero and M Ocean View lines to accommodate additional passengers from the F Market & Wharves and K Ingleside lines, respectively. During the a.m. peak hour, capacity would be available on the 1 California and 1BX California Express for the 1AX California Express route, and would be available on the NX Judah Express for the 43 Masonic route. Because capacity would be available on alternative routes, the impacts of the Service Improvements, in combination with the TTRP Expanded Alternative, on lines/routes not on the TTRP corridors would be less than significant.

With implementation of either the TTRP Moderate Alternative and TTRP Variants or the TTRP Expanded Alternative and TTRP Variants, the capacity utilization of the screenlines would be less than the 85 percent capacity utilization standard for the entire system and for each of the screenlines and corridors during both the a.m. and p.m. peak hours.

As stated, for the nine program-level TTRP projects, the SFMTA would develop project-specific designs in the future utilizing the TPS Toolkit elements. These project-specific designs would be similar to those developed for the project-level TTRPs consisting of combinations of the same TPS Toolkit elements, with the same goals of reducing transit travel times and improving transit reliability. The individual TPS Toolkit elements have been analyzed for potential impacts to transit capacity and operations and have been determined to not result in significant transit impacts. Therefore, these program-level TTRPs are anticipated to have less-than-significant impacts on transit capacity and operations under Existing plus Project conditions.

Therefore, the impact of the TTRP projects on transit capacity and operations would be less than significant.

Traffic Impacts. For program-level TTRP projects, implementation of most of the TPS Toolkit elements along the TTRP corridors would generally not impact intersection operations. However, implementation of elements within the following TPS Toolkit categories: Lane Modification (that is, establish transit-only lanes, establish transit queue jumps, establish dedicated turn lanes, and widen turn lanes through lane reductions) and Pedestrian Improvements (that is, install pedestrian refuge islands, install pedestrian bulbs, and widen sidewalks) that reduce roadway capacity for mixed-flow traffic may result in significant traffic impacts, including at the intersections of California/Arguello, California/Park Presidio, California/Cherry, California/Locust, California/Presidio, California/Divisadero for the TTRP.1 corridor; Potrero/Division, Potrero/16th, Potrero/17th, Potrero/21st, Potrero/23rd, Potrero/24th, Potrero/25th, Jerrold/Bayshore/U.S. 101 Northbound On-ramp, Bayshore/Oakdale, Bayshore/Industrial, Bayshore/Silver for the TTRP.9 corridor; Fillmore/Lombard for the TTRP.22_2 corridor; Haight/Masonic, Stanyan/Haight, Stanyan/Frederick for the TTRP.71 corridor; Ocean/Junipero Serra, Ocean/Geneva/Phelan, Ocean/Lee, Ocean/Miramar, Ocean/Brighton for the TTRP.K corridor; Taraval/19th, and Taraval/Sunset for the TTRP.L corridor. Implementation of Mitigation Measure M-TR-8: Optimization of Intersection Operations, would minimize or reduce traffic impacts at intersections and along roadway segments, such as those intersections described above, by optimizing intersection geometries and traffic control measures to the greatest extent feasible. However, because this mitigation measure may not be adequate to mitigate significant impacts at these and/or other intersections along the program-level TTRP corridors to less-than-significant levels, and because the feasibility of providing additional capacity is unknown and it is not always possible to optimize the intersection to LOS D or better conditions, the impact on traffic operations would remain significant and unavoidable.

- Under Existing plus Service Improvements and the TTRP Moderate Alternative or TTRP Variants, none of the 78 study intersections would worsen from acceptable (LOS D or better) to unacceptable levels (LOS E or F), and eight of the 78 study intersections would continue to operate at LOS E or LOS F conditions during the a.m. and/or p.m. peak hours. However, based on an assessment of the project's changes to these LOS E or F intersection operations with implementation of the 11 project-level TTRPs, intersection operating conditions would not substantially change compared to Existing conditions, or the TTRP Moderate Alternative and TTRP Variants would not substantially worsen Existing LOS E or F intersections, and therefore, the TTRP Moderate Alternative and TTRP Variants would have less-than-significant project-specific traffic impacts.

Under Existing plus Project conditions, implementation of the TTRP Expanded Alternative on the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.28_1, and TTRP.71_1 corridors would have less-than-significant project-specific traffic impacts. However, with implementation of the TTRP Expanded Alternative and TTRP Variants on the Mission Street (TTRP.14), 16th Street (TTRP.22_1) and Stockton Street and Columbus Avenue (TTRP.30_1) corridors, in combination with the Service Improvements, significant and unavoidable impacts would occur at the following five of the 78 study intersections under Existing plus Project conditions:

- Randall Street/San Jose Avenue – from implementation of the TTRP.14 Expanded Alternative.
- 16th Street/Bryant Street – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.22_1 Expanded Alternative Variant 2, even with implementation of Mitigation Measure M-TR-26.[32]
- 16th Street/Potrero Avenue – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.22_1 Expanded Alternative Variant 2.
- 16th Street/Seventh Street – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.22_1 Expanded Alternative Variant 2.
- Columbus Avenue/Green Street/Stockton Street – from implementation of the TTRP.30_1 Expanded Alternative or TTRP.30_1 Expanded Alternative Variant 1.

As the discussion above indicates, under Existing plus Project conditions, implementation of the TTRP Moderate Alternative and TTRP Variants would have a less-than-significant impact on traffic throughout the City. While implementation of certain TPS Toolkit elements (for example, construction of transit bulbs on single-lane roadway) could result in vehicle delays and/or inconvenience, the TTRP Moderate Alternative and TTRP Variants would not cause

[32] Mitigation Measure M-TR-26 would involve restriping the eastbound and westbound approaches of the intersection of 16th/Bryant streets. This measure would improve operating conditions at the intersection, but not to acceptable levels of LOS D or better.

the study intersections to deteriorate to unacceptable levels or substantially exacerbate any existing unacceptable operating conditions at study intersections [i.e., the level of service (LOS) measurement would not worsen to a level considered to be poorly operating, resulting in traffic congestion and/or delay].

On the other hand, the TTRP Expanded Alternative and TTRP Variants would result in significant impacts at five of the study intersections, as described above. The TTRP Expanded Alternative and TTRP Variants could result in reduced roadway capacity due to the TPS Toolkit elements implemented, and therefore, would be more likely to affect traffic operating conditions. Mitigation measures to address traffic impacts while still meeting the objective of the project to improve transit speed and reliability may not be feasible. Therefore, traffic impacts at these five intersections, and potentially additional intersections along the program-level TTRP corridors where capacity-reducing toolkit categories may be proposed, would be significant and unavoidable under the TTRP Expanded Alternative and TTRP Variants or some combination of elements from the TTRP Expanded and Moderate Alternatives and TTRP Variants.

Pedestrian Impacts. Removing or consolidating transit stops as part of the TTRPs (for example, along San Bruno Avenue as part of project-level TTRP.8X Moderate and Expanded Alternatives, and along Mission Street as part of project-level TTRP.14 Moderate and Expanded Alternatives) would increase the distance between stops, similar to removal or realignment of routes (for example, 19 Polk). These project components could increase the physical effort required to reach transit relative to Existing conditions for some transit patrons and as such, may pose a burden to them. However, stop removal or consolidation would be consistent with SFMTA's *Proposed Revisions to Transit Stop Spacing Guidelines* regarding bus stop spacing, and removing or consolidating transit stops would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas.[33]

Converting flag stops to bus zones (for example, under project-level TTRP.8X Moderate and Expanded Alternative) would improve pedestrian conditions by allowing passengers to be picked up and dropped off at the curb adjacent to the sidewalk instead of in the street.

Implementation of TPS Toolkit elements along the program-level TTRP corridors would not result in overcrowded sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas. At uncontrolled intersections, and at two-way stop-controlled intersections that require only

[33] SFMTA, *Proposed Revisions to Transit Stop Spacing Guidelines*, February 16, 2012. This report is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

vehicles on the street without transit (i.e., the non-transit cross-street traffic) to stop, intersection safety and/or pedestrian access to transit stops would be improved with added right-of-way controls provided by a traffic signal (for example, at the intersection of 16th/Missouri streets part of project-level TTRP.22_1 Moderate and Expanded Alternatives and TTRP.22_1 Expanded Alternative Variants), and new traffic signals would include pedestrian countdown signals and marked crosswalks at the intersection.

At some all-way stop-controlled intersections, stop signs on the streets with transit would be removed, and traffic calming measures would be installed. Stop signs would typically be retained on the non-transit cross-street, but in some cases may be removed on both streets. Although removal of stop signs can make driver behavior less predictable for other roadway users, traffic calming measures would generally involve improving crossing conditions for pedestrians, slowing traffic, and reducing right-of-way conflicts between pedestrians and other traffic. Traffic calming measures that could be implemented with the intersection control changes include: traffic circles, pedestrian refuge islands, pedestrian or transit bulbs, speed humps, median extensions through an intersection, flashing beacons, parking restrictions to improve sight distance, and enhanced crosswalk markings and signs. These treatments would be implemented to facilitate safe and easy pedestrian crossings across streets where traffic no longer has to stop at a stop sign, with project implementation.

Pedestrian crossings at traffic circles (for example, proposed at the five intersections on McAllister Street for project-level TTRP.5 Expanded Alternative) with either two-way stop-control or uncontrolled (that is, yield) operations would be similar to pedestrian conditions at unsignalized intersections, where pedestrians have the right-of-way and vehicles at either approach are required to stop and yield to pedestrians. However, removal of stop signs would generally make it more difficult for pedestrians to cross the street, as moving vehicles may not always yield to pedestrians as required. In the design of such elements, the SFMTA may set back the pedestrian crossings further from the intersection to increase the visibility of pedestrians to approaching vehicle traffic.

Pedestrian refuge islands (for example, at the intersection of Fulton/Cole streets for project-level TTRP.5 Expanded Alternative) would improve pedestrian safety by increasing pedestrian visibility, minimizing pedestrian exposure to vehicular traffic (by providing a safe place within the street for pedestrians to wait for vehicles that do not yield), and shortening the street crossing distance; while transit bulbs and pedestrian bulbs (for example, at the intersection of Fulton/Cole streets for project-level TTRP.5 Moderate Alternative) would improve pedestrian safety by shortening the street crossing distance, improving pedestrian visibility by reducing the speed of turning traffic, and by providing additional space for pedestrian queuing. These elements would enhance pedestrian visibility and provide safer access to transit for pedestrians. Sidewalk widening (for example, project-level TTRP.22_1

Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, and TTRP.22_1 Expanded Alternative Variant 2) would improve pedestrian conditions by shortening the street crossing distance at the corresponding intersections and by providing additional pedestrian space and space for transit shelters.

Lane modifications (for example, widening, tow-way, or parking removal proposed for project-level TTRP.14 Moderate Alternative Variant 1) would not substantially affect pedestrian travel. Turn restrictions (for example, along 16th Street as part of project-level TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, and TTRP.22_1 Expanded Alternative Variant 2) would reduce potential for conflicts related to turning vehicles, particularly between left-turning vehicles and pedestrians at intersections.

Overall, the TEP was designed to improve pedestrian safety at or near the locations where transit improvements are proposed, with the exception of lane modifications (if implemented without any other TPS Toolkit elements). In these conditions, pedestrian conditions would be similar to those under Existing conditions. While there are some differences between the TTRP Moderate and TTRP Expanded Alternatives and TTRP Variants with respect to which TPS Toolkit elements would be applied to the Rapid Network, overall, irrespective of the alternative chosen, pedestrian conditions would generally improve and pedestrian impacts would be less than significant under the TEP. Stop consolidation may be an inconvenience to the public but for CEQA purposes, stop consolidation would not result in hazardous pedestrian conditions (for example, sight-distance issues, overcrowding on sidewalks, etc.). Therefore, the impact of the program-level and project-level TTRPs on pedestrians would be less than significant.

Bicycle Impacts. Of all the TEP project components, the TTRP proposals would have the greatest potential to affect bicycle conditions due to the changes that would occur within the roadway; however, as described below, impacts to bicycles and bicycle facilities as a result of the TTRPs and TTRP Variants would be less than significant.

Under the TTRP.J Moderate Alternative and TTRP.J Expanded Alternative, implementation of the transit bulbs, boarding island extensions, stop relocations and pedestrian bulbs on Church Street and on San Jose Avenue would not substantially affect the bicycle lane or vehicle travel on the parallel Bicycle Route 45 on Valencia Street, bicycle travel on parallel Bicycle Route 49 on Sanchez Street (which has sharrows), or travel in the bicycle lanes on San Jose Avenue. Some delay to bicycle travel along Church Street and 30th Street may occur at transit stops, where, with transit bulbs, buses would temporarily block bicycle lane travel, requiring all non-transit traffic in the corresponding travel lane and bicycle lane to stop, or if feasible, to pass the bus with care. However, similar delays and crossing of bicycle lanes by buses, currently occurs under Existing conditions at other locations throughout the City. Under the TTRP.J Expanded Alternative, with conversion of five intersections along

Church Street between 25th and Day streets from all-way stop-controlled to two-way stop-controlled, bicyclists traveling in the transit direction (in this case, northbound and southbound on Church Street) would no longer need to stop at these intersections, and in the opposing direction (in this case, eastbound and westbound on Church Street) would be required to yield to traffic on Church Street. Under the TTRP.J Expanded Alternative, a transit-only lane would be established on Church Street between Duboce Avenue and 16th Street by removing one mixed-flow lane in both directions. Church Street is not a designated bicycle route, and the improvements along this section would not affect the bicycle lane on Duboce Avenue. With elimination of one mixed-flow lane in each direction, bicyclists would share the travel lane with a greater number of vehicles in the remaining mixed-flow lanes; however, this would not create a potentially hazardous condition for bicyclists, and would not substantially affect bicycle facilities or operation.

- The TTRP.L Moderate Alternative and TTRP.L Expanded Alternative improvements, such as transit bulbs, boarding island extensions, stop relocations, and pedestrian bulbs on Taraval Street, would not affect bicycle travel. Under the TTRP.L Expanded Alternative, the intersection of Ulloa Street/15th Avenue would be converted from an all-way stop-controlled to a two-way stop-controlled intersection, removing the stop signs for westbound and southbound traffic, allowing bicyclists traveling westbound in the Ulloa Street bicycle lanes to, similar to motor vehicle traffic, no longer stop at this intersection, although they would have to navigate around the traffic calming treatment within the intersection. No other changes are proposed to the bicycle facilities or travel lanes on Ulloa or Vicente streets under either the TTRP.L Moderate Alternative and TTRP.L Expanded Alternative, and bicycle travel on these streets would remain similar to Existing conditions. Under the TTRP.L Expanded Alternative, a transit-only lane would also be established on Taraval Street between 15th and 46th avenues by converting one mixed-flow lane to a transit-only lane in both directions while maintaining the existing parking lanes. With the elimination of one mixed-flow travel lane in each direction, bicyclists on Taraval Street would share the remaining mixed-flow lane with a greater number of vehicles. However, this would not substantially affect bicycle operations or access nor create a potentially hazardous condition for bicyclists, as it would not represent a substantial change over Existing conditions.

  The TTRP.N Moderate Alternative and TTRP.N Expanded Alternative would not substantially affect bicycle travel. There are no bicycle routes on Carl Street, Irving Street, Ninth Avenue or Judah Street, and the proposed improvements (for example, transit bulbs, extension of existing transit boarding islands, stop relocation, etc.) would not affect bicycle travel on nearby eastbound/westbound routes such as on Kirkham Street or northbound-southbound routes such as Sixth, Seventh, 20th, and 34th avenues.

Under the TTRP.5 Moderate Alternative and TTRP.5 Expanded Alternative, implementation of transit bulbs on McAllister Street west of Van Ness Avenue, and on other streets with one travel lane in each direction, may delay bicyclists as the bus would stop in the travel lane to pick up and drop off passengers at the transit bulb. The increased delay to non-transit vehicles, including bicyclists, would only occur when a bus is present at the bus stop, and would not substantially affect bicycle circulation. Under TTRP.5 Expanded Alternative, conversion of all-way stop-controls to traffic circles at intersections along McAllister Street would reduce the frequency with which bicyclists on McAllister Street would have to stop and start, which would be an improvement for bicyclists.

Under the TTRP.8X Moderate Alternative, bicycle lanes would be established in the westbound direction on Geneva Avenue on the block between Paris and London streets, and in the eastbound direction on Geneva Avenue along the two blocks between Mission and Paris streets (bicycle lanes are currently provided in both directions of Geneva Avenue to the east, between Paris and Moscow streets). Under the TTRP.8X Expanded Alternative, a bicycle lane would also be provided in each direction of Geneva Avenue between Moscow and Santos streets. Implementation of transit bulbs, right-turn only pockets, and other elements on Geneva Avenue would not substantially affect bicycle operations along Geneva Avenue. Implementation of right-turn pockets could benefit bicyclists by providing clearer lane designations at an intersection approach and reducing the chance of right hook collisions occurring when drivers make a right turn at the last moment across a bicycle lane or facility and in front of a bicyclist. As described above, the implementation of transit bulbs on San Bruno, Visitacion, Sunnydale, and Geneva avenues and on Hahn and Santos streets may delay bicyclists when the 8X Bayshore Express and 8BX Bayshore Express buses stop in the travel lane to pick up and drop off passengers at the transit bulbs, particularly on streets with one travel lane in each direction (i.e., all of the above streets except for Geneva Avenue, which has two travel lanes in each direction). The increased delay to bicyclists would only occur when a bus is present at the bus stop. With the exception of Geneva Avenue, these streets are not designated bicycle routes. Under the TTRP.8X Expanded Alternative, with conversion of four intersections from all-way stop-controlled to two-way stop-controlled, bicyclists traveling on Visitacion Avenue would no longer need to stop at these intersections.

- Implementation of the TTRP.9 Moderate Alternative and TTRP.9 Expanded Alternative would not substantially affect bicycle travel. On the segment of Potrero Avenue between 18th and 24th streets, the TTRP.9 Moderate Alternative and TTRP.9 Expanded Alternative would maintain the southbound and northbound bicycle lane facilities (Class II) and add an outbound (southbound) transit-only lane. Under both TTRP.9 Moderate Alternative and TTRP.9 Expanded Alternative, the impact on bicyclists at locations where transit bulbs would be implemented adjacent to a bicycle lane (for example, on 11th Street and on Potrero Avenue) would be similar to Existing conditions when buses travel across the bicycle lane to a curbside bus zone. However, in this case, the bus would be stopped within the bicycle lane, and bicyclists would be able to pass the bus, conditions permitting, or would, similar to vehicle traffic, need to wait behind the bus. Implementation of transit bulbs adjacent to bicycle lanes would not reduce conflicts between buses and bicyclists; however, transit-bicycle conflicts would not substantially increase over Existing conditions. Other TTRP.9 Moderate Alternative and TTRP.9 Expanded Alternative improvements, such as pedestrian bulbs, would not affect bicycle lane travel on 11th Street, Potrero Avenue, and Bayshore Boulevard because the existing bicycle lanes would be maintained. Implementation of the TTRP.9 Moderate Alternative and TTRP.9 Expanded Alternative would not substantially affect the travel lanes, and conditions for bicyclists would be similar to Existing conditions.

- The TTRP.14 Moderate Alternative (for both Variants 1 and 2) and TTRP.14 Expanded Alternative would not substantially affect bicycle conditions. Implementation of transit bulbs near 11th Street may delay bicyclists on Bicycle Route 30 (which runs westbound for a short two-block segment [approximately 1,100 feet] of Mission Street between Tenth Street and South Van Ness) as the bus would stop in the travel lane to pick up and drop off passengers. However, the increased delay would only occur when a bus is present at the stop. New transit-only lanes on Mission Street, south of 13th Street would not affect existing bicycle routes and would not likely increase traffic volumes on other nearby bicycle routes. Further, bicyclists on Mission Street would benefit from turn restrictions, which would reduce conflicts between turning vehicles and bicyclists. Implementation of the transit-only lanes may increase vehicle volumes in the shared lane, potentially increasing conflicts between cyclists and vehicles. However, this potential conflict would be similar to existing conditions and would not increase hazards experienced by bicyclists.

Under the TTRP.22_1 Expanded Alternative (for both Variants 1 and 2), the existing bicycle lanes on 16th Street (Bicycle Route 40) between Seventh and Kansas streets would be relocated to 17th Street. At Kansas Street, the relocated bicycle lane would connect with the existing bicycle lane to the west (part of the Bicycle Route 40), while at Seventh Street the bicycle lane would connect with the bicycle lane on Mississippi Street that runs between Mariposa Street and 16th Street. Bicyclists who continue to travel on 16th Street between Seventh and Kansas streets, even after the relocation of bicycle lanes to 17th Street, would share the travel lane with a greater number of vehicles in the remaining mixed-flow lanes; however, this would not create a potentially hazardous condition for bicyclists.

TTRP.28_1 Moderate Alternative and TTRP.28_1 Expanded Alternative would not substantively affect bicycle travel. The proposed improvements along 19th Avenue would not affect bicycle conditions along the parallel Bicycle Route 74, which travels along 20th Avenue.

Additionally, Bicycle Route 86, which crosses 19th Avenue at Winston Drive, would not be affected by the proposed transit bulb on southbound 19th Avenue at Winston Drive.

Under TTRP.30_1 Moderate Alternative, because transit bulbs currently exist on Stockton Street, project-related conditions would be similar to Existing conditions. For North Point Street, which currently has a bicycle lane and one travel lane in each direction, project-related conditions would be similar to Existing conditions when buses travel across the bicycle lane to a curbside bus zone. However in this case, under project-related conditions, the bus would be stopped within the bicycle lane, and bicyclists would be able to pass the bus, conditions permitting. Implementation of transit bulbs would not substantially increase transit-bicycle conflicts from Existing conditions.

- Implementation of the TTRP.71_1 Moderate Alternative and TTRP.71_1 Expanded Alternative would not substantially affect bicycle travel. The proposed TTRP.71_1 Moderate Alternative improvements, such as transit bulbs and pedestrian bulbs on Haight Street, would not affect bicycle lane travel on Haight Street because bicyclists would continue to share the travel lane with vehicles, as under Existing conditions. However, because Haight Street generally has one travel lane in each direction, a bus stopped at a transit bulb could require a bicyclist behind the bus, similar to motor vehicles, to wait while the passengers boarded, rather than the existing configuration that allows buses to pull out of the travel lane into a bus zone to board passengers. With the TTRP.71_1 Moderate Alternative, conversion of the all-way stop sign controlled intersections of Haight/Pierce streets and Haight/Scott streets to signalized intersections would reduce the frequency with which bicyclists would have to stop and start, which would be an improvement for bicyclists on the segment of Bicycle Route 30 (Class III) that runs along Haight Street for the one block between Pierce and Scott streets.

- Under the TTRP.71_1 Moderate Alternative and TTRP.71_1 Expanded Alternative, the stop signs at all approaches at the intersection of Haight Street/Clayton Street would be replaced with a traffic signal, which would reduce delays for bicyclists traveling northbound or southbound on Clayton Street which is part of Bicycle Route 55 (Class III). Under the proposed TTRP.71_1 Expanded Alternative, the stop signs on Haight Street would be removed at its intersections with Laguna, Webster, Pierce, Scott and Shrader streets (i.e., intersections would be converted from all-way stop-controlled to two-way stop-controlled intersections). Bicycle travel on Haight Street, similar to motor vehicle traffic would experience less delay eastbound/westbound, but traffic on the intersecting streets may experience some additional delay, as they would be required to stop and wait for a break in the Haight Street traffic to proceed. Due to anticipated traffic and bicycle volumes on Haight Street, this would not be considered a significant change to Existing conditions.

Overall, the TEP would not substantially change or affect bicycle travel or bicycle facilities throughout the City, with the exception of the TTRP.22 Expanded Alternative (for both Variants 1 and 2), which would relocate the bicycle lanes on 16th Street between Seventh and Kansas streets to 17th Street. Implementation of the TEP would introduce new elements to the roadway (bulbs, traffic circles, etc.) that bicyclists would need to navigate around or through. However, these treatments are standard transportation features and would be designed to meet the City's roadway design standards, which are meant to account for safety of all users, including bicyclists. Therefore, the impact of the program-level and project-level TTRPs on bicycle facilities and operation would be less than significant.

Loading Impacts. Implementation of the TPS Toolkit elements for the TTRPs may result in potential displacement of on-street commercial loading spaces that cannot be relocated nearby, and therefore would result in significant loading impacts. For example, along the Mission Street corridor (TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, and TTRP.14 Expanded Alternative) north of 13th Street, and on Stockton Street (TTRP.30_1 Moderate Alternative, TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, and TTRP.30_1 Expanded Alternative Variant 2) between the intersections of Columbus Avenue/Green Street/Stockton Street and Stockton/Sacramento streets, commercial loading spaces would be removed and not all spaces could be relocated within 250 feet of the removed spaces. This may increase the occurrence of double-parking within the transit-only or mixed-flow lanes, and increase interference with vehicular and bicycle flow. The future detailed designs for the nine program-level TTRP corridors may also affect commercial loading spaces.

Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces, requires that whenever feasible, commercial loading spaces would be relocated within 250 feet of the removal location. However, the feasibility of providing replacement commercial loading spaces cannot be assured in every situation where loading spaces may be removed for some project-level corridors (TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate

Alternative Variant 2, and TTRP.14 Expanded Alternative, TTRP.30_1 Moderate Alternative, TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, and TTRP.30_1 Expanded Alternative Variant 2) and program-level TTRP corridors. Therefore, the impact on commercial loading along the project-level and program-level TTRP corridors would be significant and unavoidable.

Overall, the implementation of the TTRPs would not generate additional loading demand; however, implementation of the TTRPs may result in the removal of on-street commercial loading spaces that cannot be relocated nearby. The SFMTA recognizes the importance of maintaining commercial loading space availability, especially in neighborhood commercial areas. Thus, the SFMTA would have to replace as many of the on-street commercial loading spaces as possible, in compliance with Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces. However, all removed commercial loading spaces cannot be replaced within 250 feet on the Mission Street corridor. Mitigation Measure M-TR-48: Enforcement of Parking Violations, could reduce, but may not eliminate these significant impacts. Therefore, there may be significant and unavoidable impacts to commercial loading.

As indicated above, passenger loading/unloading zones provide a place to load and unload passengers for adjacent businesses and residences and are intended for quick passenger drop-off and pick-up. These zones require a permit from SFMTA, and the permits require annual renewals. Similar to commercial loading spaces, the design of the TEP proposals considered the potential relocation of passenger loading/unloading zones. However, while the loss of passenger loading/unloading zones may be an inconvenience, it would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles; therefore, the loss of passenger loading/unloading zones would be considered a less-than-significant impact.

Emergency Vehicle Access Impacts

Implementation of the Service Improvements, construction of the program-level and project-level Service-related Capital Improvement projects, the project-level TTRPs and the application of the TPS Toolkit elements along the program-level TTRP corridors would not hinder emergency vehicle access. TPS Toolkit elements would be designed to ensure that emergency vehicles would be adequately accommodated. Some TPS Toolkit elements, such as pedestrian bulbs, would result in tighter turning radii, which could affect emergency vehicle turning movements, especially larger trucks such as fire trucks. However, all traffic calming improvements, including pedestrian bulbs, traffic circles, and transit bulbs would be designed consistent with San Francisco Fire Department applicable standards and would be reviewed by the San Francisco Fire Department prior to implementation to ensure that the designs meet those applicable standards, and to ensure adequate emergency vehicle access.

Regardless of the number of travel lanes on a street, all drivers must comply with the California Vehicle Code § 21806, which requires that drivers yield right of way to authorized emergency vehicles and drive to the right road curb or edge, stop and remain stopped until the emergency vehicle has passed. Emergency vehicles would be permitted full use of any transit-only lanes, which would have fewer vehicles in them than mixed-flow lanes, and would not be subject to turn restrictions. Therefore, widening travel lanes through lane reductions, implementation of transit-only lanes, and turn restrictions would not substantially affect emergency vehicle access. Overall, the impact of the TEP projects on emergency vehicle access would be less than significant.

Construction Impacts

Generally within San Francisco, because construction activities are temporary and limited in duration and are required to be conducted in accordance with City requirements, construction-related transportation impacts of the program-level and project-level TEP projects would be considered less than significant. Implementation of the Service Improvements would result in minor construction activities such as curb ramps in limited locations; therefore, construction activities and duration would be limited. Construction of the Service-related Capital Improvement projects would typically occur over a period of six to 12 months, depending on the project; however, construction of accessible platforms would take up to three months. Construction duration for implementation of the TPS Toolkit elements along TTRP corridors would take between six and 18 months, depending on the extent of the improvements and the length of the corridor, although the duration at any one location along a corridor would be substantially less.

Construction of the TEP project may require the temporary closure of travel lanes or sidewalks, or the temporary removal of on-street parking, and construction staging and delivery vehicles may temporarily impede traffic flow on the affected street. In some instances, such as during traffic circle installation, construction may require temporary street closures and traffic diversion. During the construction period for any individual project component, temporary and intermittent traffic and transit impacts may result from truck movements to and from the construction site. In general, parking lane, travel lane, and sidewalk closures are subject to review and approval by the City's Transportation Advisory Staff Committee (TASC) that consists of representatives of City departments including the SFMTA, DPW, Fire, Police, Public Health, the Port, and the Taxi Commission. The TASC review and approval process takes into consideration other construction projects in the vicinity.

The increase in vehicles traveling to and from the project sites during construction could increase traffic conflicts from potential conflicts between construction vehicles (with slower speeds and wider turning radii than autos) and automobiles, bicyclists, and pedestrians. However, construction activities would be conducted in accordance with the City's *Regulations for Working in San Francisco Streets* (that is, the *Blue Book*)[34], including those regarding sidewalk and lane closures, to minimize traffic conflicts during construction.

Improvement Measure I-TR-1: Construction Measures on p. 4.2-70 would further reduce the less-than-significant construction-related transportation impacts, and are proposed to reduce potential conflicts between construction activities and pedestrians, transit, and autos, including construction truck traffic management. Implementation of these improvement measures would require that the SFMTA avoid truck trips/deliveries during the peak commute periods, provide project construction updates for adjacent businesses and residents, and encourage carpool and transit access for construction workers. Implementation of this improvement measure would further reduce the magnitude of this less-than-significant construction-related transportation impact, and would not result in any secondary transportation-related impacts.

Parking Impacts

The proposed project would not generate any new parking demand. Implementation of some TPS Toolkit elements and TTRP projects would require more substantial removal of on-street parking spaces than other aspects of the TEP. This parking removal may result in increased on- and off-street parking occupancy in the vicinity of the improvements. The parking space loss or gain would generally vary between the TTRP Moderate Alternative and its Variants and the TTRP Expanded Alternative and its Variants for each TTRP corridor. Parking losses and (minor) parking gains would be as follows (Tables 19A and 19B show the details of the parking changes associated with each of the TTRPs):

- TTRP.J would result in a net decrease of 20 parking spaces for both TTRP.J Moderate and TTRP.J Expanded Alternatives in order to implement transit bulbs, extend transit islands and improve stop and pedestrian conditions.
- TTRP.L would result in a net decrease of 75 parking spaces for TTRP.L Moderate Alternative and 80 parking spaces for TTRP.L Expanded Alternative in order to implement transit bulbs, transit island extensions, transit islands and improve stop and pedestrian conditions.

[34] SFMTA, *Regulations for Working in San Francisco Streets,* 8th Edition, January 2012. Available online at: http://www.sfmta.com/services/streets-sidewalks/construction-regulations. Accessed June 4, 2013.

- TTRP.N would result in a net decrease of 120 parking spaces for TTRP.N Moderate Alternative and 130 parking spaces for TTRP.N Expanded Alternative in order to implement transit bulbs, transit island extensions and improve stop and pedestrian conditions.

- TTRP.5 would result in a net decrease of 100 parking spaces for TTRP.5 Moderate Alternative to implement stop changes, and 110 parking spaces for TTRP.5 Expanded Alternative to implement the stop changes, lane modifications, transit bulbs and pedestrian bulbs, of which 20 spaces would be removed on a part-time basis.

- TTRP.8X would result in a net decrease of 90 parking spaces for TTRP.8X Moderate Alternative and 80 parking spaces for TTRP.8X Expanded Alternative in order to implement queue jumps, transit bulbs, bus zone extensions, turn pockets, bus zone optimizations, stop conversions, and improve stop and pedestrian conditions.

- TTRP.9 would result in a net decrease of 30 parking spaces for TTRP.9 Moderate Alternative and 55 parking spaces for TTRP.9 Expanded Alternative in order to implement the stop changes, lane modifications, transit bulbs and pedestrian bulbs.

- TTRP.14 would result in a net decrease of 1,160 of which 1,130 would be removed on a part-time basis for TTRP.14 Moderate Alternative Variant 1, a net decrease of 960 of which 715 would be removed on a part-time basis for TTRP.14 Moderate Alternative Variant 2, and a net decrease of 405 parking spaces of which 235 would be removed on a part-time basis for TTRP.14 Expanded Alternative. The parking spaces would be removed in order to implement lane widening to accommodate the width of a bus, transit only lanes, transit bulbs, turn pockets and stop changes.

- TTRP.22_1 would result in a net increase of 10 parking spaces for TTRP.22_1 Moderate Alternative to implement stop changes and transit bulbs. A net decrease of 290 parking spaces for TTRP.22_1 Expanded Alternative that would enable the implementation of sidewalk extensions, transit only lanes, transit boarding islands, stop changes and improve stop and pedestrian conditions. There would be a total net decrease of 520 parking spaces for TTRP.22_1 Expanded Alternative Variant 1 of which 240 would be removed on a part-time basis for peak hour tow-away lanes. There would be a decrease of 280 parking spaces for TTRP.22_1 Expanded Alternative Variant 2, which would not include peak hour tow-away lanes.

- TTRP.28_1 would result in a net increase of 10 parking spaces for TTRP.28_1 Moderate Alternative and TTRP.28_1 Expanded Alternative.

- TTRP.30_1 would result in a net increase of 20 parking spaces for TTRP.30_1 Moderate Alternative, TTRP.30_1 Expanded Alternative, and TTRP.30_1 Expanded Alternative Variant 1, and no net increase or decrease in parking spaces would occur with TTRP.30_1 Expanded Alternative Variant 2.

- TTRP.71_1 would result in a net decrease of 45 parking spaces for TTRP.71_1 Moderate Alternative and 60 parking spaces for TTRP.71_1 Expanded Alternative in order to implement the stop changes, turn pockets, transit bulbs and pedestrian bulbs.

In general, changes to on-street parking throughout the City as a result of the TEP project would be along several TTRP corridors as described above. The parking loss as a result of the TEP would be a less-than-significant impact because: parking removal would, in most cases, be spread out over the entire length of the TTRP corridors; other parking, either on- or off-street would be available; the TTRP corridors are well served by public transit and other modes; and, the proposed project improvements would further improve transit and pedestrian conditions. Therefore, the parking loss would not be considered substantial in most cases. In instances where parking removal is substantial, because the parking loss would be spread out over the entire corridor, and other parking, even if difficult to find in some areas, would be available along the corridor, the parking loss would not be expected to create hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. For the TEP, the potential hazards or delays considered included: whether the parking loss would lead to additional traffic circling in the area that could result in vehicles double parking in a bicycle lane or in mixed-flow/transit-only lanes, particularly when there is only one lane of travel in each direction; whether vehicles would substantially increase instances of blocking sidewalks and/or driveways in an attempt to locate parking; and whether vehicles could form a queue in a mixed-flow/transit-only lane in an attempt to enter off-street parking facilities.

It is important to note that under Existing conditions, collision rates, on average, are higher on Rapid Network streets, where TTRPs are proposed, than those along corridors that are parallel to the TTRPs; this is particularly the case with sideswipe collisions for transit and private vehicles that occur as a result of narrow travel lanes (9 feet).[35] The TTRP projects are anticipated to improve these conditions with widened travel lanes. Thus, while removal of parking may result in some conflicts due to double parking and vehicles blocking driveways or bicycle lanes, the proposed project may also reduce collisions due to widened travel lanes that reduce friction between transit vehicles and other vehicles.

Cumulative Transportation Impacts

Implementation of components of the TEP project would result in significant and unavoidable cumulative impacts to transit, traffic, commercial loading, and parking, depending on alternative. The Service Improvements or Service Variants would result in a significant cumulative impact on the Mission corridor within the Southeast screenline. Both the TTRP Moderate and Expanded Alternatives would result in a significant cumulative transit impacts on the Mission Corridor and Fulton/ Hayes Corridor screenlines, even with implementation of Mitigation Measure M-C-TR-1: SFMTA Monitoring of Muni Service.

[35] Tanner, Britt, 2013. SFMTA analysis using Crossroads/SWITRS Database. Collisions gathered from Crossroads Software's Traffic Collision Database on 6/26/13 for time period between 11/1/2006 and 10/31/2011 for each street between 14th and Cesar Chavez, including intermediate and limit intersections. Crossroads uses SWITRS (Statewide Integrated Traffic Records System) data which is maintained by the California Highway Patrol. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission St, Suite 400, as part of Case File No. 2011.0558E.

Implementation of certain TPS Toolkit elements would result in cumulative traffic impacts at intersections along the program-level TTRP corridors. **Mitigation Measure M-TR-8: Optimization of Intersection Operations**, which would optimize intersection geometries and traffic control measures to the greatest extent feasible when developing detailed design of the TTRP proposals, would minimize or reduce traffic impacts at intersections. However, because this mitigation measure may not be adequate to mitigate intersection operations to less-than-significant levels, and because the feasibility of providing additional capacity is unknown, the cumulative impact on traffic operations would remain significant and unavoidable. The TTRP Moderate Alternative would not result in any cumulative traffic impacts. The TTRP Expanded Alternative would result in significant cumulative traffic impacts at 13 intersections: Columbus/Green/Stockton, 16th/Bryant, 16th/Potrero, 16th/Seventh, Randall/San Jose, Mission/Fifth, Mission/16th, Geneva/Carter, Geneva/Moscow, Fulton/Masonic, 16th/Owens, and 16th/Fourth and Market/Church/14th. Implementation of mitigation measures was determined to either be infeasible or to not reduce delay enough to totally reduce the impact. Therefore, TTRP Expanded Alternative traffic impacts would be significant and unavoidable, even with mitigation.

Implementation of certain TPS Toolkit elements may result in cumulative commercial loading impacts along the program-level TTRP corridors. Implementation of Mitigation Measures M-TR-10: Provision of Replacement Commercial Loading Spaces could reduce cumulative loading impact; however, in some locations with a high volume of loading demand, and at locations where mitigation is incompatible with the proposed improvement, or where roadway geometry precludes implementation of mitigation, impacts may not be reduced to a less-than-significant level. Therefore, cumulative loading impacts along the program-level TTRP corridors would be significant and unavoidable. Both the TTRP Moderate and Expanded Alternatives would have significant cumulative commercial loading impacts on two corridors, Mission Street for the TTRP.14 and Variants and Stockton Street for the TTRP.30 and Variants. Implementation of M-TR-48: Enforcement of Parking Violations would not reduce these cumulative impacts to a less-than-significant levels and thus, they would be significant and unavoidable.

Implementation of certain TPS Toolkit elements may result in significant cumulative parking impacts along the program-level TTRP corridors. Implementation of Mitigation Measure M-C-TR-49: Explore the Implementation of Parking Management Strategies, could improve transportation conditions within the area; however, it is uncertain if parking management strategies would reduce impacts to a less-than-significant level. Therefore, parking impacts on program-level TTRP corridors would be significant and unavoidable. While both the TTRP Moderate and Expanded Alternatives would not have project-level impacts on parking, the TTRP Moderate Alternative would have a cumulatively considerable contribution to a significant cumulative parking impact on Mission Street between 13th and Cesar Chavez streets as a result of the TTRP.14 Moderate Alternative Variants. The TTRP Expanded Alternative would have a cumulatively considerable contribution to a significant cumulative parking impact on 16th Street between Bryant and Third streets as a result of the TTRP.22 Expanded Alternative and Variants 1 or 2. Although the SFMTA may implement parking management strategies as mitigation (Mitigation Measure M-C-TR-49) for these parking impacts, the effectiveness of such mitigation is uncertain. Therefore, the projects contribution to the cumulative parking impacts on these two corridors would remain significant and unavoidable, even with mitigation.

Summary

The TEP projects are intended to provide a systemwide improvement to Muni service. Through analysis and outreach, the SFMTA has identified a set of Service Improvements and Service Variants, Service-related Capital Improvements necessary to support the Service Improvements, and transit travel time reduction proposals (TTRPs) for selected Rapid Network corridors. Overall, these projects would increase transit reliability and improve transit travel times. Transit would operate on some streets where it does not currently exist. In other locations underutilized routes or route segments would be eliminated. Where there is demand or need, service may be increased. In some places, implementation of these improvements would require that people walk further to access transit. On the other hand, the installation of accessible platforms would increase accessibility to the light rail system for disabled passengers. The TTRPs would install treatments to prioritize transit operations on the identified Rapid Network. These improvements would result in changes to the roadway that may slow traffic in some locations and may remove parking and commercial loading spaces that cannot be conveniently relocated. However, overall transit operations would be improved. Parking removal would be minimal for the Service Improvements and Service Variants and Service-related Capital Improvements and would vary, but remain less than significant, under the TTRP Moderate and TTRP Expanded Alternatives.

The TEP project would result in significant and unavoidable impacts to traffic, transit (on select corridors under 2035 Cumulative conditions), commercial loading (on select corridors under Existing plus Project and 2035 Cumulative plus Project conditions), and parking (on select corridors under 2035 Cumulative plus Project conditions). With respect to traffic, the TTRP Moderate Alternative would have fewer impacts than the TTRP Expanded Alternative. With respect to transit and loading, the impacts of the two alternatives would generally be comparable.

4.2.4.4 IMPACTS COMMON TO PROGRAM-LEVEL AND PROJECT-LEVEL TEP ELEMENTS

Impact TR-1: Implementation of the Service Policy Framework and the TEP project components would not result in construction-related transportation impacts because of their temporary and limited duration. (Less than Significant)

Construction and implementation of the entire TEP project would occur over a period of approximately five to six years so that at any one time only some of the project components would be under construction. Construction of the proposed projects may require the temporary closure of travel lanes or sidewalks, or the temporary removal of on-street parking, and construction staging and delivery vehicles may temporarily impede traffic flow on affected streets. In some instances, such as during traffic circle installation, construction may require temporary street closures and traffic and/or transit reroutes. During the project's construction period, temporary and intermittent traffic and transit impacts may result from truck movements to and from the construction sites. In general, parking and travel lane and sidewalk closures are subject to review and approval by the City's Transportation Advisory Staff Committee (TASC) which consists of representatives of several City departments including SFMTA, DPW, Fire, Police, and the Planning Department. The TASC review and approval process takes into consideration other construction projects in the vicinity.

The increase in vehicles traveling to and from the project sites during construction could increase traffic safety hazards from potential conflicts between construction vehicles (with slower speeds and wider turning radii than autos) and automobiles, bicyclists, and pedestrians. However, construction activities would be conducted in accordance with the City's *Regulations for Working in San Francisco Streets* (i.e., the Blue Book) including those regarding sidewalk and lane closures, to minimize traffic safety hazards during construction (for example, through the installation of signs to warn motorists, bicyclists, and pedestrians of the construction zone and the use of flaggers, illuminated signs, and flashing yellow signs).[36] Generally within San Francisco, because construction activities are temporary and limited in duration and are required to be conducted in accordance with City requirements, construction-related transportation impacts of projects are considered less than significant. Similarly, the TEP projects' construction-related transportation impacts would be considered less than significant as described further below.

Policy Framework. The TEP proposals (proposed Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants) embody the

[36] SFMTA, *Regulations for Working in San Francisco Streets,* 8th Edition, January 2012. Available online at: http://www.sfmta.com/services/streets-sidewalks/construction-regulations. Accessed June 4, 2013.

potential physical effects of the implementation of the Policy Framework, and it is therefore, reasonable to assume that implementation of the Policy Framework would have no foreseeable indirect significant impact on the physical environment in terms of construction-related transportation impacts. Accordingly, indirect construction-related transportation impacts of the Policy Framework would be less than significant. Implementation of the Policy Framework over time may result in other projects for the transit network that could result in physical changes to the environment. Such future projects, once developed, may require additional environmental review.

Service Improvements. Implementation of the Service Improvements and Service Variants would only result in minor construction activities such as curb ramps in limited locations; therefore, construction activities would be limited (i.e., a small area of the sidewalk over a short time frame). Further, due to the temporary nature of construction, these impacts on the transportation network would be less than significant.

TPS Toolkit Elements and TTRP Projects. Construction-related transportation impacts of the TPS Toolkit elements individually, or as part of TTRP projects or TTRP Variants, generally would not be considered significant due to their temporary and limited duration. The duration of construction activities would vary, depending on the individual TPS Toolkit element, but could range from a couple of days for travel lane and curb striping and/or restriping (for example, stop relocation, optimize transit stops, convert flag stop to bus zone), about seven days for non-curb work such as transit boarding islands, pedestrian refuge islands, and traffic circles, to about 15 days of construction for pedestrian bulbs, transit islands, and traffic signals. Construction duration for implementation of the 11 project-level TTRPs (TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X_1, TTRP.9, TTRP.14, TTRP.22_1, TTRP.28_1, TTRP.30_1, and TTRP.71_1) and of the application of TPS Toolkit elements along the nine program-level TTRP corridors (TTRP.1, TTRP.5, TTRP.22_2, TTRP.28_2, TTRP.30_2, TTRP.71, TTRP.K, TTRP.L, and TTRP.M) is anticipated to be between six and 18 months for each TTRP, depending on the extent of the improvements and the length of the corridor. Construction activities for each corridor would occur one to two blocks at a time (or between 1,000 to 1,800 feet depending on the block length in the project vicinity), and would proceed along the corridor in that fashion.[37]

Removing or consolidating transit stops, optimizing transit stop locations, converting flag stops to bus zones, transit-only lanes, parking restrictions, and turn restrictions would primarily include pavement and curb restriping and would not involve substantial construction activities that would impact travel lanes or adjacent sidewalks. Implementation of transit-only

[37] City and County of San Francisco, San Francisco Public Works Code, Sections 2.4.52 and 2.4.55. Available online at: http://www.amlegal.com/nxt/gateway.dll/California/publicworks/publicworkscode?f=templates$fn=default.htm$3.0$vid=amlegal:sanfrancisco_ca$sync=1. Accessed June 11, 2013.

lanes would involve demarcation of travel lanes with a solid red paint and would require temporary travel lane closures. TPS Toolkit elements that would primarily involve painting/striping would be completed within one to two days, while transit-only lanes would be striped at a rate of up to 0.5 mile, or approximately three blocks, per day. Transit-only lanes are often striped on weekends or other non-peak weekday times when traffic volumes are lower on the affected roadway.

Construction of transit bulbs, pedestrian bulbs, and sidewalk widening requires work along the curb lane. This work would result in closure of the parking lane where the sidewalk is being extended and would generally require temporary travel lane closures, depending on the construction activity. A portion of the adjacent sidewalk may also require temporary closure; however, pedestrian access would be maintained, via temporary detours. On streets with more than two travel lanes in each direction, temporary lane closures would reduce the roadway capacity and require all vehicles to use the remaining lane. On streets with one lane in each direction, alternate one-way traffic operations may be required. Temporary lane closures would result in additional vehicle delay, and some drivers might shift to other potentially less convenient routes to access their destinations.

Construction of transit boarding islands, pedestrian refuge islands, and traffic circles would occur within the street right-of-way. This construction may result in temporary travel lane closures, alternate one-way traffic operations, or street or intersection closures (for example, construction of traffic circles would likely require temporary intersection closures that would necessitate detours to other parallel streets). As appropriate, detours with appropriate signage would be provided for pedestrians, bicyclists, and vehicles. Overall, because construction activities would be temporary and limited in duration, and would be conducted in accordance with City requirements, construction-related transportation impacts of the TPS Toolkit elements and TTRP projects or TTRP Variants would be less than significant.

Terminal and Transfer Point Improvements (TTPI). Construction activities for the project-level TTPI.1: Persia Triangle Improvements are anticipated to take between six and 12 months. Construction of transit bulbs and pedestrian bulbs resulting in wider sidewalks on Mission Street, and on Ocean and Persia avenues, would require work along the curb lane. This construction would result in closure of the parking lane where the sidewalk is being extended and may require temporary travel lane closures and alternate one-way traffic operations, depending on the construction activity. A portion of the adjacent sidewalk may also require temporary closure; however, pedestrian access would be maintained. As noted above, temporary lane closures would be subject to City review and approval and would likely result in additional vehicle delay, and some drivers might shift to other potentially less convenient routes to access their destinations.

Construction activities associated with the program-level TTPI.2: Lyon Street/Richardson Avenue Bus Stop/Transfer Point, TTPI.3: E Line Independent Terminal at Beach Street/Jones Street, and TTPI.4: San Francisco General Hospital Transfer Point projects would also take between six and 12 months each. The new transit bulbs for TTPI.2 and TTPI.4 would require work along the curb lanes of Lyon Street and Potrero Avenue, would require closure of the parking lanes where the sidewalks would be extended, and may require temporary travel lane or partial sidewalk closures. Temporary lane closures would result in additional vehicle delay. TTPI.3, which would include construction of bypass rail and associated track work, would require travel lane closures while the tracks are being installed. Installation of the new track and other track work would be conducted when the service frequency on the F Market & Wharves historic streetcar is low (early mornings/late evenings) and/or when motor coaches could be temporarily used for service on the route. Overall, because construction activities would be temporary and limited in duration, and would be conducted in accordance with City requirements, construction-related transportation impacts of the TTPI projects would be less than significant.

Overhead Wire Expansion (OWE) Projects. Construction activities associated with the project-level OWE.1: New Overhead Wiring – Reroute 33 Stanyan onto Valencia Street, OWE.1 Variant: New Overhead Wiring – Reroute 33 Stanyan onto Guerrero Street, OWE.2: Bypass Wires at Various Terminal Locations, OWE.3: New Overhead Wiring – 6 Parnassus on Stanyan Street, OWE.4: 5 Fulton Limited/Local Bypass Wires, and OWE.5: 22 Fillmore Extension to Mission Bay projects, and program-level OWE.6: New Overhead Wiring – 6 Parnassus Extension to West Portal Station project are anticipated to each take between six and 12 months, depending on whether the project would require new poles and associated wire infrastructure (for example, as part of development within Mission Bay, the support poles for the new overhead wire have already been constructed on the segment of 16th Street between Seventh and Third streets). Construction of new overhead wires would typically require installation of new pole foundations and/or underground ductwork and installation of the overhead wire service. Construction activities associated with the poles would include construction within the sidewalk and would typically not require parking or travel lane closures, although some temporary disruption may occur. Installation of the overhead wires and connection to existing wires would require shut down of the electrical transformer and would be conducted at night when service frequency is low and when motor coaches would be temporarily used for service on the route. At some locations, the curbside parking lane in the vicinity of the poles would not be available for parking and would be used for staging of materials or construction activities. Pedestrian access would be maintained when construction activities affect the sidewalk. Overall, because construction activities would be temporary and limited in duration, and would be conducted in accordance with City requirements, construction-related transportation impacts of the OWE projects would be less than significant.

Systemwide Capital Infrastructure (SCI) Projects. Construction activities associated with the program-level SCI.1: Accessible Platforms is typically 15 work days per platform; however, due to the time that is needed for concrete to cure between construction activities (during which no other construction activity is occurring), construction of an accessible platform may take up to three months. Construction of accessible platforms generally requires temporary travel lane closures, depending on the location of the platform and phase of construction activity. On streets with more than two travel lanes in each direction, temporary lane closures would reduce the roadway capacity and require all vehicles to use the remaining lane. On streets with one travel lane in each direction, alternate one-way traffic operations may be required. Temporary lane closures would result in additional vehicle delay, and some drivers might shift to other potentially less convenient routes to access their destinations.

Construction duration for the implementation of project-level SCI.2: Sansome Street Contraflow Lane Extension project is anticipated to be between six and nine months. Construction activities would include restriping, the installation of signage, and the installation of two traffic signal mast-arm poles and six traffic signal poles within the three-block segment (approximately 1,000 feet). Excavation for traffic signal infrastructure, including foundations for mast arms, signal poles and conduits, would be required to implement this project. Overall, because construction activities would be temporary and limited in duration, and would be conducted in accordance with City requirements, construction-related transportation impacts of the SCI projects would be less than significant.

Improvement Measure I-TR-1: Construction Measures

During the construction of all TEP projects, the SFMTA shall require the following:

1) Construction contractors shall be prohibited from scheduling any truck trips, such as concrete mixers, heavy construction equipment and materials delivery, etc., to the construction sites during the a.m. (7 to 9 a.m.) and p.m. (4 to 6 p.m.) peak commute periods.

2) All construction activities shall adhere to the provisions in the City of San Francisco's Regulations for Working in San Francisco Streets (Blue Book), including those addressing sidewalk and lane closures. To minimize construction impacts on nearby businesses and residents, the SFMTA shall alert motorists, bicyclists, and nearby property owners of upcoming construction through its existing website and other available means, such as distribution of flyers, emails, and portable message or informational signs. Information provided shall include contact name(s) for the SFMTA project manager, public information officer, and/or the SFMTA General Enforcement Division contact number (311).

3) Construction contractors shall encourage construction workers to use carpooling and transit to the construction site in order to minimize parking demand.

Improvement Measure I-TR-1: Construction Measures would further reduce the projects' less-than-significant impacts related to potential conflicts between construction activities and pedestrians, transit, and autos, including construction truck traffic management, project construction updates for adjacent businesses and residents, and carpool and transit access for construction workers. Implementation of this improvement measure would further reduce the magnitude of the TEP's less-than-significant construction-related transportation impact, and would not result in any secondary transportation related impacts.

4.2.4.5 PROGRAM-LEVEL IMPACTS

Service Policy Framework

Impact TR-2: Implementation of the Service Policy Framework Objectives A through D would not result in significant impacts to local or regional transit, traffic operations, pedestrians and bicyclists, loading, emergency vehicle access, or parking. (Less than Significant)

The Policy Framework Objectives and Actions are described in Chapter 2, Project Description, Section 2.5.1.1, pp. 2-19 to 2-23. Because the Policy Framework is a policy document with objectives and actions developed to guide the provision of reliable and efficient transit service throughout the City, it would not result in direct physical changes to the transportation environment. Indirect physical effects of the Policy Framework could result from the implementation of physical projects developed pursuant to these policies. The TEP projects provide a good representative example of the types of projects, both in size and scope, which may be proposed under the Policy Framework. Therefore, the analysis of the TEP projects informs the analysis of the potential indirect transportation effects of the Policy Framework. With respect to the TEP, indirect effects of the Policy Framework could result from implementation of the Service Improvements or Service Variants, the Service-related Capital Improvements, and the TTRPs or TTRP Variants. Thus, the indirect effects of the Policy Framework that may result from the TEP were analyzed as part of the transportation assessment conducted for the TEP and are summarized below. Wherever possible, analysis of relevant project-level TEP components is provided, since some of the future projects under the Policy Framework would be similar to these types of projects.

Objective A. Actions supporting Objective A would involve allocating transit resources efficiently while maintaining citywide coverage. Action A.4 would require the SFMTA to prepare and distribute materials related to transit service and would likely be similar to existing promotional activities (for example, publishing maps and marketing current service information on SFMTA's and regional 511 websites); therefore, implementation of Action A.4 would not have a physical impact on the transportation network. Implementation of Actions A.1, A.2, and A.3 may lead to physical changes to the transportation network, which could have a significant impact on the transportation network. For example, Actions A.1 and A.2

may result in actions that are reflected in the Service Improvements or Service Variants such as the provision of new routes (for instance, the 11 Downtown Connector or 32 Roosevelt) or realignment of existing routes (for example, 22 Fillmore), as well as increased frequency or greater span of service to reflect changing ridership demand. If necessary, additional Service-related Capital Improvements may also be required to support service changes. Action A.3 may result in the implementation of TPS Toolkit elements to reduce transit travel time along the Rapid Network corridors such as those designed for the TTRPs or TTRP Variants.

Objective B. Under Objective B, measuring the efficiency of transit service by tier classification and assigning resources to best fit the passenger demands would ensure that the service continues to improve and quality transit is consistently delivered. Application of performance standards to conduct qualitative and quantitative evaluations of the Muni system, as included in Actions B.1 and B.2, would rely on the SFMTA's existing monitoring and reporting procedures, and would be a refinement of existing administrative procedures. Therefore, Actions B.1 and B.2 would not result in physical changes to the transportation environment. Actions B.3 and B.4, however, may result in reclassification of routes to respond to changing passenger patterns or service demand and may require changes to service, as reflected in the Service Improvements or Service Variants (for example, change in vehicle type such as vans, standard buses, and articulated buses), and therefore, have the potential to indirectly affect the physical environment. If necessary, additional Service-related Capital Improvements may also be required to support service changes, and these also have the potential to indirectly affect the physical environment.

Objective C. Actions supporting Objective C would improve transit service reliability and reduce transit travel times. Actions C.1 and C.2 would rely on the SFMTA's existing evaluation and planning procedures, would be similar to existing administrative procedures, and would therefore not result in a physical effect on the transportation environment. Actions C.3, C.4, and C.5 may result in the implementation of TPS Toolkit elements to enhance transit operations (for example, transit-only lanes, turn restrictions, and transit queue jumps) and the pedestrian environment (for example, pedestrian bulbs and traffic calming measures). Actions C.3 through C.5 may also include development of proposals similar to the TTRP proposals for additional Rapid Network corridors. Therefore, Actions C.3, C.4, and C.5 have the potential to indirectly affect the physical environment.

Objective D. Actions supporting Objective D would improve the Muni passenger experience. Actions D.1 and D.2 would not be expected to result in changes to the physical environment as they call for the application of particular standards in the provision of transit service. Action D.4 would also not result in changes to the physical environment. Action D.4 would involve continued coordination with other City and regional agencies, including the

Metropolitan Transportation Commission (MTC), which administers the Clipper card, to encourage and promote Muni and facilitate use of the system. None of the administrative, publicity, or cooperative actions would generate transportation-related physical impacts. However, Action D.3 has the potential to indirectly affect the physical environment through installation of physical amenities at transit stops, such as installation of shelters, maps, stop identification numbers, real time arrival displays and similar amenities.

Therefore, Objective A, Action A.3 and Objective C, Actions C.3 through C.5 may result in implementation of TPS Toolkit elements to reduce transit travel times along Rapid Network Corridors. Objective A, Actions A.1 and A.2, and Objective B, Actions B.3 and B.4 may result in implementation of Service Improvements or Service Variants as well as Service-related Capital Improvements to support the proposed service changes; and Objective D, Action D.3 may result in implementation of Service-related Capital Improvements. These Actions have the potential to indirectly affect the physical environment.

Implementation of Service Improvements to meet Actions referenced above under Objectives A and B would improve conditions for transit through the addition of new routes, route elimination, changes to route alignments, changes to headways, and changes in transit vehicle type to meet the changing passenger needs. Implementation of the TPS Toolkit elements and the TTRP proposals, including TTRP Variants, to meet Actions referenced above under Objectives A and C would also have a beneficial effect of improving conditions for transit. Implementing transit bulbs and transit boarding islands, optimizing bus stop lengths, and removing or consolidating stops would have a beneficial effect of improving conditions for transit and minimizing delays by reducing the number of times transit vehicles stop at intersections, and reducing transit travel times by eliminating the need for buses to exit and re-enter the flow of traffic. Providing dedicated turn lanes, turn restrictions, and parking restrictions would minimize delays and the impact of congestion on transit. Wider travel lanes would also allow buses to operate at faster travel speeds, and the reduction in friction with vehicles in adjacent lanes would reduce the potential for sideswipe collisions. Implementation of these elements would therefore, increase transit service reliability and reduce transit travel times.

Implementation of TPS Toolkit elements along the TTRP corridors would not result in overcrowded sidewalks or create potentially hazardous conditions for pedestrians. Removing or consolidating transit stops (for example, project-level TTRP.8X Moderate Alternative and TTRP.8X Expanded Alternative) would increase the distance between stops, which could increase the physical effort required to reach transit relative to Existing conditions for some transit riders and as such, may pose a challenge to some riders. However, removing or consolidating transit stops would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas. Converting flag stops to bus zones (for example, project-level TTRP.8X Moderate Alternative and TTRP.8X Expanded Alternative) can improve pedestrian conditions by allowing passengers to be picked up and dropped off at the curb adjacent to the sidewalk instead of in the street.

Implementation of the Service Improvements under Objectives A and B could result in an increase in the number of buses along the routes affected by the TEP proposals, which could result in an increased potential for pedestrian and transit conflicts; however, this increased service would not result in hazardous conditions for pedestrians. Removing or realigning routes could increase the physical effort required to reach transit relative to existing conditions for some transit riders and as such, may pose a challenge to some. However, route removal/realignment would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas.

Installation of physical amenities such as shelters, maps, stop Identification Numbers, real time arrival displays, and similar amenities would generally occur on existing sidewalks and as such would have no effect on traffic LOS or transit capacity and operations. Further, these types of amenities would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a site. These types of amenities would also not create potentially hazardous conditions for bicyclists or substantially interfere with bicycle accessibility to a site. Finally, they would not affect loading or emergency vehicle access and the construction of these amenities would not only be temporary but relatively minor. The construction and operation of these amenities would generally occur within existing sidewalks, and would not substantially alter pedestrian facilities, and accordingly, Action D.3 would result in less-than-significant secondary impacts to the physical environment.

Implementation of the Service Improvements under Objectives A and B would typically increase the number of transit vehicles along a route; however, an increase of a few buses an hour would not be noticeable and not substantially affect bicycle travel along the route. Route realignments may introduce transit onto streets that currently do not have transit; however, many of these new street segments are not designated bicycle routes and if they are bicycle routes, conditions for bicyclists with Service Improvements would be similar to Existing conditions on other segments along the route. Implementation of TPS Toolkit elements along TTRP corridors would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility. Removal/consolidation of stops, relocation of stops, optimization of transit stop lengths, installation of transit bulbs, or conversion of flag stops to bus zones would not affect existing bicycle facilities. The impact on bicyclists on streets where transit bulbs would be implemented adjacent to a bicycle lane (for example, program-level TTRP.9 could potentially include transit bulbs on Potrero Avenue, which has bicycle lanes in both directions) would be similar to Existing conditions when buses travel across the bicycle lane to a curbside bus zone. However, in this case, the bus would be stopped within the bicycle lane, and bicyclists would be able to pass the bus, conditions permitting, or non-transit vehicles, including bicyclists, would need to wait for the bus to proceed. Implementation of transit bulbs adjacent to bicycle lanes would not reduce conflicts between buses and bicyclists; however, transit-bicycle conflicts would not substantially increase compared to Existing conditions.

Analysis of the TPS Toolkit elements, TTRP proposals or TTRP Variants, Service Improvements or Service Variants, and Service-related Capital Improvements in Impacts TR-7 through TR-58 indicated that their implementation would not affect local or regional transit capacity utilization or delay transit nor affect pedestrian circulation or the bicycle network or access. Emergency vehicle access would also remain unchanged from Existing conditions, and impacts pursuant to Objectives A through D would be less than significant.

Transit Impacts. For the reasons discussed above, the implementation of the Policy Framework Objectives A through D would result in less-than-significant indirect impacts under Existing plus Project conditions.

Pedestrian Impacts. For the reasons discussed above, the implementation of the Policy Framework Objectives A through D would have no foreseeable indirect significant impact on the physical environment in terms of pedestrian access, safety, and circulation, and therefore, impacts on pedestrians would be less than significant.

Bicycle Impacts. For the reasons discussed above, the implementation of the Policy Framework Objectives A through D would have no foreseeable indirect significant impact on the physical environment in terms of bicycle access, safety, and circulation, and therefore, impacts on bicycle facilities and operation would be less than significant.

Passenger Loading Impacts. Implementation of Objective A, Action A.3, and Objective C, Actions C.3 through C.5, may lead to the implementation of TPS Toolkit elements to reduce travel times along the Rapid Network. Implementation of Service Improvements under Objectives A and B could result in new transit stops on streets which currently do not have transit, and result in Service-related Capital Improvements to support the Service Improvements. Implementation of the Service Improvements, Service-related Capital Improvements, and TPS Toolkit elements for TTRP proposals may result in the elimination of parking spaces, and potentially passenger loading/unloading zones. Similar to commercial loading spaces, the implementation of the Policy Framework Objectives A through D would consider the potential relocation of passenger loading/unloading zones. However, if removal of these passenger loading permit areas are required, the loss of passenger loading/unloading zones would be considered an inconvenience, but would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles. See the discussion of less-than-significant impacts related to passenger loading/unloading activities in Section 4.2.4.2 on p. 4.2-33. Therefore, the impact of a loss of passenger loading/unloading zones would be less than significant.

Emergency Vehicle Access Impacts. For the reasons discussed above, implementation of any TEP project components would not substantially change the ability of emergency service providers to travel along corridors or access adjacent land uses. The implementation of the Policy Framework Objectives A through D would have no foreseeable indirect significant impact on the physical environment in terms of emergency vehicle access and therefore, impacts on emergency vehicle access would be less than significant.

Parking Impacts. For the reasons discussed above, implementation of Objective A, Action A.3, and Objective C, Actions C.3 through C.5, may lead to the implementation of TPS Toolkit elements to reduce travel times along the Rapid Network, which may result in a loss in on-street parking spaces. In addition, for the reasons discussed above, implementation of Objective A, Actions A.1 and A.2, and Objective B, Actions B.3 and B.4 may result in the implementation of service changes such as the Service Improvements and Service Variants, and if necessary, the Service-related Capital Improvements to support service changes. The Service Improvements and Service Variants may result in a loss of on-street parking spaces (up to five parking spaces in any one location). The Service-related Capital Improvements to support service changes would also result in limited on-street parking loss (up to six spaces). A decrease in the on-street parking supply could occur at specific project locations, but would not likely be substantial nor create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles. In other locations, parking may be created through the removal of existing elements (such as transit stops, etc.). The parking spaces that would be displaced due to part-time (for example, implementation of tow-away parking restrictions during part of the day) and permanent loss of parking spaces likely could be accommodated on other nearby streets or in nearby parking facilities, which could result in increased competition for the remaining other on-street, and potentially off-street, parking supply. However, if replacement parking cannot be provided or parking demand is high in particular areas, the affected project-related areas are likely to be well served by transit, as well as other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. At some locations, drivers and passengers would have to walk further between a parking space and their destination, or switch to transit or other modes. Based on the above, the overall impact related to decrease in the on-street parking supply resulting from the Policy Framework would be less than significant. In the future, when other projects are proposed to implement the Objectives and Actions of the Policy Framework, they may require additional environmental review. As part of that review, any proposed on-street parking loss will be assessed to determine if it is substantial, occurs in an area that can accommodate mode shift (i.e., an area well served by transit with adequate bicycle and pedestrian facilities), and whether any substantial loss of parking would result in hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians.

Impact TR-3: Implementation of the Policy Framework Objective A, Action A.3, and Objective C, Actions C.3 through C.5 may result in significant traffic impacts. (Significant and Unavoidable with Mitigation)

As described in Impact TR-2 above, implementation of Objective A, Action A.3, and Objective C, Actions C.3 through C.5 could result in implementation of TPS Toolkit elements and TTRPs, including TTRP Variants. Implementation of the TPS Toolkit elements, including Lane Modifications (for example, transit-only lanes, widening travel lanes through parking restrictions) and Pedestrian Improvements (for example, sidewalk widening), may result in significant impacts on traffic operations, because some proposals would reduce mixed-flow capacity such that the vehicle traffic flow would not be accommodated in the remaining mixed-flow travel lanes. At some intersections, implementation of transit-only lanes, widening travel lanes through lane reductions, widening travel lanes through parking restrictions (for example, TTRP.14 Moderate Alternative Variant 1 or TTRP.14 Moderate Alternative Variant 2 on the segment between 13th and Cesar Chavez streets), and sidewalk widening to improve pedestrian conditions would result in reduced vehicle capacity and intersection operations worsening from LOS D or better to LOS E or LOS F, worsening from LOS E to LOS F, or worsening of the v/c ratio substantially at intersections currently operating at LOS E or LOS F conditions, which would be considered a significant traffic impact. Mitigation measures such as signal changes or additional turn pockets, turn restrictions, and tow-away parking restrictions, included in **Mitigation Measure M-TR-8: Optimization of Intersection Operations**, on p. 4.2-92, to provide additional capacity, may reduce or eliminate the significant impact. However, in some instances, intersection operations following the implementation of Mitigation Measure M-TR-8 would not reduce intersection operations impacts to less-than-significant levels (for example, project-level TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, and TTRP.22_1 Expanded Alternative Variant 2 and Mitigation Measure M-TR-26: Intersection Restriping at 16th/Bryant streets on p. 4.2-194 and other intersections operating at LOS E or LOS F); therefore, these impacts would be significant and unavoidable.

Implementation of Mitigation Measure M-TR-8: Optimization of Intersection Operations, which would optimize intersection geometries and traffic control measures to the greatest extent feasible when developing detailed design of the TTRP proposals, would minimize or reduce traffic impacts at intersections and along roadway segments. However, because this mitigation measure may not be adequate to mitigate traffic impacts on intersection operations to less-than-significant levels, and because the feasibility of providing additional capacity for travel lanes is unknown, nor is it always possible to optimize the intersection such that level of service falls below LOS E, the impact on traffic operations would remain significant and unavoidable even with implementation of Mitigation Measure M-TR-8.

Therefore, implementation of the Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 would have indirect significant impacts on the physical environment with respect to traffic. The indirect impacts of implementation of the Policy Framework would include impacts on traffic as evidenced by the analysis of the TEP components presented in Impacts TR-8, TR-14, TR-24, TR-26, TR-27, TR-28, TR-30, TR-31, TR-32, TR-34, TR-35, TR-36, TR-38, TR-40, and TR-42 below. Since there are no feasible traffic mitigation measures for these impacts, these indirect impacts of the Policy Framework would be considered significant and unavoidable. Implementation of the Policy Framework, where travel lane reductions or changes in travel lane capacity would occur, would result in projects that would in turn result in significant and unavoidable traffic (i.e., intersection) impacts, such as those analyzed with the project-level TTRP proposals. Such intersection impacts, would be similar (in volumes and operations) to the impacts of intersections analyzed in Impacts TR-24, TR-26, TR-27, TR-28, TR-30, TR-31, TR-32, TR-34, TR-35, TR-36, TR-38, TR-40, and TR-42 below at the project level, and implementation of the Policy Framework (specifically travel lane reductions and changes) would similarly result in significant traffic impacts. These intersection impacts would similarly apply Mitigation Measure M-TR-8, to optimize intersection operations, but could still result in significant and unavoidable traffic impacts on intersections along the identified transit corridors.

Impact TR-4: Implementation of the Policy Framework Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 would not result in significant traffic impacts. (Less than Significant)

As described above in Impact TR-2, Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 would not have a physical impact on the transportation network. The physical effects of the TEP projects that may result from these actions would be the implementation of Service Improvements, Service Variants, and Service-related Capital Improvements. These TEP project components would not involve travel lane reductions. In addition, Action D.3 would result in the installation of physical amenities at transit stops, which may result in minor physical changes to the environment. Accordingly, there would be less-than-significant traffic impacts as a result of Objective A, Action A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4.

Impact TR-5: Implementation of the Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 may result in significant loading impacts. (Significant and Unavoidable with Mitigation)

As described above in Impact TR-2, implementation of Objective A, Action A.3 and Objective C, Actions C.3 through C.5 may lead to implementation of TPS Toolkit elements to reduce travel times along the Rapid Network corridors. Implementation of the TPS Toolkit elements for TTRP proposals, including TTRP Variants, may result in significant impacts on commercial loading if a substantial amount of on-street parking spaces, specifically on-street commercial loading spaces, were to be eliminated to implement these elements (for example, all day tow-away restrictions) and if those removed commercial loading spaces could not be replaced with others in the project vicinity. The level of impact with the loss of on-street commercial loading zones would depend on the location and number of spaces that would be eliminated, the provision of alternative accommodations for loading/unloading activities that could be part of the design of the TTRP proposals (for example, replacing commercial loading spaces), and whether the loss of loading would result in potentially hazardous conditions or significant delay affecting transit, traffic, bicycles, or pedestrians. The potential loss of a large amount of commercial loading spaces, without provision of alternative accommodations, could reduce the overall commercial loading space supply such that loading activities could not be accommodated within convenient on-street loading zones. Additionally, the loss of loading zones could result in potentially hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. Under these circumstances, this impact could be considered a significant impact.

With implementation of **Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces**, providing replacement commercial loading spaces of similarlength on the same block and side-of-the-street or within 250 feet on adjacent side streets, an impact on commercial vehicle loading/unloading operations, if identified, could be reduced to a less-than-significant level. However, because the feasibility of this mitigation measure is unknown until a specific project is analyzed, the indirect impact on loading operations for the implementation of Objective A, Action A.3 and Objective C, Actions C.3 through C.5 would remain significant and unavoidable.

In addition, with Implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, recommending SFMTA enforce parking regulations in transit-only lanes, including the potential for using video cameras on transit vehicles, the impact related to loss of commercial loading spaces on traffic and transit operations would be reduced. However, because the effectiveness of the use of camera video enforcement on the new transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, the indirect impact on loading operations for the implementation of Objective A, Action A.3 and Objective C, Actions C.3 through C.5 would remain significant and unavoidable.

Impact TR-6: Implementation of the Policy Framework Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 would not result in significant loading impacts. (Less than Significant)

As described above, implementation of projects under the Policy Framework Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 would not have a direct physical impact on the transportation network. In addition, projects that would result from these objectives and actions would not entail a wide-scale removal of on-street commercial loading spaces. Accordingly, there would be no significant commercial loading impacts as a result of Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4.

TPS Toolkit Elements

This section presents the program-level review of the TPS Toolkit elements that would be implemented along the Rapid Network corridors as part of the TEP. There are 18 TPS Toolkit elements that have been grouped into one of five categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements. All TPS Toolkit elements (as well as the resulting TTRPs and TTRP Variants) would be designed and implemented to meet the SFMTA and DPW standards and specifications and all city, state, and federal codes, rules, and regulations, including those related to ADA accessibility. The TPS Toolkit categories and specific elements include:

- **Transit Stop Changes**: Remove or Consolidate Transit Stops, Optimize Transit Stops Locations at Intersections, Install Transit Bulbs, Install Transit Boarding Islands, Optimize Transit Stop Lengths, and Convert Flag Stops to Bus Zones.

- **Lane Modifications:** Establish Transit-Only Lanes, Establish Transit Queue Jump/Bypass Lanes, Establish Dedicated Turn Lanes, and Widen Travel Lanes Through Lane Reductions.

- **Parking and Turn Restriction:** Implement Turn Restrictions, and Widen Travel Lanes through Parking Restrictions.

- **Traffic Signal and Stop Sign Changes:** Install Traffic Signals at Uncontrolled and Two-way Stop-Controlled Intersections, Install Traffic Signals at All-way Stop-Controlled Intersections, and Replace All-way Stop-Controls with Traffic Calming Measures.

- **Pedestrian Improvements:** Install Pedestrian Refuge Islands, Install Pedestrian Bulbs, and Widen Sidewalks.

Impact TR-7: Implementation of all of the TPS Toolkit categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements, would not result in significant impacts to local or regional transit, pedestrians and bicycles, emergency vehicle access, or parking. (Less than Significant)

Transit Impacts. Installation of individual TPS Toolkit elements in isolation would not result in a substantial number of new transit trips and therefore, would not substantially increase transit demand.

Transit Stop Changes - Implementing Transit Stop Changes to optimize transit stop locations on corridors with overlapping routes would remove these transit stops for any overlapping routes. Overlapping routes and ridership, including regional transit routes, if present at the transit stops would be part of the review and decision in determining potential locations for stop removal or consolidation. The Transit Stop Changes would serve to decrease transit travel times along a route as indicated in the following discussion.

- Removing or consolidating transit stops can decrease transit travel times by reducing the number of times transit vehicles stop enroute at intersections. Optimizing transit stop locations at intersections can decrease transit travel times by allowing more effective use of transit signal priority at signalized intersections. At stop sign-controlled intersections, optimizing stop locations from the farside to the nearside can eliminate the need for buses to stop twice at the same intersection: once at the stop sign and once on the farside of the intersection.

- Transit bulbs can reduce transit travel times on bus routes by eliminating the need for buses to exit and re-enter the flow of traffic to access curbside transit stops. Transit bulbs could reduce transit travel times on rail lines by providing a place for boarding passengers to wait directly adjacent to a stopped LRV, thereby eliminating the time needed for passengers to walk from the curb across a parking lane to the LRV.

- Transit boarding islands could reduce transit travel times on bus routes by eliminating the need for buses to exit and re-enter the flow of traffic to access curbside transit stops. Transit boarding islands also allow the bus to avoid the curb lane, which is generally slower as a result of parking maneuvers, right turns, and illegal double parking. Transit boarding islands could reduce transit travel times on rail lines that operate on fixed guideways in the center of the street by providing a place for boarding passengers to wait directly adjacent to a stopped LRV, thereby eliminating the time needed for passengers to walk from the curb to the LRV.

- Optimizing transit stop lengths (i.e., increasing the length of a bus stop) could reduce transit travel times by providing space for all doors of a transit vehicle to align with the curb or boarding island or by providing space for multiple buses to pick-up and drop-off passengers at a bus stop concurrently. Most bus stops are designed to accommodate the arrival and departure of one bus at a time; however, where bus stops serve multiple bus routes and/or bus routes with frequent service, bus stops would be designed to accommodate multiple buses at the same time, thereby reducing the delay associated with a second bus waiting to access a bus stop to pick-up and drop-off passengers.

- Bus zones also provide bus operators with a clear line-of-sight to see waiting passengers and to pull alongside the curb, thereby improving transit accessibility and transit passenger convenience.

Lane Modifications. In addition to travel time savings, TPS Toolkit category Lane Modifications would have a beneficial effect of improving conditions for transit and minimizing delays by providing exclusive transit-only and transit queue jumps that would not be subject to mixed-flow travel lane delays, and improving overall intersection operations through dedicated turn lanes to minimize impact of congestion on transit. At locations where travel lane reductions would provide for wider mixed-flow travel lanes (rather than for a transit-only lane), buses would be able to operate at faster travel speeds, and the reduction in friction with vehicles in adjacent lanes would reduce the potential for sideswipe collisions.

Parking and Turn Restrictions. Parking and Turn Restrictions would be implemented to reduce conflicts between transit and vehicles. Left-turn restrictions can reduce transit travel times by preventing turning vehicles from blocking the through-movement of transit vehicles and other traffic. At locations with narrow travel lanes, widening of travel lanes by restricting parking and reallocating street space would reduce transit travel times by eliminating the need for buses and other large vehicles to straddle two travel lanes by reducing delays associated with parking maneuvers and providing additional space for through-moving transit vehicles.

Traffic Signal and Stop Sign Changes. Replacing stop signs with traffic signals can reduce transit travel times by allowing transit vehicles to take advantage of planned transit signal priority improvements that reduce signal delay for approaching transit vehicles. This element could also reduce delays associated with long vehicle queues at busy intersections that are all-way stop-controlled or two-way stop-controlled. At some intersections that are all-way stop-controlled, the stop signs on the street with transit can be removed to reduce transit travel time by allowing transit vehicles to proceed through intersections without coming to a complete stop. If there are transit lines on both streets, the transit line where stop signs would be maintained would experience additional delay. This element would also reduce delays associated with long vehicle queues at busy intersections with stop signs.

Pedestrian Improvements. Pedestrian bulbs at signalized intersections and widened sidewalks can reduce transit travel time by reducing the roadway crossing distance, which can provide flexibility in traffic signal timing and reduce the likelihood of transit vehicles arriving on a red signal indication. Pedestrian refuge islands can reduce transit travel time by shifting travel lanes toward the curb and eliminating the need for buses to exit and re-enter the flow of traffic to access curbside transit stops.

Because TPS Toolkit categories Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements would not affect transit capacity or delay transit, transit impacts would be less than significant.

Pedestrian Impacts. Installation of individual TPS Toolkit elements would not result in overcrowded sidewalks or create potentially hazardous conditions for pedestrians. Transit Stop Changes, including removing or consolidating stops would increase the distance between stops, which could increase the physical effort required to reach transit relative to Existing conditions for some transit riders and, as such, may present a challenge to some riders. The increased distances may inconvenience some passengers; however, the additional distance would be relatively minimal, and overall transit stop spacing would be consistent with SFMTA's *Proposed Revisions to Transit Stop Spacing Guidelines* regarding bus stop spacing.[38] The SFMTA recognizes that passengers, including the elderly and disabled, may have differing concerns with respect to transit stop location. Some may depend on transit to meet their needs for efficient travel, while others prefer more frequent stops to minimize walking distances. While stop removal or consolidation may increase the physical effort required to reach a particular route, posing a challenge to some riders, the TEP project also includes components to improve pedestrian conditions, as described below. Stop removal or consolidation would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas.

The installation of transit bulbs would provide added space for transit passenger amenities, such as shelters. Additionally, transit boarding islands would provide a place for boarding passengers to wait directly adjacent to the LRV or bus instead of having to cross over mixed-flow travel lanes and parking lanes to board a LRV or bus in the center travel lane. Transit

[38] SFMTA, *Proposed Revisions to Transit Stop Spacing Guidelines*, February 16, 2012. This report is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

bulbs generally would improve pedestrian safety for all pedestrians, not just transit passengers, by shortening the street crossing distance at the adjacent intersection, improving the pedestrian visibility, reducing the speed of turning traffic, and reducing sidewalk crowding at transit stop locations. Additionally, where physical limitations exist, transit bulbs could be designed to facilitate boarding and alighting from the front door only (rear door boarding and alighting along the street would still be available).

At flag stops adjacent to on-street parking, all passengers, including wheelchair users, currently must board and exit buses in the street. Converting flag stops to bus zones can improve pedestrian conditions by allowing passengers to be picked up and dropped off at the curb adjacent to the sidewalk instead of in the street. This also improves pedestrian safety as passengers are more visible to non-transit vehicles and no longer have to walk into the street to board the bus.

Implementation of Lane Modifications would not substantially affect pedestrian travel, result in overcrowding of sidewalks, or create potentially hazardous conditions for pedestrians. Furthermore, widening travel lanes by reducing the overall number of travel lanes may improve pedestrian crossing safety. Changes to the signal phases and timing to accommodate transit queue jumps and left turn pockets would meet or exceed the minimum pedestrian crossing time requirements in the CA MUTCD.

Parking and Turn Restrictions and Traffic Signals and Stop Sign Changes would not result in overcrowding of sidewalks or create potentially hazardous conditions for pedestrians. Turn restrictions would reduce the potential for conflicts between turning vehicles and pedestrians at intersections. At uncontrolled intersections and at two-way stop-controlled intersections that require only vehicles on the street without transit to stop, intersection safety and/or pedestrian access to transit stops would be improved with the added right-of-way controls provided by a traffic signal. At these intersections, installing a traffic signal could improve vehicular and pedestrian safety by clarifying the right-of-way for crossing the street with transit while minimizing travel time delays for transit vehicles. New traffic signals would include pedestrian countdown signals and marked crosswalks at the intersection.

At all-way stop-controlled intersections, where stop signs on the streets with transit would be removed, other traffic calming measures would be installed. Traffic calming measures that could be implemented with the intersection control changes include traffic circles, pedestrian refuge islands, pedestrian or transit bulbs, speed humps, median extensions through an intersection, flashing beacons, parking restrictions to improve sight distance, and enhanced crosswalk markings and signs. Such measures would generally involve improving crossing conditions for pedestrians, slowing traffic, and reducing right-of-way conflicts between pedestrians and other traffic. These treatments would be included to facilitate safe and easy pedestrian crossings across streets where traffic no longer has to stop at a stop sign.

Pedestrian refuge islands could also improve pedestrian safety by increasing pedestrian visibility. Pedestrian crossing at traffic circles with crosswalks with either two-way stop-control or uncontrolled (i.e., yield) operations would be similar to pedestrian conditions at unsignalized intersections, where pedestrians have the right-of-way, and vehicles at either approach are required to stop and yield to pedestrians. However, removal of stop signs may make it more difficult for pedestrians to cross the street, because moving vehicles may not always yield to pedestrians as required. In certain situations, the turning radii of vehicles around the traffic circle may encroach on crosswalks, depending on the location of the existing crosswalks. In the design of these elements, SFMTA would set crosswalks back from the intersections, as needed, to limit these potential encroachments.

Pedestrian improvements would not result in overcrowding of sidewalks, or create potentially hazardous conditions for pedestrians. Pedestrian refuge islands would improve pedestrian safety by increasing pedestrian visibility and minimizing pedestrian exposure to vehicular traffic, while pedestrian bulbs would improve pedestrian safety by shortening the street crossing distance, improving pedestrian visibility, and reducing the speed of turning traffic. Sidewalk widening would improve pedestrian conditions by providing additional pedestrian space and space for transit shelters, landscaping and other amenities. Sidewalk widening could also improve pedestrian safety by shortening the street crossing distance.

Overall, the impact of TPS Toolkit categories Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements on pedestrians would be less than significant.

Bicycle Impacts. Implementation of individual TPS Toolkit elements along TTRP corridors would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility. Transit Stop Changes, including removal and/or consolidation of transit stops, relocation of transit stops, optimization of transit stop lengths, installation of transit bulbs, or conversion of flag stops to bus zones would not affect existing bicycle facilities. On the TTRP corridors or corridor segments that overlap with existing bicycle routes, the design of the transit boarding islands, if proposed, would accommodate bicycle travel (as is the case for the recent change to the transit boarding island on the farside of the intersection of Church Street/Duboce Avenue in the outbound direction). On streets without bicycle lanes, transit bulbs would reduce conflicts between buses and bicyclists that occur when buses pull into and out of bus zones. On streets with two or more travel lanes in one direction, bicyclists would be able to change lanes to pass a bus stopped at the transit bulb. On streets with one lane in each direction (for example, on the TTRP.5 corridor for the 5 Fulton and 5L Fulton Limited), non-transit vehicles, including bicyclists would either be delayed while the bus is stopped at the transit bulb or would pass the bus while it was stopped at the bulb. The impact on bicyclists on streets where transit bulbs would be implemented adjacent to a bicycle lane (for example, the program-level TTRP.9: 9 San Bruno and 9L San Bruno Limited could potentially include transit bulbs on Potrero Avenue, which has a bicycle lane in both directions) would be similar to Existing conditions when buses travel across the bicycle lane to a curbside bus zone. However, in this case, the bus would be stopped within the bicycle lane, and bicyclists would either yield or pass the bus, conditions permitting. Implementation of transit bulbs adjacent to bicycle lanes would not reduce existing conflicts between buses and bicyclists; however, bus-bicycle conflicts would not substantially increase over Existing conditions so as to result in hazardous conditions for bicyclists.

Implementation of Lane Modifications would similarly not substantially affect bicycle travel. At locations where on-street parking adjacent to a bicycle lane would be removed, bicyclists would benefit as the potential for conflicts between drivers parking their vehicles and bicyclists would decrease. On streets with two lanes per direction and no bicycle lane, conversion of one mixed-flow travel lane to a transit-only lane (for example, on Mission Street under TTRP.14 Expanded Alternative) would increase the number of vehicles in the remaining mixed-flow travel lane. Bicyclists would therefore need to share the mixed-flow lane with more vehicles, which could result in an increase in potential for vehicle-bicycle conflicts. However, conditions for bicyclists would be similar to other streets throughout San Francisco and would not be a traffic hazard for bicyclists. In some instances, on streets where mixed-flow lanes are proposed to be removed to provide transit-only lanes, signed bicycle routes with bicycle lanes are often available on nearby parallel streets (for example, Valencia Street, which has bicycle lanes in both directions, is one block or approximately 600 feet west of Mission Street where a transit-only lane is proposed), providing nearby bicycle routes that avoid this increase in traffic in the remaining mixed-flow travel lanes. Implementation of right-turn pockets could benefit bicyclists by providing clearer lane designations at an intersection approach and reducing the chance of right hook collisions occurring when drivers make a right turn at the last moment across a bicycle lane or facility and in front of a bicyclist.

Implementation of Parking and Turn Restrictions for non-transit vehicles, including bicyclists, would not substantially affect bicycle travel. Turn restrictions would reduce the potential for conflicts between turning vehicles and bicyclists. At locations where on-street parking adjacent to the bicycle lane would be removed, bicyclists would benefit as the potential for conflicts between drivers parking their vehicles and bicyclists would decrease.

Implementation of Traffic Signal and Stop Sign Changes would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility. Conversion of all-way stop-controlled intersections to two-way stop-controlled, with or without a traffic circle, could reduce the frequency with which bicyclists would have to stop and restart in the transit direction, which would be an improvement for bicyclists.

Bicyclists on the street where stop-signs would remain would be required to yield to oncoming traffic and could experience longer delays, similar to vehicular traffic. Implementation of traffic circles as part of a conversion of an all-way stop-controlled intersection to uncontrolled (i.e., yield) would reduce bicyclist delays at all approaches because bicyclists and vehicles would need to yield right-of-way to bicycles or vehicles traveling counterclockwise around the circle before entering the intersection.

Implementation of Pedestrian Improvements would not substantially affect bicycle travel. At locations where on-street parking adjacent to the bicycle lane would be removed, bicyclists would benefit as the potential for conflicts between drivers parking their vehicles and bicyclists would decrease. Pedestrian bulbs would not extend beyond the width of a parking lane, and therefore would not impede upon a bicycle lane or bicycle travel within a mixed-flow lane. Pedestrian refuge islands would be constructed within a median and would not affect bicycle lanes or bicycle travel within a mixed-flow lane. Sidewalk widening would be accomplished by removing the parking lane or through mixed-flow lane removal and therefore would not affect any existing bicycle lanes.

Overall, the impact of TPS Toolkit categories Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements on bicycle facilities and operations would be less than significant.

Passenger Loading Impacts. Implementation of TPS Toolkit categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements would have the potential to remove on-street parking, including potential passenger loading/unloading zones. Traffic Signal and Stop Sign Changes would not result in the loss of parking with the exception of the implementation of traffic control measures, such as traffic circles, pedestrian bulbs, and parking restrictions at intersection approaches to improve sight distance. These elements may require the removal of a limited number of parking spaces. However, these would not likely be in areas where passenger loading/unloading zones are currently located. Implementation of these TPS Toolkit elements for the TTRP proposals may result in the elimination of parking spaces, and similarly, potentially eliminate passenger loading/unloading zones. Similar to commercial loading spaces, the implementation of the TPS Toolkit elements would consider the relocation of passenger loading/unloading zones, although there are typically fewer passenger loading/unloading zones than commercial loading spaces along Rapid Network corridors. Passenger loading/unloading zones provide a place to load and unload passengers for adjacent businesses and residences and are intended as a convenience for passengers, for quick drop-off and pick-up. Passenger loading/unloading zones are annual permits managed by SFMTA, and if removal of these passenger loading/unloading zones is required and no alternative locations are identified, the resulting loss of passenger loading/unloading zones would be considered an inconvenience, and passengers may need to walk further to access the destination. However, this circumstance would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles. Therefore, the loss of passenger loading/unloading zones would not be a considered a significant impact.

Emergency Vehicle Access Impacts. Implementation of Transit Stop Changes, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements would not substantially affect traffic flow, and therefore, emergency vehicle access would remain unchanged from Existing conditions.

The design of transit boarding islands and pedestrian bulbs would be reviewed by the San Francisco Fire Department (SFFD) to make sure that they meet all applicable standards and to ensure that emergency vehicle access at specific locations is maintained. The design of transit bulbs would also be reviewed to ensure that there would not be any impacts on emergency vehicle access. In addition to the preliminary project review conducted by TASC on proposed projects affecting the City right-of-way, the SFFD, along with other City agencies, reviews proposal details that modify sidewalks or curbs as part of the sidewalk legislation process. In accordance with the DPW's Order No. 172,512, the Board of Supervisors must approve changes to the City's sidewalks. As part of this approval process, public agencies and private contractors submit necessary plans and information to the Bureau of Street Use and Mapping (BSM), a division of the DPW, for review and approval. The BSM refers the plans to several City agencies, including the DPH, SFFD, the Port, and the San Francisco Public Utilities Commission (SFPUC) as well as outside utility companies, including PG&E, and a number of telecommunications infrastructure providers. This City and agency review ensures that any safety issues, including emergency access, are resolved prior to permit issuance.

Similarly, the design of traffic circles would be reviewed by the SFFD to make sure that they meet all applicable standards and to ensure that emergency vehicle access is maintained. If needed, fire and rescue vehicles would be able to mount the traffic circle as they travel through the intersection. Therefore, regardless of intersection controls (for example, all-way stop-controlled, two-way stop-controlled, or traffic circles), emergency vehicles would continue to have right-of-way, and emergency vehicle access would not be affected.

Implementation of Lane Modifications and Parking and Turn Restrictions would not substantially affect emergency vehicle access, which would remain relatively unchanged from Existing conditions. Widened travel lanes would facilitate emergency vehicle access for large fire and rescue vehicles, and emergency vehicles would be able to travel within transit-only lanes, which would have fewer vehicles than mixed-flow lanes. With implementation of transit-only lanes, emergency service providers may adjust travel routes to respond to incidents; however, emergency vehicle access along the TTRP corridors would not be substantially affected. Regardless of the number of travel lanes on a street, all drivers must comply with the California Vehicle Code § 21806, which requires that drivers yield right-of-way to authorized emergency vehicles, and drive to the right road curb or edge, stop, and remain stopped until the emergency vehicle has passed. Emergency vehicles would be permitted full use of any transit-only lanes and would not be subject to the turn restrictions. Widened travel lanes would facilitate emergency vehicle access for large fire and rescue vehicles.

The impact of TPS Toolkit categories Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements on emergency vehicle access would therefore be less than significant.

Parking Impacts. Implementation of Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements would not result in an increase in parking demand, but would remove on-street parking.

Implementation of Transit Stop Changes may reduce the amount of on-street parking supply, as follows:

- Removing stops would result in the following changes. For stop consolidation, a new intermediate transit stop would result in the removal of a limited amount of on-street parking, but removal of the existing transit zones may result in the availability of additional curb space that could be used for new on-street parking, bicycle parking, parklets, or parking restrictions at intersection approaches to improve pedestrian visibility and sight distance. Similarly, consolidating stops may result in the availability of additional curb space as described above, while at the same time may require removing between two to five curbside parking spaces from the new consolidated stop location. Typically some, but not all, of the parking can be replaced at the former stop location.

- Relocating transit stops from the nearside to the farside of an intersection or vice versa could require removing curb-side parking from the new stop location; some or all of the parking could be replaced at the former stop location.

- In most instances, transit bulbs would be built at existing bus zones and would not require removing additional parking. In some instances, adjacent parking would be removed to lengthen the transit bulb and/or additional curb space may become available.

- In most instances, center transit boarding islands would be built at existing transit stops and travel lanes would be shifted to the parking lane to accommodate the center boarding island. New boarding islands would require the removal of parking along side or leading up to the transit stop, to accommodate the transition of lanes around the boarding islands. In most instances, some parking would need to be removed as part of constructing a transit boarding island.

- Where existing bus stops are lengthened, any parking in the new bus zone would need to be prohibited.

Lane Modifications could temporarily or permanently restrict access to on-street parking spaces if parking lanes are removed to implement transit-only lanes.

Parking and Turn Restrictions would temporarily or permanently limit access to on-street parking spaces. As noted above, parking restrictions could be implemented either during peak periods, such as 7 to 9 a.m. or 4 to 6 p.m., or permanently to facilitate bus travel on streets with narrow travel lanes.

Traffic Signal and Stop Sign Changes, including installation of traffic signals, or conversion of all-way stop-controlled intersections to two-way stop-controlled intersections, would typically not result in changes to the on-street parking supply. However, implementation of traffic control measures, such as traffic circles, pedestrian bulbs, and parking restrictions at intersection approaches to improve sight distance, may require removal of a limited number of parking spaces.[39] Traffic circles would require a 20-foot red zone on both sides of the street at each approach, which could result in a parking loss of up to eight parking spaces at each intersection.

Pedestrian Improvements, including implementation of pedestrian bulbs may result in a loss of one to two parking spaces per location. Sidewalk widening often requires removal of parking, but could also be accomplished through travel lane removal or narrowing on streets with multiple travel lanes in the same direction. Existing sidewalk widths and conditions vary throughout the City; therefore, the amount a particular sidewalk would be widened would also vary. If a wider sidewalk were proposed on a street with one mixed-flow travel lane plus parking in each direction, parking could be removed on one or both sides of the street to accommodate wider sidewalks.

The application of combinations of TPS Toolkit elements would result in a loss of parking spaces along the nine program-level TTRP corridors. Although the detailed designs are not yet developed for these transit corridors, the analysis of the project-level TTRPs illustrates

[39] Sight distance is the distance from which an object at eye level remains visible to an observer. Stopping sight distance is defined as the distance needed for drivers to see an object on the roadway ahead and bring their vehicles to a safe stop before colliding with the object.

that there would likely be a decrease in the overall on-street parking supply that may or may not be able to be replaced. The parking spaces that would be displaced due to part-time (for example, implementation of tow-away parking restrictions) and permanent loss of parking spaces along the TTRP corridors may be accommodated on other nearby streets, or in other parking facilities within ½ mile of these corridors. This could result in increased competition for the remaining other on-street, and potentially off-street, parking supply in these areas. At some locations, drivers and passengers would have to walk further between a parking space and their destination, or switch to transit or other modes. By design, the TTRPs are being implemented on the Rapid Network and therefore, would be well served by transit. These corridors already accommodate pedestrians, and bicycle facilities are often located on nearby streets. Although the installation of TPS Toolkit elements, particularly Lane Modifications (transit-only lanes or lane reductions), Parking and Turn Restrictions, and Pedestrian Improvements categories, could result in the removal of a number of parking spaces, the parking loss would be distributed along the length of the affected corridor. Given that the parking loss would likely be dispersed, that the Rapid Network is well served by transit, and that other on-street or off-street parking could be available within the vicinity of the affected corridor, the loss of parking is not expected to result in hazardous conditions or delays to any of the modes, such as repeatedly blocking sidewalks, mixed-use lanes, transit or bicycle lanes. Hence, the impact related to parking supply would be less than significant.

Impact TR-8: Implementation of the following TPS Toolkit categories: Lane Modifications and Pedestrian Improvements may result in significant traffic impacts. (Significant and Unavoidable with Mitigation)

Implementation of some elements within the TPS Toolkit categories Lane Modifications and Pedestrian Improvements may remove travel lanes, which could substantially affect existing traffic operations at nearby intersections. A transit queue jump/bypass lane may be created by restricting parking at an intersection approach, which would not, outside of signal phasing, impact traffic operations. However, a transit queue jump/bypass lane may also be created by allocating a travel lane to transit vehicles only near the intersection where more than one mixed-flow lane is available. This would have the potential to impact traffic operations, although less so when the transit queue jump/bypass lane receives a dedicated signal phase. Dedicated turn lanes could be implemented similarly. Therefore, the impact of transit queue jumps and dedicated turn lanes on intersection operations may be substantial, depending on the design and the existing traffic conditions. It should be noted however, that in practice, dedicated turn lanes are typically implemented at intersections to reduce overall intersection delay and therefore, would likely improve intersection operations. Establishing transit-only lanes and widening travel lanes through lane reductions would reduce roadway segment and intersection capacity. At roadway segments and intersections operating at or close to or close to capacity, travel lane reductions could result in significant impacts on traffic operations. For example, at the study intersection of Potrero/16th streets, with implementation of the transit-only lane on 16th Street as part of the TTRP.22_1 Expanded Alternative, the p.m. peak hour intersection LOS would change from LOS D under existing conditions to LOS F, resulting in a significant impact. Therefore, because the reduction in capacity at roadway segments and intersections could worsen operating conditions to LOS E or LOS F, or significantly reduce the capacity at intersections already operating at LOS E or F through the implementation of transit queue jump/bypass lanes, transit-only lanes, or widening mixed-flow lanes through lane reductions, implementation of these elements could result in a significant traffic impact.

Construction of pedestrian bulbs and sidewalk widening would primarily occur within the curb parking lane; therefore, construction of sidewalk extensions/bulb-outs would not affect the adjacent travel lanes and traffic operations. Similarly, sidewalk widening and pedestrian bulbs would typically only affect parking lanes; therefore, the impact on travel lanes and traffic operations would be limited and less than significant. However, on some streets with multiple travel lanes, it may be desirable to widen sidewalks by eliminating a travel lane and reallocating the right-of-way to sidewalks. The impact of the lane reduction would depend on the total number of travel lanes and the traffic volume demand. At roadway segments and intersections currently operating at, or near, capacity, travel lane reductions could result in significant impact on traffic operations.

Mitigation Measure M-TR-8: Optimization of Intersection Operations

The final design of program-level TTRPs that include TPS Toolkit elements from the Lane Modifications and Pedestrian Improvements categories shall integrate design elements from the following intersection geometries and traffic control measures to the greatest extent feasible without compromising the purpose of the project. Potential intersection geometry optimization measures include left or right turn pockets, turn prohibitions, restriping to add additional mixed-flow capacity, lane widening to provide for transit-only or mixed-flow lanes, and parking prohibitions. Potential traffic control measures include signalization, exclusive signal phases, and changes to the signal cycle. The final design shall ensure that transit, pedestrian, and bicycle travel are accommodated, is within the confines of feasible traffic engineering solutions, and does not conflict with overall City policies related to transportation.

Implementation of Mitigation Measure M-TR-8: Optimization of Intersection Operations would minimize or reduce traffic impacts at intersections and along roadway segments and it would not result in new secondary impacts on the transportation network. Intersections would be designed to meet the SFMTA and DPW design specifications, and signal timing would be set to meet or exceed the requirements in the CA MUTCD, including, but not limited to, the minimum pedestrian crossing time.[40] However, because this measure may not be adequate to mitigate intersection traffic operations to less-than-significant levels, and because the feasibility of providing additional vehicle capacity is unknown, and it is not always possible to optimize the intersection such that level of service falls below LOS E, the impact on traffic operations would remain significant and unavoidable.

Impact TR-9: Implementation of the following TPS Toolkit categories: Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, would not result in significant traffic impacts. (Less than Significant)

Implementation of Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes would not remove any travel lanes nor substantially affect existing travel lane operations at nearby intersections. Implementation of transit bulbs may delay vehicles when the bus stops in the travel lane to pick up and drop off passengers at the transit bulb. The increased delay to non-transit vehicles would only occur when a bus is present at the bus stop and would not substantially affect overall peak hour intersection operations. For example, at the intersection of 16th Street/Potrero Avenue, with implementation of transit bulbs in isolation from other TPS Toolkit elements, the intersection operating conditions during the p.m. peak hour would remain similar to Existing conditions (i.e., at LOS D). As noted above, optimizing transit stop locations and lengths and reducing the number of bus stops would decrease transit travel times by reducing the need for buses to stop at the same intersection, thereby reducing the point of conflicts between buses and vehicles, and would overall improve transit operations. Optimizing transit zones, consolidating bus stops, installing transit boarding islands, and converting flag stops to bus zones would minimally change intersection operations.

Turn restrictions at intersection approaches would likely enhance overall intersection capacity, improve transit and traffic flow, and reduce potential for conflicts between turning vehicles (particularly left-turning vehicles) and other traffic, bicycles, and pedestrians. Turn restrictions may result in some vehicles making around the block maneuvers in order to access their destination, thus slightly increasing overall trip lengths, or shift some vehicles to other parallel streets. However, the ultimate effect at the intersections level would likely be an improvement in the intersection level of service where turns are restricted, because the turns are often key contributors to overall delay. The volume of vehicles making around the block maneuvers or making left turns downstream or upstream of the subject intersections would likely be relatively low, and as such, would not be expected to substantially adversely affect the LOS at intersections of adjacent roadways. For example, TTRP.14 Expanded Alternative would include forced right turns at every intersection for non-transit vehicles for

[40] California Manual of Uniform Traffic Control Devices. Available online at: http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/ca_mutcd2012.htm. Accessed June 4, 2013.

the segment of northbound Mission Street between 13th and Cesar Chavez Streets. However, the impact on any one intersection would be minimal, and LOS operating conditions at intersections to which traffic volumes would likely divert (for example to Guerrero Street or South Van Ness Avenue, including to the study intersections of Guerrero/20th streets and South Van Ness Avenue/20th Street) would remain similar to Existing conditions. Parking restrictions to provide for wider travel lanes would also enhance operations at intersections and along roadway segments.

Signalization of stop-controlled intersections with higher traffic volumes, would generally reduce overall intersection delays. Conversion of all-way stop-controlled intersections to two-way stop-controlled with additional traffic calming measures may result in lower vehicle speeds and increased delay on the streets subject to stop controls because vehicles, including transit, if present, would need to find a gap in traffic flow on the streets where stop signs are proposed to be removed. For example, under TTRP.J Expanded Alternative, at the all-way stop-controlled intersection of 25th and Church streets where the worst approach (northbound on Church Street) currently operates at LOS C during the p.m. peak hour, with 23 seconds of delay per vehicle, the northbound and southbound approaches would no longer be subject to stop controls. With conversion from all-way to two-way stop-controlled operations, the delay per vehicle on the TTRP corridor approaches would decrease and the delay for the non-TTRP corridor approaches would increase. The overall LOS condition would worsen, with the worst approach (westbound) operating at LOS F with more than 50 seconds of delay per vehicle with the conversion, for this specific example. However, even with this level of delay, peak hour signal warrants would not be met at this sample intersection, and would generally not be met at other similar intersections. Conversion of an all-way stop-controlled intersection to a two-way stop-control would generally only be done at locations where traffic signal warrants would not be met, and therefore the conversion of all-way to two-way stop-controlled would not result in significant traffic impacts, even if approach delays increased, or operate at LOS E or LOS F conditions.[41]

Implementation of traffic circles as part of conversion of all-way stop controlled intersections to two-way stop-controlled, with stop signs removed on the street with transit, would reduce delays on the streets without stop signs, and could delay the stop-controlled approaches, as they would be required to wait for a gap in traffic to proceed. Implementation of traffic circles as part of conversion of all-way stop-controlled intersections to uncontrolled (i.e., yield) could increase delays at all approaches, depending on the level of traffic volumes, as drivers would

[41] As indicated in Section 4.2.4.1 on pp. 4.2-21 to 4.2-22, the operational impacts on unsignalized intersections are considered significant if project-related traffic causes the level of service at the worst approach to deteriorate from LOS D or better to LOS E or LOS F and peak hour signal warrants would be met, or would cause peak hour signal warrants to be met when the worst approach is already operating at LOS E or LOS F.

need to yield right-of-way to vehicles traveling counterclockwise around the circle before entering the intersection. Vehicle delay could also be similar to existing levels. For example, traffic circles are proposed at six intersections along McAllister Street as part of the TTRP.5 Expanded Alternative. At the study intersection of McAllister and Scott streets, the LOS analysis for a.m. and p.m. peak hour conditions indicates that average vehicle delay would be slightly less with implementation of the traffic circle (average delay of 9 seconds and LOS A) as compared to Existing conditions (i.e., with the worst approach operating at LOS B).

Depending on the curb-to-curb width of the intersecting streets, the distance from corner to corner may be too small for left-turning larger trucks to circulate counterclockwise, even if the traffic circles include a mountable apron, and instead trucks would need to make left turns in front of the traffic circle. This condition would not be considered a potential traffic hazard, since due to the City's typically narrow streets, trucks often encroach on opposing travel lanes throughout San Francisco, traffic and truck volumes on such streets are generally low, and since the design of the traffic circle would be required to meet DPW design specifications for this feature. Additionally, there are other intersections in San Francisco with similar designs.

Other traffic calming measures that could be implemented with the intersection control changes include: pedestrian refuge islands, pedestrian or transit bulbs, speed humps, median extensions through an intersection, flashing beacons, parking restrictions to improve sight distance, and enhanced crosswalk markings and signs. When implemented as part of Traffic Signal and Stop Sign Changes, traffic calming measures would typically be implemented within the curb parking lane (for example pedestrian bulbs) or across a roadway (for example, speed humps), and therefore, their implementation would not substantially affect the adjacent travel lanes and traffic operations.

Overall, the impacts of Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes on traffic operations would be less than significant.

Impact TR-10: Implementation of the following TPS Toolkit categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements, may result in significant loading impacts. (Significant and Unavoidable with Mitigation)

The following TPS Toolkit categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements, would not generate additional loading demand. However, each of these TPS Toolkit elements would have the potential for the removal, relocation, or addition of on-street parking, which may include commercial loading spaces. Parking restrictions on streets where on-street commercial loading spaces are located would limit loading access to hours outside of the parking restriction. For example, if parking is restricted during the 7 to 9 a.m. and 4 to 6 p.m. peak periods, loading would need to occur prior to 7 a.m., during the midday period between 9 a.m. and 4 p.m., or after 6 p.m. While this may be an inconvenience for trucks due to limited delivery times, it would not be considered a significant impact to commercial loading. At locations where construction of sidewalk extensions and pedestrian bulbs would occur within the curb parking lane and on-street parking is removed, some commercial loading spaces may be removed. The removal of a single loading space would not be considered a significant impact because other loading spaces would remain in the nearby vicinity. However, removal of multiple loading spaces could reduce the overall loading supply such that loading activities could not be accommodated within convenient on-street loading zones; and such that the loss of loading zones could result in double-parking within the transit-only lane, mixed-flow lane, or bicycle lane, which could increase conflicts with vehicular, transit, and bicycle traffic. As a result, the potential removal of commercial loading spaces related to these TPS Toolkit categories could result in a significant impact.

Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces

Where feasible, the SFMTA shall install new commercial loading spaces of similar length on the same block and side of the street, or within 250 feet on adjacent side streets, of where commercial loading spaces would be permanently removed, in order to provide equally convenient loading space(s). These loading spaces shall only be replaced on streets with commercial uses.

With implementation of Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces, the impact on loading operations would be reduced. Mitigation Measure M-TR-10 would result in a decrease in the number of on-street (non-commercial) parking spaces but this would not be considered a new secondary significant impact on the transportation network. While in many situations providing on-street loading spaces elsewhere on the block or around the corner would not present any challenges, replacement may not always be possible due to conditions such as existing parking prohibitions or availability of general on-street spaces that could be converted to loading spaces. Because the feasibility of providing replacement commercial loading spaces of similar length on the same block and side of the street or within 250 feet on adjacent side streets cannot be assured in every situation where loading spaces are removed as a result of the proposed project, the impact on loading operations with respect to these TPS Toolkit elements would remain significant and unavoidable.

Impact TR-11: Implementation of TPS Toolkit element category Traffic Signal and Stop Sign Changes would not result in significant loading impacts. (Less than Significant)

Implementation of the TPS Toolkit category Traffic Signal and Stop Sign Changes would not result in an increase in loading demand. Signalization of intersections would not remove existing commercial loading spaces, and therefore, would not have an effect on loading/unloading activity occurring at the curb on these streets or on other streets in the vicinity of the project. While the CA MUTCD recommends a 20-foot-long red zone on all approaches of an intersection, the implementation of traffic circles would likely require a red zone of a minimum of 20 feet on both sides of the street at each approach of the intersection. If an existing loading zone is located within the red zone, as part of the design of the traffic circle, the loading zone would be relocated further from the intersection and loading operations would not be affected. Therefore, the impact of Traffic Signal and Stop Sign Changes on loading operations would be less than significant.

Program-Level Service-Related Capital Improvement Projects

The following section analyzes the impact of the five program-level Service-related Capital Improvement projects described in Chapter 2, Project Description, Section 2.5.1.2, in Table 5 on pp. 2-24 to 2-25, including:

- TTPI.2: Lyon Street/Richardson Avenue Bus Stop – Transfer Point
- TTPI.3: E Embarcadero Line Independent Terminal at Jones Street/Beach Street and Reconfigured F Market & Wharves Terminal to facilitate E Embarcadero operation
- TTPI.4: San Francisco General Hospital Transfer Point
- OWE.6: New Overhead Wiring – 6 Parnassus Extension to West Portal Station
- SCI.1: Accessible Platforms for Rail Lines

Impact TR-12: Implementation of program-level Service-related Capital Improvements projects (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) would not result in significant impacts to local or regional transit, traffic operations, pedestrians and bicyclists, loading, emergency vehicle access, or parking. (Less than Significant)

Transit Impacts. The three program-level terminal and transfer point projects (TTPI.2: Lyon Street/Richardson Avenue Bus Stop – Transfer Point, TTPI.3: The E Embarcadero Line Independent Terminal at Jones Street/Beach Street and Reconfigured F Market & Wharves terminal to facilitate E Embarcadero Operation, and TTPI.4: San Francisco General Hospital Transfer Point) would be implemented to support the project-level Service Improvements analyzed in Impact TR-19. TTPI.2: Lyon Street/Richardson Avenue Bus Stop – Transfer Point would facilitate connections between the 28L 19th Avenue Limited and Golden Gate Transit, while the TTPI.4: San Francisco General Hospital Transfer Point would facilitate transfers between the 9 San Bruno, 9L San Bruno Limited, 10 Sansome (proposed change from 10 Townsend), 19 Polk, 48 Quintara-24th Street and the proposed new 58 24th Street routes. The transfer point would facilitate passenger loading/unloading and would therefore enhance transit operations for the affected lines. TTPI.3: the E Embarcadero Line Independent Terminal at Jones and Beach streets and associated reconfiguration of the F Market & Wharves historic streetcar terminal would improve reliability for the new E Embarcadero and the F Market & Wharves historic streetcar operations.

The new overhead wire for OWE.6 and accessible platforms proposed in SCI.1, in isolation, would not result in any new local or regional transit trips, and therefore would not increase transit demand. The new overhead wires would enable the extension of the 6 Parnassus route to the West Portal Station, thereby enhancing connectivity with the K Ingleside, L Taraval, and M Ocean View light rail lines as well as the 48 Quintara-24th Street and 17 Parkmerced bus routes. The specific design for this project, including the proposed streets, has not been developed. Transit operations along the route extension would be similar to operations north of Quintara Street, where overhead wires are currently provided for the 6 Parnassus route. The new accessible platforms along the surface portion of the light rail system would not affect light rail operations because the new platforms would be built along the existing rail lines and would be designed to fit within the right-of-way constraints at the selected locations.

Implementation of the program-level Service-related Capital Improvement projects (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) would not, in isolation, result in a substantial number of new transit trips and therefore would not increase transit demand. Because the improvements would not affect transit capacity or operations, the impact of the program-level Service-related Capital Improvement projects (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) on local and regional transit would be less than significant.

Traffic Impacts. The three Terminal and Transfer Point Improvement projects would include roadway striping of bus stops and the construction and installation of transit bulbs, new bypass rails, track turnouts, track switches, overhead wiring and poles, possible sidewalk modifications, and parking removal. These projects would not result in a reduction in mixed-flow lanes nor substantially affect existing travel lane operations at nearby intersections. Transit service following the OWE.6 Overhead wire project would be provided on streets which previously did not have transit service, potentially along portions of 14th Avenue, Taraval Street, and Lenox Way. However, as described in Impact TR-18, the new transit service associated with the Service Improvements for the 6 Parnassus would not substantially alter traffic operations on these streets. New overhead wiring (OWE.6) would not remove any travel lanes between the 14th Avenue terminal for the current 6 Parnassus operations or in the vicinity of the West Portal Station, nor substantially affect existing travel lane operations along the extended route. New accessible platforms (SCI.1) would not remove any travel lanes nor substantially affect existing travel lane operations along the existing rail lines. The additional stops to accommodate passengers with mobility impairments would not substantially increase travel time for the light rail and historic streetcar lines, and transit operations would remain similar to Existing conditions. Therefore, the impact of the program-level Service-related Capital Improvement projects (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) on traffic operations would be less than significant.

Pedestrian Impacts. Implementation of the three Terminal and Transfer Point Improvements (TTPI.2, TTPI.3, and TTPI.4) would not result in overcrowding of sidewalks or create potentially hazardous conditions for pedestrians. The improvements to the terminal and transfer points would facilitate transfers between routes and improve terminal definition for passengers. The new transit bulbs for TTPI.2 and TTPI.4 would improve pedestrian safety by shortening the street crossing distance, improving the pedestrian visibility, reducing the speed of turning traffic, and providing additional space for pedestrian queuing. These elements would enhance pedestrian visibility and provide safer access to transit for pedestrians. The new terminal for the E Embarcadero line may result in some sidewalk modifications; however, minimum sidewalk widths would be maintained.

Implementation of new overhead wiring (OWE.6) would not result in overcrowding of sidewalks or create potentially hazardous conditions for pedestrians. Installation of poles (for example, support poles up to 30-feet in height, with typical spacing of 90 to 100 feet between poles) for the overhead wires would add to the sidewalk furniture (such as newspaper stands and mailboxes) that could incrementally reduce the effective width of the sidewalk. Installation of poles for the overhead wires for the TTPI.3, the E Embarcadero Line Independent Terminal at Jones Street/Beach Street and Reconfigured F Market & Wharves terminal to facilitate E Embarcadero operation, would add to the sidewalk furniture, which could reduce the effective width of the sidewalks on Jones and Beach streets. However, given that existing sidewalks already include roadway infrastructure (for example, traffic lights, traffic control boxes, and overhead wire poles) as well as other furniture (for example, newspaper stands and mailboxes), the poles would not materially affect the existing pedestrian environment in the vicinity of the existing F Market & Wharves historic streetcar on Jones and Beach streets. In addition, any changes to sidewalks would comply with ADA requirements. Implementation of accessible rail platforms (SCI.1) would allow Muni passengers with mobility impairments to better use the light rail system but would not affect overall pedestrian circulation in the vicinity of the accessible platforms. Implementation of accessible platforms would not result in sidewalk (non-platform) modifications. Therefore, the impact of the program-level Service-related Capital Improvement projects (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) on pedestrians would be less than significant.

Bicycle Impacts. Implementation of the three Terminal and Transfer Point Improvements (TTPI.2, TTPI.3, and TTPI.4) would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility. TTPI.2 would provide a curbside bus stop/transfer point on Richardson Avenue at the intersection of Lyon Street/Richardson Avenue, which would not affect Bicycle Route 4 that runs on Francisco Street (Class II) and Lyon Street (Class III) or affect bicycle circulation in the area. TTPI.3 would provide a new terminal in the vicinity of an existing terminal and would not affect bicycle circulation on nearby Bicycle Route 2 on North Point Street (Class II). The proposed improvements related to bypass tracks and turnouts would increase the amount of rails within Jones and Beach streets; however, neither street is a designated bicycle route, and therefore, bicycle facility conditions would not change substantially from Existing conditions. TTPI.4 would improve the existing bus stops on Potrero Avenue between 23rd and 24th streets by extending and replacing the curbside bus zones to transit bulbs. Bicycle Route 25 runs on Potrero Avenue (Class II), and there is a bicycle lane adjacent to the bus stops. To access the bus stops, buses currently travel across the bicycle lane, often blocking them while loading and unloading passengers. With implementation of the transit bulbs, buses would be stopped within the bicycle lane, and bicyclists would be able to pass a bus, conditions permitting, or would need to wait behind the bus similar to vehicle traffic. Implementation of transit bulbs adjacent to bicycle lanes would not reduce existing conflicts between buses and bicyclists; however, transit-bicycle conflicts would not substantially increase compared to Existing conditions.

Implementation of the new overhead wiring (OWE.6) would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility. Bicycle Route 60 runs on Ulloa Street between 15th and Forest Side avenues (Class II), and the L Taraval line and the 48 Quintara-24th route run on this section of Ulloa Street. Although the exact route is unknown, if the 6 Parnassus is extended via Ulloa Street, additional transit vehicles would travel on this section of Ulloa Street, thus increasing the potential for transit and bicycle conflicts; however, this condition would not result in hazardous conditions. Accessible platforms (SCI.1) would be constructed at locations where changes to transit stops would occur; accessible platforms could be accommodated without affecting the adjacent travel lanes or bicycle lanes. Therefore, bicycle conditions at the new accessible platforms would be similar to those at existing locations along the light rail and historic streetcar network. Therefore, the impact of the program-level Service-related Capital Improvement projects (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) on bicycle facilities and operations would be less than significant.

Loading Impacts. Implementation of the program-level Service-related Capital Improvement projects (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) would not generate additional loading demand. With implementation of the Terminal and Transfer Point Improvements (TTPI.2, TTPI.3, and TTPI.4), the new bus stops, transit bulbs, new overhead wiring, and bypass rail and associated track work and modifications to the sidewalk may affect on-street commercial loading spaces in the vicinity of the projects, depending on the final design. Although for each individual project component, the extent of impact would be limited. TTPI.4 would likely require parking removal to accommodate longer transit zones and the new transit bulbs. However, on Potrero Avenue between 23rd and 24th streets, there currently are bus zones in both directions and no on-street commercial loading spaces. Implementation of the longer transit zones and transit bulbs would therefore, not affect loading conditions on Potrero Avenue. The exact location of the E Embarcadero independent terminal (TTPI.3) is not known, but this terminal would be located along the existing F Market & Wharves historic streetcar line, where on-street parking has already been removed. At the intersection of Lyon Street/Richardson Avenue (TTPI.2), there are no on-street commercial loading spaces. Implementation of new overhead wiring (OWE.6) to extend the 6 Parnassus route from its current terminal at 14th Avenue and Quintara Street to West Portal Station would install new transit stops in addition to overhead wires and related infrastructure. No loading spaces would be removed as a result of the overhead wire installation. At this time it is unknown whether the new stops on the route extension would be flag stops or transit zones. However, the streets that the route is likely to operate on are primarily residential with no on-street commercial loading zones. On Taraval Street and closer to West Portal Station for the new terminal, the loading that may be affected would be for new transit zones, which typically require removal of two to five parking spaces. Therefore, commercial loading conditions in these areas would not be substantially affected. Accessible platforms (SCI.1) would result in the elimination of up to six on-street parking spaces, and if any commercial loading spaces were affected, they would likely be relocated nearby; therefore, implementation of accessible platforms would not eliminate commercial loading spaces. Thus, the impact of the program-level Service-related Capital Improvement projects (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) on loading would be less than significant.

Emergency Vehicle Access Impacts. Implementation of the program-level TTPI projects (TTPI.2, TTPI.3, TTPI.4), new overhead wiring (OWE.6) between the current 6 Parnassus terminal at 14th Avenue and Quintara Street and the West Portal Station, and accessible rail platforms (SCI.1) would not eliminate travel lanes nor substantially affect traffic flow, and emergency vehicle access would remain similar to Existing conditions in these locations. Specifically, installation of a transit bulb on Lyon Street, transfer points including bus zones and transit bulbs on Potrero Avenue, and an additional terminal location for the E Embarcadero would not eliminate any travel lanes and would not result in a substantial change from Existing conditions for emergency vehicles. Furthermore, the design of the project elements, such as the transit bulb would be reviewed to ensure that there would not be any impacts on emergency vehicle access. Therefore, the impact of the program-level Service-related Capital Improvements (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) on emergency vehicle access would be less than significant.

Parking Impacts. Implementation of the program-level Service-related Capital Improvements (TTPI.2, TTPI.3, TTPI.4, OWE.6, and SCI.1) would result in the removal of a limited number of parking spaces. Implementation of the Terminal and Transit Point Improvement projects (TTPI.2, TTPI.3, TTPI.4) could result in elimination of one or more on-street parking spaces per improvement, primarily for TTPI.4 on Potrero Avenue between 23rd and 24th Streets. Construction of the new overhead wiring (OWE.6) would not substantially affect the on-street parking supply. New transit stops may be flag stops, requiring no parking removal, or transit zones, which would remove two to five parking spaces in any one location. In addition, the establishment of a new terminal near the West Portal Station for the 6 Parnassus may result in the elimination of up to five on-street parking spaces, depending on the on-street parking conditions at the location of the terminal. However, there would not be a substantial number of lost parking spaces, and parking spaces in other areas, such as along the former terminus, would be added. Construction of accessible platforms (SCI.1) would result in elimination of up to six on-street parking spaces depending on location. Hence, due to the limited amount of parking removal, the impacts on parking as a result of the program-level Service-related Capital improvements would be less than significant.

Program-Level TTRP Proposals

The TEP project would include nine program-level TTRPs, for which specific designs are not yet known, including:

- TTRP.1: 1 California
- TTRP.9: 9 San Bruno/9L San Bruno Limited
- TTRP.22_2: 22 Fillmore
- TTRP.28_2: 28L 19th Avenue Limited
- TTRP.30_2: 30 Stockton
- TTRP.71: 71L Haight-Noriega Limited and 6 Parnassus
- TTRP.K: K Ingleside
- TTRP.L: L Taraval
- TTRP.M: M Ocean View

The TPS Toolkit elements would be utilized to develop the designs for the program-level TTRP proposals. Therefore, once designed, the program-level TTRPs would be similar to the project-level TTRPs or TTRP Variants. Each TTRP would include a combination of the TPS Toolkit elements to address the needs (including reducing transit delay) for that particular Rapid Network corridor.

Impact TR-13: Implementation of any of the TPS Toolkit categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements along the nine program-level TTRP corridors would not result in significant impacts to local or regional transit, pedestrians and bicyclists, emergency vehicle access, or parking. (Less than Significant)

Transit Impacts. Overall, implementation of TPS Toolkit elements on the program-level TTRP corridors would have the beneficial effect of improving conditions for transit, and impacts of the program-level TTRPs on transit, including on any regional transit routes which share the corridor, would be similar to those discussed under Impact TR-7 for the TPS Toolkit elements, and would be less than significant. For example, installing transit bulbs and transit boarding islands, optimizing bus stop lengths, and removing or consolidating stops would have a beneficial effect of improving conditions for transit. Transit travel times and transit delay would be minimized by elements within the category Transit Stop Changes by reducing the number of times transit vehicles stop at intersections and by eliminating the need for buses to exit and re-enter the flow of traffic. Bus zones (i.e., converting flag stops to bus zones) provide bus operators with a clear line-of-sight to see waiting passengers and to pull alongside the curb, thereby improving transit accessibility and passenger convenience.

Implementation of lane modifications along the Rapid Network corridors would similarly have a beneficial effect of improving conditions for transit and minimizing transit delays by providing exclusive transit-only and transit queue jumps that would not be subject to mixed-flow lane delays and by improving overall intersection operations through dedicated turn lanes to minimize impact of congestion on transit. At locations where travel lane reductions would provide for wider mixed-flow lanes (rather than for a transit-only lane), buses would be able to operate at faster travel speeds, and the reduction in friction with vehicles in adjacent lanes would reduce the potential for sideswipe collisions.

Parking and turn restrictions would be implemented to reduce conflicts between transit and vehicles. Left-turn restrictions can reduce transit travel times by preventing turning vehicles from blocking the through-movement of transit vehicles and other traffic. At locations with narrow travel lanes, widening travel lanes by restricting parking and reallocating street space would reduce transit travel times by eliminating the need for buses and other large vehicles to straddle two travel lanes, reducing delays associated with parking maneuvers, and providing additional space for through-moving transit vehicles.

Replacing stop signs with traffic signals can reduce transit travel times by allowing transit vehicles to take advantage of planned transit signal priority improvements that reduce signal delay for approaching transit vehicles. At some intersections that are all-way stop-controlled, the stop signs on the street with transit can be removed to reduce transit travel time by allowing transit vehicles to proceed through intersections without coming to a complete stop.

If any transit routes are located on the cross-streets where stop signs would remain, transit vehicles on the stop-controlled approaches would likely experience an increase in delays, because transit vehicles would need to find a gap in traffic flow on the streets where stop signs would be removed. However, this increase in delay on these non-TTRP corridors would not be considered significant, and the SFMTA would account for this potential delay during development of detailed design of the program-level TTRPs. For example, as discussed in Impact TR-23, as part of the TTRP.N Expanded Alternative, the intersection of Judah Street/23rd Avenue would be converted from an all-way stop-controlled intersection to a two-way stop-controlled intersection where stop signs would be removed from the Judah Street approaches on which the N Judah line runs, and stop signs would be maintained on the 23rd Avenue approaches on which the 16X Noriega Express and 71 Haight-Noriega/71L Haight-Noriega Limited travel in the southbound direction. At the intersection of Judah Street/23rd Avenue, while delay for the side streets subject to stop sign control would increase (i.e., 23rd Avenue) and the LOS would change from LOS B under Existing conditions to LOS E conditions with implementation of the TTRP.N Expanded Alternative, and therefore the 16X Noriega Express and 71 Haight-Noriega/71L Haight-Noriega Limited would experience increased delays, peak hour signal warrants at this intersection would not be met and gaps in traffic would still allow cross-traffic to proceed. Thus, traffic impacts at the intersection of Judah Street/23rd Avenue, and at similar intersections, would not be considered significant.

Pedestrian bulbs at signalized intersections and widened sidewalks can reduce transit travel time by reducing the roadway crossing distance, which can provide some flexibility in traffic signal timing and reduce the likelihood of transit vehicles arriving on a red signal indication. Pedestrian refuge islands can reduce transit travel time by eliminating parking and shifting the travel lanes toward the curb. The bus would then stop in the travel lane, eliminating the need for buses to exit and re-enter the flow of traffic to access curbside transit stops.

Capacity Utilization. Tables 12 and 13, pp. 4.2-122 to 4.2-135, present the ridership and capacity utilization for the various lines and routes affected by the TEP for a.m. and p.m. peak hour conditions, respectively. The capacity utilization on these tables includes the changes that would result from the project-specific improvements analyzed for the 11 project-level TTRPs, for the TTRP Moderate Alternative, the TTRP Expanded Alternative as well as for any TTRP Variants, and estimated improvements that would result from implementation of the TPS Toolkit along the nine program-level TTRPs.[42] During both the a.m. and p.m. peak hours, the capacity utilization for the routes that run along the program-level TTRP corridors (i.e., the 1 California, 1AX California Express, 1BX California Express, 9 San Bruno, 9L San Bruno Limited, 22 Fillmore, 28 19th Avenue, 28L 19th Avenue Limited, 30 Stockton, 45 Union-Stockton, 71L Haight-Noriega, 6 Parnassus, K Ingleside, L Taraval, and M Ocean View) would not exceed the 85 percent capacity utilization standard, with a few

[42] Since publication of the Draft EIR on July 10, 2013, project level designs have been developed for the TTRP.L, TTRP.9 and TTRP.71_1, which were originally analyzed at a program level. Project level analysis is included in the EIR along with the program level analysis provided on EIR pp. 4.2-102 to 4.2-116. This additional information does not identify any new significant impacts or more severe impacts for the TEP.

exceptions (on the TTRP.1, TTRP.71, and TTRP.K corridors). However, these exceedances for these program-level TTRP corridors would not be considered a significant transit impact because nearby routes (such as 1AX and 1BX California Express bus routes, and 16X Noriega Express route) would have capacity that would be available to passengers. Additionally, although capacity utilization in the peak direction of travel in the a.m. and p.m. peak hours would slightly exceed the 85 percent capacity utilization standard in some instances considering the enhanced reliability potential, it would still be an improvement (reduction) as compared to Existing conditions (which range from 86 to 90 percent). In addition, if the TEP project were to be approved, at the time of implementation of the project-level Service Improvements or Service Variants and TTRPs as well as the program-level TTRPs, the SFMTA would reevaluate key factors, including annual ridership, vehicle availability, and resource availability. Based on this information, the SFMTA may need to make minor modifications to the Service Improvements or Service Variants. Therefore, while the specific service plan described in Section 2.5.2.1, pp. 2-57 to 2-102, and included as part of the program-level and project-level TTRP analyses, is based on current conditions and best available information, the SFMTA would likely make minor adjustments in the service plan over time, pursuant to current practice, in order to minimize their threshold capacity exceedance to the greatest extent possible. Therefore, the impact of implementation of the program-level TTRP proposals on transit capacity and operations would be less than significant.

Pedestrian Impacts. Implementation of TPS Toolkit elements along the program-level TTRP corridors would not result in overcrowded sidewalks or create potentially hazardous conditions for pedestrians. Removing or consolidating transit stops (for example, as proposed for project-level TTRP.8X Moderate Alternative and TTRP.8X Expanded Alternative) would increase the distance between stops, which could increase the physical effort required to reach transit relative to Existing conditions for some transit riders and as such, may pose an inconvenience to them. However, transit stop removal or consolidation would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas. Overall stop spacing would be consistent with SFMTA's *Proposed Revisions to Transit Stop Spacing Guidelines*.[43] Converting flag stops to bus zones (for example, as proposed for project-level TTRP.8X Moderate Alternative and TTRP.8X Expanded Alternative) can improve pedestrian conditions by allowing passengers to be picked up and dropped off at the curb adjacent to the sidewalk instead of in the street.

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[43] SFMTA, *Proposed Revisions to Transit Stop Spacing Guidelines*, February 16, 2012. This report is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

At uncontrolled intersections and two-way stop-controlled intersections that require only vehicles on the street without transit to stop, intersection safety and/or pedestrian access to transit stops would be improved with added right-of-way controls provided by a traffic signal (for example, as proposed for project-level TTRP.J Moderate Alternative), and new traffic signals would include pedestrian countdown signals and marked crosswalks at the intersection.

At all-way stop-controlled intersections, where stop signs on the streets with transit would be removed, other traffic calming measures could be installed. Traffic calming measures that could be implemented with the intersection control changes include pedestrian refuge islands (for example, as proposed for project-level TTRP.N Moderate Alternative and TTRP.N Expanded Alternative), pedestrian or transit bulbs (for example, as proposed for project-level TTRP.28_1 Moderate Alternative and TTRP.28_1 Expanded Alternative), speed humps, median extensions through an intersection, flashing beacons, parking restrictions to improve sight distance, and enhanced crosswalk markings and signs. Such measures would generally improve crossing conditions for pedestrians, by slowing traffic and reducing right-of-way conflicts between pedestrians and other traffic. These elements would be included to facilitate safe and easy pedestrian crossings across streets where traffic no longer has to stop at a stop sign.

Pedestrian crossings at traffic circles with crosswalks (for example, as proposed for project-level TTRP.5 Expanded Alternative on McAllister Street) with either two-way stop-control or uncontrolled (i.e., yield) operations would be similar to pedestrian conditions at unsignalized intersections, where pedestrians have the right-of-way, and vehicles at either approach are required to stop and yield to pedestrians. However, removal of stop signs generally can make it more difficult for pedestrians to cross the street because moving vehicles are less likely to yield to pedestrians. In certain situations, the turning radii of vehicles around the circle may encroach on crosswalks, depending on the location of the existing crosswalks. In the design of these elements, the SFMTA sets crosswalks back from the intersections, as needed, to eliminate these potential encroachments.

Pedestrian refuge islands would improve pedestrian safety by increasing pedestrian visibility and minimizing pedestrian exposure to vehicular traffic. Transit bulbs and pedestrian bulbs would improve pedestrian safety by shortening the street crossing distance, improving the pedestrian visibility, reducing the speed of turning traffic, and providing additional space for pedestrian queuing. These elements would enhance pedestrian visibility and provide safer access to transit for pedestrians. Sidewalk widening (for example, as proposed for project-level TTRP.22_1 Expanded Alternative) would improve pedestrian conditions by providing additional pedestrian space and space for transit shelters. Lane modifications (for example, as proposed for project-level TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate

Alternative Variant 2, and TTRP.14 Expanded Alternative) would not substantially affect pedestrian travel. Turn restrictions (for example, as proposed for project-level TTRP.22_1 Moderate Alternative and TTRP.22_1 Expanded Alternative) would reduce potential for conflicts between turning vehicles and pedestrians at intersections.

Bicycle Impacts. Implementation of TPS Toolkit elements along the program-level TTRP corridors would not directly affect bicycle facilities because the majority of the proposed TTRP segments are not designated bicycle routes (or only overlap bicycle routes in certain one-to-two-block segments, [which could range from 300 to as much as 2,000 feet]) and do not have existing bicycle lanes. In general, implementation of the program-level TTRPs would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility. Removal/consolidation of stops, relocation of stops, optimization of transit stop lengths, installation of transit bulbs or the conversion of flag stops to bus zones would not affect existing bicycle facilities. The impact on bicyclists on streets where transit bulbs would be implemented adjacent to a bicycle lane (for example, as may be proposed for program-level TTRP.9, which could potentially include transit bulbs on Potrero Avenue that currently has bicycle lanes in both directions) would be similar to Existing conditions when buses travel across the bicycle lane to a curbside bus zone. However, in this case, the bus would be stopped within the bicycle lane, and bicyclists would be able to pass the bus, conditions permitting, or would, similar to vehicle traffic, need to wait behind the bus. Implementation of transit bulbs adjacent to bicycle lanes would not reduce conflicts between buses and bicyclists; however, transit-bicycle conflicts would not substantially increase over Existing conditions.

Turn restrictions (such as along Mission Street as part of the proposed project-level TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, and TTRP.14 Expanded Alternative, or at the intersections of Church/15th streets and Church/16th streets as proposed for the TTRP.J Expanded Alternative) would reduce the potential for conflicts between turning vehicles and bicyclists. At locations where on-street parking adjacent to the bicycle lane would be removed, bicyclists would benefit as the potential for conflicts between drivers parking their vehicles and bicyclists would decrease. Pedestrian bulbs would not extend beyond the width of a parking lane and would therefore not impede a bicycle lane or bicycle travel within a mixed-flow lane. Pedestrian refuge islands would be constructed within a median and would not affect bicycle lanes or bicycle travel within a mixed-flow lane. Sidewalk widening would be accomplished by removing the parking lane or through mixed-flow lane removal (for example, along 16th Street as part of proposed TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, and TTRP.22_1 Expanded Alternative Variant 2), and therefore, would not affect bicycle lanes or bicycle travel.

At locations where on-street parking adjacent to the bicycle lane would be removed, bicyclists would benefit as the potential for conflicts between drivers parking their vehicles and bicyclists would decrease. On streets with two lanes in each direction and no bicycle lane, conversion of one mixed-flow lane to a transit-only lane (for example, on Mission Street under TTRP.14 Expanded Alternative) would increase the number of vehicles in the remaining mixed-flow lane. Bicyclists would therefore need to share the mixed-flow lane with more vehicles, which could result in an increase in vehicle-bicycle conflicts. However, conditions for bicyclists in these shared mixed-flow lanes would be similar to other streets throughout San Francisco and would not be considered a traffic hazard for bicyclists.

Conversion of all-way stop-controlled intersections to two-way stop-controlled would reduce the frequency with which bicyclists travelling in the uncontrolled direction would have to stop and restart, which would be an improvement for bicyclists. Bicyclists on the street where stop signs would remain would experience longer delays, similar to vehicular traffic, as they would be required to yield to oncoming traffic. With the conversion of all-way stop-controlled to uncontrolled (i.e., yield) with a traffic circle (for example, traffic circles proposed at six intersections on McAllister Street as part of project-level TTRP.5 Expanded Alternative), bicyclists would be required to yield to vehicles and other bicyclists in the intersection, and similar to vehicles, could have similar delay traveling through the intersection.

Emergency Vehicle Access Impacts. Implementation of TPS Toolkit elements along the program-level TTRP corridors would not substantially affect traffic flow or change the ability of emergency service providers to travel along the program-level TTRP corridors or access adjacent land uses. Implementation of project-level TTRPs that convert mixed-flow lanes to transit-only lanes were found to increase overall intersection delay due to reduction in capacity for mixed-flow vehicles; however, right-of-way widths on these corridors would allow vehicles to safely pull over to allow emergency vehicles to pass. With implementation of transit-only lanes, emergency vehicle providers may adjust travel routes to respond to incidents; however, emergency vehicle access along the TTRP corridors would not be substantially affected. Emergency vehicles would be permitted full use of any transit-only lanes, and would not be subject to turn restrictions. Widened travel lanes would facilitate emergency vehicle access, specifically for large fire and rescue vehicles. The design of traffic circles, pedestrian bulbs, and pedestrian refuge islands would be reviewed by the SFFD to make sure that they meet all applicable standards and to ensure that emergency vehicle access is maintained. If needed, fire and rescue vehicles would be able to mount the traffic circle as they travel through the intersection.

Furthermore, regardless of the number of travel lanes on a street, all drivers must comply with the California Vehicle Code § 21806, which requires that drivers yield right-of-way to authorized emergency vehicles, drive to the right road curb or edge, stop, and remain stopped until the emergency vehicle has passed. Therefore, implementation of the TPS Toolkit elements along program-level TTRP corridors, including widening travel lanes through lane reductions and implementing transit-only lanes and traffic circles, would not substantially affect emergency vehicle access.

- Impact assessment of the 11 project-level TTRP proposals analyzed in Impact TR-20 through Impact TR-58 did not identify any significant impacts on pedestrians, bicyclists, and emergency vehicle access. Because similar elements would be proposed and similar transportation network conditions exist for the program-level TTRPs, the impact of the program-level TTRP proposals on pedestrians, bicyclists, and emergency vehicle access would be less than significant.

Parking Impacts. Implementation of the TPS Toolkit elements along the nine program-level TTRP corridors would not result in an increase in parking demand. Implementation of some of the TPS Toolkit elements along the TTRP corridors could result in elimination of on-street parking spaces. For example, implementation of transit-only lanes through part-time peak period tow-away or permanent curbside parking restrictions would result in parking losses. Based on the SFMTA's experience, the loss of parking spaces for other TPS Toolkit elements would range from no spaces removed (for example, left turn restrictions) to the loss of up to ten parking spaces along routes with center-running transit, and new transit boarding islands. Additionally, up to five spaces would be removed for installation of new transit stops. The parking spaces that would be displaced due to part-time (for example, implementation of tow-away parking restrictions) and permanent loss of parking spaces may or may not be accommodated on other nearby streets or within 1/2 mile of the parking removal, which if parking utilization is high, could result in increased competition for remaining on-street and off-street parking supply. However, even if replacement parking cannot be provided or parking demand is high along the TTRP corridors, these TTRP corridors are well served by transit, as well as other modes, and improvements to transit and pedestrian conditions would occur as a result of the proposed project. At some locations, drivers and passengers would have to walk further between their parking space and destination, or switch to transit or other modes. By design, the TTRPs would be implemented on the Rapid Network and therefore, land uses along these corridors are well served by transit. The TTRP proposals would encourage transit use through the reduction of transit travel time and increase in transit reliability, which may further lead to a mode shift from private passenger vehicles to transit. These corridors already accommodate pedestrians, and bicycle facilities are often located on nearby streets. Although the loss of parking along these corridors as a result of the installation of some TPS Toolkit elements, particularly Lane Modifications (for example, transit-only lanes or lane reductions), Parking and Turn Restrictions, and Pedestrian Improvements categories, could be high, the loss would, in most cases, be distributed along the length of the affected corridor. In locations where the decrease in the on-street parking supply as a result of the program-level TTRPs is substantial, it would not be expected to create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles. Specifically, while finding alternate parking locations could be difficult, the change in parking conditions is not expected to create hazardous conditions such as consistent blockage of sidewalks and travel lanes or queue spillage from existing off-street parking facilities. Hence, the impact as a result of the program-level TTRPs related to parking supply would be considered less than significant.

It is important to note that under Existing conditions, collision rates, on average, are higher on Rapid Network streets, where TTRPs are proposed, than those along corridors that are parallel to the TTRPs; this is particularly the case with sideswipe collisions for transit and private vehicles that occur as a result of narrow travel lanes (9 feet).[44] The TTRP projects are anticipated to improve these conditions with widened travel lanes. Thus, while removal of parking may result in some conflicts due to double parking and vehicles blocking driveways or bicycle lanes, the proposed project may also reduce collisions due to widened travel lanes that reduce friction between transit vehicles and other vehicles.

Impact TR-14: Implementation of TPS Toolkit elements within the following categories: Lane Modifications and Pedestrian Improvements, along the program-level TTRP corridors may result in significant traffic impacts. (Significant and Unavoidable with Mitigation)

In general, implementation of most of the TPS Toolkit elements would not affect intersection operations. However, similar to the discussion under Impact TR-8 for the TPS Toolkit analysis, implementation of elements within TPS Toolkit categories Lane Modification (i.e., establish transit-only lanes, establish transit queue jumps, establish dedicated turn lanes, and widen turn lanes through lane reductions) and Pedestrian Improvements (i.e., install pedestrian refuge islands, install pedestrian bulbs, and widen sidewalks) that reduce capacity for mixed-flow traffic flow may result in significant traffic impacts.

According to the SFMTA, transit-only lanes would be implemented on streets that have two or more mixed-flow lanes in each direction or where an additional travel lane could be created with curbside parking restrictions. Therefore, transit-only lanes may result in some diversion to other parallel streets, depending on several factors: such as the length of the transit-only lane; whether implementation of the transit-only lane reduces capacity for mixed-

[44] Tanner, Britt, 2013. SFMTA analysis using Crossroads/SWITRS Database. Collisions gathered from Crossroads Software's Traffic Collision Database on 6/26/13 for time period between 11/1/2006 and 10/31/2011 for each street between 14th and Cesar Chavez, including intermediate and limit intersections. Crossroads uses SWITRS (Statewide Integrated Traffic Records System) data which is maintained by the California Highway Patrol. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission St, Suite 400, as part of Case File No. 2011.0558E.

flow traffic (for example, if only a parking lane is converted into a transit-only lane, vehicle capacity for mixed-flow traffic is retained); the traffic volumes on the rapid network street; and the availability of other parallel vehicle routes. At some intersections, implementation of transit-only lanes, widening travel lanes through lane reductions, and widening travel lanes through parking restrictions (for example, as proposed in TTRP.14 Moderate Alternative Variant 1 or TTRP.14 Moderate Alternative Variant 2 on the segment between 13th and Cesar Chavez streets) would result in reduced vehicle capacity and intersections operations worsening from LOS D or better to LOS E or LOS F, worsening from LOS E to LOS F, or worsening the v/c ratio substantially at intersections currently operating at LOS E or LOS F conditions, which would be considered a significant traffic impact. Typically transit queue jumps are implemented in combination with other TPS Toolkit elements such as transit-only lanes (for example, as proposed in project-level TTRP.8X Moderate Alternative and TTRP.8X Expanded Alternative at the intersection of Geneva Avenue/I-280 Northbound On-ramp), and, although it is a change to traffic operations, the impact of the change in signal cycle would not substantially affect operating conditions. Dedicated turn lanes/pockets are implemented to reduce overall intersection delay and therefore would improve intersection operations.

Implementation of the TPS Toolkit category Pedestrian Improvements, which includes pedestrian bulbs and sidewalk widening, would primarily occur within the curb parking lane. Therefore, implementation of sidewalk extensions/pedestrian bulb would not affect the adjacent travel lanes and traffic operations (for example, as proposed in project-level TTRP.J Moderate Alternative and TTRP.J Expanded Alternative at intersections along Church Street) and the impact on travel lanes and traffic operations would be less than significant. However, on some streets with multiple travel lanes, it may be desirable to widen sidewalks by eliminating or narrowing a travel lane and reallocating the right-of-way to sidewalks. The impact of the lane reduction would depend on the total number of travel lanes and the traffic volume demand. At roadway segments and intersections operating at or near capacity, travel lane reductions could result in significant impact on traffic operations. Therefore, the impacts of the application of TPS Toolkit categories Lane Modifications and Pedestrian Improvements for the program-level TTRP corridors on traffic operations would be significant.

As described above, implementation of some elements of the TPS Toolkit categories Lane Modifications and Pedestrian Improvements could reduce the overall mixed-flow capacity of the roadway and thus, increase the level of vehicular delay at intersections along the affected corridors. On certain program-level TTRP corridors, excess mixed-flow travel lane capacity is available and, while taking away mixed-flow capacity could increase overall delay, the intersection LOS would remain acceptable (i.e., LOS D or better). On other TTRP corridors, however, reducing mixed-flow travel lane capacity could increase or exacerbate delay such that the intersection LOS becomes unacceptable (LOS E or LOS F), or could substantially worsen existing LOS E or LOS F conditions. To the extent that the implementation of transit-only lanes and the widening of mixed-flow lanes as well as the widening of sidewalks would deteriorate intersection LOS, these elements would result in a significant traffic impacts. Such impacts could potentially occur at, but not be limited to the following 28 intersections on the program-level TTRP corridors[45]:

- TTRP.1: California/Arguello, California/Park Presidio, California/Cherry, California/Locust, California/Presidio, and California/Divisadero
- TTRP.9: Potrero/Division, Potrero/16th, Potrero/17th, Potrero/21st, Potrero/23rd, Potrero/24th, Potrero/25th, Jerrold/Bayshore/U.S. 101 Northbound On-ramp, Bayshore/Oakdale, Bayshore/Industrial, and Bayshore/Silver
- TTRP.22_2: Fillmore/Lombard
- TTRP.71: Haight/Masonic, Stanyan/Haight, Stanyan/Frederick
- TTRP.K: Ocean/Junipero Serra, Ocean/Geneva/Phelan, Ocean/Lee, Ocean/Miramar, Ocean/Brighton
- TTRP.L: Taraval/19th, Taraval/Sunset

Implementation of Mitigation Measure M-TR-8: Optimization of Intersection Operations, which would optimize intersection geometries and traffic control measures to the greatest extent feasible when developing detailed design of the TTRP proposals, would minimize or reduce traffic impacts at intersections, including those listed above, and along roadway segments. However, because this mitigation measure may not be adequate to mitigate intersection operations to less-than-significant levels, and because the feasibility of providing additional capacity is unknown nor is it always possible to optimize the intersection such that LOS falls below LOS E, the impact of TPS Toolkit categories Lane Modifications and Pedestrian Improvements on traffic operations for the program-level TTRP corridors would remain significant and unavoidable.

Impact TR-15: Implementation of any TPS Toolkit elements within the following categories: Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, along the program-level TTRP corridors would not result in significant traffic impacts. (Less than Significant)

[45] The potentially impacted intersections along the program-level TTRP corridors were selected in consultation with SFMTA, based on transportation judgment and knowledge of the traffic operating conditions along these corridors.

Similar to the discussion under Impact TR-9 in the TPS Toolkit analysis, implementation of TPS Toolkit category Transit Stop Changes, which would include the installation of transit bulbs and transit boarding islands, would not remove any travel lanes nor substantially affect existing peak hour intersection operations at nearby intersections. On Rapid Network streets with one mixed-flow lane (for example, Fillmore Street on the 22 Fillmore Rapid Network route) where transit bulbs may be installed, vehicles would be delayed as the bus stops in the mixed-flow lane to pick up and drop off passengers at the transit bulb. However, the increased delay would only occur when a bus is present at the bus stop and may not result in additional delays over Existing conditions at locations where buses currently do not fully access the bus stop. Therefore, the increased delay would not substantially affect overall peak hour intersection operations. Optimizing/lengthening transit zones, consolidating bus stops, and converting flag stops to bus zones would not reduce mixed-flow lane capacity and would only minimally change intersection operations.

Similar to the discussion under Impact TR-9 in the TPS Toolkit analysis, TPS Toolkit categories Traffic Signal and Stop Sign Changes (for example, installing traffic signals at uncontrolled, two- or all-way stop-controlled intersections or replacing all-way stop-controls with traffic calming measures at intersections) and Parking and Turn Restrictions (for example, implement turn restrictions, or widen travel lanes through parking restrictions) would not impact intersection operations. Turn restrictions at intersection approaches (for example, as proposed in project-level TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, and TTRP.14 Expanded Alternative) would enhance overall intersection capacity, improve transit and traffic flow, and reduce the potential for conflicts between turning vehicles and traffic, bicycles, and pedestrians.

Signalization of stop-controlled intersections with higher traffic volumes would generally reduce overall intersection delay (for example, as proposed in project-level TTRP.N Moderate Alternative and TTRP.N Expanded Alternative at the intersection of Judah Street and 18th Avenue). Conversion of all-way stop-controlled intersections to two-way stop-controlled with additional traffic calming measures (for example, as proposed in project-level TTRP.J Expanded Alternative at intersections along Church Street) may result in lower vehicle speeds and increased delay on the streets subject to stop controls because vehicles, including transit (if present), would need to find a gap in traffic flow on the streets where stop signs would be removed. However, the increase in side-street delay subject to stop sign controls would not be substantial and side streets would continue to operate at acceptable conditions. In some instances, side street delay may increase substantially or operate at unacceptable conditions (LOS E or F), but even with that level of delay, peak hour signal warrants would not be met. Therefore, impacts to similar intersections along the program-level corridors would be considered less than significant. Conversion of all-way stop-controlled intersections to two-way stop-control intersections would generally be made at locations where traffic signal warrants would not be met, and therefore the conversion of all-way to two-way stop-controlled would result in less-than-significant traffic impacts, even if approach delays increased, or operate at LOS E or LOS F conditions.[46]

Implementation of traffic circles as part of conversion of all-way stop-controlled intersections to two-way stop-controlled intersections with stop signs removed on the street with transit would reduce delays on the street without stop signs, and could delay the stop-controlled approaches, as they would be required to wait for a gap in traffic to proceed. Implementation of traffic circles as part of conversion of all-way stop-controlled intersections to uncontrolled (i.e., yield) could increase delays at all approaches, depending on the level of traffic volumes, as drivers would need to yield right-of-way to vehicles traveling counterclockwise around the circle before entering the intersection. Vehicle delay could also be similar to existing levels. Depending on the curb-to-curb width of the intersecting streets, the distance from corner to corner may be too small for left-turning larger trucks to circulate counterclockwise, even if the traffic circles include a mountable apron, and instead trucks would need to make left turns in front of the traffic circle. This condition would not be considered a potential traffic hazard since due to the City's typically narrow streets, trucks often encroach on opposing travel lanes throughout San Francisco, traffic and truck volumes on such streets are generally low, and since the design of the traffic circle would be required to meet DPW design specifications for this feature. Additionally, there are other intersections in San Francisco with similar designs.

Other traffic calming measures that could be implemented with the intersection control changes include: pedestrian refuge islands, pedestrian or transit bulbs, speed humps, median extensions through an intersection, flashing beacons, parking restrictions to improve sight distance, and enhanced crosswalk markings and signs. When implemented as part of Traffic Signal and Stop Sign Changes, traffic calming measures would typically be implemented within the curb parking lane (for example pedestrian bulbs) or across a roadway (for example, speed humps), and therefore, their implementation would not substantially affect the adjacent travel lanes and traffic operations.

Therefore, the impacts of TPS Toolkit categories Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes as applied to the program-level TTRP corridors on traffic operations would be less than significant.

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[46] As indicated in Section 4.2.4.1 on pp. 4.2-21 to 4.2-22, the operational impacts on unsignalized intersections are considered significant if project-related traffic causes the level of service at the worst approach to deteriorate from LOS D or better to LOS E or LOS F and peak hour signal warrants would be met, or would cause peak hour signal warrants to be met when the worst approach is already operating at LOS E or LOS F.

Impact TR-16: Implementation of the following TPS Toolkit categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements, along the program-level TTRP corridors may result in significant loading impacts. (Significant and Unavoidable with Mitigation)

Similar to the analysis under Impact TR-10 for the TPS Toolkit analysis, implementation of the TPS Toolkit categories Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements along the program-level TTRP corridors would not generate additional loading demand. However, some TPS Toolkit elements (for example, transit bulbs, transit boarding islands, transit-only lanes, widening of travel lanes, optimization of bus stops, and sidewalk extensions) would have the potential to remove or relocate on-street parking, which may include on-street commercial loading spaces. Parking restrictions on streets where on-street commercial loading spaces are located would limit loading access to hours outside of the parking restriction. While this may be an inconvenience for trucks due to limited delivery times, it would not be considered a significant impact on commercial loading activities. At locations where construction of sidewalk extensions and pedestrian bulbs would occur within the curb parking lane and on-street parking is removed, some commercial loading spaces may be removed. The removal of a single commercial loading space would not be considered a significant impact because other commercial loading spaces would remain in the nearby vicinity. However, the removal of multiple commercial loading spaces could reduce the overall loading supply such that loading activities could not be accommodated within convenient on-street commercial loading zones and such that the loss of commercial loading zones could also result in or worsen double-parking within the transit-only lane, mixed-flow lane, or bicycle lane, and such double-parked vehicles would result in increased interference with vehicular and bicycle flow. The project-level TTRP analysis is illustrative of the potential for commercial loading impacts to occur as a result of the program-level TTRPs. For example, the Moderate and Expanded Alternatives proposed for project-level TTRP.J and TTRP.28 would not affect any on-street commercial loading spaces; the Moderate and Expanded Alternatives proposed for TTRP.N, TTRP.5, and TTRP.8X would relocate commercial loading spaces within 250 feet of the location impacted; and under the proposed TTRP.14 Moderate Alternative Variants 1 and 2, TTRP.14 Expanded Alternative, and the Moderate and Expanded Alternatives proposed for TTRP.30, some of the affected commercial loading spaces could not be relocated within 250 feet and the loss of this commercial parking would be in locations where double parking and conflicts with vehicular, transit and bicycle traffic could occur. Therefore, overall impacts on commercial loading for these TTRPs were determined to be significant. Because the design of the program-level TTRPs and potential impact to on-street loading conditions (i.e., potential removal of commercial loading spaces and feasibility of relocating within 250 feet) is not known, the loading impact as a result of the program-level TTRPs could be similar to those identified under the project-level TTRP corridors, and would therefore, similarly be considered a significant impact.

With implementation **of Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces**, the impact of program-level TTRPs on commercial loading operations would be reduced. While in many situations providing on-street loading spaces elsewhere on the block or around the corner would not present any challenges, replacement may not always be possible due to conditions such as existing parking prohibitions or lack of availability of general on-street spaces that could be converted to loading spaces. Therefore, because the feasibility of providing replacement commercial loading spaces of similar length on the same block and side-of-the-street or within 250 feet on adjacent side streets cannot be assured in every situation where commercial loading spaces may be removed as a result of TTRPs, the impact of the program-level TTRPs on loading operations would remain significant and unavoidable.

Impact TR-17: Implementation of any of the TPS Toolkit elements within the category Traffic Signal and Stop Sign Changes along the program-level TTRP corridors would not result in significant loading impacts. (Less than Significant)

Implementation of the TPS Toolkit category Traffic Signal and Stop Sign Changes would not result in an increase in loading demand. Signalization of intersections would not remove existing commercial loading spaces, and therefore, would not have an effect on commercial loading/unloading activity occurring at the curb on these streets or other streets in the project vicinity. Implementation of traffic calming measures (for example, pedestrian bulbs, enhanced crosswalk markings and signs, and traffic circles) would generally not affect on-street commercial loading spaces. Implementation of traffic circles would require a red zone of a minimum of 20 feet on both sides of the street at each approach of the intersection. If an existing commercial loading space is located within the red zone, as part of the design of the traffic circle, it would be relocated farther from the intersection and loading operations would not be affected. Therefore, the impact of Traffic Signal and Stop Sign Changes on loading operations would be less than significant.

Implementation of traffic calming measures (for example, pedestrian bulbs, enhanced crosswalk markings and signs, and traffic circles) would generally not affect on-street commercial loading spaces. While the CA MUTCD optionally recommends a 20-foot red zone on all approaches of an intersection, the implementation of traffic circles would require a red zone of a minimum of 20 feet on both sides of the street at each approach of the intersection. If an existing commercial loading space is located within the red zone, as part of the design of the traffic circle, it would be relocated farther from the intersections and loading operations would not be affected. Therefore, the impact of Traffic Signal and Stop Sign Changes on loading operations would be less than significant.

4.2.4.6 PROJECT-LEVEL TEP IMPROVEMENTS ANALYSIS

This section presents the assessment of transportation impacts resulting from implementation of the project-level components of the TEP, including the Service Improvements and Service Variants, project-level Service-related Capital Improvements and Service-related Capital Improvement Variants, and project-level TTRPs and TTRP Variants. Because some of the TEP components would result in minimal impacts to the transportation network, in certain instances, the impact discussion of overlapping issues is grouped together (for example, pedestrian and bicycle impacts). The impact assessment of the Service Improvements and Service Variants is presented by route, and where one or more routes are reconfigured to replace or supplement an existing route, the impact assessment for these routes is presented together. All changes to service headways of the lines/routes are included in the impact analysis of the Service Improvements and Service Variants (i.e., Existing plus Service Improvements only conditions) and TTRP proposals (Existing plus Service Improvements and the TTRP Moderate Alternative or Expanded Alternative including TTRP Variant conditions). The following are impacts statements associated with the project-level TEP components.

- Service Improvements and Service Variants: Impact TR-18
- Service-related Capital Improvements and Service-related Capital Improvement Variants: Impact TR-19
- TTRPs (Moderate or Expanded Alternatives including TTRP Variants): Impacts TR-20 through TR-58

Because the TTRP Moderate Alternative and the TTRP Expanded Alternative proposals, which include some Variants, are analyzed at an equal level, separate impact statements are provided for each. In addition, where the TEP component results in a less-than-significant impact related to a transportation topic (i.e., transit, traffic, pedestrians, bicyclists, loading, emergency vehicle access, and/or parking), the impact discussion is combined into one impact statement (for example, the Service Improvements and Service Variants would have less-than-significant impacts on all elements of the transportation analysis noted above, and therefore, discussion of all Service Improvements and Service Variants is included in one impact statement - Impact TR-18).

Service Improvements and Service Variants

The SFMTA is proposing to add up to 380,000 service hours on an annual basis as part of the proposed Service Improvements or Service Variants, which are anticipated to take effect between 2015 and 2019, pending resource availability. A description of the proposed Service Improvements and Service Variants is included in Section 2.5.2.1, pp. 2-57 to 2-102 of this document, and where the discussion references the Service Improvements as a category, the Service Variants are assumed to be included in the analysis and conclusions because the Service Variants represent a minor change to the Service Improvements. What is proposed by the Service Variants are similar types of changes as the Service Improvements and therefore, are encompassed by the analysis of the Service Improvements. In general, Service Improvements that only affect the headway between buses (for example, a change from 20 minutes to 15 minutes, or approximately a change from three buses per hour to four buses per hour), would result in a minor change in the number of transit vehicles that would be traveling on a route, and would not result in a noticeable effect on the transportation network. Therefore, the discussion below focuses on those routes that may exceed the 85 percent capacity utilization standard under Existing and/or Existing plus Service Improvements conditions, and on Service Improvements that would alter or modify routes or change vehicle types.

The proposed Service Improvements or Service Variants would also introduce transit service onto streets that did not previously have transit running on them. Streets where transit would be introduced include the following:

- The M Ocean View light rail line would enter Parkmerced via Crespi Drive, travel along a new surface street that will be constructed during the redevelopment of Parkmerced, and exit via a new surface street near the intersection of 19th Avenue/Junipero Serra Boulevard.

- The 1BX California "B" Express route would travel on the following roadways that currently do not have any transit service: California Street between Fillmore and Gough streets and Gough Street between California and Bush streets.

- The 6 Parnassus route would travel on the following roadways that currently do not have any transit service: Ulloa Street between Claremont Boulevard and Lennox Way, Lennox Way between Ulloa and Taraval streets, Claremont Boulevard between Ulloa and Taraval streets, Taraval Street between 14th Avenue and Claremont Boulevard, 14th Avenue between Quintara and Santiago streets, and Stanyan Street between Parnassus and Frederick streets.

- The 10 Sansome route would travel on the following roadways that do not currently have any transit service: Fourth Street from Channel to Long Bridge streets, Long Bridge Street between Fourth and Seventh streets, Seventh Street between Mission Bay Boulevard and Irwin Street, Irwin Street between Seventh and 16th streets, 16th Street between Irwin and Connecticut streets, and Connecticut Street between 16th and 17th streets.[47] Weekend and evening service on the 10 Sansome bus line would include service on Franklin Street between Pacific Avenue and Jackson Street and on Pacific Avenue between Franklin Street and Van Ness Avenue.

- The 11 Downtown Connector route would travel on the following roadway that does not currently have any transit service: Bay Street from Van Ness Avenue to Polk Street.
- The 17 Parkmerced route would travel on the following roadways that do not currently have any transit service: Font Boulevard from Lake Merced Boulevard to Arballo Drive, Chumasero Drive from Font Boulevard to Brotherhood Way, Brotherhood Way between the 19th Avenue on- and off-ramps and Lake Merced Boulevard, John Daly Boulevard from Junipero Serra Boulevard to Lake Merced Boulevard, and Lake Merced Boulevard from John Daly Boulevard to John Muir Drive.
- The 18 46th Avenue route would travel on the following roadways that do not currently have any transit service: 36th Avenue between Yorba Street and Sloat Boulevard, Yorba Street between Sunset Avenue and 36th Avenue, southbound ramp from Sloat Boulevard to Sunset Avenue, and northbound ramp from Sloat Boulevard to Sunset Avenue.
- The 19 Polk route would travel on the following roadway that does not currently have any transit service: Polk Street from Eddy Street to McAllister Street.
- The 22 Fillmore route would travel on the following roadways that do not currently have any transit service: 16th Street between Kansas and Third streets, Mission Bay Boulevard North and South between Third and Fourth streets, and Fourth Street between Mission Bay Boulevard North and South. The 22 Fillmore Variants 1 and 2 route would travel on 15th Street between Valencia and Mission streets and on Valencia Street between 15th and 16th streets.
- The 23 Monterey route would travel on the following roadways that do not currently have transit any service: Oakdale Avenue between Toland and Industrial streets, Industrial Street between Oakdale and Palou avenues, and Palou Avenue between Industrial and Selby streets.
- The 27 Folsom route would travel on the following roadways that do not currently have any transit service: Leavenworth Street between Jackson and Vallejo streets, Vallejo

[47] This is the 10 Townsend route, renamed to reflect the route's proposed realignment as described in Table 8 of the Project Description on p. 2-74.

Street between Leavenworth Street and Van Ness Avenue, and Green Street between Van Ness Avenue and Polk Street. The 27 Folsom Service Variant route would include transit service on Harrison Street between 11th and Cesar Chavez streets.

- The 28L 19th Avenue Limited route would travel on the following roadways that do not currently have any transit service: Alemany Boulevard between Geneva and Niagara avenues, Brotherhood Way between Chumasero Drive and Alemany Boulevard, Niagara Avenue between Mission Street and Alemany Boulevard, Paris Street between Geneva Boulevard and Rolph Street, and Rolph Street between Paris Street and Naples Avenue.

- The 29 Sunset route would travel on the following roadway that does not currently have any transit service: Persia Avenue between Ocean Avenue and Mission Street.

- The 32 Roosevelt route would travel on the following roadways that do not currently have any transit service: Sanchez Street between Market and 14th streets, Frederick Street between Cole and Clayton streets and Clayton Street between Parnassus Avenue and Ashbury Street.

- The 33 Stanyan route would travel on the following roadways that do not currently have any transit service: Valencia Street between 18th and 16th streets, Guerrero Street between 18th and 16th streets, 16th Street between De Haro and Connecticut streets, and Connecticut Street between 16th and 17th streets.

- The 35 Eureka route would travel on the following roadways that do not currently have any transit service: 21st Street between Eureka and Douglass streets, Arlington Street between Bosworth and Wilder streets, Wilder Street between Diamond and Arlington streets, Bemis Street between Addison and Miguel streets, Miguel Street between Bemis and Arlington streets, and Arlington Street between Miguel and Bosworth streets.

- The 37 Corbett route would travel on the following street that does not currently have any transit service: Sanchez Street between Market and 14th streets, and Frederick Street between Clayton and Cole streets.

- The 43 Masonic route would travel on the following roadways that do not currently have any transit service: Gorgas Avenue between Doyle Drive and Richardson Avenue, Lincoln Boulevard between Presidio Boulevard and Halleck Street, Halleck Street between Lincoln Boulevard and Doyle Drive, and Frederick Street between Clayton and Cole streets.

- The 47 Van Ness route would travel on the following roadways that do not currently have any transit service: South Van Ness Avenue between Mission and 13th streets, 13th Street between South Van Ness Avenue and 11th Street, and Division Street between Potrero Avenue and Townsend Street.

- The 48 Quintara-24th route would travel on the following roadways that do not currently have any transit service: Douglass Street between 24th and Clipper streets, and Clipper Street between Douglass Street and Grandview Avenue.

- The 54 Felton route would travel on the following roadways that do not currently have any transit service: Bacon Street between Holyoke and University streets, Ingalls Street between Palou and Revere avenues and between Oakdale and La Salle avenues, and Persia Street between Paris Street and Naples Avenue.

- The 56 Rutland route would travel on the following roadways that do not currently have any transit service: Rutland Street between Wilde and Tioga avenues, and Leland Avenue between Sawyer and Rutland streets.

- The 58 24th Street route would travel on the following roadway that does not currently have any transit service: Clipper Street between Diamond and Castro streets.

Impact TR-18: Implementation of the Service Improvements or Service Variants would not result in significant impacts to local or regional transit, traffic operations, pedestrians and bicyclists, loading, emergency vehicle access, or parking. (Less than Significant)

Tables 12 and 13 present the Existing conditions and Existing plus Service Improvements ridership and capacity by route for inbound and outbound directions for the a.m. and p.m. peak hours, respectively. As indicated in Section 4.2.4.2, the transit ridership and capacity utilization are presented at the MLP for each route. For new routes, the MLP was determined at the stop with the highest ridership during the peak hours using the SF-CHAMP model transit ridership forecasts for the project. Where capacity utilization is greater than the 85 percent capacity utilization standard, the values are highlighted in bold on Tables 12 and Table 13, and further discussed below. Tables 16 and 17, p. 4.2-180 to 4.2-186, present the LOS analysis and average vehicle delay for the 78 study intersections for Existing and for Existing plus Service Improvements for the a.m. and p.m. peak hours, respectively.

Table 12: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – A.M. Peak Hour

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
E Embarcadero – IB[4]	-	-	-	169	280	60.5%	169	60.5%	172	61.4%	165	59.0%	167	59.7%
E Embarcadero – OB[4]	-	-	-	84	280	29.9%	84	30.1%	88	31.5%	85	30.3%	87	31.0%
F Market & Wharves – IB	289	700	41.2%	203	560	36.3%	203	36.2%	206	36.8%	201	35.8%	203	36.3%
F Market & Wharves – OB	162	627	25.8%	125	560	22.3%	125	22.3%	128	22.9%	124	22.2%	127	22.6%
J Church – IB	573	714	80.3%	626	893	70.2%	648	72.6%	718	80.5%	684	76.7%	754	84.5%
J Church – OB	156	830	18.8%	147	893	16.5%	157	17.6%	173	19.4%	155	17.3%	167	18.7%
K Ingleside - IB	735	833	**88.2%**	675	840	80.3%	682	81.2%	720	85.7%	675	80.3%	710	84.5%
K Ingleside– OB	330	714	46.2%	366	840	43.6%	359	42.8%	367	43.7%	357	42.6%	369	43.9%
L Taraval – IB	1616	1904	84.9%	1537	1904	80.7%	1557	81.8%	1599	84.0%	1562	82.1%	1590	83.5%
L Taraval – OB	321	1660	19.3%	341	1904	17.9%	340	17.9%	341	17.9%	336	17.7%	345	18.1%
M Ocean View – IB	1274	1666	76.5%	1233	1680	73.4%	1223	72.8%	1257	74.8%	1225	72.9%	1249	74.3%
M Ocean View – OB	279	1660	16.8%	262	1680	15.6%	260	15.4%	264	15.7%	255	15.2%	269	16.0%
N Judah – IB	1792	1904	**94.1%**	2029	2596	78.2%	2090	80.5%	2139	82.4%	2079	80.1%	2152	82.9%
N Judah – OB	544	1904	28.6%	556	2596	21.4%	563	21.7%	595	22.9%	572	22.0%	592	22.8%
NX Judah Express – IB[5]	247	378	65.2%	221	378	58.4%	245	64.7%	256	67.8%	245	64.9%	255	67.3%
T Third - IB	428	714	60.0%	474	840	56.4%	486	57.9%	496	59.0%	487	57.9%	497	59.2%
T Third – OB	347	833	41.7%	354	840	42.1%	347	41.3%	361	43.0%	349	41.6%	362	43.1%
1 California – IB[6]	857	1080	79.4%	687	1080	63.6%	758	70.2%	782	72.4%	729	67.5%	754	69.8%
1 California – OB[6]	583	1080	54.0%	465	1080	43.1%	485	44.9%	560	51.9%	537	49.7%	537	49.7%

Table 12: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – A.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
1AX California Express – IB[5]	380	484	78.6%	368	484	76.1%	384	79.4%	402	83.2%	387	80.0%	415	**85.8%**
1BX California Express – IB[5]	626	806	77.7%	578	806	71.7%	597	74.2%	631	78.3%	603	74.8%	641	79.5%
2 Clement – IB	245	315	77.8%	428	756	56.6%	429	56.7%	450	59.6%	430	56.9%	455	60.2%
2 Clement – OB	120	315	38.1%	321	756	42.5%	312	41.3%	317	41.9%	308	40.7%	323	42.7%
3 Jackson – IB[9]	240	315	76.2%	-	-	-	-	-	-	-	-	-	-	-
3 Jackson – OB[9]	72	252	28.6%	-	-	-	-	-	-	-	-	-	-	-
5 Fulton/5L Fulton Limited – IB[4]	833	1050	79.4%	1057	1504	70.3%	1224	81.4%	1315	**87.4%**	1224	81.4%	1256	83.5%
5 Fulton/5L Fulton Limited – OB[4]	340	893	38.1%	379	1504	25.2%	464	30.8%	493	32.8%	450	29.9%	468	31.1%
6 Parnassus – IB	270	378	71.4%	187	378	49.5%	263	69.6%	265	70.0%	289	76.5%	277	73.2%
6 Parnassus – OB	109	344	31.7%	100	378	26.3%	100	26.3%	108	28.5%	98	26.0%	106	28.2%
8X Bayshore Express – OB[5]	504	752	67.0%	491	752	65.2%	490	65.1%	503	66.9%	502	66.8%	517	68.8%
8AX Bayshore Express[5]	608	752	80.9%	579	752	77.0%	579	77.0%	641	**85.2%**	592	78.7%	647	**86.0%**
8BX Bayshore Express[5]	488	705	69.1%	486	752	64.6%	455	60.5%	480	63.9%	447	59.5%	485	64.5%
9 San Bruno – IB	225	315	71.4%	232	315	73.7%	244	77.6%	218	69.1%	233	74.0%	244	77.4%
9 San Bruno – OB	175	315	55.6%	210	315	66.5%	223	70.7%	229	72.7%	220	69.9%	222	70.4%
9L San Bruno Limited – IB	240	315	76.2%	237	378	62.6%	248	65.5%	289	76.5%	285	75.3%	290	76.7%
9L San Bruno Limited – OB	115	315	36.5%	105	378	27.7%	104	27.6%	115	30.5%	104	27.4%	114	30.2%
10 Townsend/Sansome – IB	141	189	74.6%	451	630	71.5%	452	71.8%	470	74.7%	449	71.3%	468	74.2%
10 Townsend/Sansome – OB	165	189	**87.3%**	477	630	75.7%	479	76.1%	504	80.0%	474	75.3%	489	77.7%
11 Downtown Connector-IB[4]	-	-	-	214	315	67.8%	219	69.6%	222	70.6%	220	70.0%	232	73.7%

Table 12: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – A.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
11 Downtown Connector-OB[4]	-	-	-	146	315	46.3%	146	46.5%	160	50.8%	145	46.1%	161	51.1%
12 Folsom-Pacific – IB[11]	123	189	65.1%	-	-	-	-	-	-	-	-	-	-	-
12 Folsom-Pacific – OB[11]	144	189	76.2%	-	-	-	-	-	-	-	-	-	-	-
14 Mission - IB[6]	370	940	39.4%	379	752	50.5%	393	52.2%	454	60.3%	364	48.3%	421	56.0%
● 14 Mission - OB[6]	220	940	23.4%	58	376	15.4%	70	18.6%	78	20.6%	73	19.4%	79	21.0%
14L Mission Limited - IB	487	627	77.7%	534	752	71.0%	580	77.1%	635	84.5%	557	74.1%	608	80.8%
14L Mission Limited - OB	180	627	28.7%	185	752	24.6%	215	28.5%	229	30.5%	221	29.3%	233	31.1%
14X Mission Express[5]	525	705	74.5%	570	752	75.8%	548	72.9%	605	80.5%	543	72.2%	608	80.9%
16X Noriega Express[5]	340	572	59.5%	368	420	**87.6%**	327	77.8%	354	84.2%	329	78.3%	334	79.6%
17 Parkmerced - IB	42	126	33.3%	105	135	77.6%	99	73.4%	104	76.7%	99	73.4%	104	77.2%
17 Parkmerced - OB	12	126	9.5%	32	135	23.4%	30	22.5%	31	23.1%	31	22.9%	32	23.4%
18 46th Avenue - IB	108	189	57.1%	98	189	52.0%	91	48.4%	97	51.1%	95	50.5%	99	52.2%
18 46th Avenue - OB	99	189	52.4%	96	189	50.5%	93	49.2%	97	51.2%	95	50.1%	96	50.6%
19 Polk - IB	160	252	63.5%	94	252	37.4%	86	34.1%	94	37.4%	88	34.9%	100	39.8%
19 Polk - OB	220	252	**87.3%**	93	252	36.8%	87	34.7%	100	39.8%	85	33.9%	108	42.9%
21 Hayes - IB	360	420	**85.7%**	405	473	**85.8%**	331	70.1%	344	72.8%	346	73.2%	381	80.5%
21 Hayes - OB	133	420	31.7%	168	473	35.6%	130	27.6%	137	29.0%	135	28.7%	140	29.5%
22 Fillmore - IB	293	420	69.8%	313	630	49.7%	444	70.5%	500	79.4%	495	78.5%	532	84.5%
22 Fillmore - OB	287	420	68.3%	274	630	43.6%	346	54.9%	419	66.5%	483	76.7%	481	76.4%
23 Monterey - IB	144	189	76.2%	133	189	70.4%	136	72.1%	134	71.0%	129	68.2%	132	70.1%

Table 12: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – A.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
23 Monterey - OB	138	189	73.0%	124	189	65.8%	127	67.2%	130	68.7%	126	66.6%	129	68.2%
24 Divisadero - IB	270	378	71.4%	282	420	67.0%	274	65.2%	288	68.7%	253	60.2%	287	68.4%
24 Divisadero - OB	144	378	38.1%	147	420	35.1%	133	31.7%	157	37.4%	129	30.8%	148	35.1%
27 Folsom - IB	132	252	52.4%	97	252	38.6%	80	31.6%	89	35.3%	85	33.9%	102	40.4%
27 Folsom - OB	140	252	55.6%	137	252	54.2%	127	50.4%	133	52.6%	122	48.6%	130	51.5%
28 19th Avenue - IB	276	378	73.0%	199	420	47.4%	274	65.3%	300	71.4%	283	67.4%	302	72.0%
28 19th Avenue - OB	195	315	61.9%	205	420	48.8%	280	66.8%	303	72.2%	281	66.8%	297	70.6%
28L 19th Avenue Limited – IB[7]	195	315	61.9%	208	420	49.4%	217	51.6%	250	59.6%	224	53.2%	260	61.8%
28L 19th Avenue Limited – OB[7]	170	315	54.0%	148	420	35.3%	146	34.7%	153	36.4%	139	33.1%	154	36.6%
29 Sunset - IB	300	378	79.4%	293	420	69.7%	277	66.1%	293	69.8%	279	66.5%	301	71.6%
29 Sunset - OB	294	378	77.8%	232	420	55.3%	223	53.2%	238	56.6%	225	53.6%	240	57.1%
30 Stockton – IB[6,8]	353	491	71.8%	428	806	53.1%	540	67.0%	558	69.3%	537	66.6%	573	71.1%
30 Stockton – OB[6,8]	437	591	73.9%	402	806	49.9%	418	51.9%	430	53.4%	420	52.2%	441	54.7%
30X Marina Express - IB	900	945	**95.2%**	862	1025	84.0%	848	82.7%	857	83.6%	808	78.8%	863	84.1%
31 Balboa - IB	230	315	73.0%	224	315	71.2%	212	67.2%	222	70.3%	208	66.0%	221	70.1%
31 Balboa - OB	155	315	49.2%	134	315	42.6%	125	39.8%	127	40.2%	127	40.3%	127	40.3%
31AX Balboa Express[5]	185	315	58.7%	154	315	48.8%	143	45.2%	150	47.6%	135	42.9%	146	46.4%
31BX Balboa Express[5]	240	378	63.5%	218	378	57.6%	194	51.4%	209	55.4%	208	54.9%	222	58.8%
32 Roosevelt - IB[4]	-	-	-	83	120	69.4%	86	71.3%	89	73.8%	83	68.8%	88	73.1%
32 Roosevelt - OB[4]	-	-	-	32	120	26.9%	34	28.1%	36	30.0%	35	28.8%	34	28.1%

Table 12: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – A.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
33 Stanyan - IB	140	252	55.6%	104	252	41.1%	103	40.9%	112	44.6%	106	42.0%	117	46.3%
33 Stanyan - OB	128	252	50.8%	87	252	34.4%	84	33.2%	107	42.5%	105	41.5%	123	48.7%
35 Eureka - IB	42	90	46.7%	73	120	61.2%	73	60.5%	73	60.5%	73	60.7%	74	61.6%
35 Eureka - OB	10	90	11.1%	17	120	14.0%	17	13.9%	17	14.2%	17	13.9%	17	14.2%
36 Teresita - IB	42	90	46.7%	63	120	52.5%	60	50.3%	60	50.1%	59	48.9%	58	48.3%
36 Teresita - OB	50	90	55.6%	97	120	81.2%	97	80.9%	101	83.9%	98	81.5%	101	83.9%
37 Corbett - IB	116	180	64.4%	111	180	61.6%	114	63.6%	118	65.4%	110	61.2%	117	64.8%
37 Corbett - OB	48	180	26.7%	43	180	24.0%	45	25.2%	48	26.4%	46	25.5%	45	25.2%
38 Geary - IB	230	470	48.9%	432	752	57.5%	411	54.6%	429	57.0%	411	54.6%	432	57.4%
38 Geary - OB	195	470	41.5%	356	752	47.4%	343	45.6%	343	45.5%	335	44.5%	342	45.5%
38AX Geary Express[5]	164	344	47.6%	155	344	45.0%	133	38.6%	156	45.5%	137	39.9%	155	45.2%
38BX Geary Express[5]	158	344	46.0%	155	344	45.2%	133	38.7%	153	44.7%	139	40.4%	155	45.1%
38L Geary Limited - IB	818	1025	79.8%	829	1128	73.5%	781	69.2%	821	72.8%	773	68.5%	823	72.9%
38L Geary Limited - OB	644	1025	62.8%	636	1128	56.4%	606	53.8%	614	54.4%	594	52.7%	613	54.4%
41 Union - IB	443	705	62.8%	470	806	58.4%	487	60.5%	513	63.7%	478	59.4%	510	63.3%
41 Union - OB	70	470	14.9%	106	806	13.1%	99	12.3%	109	13.5%	97	12.0%	103	12.7%
43 Masonic - IB	348	378	**92.1%**	360	473	76.1%	373	79.0%	387	81.9%	384	81.3%	409	**86.6%**
43 Masonic - OB	246	378	65.1%	259	473	54.8%	256	54.2%	273	57.8%	255	54.0%	276	58.5%
44 O'Shaughnessy - IB	398	473	84.1%	369	504	73.1%	366	72.7%	380	75.4%	367	72.7%	378	75.1%
44 O'Shaughnessy - OB	222	378	58.7%	256	504	50.9%	252	49.9%	282	55.9%	257	51.1%	281	55.8%

Table 12: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – A.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
45 Union-Stockton - IB	398	473	84.1%	406	540	75.2%	414	76.6%	428	79.2%	397	73.6%	420	77.8%
45 Union-Stockton - OB	420	540	77.8%	385	540	71.4%	386	71.6%	404	74.9%	388	71.9%	399	73.9%
47 Van Ness - IB	294	378	77.8%	250	504	49.6%	244	48.4%	268	53.1%	251	49.7%	274	54.4%
47 Van Ness - OB	276	378	73.0%	341	504	67.6%	330	65.6%	340	67.5%	315	62.6%	345	68.4%
48 24th Street-Quintara - IB	276	378	73.0%	188	252	74.5%	187	74.2%	207	82.3%	191	75.8%	206	81.9%
48 24th Street-Quintara - OB	230	315	73.0%	175	252	69.3%	176	69.7%	179	70.9%	174	68.9%	182	72.4%
49L Van Ness-Mission Ltd - IB[10]	345	705	48.9%	423	752	56.3%	433	57.6%	479	63.8%	397	52.8%	440	58.5%
49L Van Ness-Mission Ltd - OB[10]	285	705	40.4%	253	752	33.7%	263	34.9%	265	35.2%	240	31.9%	270	36.0%
52 Excelsior - IB	87	189	46.0%	90	135	66.7%	90	66.7%	93	68.6%	91	67.4%	91	67.2%
52 Excelsior - OB	78	189	41.3%	79	135	58.9%	80	59.3%	85	63.1%	81	59.6%	84	62.4%
54 Felton - IB	105	189	55.6%	147	252	58.4%	149	59.1%	155	61.4%	151	59.9%	154	61.2%
54 Felton - OB	117	189	61.9%	166	252	65.9%	166	66.0%	169	67.0%	165	65.5%	169	67.0%
56 Rutland - IB	24	90	26.7%	36	120	30.2%	37	31.2%	37	31.2%	37	31.2%	38	31.3%
56 Rutland - OB	12	90	13.3%	10	120	8.2%	10	8.2%	10	8.2%	10	8.2%	10	8.2%
58 24th Street – IB[4]	-	-	-	149	252	59.1%	148	58.9%	162	64.2%	151	60.1%	155	61.4%
58 24th Street – OB[4]	-	-	-	110	252	43.7%	111	44.1%	116	45.9%	109	43.3%	112	44.5%
66 Quintara - IB	45	135	33.3%	44	120	36.6%	43	36.2%	45	37.5%	41	33.9%	44	36.7%
66 Quintara - OB	48	135	35.6%	46	120	38.2%	46	38.2%	47	39.5%	45	37.6%	46	38.6%
71L Haight-Noriega Ltd - IB[12]	300	378	79.4%	282	420	67.2%	279	66.3%	346	82.5%	295	70.3%	351	83.5%
71L Haight-Noriega Ltd - OB[12]	131	344	38.1%	133	420	31.6%	150	35.8%	152	36.1%	151	36.0%	161	38.4%

Table 12: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – A.M. Peak Hour (continued)

Notes:

1. SI = Service Improvements. For the TEP, a range of potential combinations of the elements in the TPS Toolkit is being considered for the project level TTRPs in order to reduce transit travel time. The range of TTRP treatments being analyzed has been bracketed by: 1) a moderate set of TPS Toolkit elements referred to as the Moderate Alternative; and 2) an expanded set of TPS Toolkit elements referred to as the Expanded Alternative. The difference between these two alternatives is that the Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental effects such as substantial changes to traffic, bicycle, or pedestrian circulation or similar impacts, whereas the Moderate Alternative is expected to have fewer physical environmental effects due to the nature of the TPS Toolkit elements chosen. For both the Moderate Alternative and Expanded Alternative, transit ridership estimates were prepared using the SF-CHAMP model for two conditions: 1) "Travel Time Reduction" reflects the travel time reductions associated with the TTRP improvements but without any adjustments to the SF-CHAMP model to account for improvements related to transit reliability, and 2) "Travel Time Reduction plus Enhanced Reliability" reflects the travel time reductions associated with the TTRP improvements plus incorporates adjustments to the SF-CHAMP model to account for the potential effects of improved reliability that would be associated with transit priority projects. See the Transportation Impact Study Section 3.3 for detailed discussion of transit forecasts.
2. Ridership and capacity utilization at the Maximum Load Point (MLP).
3. Bus routes, and light rail and historic streetcar vehicle lines operating at capacity utilization greater than 85 percent are highlighted in **bold.**
4. New Route. MLP for new E Embarcadero, 5L Fulton Limited, 11 Downtown Connector, 32 Roosevelt, and 58 24th Street based on estimated MLP in the SF-CHAMP model.
5. For Express/Peak-only bus routes, the ridership, capacity, and capacity utilization are presented for inbound service towards downtown during the a.m. peak hour, and outbound service away from downtown during the p.m. peak hour. The exception is the 8X Bayshore Express where the ridership, capacity, and capacity utilization is presented for outbound from downtown during the a.m. peak hour, and inbound service towards downtown during the p.m. peak hour.
6. The ridership, capacity, and capacity utilization for a.m. and p.m. peak hours include the short line.
7. The 28L 19th Avenue Limited runs between 7 and 9 a.m., and between 2 and 3:30 p.m. (outside of the p.m. peak hour)
8. For the 30 Stockton, the ridership, capacity, and capacity utilization for a.m. and p.m. peak hour include the short line, and assume a mixed fleet (i.e., both standard and articulated motor coaches).
9. With the proposed TEP project, the 2 Clement, 10 Sansome, 22 Fillmore, 24 Divisadero, and 43 Masonic would replace service along portions of the existing 3 Jackson, which would be discontinued.
10. With implementation of the Van Ness Avenue BRT, the 49 Van Ness-Mission will be replaced by the 49L Van Ness-Mission Limited.
11. With the proposed TEP project, the 27 Bryant and 10 Sansome would replace the 12 Folsom-Pacific, which would be discontinued.
12. With the proposed TEP project, the 71 Haight-Noriega service would be replaced by an expanded 71L Haight-Noriega Limited.

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP.

Table 13: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – P.M. Peak Hour

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
E Embarcadero – IB[4]	-	-	**-**	68	280	24.3%	67	24.1%	69	24.7%	67	24.1%	69	24.5%
E Embarcadero – OB[4]	-	-	**-**	138	280	49.3%	137	49.1%	139	49.6%	138	49.3%	139	49.6%
F Market & Wharves - IB	249	700	35.5%	253	840	30.1%	257	30.5%	267	31.7%	259	30.8%	270	32.2%
F Market & Wharves - OB	718	700	**102.5%**	729	840	**86.8%**	717	**85.3%**	735	**87.5%**	725	**86.3%**	735	**87.5%**
J Church - IB	189	952	19.9%	116	793	14.7%	134	16.8%	170	21.5%	151	19.0%	187	23.6%
J Church - OB	498	830	60.0%	465	793	58.6%	494	62.2%	562	70.8%	485	61.2%	553	69.7%
K Ingleside - IB	508	714	71.1%	547	840	65.2%	554	65.9%	570	67.9%	550	65.5%	567	67.5%
K Ingleside- OB	750	830	**90.3%**	724	840	**86.2%**	727	**86.5%**	756	**90.0%**	726	**86.4%**	753	**89.6%**
L Taraval - IB	609	2131	28.6%	521	1904	27.4%	521	27.4%	540	28.4%	519	27.3%	536	28.1%
L Taraval - OB	1360	1904	71.4%	1326	1904	69.6%	1333	70.0%	1369	71.9%	1331	69.9%	1367	71.8%
M Ocean View - IB	488	1660	29.4%	456	1680	27.1%	446	26.5%	464	27.6%	450	26.8%	463	27.6%
M Ocean View - OB	864	1428	60.5%	944	1680	56.2%	944	56.2%	973	57.9%	934	55.6%	963	57.3%
N Judah - IB	880	1904	46.2%	950	2380	39.9%	980	41.2%	1013	42.5%	974	40.9%	1010	42.4%
N Judah - OB	1773	2131	83.2%	1712	2380	71.9%	1761	74.0%	1849	77.7%	1756	73.8%	1846	77.6%
NX Judah Express – IB[5]	275	378	72.9%	261	378	69.1%	270	71.4%	288	76.1%	271	71.8%	288	76.2%
T Third - IB	365	830	43.9%	358	840	42.6%	351	41.8%	364	43.3%	348	41.4%	361	43.0%
T Third - OB	550	714	77.0%	594	840	70.7%	595	70.8%	616	73.3%	591	70.4%	606	72.1%
1 California – IB[6]	600	1080	55.6%	595	1260	47.2%	595	47.2%	612	48.5%	597	47.4%	608	48.2%
1 California – OB[6]	909	1080	84.1%	1060	1260	84.1%	1060	84.1%	1073	**85.1%**	1053	83.6%	1059	84.1%

Table 13: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
1AX California Express – OB[5]	208	291	71.4%	170	335	50.7%	179	53.6%	185	55.2%	186	55.7%	200	59.7%
1BX California Express – OB[5]	250	315	79.4%	195	470	41.5%	204	43.3%	213	45.3%	210	44.6%	228	48.5%
2 Clement - IB	170	315	54.0%	210	756	27.8%	211	27.9%	221	29.2%	212	28.1%	218	28.8%
2 Clement - OB	260	315	82.5%	567	756	75%	567	74.9%	608	80.4%	561	74.2%	605	80.0%
3 Jackson - IB[9]	125	315	39.7%	-	-	-	-	-	-	-	-	-	-	-
3 Jackson – OB[9]	210	315	66.7%	-	-	-	-	-	-	-	-	-	-	-
5 Fulton/5L Fulton Limited - IB[6]	600	840	71.4%	809	1457	55.5%	948	65.0%	994	68.2%	895	61.4%	949	65.1%
● 5 Fulton/5L Fulton Limited – OB[6]	659	798	82.5%	1082	1457	74.3%	1136	78.0%	1231	84.5%	1125	77.2%	1179	80.9%
6 Parnassus - IB	156	378	41.3%	138	378	36.5%	154	40.9%	158	41.8%	153	40.4%	167	44.2%
6 Parnassus - OB	252	378	66.7%	194	378	51.3%	221	58.4%	273	72.2%	211	55.9%	271	71.7%
8X Bayshore Express – IB[5]	408	752	54.3%	377	752	50.1%	356	47.4%	380	50.6%	353	47.0%	396	52.6%
8AX Bayshore Express – OB[5]	472	752	62.8%	534	752	71.0%	524	69.6%	539	71.6%	533	70.9%	555	73.8%
8BX Bayshore Express – OB[5]	568	752	75.5%	516	752	68.6%	533	70.9%	559	74.3%	522	69.4%	566	75.3%
9 San Bruno - IB	180	315	57.1%	179	315	56.8%	199	63.3%	227	72.0%	232	73.7%	150	47.7%
9 San Bruno - OB	215	315	68.3%	205	315	65.2%	221	70.1%	251	79.7%	222	70.4%	248	78.8%
9L San Bruno Limited - IB	140	315	44.4%	147	315	46.7%	161	51.1%	119	37.7%	104	32.9%	138	43.7%
9L San Bruno Limited - OB	200	315	63.5%	202	315	64.1%	212	67.2%	254	80.7%	215	68.2%	251	79.7%
10 Townsend/Sansome - IB	186	189	**98.4%**	451	630	71.7%	448	71.1%	466	74.0%	443	70.4%	473	75.0%
10 Townsend/Sansome - OB	171	189	**90.5%**	504	630	79.9%	509	80.8%	525	83.3%	502	79.7%	527	83.7%
11 Downtown Connector-IB[4]	-	-	-	117	315	37.0%	110	34.9%	121	38.4%	110	35.0%	122	38.6%

Table 13: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
11 Downtown Connector-OB[4]	-	-	-	163	315	51.9%	154	48.8%	158	50.2%	164	52.1%	168	53.5%
12 Folsom-Pacific – IB[11]	135	189	71.4%	-	-	-	-	-	-	-	-	-	-	-
12 Folsom-Pacific – OB[11]	126	189	66%	-	-	-	-	-	-	-	-	-	-	-
14 Mission – IB[6]	232	752	30.9%	80	376	21.4%	84	22.5%	96	25.5%	77	20.5%	86	22.9%
14 Mission – OB[6]	360	752	47.9%	360	752	47.8%	352	46.9%	404	53.7%	352	46.8%	427	56.7%
14L Mission Limited - IB	293	627	46.8%	265	752	35.3%	293	38.9%	329	43.7%	279	37.1%	302	40.2%
14L Mission Limited - OB	427	627	68.1%	480	752	63.8%	487	64.8%	543	72.2%	494	65.7%	562	74.8%
14X Mission Express[5]	368	705	52.1%	353	752	46.9%	315	41.9%	369	49.1%	311	41.4%	367	48.9%
16X Noriega Express[5]	253	517	49.0%	231	420	55.0%	233	55.5%	231	55.1%	225	53.5%	240	57.2%
17 Parkmerced - IB	32	126	25.4%	95	180	52.8%	93	51.9%	95	52.7%	93	51.6%	96	53.1%
17 Parkmerced - OB	42	126	33.3%	118	180	65.3%	115	63.8%	120	66.4%	116	64.5%	120	66.9%
18 46th Avenue - IB	84	189	44.4%	70	189	37.2%	76	40.1%	78	41.3%	72	38.4%	80	42.3%
18 46th Avenue - OB	93	189	49.2%	71	189	37.4%	69	36.5%	75	39.4%	66	35.1%	71	37.8%
19 Polk - IB	172	252	68.3%	126	252	49.9%	116	46.2%	122	48.3%	116	46.0%	147	58.2%
19 Polk - OB	124	252	49.2%	75	252	29.8%	78	31.0%	89	35.2%	78	30.8%	91	36.1%
21 Hayes - IB	156	378	41.3%	211	420	50.3%	164	39.0%	174	41.4%	178	42.4%	178	42.4%
21 Hayes - OB	306	378	81.0%	286	420	68.1%	291	69.2%	307	73.0%	270	64.2%	325	77.5%
22 Fillmore - IB	323	473	68.3%	301	687	43.8%	365	53.0%	438	63.8%	370	53.8%	423	61.6%
22 Fillmore - OB	308	473	65.1%	472	687	68.7%	459	66.8%	572	83.2%	437	63.6%	573	83.3%
23 Monterey - IB	93	189	49.2%	87	189	45.8%	86	45.6%	88	46.6%	87	46.1%	90	47.9%

Table 13: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
23 Monterey - OB	87	189	46.0%	64	189	34.0%	67	35.7%	71	37.6%	68	36.2%	70	36.9%
24 Divisadero - IB	174	378	46.0%	205	420	48.7%	163	38.8%	143	34.1%	159	37.9%	179	42.6%
24 Divisadero - OB	276	378	73.0%	240	420	57.0%	262	62.3%	271	64.6%	190	45.3%	272	64.8%
27 Folsom - IB	160	252	63.5%	115	252	45.7%	105	41.7%	122	48.3%	116	46.2%	127	50.5%
27 Folsom - OB	116	252	46.0%	87	252	34.4%	81	32.0%	92	36.7%	77	30.7%	89	35.3%
28 19th Avenue - IB	282	378	74.6%	196	420	46.6%	291	69.4%	309	73.6%	293	69.8%	307	73.1%
28 19th Avenue - OB	282	378	74.6%	206	420	49.1%	310	73.8%	335	79.9%	317	75.5%	329	78.4%
28L 19th Avenue Limited - IB[7]	-	-	-	273	420	65.0%	275	65.4%	289	68.7%	276	65.6%	289	68.8%
28L 19th Avenue Limited - OB[7]	-	-	-	323	420	76.8%	308	73.4%	333	79.3%	309	73.6%	321	76.5%
29 Sunset - IB	264	378	69.8%	183	344	53.1%	169	49.0%	179	52.2%	167	48.6%	177	51.6%
29 Sunset - OB	294	378	77.8%	235	378	62.1%	224	59.3%	239	63.2%	222	58.6%	237	62.7%
30 Stockton – IB [6,8]	705	1224	57.6%	868	1410	61.6%	1008	71.5%	1038	73.6%	956	67.8%	1021	72.4%
30 Stockton – OB [6,8]	660	1248	52.9%	592	1410	42.0%	624	44.3%	659	46.8%	634	45.0%	681	48.3%
30X Marina Express - OB	432	504	**85.7%**	442	540	81.8%	432	79.9%	449	83.2%	430	79.6%	440	81.5%
31 Balboa - IB	141	270	52.4%	141	315	44.8%	133	42.3%	132	41.9%	134	42.6%	134	42.5%
31 Balboa - OB	223	270	82.5%	246	315	78.2%	228	72.5%	248	78.7%	213	67.5%	247	78.5%
31AX Balboa Express[5]	235	344	68.3%	219	344	63.7%	203	59.2%	213	62.0%	212	61.5%	217	63.1%
31BX Balboa Express[5]	180	315	57.1%	176	315	55.9%	167	53.1%	174	55.3%	169	53.6%	174	55.2%
32 Roosevelt - IB	-	-	**-**	32	120	26.9%	33	27.5%	35	29.4%	34	28.1%	36	30.0%
32 Roosevelt - OB	-	-	**-**	81	120	67.5%	86	71.9%	90	75.0%	85	70.6%	89	74.4%

Table 13: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
33 Stanyan - IB	156	252	61.9%	103	252	45.2%	89	35.3%	88	35.0%	99	39.3%	102	40.3%
33 Stanyan - OB	132	252	52.4%	114	252	45.2%	127	50.3%	151	59.7%	132	52.5%	145	57.6%
35 Eureka - IB	15	135	11.1%	30	120	25.0%	28	23.6%	29	24.5%	29	24.2%	29	24.5%
35 Eureka - OB	72	135	53.3%	68	120	56.6%	74	61.8%	78	65.1%	70	58.2%	76	63.5%
36 Teresita - IB	62	90	68.9%	93	120	77.5%	96	79.6%	99	82.9%	98	81.9%	97	81.2%
36 Teresita - OB	30	90	33.3%	51	120	42.5%	51	42.4%	53	43.8%	50	41.7%	51	42.5%
37 Corbett - IB	57	135	42.2%	43	180	24.1%	44	24.5%	47	26.4%	45	25.2%	48	26.8%
37 Corbett - OB	111	135	82.2%	108	180	59.8%	115	63.8%	120	66.5%	113	62.5%	119	66.4%
38 Geary - IB	352	752	46.8%	437	940	46.5%	422	44.9%	434	46.2%	430	45.8%	438	46.6%
38 Geary - OB	450	705	63.8%	656	940	69.8%	666	70.8%	679	72.3%	658	70.0%	683	72.6%
38AX Geary Express[5]	280	420	66.7%	260	420	62.0%	242	57.6%	259	61.7%	241	57.5%	256	60.9%
38BX Geary Express[5]	222	378	58.7%	180	378	47.6%	166	44.0%	192	50.8%	164	43.5%	184	48.6%
38L Geary Limited - IB	556	1025	54.3%	374	1128	33.1%	330	29.3%	362	32.1%	347	30.7%	370	32.8%
38L Geary Limited - OB	862	1025	84.0%	754	1128	66.8%	709	62.9%	773	68.5%	708	62.8%	798	70.7%
41 Union - IB	135	473	28.6%	104	540	19.2%	96	17.8%	109	20.1%	91	16.8%	102	18.9%
41 Union - OB	398	473	84.1%	421	540	77.9%	422	78.1%	445	82.5%	428	79.3%	452	83.7%
43 Masonic - IB	160	315	50.8%	152	378	40.2%	159	42.0%	159	42.1%	159	42.1%	161	42.6%
43 Masonic - OB	240	315	76.2%	284	378	75.0%	271	71.6%	290	76.8%	274	72.5%	283	74.9%
44 O'Shaughnessy - IB	180	420	42.9%	153	473	32.4%	151	32.0%	163	34.5%	152	32.1%	159	33.7%
44 O'Shaughnessy - OB	353	420	84.1%	359	473	75.9%	363	76.9%	361	76.4%	365	77.3%	368	77.8%

Table 13: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Route/Direction	Existing			Existing + Service Improvements			Existing + SI + TTRP Moderate Alt[1]				Existing + SI + TTRP Expanded Alt[1]			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
45 Union-Stockton - IB	240	315	76.2%	259	315	82.3%	227	72.1%	246	78.2%	237	75.3%	244	77.6%
45 Union-Stockton - OB	260	315	82.5%	233	315	74.1%	235	74.7%	246	78.2%	240	76.3%	251	79.7%
47 Van Ness - IB	276	378	73.0%	212	504	42.0%	207	41.0%	232	45.9%	204	40.4%	227	45.0%
47 Van Ness - OB	258	378	68.3%	207	504	41.0%	199	39.5%	225	44.7%	206	40.8%	219	43.5%
48 24th Street-Quintara - IB	175	315	55.6%	121	252	48.1%	126	49.9%	130	51.5%	122	48.6%	133	52.9%
48 24th Street-Quintara - OB	180	315	57.1%	52	252	20.7%	60	23.7%	82	32.6%	73	28.9%	136	53.9%
49L Van Ness-Mission Ltd-IB[10]	353	705	50.0%	435	752	57.9%	473	62.9%	504	67.1%	453	60.2%	480	63.9%
49L Van Ness-Mission Ltd-OB[10]	375	705	53.2%	501	752	66.6%	532	70.8%	543	72.3%	511	67.9%	587	78.1%
52 Excelsior - IB	66	189	34.9%	84	135	62.2%	82	60.8%	88	65.5%	82	60.9%	77	57.2%
52 Excelsior - OB	81	189	42.9%	75	135	55.6%	77	57.4%	81	60.1%	76	56.0%	80	58.9%
54 Felton - IB	111	189	58.7%	168	252	66.6%	167	66.3%	177	70.1%	162	64.4%	173	68.5%
54 Felton - OB	114	189	60.3%	161	252	64.0%	166	65.8%	171	67.8%	165	65.4%	165	65.3%
56 Rutland - IB	16	90	17.8%	18	120	14.9%	18	14.8%	18	14.9%	18	14.8%	18	14.8%
56 Rutland - OB	14	90	15.6%	19	120	16.2%	19	16.2%	19	16.2%	19	16.2%	19	16.2%
58 24th Street – IB[4]	-	-	**-**	111	252	44.2%	115	45.4%	114	45.1%	113	45.0%	115	45.8%
58 24th Street – OB[4]	-	-	**-**	149	252	59.1%	149	59.0%	156	62.1%	151	59.7%	154	61.2%
66 Quintara - IB	18	135	13.3%	11	120	9.3%	13	10.5%	13	11.2%	12	10.2%	13	10.7%
66 Quintara - OB	48	135	35.6%	44	120	36.4%	44	36.5%	44	36.9%	46	38.2%	46	38.5%
71L Haight-Noriega Ltd – IB[12]	258	378	68.3%	275	420	65.5%	260	61.8%	262	62.5%	254	60.6%	258	61.5%
71L Haight-Noriega Ltd – OB[12]	324	378	**85.7%**	411	420	**98.0%**	420	**100.0%**	333	79.3%	444	**105.8%**	319	76.0%

Table 13: Muni Ridership and Capacity Utilization by Line – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Notes:

1. SI = Service Improvements. For the TEP, a range of potential combinations of the elements in the TPS Toolkit is being considered for the TTRPs in order to reduce transit travel time. The range of TTRP treatments being analyzed has been bracketed by: 1) a moderate set of TPS Toolkit elements referred to as the Moderate Alternative; and 2) an expanded set of TPS Toolkit elements referred to as the Expanded Alternative. The difference between these two alternatives is that the Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental effects such as substantial changes to traffic, bicycle, or pedestrian circulation or similar impacts, whereas the Moderate Alternative is expected to have fewer physical environmental effects due to the nature of the TPS Toolkit elements chosen. For both the Moderate Alternative and Expanded Alternative, transit ridership estimates were prepared using the SF-CHAMP model for two conditions: 1) "Travel Time Reduction" reflects the travel time reductions associated with the TTRP improvements but without any adjustments to the SF-CHAMP model to account for improvements related to transit reliability, and 2) "Travel Time Reduction plus Enhanced Reliability" reflects the travel time reductions associated with the TTRP improvements plus incorporates adjustments to the SF-CHAMO model to account for the potential effects of improved reliability that would be associated with transit priority projects. See the Transportation Impact Study Section 3.3 for detailed discussion of transit forecasts.
2. Ridership and capacity utilization at the Maximum Load Point (MLP).
3. Bus routes, and light rail and historic streetcar vehicle lines operating at capacity utilization greater than 85 percent are highlighted in **bold.**
4. New Route. MLP for new E Embarcadero, 5L Fulton Limited, 11 Downtown Connector, 32 Roosevelt, and 58 24th Street based on estimated MLP in the SF-CHAMP model.
5. For Express/Peak-only bus routes, the ridership, capacity, and capacity utilization are presented for inbound service towards downtown during the a.m. peak hour, and outbound service away from downtown during the p.m. peak hour. The exception is the 8X Bayshore Express where the ridership, capacity, and capacity utilization is presented for outbound from downtown during the a.m. peak hour, and inbound service towards downtown during the p.m. peak hour.
6. The ridership, capacity, and capacity utilization for a.m. and p.m. peak hours include the short line.
7. The 28L 19th Avenue Limited runs between 7 and 9 a.m., and between 2 and 3:30 p.m.
8. For the 30 Stockton, the ridership, capacity, and capacity utilization for a.m. and p.m. peak hour include the short line, and assume a mixed fleet (i.e., both standard and articulated motor coaches).
9. With the proposed TEP project, the 2 Clement, 10 Sansome, 22 Fillmore, 24 Divisadero, and 43 Masonic would replace service along portions of the existing 3 Jackson, which would be discontinued.
10. With implementation of the Van Ness Avenue BRT, the 49 Van Ness-Mission will be replaced by the 49L Van Ness-Mission Limited.
11. With the proposed TEP project, the 27 Bryant and 10 Sansome would replace the 12 Folsom-Pacific, which would be discontinued.
12. With the proposed TEP project, the 71 Haight-Noriega service would be replaced by an expanded 71L Haight-Noriega Limited.

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP.

Transit Impacts. Tables 12 and 13 present the ridership, capacity, and capacity utilization by route for inbound and outbound directions for Existing and Existing plus Service Improvements conditions for the a.m. and p.m. peak hours, respectively. Under Existing conditions, the capacity utilization on nine routes currently exceeds the 85 percent capacity utilization standard at the MLP in one or both directions. These include the F Market & Wharves historic streetcar (p.m. peak), K Ingleside (a.m. and p.m. peaks), N Judah (a.m. peak hour), 10 Townsend (a.m. and p.m. peak hour)[48], 19 Polk (a.m. peak hour), 21 Hayes (a.m. peak hour), 30X Marina Express (a.m. and p.m. peak hour), 43 Masonic (a.m. peak hour), and 71 Haight-Noriega/71L Haight Noriega Limited (p.m. peak hour).

With introduction of the Service Improvements, most of the existing exceedances would be reduced to either less than the 85 percent standard or to capacity utilization greater than the 85 percent standard but less than under Existing conditions (for example, from 102.5 percent under Existing conditions to 86.8 percent under Existing plus Service Improvements conditions for the F Market & Wharves line during the p.m. peak hour). Other existing exceedances, which would be reduced below 85 percent capacity utilization through the implementation of the Service Improvements include the N Judah inbound, 10 Sansome outbound, 19 Polk outbound, 30X Marina Express inbound, and the 43 Masonic inbound in the a.m. peak hour; and the 10 Sansome inbound and outbound, and the 30X Marina Express outbound in the p.m. peak hour. In a few instances, where the capacity utilization is greater than the 85 percent standard under Existing conditions, implementation of the TEP components would further increase the exceedance (for example, from 85.7 percent under Existing conditions to 98.0 percent under Existing plus Service Improvements conditions for the 71 Haight-Noriega/71L Haight Noriega Limited during the p.m. peak hour). Also, in one instance for the 16X Noriega Express, where the capacity utilization is less than 85 percent under Existing conditions, implementation of the proposed project would increase capacity utilization to more than the 85 percent standard (i.e., from 59.5 percent under Existing conditions, to 87.6 percent under Existing plus Service Improvements conditions for the 16X Noriega Express during the a.m. peak hour).

As indicated in Tables 12 and 13, under Existing plus Service Improvements conditions, generally the transit capacity utilization on routes where minor changes to frequency are proposed would not exceed the 85 percent capacity utilization standard during the a.m. or p.m. peak hours, and generally with an increase in service frequency, the capacity utilization on these routes would decrease.

[48] The 10 Townsend is proposed to be renamed to 10 Sansome as part of the Service Improvements. Please see the complete description of the proposed service changes for this route in Table 8 on p. 2-74.

With the implementation of the Service Improvements, capacity utilization would exceed the 85 percent capacity utilization standard for the following five lines/routes:

- F Market & Wharves (p.m. peak hour)
- K Ingleside (p.m. peak hour)
- 16X Noriega Express (a.m. peak hour)
- 21 Hayes (a.m. peak hour)
- 71 Haight-Noriega/71L Haight Noriega Limited (p.m. peak hour)

Generally, any exceedances of the capacity utilization standard in the a.m. peak hour occur in the inbound direction and exceedances of the capacity utilization standard in the p.m. peak hour occur in the outbound direction. Because the capacity utilization standard exceedance with the Service Improvements would still be less than under Existing conditions, and/or because passengers would be able to utilize nearby routes that provide similar service, as described below, the impact of the Service Improvements on capacity utilization of these lines and routes would be considered less than significant.

- **F Market & Wharves** – With implementation of the Service Improvements, capacity utilization on the F Market & Wharves historic streetcar line at the MLP would be below the capacity utilization standard during the a.m. peak hour in both directions and during the p.m. peak hour in the inbound direction. With the Service Improvements, the capacity utilization during the p.m. peak hour in the outbound direction would decrease from 102.5 percent under Existing conditions to 86.8 percent. Therefore, while the capacity utilization would still be greater than the 85 percent standard, the exceedance as compared to Existing conditions would actually decrease. Additionally, passengers would be able to use the new E Embarcadero historic streetcar line, which would have capacity during the p.m. peak hour (i.e., capacity utilization on the new E Embarcadero would be 49.3 percent outbound during the p.m. peak hour).

- **K Ingleside** – With implementation of the Service Improvements, capacity utilization on the K Ingleside line, at the MLP, would be below the capacity utilization standard during the a.m. peak hour in both directions and during the p.m. peak hour in the inbound direction. With the Service Improvements, the capacity utilization during the a.m. peak hour in the inbound direction would decrease from 88.2 percent under Existing conditions to 80.3 percent. With the Service Improvements, the capacity utilization during the p.m. peak hour in the outbound direction would decrease from 90.3 percent under Existing conditions to 86.2 percent. Therefore, while the capacity utilization would still be greater than the 85 percent standard, the exceedance as compared to Existing conditions would actually decrease. Additionally, passengers would be able to use the M Ocean View, which would have capacity during the p.m. peak hour (i.e., capacity utilization on the M Ocean View would be 56.2 percent outbound during the p.m. peak hour).

- **16X Noriega Express** – With implementation of the Service Improvements, transit capacity utilization on the 16X Noriega Express (inbound in the morning and outbound in the evening), at the maximum load points, would be below the capacity utilization standard during the p.m. peak hour in the outbound direction. Capacity utilization under Existing plus Service Improvements conditions would be 87.6 percent inbound during the a.m. peak hour an increase from Existing conditions, and therefore, capacity utilization on the 16X Noriega Express would exceed the 85 percent capacity utilization standard during the a.m. peak hour. However, under the proposed project, passengers would also be able to use the expanded 71L Haight-Noriega Limited, which would have available capacity during the a.m. peak period (i.e., capacity utilization during the a.m. peak period would be 67.2 percent).

- **21 Hayes** – With implementation of the Service Improvements, transit capacity utilization on the 21 Hayes at the maximum load points would be below the capacity utilization standard during the a.m. peak hour in the outbound direction and during the p.m. peak hour in both directions. With the Service Improvements, the capacity utilization during the a.m. peak hour in the inbound direction would slightly increase from 85.7 percent under Existing conditions to 85.8 percent under Existing plus Service Improvements conditions. Additionally, passengers would be able to use the 5 Fulton/5L Fulton Limited route to the north, which would have capacity during the a.m. peak hour (i.e., capacity utilization on the 5 Fulton/5L Fulton Limited under Existing plus Service Improvements conditions would be 70.3 percent inbound during the a.m. peak hour).

- **71L Haight-Noriega Limited** – Transit capacity utilization on the 71L Haight-Noriega Limited, at the maximum load points, would be below the capacity utilization standard during the a.m. peak hour in both directions and during the p.m. peak hour in the inbound direction. With the Service Improvements, the capacity utilization during the p.m. peak hour in the outbound direction would increase from 85.7 percent under Existing conditions to 98.0 percent. However, passengers would be able to use alternate routes on the corridor, specifically the 16X Noriega Express route, which would have capacity during the p.m. peak hour (i.e., capacity utilization on the 16X Noriega Express would be 55.0 percent outbound during the p.m. peak hour).

Therefore, under Existing plus Service Improvements conditions, while capacity utilization of some individual routes would exceed 85 percent, it would decrease from Existing conditions and could be accommodated within the available capacity of the transit corridor. Therefore, the impact on transit capacity would be considered less than significant.

In addition to capacity utilization, the analysis examined the extent to which Service Improvements would affect transit operations (travel time, etc.). Service Improvements would result in minimal changes to transit operations on affected routes. Transit and traffic conditions with the Service Improvements would be similar to Existing conditions and would therefore, not cause a substantial increase in delays to other local or regional routes that travel along the same route, or segment of the route, or that may intersect with these routes and lines. As indicated in Tables 16 and 17, under Existing plus Service Improvements conditions with the proposed changes in service headways, new routes, and route realignments for all Service Improvements, all study intersections would operate with similar delay and at the same LOS as under Existing conditions. Vehicle flow (both transit and traffic) would remain similar to Existing conditions with implementation of Service Improvements, and therefore, the Service Improvements would have a less-than-significant impact on local and regional transit operations.

In addition to the proposed service headway (frequency) changes, the proposed route realignments and change in transit vehicle type for the following routes were reviewed to assess the potential impact of these changes on transit operations. The proposed route realignments' effect on traffic operations is further discussed in the next section (Traffic, Loading, Emergency Vehicle Access, and Parking Impacts starting on p. 4.2-142). Table 7 in the Project Description summarizes the proposed Service Improvements, including which routes have changes to their route alignments or changes to vehicle types. Table 8 in the Project Description provides additional detail regarding the proposed Service Improvements and Service Variants. In addition, these changes are provided graphically in the Route Maps provided as Appendix A to the Initial Study included as Appendix 2 to the EIR on the enclosed CD.

2 Clement and 2 Clement Service Variant – The proposed Service Improvements on the 2 Clement would result in minimal changes to transit operations on this route (i.e., the frequency of the 2 Clement route would increase, but would maintain the existing combined frequency of the 2 Clement route and the 3 Jackson route, which would be discontinued), and transit operations would remain similar to Existing conditions. With the Service Improvements a shift in ridership from the discontinued 3 Jackson route to this route would occur, and even with the additional ridership from the 3 Jackson, this route would operate well below the 85 percent capacity utilization standard.

Under the 2 Clement Service Variant, supplemental trolley service would be added, as described above, and the route would be extended on California Street between Arguello Boulevard and Eighth Avenue, which would overlap with the 1 California, 1AX California

Express, and 1BX California Express. Conditions on this segment would be similar to those currently existing to the east on California Street between Presidio and Arguello avenues and would not substantially affect the 1 California, 1AX California Express, or 1BX California Express operations, and transit operations on California Street between Presidio and Arguello avenues would remain similar to Existing conditions.

5 Fulton/5L Fulton Limited and 5 Fulton Service Variant – The proposed Service Improvements on the 5 Fulton/5L Fulton Limited would result in minimal changes to transit operations on the 5 Fulton/5L Fulton Limited. A short-line turnback route would be added to supplement the 5L Fulton Limited route that would turnaround at Eighth Avenue, utilizing Sixth Avenue, Cabrillo Street, and Eighth Avenue. The turnaround loop would overlap with the 44 O'Shaughnessy on Cabrillo Street between Sixth and Eighth avenues, and on Eighth Avenue between Cabrillo and Fulton streets. The 5 Fulton Service Variant would operate the 5 Fulton short line with motor coach service prior to installation of overhead bypass wires, which would not substantially change conditions along the 5 Fulton route; therefore, transit operations for the 5 Fulton would remain similar to Existing conditions.

14 Mission and 30 Stockton – On the 14 Mission, due to similar vehicle size, the change in vehicle type from trolley coach to motor coach would not result in changes in transit capacity or transit operations for the 14 Mission. Similarly, articulated buses are currently used on a portion of the 30 Stockton route that terminates at Van Ness Avenue (i.e., the 30 Stockton short line); therefore, existing bus stops in this segment can accommodate longer buses. Overall, the use of articulated buses for service on the 30 Stockton would not substantially change conditions along the 30 Stockton route; therefore, transit operations for the 30 Stockton and all lines crossing the 30 Stockton (for example, 22 Fillmore, 47 Van Ness, 49L Van Ness-Mission Limited, and 41 Union) or running along the same alignment (for example, the 45 Union-Stockton and 30X Marina Express) would remain similar to Existing conditions.

17 Parkmerced and 17 Parkmerced Service Variant – Route changes on the 17 Parkmerced and 18 46th Avenue would result in minimal changes to transit operations in the area. For the 17 Parkmerced route, service headways are currently between 15 and 20 minutes between buses, with four buses per hour traveling along the route. On streets where routes currently travel, and on streets that currently do not have transit, such as Font Boulevard, portions of Brotherhood Way, Chumasero Drive, and John Daly Boulevard, the proposed realignment would add up to four buses per hour onto these streets. With these proposed changes to transit service, transit and traffic conditions on these streets would remain similar to Existing conditions and would not cause a substantial increase in delays to other routes that may intersect with these routes (for example, the intersecting routes: 28 19th Avenue, 28L 19th Avenue Limited, and 29 Sunset). The increased service proposed on the 17 Parkmerced and the 14L Mission

Limited routes would result in some additional buses at the Daly City BART station. The SFMTA is currently working with BART, as well as other agencies and jurisdictions including Caltrans, SamTrans, Parkmerced, SFCTA, San Francisco State University, and Daly City, on the Daly City Station Access Improvement Plan to increase capacity at the station for Muni and SamTrans buses, improve the operations of the bus intermodal facility, and address bicycle and pedestrian safety in the station vicinity.[49]

- The 17 Parkmerced Service Variant would include an alternate route alignment that utilizes existing routes and also introduces transit service (up to four buses per hour) onto streets that did not previously have transit running on them, including Font Boulevard and Brotherhood Way. Therefore, with these proposed changes to transit service, transit and traffic conditions on these streets would remain similar to Existing conditions and would not cause a substantial increase in delays to other routes that may intersect with these routes.

- **33 Stanyan and 33 Stanyan Service Variant** – The rerouted 33 Stanyan service from Mission Street to Valencia Street would reduce the number of buses on the two-block segment (approximately 1,200 feet) of Mission Street between 16th and 18th streets, which would facilitate travel for the 14 Mission, 14L Mission Limited, and 14X Mission Express on that segment of Mission Street. The proposed relocation to Valencia Street, which has one travel lane in each direction and similar levels of congestion as Mission Street for this two-block segment during peak periods, would not substantially affect the operations of the 33 Stanyan.

- The 33 Stanyan Service Variant, which would reroute service from Mission Street to Guerrero Street, would reduce the number of buses on the two-block segment of Mission Street between 16th and 18th streets. The proposed relocation to Guerrero Street, which has two travel lanes in each direction and generally less congestion than on Mission or Valencia streets for this two-block segment during peak periods, would not substantially affect the operations of the 33 Stanyan.

76 Marin Headlands – A 24-month pilot project for the proposed 76 Marin Headlands Service Improvements is underway and is collecting data about the route's reliability, ridership, and passenger satisfaction to assess the benefits of the proposed service changes.[50] The proposed Saturday service would improve weekend transit service to the

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[49] Bay Area Rapid Transit District (BART), Daly City Station Access Improvement Plan, June 2012. Available online at: http://www.bart.gov/about/planning/dalycity.aspx. Accessed March 27, 2013.

[50] A 24-month pilot project for the 76 Marin Headlands service changes received environmental clearance on October 11, 2012. The case file is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File 2012.1140E.

Marin Headlands. The introduction of Saturday service on the 76 Marin Headlands would serve to accommodate the Saturday ridership demand, which is currently unknown (but being studied). Because the NX Judah Express only runs on weekdays, the proposed use of the existing NX Judah Express terminal for the 76 Marin Headlands on weekends would not affect operation of the NX Judah Express service.

91 Owl A and 91 Owl B – Splitting the 91 Owl route into two shorter routes (A and B) would improve reliability of the route service. The two Owl routes would run in the evenings on streets with existing transit service.

Overall, implementation of the Service Improvements, including those discussed specifically above, would not impact local or regional transit capacity or operations. Therefore, the impacts on transit related to the proposed Service Improvements would be less than significant.

- **Traffic, Loading, Emergency Vehicle Access, and Parking Impacts.** Under the Service Improvements and Service Variants, additional LRVs and buses would primarily travel on streets and through intersections on which the lines/routes are already located and result in a minimal increase in the number of transit vehicles per hour on weekdays. Most changes in service would result in one to three additional buses during the weekday peak periods, with some relocated/new routes resulting in four to eight additional buses during the weekday peak periods. In general, the Service Improvements that only affect the headway between buses (for example, a change from 20 minutes between buses to 15 minutes between buses – from three buses per hour to four buses per hour) would result in a minor change in the number of transit vehicles that are deployed and would not result in a noticeable effect on the transportation network. Table 7 in the Project Description includes a summary listing of which routes would experience a change in headways and Table 8 includes the existing and proposed headways for those routes under the proposed Service Improvements and Service Variants.

An increase in transit service along a route or change in route alignment, including associated changes for effected bus stops, would increase the potential for conflicts between transit vehicles and other vehicular traffic in some locations; however, the addition of transit vehicles on these existing routes, even at intersections operating poorly under Existing conditions (i.e., intersections operating at LOS E or LOS F conditions), would not substantially change traffic conditions along the route. Tables 16 and 17 in the TTRP traffic analysis on pp. 4.2-180 to 4.2-186 include the traffic operating conditions for the study intersections for Existing plus Service Improvements conditions for the a.m. and p.m. peak hours, respectively. As indicated in these tables, with the proposed changes in service headways, new routes, and route realignments for all Service Improvements, all study intersections would operate with similar delay and at the same LOS as under Existing conditions. Similar conditions (delay and LOS) would be anticipated at other City intersections with the Service Improvements.

Except as noted below, in general, the Service Improvements would not remove parking, and would similarly not affect commercial loading spaces or passenger loading/unloading zones. As noted below, for proposed route realignments, some parking would be removed for new transit stops (one to two spaces per stop), and potentially added where transit stops are proposed to be removed.

The Service Improvements would result in minimal changes to the right-of-way (parking, transit zones, terminal locations), and therefore would be a less-than-significant impact on emergency vehicle access. Emergency vehicle access would remain similar to Existing conditions and is not further discussed below.

As noted above, the Service Improvements include route realignments, and although the LOS analysis indicated no significant traffic impacts associated with the Service Improvements (which includes route realignments), a discussion of the impact of the individual route realignments on traffic operations is presented below.

1BX California Express – The route alignment of the 1BX California Express between Fillmore and Gough streets would change. Where the inbound (eastbound) route currently turns south on Fillmore Street, the proposed route would continue eastbound on California Street and turn south on Gough Street to Bush Street. The segment that travels south on Fillmore Street and east on Bush Street to Gough Street would be discontinued. The route realignment would reduce travel times on the 1BX California Express by eliminating travel on the frequently-congested segment of Fillmore Street between California and Gough streets (in comparison, Gough Street has three southbound lanes as compared to one travel lane in each direction on Fillmore Street). Traffic operations on the proposed new route segment would not substantially change over Existing conditions.

New bus stops would be added on Pine Street and on Bush Street at Van Ness Avenue to improve connections to the Civic Center, which may remove some parking related to the new stops, but would not affect any commercial loading spaces or passenger loading/unloading zones. The new bus stop would be used by the 1AX/BX California Expresses, 31AX/BX Balboa Expresses, and 38AX/BX Geary Expresses. The additional stops to accommodate passengers and facilitate transfers would increase overall bus travel times, but the increase would not be substantial enough to affect transit or traffic operations.

5 Fulton/5L Fulton Limited and 5 Fulton Service Variant – The proposed Service Improvements, which include a new Limited service and short-line service on the 5 Fulton/5L Fulton Limited, would result in minimal changes to transit operations of the route, and transit and traffic conditions would be similar to Existing conditions, even at intersections operating poorly under Existing conditions. A short-line turnback route would be added to supplement the 5L Fulton Limited route which would turnaround at Eighth Avenue, utilizing Sixth Avenue, Cabrillo Street, and Eighth Avenue. Traffic and parking conditions on the proposed turnaround route would not substantially change over Existing conditions.

6 Parnassus, 71 Haight-Noriega/71L Haight-Noriega Limited and 71L Haight-Noriega Limited Service Variant – The 6 Parnassus reroute would travel on streets and through intersections on which transit is currently located (for example, the 71 Haight-Noriega/71L Haight-Noriega Limited route on the section of Haight Street between Masonic Avenue and

- Stanyan Street), with the exception of a two-block segment (approximately 700 feet) of Stanyan Street between Frederick Street and Parnassus Avenue where currently no transit is located. Streets eliminated from the 6 Parnassus route would include Masonic Avenue, Frederick and Clayton streets, and Parnassus Avenue between Clayton and Stanyan streets. However, the

32 Roosevelt and the 33 Stanyan routes would continue to offer service on these route segments, and therefore, traffic and parking conditions would generally be similar to Existing conditions.

- The Service Improvements also include the 37 Corbett Service Variant 2 and the 43 Masonic Service Variant, which would provide service on the streets currently served by the 6 Parnassus, and would add transit service to Frederick Street between Clayton and Cole streets.

  No route changes are proposed for the 71 Haight-Noriega/71L Haight-Noriega Limited, but local 71 Haight-Noriega service would be replaced with limited-stop service. The 71L Haight-Noriega Limited Service Variant would provide clearer two-way inbound/outbound service on 22nd Avenue instead of inbound/outbound service on 22nd/23rd avenue couplet. Even with two-way service on 22nd Avenue, traffic conditions with the 71L Haight-Noriega Limited Service Variant, would generally be similar to Existing condition.

  At the intersection of Stanyan/Haight streets, the 71 Haight-Noriega/71L Haight-Noriega Limited and 33 Stanyan routes currently turn to and from Haight Street. Because of the narrow width of Haight Street, wider turning radii for buses, and high volume of pedestrians, bus operations are often constrained during peak periods. With the addition of the 6 Parnassus to the segment of Haight Street between Masonic Avenue and Stanyan Street, the number of buses turning at this intersection would increase, thereby increasing the potential for congestion along this busy corridor. To accommodate the additional buses, the SFMTA is investigating additional changes to the signal phasing to facilitate bus movements, particularly from northbound Stanyan Street onto eastbound Haight Street, by providing separate turn phases for southbound left turns (which would also be used by the 33 Stanyan buses) and for westbound left turns (which would be used by the 6 Parnassus and 71L Haight-Noriega Limited buses), during which time pedestrian flows would be restricted. With or without these signal adjustments, the effect on traffic congestion would be relatively small given the small increase in the number of buses making this turn over the entire peak hour (i.e., about six buses per hour).

- **8X Bayshore Express and 8BX Bayshore Express and associated Service Variants** – The 8X Bayshore Express and 8BX Bayshore Express routes would no longer continue north of Broadway, and this segment would be replaced by the new 11 Downtown Connector route. The layover for the 8X Bayshore Express and the terminals for the 8AX Bayshore Express and 8BX Bayshore Express would use existing bus zones and/or peak period tow-away lanes. Therefore, traffic conditions would be similar to those under Existing conditions, and the proposed service and route changes would not affect any parking or commercial loading spaces.

- The 8X Bayshore Express Service Variant and 8BX Bayshore Express Service Variant would retain service along the existing alignment between Broadway and North Point Street, and the existing bus stops and terminal facilities would be used. Therefore, for these Service Variants, traffic and parking conditions would remain similar to Existing conditions.

10 Sansome, 11 Downtown Connector, and 27 Folsom and associated Service Variants
The 10 Sansome would mostly travel on streets and through intersections on which transit is currently located. The 10 Sansome service in the northern segment of the route would continue as under Existing conditions, with two exceptions. Weekend and evening service, which currently uses Van Ness Avenue between Jackson Street and Pacific Avenue to loop,

- would instead loop via Franklin Street. The one-block segment (approximately 300 feet) on Van Ness Avenue (between

Jackson Street and Pacific Avenue would be eliminated to reduce conflicts with the planned BRT service on Van Ness Avenue. In addition, with implementation of the project-level SCI.2 – Sansome Street Contraflow Lane Extension project between Broadway and Clay Street, the 10 Sansome route would travel on Sansome Street rather than on Battery Street. South of Market, new service would be provided on Seventh Street between Mission Bay Boulevard and Irwin Street, on Irwin Street between Seventh and 16th streets, on 16th Street between Irwin and Connecticut streets, and on Connecticut Street between 16th and 17th streets.

With the exception of the northern segment, the new 11 Downtown Connector would predominantly travel on streets and through intersections on which transit is currently located, with similar service (replacing the 12 Folsom service in part). The exception is the one-block segment (approximately 500 feet) of Bay Street between Van Ness Avenue and Polk Street that would be used for the route turnaround. This route would also travel along streets that currently have transit (i.e., via the route of the existing 27 Bryant and 12 Folsom-Pacific, which would be discontinued), except for the northern extension on Leavenworth Street between Jackson and Vallejo streets, Vallejo Street between Leavenworth Street and Van Ness Avenue, and Hyde Street between Vallejo and Washington streets. Therefore, these Service Improvements would not substantially alter traffic operating conditions over Existing conditions. Outside of the removal of up to 14 parking spaces for the northern and southern terminals, parking conditions would not substantially change over Existing conditions.[51]

Both the 11 Downtown Connector and the 27 Folsom include proposed service variants (11 Downtown Connector Service Variant and 27 Folsom Service Variant 1) for two-way operation on Folsom Street, rather than the one-way couplet of eastbound Folsom Street and westbound Harrison Street. While the TEP does not propose changing the operation of Folsom Street from one-way to two-way, the 11 Downtown Service Variant and 27 Folsom Service Variant 1 are proposed in the event that Folsom and Howard streets are converted to two-way operation, as proposed as part of the Draft Central Corridor Plan.[52] Analysis of two-way Folsom Street and two-way Howard Street between Second and 11th streets will be conducted as part of the Central Corridor Plan EIR, and the proposed two-way street segments would connect with the planned two-way roadway network on Howard and Folsom streets east of Second Street designed as part of the Transit Center District Plan. As part of the Central Corridor Plan EIR, curb parking regulations and location of bus stops will be determined, and the exact number of parking spaces to be eliminated will be determined. As

[51] For the 11 Downtown Connector southern terminal, up to eight parking spaces would be removed on the east side of South Van Ness Avenue at its intersection with Market Street. For the 11 Downtown Connector northern terminal, up to six parking spaces would be removed on Van Ness Avenue between Bay and North Point streets.

[52] San Francisco Planning Department, Central Corridor Plan Draft Plan for Public Review, April 2013. Available online at: http://www.sf-planning.org/index.aspx?page=2557. Accessed April 18, 2013.

previously described, each new stop would require removal of two to five parking spaces in any one location, which would not substantially change parking conditions in the area. The 27 Folsom Service Variant 1 also includes two-way service on Leavenworth and Ellis streets, if these streets are converted to two-way operation under the Tenderloin-Little Saigon Community Transportation Study.[53]

The Service Improvements would include the 27 Folsom Service Variant 2, which would reroute service in both directions for the route segment between 11th and Cesar Chavez streets from Folsom Street to Harrison Street. The segment of Harrison Street between 11th and Cesar Chavez streets does not currently have transit service. It generally contains one travel lane in each direction (the exception is southbound Harrison Street between 13th and 16th streets, which has two southbound travel lanes) and a bicycle lane between 13th and 22nd streets. Between 22nd and Cesar Chavez streets, the bicycle lane is discontinuous due to diagonal and 90-degree parking on the east side of Harrison Street. Rerouting of the 27 Folsom service under 27 Folsom Service Variant 2 to Harrison Street would remove transit service from Folsom Street and introduce transit service onto Harrison Street. Transit stop locations would be relocated under this Service Variant resulting in the removal of some parking on Harrison Street (two to five spaces for each new stop location) and potential addition of parking on Folsom Street between 11th and Cesar Chavez streets due to removal of bus stops. Traffic and transit conditions on Harrison Street would be similar to Existing conditions on Bryant and Folsom streets, where there is one travel lane in each direction.

- The Service Improvements also include the 11 Downtown Connector Service Variant 2 and 27 Folsom Service Variant 3. The 11 Downtown Connector Service Variant 2 would include an additional route segment along the existing 12 Folsom-Pacific alignment south of the intersection of 11th and Folsom streets, and would not reroute the 27 Bryant to Folsom Street in the South of Market and Inner Mission. The 27 Folsom Service Variant 3 includes an alternate alignment that would maintain the existing routing and name of the 27 Bryant south of Market Street under the 11 Downtown Connector Service Variant 2. Under the 27 Folsom Service Variant 3, the existing alignment of the 27 Bryant south of Market Street would not be realigned from Bryant Street to Folsom Street, as proposed under the 27 Folsom Service Improvements.

[53] Information on the Tenderloin-Little Saigon Community Transportation Study is available online at http://www.sfcta.org/transportation-planning-and-studies/neighborhood-transportation-planning/tenderloinlittle-saigon. Accessed June 10, 2013.

As indicated above, the 10 Sansome, new 11 Downtown Connector, and 27 Folsom routes would travel predominantly on streets and through intersections on which they are currently located, and/or on streets where transit already exists (with the exception of Harrison Street under 27 Folsom Service Variant 2). The Service Improvements or the identified Service Variants described above would not substantially change traffic conditions along the routes, even at intersections operating poorly under Existing conditions.

16X Noriega Express and 16X Noriega Express Service Variant – Adding 16X Noriega Express service to the portion of Market Street between Fourth and Spear streets would have only a marginal effect on the overall traffic conditions of this portion of the street. This portion of Market Street already accommodates a high volume of buses in the peak periods, and no new infrastructure would be required on Market Street. Service on the one block segment of Spear Street between Market and Mission streets (approximately 600 feet), Mission Street between Spear and Main streets (approximately 350 feet), and Main Street between Mission and Market streets (approximately 650 feet) would be similar in that a high volume of buses already uses these streets. The Service Improvements would not substantially change traffic conditions along the route, even at intersections operating poorly under Existing conditions. These changes would not substantially affect parking conditions in the area.

In addition, the Service Improvements would include Service Variants for the 16X Noriega Express as well as for the 71L Haight-Noriega Limited. Service on these routes is currently provided inbound on 22nd Avenue and outbound on 23rd Avenue between Lincoln Way and Noriega Street. 16X Noriega Express Service Variant and 71L Haight-Noriega Limited Service Variant are proposed to consolidate service such that both inbound and outbound service would be provided on 22nd Avenue. This would eliminate transit service on 23rd Avenue and increase the volume of buses on 22nd Avenue. Traffic levels on 22nd Avenue are relatively low, and the mixed-flow lane in each direction could accommodate the additional buses with the consolidation in the southbound direction. Some parking, related to new outbound stops on 22nd Avenue would be removed (two to five spaces for each new stop location), and some added with the removal of transit stops on 23rd Avenue. Overall the existing activity levels, including bicycling (22nd Avenue is not a designated bicycle route), pedestrians, and vehicle traffic, are relatively low along this section of 22nd Avenue, and the addition of southbound service in the p.m. peak period and to the existing northbound service is not expected to have a substantial effect on this travel. No new right-of-way would be required for these service changes. Therefore, these two Service Variants would not substantially change traffic conditions along the route, even at intersections operating poorly under Existing conditions. These changes would not substantially affect parking conditions in the area.

- **17 Parkmerced, 17 Parkmerced Service Variant, and 18 46th Avenue** – Proposed service on the 17 Parkmerced and 18 46th Avenue would be at 15-minute headways between buses in both directions during both peak periods. This would increase existing traffic volumes by up to four buses per hour in each direction. The Service Improvements would not substantially change traffic conditions along these routes, even on new transit route segments and at intersections which may operate poorly under Existing conditions. This relatively minor increase is not expected to have a substantial effect on Existing conditions of the transportation network.

  With the exception of some new street segments for the 17 Parkmerced route, the realignment of the 18 46th Avenue and of the 17 Parkmerced would result in both routes traveling on segments that are already served by transit; therefore, on streets where service is already provided, no parking spaces would be removed. On street segments where the realignment would add transit, new stops may result in the loss of two to five parking spaces in any one location. In addition, the new terminal on Sloat Boulevard at Havenside Drive would result in the removal of up to four parking spaces. These changes would not substantially affect parking conditions along the 17 Parkmerced or 18 46th Avenue routes.

- The Service Improvements also include the 17 Parkmerced Service Variant, which would add transit service to Font Boulevard between Lake Merced Boulevard and Arballo Drive (2 travel lanes in each direction), Chumasero Drive between Font Boulevard and Brotherhood Way (1 travel lane in each direction), and Brotherhood Way between Junipero Serra and Lake Merced boulevards (2 travel lanes in each direction). The addition of transit service to these streets would not substantially change traffic conditions on these streets, and conditions would be similar to Existing conditions on adjacent street segments on which the 17 Parkmerced and the 18 46th Avenue routes currently travel.

19 Polk – With the exception of the new route segment on Polk Street between Eddy and McAllister streets, the 19 Polk would travel on streets and through intersections that currently have transit. Traffic operations on this new segment would be similar to the segment to the north of Eddy Street. Therefore, these proposed changes would not represent a substantial change to traffic or parking conditions over Existing conditions.

22 Fillmore and 22 Fillmore Service Variants 1 and 2 – The 22 Fillmore route, including 22 Fillmore Variants 1 and 2, would travel mostly on streets and through intersections that currently have transit, with the exception that the 22 Fillmore service improvements and 22 Fillmore Service Variants 1 and 2 would introduce transit on the segment of 16th Street between Connecticut and Third streets, and both Service Variants would utilize motor coach service between the 16th Street BART Station and the Mission Bay terminus. As indicated in the level of service analysis, these types of Service Improvements would not substantially change traffic conditions (delay or level of service) along the route, even at intersections operating poorly under Existing conditions. Outside of the removal of two to five parking spaces in any one location for new transit stops for the segments where no service currently exists, parking conditions would not change compared to Existing conditions as a result of this service change.

23 Monterey – With the exception of the new route segments on Oakdale Avenue and Industrial Street east of Toland Street, the 23 Monterey would travel on streets and through intersections that currently have transit (i.e., existing segments for either the 23 Monterey or the 24 Divisadero, which also runs on Palou Avenue between Industrial and Phelps streets). Intersections along the new segment on Oakdale Avenue between Toland and Industrial streets, and Palou Avenue between Industrial and Phelps streets are currently all-way stop-controlled (i.e., intersections of Industrial Street/Oakdale Avenue, Industrial Street/Palou Avenue, Rankin Street/Palou Avenue, Silver/Palou avenues, and Phelps Street/Palou Avenue) and, due to the low peak hour traffic volumes, operate at acceptable conditions. An increase of up to three buses per hour at these intersections would not substantially affect the unsignalized intersection operating conditions. New transit stops on the new route segment may result in the loss of two to five parking spaces in any one location. Therefore, the Service Improvements on the 23 Monterey route would not substantially change traffic or parking conditions along the route.

- **28 19th Avenue and 28L 19th Avenue Limited and associated Service Variants** – Service headway and route changes on the 28 19th Avenue and 28L 19th Avenue Limited would result in minimal changes to transit operations on these routes (one to two additional buses per peak hour) and would travel on streets that currently have transit. Transit and traffic conditions would therefore, be similar to

Existing conditions and would not cause a substantial increase in delays to other transit routes that travel along the same segment (for example, Golden Gate Transit) or that may intersect with these routes (for example, L Taraval).

For the 28 19th Avenue Limited, up to 10 parking spaces would be removed at the current 30 Stockton Short line terminal on North Point Street between Van Ness Avenue and Polk Street. In addition, the southern terminal for this route would be located on Geneva Avenue midblock between Mission Street and Alemany Boulevard, requiring the removal of up to five parking spaces. Other than for these terminals, parking conditions would remain the same as under Existing conditions.

- The Service Improvements also include the 28 19th Avenue Service Variant and the 28L 19th Avenue Limited Service Variant. The 28 19th Avenue Service Variant would retain the existing routing of the 28 19th Avenue between the Golden Gate Bridge Toll Plaza Area and the intersection of Lombard and Laguna Streets and would extend service north to the intersection of Van Ness Avenue/North Point Street on streets that currently have transit, whereas the 28L 19th Avenue Limited Service Variant would terminate service at Park Presidio Boulevard and California Street, and would not provide express service to the Presidio or Fort Mason. Therefore, for these Service Variants, traffic and parking conditions would remain similar to Existing conditions.

- **29 Sunset** – As part of the realignment of the 29 Sunset, transit service would be introduced on Persia Avenue for a short segment (one block, or approximately 250 feet) between Mission Street and Ocean Avenue. The Service Improvements would not result in the removal of parking; however, the TTPI.1 Persia Triangle Improvements to support the improvements would remove some parking related to a new transit stop. The realignment of the 29 Sunset and the 54 Felton from Geneva Avenue to Ocean Avenue would require pedestrians to access the Balboa Park Station from the Ocean Avenue side of the station via an existing pedestrian pathway on the west side of the station. The SFMTA is working with the SFCTA and BART on the Balboa Park Station Area Circulation Study, which includes implementation of pedestrian and bicycle improvements around the station to ensure similar or improved pedestrian access and crossings to the station.[54] Therefore, traffic and parking conditions would remain the same as under Existing conditions.

[54] Fehr & Peers and San Francisco County Transportation Authority, Balboa Park Station Area Circulation Study, March 2013. Available online at: http://www.sfcta.org/transportation-planning-and-studies/current-research-and-other-projectsstudies/balboa-park-station-area-circulation-study. Accessed March 27, 2013.

32 Roosevelt and 37 Corbett and associated Service Variants – The route changes for these two routes would introduce transit service on streets that currently do not have transit: on Sanchez Street between Market and 14th streets, Frederick Street between Cole and Clayton streets, and Clayton Street between Parnassus Avenue and Ashbury Street for the 32 Roosevelt route, and on Sanchez Street between Market and 14th streets for the 37 Corbett route. The introduction of service on streets that currently do not have transit would result in the establishment of new transit stops, which could remove two to five parking spaces depending on the type of stop. Similarly the removal of service on some streets would remove transit stops, potentially converting that space, if it was a bus zone, into additional parking spaces. Neither change along the 32 Roosevelt or 37 Corbett routes would affect commercial loading spaces.

Both routes would use the loop route from the terminal on Church Street, which would increase the number of buses on these streets by up to seven buses per hour during the a.m. and p.m. peak periods. Although an increase over Existing conditions, these additional buses would not substantially affect the operating conditions of the all-way stop-controlled and two-way stop controlled intersections along the loop route. Therefore, the Service Improvements would not substantially change traffic conditions along the routes, even at intersections operating poorly under Existing conditions. The new terminal on Church Street between Market and Reservoir streets would require the removal of up to five parking spaces. Both routes include a Service Variant with an alternative alignment along Church Street, Hermann Street, Fillmore Street, and Duboce Avenue, which, with the exception of the one block of Fillmore Street, already have existing transit service, and therefore traffic and parking conditions for the Service Variants would be similar to Existing conditions.

- The Service Improvements also include 37 Corbett Service Variant 2 which would maintain the existing routing on the northern segment of the 37 Corbett (i.e., the 32 Roosevelt route would not be implemented) and would provide an alternative alignment on Frederick Street between Cole Street and Masonic Avenue, and on Masonic Avenue between Frederick and Haight streets, and would use the existing 6 Parnassus terminal at Haight Street and Masonic Avenue. The 37 Corbett Service Variant 2 would add transit service to the two-block segment (about 630 feet) of Frederick Street between Clayton and Cole streets. Traffic conditions with the addition of transit service to this segment would be similar to those on Frederick Street east of Clayton Street, and would be similar to Existing conditions.

- **33 Stanyan and 33 Stanyan Service Variant** – The two-block reroute (approximately 1,200 feet along Valencia Street) of the 33 Stanyan from Mission Street to Valencia Street (a distance of about 650 feet) would alleviate transit congestion on the segment of Mission Street between 16th and 18th streets. The 14 Mission, 14L Mission Limited, and 14X Mission Express currently stop at the Mission Street bus stops, including at 16th/Mission streets and the 22 Fillmore and 33 Stanyan stops on 16th Street. It is not anticipated that the two-block reroute of 33 Stanyan service from Mission Street to Valencia Street would substantially affect traffic operations at the intersection of Valencia/16th streets because the addition of four buses per hour would not change the intersection operating conditions or LOS (i.e., the nearby intersection of 16th/Guerrero streets, which has higher traffic volumes and operates at LOS C under Existing conditions and would operate at the same LOS under Existing plus Service Improvements conditions). Therefore, the introduction of transit service (four buses per hour) on this portion of Valencia Street would not substantially affect traffic operating conditions.

The relocation of the 33 Stanyan service from Mission Street to Valencia Street would require up to two new bus stops with the removal of two to five parking spaces for each stop. In addition, the elimination of up to eight other parking spaces would be required to facilitate left turns made by the buses. None of these parking space removals would be commercial loading spaces or passenger loading/unloading zones. Therefore, the service changes to the 33 Stanyan would not affect commercial loading spaces or passenger loading/unloading zones.

The rerouted 33 Stanyan would also travel on 16th Street between De Haro and Connecticut streets and on Connecticut Street between 16th and 17th streets, which currently do not have transit service. With the addition of transit service, conditions would be similar to those on 16th Street to the west and Connecticut Street to the south. Similar to above, the introduction of 33 Stanyan service on streets that currently do not have transit would result in the establishment of new transit stops, which could, depending on the type of stop, remove two to five parking spaces per transit stop. Under the 22 Fillmore Service Variant 2, the existing 33 Stanyan route between Potrero Avenue and the current southern terminus at 20th Street would be maintained. Overall, these service changes would not substantially affect traffic or parking conditions.

- The Service Improvements also include the 33 Stanyan Service Variant that would include an alternative alignment on 16th Street between Mission and Guerrero streets, and on Guerrero Street between 16th and 18th streets. It is not anticipated that the alternate alignment on Guerrero Street between 18th and 16th streets would substantially affect traffic operations at the intersections in this segment or Guerrero/18th streets because the addition of four buses per hour would not change the intersection operating conditions or LOS (i.e., the study intersection of 16th Street/Guerrero Street currently operates at LOS C under Existing conditions).

- **35 Eureka and 36 Teresita and Associated Service Variants** – With the exception of the one-block segments of Arlington Street between Bosworth and Wilder streets, Wilder Street between Diamond and Arlington streets near the Glen Park BART Station, and the one-block segment of 21st Street between Douglass and Eureka streets, the 35 Eureka and 36 Teresita would travel primarily on streets and through intersections that transit currently uses. Therefore, parking conditions would be similar to Existing conditions. For both the 35 Eureka and 36 Teresita routes, the increase in service would be one bus per hour per direction, which would not substantially affect traffic operating conditions, including any changes to delay or intersection LOS operating conditions. For the 35 Eureka route, Arlington, Wilder, and 21st streets are two-way with one travel lane in each direction, and intersections along the proposed realignment are either all-way stop-controlled or two-way stop-controlled. Traffic conditions for the 35 Eureka Service Variant, which would route service onto Brompton Street between Chenery and Bosworth streets rather than Diamond Street, would be similar to Existing conditions. The Service Improvements including Service Variants would not substantially change traffic along the routes, even at intersections operating poorly under Existing conditions. Overall, these service changes would not substantially affect traffic or parking conditions.

- The 35 Eureka Service Variant 2 would maintain the existing routing of the 35 Eureka on Digby, Farnum, Moffit, and Addison streets, and would extend service from the intersection of Bemis and Addison streets, outbound towards the Glen Park BART Station via Bemis Street between Addison and Miguel streets, Miguel Street between Bemis and Arlington streets, and Arlington Street between Miguel and Bosworth streets. Service would terminate on Bosworth Street across from the Glen Park BART Station between Arlington and Diamond streets. Inbound service towards the Castro Station would continue from the southern terminal on Bosworth Street via Diamond Street between Bosworth and Chenery streets, Chenery Street between Diamond and Miguel streets, Miguel Street between Chenery and Bemis streets, and Bemis Street between Miguel and Addison streets, where it would connect with the existing 35 Eureka route. The 35 Eureka Service Variant 2 new transit street segments not currently served by any Muni route would be Bemis Street between Addison and Miguel streets, Miguel Street between Bemis and Arlington streets, and Arlington Street between Miguel and Bosworth streets. Bemis, Miguel, and Arlington streets are two-way with one travel lane in each direction, and intersections along the proposed realignment are either all-way stop-controlled or two-way stop-controlled. Traffic and parking conditions for the 35 Eureka Service Variant 2 would be similar to the Service Improvements and Existing conditions.

- The 35 Eureka Service Variant 3 would, similar to the 35 Eureka Service Variant 2, maintain the existing routing of the 35 Eureka on Digby, Farnum, Moffit, and Addison streets, but would include an alternative routing to the 35 Eureka Service Variant 2 in which two-way service would be provided on Chenery Street. This would replace the one-way transit service that is proposed for Arlington Street outbound towards the Glen Park BART Station, and on Chenery Street inbound towards the Castro Station under the 35 Eureka Service Variant 2. The 35 Eureka Service Variant 3 new transit street segments not currently served by any Muni route would be Bemis Street between Addison and Miguel streets, and Miguel Street between Bemis and Chenery streets. Chenery Street has one travel lane in each direction, and intersections are either all-way stop-controlled or two-way stop-controlled. Traffic and parking conditions for the 35 Eureka Service Variant 3 would be similar to the Service Improvements and to Existing conditions.

- **43 Masonic and 43 Masonic Service Variant** – The addition of up to two buses during the peak hours along the 43 Masonic route would not substantially affect traffic operations, even at intersections operating poorly under Existing conditions. Because the 43 Masonic would travel on streets and through intersections on which the transit routes are located (i.e., either the 43 Masonic, the 28 19th Avenue, 28L 19th Avenue Limited, or the PresidiGo shuttle) and would not result in changes to the right-of-way or to on-street parking.

- The Service Improvements also include the 43 Masonic Service Variant, which would include an alternative alignment on Masonic Avenue between Haight and Frederick streets, and on Frederick Street between Masonic Avenue and Cole Street. The 43 Masonic Service Variant would provide service on the segments of Masonic Avenue and Frederick Street that would be formerly served by the 6 Parnassus (i.e., the 6 Parnassus Service Improvements would follow Haight and Stanyan streets). The 43 Masonic Service Variant would provide transit service on a two-block segment currently not served by Muni (about 630 feet) of Frederick Street between Clayton and Cole streets. Traffic and parking conditions with the addition of transit service to this segment would be similar to those on Frederick Street east of Clayton Street, and would be similar to Existing conditions.

47 Van Ness – The proposed changes to the 47 Van Ness would introduce transit on South Van Ness Avenue between 11th and 13th streets, and on 13th Street between South Van Ness Avenue and Bryant Street, and Division Street between Potrero Avenue and Townsend Street. Any changes to transit stops on these new service segments may require the removal of some parking, approximately two to five parking spaces per transit stop. Parking removals associated with new stops would not substantially change parking conditions over Existing conditions. Although this is based on potential locations, this change would not include the removal of any commercial loading spaces. The segments of South Van Ness Avenue between Mission and 13th streets, 13th Street between South Van Ness Avenue and

Bryant Street, and Division Street between Brannan and Townsend streets do not have any commercial loading spaces that would be affected by the realignment of the 47 Van Ness.

Both South Van Ness Avenue and 13th Street have three travel lanes in each direction, and the introduction of transit on these streets would not substantially affect traffic operating conditions at the study intersections. The Service Improvements would not substantially change traffic conditions along the routes, even at intersections operating poorly under Existing conditions.

48 Quintara-24th Street – Under the Service Improvements, the portion of the 48 Quintara-24th Street east of Connecticut Street would be discontinued, and instead the 48 Quintara-24th Street would follow the existing 19 Polk route to Hunters Point Shipyard (via Evans Avenue, Middle Point Road, and Innes Avenue). Because the 48 Quintara-24th Street would essentially replace the 19 Polk service on this segment, traffic and parking conditions would remain essentially the same as under Existing conditions.

The 48 Quintara-24th Street would add transit service to Clipper Street between Grandview Terrace and Douglass Street, and to Douglass Street between Clipper and 24th streets. However, traffic operations along these segments, where intersections are either all-way stop-controlled or two-way stop controlled, would not be substantially changed over Existing conditions with the addition of up to four buses per hour. Any changes to transit stops on these new service segments, depending on the type of transit stop, may require the removal of some parking, approximately two to five parking spaces per transit stop.

Because service headways and route changes on the 19 Polk and 48 Quintara-24th Street would result in minimal changes to overall transit operations (for example, the 48 Quintara-24th Street would cover the southern portion of the 19 Polk that would be discontinued), transit, traffic and parking operations would be similar to Existing conditions. The Service Improvements would not substantially change traffic conditions along the routes, even at intersections operating poorly under Existing conditions. Overall, these service changes would not substantially affect traffic or parking conditions.

52 Excelsior – Under the Service Improvements, the new terminal for this route would be located on the western side of Phelan Avenue between Cloud Circle Street and Ocean Avenue, which would result in a reduction of up to five parking spaces. This service change would not substantially affect parking conditions. Additionally, no commercial loading spaces or passenger loading/unloading zones would be affected.

As the revised 52 Excelsior would travel on streets and through intersections on which transit routes are currently located and would not result in changes to the right-of-way, there would be no effect on traffic operations. With the proposed Service Improvements, traffic and parking conditions along the route would remain similar to Existing conditions.

54 Felton – Under the Service Improvements, the 54 Felton route would travel on Bacon Street between Holyoke and University streets, on two segments of Ingalls Street, one between Revere Street and Palou Avenue, and one between Oakdale and La Salle avenues, which do not currently have transit service (i.e., instead of on Woolsey Street two blocks to the south, Revere Street between Third and Ingalls Street, La Salle Avenue from Hudson Avenue to Ingalls Street). Operating conditions on these new segments would be similar to those on Bacon Street to the east, and Ingalls Street to the north and south, because the intersections along this segment are also unsignalized (all-way stop-controlled or two-way stop-controlled). Any changes to transit stops on these new service segments may require the removal of some parking, approximately two to five parking spaces per transit stop, depending on the type of transit stop (flag or pole stops do not require parking removal). The Service Improvements would not substantially change traffic or parking conditions along the route.

56 Rutland – Intersections on the streets proposed to be served by the reconfigured 56 Rutland (Leland Avenue between Sawyer and Rutland streets, Rutland Street between Tioga and Wilde avenues, Alpha Street between Leland and Arleta avenues, and Arleta Avenue between Alpha Street and Bayshore Boulevard) are unsignalized, with low traffic volumes. The addition of up to one bus per hour (i.e., change from 30- to 20-minute headways) would not substantially affect traffic operating conditions at intersections along the route, even at intersections operating poorly under Existing conditions. The new terminal for the 56 Rutland on Arleta Avenue would result in the elimination of up to five parking spaces but would not remove any commercial loading spaces or passenger loading/unloading zones. For these reasons, traffic and parking conditions would remain similar to those under Existing conditions.

58 24th Street – The eastern portion of the new 58 24th Street route would replace the existing 48 Quintara-24th Street route and would therefore travel on streets that currently have transit. In addition, the 58 24th Street route would travel on Clipper Street between Diamond and Castro streets, which currently does not have transit service. Clipper Street is two-way with one travel lane in each direction, and the intersections of Diamond/Clipper streets and Castro/Clipper streets are all-way stop-controlled intersections. The addition of the new service, with up to four buses per hour per direction along an existing bus route, or on a segment without existing transit service would not substantially affect traffic conditions along the 58 24th Street route, as traffic conditions would remain similar to those under Existing conditions.

The terminal for the new 58 24th Street route would be located in the existing bus stop on Castro Street on the nearside of northbound Castro Street at its intersection with 25th Street. The bus stop would be extended, requiring the removal of up to five parking spaces. Outside of the removal of two to five parking spaces in any one location for new transit stops for the segments where no service previously existed and the removal to accommodate the terminal, parking conditions along this route would not change substantially compared to Existing conditions.

76 Marin Headlands – The Service Improvement proposed for the 76 Marin Headlands route alignment would not be expected to generate new vehicle trips or reduce roadway capacity, and thus would not result in changes to the operating conditions at any intersections along the route. Due to the limited frequency of the 76 Marin Headlands service (i.e., hourly service is provided on Sundays), the addition of Saturday service (with a schedule similar to the Sunday hourly service) is not anticipated to substantially affect Saturday traffic conditions at intersections along the route, even at intersections operating poorly under Existing conditions. The northern terminus of the 76 Marin Headlands route would be extended by 0.75 mile to the Point Bonita Lighthouse parking lot and trailhead. The addition of one round-trip bus per hour on weekends would not substantially affect traffic operating conditions on Field Road. The Service Improvement for the 76 Marin Headlands would not affect parking within the Marin Headlands, and the service would utilize the existing northern terminus within the Fort Cronkhite parking lot. The route segment south of Market Street to the downtown San Francisco Caltrain Station would be discontinued. The new southern terminus of the 76 Marin Headlands route would be located in the vicinity of Montgomery Station. The southern terminal would be located at the existing NX Judah Express terminal, at the northwest corner of the intersection of Sutter and Sansome streets. This terminal would be at an existing farside stop and would not require the removal of any parking. Overall, these service changes would not substantially affect traffic or parking conditions.

Overall, for the reasons provided above the impacts of the Service Improvements on traffic, loading, and parking would be less than significant*.*

Pedestrian and Bicycle Impacts – Implementation of the Service Improvements would not result in overcrowding of sidewalks or create potentially hazardous conditions for pedestrians. The proposed changes in service headways could result in an increase in the number of buses along the routes affected by the TEP proposals, which could result in an increased potential for pedestrian, bicycle, and transit conflicts; however, this increased service would not result in hazardous conditions for pedestrians as explained below.

Removing or realigning routes could increase the physical effort required to reach transit relative to Existing conditions for some transit riders and as such, may pose a challenge to some riders. However, route removal/realignment would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas. Although less than significant, realignments that could result in changes to the pedestrian environment or additional effort to reach transit are further discussed below.

Implementation of the Service Improvements would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle facilities or accessibility for the following reasons. Some transit routes with proposed Service Improvements overlap with the bicycle route network (for example, the J Church where Bicycle Route 45 overlaps on 30th Street and San Jose Avenue, which runs as a Class II facility (bicycle lane) and the N Judah line, which overlaps with Bicycle Route 40 that runs on Kirkham Street as a Class II facility). However, transit routes overlapping with bicycle routes and facilities do not affect the operation of these facilities. Service Improvements would typically increase the number of transit vehicles along a route; however, an increase of a few buses an hour would not be noticeable and not substantially affect bicycle travel along the route. With implementation of the Service Improvements, route realignments may introduce transit onto streets that currently do not have transit; however, many of these new street segments are not designated bicycle routes and if they are bicycle routes, conditions for bicyclists would be similar to Existing conditions on other segments along the route. Alternative bicycle routes are available to bicyclists, as bicyclists are permitted to use any street within the City's street network. Diversions to other streets or routes would not present a hazard to bicyclists, but rather would be an inconvenience not rising to the level of making bicycle travel infeasible or an unattractive alternative. For these reasons, transit routes overlapping with bicycle routes, even where new transit service is being added, would not represent a hazardous conditions for bicyclists or otherwise substantially interfere with bicycle facilities. The Service Improvements would include route realignments, and although less-than-significant, the impact of the route realignments on pedestrians and bicyclists are described in more detail below.

2 Clement, 2 Clement Service Variant, and 3 Jackson – With the discontinuation of the 3 Jackson route, some passengers may need to walk farther to access the 2 Clement route, which may be an inconvenience or increase the physical effort required to reach the 2 Clement route. As indicated above, while this change may pose a challenge to some passengers, the route elimination would be considered a less-than-significant impact to pedestrians because east of Fillmore Street, the 2 Clement route runs along the same alignment as the 3 Jackson. West of Fillmore Street, the 10 Sansome, 22 Fillmore, and 24 Divisadero would serve the 3 Jackson passengers. Bicycle Route 16 (Class III) runs on the Sutter and Post street portions of the 2 Clement route; however, the Service Improvements would not affect frequency of transit service along this portion of the route, and therefore bicycle conditions would not substantially change over Existing conditions.

6 Parnassus – Streets eliminated from the 6 Parnassus route would include Masonic Avenue between Haight and Frederick streets, Frederick Street between Masonic Avenue and Clayton Street, Clayton Street between Frederick Street and Parnassus Avenue, and Parnassus Avenue between Clayton and Stanyan streets. The 32 Roosevelt and 33 Stanyan routes would continue to offer service on the segments no longer served by the 6 Parnassus. With the proposed reroute, transit access along Haight Street would increase, and pedestrian conditions would be similar to Existing conditions.

- The 6 Parnassus currently operates on Haight Street where Bicycle Route 30 (Class III, sharrows) runs for the one-block section between Pierce and Scott streets (approximately 450 feet); however, the Service Improvement changes to frequency would not substantially affect bicycle conditions on this block. This is because there are no designated bicycle facilities on Haight or Stanyan streets in the vicinity of the proposed reroute (although Stanyan Street has sharrows in the southbound direction), and therefore, the Service Improvements for the 6 Parnassus would not substantially affect bicycle facilities. Stanyan Street is not a designated bicycle route and has two mixed-flow travel lanes in each direction, and the increase in transit service on the short segment of Stanyan Street between Haight Street and Parnassus Avenue would not substantially affect bicycle travel along this street as conditions for bicyclists would remain similar to Existing conditions.

- The Service Improvements also include the 37 Corbett Service Variant 2 and the 43 Masonic Service Variant, which would provide service on the streets currently served by the 6 Parnassus, and would add transit service to Frederick Street between Clayton and Cole streets, which is not a designated bicycle route.

- **10 Sansome, 11 Downtown Connector, 12 Folsom-Pacific, 27 Folsom and associated Service Variants** – The proposed route changes would remove 10 Sansome service from Townsend Street (renaming the route from 10 Townsend to 10 Sansome), and from 17th and Rhode Island streets, and would remove 27 Bryant service from Bryant Street. Some passengers may need to walk further to access these routes and some may be inconvenienced. Existing passengers on Bryant Street could also use the 9 San Bruno/9L San Bruno Limited service. The 10 Sansome would travel along the route of the existing 10 Townsend; however, service on portions of Townsend Street (part of Bicycle Route 36 with Class II bicycle lanes) and Rhode Island and 17th streets would be eliminated. The 10 Sansome would continue to run along streets that are designated bicycle routes, including Townsend Street (Bicycle Route 36 with Class II bicycle lanes), Second and Sansome streets (Bicycle Route 11, a Class III facility, with some locations having sharrows), and Broadway (Bicycle Route 10, a Class III (designated bicycle route where bicycles share the travel lanes with vehicles) facility). Overall, conditions along the 10 Sansome route for bicyclists would remain similar to Existing conditions.

The new 11 Downtown Connector would travel along streets that currently have transit, including the 8X Bayshore Express and 8BX Bayshore Express segment north of Broadway, and similar to the 10 Sansome, would run along streets that have portions designated as bicycle routes, including Folsom Street (Bicycle Route 30 with Class II bicycle lanes); Second, Sansome, Washington, and Clay streets and Columbus Avenue (all Bicycle Route 11 – Class III, designated bicycle route); and North Point Street (Bicycle Route 2 - Class II, bicycle lanes). The 11 Downtown Connector would also travel on Polk Street between North Point and Bay streets and use the one-block segment of Polk Street (approximately 300 feet along Bicycle Route 25 – Class II/III, bicycle lanes/designated route) for the route turnaround. Overall, because conditions for bicyclists along the 11 Downtown Connector route would remain similar to Existing conditions, the new service would not result in hazardous conditions for bicyclists.

The 27 Folsom would travel along the route of the existing 27 Bryant and 12 Folsom-Pacific (which would be discontinued); however, service on Bryant Street would be eliminated and instead, the 27 Folsom would be rerouted onto Folsom Street and Harrison Street. Folsom Street east of 13th Street is part of Bicycle Route 30 (with Class II bicycle lanes) but also serves the existing 12 Folsom-Pacific route. Therefore, the 27 Folsom would continue to primarily travel along streets that currently have transit and the Service Improvements would not result in a substantial change in bicycle conditions from Existing conditions. There are no designated bicycle routes on the 27 Folsom extension north via Leavenworth and Hyde streets to Vallejo Street, therefore, bicycle facilities would not be affected, and conditions for bicycles travelling on these off-network streets would be similar to those south of Jackson Street.

As part of the new northern terminus/turnaround, the 27 Folsom would also travel on Polk Street for one block (approximately 300 feet) between Green and Vallejo streets, and on Green Street for one block (approximately 450 feet) between Polk Street and Van Ness Avenue. Both Polk and Green streets are part of the bicycle route network (Bicycle Route 25 on Polk Street and Bicycle Route 6 on Green Street) and have sharrows along the 27 Folsom route segments. It is not anticipated that turnaround maneuvers for transit on these two blocks would substantially alter bicycle conditions over Existing conditions, or substantially increase conflicts between buses and bicyclists on these streets.

Both the 11 Downtown Connector and the 27 Folsom include service variants (i.e., the 11 Downtown Connector Service Variant 1 and 27 Folsom Service Variant 1) for two-way operation on Folsom Street, rather than the one-way couplets of eastbound Folsom Street and westbound Harrison Street. Analysis of two-way Folsom Street and two-way Howard Street between Second and 11th streets (as a connection to the planned roadway network east of Second Street according the Transit Center District Plan) will be conducted as part of the Central Corridor Plan EIR, and it is not known whether bicycle lanes would be provided on Folsom Street westbound.

The Service Improvements also include the 27 Folsom Service Variant 2, which would reroute service in both directions for the route segment between 11th and Cesar Chavez streets from Folsom Street to Harrison Street. Bicycle Route 33 runs on Harrison Street between 11th and Cesar Chavez streets, as a Class II (bicycle lane) facility between 11th and 22nd streets, and as a Class III (designated bicycle route) facility between 22nd and Cesar Chavez streets. Currently there are no transit routes on this segment of Harrison Street, and rerouting of the 27 Folsom onto this segment would increase the potential for bicycle and transit conflicts. However, as previously described, the addition of transit service on streets with bicycle lanes or sharrows would not result in hazardous conditions for bicyclists, as many existing transit routes overlap with bicycle routes in the City.

- The Service Improvements include the 11 Downtown Connector Service Variant 2 which would retain service on Folsom Street along the existing 12 Folsom-Pacific route, and 27 Folsom Service Variant 3 which would maintain the existing routing of the 27 Bryant south of Market Street. Under these two Service Variants, conditions for bicyclists along Folsom and Bryant streets would remain similar to Existing conditions.

16X Noriega Express – The proposed changes in the 16X Noriega Express route would result in an increase in buses along Market Street between Fourth and Spear streets, which could increase the potential for pedestrian, bicycle, and transit conflicts. However, this increased service would not result in new hazardous conditions for pedestrians or bicyclists for the following reasons. Market Street is part of Bicycle Route 50 (Class III on the segment of Market Street between Fourth and Spear streets), but as noted above, this segment of Market Street already has a high volume of buses during the peak periods, and the addition of the 16X Noriega Express route would not substantially change conditions for bicyclists because many existing transit routes overlap with bicycle routes in the City.

- **17 Parkmerced, 17 Parkmerced Service Variant, and 18 46th Avenue** – The 17 Parkmerced and 18 46th Avenue service changes would remove transit service on segments of the 18 46th Avenue route, such as north of John Muir Drive, which would cause some riders to walk further to access nearby transit (namely the realigned 17 Parkmerced service). The realigned 17 Parkmerced would also introduce transit service to two roadways that currently do not have transit but that are part of the bicycle route network, including Font Boulevard from Lake Merced Boulevard to Arballo Drive (Bicycle Route 90 – Class III facility) and Lake Merced Boulevard from John Daly Boulevard to John Muir Drive (Bicycle Route 85 – Class III facility). However, transit volumes would be relatively low and, as previously described, new transit service on these streets would not pose a hazard to bicyclists because many existing transit routes overlap with bicycle routes in the City.

- The Service Improvements also include the 17 Parkmerced Service Variant which would introduce transit service to Font Boulevard between Lake Merced Boulevard and Arballo

Drive (Bicycle Route 90 – Class III facility), which currently does not have transit but is part of the Citywide bicycle route network, and on Brotherhood Way between Junipero Serra and Lake Merced boulevards, which currently does not have transit and is not part of the Citywide bicycle route network. Conditions for bicyclists on Font Boulevard would be similar to those where the 17 Parkmerced currently runs on Font Boulevard between Arballo and Chumasero drives.

19 Polk and 48 Quintara-24th Street – As part of the Service Improvements, the portion of the 19 Polk route south of 24th Street would be discontinued, and the discontinued route would be replaced with the revised 48 Quintara-24th Street. Therefore, conditions for pedestrians and bicyclists on the portion of the realigned 48 Quintara-24th Street route would remain unchanged from Existing conditions. The realignment of the 48 Quintara-24th Street would also introduce transit service to a portion of Clipper Street, which is part of Bicycle Route 60 (Class II, bicycle lanes) and does not currently have transit. Conditions of this new segment would be similar to those directly to the west, and the up to four buses per hour on this segment of Clipper Street would not substantially affect bicycle lane operations, because as noted above, with the new service, bicycle conditions would be similar to Existing conditions on Clipper Street to the west where the 48 Quintara-24th Street route and Bicycle Route 60 overlap.

As part of the Service Improvements the 19 Polk would be removed from Hyde Street between Eddy and McAllister streets, from Larkin Street between Geary and Market streets, from Geary Street between Larkin and Polk streets, and from Eddy Street between Hyde and Polk streets. Instead, the 19 Polk would be realigned to travel on Polk Street between Eddy and McAllister streets (three blocks or approximately 1,000 feet), and would connect with the 19 Polk route to the north on Polk Street. The realignment of a segment of the 19 Polk from Hyde and Larkin streets to Polk Street would not substantially affect bicycle travel on Polk Street, which is part of Bicycle Route 25 (Class II, bicycle lane in this segment) because conditions on this three-block segment would be similar to those immediately to the north on Polk Street (i.e., where the 19 Polk and Bicycle Route 25 currently overlap), because the new transit service would not substantially affect bicycle lane conditions, and because conditions for bicyclists would remain similar to Existing conditions. In addition, this service change for the 19 Polk would remove transit service from the section of Larkin Street that is part of Bicycle Route 25 (a Class III facility in this segment).

23 Monterey – The 23 Monterey realignment would introduce transit service onto Oakdale Avenue between Toland and Industrial streets, and Palou Avenue between Industrial and Phelps streets, which currently do not have transit. Oakdale Avenue is part of Bicycle Route 170 (Class II, bicycle lanes), and Industrial Street is a connector route of Bicycle Route 25 (Class III bicycle route). With the addition of transit service, conditions for bicyclists on this segment of Oakdale Avenue, which already has bicycle lanes, would be similar to those east of the new segment on which the 23 Monterey currently operates. The 23 Monterey reroute onto a segment of Industrial Street would not substantially affect bicycle conditions on Industrial Street because the 24 Divisadero currently runs on this street, and the addition of up to three buses an hour in both directions would not substantially affect bicycle conditions because conditions for bicyclists would remain similar to Existing conditions.

29 Sunset and 54 Felton – Service changes on the 29 Sunset would shorten the route by providing a more direct route on Ocean Avenue to the Balboa Park Station, and the 54 Felton would be realigned to match the realigned 29 Sunset. The Service Improvement for the 29 Sunset and 54 Felton would add more transit service to Ocean Avenue, which is part of Bicycle Route 84 (Class II, bicycle lanes), but would remove service from Geneva Avenue, which is part of Bicycle Route 90 (Class III in the segment where the 29 Sunset would be removed). The realignment of the 29 Sunset and 54 Felton from Geneva Avenue to Ocean Avenue would require pedestrians to access the BART and Muni station from the Ocean Avenue side of the station via an existing pedestrian pathway on the west side of the station. The SFMTA is working with the SFCTA and BART on the SFCTA's Balboa Park Station Area Circulation Study, which includes implementation of pedestrian and bicycle improvements around the station. Because transit service is currently provided on Ocean Avenue, the conditions for bicyclists on Ocean Avenue would remain similar to Existing conditions.

- **32 Roosevelt and 37 Corbett and associated Service Variants** – The route changes on the 32 Roosevelt and 37 Corbett would provide transit service and passenger access on streets that currently do not have transit (i.e., Sanchez, Clayton, and Frederick streets). The streets on which transit service would be introduced for these two routes are not currently part of the Citywide designated bicycle network, therefore the Service Improvement changes would not substantially affect bicycle facilities. Furthermore, although not in the bicycle network, the increase in transit service on non-network streets would similarly not substantially affect bicycle travel along these streets, and conditions for bicyclists would remain similar to Existing conditions.

- The 37 Corbett Service Variant 2 would introduce transit service onto Frederick Street between Clayton and Cole streets, which is not currently part of the Citywide designated bicycle network, and therefore, conditions for bicyclists along the alternative alignment would remain similar to conditions on adjacent streets and Existing conditions.

- **33 Stanyan and 33 Stanyan Service Variant** – As part of the realignment, the 33 Stanyan route would also travel on streets that currently do not have transit service, including Valencia Street between 18th and 16th streets, 16th Street between De Haro and Connecticut streets, and Connecticut Street between 16th and 17th streets. Conditions on the new route segments would be similar to conditions to the west on 16th Street and to the south on Connecticut Street. Bicycle Route 40 (Class II) runs on 16th Street and Bicycle Route 45 (Class II bicycle lanes) runs on Valencia Street; however, new transit service would not affect the bicycle lane operations, and conditions would be similar to other locations in the City where transit routes overlap with bicycle routes. Passengers along Potrero Avenue would still be able to access the 9 San Bruno or 9L San Bruno Limited and transfer to the 33 Stanyan at 16th Street. The 33 Stanyan Service Variant, which would route the 33 Stanyan on Guerrero Street between 18th and 16th streets, would not introduce transit service onto designated bicycle network streets, and conditions for bicyclists would remain similar to Existing conditions.

- **35 Eureka and 36 Teresita and Associated Service Variants** – As a result of the realignment of the 35 Eureka, passengers along the segment of the 35 Eureka on Farnum, Moffitt, Bemis, and Addison streets would access the 35 Eureka or 36 Teresita via a short walk (one to four blocks or approximately 400 to 2,000 feet depending on the starting location) to the remaining portions on Diamond Street. Service on the 36 Teresita along Warren Drive and Seventh Avenue would be eliminated. Passengers from the Forest Knolls would still be able to access transit via a short walk (two to three blocks) to the remaining portions of the 36 Teresita or use the 43 Masonic and 44 O'Shaughnessy routes on Seventh Avenue and Laguna Honda Boulevard. There are no designated bicycle routes on the proposed realignment segments, and bicycle travel in the area is generally low. With the proposed Service Improvements conditions for bicyclists would remain similar to Existing conditions.

- The 35 Eureka Service Variant 2 would introduce transit service onto Miguel Street between Bemis and Arlington Streets, and the one-block segment of Miguel Street between Chenery and Arlington streets is part of Bicycle Route 66 (Class III facility). The 35 Eureka would also travel on Bosworth, Diamond and Chenery streets which are part of Bicycle Route 45 and Bicycle Route 55. The 36 Teresita, 44 O'Shaughnessy, and 52 Excelsior routes currently run along these streets, and therefore conditions for bicyclists would be similar to Existing conditions.

- The 35 Eureka Service Variant 3 would introduce transit service onto Miguel Street between Bemis and Arlington Streets. The 35 Eureka Service Variant 3 would also travel on Bosworth, Diamond and Chenery streets which are part of Bicycle Route 45 and Bicycle Route 55. The 36 Teresita, 44 O'Shaughnessy, and 52 Excelsior routes currently run along these streets, and therefore conditions for bicyclists would be similar to Existing conditions.

- **43 Masonic and 43 Masonic Service Variant** – Because the 43 Masonic would travel primarily on streets and through intersections on which the transit routes are located (i.e., either the 43 Masonic, the 28 19th Avenue, 28L 19th Avenue Limited, or the PresidiGo shuttle), and would not result in changes to the right-of-way, pedestrian facilities would not be affected and the bicycle network would not be changed. There are a number of bicycle routes that coincide with the 43 Masonic, including, but not limited to, Bicycle Route 55 within the Presidio (both Class II bicycle lanes, and Class III bicycle route) and on Presidio Avenue (Class III), Bicycle Route 40 on Parnassus Avenue (Class III), Bicycle Route 65 on Seventh Avenue and Laguna Honda Boulevard (Class II bicycle lanes), and Bicycle Route 90 on Geneva Avenue (Class III); however, as discussed above, conditions for bicyclists would remain similar to Existing conditions.

The 43 Masonic would no longer serve Letterman Drive and Lombard Street between Presidio and Richardson avenues; however, it would connect with the Presidio Transit Center at Lincoln Boulevard and Graham Street.

- The 43 Masonic Service Variant would introduce transit service onto Frederick Street between Clayton and Cole streets, which is not currently part of the Citywide designated bicycle network, and therefore, conditions for bicyclists along the alternative alignment would remain similar to conditions on adjacent streets and Existing conditions.

47 Van Ness – Service changes related to the 47 Van Ness would include new service on segments on South Van Ness Avenue, 13th Street, and Division Street, which would not alter existing pedestrian conditions or facilities on those streets, and would be rerouted from Harrison and Bryant streets to Townsend Street. In addition to new service, the 47 Van Ness service would be eliminated from portions of North Point, Stockton, Beach, and Powell streets; however, the North Point segment would be covered by the new 11 Downtown Connector route. With the exception of bicycle lanes on Division Street (Bicycle Route 36 – Class II, bicycle lanes near Potrero Square), there are no bicycle routes or facilities on the segments on South Van Ness Avenue and 13th Street where 47 Van Ness service would be added. Introduction of bus service on Division Street between Brannan and Townsend streets (the 9 San Bruno and 9L San Bruno Limited routes run on Division Street between Bryant and Brannan streets) would not substantially change the bicycle travel on Division Street because many existing transit routes overlap with bicycle routes in the City and conditions for bicyclists on Division Street would remain similar to Existing conditions. The 47 Van Ness would run on Townsend Street between Division and Fourth streets, and while Bicycle Route 38 runs along Townsend Street (with Class II bicycle lanes), conditions for bicyclists within the bicycle lane would be similar to Existing conditions because the 10 Townsend currently runs along Townsend Street (as part of the TEP, the 10 Townsend would be renamed the 10 Sansome and service would be rerouted off of Townsend Street, and would instead be routed through Mission Bay to the east). Conditions for bicyclists along the realigned 47 Van Ness would remain similar to Existing conditions.

58 24th Street – Under the Service Improvements, the 58 24th Street route would turnaround off of 24th Street using Castro, Clipper and Diamond streets. Bicycle Route 60 (Class III) runs on Clipper Street and Bicycle Route 749 (Class III) runs on Diamond Street in the 58 24th Street bus route's location. The addition of up to four buses per hour on these routes would not affect traffic and bicycle conditions on these streets or result in bicycle hazards because conditions for pedestrians and bicyclists would remain similar to Existing conditions.

76 Marin Headlands – As noted above, a 24-month pilot project for the proposed 76 Marin Headlands Service Improvements is underway and is collecting data about the route's reliability, ridership, and passenger satisfaction to assess the benefits of the proposed service changes.[55] The Service Improvements on the 76 Marin Headlands would eliminate the existing service on this bus route south of Market Street. Passengers who currently start or end their trip at the downtown San Francisco Caltrain Station or along the existing route south of Market Street could take other bus routes, including the 30 Stockton or the 45 Union-Stockton to the terminal at Sansome and Sutter streets (the 30 Stockton and the 45 Union-Stockton provide weekend service approximately every 10 minutes). North of Market Street, the 76 Marin Headlands route runs on Sutter and Post streets, which are part of Bicycle Route 16 (Class III). The addition of one round-trip bus per hour on Saturdays along Bicycle Route 16 would not substantially change bicycle conditions or result in bicycle hazards, as conditions would be similar to Existing conditions on Bicycle Route 16 on Sundays (when current 76 Marin Headlands service is provided).

The extension of the 76 Marin Headlands route to the Point Bonita Lighthouse would occur along roads currently without transit service in this recreational area. However, the addition of one round-trip bus per hour on Saturdays would not substantially change pedestrian or bicycle circulation nor result in hazardous conditions in the area, and conditions for bicyclists would remain similar to Existing conditions.

91 Owl A and 91 Owl B – Splitting the existing 91 Owl route into two routes (91 Owl A and 91 Owl B) would eliminate the Cargo Way segment of the route between Third and Mendell streets, and passengers would be required to walk up to about 1,500 feet (depending on their destination) to or from these routes on Third Street. The route realignment would not substantially affect pedestrian or bicycle conditions on these streets or result in bicycle hazards because conditions for pedestrians and bicyclists would remain similar to Existing conditions.

As discussed above, the impacts of the Service Improvements on pedestrians and bicyclists would be less than significant.

Project-Level Service-Related Capital Improvement Projects

The following section analyzes the impact of the seven project-level Service-related Capital Improvement projects and the Overhead Wire Expansion project OWE.1 Variant described in Chapter 2, Project Description, Section 2.5.2.2, on pp. 2-102 to 2-110, including:

[55] A 24-month pilot project for the 76 Marin Headlands service changes received environmental clearance on October 11, 2012. The case file is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File 2012.1140E.

- TTPI.1: Persia Triangle Improvements
- OWE.1: New Overhead Wiring – Reroute 33 Stanyan onto Valencia Street
- OWE.1 Variant: New Overhead Wiring – Reroute 33 Stanyan onto Guerrero Street
- OWE.2: Bypass Wires at Various Terminal Locations
- OWE.3: New Overhead Wiring – 6 Parnassus on Stanyan Street
- OWE.4: 5 Fulton Limited/Local Bypass Wires
- OWE.5: 22 Fillmore Extension to Mission Bay
- SCI.2: Sansome Contraflow Lane Extension

Impact TR-19: Implementation of the project-level Service-related Capital Improvement projects (TTPI.2, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) would not result in significant impacts to local or regional transit, traffic operations, pedestrians and bicyclists, loading, emergency vehicle access, or parking. (Less than Significant)

Transit Impacts. The project-level Service-related Capital Improvement projects have been identified to support certain Service Improvements or Service Variants as described below. The TTPI.1: Persia Triangle Improvements project would reduce travel times on the 29 Sunset, and enhance access to the 29 Sunset and reduce delays at bus stops for both the 29 Sunset and the 49L Van Ness-Mission Limited. The TTPI.1 project would improve transit operations for the 29 Sunset by facilitating turning movements from Ocean Avenue to Persia Avenue, and accommodating the 29 Sunset service on Persia Avenue between Mission Street and Ocean Avenue for both the inbound and outbound routes. Currently, the inbound 29 Sunset route turns left from Persia Avenue westbound onto Mission Street southbound, and right onto Geneva Avenue westbound to the Balboa Park Station. With implementation of TTPI.1, the 29 Sunset route would be realigned so that the inbound (northbound) route could continue directly on Persia Avenue across Mission Street (one block or approximately 250 feet), and then turn left onto Ocean Avenue to proceed to the Balboa Park Station, and as a result, both the inbound and outbound routes would travel on the same streets. With implementation of TTPI.1, the existing inbound route segment on Mission Street between Persia and Geneva avenues and Geneva Avenue between Mission Street and Ocean Avenue would be eliminated. The TTPI.1 project would also improve transit operations for the 49L Van Ness-Mission Limited by providing a transit bulb on Mission Street and thereby not requiring buses to pull into and out of bus stops and into adjacent traffic.

The five project-level Overhead Wire Expansion projects (OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, and OWE.5) would support the Service Improvements analyzed in Impact

TR-18. These would include new overhead wiring to support the route realignment on the 33 Stanyan from Mission Street to Valencia Street between 16th and 18th streets (OWE.1), on Guerrero Street between 16th and 18th streets (OWE.1 Variant), and on the 6 Parnassus route (OWE.3), which is proposed to travel on Stanyan Street instead of Masonic Avenue between Haight Street and Parnassus Avenue. New overhead wiring for the 22 Fillmore extension to Mission Bay was evaluated in the Final Mission Bay Subsequent EIR (SEIR) in 1998 and is provided here for informational and cumulative context.[56] For OWE.5, the overhead wire support poles and underground conduit infrastructure have been or would be installed by developers along the corridor. The SFMTA would be responsible for installing the overhead wires. Bypass wires are proposed at terminals at Lyon and Union streets for the 41 Union and 45 Union-Stockton routes, at Presidio Avenue and Sacramento Street for the 1 California and 2 Clement routes (OWE.2), and on Fulton and McAllister streets to allow the new 5L Fulton Limited to bypass the 5 Fulton route (OWE.4).

Implementation of SCI.2: Sansome Street Contraflow Lane Extension project would allow the proposed 10 Sansome route to access Sansome Street directly from Broadway, rather than having to turn right on Battery Street and then right onto Washington Street to access Sansome Street south of Washington Street, thus reducing transit travel times. Because the extension of the contraflow lane three blocks between Washington Street and Broadway (approximately 1,000 feet) would not substantially affect intersection operations as described below, it would also not affect transit routes running along this segment of Sansome Street in the northbound direction, including the 10 Sansome, 30X Marina Express, and Golden Gate Transit routes.

Implementation of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) would not, in isolation, result in new transit trips and therefore would not increase transit demand. Because these improvements would not affect transit capacity or operations, the impact of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) on local and regional transit would be less than significant.

Traffic Impacts. The proposed transit bulbs on Mission Street and on Ocean and Persia avenues included as part of the TTPI.1 project would not remove any travel lanes nor substantially affect existing travel lane operations at the adjacent intersections of Mission Street/Persia Avenue, Ocean/Persia avenues, and Ocean Avenue/Mission Street. See Impact TR-9 on p. 4.2-93 for analysis of TPS Toolkit category Transit Stop Changes for impact assessment of transit bulbs on traffic operations.

Implementation of overhead wire infrastructure for the OWE projects would not remove any travel lanes nor substantially affect existing travel lane operations at intersections. Therefore, there would be no direct operational traffic impacts associated with the OWE, and any indirect operational effects are analyzed in the Service Improvements that these project

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[56] San Francisco Planning Department/San Francisco Redevelopment Agency, *Final Mission Bay Subsequent Environmental Impact Report*, p. V.E.53. Certified September 17, 1998. This document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E; the entire SEIR is available there in Case File No. 96.771E.

components would facilitate. As discussed in Impact TR-18, the Service Improvements for routes supported by the overhead wire infrastructure projects would have a less-than-significant impact on traffic operations.

- Implementation of SCI.2 would reduce the number of northbound travel lanes on the three-block segment (approximately 1,000 feet) of Sansome Street between Washington Street and Broadway from three lanes to two lanes (i.e., similar to the contraflow lane configuration south of Washington Street). Weekday p.m. peak hour analysis of the study intersections of Broadway/Sansome Street and Washington/Sansome streets indicate that with the proposed contraflow lane configurations, the study intersections and other intersections along the route (which have similar or lower traffic volumes than the study intersections) would operate at acceptable intersection LOS operating conditions of LOS C or better during the p.m. peak hour with implementation of SCI.2.

- As described above, the impact of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) on traffic operations would be less than significant.

- **Pedestrian Impacts.** Implementation of project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) would improve pedestrian conditions and would not result in overcrowding of sidewalks or create potentially hazardous conditions for pedestrians, as explained below. The new transit and pedestrian bulbs included as part of the TTPI.1 project would provide added space for boarding passengers as well as those waiting. Bus and pedestrian bulbs would also improve pedestrian safety for all pedestrians in the project vicinity by shortening the street crossing distance, improving the pedestrian visibility, reducing the speed of turning traffic, and providing additional space for pedestrian queuing at transit stops. These elements would enhance pedestrian visibility and provide safer access to transit.

- The installation of poles for the OWE projects would add to the sidewalk furniture (for example, newspaper stands and mailboxes), which can reduce its effective width. These poles would be installed approximately one every 90 to 100 feet and would be about eight to 13 inches in diameter at the base. Given these dimensions and spacing, and that existing sidewalks already include roadway infrastructure (for example, traffic lights and traffic control boxes) as well as other furniture, the poles would not materially affect the existing pedestrian environment. Specifically, the installation of these poles would not result in substantial sidewalk overcrowding or create potentially hazardous conditions.

  With implementation of the SCI.2 project, pedestrian conditions on Sansome Street sidewalks and crosswalks would not change from Existing conditions, and minimum pedestrian crossing times would be maintained. Curb ramps would be installed at each of the four corners of the intersections of Sansome/Washington streets, Sansome/Jackson streets, and Pacific Avenue/Sansome Street.

- Considering the above, the impact of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) on pedestrians and pedestrian facilities would be less than significant.

- **Bicycle Impacts.** Implementation of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility. Implementation of the TTPI.1 project would not substantially affect bicycle travel along Mission Street or Ocean or Persia avenues. Bicycle Route 45 (on Alemany Boulevard) and Route 84 (on Ocean Avenue west of Alemany Boulevard) are in the vicinity of the TTPI.1 Persia Triangle Improvements site; however, Bicycle Route 84 on Ocean Avenue does not extend east of Alemany Boulevard. With implementation of TTPI.1, the 29 Sunset route would be realigned and the existing inbound bus route segment on Geneva Avenue between Mission Street and Ocean Avenue would be eliminated, thereby reducing conflicts between buses and bicyclists on Geneva Avenue. Inbound bus service would be added to the one-block segment (approximately 250 feet) of Persia Avenue between Mission Street and Ocean Avenue (outbound service already travels on this segment); however, Persia Avenue is not a designated bicycle route, and bicycle traffic on this non-bicycle network street is relatively low. The transit bulbs and pedestrian bulbs would not affect the bicycle lanes on Ocean Avenue nor result in any diversion of vehicular traffic to Ocean Avenue or Alemany Boulevard. Service Improvement changes to the bus routes in the area are analyzed under Impact TR-18 above. Overall, additional buses, and related TTPI project improvements would not substantially interfere with bicycle travel or facilities in the area.

- Implementation of the overhead wire infrastructure as part of the OWE projects would not remove any mixed-flow lanes or bicycle lanes. The support poles installed for these OWE projects would not be located within the roadway, and any necessary electrical infrastructure would be installed underground. Therefore, these projects would not substantially affect bicycle travel along the proposed locations for OWE bypass wires or extensions.

  Implementation of the SCI.2 project would not substantially affect bicycle travel along Sansome Street. Bicycle Route 11 (Class III bicycle route) runs northbound on Sansome Street between Market and Washington streets, and the contraflow lane extension would not affect bicycle access along the route. With SCI.2, buses would travel both northbound and southbound on Sansome Street, and therefore, bicyclists traveling northbound on Sansome Street and turning left onto Washington Street would need to yield to buses (up to 10 buses per hour) traveling southbound on Sansome Street. However, these conditions would be similar to those on two-way streets in the City and would not increase hazards for bicyclists.

- In summary, the impact of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) on bicyclists and bicycle facilities would be less than significant.

- **Loading Impacts.** Implementation of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) would not generate additional loading demand. The implementation of the bus zones, pedestrian bulbs, and transit bulbs for the TTPI.1 would not affect any on-street commercial loading spaces in the vicinity of the project component sites. Similarly, the overhead wire infrastructure projects would not affect any on-street commercial loading spaces in the vicinity of the project component sites. With implementation of the SCI.2 project, it is proposed that existing on-street vehicle parking spaces on the west side of Sansome Street be converted to commercial loading spaces, which would increase the number of commercial loading spaces in this area of the project. On the three-block segment of Sansome Street between Washington Street and Broadway (approximately 1,000 feet), there are 27 parking spaces, of which 10 are currently designated for commercial vehicle loading/unloading activities. With implementation of SCI.2, the Sansome Street Contraflow Lane Extension, up to 17 of these parking spaces would be converted to commercial loading spaces.

- For the above reasons, the impact of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) on loading would be less than significant.

- **Emergency Vehicle Access Impacts.** Implementation of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) would not substantially affect traffic flow, and therefore, emergency vehicle access would remain similar to Existing conditions. With implementation of the TTPI.1 project, the proposed pedestrian bulb at the intersection of Ocean Avenue/Mission Street would result in tighter turning radii at the corner, which could affect emergency vehicle turning movements, especially larger vehicles such as fire trucks. However, the pedestrian bulbs would be designed consistent with the SFFD applicable standards and would be reviewed by the SFFD to make sure the pedestrian bulbs meet those standards.

As previously described, implementation of the OWE projects would not affect any travel lanes and therefore, would not affect emergency access.

Implementation of the SCI.2 project would not substantially change the ability of emergency service providers to travel on Sansome Street or access adjacent land uses. Emergency vehicle access conditions would be similar to those on Sansome Street south of Washington Street. The SFFD Station 13 is located on Sansome Street between Washington and Clay streets, and the implementation of the contraflow lane between Broadway and Washington Street would enhance access for SFFD vehicles traveling to the station from Broadway.

For the reasons described above, the impact of the project-level Service-related Capital Improvement projects (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) on emergency vehicle access would be less than significant.

Parking Impacts. Implementation of the Service-related Capital Improvements (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) would result in the removal of a limited number of parking spaces as discussed below. Implementation of TTPI.1 Persia Triangle Improvements could result in elimination of up to five existing parking spaces on Persia and Ocean avenues. Other on-street parking spaces are available on Persia and Ocean avenues, and on Mission Street, and the area is well served by transit. Construction of the new overhead wiring (OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5) would not affect any on-street parking supply. Implementation of SCI.2 would alter the use of vehicle parking spaces on the west side of the three-block segment of Sansome Street between Washington Street and Broadway (approximately 1,000 feet) by up to 17 parking spaces. On this three-block segment there are 27 existing parking spaces, of which 10 are currently designated for commercial vehicle loading/unloading activities. With implementation of SCI.2, the Sansome Street Contraflow Lane Extension, up to 17 additional parking spaces would be converted to 24-hour commercial loading spaces. Conversion of all parking spaces to commercial loading spaces could result in increased competition for the remaining on-street, and potentially off-street, parking supply. However, a conversion of 17 parking space from general use to commercial use would not be considered a substantial loss of parking in this area, particularly because these spaces could be converted back by SFMTA to general use in the future. Furthermore, the SCI.2 project area is well served by alternative modes of travel (both transit service and bicycle facilities). Hence, impacts that may result from a shortfall in parking as a result of the removal of up to five on-street parking spaces under TTPI.1 and the conversion of up to 17 on-street parking spaces to commercial loading spaces under SCI.2 would not be significant. Overall, the Service-related Capital improvements (TTPI.1, OWE.1, OWE.1 Variant, OWE.2, OWE.3, OWE.4, OWE.5, and SCI.2) would result in less-than-significant parking impacts.

Project-level TTRPs Impact Analysis

This section presents the project-level review of the Service Improvements in combination with implementation of the TTRP proposals for 11 Rapid Network corridors (i.e., J Church, L Taraval, N Judah, 5 Fulton/5L Fulton Limited, 8X Bayshore Express, 9 San Bruno/9L San Bruno Limited, 14 Mission/14L Mission Limited, 22 Fillmore, 28 19th Avenue/28L 19th Avenue Limited, 8X Bayshore Express/30 Stockton/45 Union-Stockton, and 71 Haight-Noriega/71L Haight-Noriega Limited/6 Parnassus). A description of these proposals is included in Section 2.5.2.1

and Section 2.5.2.3 of this document. For each of these corridors, two alternatives have been analyzed at an equal level of detail, a TTRP Moderate Alternative and a TTRP Expanded Alternative.

Transit Impacts

Impact TR-20: Implementation of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14 Variant 1, TTRP.14 Variant 2, TTRP.22_1, TTRP.28_1, TTRP.30_1, or TTRP.71_1 would not result in significant impacts to local or regional transit. (Less than Significant)

Capacity Utilization. With implementation of the eight project-level TTRP Moderate Alternative proposals (including Variants), transit ridership and capacity utilization on the Muni system and routes along the TTRP corridors would increase over Existing conditions, due to the Service Improvements (i.e., additional capacity on existing routes, route restructuring, and new routes) in combination with the TTRP Moderate Alternative proposals. As passengers are attracted to the routes serving the TTRP corridors due to increased reliability and reduced transit travel time, ridership on other lines may decrease (thereby decreasing the capacity utilization of the non-TTRP corridor lines). The impact of implementation of the TTRP Moderate Alternative on transit capacity utilization was reviewed by line/route for each TTRP corridor, and for the downtown screenlines.

TTRP corridors – Tables 12 and 13 on pp. 4.2-122 to 4.2-135 present the transit capacity utilization by route for existing as well as proposed conditions with implementation of TTRPs, in combination with the Service Improvements. Transit capacity utilization, at the MLPs, is presented for the range of expected ridership with implementation of the project-level TTRPs, for both the Moderate and Expanded Alternatives. As described in Section 4.2.4.2, p. 4.2-35, transit ridership estimates were developed using the SF-CHAMP model for conditions without and with the potential effects of enhanced reliability (i.e., ridership estimates reflecting travel time reductions associated with the TTRP proposals only, and ridership estimates for conditions with travel time reductions associated with the TTRP proposals plus enhanced reliability that would be anticipated with implementation of the TTRP proposals).

With implementation of the project-level TTRP Moderate Alternative projects, capacity utilization would be less than the 85 percent standard for eight of the 11 TTRP corridors:

- TTRP.J Moderate Alternative (J Church).
- TTRP.L Moderate Alternative (L Taraval).
- TTRP.N Moderate Alternative (N Judah).

- TTRP.9 Moderate Alternative (9 San Bruno and 9L San Bruno Limited).
- TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 (14 Mission, 14L Mission Limited, and 14X Mission Express).

- TTRP.22_1 Moderate Alternative (22 Fillmore).
- TTRP.28_1 Moderate Alternative (28 19th Avenue and 28L 19th Avenue Limited).
- TTRP.30_1 Moderate Alternative (30 Stockton and 45 Union-Stockton).

- The remaining three TTRP corridors (i.e., TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, and TTRP.71_1 Moderate Alternative) for which capacity utilization exceeds the 85 percent capacity utilization standard are discussed below.

  With implementation of the TTRP.5 Moderate Alternative, capacity utilization on the 5 Fulton would be less than the 85 percent capacity utilization standard during the p.m. peak hour. However, during the a.m. peak hour the capacity utilization on the 5 Fulton would be 87.4 percent in the inbound direction and would therefore, exceed the 85 percent capacity utilization standard. Because capacity would be available on the 21 Hayes to the south to accommodate additional passengers (i.e., capacity utilization of 72.8 percent during the a.m. peak hour), the impacts of the TTRP.5 Moderate Alternative on capacity utilization along this transit corridor would be less than significant.

  With implementation of the TTRP.8X Moderate Alternative, capacity utilization on the 8X Bayshore Express and 8BX Bayshore Express would be less than the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours. However, the capacity utilization on the 8AX Bayshore Express would be 85.2 percent during the a.m. peak hour (but would be less than 85 percent during the p.m. peak hour) and would therefore, exceed 85 percent capacity utilization standard during the a.m. peak hour. Because capacity would be available on the 8BX Bayshore Express to accommodate additional passengers (i.e., capacity utilization of 63.9 percent during the a.m. peak hour), the impacts of the TTRP.8X Moderate Alternative on capacity utilization along this transit corridor would be less than significant.

- With implementation of the TTRP.71_1 Moderate Alternative, capacity utilization on the 6 Parnassus would be less than the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours. However, the capacity utilization on the 71L Haight-Noriega Limited would be 100 percent during the p.m. peak hour (but would be less than 85 percent during the a.m. peak hour) and would therefore, exceed 85 percent capacity utilization standard during the p.m. peak hour. Because capacity would be available on the 16X Noriega Express to accommodate additional passengers (i.e., capacity utilization of 55.5 percent during the p.m. peak hour), the impacts of the TTRP.71_1 Moderate Alternative on capacity utilization along this transit corridor would be less than significant.

- *Lines/routes not on the project-level TTRP corridors* – As indicated in Impact TR-18, with implementation of the Service Improvements, capacity utilization would exceed the 85 percent capacity utilization standard on the F Market & Wharves, K Ingleside, 16X Noriega Express, and 21 Hayes. With implementation of the Service Improvements in combination with the TTRP Moderate Alternative, capacity utilization would continue to exceed the 85 percent capacity utilization standard on the F Market & Wharves, the K Ingleside, and the 1 California route during p.m. peak hour in the outbound direction. With implementation of the TTRP Moderate Alternative, capacity utilization on the 16X Noriega Express and the 21 Hayes would decrease from Existing plus Service Improvements conditions, and would no longer exceed the 85 percent capacity utilization standard. As indicated in Impact TR-18, capacity would be available on the E Embarcadero and M Ocean View lines to accommodate additional passengers from the F Market & Wharves and K Ingleside lines. On the 1 California route, capacity would be available on the 1AX California Express and 1BX California Express (i.e., capacity utilization of 71.2 percent for the three routes combined). Because capacity would be available on alternative routes, the impacts of the Service Improvements, in combination with the TTRP Moderate Alternative, on lines/routes not on the TTRP corridors would be less than significant.

Muni Screenlines – The transportation analysis prepared for the TEP project also examined the potential for the proposed project to affect the downtown transit screenlines. The additional ridership and capacity utilization by screenline and corridor is presented in Tables 14 and 15 on pp. 4.2-172 to 4.2-173 for the a.m. and p.m. peak hours, respectively. During both peak hours, with the additional transit ridership on the Muni routes, plus the additional capacity associated with the Service Improvements, the capacity utilization of the corridors and screenlines would be less than the 85 percent capacity utilization standard for the entire system and for each of the screenlines and corridors. During the a.m. peak hour, the capacity utilization of the "Subway lines" corridor of the Southwest screenline would decrease from 85.6 percent under Existing conditions, to between 79.1 and 81.4 percent for the TTRP Moderate Alternative, and therefore, would be below the 85 percent capacity utilization standard, representing an improvement and overall a less-than-significant impact on transit demand.[57]

Transit Operations. As described in Section 4.2.4.2, the SF-CHAMP model was used to estimate the effects of implementing the project-level TTRPs on transit operations, as compared to conditions resulting from implementation of only the Service Improvements (i.e., ridership and operating conditions with estimated transit travel time savings compared to conditions without the time savings). With implementation of the TTRP Moderate Alternative proposals including Variants (both without and with enhanced service reliability), transit travel times would decrease along the TTRP portions of the routes, as well as for other Muni and regional routes traveling along the same TTRP corridor segments. During the a.m. and p.m.

[57] Transit ridership projections associated with the TTRP projects were estimated for conditions with travel time reductions, and for conditions with travel time reductions plus enhanced reliability, and therefore capacity utilization is presented as a range. For example, under the TTRP Moderate Alternative for the "Subway lines" corridor of the Southwest screenline, capacity utilization would be 79.1 percent for conditions with travel time reductions, and 81.4 percent with travel time reductions plus enhanced reliability, and therefore, the capacity utilization is presented as a range between 79.1 and 81.4 percent.

Table 14: Muni Screenlines – Existing and Existing plus Project Conditions – Weekday A.M. Peak Hour

Screenline/ Corridor	Existing			Existing + Service Improvements (SI)			Existing + SI + TTRP Moderate Alt				Existing + SI + TTRP Expanded Alt			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
Northeast														
Kearny/Stockton	2,532	3,366	75.2%	2,466	3,929	62.8%	2,559	65.1%	2,633	67.0%	2,518	64.1%	2,669	67.9%
Other lines	439	1,005	43.7%	832	1,785	46.6%	835	46.8%	881	49.3%	829	46.4%	864	48.4%
Subtotal	*2,971*	*4,371*	*68.0%*	*3,298*	*5,714*	*57.7%*	*3,394*	*59.4%*	*3,514*	*61.5%*	*3,347*	*58.6%*	*3,533*	*61.8%*
Northwest														
Geary	1,370	2,183	62.8%	1,572	2,567	61.2%	1,458	56.8%	1,559	60.7%	1,459	56.8%	1,564	60.9%
California	1,863	2,369	78.6%	1,632	2,369	68.9%	1,740	73.4%	1,815	76.6%	1,719	72.6%	1,809	76.4%
Sutter/Clement	485	630	77.0%	428	756	56.6%	429	56.7%	450	59.6%	430	56.9%	455	60.2%
Fulton/Hayes	1,193	1,470	81.2%	1,463	1,977	74.0%	1,556	78.7%	1,659	83.9%	1,570	79.4%	1,637	82.8%
Balboa	655	1,008	65.0%	596	1,008	59.1%	548	54.4%	581	57.6%	551	54.7%	589	58.5%
Subtotal	*5,566*	*7,660*	*72.7%*	*5,691*	*8,677*	*65.6%*	*5,731*	*66.0%*	*6,064*	*69.9%*	*5,729*	*66.0%*	*6,054*	*69.8%*
Southeast														
Third	428	714	60.0%	474	840	56.4%	486	57.9%	496	59.0%	487	57.9%	497	59.2%
Mission	1,727	2,977	58.0%	1,906	3,008	63.4%	1,954	64.9%	2,174	72.3%	1,860	61.8%	2,078	69.1%
San Bruno/Bayshore	1,561	2,087	74.8%	1,533	2,197	69.8%	1,527	69.5%	1,628	74.1%	1,557	70.9%	1,665	75.8%
Other Lines	1,115	1,596	69.8%	1,269	2,027	62.6%	1,266	62.5%	1,372	67.7%	1,306	64.5%	1,424	70.2%
Subtotal	*4,830*	*7,374*	*65.5%*	*5,182*	*8,072*	*64.2%*	*5,232*	*64.8%*	*5,670*	*70.2%*	*5,210*	*64.5%*	*5,664*	*70.2%*
Southwest														
Subway lines	**5,418**	**6,307**	**85.9%**	5,474	7,020	78.0%	5,552	79.1%	5,714	81.4%	5,540	78.9%	5,700	81.2%
Haight/Noriega	1,157	1,706	67.8%	1,058	1,596	66.3%	1,113	69.7%	1,221	76.5%	1,158	72.6%	1,216	76.2%
Other lines	230	627	36.7%	187	560	33.4%	165	29.4%	168	30.1%	165	29.5%	167	29.9%
Subtotal	*6,805*	*8,640*	*78.8%*	*6,719*	*9,176*	*73.2%*	*6,830*	*74.4%*	*7,103*	*77.4%*	*6,863*	*74.8%*	*7,083*	*77.2%*
Total All Screenlines	*20,172*	*28,045*	*71.9%*	*20,889*	*31,641*	*66.0%*	*21,186*	*67.0%*	*22,351*	*70.6%*	*21,150*	*66.8%*	*22,336*	*70.6%*

Note:
Bold indicates that capacity utilization exceeds SFMTA standard (85% utilization standard)

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP.

Table 15: Muni Screenlines – Existing and Existing plus Project Conditions – Weekday P.M. Peak Hour

Screenline/ Corridor	Existing			Existing + Service Improvements (SI)			Existing + SI + TTRP Moderate				Existing + SI + TTRP Expanded			
							Travel Time Reductions		Travel Time Reductions plus Enhanced Reliability		Travel Time Reductions		Travel Time Reductions plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
Northeast														
Kearny/Stockton	2,158	3,291	65.6%	2,106	3,557	59.2%	1,919	53.9%	2,030	57.1%	1,948	54.8%	2,061	57.9%
Other lines	570	1,078	52.8%	889	2,065	43.0%	794	38.4%	843	40.8%	862	41.8%	914	44.3%
Subtotal	*2,727*	*4,369*	*62.4%*	*2,995*	*5,622*	*53.3%*	*2,713*	*48.3%*	*2,873*	*51.1%*	*2,810*	*50.0%*	*2,975*	*52.9%*
Northwest														
Geary	1,814	2,528	71.7%	1,850	2,866	64.5%	1,783	62.2%	1,904	66.4%	1,771	61.8%	1,920	67.0%
California	1,366	1,686	81.0%	1,390	2,065	67.3%	1,443	69.9%	1,470	71.2%	1,449	70.2%	1,487	72.0%
Sutter/Clement	470	630	74.6%	562	756	74.4%	567	74.9%	608	80.4%	561	74.2%	605	80.0%
Fulton/Hayes	965	1,176	82.0%	1,368	1,877	72.9%	1,427	76.0%	1,538	81.9%	1,395	74.3%	1,504	80.1%
Balboa	637	929	68.6%	641	974	65.9%	599	61.5%	635	65.2%	593	60.9%	638	65.5%
Subtotal	*5,252*	*6,949*	*75.6%*	*5,811*	*8,537*	*68.1%*	*5,819*	*68.2%*	*6,155*	*72.1%*	*5,769*	*67.6%*	*6,154*	*72.1%*
Southeast														
Third	550	714	77.0%	594	840	70.7%	595	70.8%	616	73.3%	591	70.4%	606	72.1%
Mission	1,529	2,789	54.8%	1,693	3,008	56.3%	1,687	56.1%	1,859	61.8%	1,668	55.5%	1,944	64.6%
San Bruno/Bayshore	1,320	2,134	61.8%	1,457	2,134	68.3%	1,489	69.8%	1,603	75.1%	1,492	69.9%	1,621	76.0%
Other Lines	1,034	1,712	60.4%	1,130	1,927	58.6%	1,162	60.3%	1,268	65.8%	1,142	59.3%	1,260	65.4%
Subtotal	*4,433*	*7,349*	*60.3%*	*4,874*	*7,909*	*61.6%*	*4,933*	*62.4%*	*5,345*	*67.6%*	*4,894*	*61.9%*	*5,431*	*68.7%*
Southwest														
● Subway lines	4,747	6,294	75.4%	4,706	6,804	69.2%	4,764	70.0%	4,947	72.7%	4,746	69.8%	4,928	72.4%
Haight/Noriega	1,105	1,651	66.9%	1,098	1,596	68.8%	1,144	71.7%	1,125	70.5%	1,152	72.2%	1,118	70.1%
Other lines	276	700	39.4%	280	840	33.3%	328	39.1%	340	40.4%	326	38.8%	339	40.3%
Subtotal	*6,128*	*8,645*	*70.9%*	*6,084*	*9,240*	*65.8%*	*6,236*	*67.5%*	*6,412*	*69.4%*	*6,224*	*67.4%*	*6,385*	*69.0%*
Total All Screenlines	*18,540*	*27,312*	*67.9%*	*19,764*	*31,308*	*63.1%*	*19,700*	*62.9%*	*20,784*	*66.4%*	*19,698*	*62.9%*	*20,945*	*66.9%*

Note:

Bold indicates that capacity utilization exceeds SFMTA 85% utilization standard

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP, peak hours, transit travel times along the route segments with TTRP improvements would decrease by approximately 1 to 30 percent, with the greatest reduction in travel times occurring on the L Taraval on the TTRP.L corridor, on the N Judah on the TTRP.N corridor, on the 22 Fillmore along the TTRP.22_1 corridor, on the 28L 19th Avenue Limited on the TTRP.28_1 corridor, and on the 71L Haight-Noriega Limited on the TTRP.71_1 corridor. Thus, with implementation of the TTRP Moderate Alternative proposals, transit operations along the corridors would be improved over Existing conditions.

Therefore, overall the impact of the 11 project-level TTRP Moderate Alternative proposals and their TTRP Variants on transit capacity and operations would be less than significant.

Impact TR-21: Implementation of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, or TTRP.71_1 would not result in significant impacts to local or regional transit. (Less than Significant)

Capacity Utilization. With implementation of the 11 project-level TTRP Expanded Alternative proposals (including TTRP Variants), transit ridership and capacity utilization on the Muni system and TTRP corridors would increase over Existing conditions, due to the Service Improvements (i.e., additional capacity on existing routes, route restructuring, and new routes) in combination with the TTRP Expanded Alternative proposals (and considering the potential for increased reliability). As passengers are attracted to the routes serving the TTRP corridors due to increased reliability and reduced transit travel time, ridership on other overlapping or nearby lines may decrease (thereby decreasing the capacity utilization of the non-TTRP routes). The impact of implementation of the TTRP Expanded Alternatives on transit capacity utilization was reviewed by line/route for each TTRP corridor, and for the downtown screenlines.

TTRP corridors – Tables 12 and 13 on pp. 4.2-122 to 4.2-135 present the transit capacity utilization by line for conditions with implementation of TTRPs, in combination with the Service Improvements. Transit capacity utilization, at the MLPs, is presented for the range of expected ridership with implementation of the project-level TTRPs, for the a.m. and p.m. peak hours, respectively. As described in Section 4.2.4.2, p. 4.2-35 transit ridership estimates were developed using the SF-CHAMP model for conditions without and with the potential effects of enhanced reliability (i.e., ridership estimates reflecting travel time reductions associated with the TTRP proposals only, and ridership estimates for conditions with travel time reductions associated with the TTRP proposals plus enhanced reliability that would be anticipated with implementation of the TTRP proposals).

With implementation of the TTRP Expanded Alternative proposals (without and with enhanced reliability), capacity utilization would be less than the 85 percent capacity utilization standard for nine of the 11 TTRP corridors:

- TTRP.J Expanded Alternative (J Church).
- TTRP.L Expanded Alternative (L Taraval).
- TTRP.N Expanded Alternative (N Judah).
- TTRP.5 Expanded Alternative (5 Fulton/5L Fulton Limited).
- TTRP.9 Expanded Alternative (9 San Bruno and 9L San Bruno Limited).
- TTRP.14 Expanded Alternative (14 Mission, 14L Mission Limited, and 14X Mission Express).
- TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, and TTRP.22_1 Expanded Alternative Variant 2 (22 Fillmore).
- TTRP.28_1 Expanded Alternative (28 19th Avenue and 28L 19th Avenue Limited).
- TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1 and TTRP.30_1 Expanded Alternative Variant 2 (30 Stockton and 45 Union-Stockton).

The remaining two TTRP corridors for which capacity utilization exceeds the 85 percent standard are discussed below.

With implementation of the TTRP.8X Expanded Alternative, capacity utilization on the 8X Bayshore Express and 8BX Bayshore Express would be less than the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours. However, the capacity utilization on the 8AX Bayshore Express would be 86.0 percent during the a.m. peak hour (but would be less than 85 percent during the p.m. peak hour) and would therefore, exceed 85 percent capacity utilization standard during the a.m. peak hour. Because capacity would be available within the same corridor on the 8BX Bayshore Express to accommodate additional passengers (i.e., capacity utilization of 64.5 percent), the impacts of the TTRP.8X Expanded Alternative on capacity utilization for the transit corridor would be less than significant.

With implementation of the TTRP.71_1 Expanded Alternative, capacity utilization on the 6 Parnassus would be less than the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours. However, the capacity utilization on the 71L Haight-Noriega Limited would be 105.8 percent during the p.m. peak hour (but would be less than 85 percent during the p.m. peak hour) and would therefore, exceed 85 percent capacity utilization standard during the p.m. peak hour. Because capacity would be available on the 16X Noriega Express to accommodate additional passengers (i.e., capacity utilization of 53.5 percent during the p.m. peak hour), the impacts of the TTRP.71_1 Expanded Alternative on capacity utilization along this transit corridor would be less than significant.

- *Lines/routes not on the project-level TTRP corridors* – As indicated in Impact TR-18, with implementation of the Service Improvements, capacity utilization would exceed the 85 percent capacity utilization standard on the F Market & Wharves, K Ingleside, 16X Noriega Express, and 21 Hayes. With implementation of the Service Improvements in combination with the TTRP Expanded Alternative, capacity utilization would continue to exceed the 85 percent capacity utilization standard on the F Market & Wharves and K Ingleside lines during the p.m. peak hour, in addition to the 1AX California Express route during a.m. peak hour in the inbound direction, and the 43 Masonic route during the a.m. peak hour in the inbound direction. With implementation of the TTRP Expanded Alternative, capacity utilization on the 16X Noriega Express and the 21 Hayes would decrease from Existing plus Service Improvements conditions, and would no longer exceed the 85 percent capacity utilization standard. As indicated in Impact TR-18, capacity would be available on the E Embarcadero and M Ocean View lines to accommodate additional passengers from the F Market & Wharves and K Ingleside lines, respectively. During the a.m. peak hour, capacity would be available on the 1 California and 1BX California Express (i.e., capacity utilization of 76.4 percent for the three routes combined) for the 1AX California Express route, and would be available on the NX Judah Express (i.e., capacity utilization of between 64.9 and 67.3 percent) for the 43 Masonic route. Because capacity would be available on alternative routes, the impacts of the Service Improvements, in combination with the TTRP Expanded Alternative, on lines/routes not on the TTRP corridors would be less than significant.

Muni Screenlines – The transportation analysis prepared for the TEP project also examined the potential for the proposed project to affect the downtown transit screenlines. The additional ridership and capacity utilization by screenline and corridor is presented in Tables 14 and 15 on pp. 4.2-172 to 4.2-173 for the a.m. and p.m. peak hours, respectively. During both peak hours, with the additional transit ridership on the Muni routes, plus the additional capacity associated with the Service Improvements, the capacity utilization of the corridors and screenlines would be less than the 85 percent capacity utilization standard for the entire system and for each of the screenlines and corridors. During the a.m. peak hour, the capacity utilization of the "Subway lines" corridor of the southwest screenline would decrease from 85.6 percent under Existing conditions, to between 78.9 and 81.2 percent (without and with enhanced reliability, respectively) for the TTRP Expanded Alternative, and therefore, below the 85 percent capacity utilization standard, represent an improvement and overall less-than-significant impact on transit demand.

Transit Operations. As described in Section 4.2.4.2, the SF-CHAMP model was used to estimate the effects of implementing the project-level TTRPs on transit operations, as compared to conditions resulting from implementation of only the Service Improvements (i.e., transit travel time savings). With implementation of the TTRP Expanded Alternative projects including Variants (both without and with enhanced reliability), transit travel times would decrease on the TTRP portion of the routes, as well as for other Muni and regional routes traveling along these corridors. During the a.m. and p.m. peak hours, transit travel times along the affected route segments would decrease by 2 to 20 percent, with the greatest reduction in transit travel times occurring on the L Taraval on the TTRP.L corridor, N Judah along the TTRP.N corridor, on the 22 Fillmore along the TTRP.22_1 corridor, on the 28 19th Avenue along the TTRP.28_1 corridor, and on the 71L Haight-Noriega Limited on the TTRP.71_ corridor. As stated in Chapter 2, p. 2-56, when combined with other ongoing SFMTA programs, the estimated travel time savings are forecast to improve an additional five percent. Thus, with implementation of the TTRP Expanded Alternative proposals, transit operations along the corridors would be improved over Existing conditions. Removal of bus stops and stop relocation would affect all overlapping routes running along the TTRP corridor which use the same bus stops (for example, affecting the 8AX Bayshore Express, 8BX Bayshore Express, 9 San Bruno, and 9L San Bruno Limited routes where the routes are on the same streets as the 8X Bayshore Express).

In some instances, at intersections that are all-way stop-controlled, the stop signs on the street with transit (the TTRP corridor) are proposed to be removed to reduce transit travel time by allowing transit vehicles to proceed through intersections without coming to a complete stop. If any transit routes are located on the cross-streets (non-TTRP corridors) where stop signs would remain, transit vehicles on the stop-controlled approaches would likely experience an increase in delay, because transit vehicles would need to find a gap in traffic flow on the streets where stop signs would be removed. However, this increase in delay would not be considered significant, and the SFMTA would account for this potential delay during development of detailed design of the program-level TTRPs. For example, as discussed in Impact TR-23, as part of the TTRP.N Expanded Alternative, the intersection of Judah Street/23rd Avenue would be converted from an all-way stop-controlled intersection to a two-way stop-controlled intersection where stop signs would be removed from the Judah Street approaches on which the N Judah line runs, and stop signs would be maintained on the 23rd Avenue approaches on which the 16X Noriega Express and 71 Haight-Noriega/71L Haight-Noriega Limited travel in the southbound direction. At the intersection of Judah Street/23rd Avenue, while delay for the side streets subject to stop sign control would increase (i.e., 23rd Avenue) and the LOS would change from LOS B under Existing conditions to LOS E conditions with implementation of the TTRP.N Expanded Alternative, and therefore the 16X Noriega Express and 71 Haight-Noriega/71L Haight-Noriega Limited would experience increased delays, peak hour signal warrants at this intersection would not be met, gaps in traffic would still allow for cross-traffic to proceed, and therefore, traffic and by extension transit impacts at the intersection of Judah Street/23rd Avenue, and at similar intersections, would not be considered significant.

- Therefore, overall the impact of the 11 project-level TTRP Expanded Alternative proposals and their TTRP Variants on transit capacity and operations would be less than significant.

Traffic Impacts

- The TTRP Moderate Alternative for all the 11 project-level TTRPs and variants primarily would include transit stop changes, pedestrian improvements, parking and turn restrictions, and new traffic signals on Church Street (five intersections), Taraval Street (five intersections), Ulloa Street (one intersection), Judah Street (seven intersections), Irving Street (one intersection), McAllister Street (six intersections), Fulton Street (two intersections), Geneva Avenue (one intersection), Mission Street (one intersection), and Haight Street (ten intersections). In addition, lane modifications are proposed as part of TTRP.8X Moderate

Alternative (side-running westbound transit-only lanes would be established on Geneva Avenue between Delano Street and the I-280 eastbound ramps, and bicycle lanes would be established on Geneva Avenue westbound between Paris and London streets, and on Geneva Avenue eastbound between Mission and Paris streets), TTRP.9 Moderate Alternative (side-running transit-only lanes in the southbound direction on Potrero Avenue between 18th and 24th streets, and the existing northbound transit-only lane between 200 feet north of 24th Street and 21st Street would be removed), and TTRP.14 Moderate Alternative Variant 1 (side-running transit-only lanes in both directions on Mission Street between 13th and Cesar Chavez streets). The TTRP Moderate Alternative would include the proposed project-level Service Improvements described in Section 2.5.2.1, pp. 2-57 to 2-102.

The TTRP Expanded Alternative and variants generally would include many of the same transit stop changes, pedestrian improvements, and parking and turn restrictions as the TTRP Moderate Alternative; however, alternate traffic signal and stop sign changes and additional improvements would be implemented under the TTRP Expanded Alternative.

- TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, and TTRP.5 Expanded Alternative would replace stop signs at intersections along on Church (four intersections), Taraval (five intersections), Judah (five intersections), McAllister (seven intersections), and Haight (six intersections) streets with traffic calming measures, rather than traffic signals. The TTRP Expanded Alternative would include new signals on Mission Street (two intersections), 16th Street (four intersections), San Bruno Avenue (one intersection), and Taraval Street (five intersections), and all-way stop-controlled intersections at four intersections on Visitacion Avenue would be converted to 2-way stop-controlled intersections with additional traffic calming measures.

The Expanded Alternative would also establish transit-only lanes on Church Street between

- Duboce Avenue and 16th Street (TTRP.J Expanded Alternative), Taraval Street between 15th and 46th avenues (TTRP.L Expanded Alternative), on Geneva Avenue between Santos Street and Moscow Avenue (TTRP.8X Expanded Alternative), on Potrero Avenue in the southbound direction between 18th and 24th streets (TTRP.9 Expanded Alternative), on 16th Street between Third and Bryant streets, and between Bryant and Church streets as TTRP Variants (TTRP.22_1 Expanded Alternative Variants 1 and 2), on Van Ness Avenue between Lombard and Bay streets, on Columbus Avenue between Filbert and Green streets, and on Kearny Street between Market and Sutter streets (TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, and TTRP.30_1 Expanded Alternative Variant 2). The TTRP.9 Expanded Alternative would remove the existing northbound transit-only lane on Potrero Avenue between 200 feet north of 24th Street and 21st Street. The TTRP.22_1 Expanded Alternative would also establish a Muni-only left turn signal to the eastbound (outbound) left-turn lane from 16th Street to Third Street. The TTRP.14 Expanded Alternative would change the existing side-running transit-only lanes into center-running transit-only lanes from First to Fifth streets westbound (outbound) and from Sixth to First streets (eastbound) inbound, transition the westbound transit-only lane back to its existing curbside configuration and rescind the eastbound transit-only lane from Seventh to Sixth streets, then, establish a new southbound (outbound) transit-only lane extending from 11th to Cesar Chavez streets. Between 11th and 13th streets, this would be achieved by converting a southbound mixed-flow lane into a transit-only lane. Between 13th and Cesar Chavez streets, this would be achieved by reducing the number of lanes from four to three lanes, with a transit-only lane and a mixed-flow lane in the southbound direction and single mixed-flow lane in the northbound direction. On Mission Street between Cesar Chavez

Street and Randall Avenue and between Silver and Geneva avenues, a mixed-flow lane in both directions would be converted to an all-day side-running transit-only lane.

- As part of TTRP.5 Expanded Alternative the number of lanes on Fulton Street between Stanyan Street and Central Avenue (six blocks or approximately 2,900 feet) would be reduced from four lanes to three lanes to provide one lane in each direction with a center left-turn lane by removing a westbound travel lane, and additional left-turn, and, where feasible, right-turn pockets at the intersections located within this segment. In addition, as part of the TTRP.5 Expanded Alternative, the number of lanes on westbound Fulton Street between Central Avenue and Baker Street (two blocks, or approximately 1,000 feet) would be reduced from two to one lane, and parking on the north side of the street would be converted from parallel to perpendicular. Also, as part of TTRP.28_1 Expanded Alternative, one of the two northbound left turn lanes on 19th Avenue at Winston Drive would be shortened.

As previously discussed, the TTRP Expanded Alternative includes the same Service Improvements as the TTRP Moderate Alternative.

- **Impact TR-22: Implementation of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14 Variant 1, TTRP.14 Variant 2, TTRP.22_1, TTRP.28_1, TTRP.30_1, or TTRP.71_1 would have less-than-significant traffic impacts at 78 study intersections. (Less than Significant)**

Tables 16 and 17 on pp. 4.2-180 to 4.2-186 present the intersection LOS operating conditions with implementation of the TTRPs in combination with the Service Improvements, for a.m. and p.m. peak hour conditions, respectively. Table 18 on p. 4.2-187 summarizes the study intersections operating at LOS E or LOS F conditions for a.m. and p.m. peak hour conditions.

Table 16: Intersection Level of Service – Existing and Existing plus Project Conditions – A.M. Peak Hour

Intersection	Existing		Existing plus Service Improvements		Existing plus SI and TTRP Moderate Alt[1]		Existing plus SI and TTRP Expanded Alt[1]	
	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS
8. Broadway/Columbus	25	C	23	C	23	C	29	C
11. Sutter/Kearny	21	C	23	C	23	C	37	D
12. Market/Kearny/Third	29	C	28	C	26	C	22	C
13. Mission/Third	43	D	42	D	38	D	36	D
14. Mission/Fifth	19	B	18	B	18	B	30	C
15. Mission/South Van Ness/12th/Otis	50	D	48	D	48	D	48	D
16. 13th/Duboce/Mission/Otis	**>80 (1.35)**	**F**	**>80 (1.34)**	**F**	**>80 (1.34)**	**F**	**>80 (1.34)**	**F**
19. 16th/Mission	43	D	42	D	54	D	15	B
24. 16th/Seventh	33	C	32	C	32	C	37	C
25. 16th/Third	23	C	24	C	24	C	24	C
32. Randall/San Jose[4]	**58**	**E**	**57**	**E**	**55**	**E**	**66**	**E**
34. Randall/Mission[2,4]	29 (nb)	D	30 (nb)	D	30 (nb)	D	12	B
48. Geneva/I-280 Northbound On-ramp	**>80 (1.45)**	**F**	**>80 (1.44)**	**F**	**>80 (1.41)**	**F**	**>80 (1.41)**	**F**
49. Geneva/I-280 Southbound Off-ramp	30	C	30	C	29	C	29	C
50. Winston/19th	**58**	**E**	**58**	**E**	**60**	**E**	**65**	**E**
66. McAllister/Scott[2,5]	13 (nb)	B	13 (nb)	B	13	B	12 (nb)	B
67. 16th/Owens	24	C	23	C	24	C	33	C
68. 16th/Fourth	18	B	18	B	18	B	25	C
69. Guerrero/20th	23	C	23	C	24	C	29	C
70. South Van Ness/20th	15	B	15	B	16	B	16	B

Table 16: Intersection Level of Service – Existing and Existing plus Project Conditions – A.M. Peak Hour (continued)

Notes:

1. SI = Service Improvements. For the TEP, a range of potential combinations of the elements in the TPS Toolkit is being considered for the project level TTRPs in order to reduce transit travel time. The range of TTRP treatments being analyzed has been bracketed by: 1) a moderate set of TPS Toolkit elements referred to as the Moderate Alternative; and 2) an expanded set of TPS Toolkit elements referred to as the Expanded Alternative. The difference between these two alternatives is that the Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental effects such as substantial changes to traffic, bicycle, or pedestrian circulation or similar impacts, whereas the Moderate Alternative is expected to have fewer physical environmental effects due to the nature of the TPS Toolkit elements chosen.
2. For all-way stop-controlled and two-way stop-controlled intersections. Delay and LOS presented for worst approach, indicated in ( ) nb = northbound, sb = southbound, eb = eastbound, wb = westbound. For signalized intersections operating at LOS E or LOS F, the overall intersection v/c ratio is presented in ( ).
3. Delay presented in seconds per vehicle. Intersections operating at LOS E or LOS F highlighted in **bold.**
4. The existing all-way stop-controlled intersection of Randall/Mission (#34) and signalized intersection of Randall/San Jose (#32) reconfigured under TTRP Expanded Alternative, and the intersection of Randall/Mission would be signalized.
5. The existing all-way stop-controlled intersection of McAllister/Scott (#66) would be signalized under TTRP Moderate Alternative and reconfigured with a traffic circle under TTRP Expanded Alternative.
6. Due to diversions, minor redistribution of traffic volumes, or conversion of auto trips to transit trips as determined by SF-CHAMP, some peak hour intersection operating conditions may improve or degrade slightly when compared to Existing conditions. In addition, based on the HCM methodology, delay and LOS is calculated based on an average of the total vehicular delay per approach, weighted by the number of vehicles at each approach. Increases in traffic volumes at an intersection usually result in increases in the overall intersection delay. However, if there are increases in the number of vehicles at movements with low delays, the average weighted delay per vehicle may remain the same or decrease. See Methodology section for additional discussion.

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP.

Table 17: Intersection Level of Service – Existing and Existing plus Project Conditions – P.M. Peak Hour

Intersection	Existing		Existing plus Service Improvements		Existing plus SI and TTRP Moderate Alt[1]		Existing plus SI and TTRP Expanded Alt[1]	
	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS
1. North Point/Van Ness[2]	17 (wb)	C	16 (wb)	C	16 (wb)	C	16 (wb)	C
2. Chestnut/Van Ness	12	B	12	B	12	B	13	B
3. Filbert/Columbus	9	A	10	B	10	B	11	B
4. Columbus/Mason	8	A	8	A	8	A	13	B
5. Union/Columbus	19	B	19	B	18	B	19	B
6. Columbus/Green/Stockton	39	D	44	D	44	D	**73**	**E**
7. Vallejo/Stockton	14	B	15	B	15	B	16	B
8. Broadway/Columbus	18	B	19	B	19	B	19	B
9. Broadway/Sansome	21	C	24	C	24	C	26	C
10. Washington/Sansome	17	B	16	B	16	B	18	B
11. Sutter/Kearny	20	B	19	B	19	B	42	D
12. Market/Kearny/Third	48	D	47	D	45	D	43	D
13. Mission/Third	20	C	20	C	20	C	21	C
14. Mission/Fifth	16	B	16	B	16	B	36	D
15. Mission/South Van Ness/12th/Otis	46	D	46	D	46	D	46	D
16. 13th/Duboce/Mission/Otis	**70**	**E**	**66**	**E**	**66**	**E**	**66**	**E**
17. Market/Church/14th	**>80 (1.02)**	**F**	**>80 (1.03)**	**F**	**>80 (1.03)**	**F**	**>80 (1.10)**	**F**
18. 16th/Guerrero	31	C	30	C	26	C	28	C
19. 16th/Mission	28	C	27	C	28	C	32	C
20. 19th/Mission	14	B	14	B	16	B	15	B
21. 16th/Bryant	26	C	26	C	26	C	**>80 (1.28)**	**F**
22. 16th/Potrero	40	D	40	D	38	D	**>80 (1.51)**	**F**
23. 16th/De Haro	23	C	23	C	23	C	27	C

Table 17: Intersection Level of Service – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Intersection	Existing		Existing plus Service Improvements		Existing plus SI and TTRP Moderate Alt[1]		Existing plus SI and TTRP Expanded Alt[1]	
	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS
24. 16th/Seventh	35	C	35	C	35	C	**58**	**E**
25. 16th/Third	25	C	25	C	25	C	24	C
26. 25th/Church[2,4]	23 (sb)	C	26 (sb)	C	11	B	**> 50 (wb)**	**F**
27. Cesar Chavez/Church[2,5]	16 (sb)	C	16 (sb)	C	8	A	**> 50 (eb)**	**F**
28. 24th/Mission	22	C	22	C	26	C	22	C
29. Cesar Chavez/Mission	29	C	28	C	28	C	26	C
30. Precita/Mission	16	B	16	B	15	B	18	B
31. 30th/Mission	11	B	11	B	9	A	19	B
32. Randall/San Jose[6]	49	D	48	D	47	D	49	D
33. Cortland/Mission	23	C	22	C	21	C	23	C
34. Randall/Mission[2,6]	27 (nb)	D	26 (nb)	D	26 (nb)	D	13	B
35. Silver/San Bruno	**57**	**E**	**57**	**E**	54	D	53	D
36. Felton/San Bruno[2,7]	**37 (nb)**	**E**	**39 (nb)**	**E**	**42 (nb)**	**E**	9	A
37. Arleta/San Bruno/Bayshore	**73**	**E**	**71**	**E**	**60**	**E**	**61**	**E**
38. Geneva/Santos	9	A	9	A	9	A	11	B
39. Geneva/Carter	38	D	38	D	38	D	52	D
40. Geneva/Moscow	17	B	17	B	17	B	55	D
41. Templeton/Mission[2,8]	11 (sb)	B	11 (wb)	B	7	A	6	A
42. Geneva/Mission	20	B	20	B	17	B	18	B
43. Persia/Mission	17	B	17	B	17	B	22	C
44. Excelsior/Mission	9	A	9	A	12	B	19	B
45. Silver/Mission	19	B	19	B	15	B	17	B
46. Geneva/Cayuga[2,9]	**46 (eb)**	**E**	**46 (eb)**	**E**	7	A	6	A

Table 17: Intersection Level of Service – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Intersection	Existing		Existing plus Service Improvements		Existing plus SI and TTRP Moderate Alt[1]		Existing plus SI and TTRP Expanded Alt[1]	
	Delay[2,3]	**LOS**	**Delay[2,3]**	**LOS**	**Delay[2,3]**	**LOS**	**Delay[2,3]**	**LOS**
47. Geneva/San Jose	25	C	25	C	25	C	24	C
48. Geneva/I-280 Northbound On-ramp	**>80 (1.55)**	**F**	**>80 (1.54)**	**F**	**>80 (1.54)**	**F**	**>80 (1.48)**	**F**
49. Geneva/I-280 Southbound Off-ramp	**58**	**E**	**55**	**E**	39	D	45	D
50. Winston/19th[16]	**66**	**E**	**63**	**E**	**65**	**E**	**63**	**E**
● 51. Taraval/19th	37	D	35	D	32	C	50	C
52. Irving/Fourth[2,10]	13 (wb)	B	13 (wb)	B	8	A	8	A
53. Judah/36th[2]	17 (nb)	C	16 (nb)	C	12 (nb)	B	11 (sb)	B
54. Judah/23rd[2,11]	12 (wb)	B	12 (wb)	B	9	A	**36 (sb)**	**E**
55. Judah/19th	37	D	37	D	33	C	34	C
56. Judah/18th[2,12]	12 (eb)	B	12 (eb)	B	9	A	10	B
57. Judah/Tenth[2,13]	11 (wb)	B	11 (wb)	B	8	A	27 (sb)	D
58. Carl/Stanyan	34	C	34	C	31	C	36	D
59. Fulton/Stanyan	**66**	**E**	**67**	**E**	**67**	**E**	**71**	**E**
60. Fulton/Parker	39	D	37	D	37	D	44	D
61. Fulton/Masonic	17	B	17	B	17	B	42	D
62. McAllister/Central[2,14]	8 (wb)	A	8 (wb)	A	8 (wb)	A	15 (sb)	B
63. McAllister/Baker[2]	9 (sb)	A	9 (sb)	A	9 (sb)	A	9 (sb)	A
64. Fulton/Baker	14	B	15	B	15	B	14	B
65. McAllister/Divisadero	14	B	15	B	15	B	15	B
66. McAllister/Scott[2,15]	11 (sb)	B	11 (sb)	B	12	B	10 (sb)	B
67. 16th/Owens	25	C	25	C	25	C	49	D
68. 16th/Fourth	16	B	16	B	16	B	18	B
69. Guerrero/20th	15	B	15	B	16	B	17	B

Table 17: Intersection Level of Service – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Intersection	Existing		Existing plus Service Improvements		Existing plus SI and TTRP Moderate Alt[1]		Existing plus SI and TTRP Expanded Alt[1]	
	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS
70. South Van Ness/20th	12	B	12	B	12	B	13	B
● 71. Taraval/Sunset	23	C	23	C	23	C	22	C
● 72. Ulloa/15th[17]	9 (wb)	A	9 (wb)	A	12	B	7 (nb)	A
● 73. Potrero/23rd	42	D	42	D	19	B	19	B
● 74. Potrero/24th	38	D	38	D	45	D	42	D
● 75. Potrero/25th	17	B	17	B	13	B	14	B
● 76. Haight/Shrader[18]	10 (wb)	A	10 (wb)	A	16	B	**> 50 (nb/sb)**	**F**
● 77. Haight/Masonic	23	C	22	C	21	C	21	C
● 78. Haight/Buchanan[19]	14 (nb)	B	14 (nb)	B	17	B	16	B

Notes:

1. SI = Service Improvements. For the TEP, a range of potential combinations of the elements in the TPS Toolkit is being considered for the project level TTRPs in order to reduce transit travel time. The range of TTRP treatments being analyzed has been bracketed by: 1) a moderate set of TPS Toolkit elements referred to as the Moderate Alternative; and 2) an expanded set of TPS Toolkit elements referred to as the Expanded Alternative. The difference between these two alternatives is that the Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental effects such as substantial changes to traffic, bicycle, or pedestrian circulation or similar impacts, whereas the Moderate Alternative is expected to have fewer physical environmental effects due to the nature of the TPS Toolkit elements chosen.
2. For all-way stop-controlled and two-way stop-controlled intersections. Delay and LOS presented for worst approach, indicated in ( ) nb = northbound, sb = southbound, eb = eastbound, wb = westbound. For signalized intersections operating at LOS E or LOS F, the overall intersection v/c ratio is presented in ( ).
3. Delay presented in seconds per vehicle. Intersections operating at LOS E or LOS F highlighted in **bold.**
4. The existing all-way stop-controlled intersection of 25th/Church (#26) assumed signalized under TTRP Moderate, and two-way stop-controlled with stop signs on eastbound and westbound approaches under the TTRP Expanded Alternative.
5. The existing all-way stop-controlled intersections of Cesar Chavez/Church (#27) assumed signalized under TTRP Moderate, and two-way stop-controlled with stop signs on eastbound and westbound approaches under the TTRP Expanded Alternative.
6. The existing all-way stop-controlled intersection of Randall/Mission (#34) and signalized intersection of Randall/San Jose (#32) reconfigured under TTRP Expanded Alternative, and intersection of Randall/Mission would be signalized.
7. The existing all-way stop-controlled intersection of Felton/San Bruno (#36) assumed signalized under TTRP Expanded Alternative.
8. The existing all-way stop-controlled intersection of Templeton/Mission (#41) assumed signalized under TTRP Expanded Alternative.

Table 17: Intersection Level of Service – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Intersection	Existing		Existing plus Service Improvements		Existing plus SI and TTRP Moderate Alt[1]		Existing plus SI and TTRP Expanded Alt[1]	
	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS

9. The existing all-way stop-controlled intersection of Geneva/Cayuga (#46) assumed signalized under TTRP Moderate and TTRP Expanded Alternatives.
10. The existing all-way stop-controlled intersection of Irving/Fourth (#52) assumed signalized under TTRP Moderate and TTRP Expanded Alternatives.
11. The existing all-way stop-controlled intersection of Judah/23rd (#54) assumed signalized under TTRP Moderate Alternative, and two-way stop-controlled with stop signs on the northbound and southbound approaches under TTRP Expanded Alternative.
12. The existing all-way stop-controlled intersection of Judah/18th (#56) assumed signalized under TTRP Moderate and TTRP Expanded Alternatives.
13. The existing all-way stop-controlled intersection of Judah/Tenth (#57) assumed signalized under TTRP Moderate Alternative, and two-way stop-controlled with stop signs on the northbound and southbound approaches under TTRP Expanded Alternative.
14. The existing all-way stop-controlled intersection of McAllister/Central (#62) assumed two-way stop-controlled with stop signs on the eastbound and westbound approaches under TTRP Moderate Alternative.
15. The existing all-way stop-controlled intersection of McAllister/Scott (#66) would be signalized under TTRP Moderate Alternative and reconfigured with a traffic circle under TTRP Expanded Alternative.

Table 17: Intersection Level of Service – Existing and Existing plus Project Conditions – P.M. Peak Hour (continued)

Intersection	Existing		Existing plus Service Improvements		Existing plus SI and TTRP Moderate Alt[1]		Existing plus SI and TTRP Expanded Alt[1]	
	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS	Delay[2,3]	LOS

16. The intersection of Winston Drive/19th Avenue operates at LOS D during the Existing conditions weekend p.m. peak hour, and would continue to operate at LOS D under Existing plus Service Improvements conditions, Existing plus Service Improvements and TTRP Moderate Alternative conditions, and Existing plus Service Improvements and TTRP Expanded Alternative conditions.

● 17. The existing all-way stop-controlled intersection of Ulloa/15th (#72) assumed signalized under the TTRP Moderate Alternative, and stop-sign controlled for the northbound and eastbound approaches under TTRP Expanded Alternative.

● 18. The existing all-way stop-controlled intersection of Haight/Shrader (#76) assumed signalized under the TTRP Moderate Alternative, and two-way stop-controlled with stop signs on the northbound and southbound approaches, and eastbound and westbound left turns restricted under TTRP Expanded Alternative.

● 19. The existing all-way stop-controlled intersection of Haight/Buchanan (#78) assumed signalized under the TTRP Moderate Alternative and TTRP Expanded Alternative conditions. The new signal would include a transit queue jump on Haight Street in the eastbound direction.

20. Due to diversion, minor redistribution of traffic volumes, or conversion of auto trips to transit trips as determined by SF-CHAMP, some peak hour intersection operating conditions may improve or degrade slightly when compared to Existing conditions. In addition, based on the HCM methodology, delay and LOS is calculated based on an average of the total vehicular delay per approach, weighted by the number of vehicles at each approach. Increases in traffic volumes at an intersection usually result in increases in the overall intersection delay. However, if there are increases in the number of vehicles at movements with low delays, the average weighted delay per vehicle may remain the same or decrease. See Methodology section for additional discussion.

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP.

Table 18: Study Intersections Operating at LOS E or LOS F – Existing and Existing plus Project Conditions – A.M. and P.M. Peak Hours

Intersection	Existing		Existing plus Service Improvements (SI)		Existing plus SI and TTRP Moderate Alt		Existing plus SI and TTRP Expanded Alt	
	Delay[1,2]	LOS	Delay[1,2]	LOS	Delay[1,2]	LOS	Delay[1,2]	LOS
AM PEAK HOUR								
16. 13th/Duboce/Mission/Otis	**>80 (1.35)**	**F**	**>80 (1.34)**	**F**	**>80 (1.34)**	**F**	**>80 (1.34)**	**F**
32. Randall/San Jose[4]	**58**	**E**	**57**	**E**	**55**	**E**	**66**	**E**
48. Geneva/I-280 Northbound On-ramp	**>80 (1.45)**	**F**	**>80 (1.44)**	**F**	**>80 (1.41)**	**F**	**>80 (1.41)**	**F**
50. Winston/19th	**58**	**E**	**58**	**E**	**60**	**E**	**65**	**E**
PM PEAK HOUR								
6. Columbus/Green/Stockton	39	D	44	D	44	D	**73**	**E**
16. 13th/Duboce/Mission/Otis	**70**	**E**	**66**	**E**	**66**	**E**	**66**	**E**
17. Market/Church/14th	**>80 (1.02)**	**F**	**>80 (1.03)**	**F**	**>80 (1.03)**	**F**	**>80 (1.10)**	**F**
21. 16th/Bryant	26	C	26	C	26	C	**>80 (1.28)**	**F**
22. 16th/Potrero	40	D	40	D	38	D	**>80 (1.51)**	**F**
24. 16th/Seventh	35	C	35	C	35	C	**58**	**E**
26. 25th/Church	23 (sb)	C	26 (sb)	C	11	B	**> 50 (wb)**	**F**
27. Cesar Chavez/Church	16 (sb)	C	16 (sb)	C	8	A	**> 50 (eb)**	**F**
35. Silver/San Bruno	**57**	**E**	**57**	**E**	54	D	53	D
36. Felton/San Bruno	**37 (nb)**	**E**	**39 (nb)**	**E**	**42 (nb)**	**E**	9	A
37. Arleta/San Bruno/Bayshore	**73**	**E**	**71**	**E**	**60**	**E**	**61**	**E**
46. Geneva/Cayuga	**46 (eb)**	**E**	**46 (eb)**	**E**	7	A	6	A
48. Geneva/I-280 Northbound On-ramp	**>80 (1.55)**	**F**	**>80 (1.54)**	**F**	**>80 (1.54)**	**F**	**>80 (1.48)**	**F**
49. Geneva/I-280 Southbound Off-ramp	**58**	**E**	**55**	**E**	39	D	45	D
50. Winston/19th	**66**	**E**	**63**	**E**	**65**	**E**	**63**	**E**
54. Judah/23rd	12 (wb)	B	12 (wb)	B	9	A	**36 (sb)**	**E**
59. Fulton/Stanyan	**66**	**E**	**67**	**E**	**67**	**E**	**71**	**E**
● 76. Haight/Shrader	10 (wb)	A	10 (wb)	A	16	B	**>50 (nb/sb)**	**F**

Notes:
1. For all-way stop-controlled and two-way stop-controlled intersections. Delay and LOS presented for worst approach, indicated in ( ) nb = northbound, sb = southbound, eb = eastbound, wb = westbound. For signalized intersections operating at LOS E or LOS F, the overall intersection v/c ratio is presented in ( ).
2. Delay presented in seconds per vehicle. Intersections operating at LOS E or LOS F highlighted in **bold.** Shaded = Project Impact

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP.

- With implementation of the TTRP.J Moderate Alternative, TTRP.L Moderate Alternative, TTRP.N Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.9 Moderate Alternative, TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, TTRP.22_1 Moderate Alternative, TTRP.28_1 Moderate Alternative, TTRP.30_1 Moderate Alternative, or TTRP.71_1 Moderate Alternative, the following 70 of the 78 study intersections would operate at LOS D or better during the a.m. and/or p.m. peak hours, or signal warrants would not be met at all-way or two-way stop-controlled intersections where the worst approach operates at LOS E or LOS F conditions, and therefore, traffic impacts as a result of the TTRP Moderate Alternative at these locations would be less than significant.

  - 25th/Church (p.m.)
  - Cesar Chavez/Church (p.m.)
  - Taraval/Sunset (p.m.)
  - Ulloa/15th (p.m.)
  - Irving/Fourth (p.m.)
  - Judah/36th (p.m.)
  - Judah/23rd (p.m.)
  - Judah/19th (p.m.)
  - Judah/18th (p.m.)
  - Judah/Tenth (p.m.)
  - Carl/Stanyan (p.m.)
  - Fulton/Parker (p.m.)
  - Fulton/Masonic (p.m.)
  - McAllister/Central (p.m.)
  - McAllister/Baker (p.m.)
  - Fulton/Baker (p.m.)
  - McAllister/Divisadero (p.m.)
  - McAllister/Scott (a.m. and p.m.)
  - Silver/San Bruno (p.m.)
  - Geneva/Santos (p.m.)
  - Geneva/Carter (p.m.)
  - Geneva/Moscow (p.m.)
  - Geneva/Mission (p.m.)
  - Geneva/Cayuga (p.m.)
  - Geneva/San Jose (p.m.)
  - Geneva/I-280 Southbound On-ramp (a.m. and p.m.)
  - Potrero/23rd (p.m.)
  - Potrero/24th (p.m.)
  - Potrero/25th (p.m.)
  - Cesar Chavez/Mission (p.m.)
  - Precita/Mission (p.m.)
  - 30th/Mission (p.m.)
  - Cortland/Mission (p.m.)
  - Randall/Mission (a.m. and p.m.)
  - Templeton/Mission (p.m.)
  - Persia/Mission (p.m.)
  - Excelsior/Mission (p.m.)
  - Silver/Mission (p.m.)
  - Guerrero/20th (a.m. and p.m.)
  - South Van Ness/20th (a.m. and p.m.)
  - 16th/Guerrero (p.m.)
  - 16th/Bryant (p.m.)
  - 16th/Potrero (p.m.)
  - 16th/DeHaro (p.m.)
  - 16th/Seventh (a.m. and p.m.)
  - 16th/Third (a.m. and p.m.)
  - 16th/Owens (a.m. and p.m.)
  - 16th/Fourth (a.m. and p.m.)
  - Taraval/19th (p.m.)
  - North Point/Van Ness (p.m.)
  - Chestnut/Van Ness (p.m.)
  - Filbert/Columbus (p.m.)
  - Columbus/Mason (p.m.)
  - Union/Columbus (p.m.)
  - Columbus/Green/Stockton (p.m.)
  - Vallejo/Stockton (p.m.)
  - Broadway/Columbus (a.m. and p.m.)
  - Sutter/Kearny (a.m. and p.m.)

- Mission/Third (a.m. and p.m.)
- Mission/Fifth (a.m. and p.m.)
- Mission/South Van Ness/ 12th/Otis (a.m. and p.m.)
- 16th/Mission (a.m. and p.m.)
- 19th/Mission (p.m.)
- 24th/Mission (p.m.)
- Market/Kearny/Third (a.m. and p.m.)
- Haight/Shrader (p.m.)
- Haight/Masonic (p.m.)
- Haight/Buchanan (p.m.)
- Broadway/Sansome (p.m.)
- Washington/Sansome (p.m)

At the eight intersections operating poorly (LOS E or LOS F) under Existing conditions during the a.m. and/or p.m. peak hours listed below, the TTRP Moderate Alternative's project contributions to poorly-operating critical movements at these intersections were examined further to determine whether the TTRP Moderate Alternate would have a significant contribution to these existing LOS E or LOS F operating conditions. The TTRP.J Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, and TTRP.28_1 Moderate Alternative were found to have less-than-significant project contributions at the following eight intersections, and therefore, their contribution to the existing intersection LOS E or LOS F conditions would not be considered a significant impact. Therefore, traffic impacts as a result of the TTRP Moderate Alternative at these locations would be less than significant.

- Market/Church/14th (p.m. peak hour) under the TTRP.J Moderate Alternative
- Fulton/Stanyan (p.m. peak hour) under the TTRP.5 Moderate Alternative
- Felton/San Bruno (p.m. peak hour) under the TTRP.8X Moderate Alternative
- Arleta/San Bruno/Bayshore (p.m. peak hour) under the TTRP.8X Moderate Alternative
- Geneva/I-280 Northbound On-ramp (a.m. and p.m. peak hours) under the TTRP.8X Moderate Alternative
- 13th/Duboce/Mission/Otis (a.m. and p.m. peak hours) under the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2
- Randall/San Jose (during the a.m. peak hour this intersection operates at LOS E, while during the p.m. peak hour this intersection operates at LOS D) under the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2
- Winston/19th (weekday a.m. and p.m. peak hour, and Saturday midday peak hour) under the TTRP.28_1 Moderate Alternative

● **Impact TR-23: Implementation of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.28_1 or TTRP.71_1 would have less-than-significant traffic impacts at 40 study intersections. (Less than Significant)**

Intersection operating conditions for Existing plus the TTRP Expanded Alternative conditions (both with and without enhanced reliability) are presented in Tables 16 and 17 on pp. 4.2-180 to 4.2-186 for the a.m. and p.m. peak hour, respectively. Table 18 on pp. 4.2-187 summarizes the study intersections operating at LOS E or LOS F conditions for the a.m. and p.m. peak hour.

- With implementation of the TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, TTRP.9 Expanded Alternative, TTRP.28_1 Expanded Alternative, and the TTRP.71_1 Expanded Alternative, the following 34 study intersections would operate at LOS D or better during the a.m. and/or p.m. peak hours, or signal warrants would not be met at all-way or two-way stop-controlled intersections where the worst approach operates at LOS E or LOS F conditions, and therefore, traffic impacts at these locations would be less than significant as a result of TTRP Expanded Alternative.

  - 25th/Church (p.m.)
  - Cesar Chavez/Church (p.m.)
  - Taraval/Sunset (p.m.)
  - Ulloa/15th (p.m.)
  - Irving/Fourth (p.m.)
  - Judah/36th (p.m.)
  - Judah/23rd (p.m.)
  - Judah/19th (p.m.)
  - Judah/18th (p.m.)
  - Judah/Tenth (p.m.)
  - Carl/Stanyan (p.m.)
  - Fulton/Parker (p.m.)
  - Fulton/Masonic (p.m.)
  - McAllister/Central (p.m.)
  - McAllister/Baker (p.m.)
  - Fulton/Baker (p.m.)
  - McAllister/Divisadero (p.m.)
  - McAllister/Scott (a.m. and p.m.)
  - Silver/San Bruno (p.m.)
  - Felton/San Bruno (p.m.)
  - Geneva/Santos (p.m.)
  - Geneva/Carter (p.m.)
  - Geneva/Moscow (p.m.)
  - Geneva/Mission (p.m.)
  - Geneva/Cayuga (p.m.)
  - Geneva/San Jose (p.m.)
  - Geneva/I-280 Southbound On-ramp (a.m. and p.m.)
  - Potrero/23rd (p.m.)
  - Potrero/24th (p.m.)
  - Potrero/25th (p.m.)
  - Taraval/19th (p.m.)
  - Haight/Shrader (p.m.)
  - Haight/Masonic (p.m.)
  - Haight/Buchanan (p.m.)

At the six intersections operating poorly under Existing conditions during the a.m. and/or p.m. peak hours listed below, the TTRP Expanded Alternative's project contributions to critical movements at these intersections were examined further to determine whether the TTRP Expanded Alternative would have a significant contribution to these existing LOS E or LOS F operating conditions. At intersections where the TTRP Expanded Alternative would reduce the amount of mixed-flow capacity at an intersection (for example, convert a mixed-flow travel lane to a transit-only lane), the overall intersection v/c ratio was reviewed to determine if the project would result in an increase in v/c of more than 10 percent, and thus contribute considerably to the existing LOS E or LOS F conditions. The TTRP.J Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, and TTRP.28_1 Expanded Alternative were found to have less-than-significant contributions at the following six intersections listed below, and therefore, their contribution to the existing intersection LOS E or LOS F conditions would not be considered a significant impact. Traffic impacts as a result of the TTRP.J Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, and TTRP.28_1 Expanded Alternative at these locations would be less than significant.

- Market/Church/14th (p.m.) in the TTRP.J Expanded Alternative
- Randall/San Jose (a.m.) in the TTRP.J Expanded Alternative
- Fulton/Stanyan (p.m. peak hour) under the TTRP.5 Expanded Alternative
- Arleta/San Bruno/Bayshore (p.m.) in the TTRP.8X Expanded Alternative
- Geneva/I-280 Northbound On-ramp (a.m. and p.m.) in the TTRP.8X Expanded Alternative
- Winston/19th (weekday a.m. and p.m., Saturday midday) in the TTRP.28_1 Expanded Alternative

Impact TR-24: Implementation of the project-level TTRP.14 Expanded Alternative would result in a significant traffic impact at the intersection of Randall Street/San Jose Avenue that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and the TTRP.14 Expanded Alternative conditions. (Significant and Unavoidable)

As part of installing southbound (outbound) transit-only lanes and reducing transit travel time, the TTRP.14 Expanded Alternative would include signalization of the intersection of Randall/Mission streets and reconfiguration of Randall Street between San Jose Avenue and Mission Street, which would eliminate the northbound right-turn movement from San Jose Avenue onto Randall Street. At the signalized intersection of Randall Street/San Jose Avenue, which currently operates at LOS E during the a.m. peak hour under and would continue to operate at LOS E under Existing plus TTRP.14 Expanded Alternative, vehicles traveling northbound on San Jose Avenue would need to continue through to intersections further north to access Mission Street from San Jose Avenue (for example, at Brook or 30th streets). Thus, the TTRP.14 Expanded Alternative improvements would result in more vehicles in the northbound critical through movement that currently operates poorly at the intersection of Randall Street/San Jose Avenue, thereby increasing the proposed project's contribution to the LOS E conditions during the a.m. peak hour, and the traffic impact for the TTRP.14 Expanded Alternative would be considered significant.

To mitigate the poor operating condition of the Randall Street/San Jose Avenue intersection, additional mixed-flow lane capacity would be needed at the northbound approach to the intersection. This is not possible because the northbound approach to this intersection is constrained by the median light rail tracks and boarding island for the J Church streetcar line. Additionally, the right-of-way to add receiving lanes on the north side of the intersection is not available due to the presence of a Class II bicycle facility (bicycle lane) and because the curb-to-curb distance narrows. Thus, the TTRP.14 Expanded Alternative would result in significant project-specific traffic impacts at the study intersection of Randall Street/San Jose Avenue. Because there are no feasible mitigation measures to improve conditions to a less-than-significant level, as previously described, the traffic impacts at this intersection would be significant and unavoidable as a result of the TTRP.14 Expanded Alternative.

Impact TR-25: Implementation of the project-level TTRP.14 Expanded Alternative would have less-than-significant traffic impacts at 19 study intersections under Existing plus Service Improvements and the TTRP.14 Expanded Alternative conditions. (Less than Significant)

With implementation of the TTRP.14 Expanded Alternative, the following 18 study intersections would continue to operate at LOS D or better during the peak hours. Therefore, traffic impacts at these locations would be less than significant as a result of the TTRP.14 Expanded Alternative.

- Mission/Third (a.m. and p.m. peak hours)
- Mission/Fifth (a.m. and p.m. peak hours)
- Mission/South Van Ness/12th/Otis (a.m. and p.m. peak hours)
- 16th/Mission (a.m. and p.m. peak hours)
- 19th/Mission (p.m. peak hour)
- 24th/Mission (p.m. peak hour)
- Cesar Chavez/Mission (p.m. peak hour)
- Precita/Mission (p.m. peak hour)
- 30th/Mission (p.m. peak hour)
- Cortland/Mission (p.m. peak hour)
- Randall/Mission (a.m. and p.m. peak hour)
- Templeton/Mission (p.m. peak hour)
- Geneva/Mission (p.m. peak hour)
- Persia/Mission (p.m. peak hour)
- Excelsior/Mission (p.m. peak hour)
- Silver/Mission (p.m. peak hour)
- Guerrero/20th (a.m. and p.m. peak hours)
- South Van Ness/20th (a.m. and p.m. peak hours)

In addition to the above 18 study intersections which operate at LOS D or better under the TTRP Expanded Alternative conditions, the remaining intersection of 13th Street/Duboce Avenue/Mission Street/Otis Street currently operates at LOS F during the a.m. peak hour and LOS E during the p.m. peak hour. Therefore, the TTRP.14 Expanded Alternative's contribution to the poorly operating critical movements at this intersection during both peak hours was examined. Since the TTRP.14 Expanded Alternative's contribution to the poorly operating critical movements would not be considerable, the project's contribution to the overall intersection LOS F and LOS E conditions at the intersection of 13th Street/Duboce Avenue/Mission Street/Otis Street would not be considered significant.

Impact TR-26: Implementation of the project-level TTRP.22_1 Expanded Alternative would result in a significant traffic impact at the intersection of 16th/Bryant streets that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative conditions. (Significant and Unavoidable with Mitigation)

Under the TTRP.22_1 Expanded Alternative, the conversion of one mixed-flow lane on 16th Street in each direction to a median transit-only lane would reduce the roadway capacity between Bryant and Third streets for mixed-flow traffic from two to one lane in each direction. New traffic signals would be installed on 16th Street at San Bruno Avenue and Wisconsin, Connecticut, and Missouri streets. Additional left-turn restrictions in both directions would be implemented along 16th Street at Bryant, Utah, San Bruno, Kansas, Rhode Island, De Haro, Carolina, Wisconsin, Arkansas, Connecticut, Missouri, and Fourth streets, and a transit-only left turn signal would be added at Third Street.

Implementation of the TTRP.22_1 Expanded Alternative would likely result in a minor increase in peak hour traffic volumes on other streets in the project vicinity due to reduced capacity along 16th Street for mixed-flow traffic and the implementation of left-turn prohibitions. East of Potrero Avenue, some drivers may divert to 17th Street, although the magnitude of diversion, based on examination of vehicle assignments from the SF-CHAMP model used to forecast changes in transit ridership and traffic volumes due to the TEP, would be minimal. Seventeenth Street currently has one travel lane in each direction, and most intersections are all-way stop-controlled or two-way stop-controlled. There are no other parallel roadways providing through access between Third Street and the Mission neighborhood, and therefore even with implementation of the transit-only lanes, it is anticipated that most vehicles would remain on 16th Street.

With implementation of the TTRP.22_1 Expanded Alternative, the p.m. peak hour operating conditions at the intersection of 16th/Bryant streets would worsen from LOS C under Existing conditions to LOS F under Existing plus Service Improvements and TTRP.22_1 Expanded Alternative conditions. The degradation of the intersection LOS operating conditions would be due to implementation of the proposed transit-only lanes in both directions on 16th Street and removal of one mixed-flow lane in each direction. This would be considered a significant impact.

To mitigate the poor operating condition of the intersection, additional mixed-flow lane capacity would be needed at the westbound approach to the intersection. The provision of additional mixed-flow lane capacity would require the narrowing of sidewalks and/or conversion of an eastbound mixed-flow lane to a westbound mixed-flow lane.

Mitigation Measure M-TR-26: Intersection Restriping at 16th/Bryant streets

The SFMTA shall reconfigure the proposed changes at the intersection of 16th/Bryant streets converting the westbound approach of 16th Street at Bryant Street from what is proposed to be a shared through-right turn lane to a through lane and a dedicated right-turn pocket adjacent to the through lane, and reconfigure the eastbound approach from what is proposed to be a separate through lane and a dedicated right-turn pocket adjacent to the through lane to a shared through/right lane.

With implementation of Mitigation Measure M-TR-26: Intersection Restriping at 16th Street/Bryant Street, intersection operations would improve to LOS E but not to less-than-significant levels (i.e., to LOS D or better conditions in the p.m. peak hour). Mitigation Measure M-TR-26 would slightly improve operations at the intersection and not result in new impacts on the transportation network. Because implementation of Mitigation Measure M-TR-26 would not improve intersection operations to LOS D or better during the p.m. peak hour, TTRP.22_1 Expanded Alternative traffic impacts at the intersection of 16th/Bryant streets would remain significant and unavoidable even with mitigation.

Impact TR-27: Implementation of the project-level TTRP.22_1 Expanded Alternative would result in a significant traffic impact at the intersection of 16th Street/Potrero Avenue that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative conditions. (Significant and Unavoidable)

With implementation of the TTRP.22_1 Expanded Alternative, the p.m. peak hour operating conditions at the intersection of 16th Street/Potrero Avenue would worsen from LOS D under Existing conditions to LOS F. The degradation of the intersection LOS operating conditions would be due to implementation of the proposed transit-only lanes in both directions on 16th Street and removal of one mixed-flow lane in each direction. This would be considered a significant impact.

To mitigate the poor operating conditions of the intersection, additional mixed-flow lane capacity would be needed at the eastbound and westbound approaches to the intersection. The provision of additional mixed-flow lane capacity would require the narrowing of sidewalks to substandard widths. Because the TTRP.22_1 Expanded Alternative would eliminate on-street parking to implement the transit-only lane, parking removal would not be an option for providing additional capacity. The Class II bicycle facility (bicycle lane) on Potrero Avenue could be removed to provide an additional northbound or southbound travel lane, but additional capacity is not required at these approaches. In addition, removal of bicycle lanes or narrowing the sidewalks to substandard widths would not be consistent with the City's *Transit First* Policy. Signal timing and roadway geometries have been optimized at this intersection, and additional improvements, such as changes to the signal timing cycle length and/or green time allocations, would not substantially change the LOS F operating conditions. Thus, the TTRP.22_1 Expanded Alternative would result in significant project-specific impact at the study intersection of 16th Street/Potrero Avenue during the p.m. peak hour. For the reasons described above, there are no feasible mitigation measures to improve the intersection operating conditions to a less-than-significant level. Therefore, traffic impacts at the intersection of 16th Street/Potrero Avenue under the TTRP.22_1 Expanded Alternative conditions would be significant and unavoidable.

Impact TR-28: Implementation of the project-level TTRP.22_1 Expanded Alternative would result in a significant traffic impact at the intersection of 16th/Seventh streets that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative conditions. (Significant and Unavoidable)

With implementation of the TTRP.22_1 Expanded Alternative, the p.m. peak hour operating conditions at the intersection of 16th/Seventh streets would worsen from LOS C under Existing conditions to LOS F under Existing plus Service Improvements and TTRP.22_1 Expanded Alternative conditions. The degradation of the intersection LOS operating conditions would be due to implementation of the proposed transit-only lanes in both directions on 16th Street, and removal of one mixed-flow lane in each direction. This would be considered a significant impact.

To mitigate the poor operating condition of the intersection, additional mixed-flow lane capacity would be needed at the eastbound and westbound approaches to the intersection. The provision of additional mixed-flow lane capacity would require the narrowing of sidewalks and/or removal of the Class II bicycle facility (bicycle lane) on 16th Street. Narrowing of sidewalks and removal of bicycle lanes would be inconsistent with the transit and pedestrian environment encouraged by the City's *Transit First* Policy by removing space dedicated to pedestrians and cyclists, and by increasing the distances required for pedestrians to cross streets. Additionally, the presence of the I-280 freeway support structures prohibit further widening of the 16th Street right-of-way. Thus, the TTRP.22_1 Expanded Alternative would result in significant project-specific impacts at the study intersection of 16th/Seventh streets during the p.m. peak hour. As described above, there are no feasible mitigation measures to improve conditions to a less-than-significant level. Therefore, traffic impacts as a result of the TTRP.22_1 Expanded Alternative at the intersection of 16th/Seventh streets would be significant and unavoidable.

Impact TR-29: Implementation of the project-level TTRP.22_1 Expanded Alternative would have less-than-significant traffic impacts at six study intersections that would

operate at LOS D or better under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative conditions. (Less than Significant)

With implementation of the TTRP.22_1 Expanded Alternative, the following six study intersections would continue to operate at LOS D or better during the peak hours. Therefore, traffic impacts at these locations would be less than significant under TTRP.22_1 Expanded Alternative conditions.

- 16th/Guerrero (p.m. peak hour)
- 16th/Mission (a.m. and p.m. peak hours)
- 16th/De Haro (p.m. peak hour)
- 16th/Third (a.m. and p.m. peak hours)
- 16th/Owens (a.m. and p.m. peak hours)
- 16th/Fourth (a.m. and p.m. peak hours)

Implementation of the center-running transit-only lanes as part of the TTRP.22_1 Expanded Alternative would require restricting access into and out of the Potrero Center shopping center to right-turn-in and right-turn-out only for the three driveways on 16th Street. This includes one driveway into the lower level of the garage, and two driveways into the surface parking lot. Provision of left turn lanes into the shopping center from 16th Street was considered; however, a separate left turn lane located between the two center-running transit-only lanes, forcing vehicles to cross the transit-only lanes, would not be a safe vehicle maneuver. Furthermore, the garage entrances/exits on Potrero Avenue and Bryant Street into the lower level of the garage would not be affected by implementation of the TTRP.22_1 Expanded Alternative. Local traffic may increase with the around-the-block maneuvers and with more traffic on Bryant Street, Division Street, and on Potrero Avenue. As indicated in Impact TR-26 and Impact TR-27, implementation of the TTRP.22_1 Expanded Alternative would result in significant and unavoidable impacts at the intersections of 16th/Bryant streets and 16th Street/Potrero Avenue, due to the reduction in the number of mixed-flow travel lanes along 16th Street. Overall, since access into the Potrero Center garage would be maintained, although restricted on 16th Street to right-turn-in and right-turn-out only, the left-turn restrictions under the TTRP.22_1 Expanded Alternative on the Potrero Center garage would not be considered a significant traffic hazard or substantially adversely impact access to the shopping center parking garage.

Impact TR-30: Implementation of the project-level TTRP.22_1 Expanded Alternative Variant 1 would result in a significant traffic impact at the intersection of 16th/Bryant streets that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and TTRP.22_1 Expanded Alternative Variant 1 conditions. (Significant and Unavoidable with Mitigation)

TTRP.22_1 Expanded Alternative Variant 1 would restripe 16th Street between Bryant and Church streets with two wider mixed-flow lanes and a parking lane in each direction. During peak periods, the parking lanes would have tow-away restrictions and would be used as curbside transit-only lanes. With implementation of the TTRP.22_1 Expanded Alternative Variant 1, the intersection of 16th/Bryant streets would operate similar to conditions with the TTRP.22_1 Expanded Alternative. With implementation of the TTRP.22_1 Expanded Alternative Variant 1, the p.m. peak hour operating conditions at the intersection of 16th/Bryant streets would worsen from LOS C under Existing conditions to LOS F. The degradation of the intersection LOS operating conditions would be due to implementation of the proposed transit-only lanes in both directions on 16th Street and removal of one mixed-flow lane in each direction. This would be considered a significant impact.

As described under Impact TR-26 above, with implementation of **Mitigation Measure M-TR-26: Intersection Restriping at 16th/Bryant streets**, intersection operations would improve from LOS F to LOS E but the impact would not be reduced to a less-than-significant level. Therefore, the TTRP.22_1 Expanded Alternative Variant 1 traffic impacts at the intersection of 16th/Bryant streets would remain significant and unavoidable with mitigation.

Impact TR-31: Implementation of the project-level TTRP.22_1 Expanded Alternative Variant 1 would result in a significant traffic impact at the intersection of 16th Street/Potrero Avenue that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 1 conditions. (Significant and Unavoidable)

With implementation of TTRP.22_1 Expanded Alternative Variant 1, the p.m. peak hour operating conditions at the intersection of 16th Street/Potrero Avenue would worsen from LOS D under Existing conditions to LOS F. The degradation of the intersection LOS operating conditions would be due to implementation of the proposed transit-only lanes in both directions on 16th Street and removal of one mixed-flow travel lane in each direction. This would be considered a significant impact.

As described under Impact TR-27, there are no feasible mitigation measures to improve conditions at the intersection of 16th Street/Potrero Avenue to a less-than-significant level. Therefore, traffic impacts at the intersection of 16th Street/Potrero Avenue under the TTRP.22_1 Expanded Alternative Variant 1 conditions would be significant and unavoidable.

Impact TR-32: Implementation of the project-level TTRP.22_1 Expanded Alternative Variant 1 would result in a significant traffic impact at the intersection of 16th/Seventh streets that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative conditions. (Significant and Unavoidable)

With implementation of the TTRP.22_1 Expanded Alternative Variant 1, the p.m. peak hour operating conditions at the intersection of 16th/Seventh streets would worsen from LOS C under Existing conditions to LOS F. The degradation of the intersection LOS operating conditions would be due to implementation of the proposed transit-only lanes in both directions on 16th Street and removal of one mixed-flow lane in each direction. This would be considered a significant impact.

As described under Impact TR-28, there are no feasible mitigation measures to improve conditions at the intersection of 16th/Seventh streets to a less-than-significant level. Therefore, traffic impacts at the intersection of 16th/Seventh streets under the TTRP.22_1 Expanded Alternative Variant 1 conditions would be significant and unavoidable.

Impact TR-33: Implementation of the project-level TTRP.22_1 Expanded Alternative Variant 1 would have less-than-significant traffic impacts at six study intersections that would operate at LOS D or better under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 1 conditions. (Less than Significant)

With implementation of the TTRP.22_1 Expanded Alternative Variant 1, the following six study intersections would continue to operate at LOS D or better during the peak hours. Therefore, traffic impacts at these locations would be less than significant under TTRP.22_1 Expanded Alternative Variant 1 conditions.

- 16th/Guerrero (p.m. peak hour).
- 16th/Mission (a.m. and p.m. peak hours).
- 16th/De Haro (p.m. peak hour).
- 16th/Third (a.m. and p.m. peak hours).
- 16th/Owens (a.m. and p.m. peak hours).
- 16th/Fourth (a.m. and p.m. peak hours).

Implementation of the center-running transit-only lanes as part of the TTRP.22_1 Expanded Alternative Variant 1 would require restricting access into and out of the Potrero Center shopping center to right-turn-in and right-turn-out only for the three driveways on 16th Street. This includes one driveway into the lower level of the garage, and two driveways into the surface parking lot. Provision of left turn lanes into the shopping center from 16th Street was considered; however, a separate left turn lane located between the two center-running transit-only lanes, forcing vehicles to cross the transit-only lanes, would not be a safe vehicle maneuver. Furthermore, the garage entrances/exits on Potrero Avenue and Bryant Street into the lower level of the garage would not be affected by implementation of the TTRP.22_1 Expanded Alternative Variant 1. Local traffic may increase with the around-the-block maneuvers and with more traffic on Bryant Street, Division Street, and on Potrero Avenue.

As indicated in Impact TR-30 and Impact TR-31, implementation of the TTRP.22_1 Expanded Alternative Variant 1 would result in significant and unavoidable impacts at the intersections of 16th/Bryant streets and 16th Street/Potrero Avenue, due to the reduction in the number of mixed-flow travel lanes along 16th Street. Overall, since access into the Potrero Center garage would be maintained, although restricted on 16th Street to right-turn-in and right-turn-out only, the left-turn restrictions under the TTRP.22_1 Expanded Alternative Variant 1 on the Potrero Center garage would not be considered a significant traffic hazard or substantially adversely impact access to the shopping center parking garage.

Impact TR-34: Implementation of the project-level TTRP.22_1 Expanded Alternative Variant 2 would result in a significant traffic impact at the intersection of 16th/Bryant streets that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 2 conditions. (Significant and Unavoidable with Mitigation)

TTRP.22_1 Expanded Alternative Variant 2 would restripe 16th Street between Bryant and Church streets to provide one mixed-flow lane and a parking lane in each direction, as well as a 24-hour westbound side-running transit-only lane. In addition, transit bulbs would be constructed at selected locations on 16th Street between Church and Harrison streets. With implementation of the TTRP.22_1 Expanded Alternative Variant 2, the intersection of 16th/Bryant streets would operate similar to conditions with the TTRP.22_1 Expanded Alternative. With implementation of the TTRP.22_1 Expanded Alternative Variant 2, the p.m. peak hour operating conditions at the intersection of 16th/Bryant streets would worsen from LOS C under Existing conditions to LOS F. The degradation of the intersection LOS operating conditions would be due to implementation of the proposed transit-only lanes in both directions on 16th Street, and removal of one mixed-flow lane in each direction. This would be considered a significant impact.

As described under Impact TR-26, with implementation of **Mitigation Measure M-TR-26: Intersection Restriping at 16th/Bryant streets**, intersection operations would improve to LOS E but not to less-than-significant levels. Therefore, traffic impacts at the intersection of 16th/Bryant streets would remain significant and unavoidable under the TTRP.22_1 Expanded Alternative Variant 2 conditions.

Impact TR-35: Implementation of the project-level TTRP.22_1 Expanded Alternative Variant 2 would result in a significant traffic impact at the intersection of 16th Street/Potrero Avenue that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 2 conditions. (Significant and Unavoidable)

With implementation of the TTRP.22_1 Expanded Alternative Variant 2, the p.m. peak hour operating conditions at the intersection of 16th Street/Potrero Avenue would worsen from LOS D under Existing conditions to LOS F. The degradation of the intersection LOS operating conditions would be due to implementation of the proposed transit-only lanes in both directions on 16th Street and removal of one mixed-flow lane in each direction. This would be considered a significant impact.

As described under Impact TR-27, there are no feasible mitigation measures to improve conditions at the intersection of 16th Street/Potrero Avenue to a less-than-significant level. Therefore, traffic impacts at the intersection of 16th Street/Potrero Avenue under the TTRP.22_1 Expanded Alternative Variant 2 conditions would be significant and unavoidable.

Impact TR-36: Implementation of the project-level TTRP.22_1 Expanded Alternative Variant 2 would result in a significant traffic impact at the intersection of 16th/Seventh streets that would operate at LOS E or LOS F conditions under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 2 conditions. (Significant and Unavoidable)

With implementation of the TTRP.22_1 Expanded Alternative Variant 2, the p.m. peak hour operating conditions at the intersection of 16th/Seventh streets would worsen from LOS C under Existing conditions, to LOS F. The degradation of the intersection LOS operating conditions would be due to implementation of the proposed transit-only lanes in both directions on 16th Street and removal of one mixed-flow lane in each direction. This would be considered a significant impact.

As described under Impact TR-28, there are no feasible mitigation measures to improve conditions to a less-than-significant level. Therefore, traffic impacts at the intersection of 16th/Seventh streets under the TTRP.22_1 Expanded Alternative Variant 2 conditions would be significant and unavoidable.

Impact TR-37: Implementation of the project-level TTRP.22_1 Expanded Alternative Variant 2 would have less-than-significant traffic impacts at six study intersections that would operate at LOS D or better under Existing plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 2 conditions. (Less than Significant)

With implementation of the TTRP.22_1 Expanded Alternative Variant 2, the following six study intersections would continue to operate at LOS D or better during the peak hours. Therefore, traffic impacts at these locations would be less than significant under TTRP.22_1 Expanded Alternative Variant 2 conditions.

- 16th/Guerrero (p.m. peak hour).
- 16th/Mission (a.m. and p.m. peak hours).
- 16th/De Haro (p.m. peak hour).
- 16th/Third (a.m. and p.m. peak hours).
- 16th/Owens (a.m. and p.m. peak hours).

- 16th/Fourth (a.m. and p.m. peak hours).

Implementation of the center-running transit-only lanes as part of the TTRP.22_1 Expanded Alternative Variant 2 would require restricting access into and out of the Potrero Center shopping center to right-turn-in and right-turn-out only for the three driveways on 16th Street. This includes one driveway into the lower level of the garage, and two driveways into the surface parking lot. Provision of left turn lanes into the shopping center from 16th Street was considered; however, a separate left turn lane located between the two center-running transit-only lanes, forcing vehicles to cross the transit-only lanes, would not be a safe vehicle maneuver. Furthermore, the garage entrances/exits on Potrero Avenue and Bryant Street into the lower level of the garage would not be affected by implementation of the TTRP.22_1 Expanded Alternative Variant 2. Local traffic may increase with the around-the-block maneuvers and with more traffic on Bryant Street, Division Street, and on Potrero Avenue. As indicated in Impact TR-34 and Impact TR-35, implementation of the TTRP.22_1 Expanded Alternative Variant 2 would result in significant and unavoidable impacts at the intersections of 16th/Bryant streets and 16th Street/Potrero Avenue, due to the reduction in the number of mixed-flow travel lanes along 16th Street. Overall, since access into the Potrero Center garage would be maintained, although restricted on 16th Street to right-turn-in and right-turn-out only, the left-turn restrictions under the TTRP.22_1 Expanded Alternative Variant 2 on the Potrero Center garage would not be considered a significant traffic hazard or substantially adversely impact access to the shopping center parking garage.

Impact TR-38: Implementation of the project-level TTRP.30_1 Expanded Alternative would result in a significant traffic impact at the intersection of Columbus Avenue/Green Street/Stockton Street that would operate at LOS E conditions under Existing plus Service Improvements and the TTRP.30_1 Expanded Alternative conditions. (Significant and Unavoidable)

With implementation of the TTRP.30_1 Expanded Alternative, the combination of lane reductions associated with the transit-only lane on Columbus Avenue at the intersection of Columbus Avenue/Green Street/Stockton Street would cause the intersection to worsen during the p.m. peak hour from LOS D under Existing conditions to LOS E conditions. This would be considered a significant impact.

To mitigate the poor operating condition of the intersection, additional mixed-flow lane capacity would be needed at the Columbus Avenue approaches to the intersection. The provision of additional mixed-flow lane capacity would require narrowing sidewalks to substandard widths to create additional through lanes or dedicated turn pockets. This would be inconsistent with the transit and pedestrian environment encouraged by the City's *Transit First* Policy because it would remove space dedicated to pedestrians and increase the distances required for pedestrians to cross streets. On-street parking is proposed for removal as part of the TTRP.30_1 Expanded Alternative proposal, and therefore the parking lane would not be available for additional mixed-flow lane capacity. Additional improvements, such as changes to the signal timing cycle length or turn restrictions and/or the closure of certain approaches (i.e., such that green time could be reallocated to other approaches) were deemed not feasible to improve operations at the intersection because of the coordinated signal timing along this corridor. Thus, the TTRP.30_1 Expanded Alternative would result in a significant project-specific impact at the study intersection of Columbus Avenue/Green Street/Stockton Street during the p.m. peak hour. For the reasons described above, there are no feasible mitigation measures to improve conditions to a less-than-significant level. Therefore, traffic impacts at the intersection of Columbus Avenue/Green Street/Stockton Street would be significant and unavoidable as a result of the TTRP.30_1 Expanded Alternative.

Impact TR-39: Implementation of the project-level TTRP.30_1 Expanded Alternative would have less-than-significant traffic impacts at nine study intersections that would operate at LOS D or better under Existing plus Service Improvements and the TTRP.30_1 Expanded Alternative conditions. (Less than Significant)

With implementation of the TTRP.30_1 Expanded Alternative, the following nine study intersections would continue to operate at LOS D or better during the peak hours. Therefore, traffic impacts at these locations would be less than significant under TTRP.30_1 Expanded Alternative conditions.

- North Point/Van Ness (p.m. peak hour)
- Chestnut/Van Ness (p.m. peak hour)
- Filbert/Columbus (p.m. peak hour)
- Columbus/Mason (p.m. peak hour)
- Union/Columbus (p.m. peak hour)
- Vallejo/Stockton (p.m. peak hour)
- Broadway/Columbus (a.m. and p.m. peak hours)
- Sutter/Kearny (a.m. and p.m. peak hours)
- Market/Kearny/Third (a.m. and p.m. peak hours)

Impact TR-40: Implementation of the project-level TTRP.30_1 Expanded Alternative Variant 1 would result in a significant traffic impact at the intersection of Columbus Avenue/Green Street/Stockton Street that would operate at LOS E conditions under Existing plus Service Improvements and the TTRP.30_1 Expanded Alternative Variant 1 conditions. (Significant and Unavoidable)

TTRP.30_1 Expanded Alternative Variant 1 would widen travel lanes on Stockton Street on the two-block segment between the intersections of Columbus Avenue/Green

- Street/Stockton Street and Stockton Street/Broadway (approximately 650 feet), resulting in one mixed-flow lane in each direction. With implementation of the TTRP.30_1 Expanded Alternative Variant 1, the combination of lane reductions associated with the transit-only lane on Columbus Avenue and removal of one mixed-flow lane on Stockton Street at the intersection of Columbus Avenue/Green Street/Stockton Street would cause the intersection to worsen during the p.m. peak hour from LOS D under Existing conditions to LOS E conditions. This would be considered a significant impact.

As described above in Impact TR-38, to mitigate the poor operating condition of the intersection, additional mixed-flow lane capacity would be needed at the Columbus Avenue approaches to the intersection. There are no feasible mitigation measures to improve conditions to a less-than-significant level. Therefore, traffic impacts at the intersection of Columbus Avenue/Green Street/Stockton Street would, similar to TTRP.30_1 Expanded Alternative, be significant and unavoidable as a result of the TTRP.30_1 Expanded Alternative Variant 1.

Impact TR-41: Implementation of the project-level TTRP.30_1 Expanded Alternative Variant 1 would have less-than-significant traffic impacts at nine study intersections that would operate at LOS D or better under Existing plus Service Improvements and the TTRP.30_1 Expanded Alternative Variant 1 conditions. (Less than Significant)

Similar to the TTRP.30_1 Expanded Alternative, under the implementation of the TTRP.30_1 Expanded Alternative Variant 1, the following nine study intersections would continue to operate at LOS D or better during the peak hours. Therefore, traffic impacts at these locations would, similar to the TTRP.30_1 Expanded Alternative, be less than significant under TTRP.30_1 Expanded Alternative Variant 1 conditions.

- North Point/Van Ness (p.m. peak hour)
- Chestnut/Van Ness (p.m. peak hour)
- Filbert/Columbus (p.m. peak hour)
- Columbus/Mason (p.m. peak hour)
- Union/Columbus (p.m. peak hour)
- Vallejo/Stockton (p.m. peak hour)
- Broadway/Columbus (a.m. and p.m. peak hours)
- Sutter/Kearny (a.m. and p.m. peak hours)
- Market/Kearny/Third (a.m. and p.m. peak hours)

Impact TR-42: Implementation of the project-level TTRP.30_1 Expanded Alternative Variant 2 would result in a significant traffic impact at the intersection of Columbus

Avenue/Green Street/Stockton Street that would operate at LOS E conditions under Existing plus Service Improvements and the TTRP.30_1 Expanded Alternative Variant 2 conditions. (Significant and Unavoidable)

TTRP.30_1 Expanded Alternative Variant 2 would be similar to TTRP.30_1 Expanded Alternative. On the two-block segment of Stockton Street between the intersections of Columbus Avenue/Green Street/Stockton Street and Stockton Street/Broadway (approximately 650 feet), the p.m. peak period tow-away zone on the west side of Stockton Street would be maintained, and the parking lane on the east side of the street would be eliminated, allowing for widening of the two southbound mixed-flow lanes and narrowing of the one northbound mixed-flow lane. With implementation of the TTRP.30_1 Expanded Alternative Variant 2, the removal of one mixed-flow lane on Stockton Street at the intersection of Columbus Avenue/Green Street/Stockton Street would cause the intersection to worsen during the p.m. peak hour from LOS D under Existing conditions to LOS E conditions. This would be considered a significant impact.

As described above in Impact TR-38, to mitigate the poor operating condition of the intersection, additional mixed-flow lane capacity would be needed at the Columbus Avenue approaches to the intersection. There are no feasible mitigation measures to improve conditions to a less-than-significant level. Therefore, traffic impacts at the intersection of Columbus Avenue/Green Street/Stockton Street would be significant and unavoidable as a result of the TTRP.30_1 Expanded Alternative Variant 2.

Impact TR-43: Implementation of the project-level TTRP.30_1 Expanded Alternative Variant 2 would have less-than-significant traffic impacts at nine study intersections that would operate at LOS D or better under Existing plus Service Improvements and the TTRP.30_1 Expanded Alternative Variant 2 conditions. (Less than Significant)

Similar to the TTRP.30_1 Expanded Alternative, under the implementation of the TTRP.30_1 Expanded Alternative Variant 2, the following nine study intersections would continue to operate at LOS D or better during the peak hours. Therefore, traffic impacts at these locations would be less than significant under TTRP.30_1 Expanded Alternative Variant 2 conditions.

- North Point/Van Ness (p.m. peak hour)
- Chestnut/Van Ness (p.m. peak hour)
- Filbert/Columbus (p.m. peak hour)
- Columbus/Mason (p.m. peak hour)
- Union/Columbus (p.m. peak hour)
- Vallejo/Stockton (p.m. peak hour)

- Broadway/Columbus (a.m. and p.m. peak hours)
- Sutter/Kearny (a.m. and p.m. peak hours)
- Market/Kearny/Third (a.m. and p.m. peak hours)

Pedestrian and Bicycle Impacts

Impact TR-44: Implementation of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14 Variant 1, TTRP.14 Variant 2, TTRP.22_1, TTRP.28_1, TTRP.30_1, or TTRP.71_1 would not result in significant impacts to pedestrians and bicyclists. (Less than Significant)

Implementation of the 11 project-level TTRP Moderate Alternative proposals and their variants, including the Service Improvements or Service Variants, would enhance pedestrian conditions at intersections by facilitating safe and easy pedestrian crossings, by providing safe spaces for pedestrians to wait, by increasing access to transit, by slowing traffic, and by increasing pedestrian visibility to drivers. For the reasons noted above, the 11 project-level TTRP Moderate Alternative proposals would not result in overcrowding of sidewalks or create new potentially hazardous conditions for pedestrians. The proposed Service Improvements or Service Variants would result in an increase in transit vehicles along some routes and may introduce transit service on streets that currently do not have transit, which, as analyzed in Transit Impacts above (Impact TR-20) could result in an increased potential for pedestrian, bicycle, and transit conflicts. However, this increased service, in combination with the TTRP Moderate Alternative improvements, would not result in new hazardous conditions for pedestrians because, as described above, the TTRP improvements would enhance pedestrian conditions at intersections.

Some TTRP projects would include relocating, consolidating, or removing bus stops, and some passengers may need to walk farther to access a transit stop. The increased distances may inconvenience some passengers; however, the overall transit stop spacing would be consistent with the SFMTA's *Proposed Revisions to Transit Stop Spacing Guidelines*.[58] See the discussion in Impact TR-7 regarding the effects on pedestrians of removing or consolidating transit stops, including the effects on the elderly and disabled. While bus stop removal may increase the physical effort required to reach the transit line/route, thus posing a challenge to some riders, the stop removal would remain consistent with the SFMTA bus stop spacing guidelines and would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas.

[58] SFMTA, *Proposed Revisions to Transit Stop Spacing Guidelines*, February 16, 2012. This report is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

TTRP.J Moderate Alternative – Implementation of the TTRP.J Moderate Alternative would enhance pedestrian conditions at intersections along Church Street and would not result in overcrowding of sidewalks or create new potentially hazardous conditions. Pedestrian improvements would include pedestrian bulbs at the intersection of 30th/Chenery streets; a new crosswalk would be installed at the intersection of San Jose Avenue/Colonial Way; and the intersections of Church/24th streets, Church/25th streets, Church/26th streets, Cesar Chavez/Church streets, and Church/Day streets would be signalized and pedestrian countdown signals would be provided. Outside of the improvements proposed, pedestrian conditions on sidewalks and crosswalks would not substantially change from Existing conditions.

The inbound and outbound stops at the J Church right-of-way and Liberty Street and the inbound stop on Church Street at 30th Street would be removed. Passengers using the stop on the J Church right-of-way at Liberty Street may need to walk further to the stop on the J Church right-of-way at 21st Street or to the stop on the J Church right-of-way at 20th Street, and passengers using the inbound stop on Church Street at 30th Street would need to walk further to the stop on Church Street at Day Street. The stop removal at the J Church right-of-way and Liberty Street, and on Church Street at 30th Street, may increase the physical effort required to reach the J Church line; however, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.J Moderate Alternative would not substantially affect bicycle travel. Within the J Church corridor, Bicycle Route 45 (a Class II bicycle lane) runs along San Jose Avenue. The remainder of the J Church corridor, specifically along Church Street, is not part of a designated bicycle route, and therefore improvements along Church Street would not affect designated bicycle facilities, nor substantially affect any bicycle travel on Church Street. The proposed TTRP.J Moderate Alternative improvements, such as transit bulbs, boarding island extensions, stop relocations, and pedestrian bulbs on Church Street and San Jose Avenue, would not affect bicycle lane travel on San Jose Avenue or Sanchez Street because no changes are proposed to the bicycle lanes on San Jose Avenue and bicyclists on Sanchez Street would continue to share the travel lane with vehicles, as under Existing conditions. Implementation of the TTRP.J Moderate Alternative improvements along the J Church corridor would not affect the travel lanes, and conditions for bicyclists would be similar to Existing conditions.

- **TTRP.L Moderate Alternative** – Implementation of the TTRP.L Moderate Alternative would enhance pedestrian conditions at intersections along Taraval Street and would not result in overcrowding of sidewalks or create new potentially hazardous conditions. Pedestrian improvements would include pedestrian refuge islands on Taraval Street at 44th Avenue, a nearside transit bulb in the outbound direction at Taraval Street and 15th Avenue, and intersections signalization with pedestrian countdown signals at Taraval/17th, Taraval/18th, Taraval/22nd, Taraval/24th, Taraval/35th, and Ulloa/15th avenues. The inbound and outbound nearside flag stops on Taraval Street at 26th, 28th, 30th, 32nd, 40th and 42nd avenues would also have new 150-foot-long boarding islands, enhancing pedestrian safety at these stops. At the intersection of Taraval Street/22nd Avenue, the nearside outbound flag stop would be replaced with a 235-foot boarding island with accessible platform and relocated to the farside; in addition, the existing farside 120-foot inbound platform at this intersection would be extended to 235 feet with an accessible platform. Outside of the improvements proposed, pedestrian conditions on sidewalks and crosswalks would not substantially change from Existing conditions.

- The nearside flag stops on Taraval Street at 17th Avenue in both directions would berelocated to 18th Avenue with new 210-foot-long boarding islands and accessible platforms for wheelchair accessibility. The proposed inbound and outbound islands located between 18th and 19th avenues would serve as the stop for 19th Avenue (inbound and outbound). Similarly the inbound and outbound stop at 24th Avenue would be removed, replaced outbound with a transit island located closer to 22nd Avenue. Other stop locations to be removed include Ulloa Street (at 46th Avenue), 44th Avenue (and Taraval Street), 35th Avenue, and Ulloa Street (at 15th Avenue). Some passengers using these stops may need to walk further to adjacent stops, and some passengers may be inconvenienced. However, the additional distance to walk to the 18th Avenue stops would not result in hazards or reduced access, and would be consistent with SFMTA's *Proposed Revisions to Transit Stop Spacing Guidelines*. Other transit passengers may experience shorter distances to the new transit stops. Minimal service headway changes are proposed as part of the Service Improvements for the L Taraval, and would be included as part of the TTRP.L Moderate Alternative. These minor headway adjustments would not substantially change the existing pedestrians conditions and in combination with the TTRP.L Moderate Alternative, would not result in hazardous conditions for pedestrians. Overall, the impact of TTRP.L Moderate Alternative on pedestrians would be less than significant.

- Implementation of the TTRP.L Moderate Alternative would not substantially affect bicycle travel. Bicycle Route 60 runs along the TTRP.L Taraval corridor for a few blocks on Ulloa Street between 15th and Forest Side avenues as a Class II bicycle lane, and on Vicente Street between 46th and 47th Avenues as a Class III bicycle route. The proposed TTRP.L Moderate Alternative improvements, such as transit bulbs, boarding island extensions, stop relocations, and pedestrian bulbs on Taraval Street, would not affect bicycle travel. Under the TTRP.L Moderate Alternative, the intersection of Ulloa Street/15th Avenue would be converted from an all-way stop-controlled to signalized intersection, and bicyclists may experience some increased delay as they wait for the signal. No other changes are proposed to the bicycle facilities or travel lanes on Ulloa or Vicente streets. Bicyclists would continue to have a designated bicycle lane on Ulloa Street and share the travel lane with vehicles on Vicente Street, as under Existing conditions. Therefore, the impact of the TTRP.L Moderate Alternative on bicycle facilities and their operation would be less than significant.

TTRP.N Moderate Alternative – Implementation of the TTRP.N Moderate Alternative would enhance pedestrian conditions at intersections along Carl, Irving, and Judah streets. The TTRP.N Moderate Alternative would include new transit bulbs that would provide for additional sidewalk space for pedestrians over Existing conditions, and the new traffic signals at the seven intersections on Judah Street and at the intersection of Irving Street/Fourth Avenue would include pedestrian countdown signals.

The intersection at Arguello Boulevard with Carl Street would be reconfigured to simplify the right-of-way, and median islands would be constructed for pedestrians. At the intersections of Irving Street/Fourth Avenue and Irving Street/Seventh Avenue, the existing flag stops in the inbound and outbound directions would be removed, and the stops would be consolidated into a new outbound stop at the farside of the intersection of Irving Street/Fifth Avenue and a new inbound stop at the farside of Irving Street/Sixth Avenue. In addition, at the intersection of Judah Street/Funston Avenue, the flag stops in the inbound and outbound directions would be removed. Stop removal at the intersection of Judah Street/Funston Avenue may increase the physical effort required to reach the N Judah line; however, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.N Moderate Alternative would not substantially affect bicycle travel. There are no bicycle routes on Carl Street, Irving Street, Ninth Avenue, or Judah Street, and the TTRP.N Moderate Alternative improvements (addition of transit bulbs, extension of existing transit boarding islands, stop relocation, flag stop removal, addition of median islands, and addition of pedestrian bulbs) would not substantially affect bicycle conditions on these non-bicycle network streets, nor affect bicycle travel on nearby designated eastbound/westbound routes such as Bicycle Route 40 on Kirkham Street, which runs as a Class II facility (bicycle lane), or northbound-southbound routes such as those on Sixth (Bicycle Route 65), Seventh (Bicycle Route 65), 20^{th} (Bicycle Route 75), and 34^{th} (Bicycle Route 85) avenues. Bicycle conditions under the TTRP.N Moderate Alternative on the affected streets would be similar to Existing conditions.

TTRP.5 Moderate Alternative – With implementation of the TTRP.5 Moderate Alternative, the proposed transit bulbs, pedestrian refuge islands, and pedestrian bulbs would enhance pedestrian conditions at intersections along Fulton and McAllister streets. Pedestrian conditions on sidewalks and crosswalks would improve or remain similar to Existing conditions, and the new traffic signals at the six intersections on McAllister Street and at two intersections on Fulton Street would include pedestrian countdown signals.

Under the TTRP.5 Moderate Alternative, the inbound and outbound bus stops at the intersections of McAllister/Polk streets, McAllister/Octavia streets, McAllister/Webster streets, McAllister/Broderick streets, McAllister Street/Central Avenue, Fulton Street/12^{th} Avenue, Fulton Street/16^{th} Avenue, and Fulton Street/20^{th} Avenue would be removed. In addition, the inbound stop on Fulton Street/36^{th} Avenue and the outbound stop at Fulton Street/38^{th}

Avenue would be removed. The stop removals on McAllister and Fulton streets may increase the physical effort required to reach the 5 Fulton and 5L Fulton Limited routes; however, as noted above, impacts on pedestrians would be less than significant. Under the TTRP.5 Moderate Alternative, new inbound and outbound bus stops would be added on McAllister Street at the intersection of McAllister/Lyon streets.

Implementation of the TTRP.5 Moderate Alternative would not substantially affect bicycle travel on Fulton or McAllister streets. Bicycle Route 20 (a Class III bicycle route) runs westbound on McAllister Street between Market Street and Masonic Avenue and although not located on the 5 Fulton route, it runs eastbound/westbound on Fulton Street (as a Class II bicycle lane) between Octavia and Baker streets. As noted above, implementation of transit bulbs on McAllister Street, which has one mixed-flow lane in each direction west of Van Ness Avenue, may delay bicyclists as the bus would stop in the travel lane to pick up and drop off passengers at the transit bulb. The increased delay to non-transit vehicles, including bicyclists, would only occur when a bus is present at the bus stop and would not substantially affect bicycle circulation. Implementation of right-turn pockets on McAllister Street at Fillmore Street and signalization of the intersections of McAllister/Laguna streets, McAllister/Scott streets, McAllister/Steiner streets, McAllister/Pierce streets, McAllister/Broderick streets, and McAllister/Lyon streets could benefit bicyclists by providing clearer lane designations at an intersection approach and reducing the chance of right hook collisions occurring when drivers make a right turn at the last moment across a bicycle lane or facility and in front of a bicyclist.

TTRP.8X Moderate Alternative – With implementation of the TTRP.8X Moderate Alternative, the proposed transit bulbs, and pedestrian bulbs would enhance pedestrian conditions at intersections along San Bruno and Geneva avenues. Pedestrian conditions on sidewalks and crosswalks would not change from Existing conditions, and the new traffic signals at the intersection of Geneva Avenue/Cayuga Street would include pedestrian countdown signals.

At a few locations on San Bruno and Geneva avenues, flag stops would be converted to bus zones, which would improve passenger loading/unloading operations (i.e., in the outbound direction on San Bruno Avenue at Somerset Avenue and at 3800/3801 San Bruno Avenue, on Visitacíon Avenue at Sawyer Avenue, and on Geneva Avenue at 1720-1750 Geneva Avenue, and in the inbound direction on San Bruno Avenue at Somerset Avenue and on 3800/3801 San Bruno Avenue). New stops would be added in both directions on San Bruno Avenue at Harkness Avenue (to consolidate stops at Wilde and Ward avenues, which would be removed), and a nearside bus stop would be established in both directions on Visitacíon Avenue at Desmond Avenue. A number of inbound and outbound stops would be removed on San Bruno Avenue, Bayshore Boulevard, Visitacion Avenue, Hahn Street, Santos Avenue, Geneva Avenue, and Moscow Street to provide for a more even transit stop spacing along the route. Removal of bus stops and stop relocation would affect all routes running along the TTRP corridor and using the bus stop (i.e., affecting the 8AX Bayshore Express, 8BX Bayshore Express, 9 San Bruno, and 9L San Bruno Limited routes where the routes are on the same streets as the 8X Bayshore Express). The stop removals along this route may increase the physical effort required to reach the 8X Bayshore Express, 8AX Bayshore

Express, 8BX Bayshore Express, 9 San Bruno or 9L San Bruno Limited routes; however, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.8X Moderate Alternative would improve bicycle conditions by providing a bicycle lane along Geneva Avenue. Bicycle Routes 5 and 25 run on San Bruno Avenue and Bayshore Boulevard as a Class II facility (bicycle lane), while Bicycle Route 90 runs on Geneva Avenue primarily as a Class III facility (signed route); however, some segments of Route 90 provide bicycle lanes (Class II). Under the TTRP.8X Moderate Alternative, bicycle lanes would be established in the westbound direction on Geneva Avenue on the block between Paris and London streets, and in the eastbound direction on Geneva Avenue along the two blocks between Mission and Paris streets (bicycle lanes are provided on both directions of Geneva Avenue to the east, between Paris and Moscow streets). The installation of right-turn pockets could benefit bicyclists by providing clearer lane designations at an intersection approach and reducing the chance of right hook collisions occurring when drivers make a right turn at the last moment across a bicycle lane or facility and in front of a bicyclist. Implementation of transit bulbs, right-turn pockets, and other elements on Geneva Avenue would not substantially affect bicycle operations along Geneva Avenue, as conditions for bicyclists on Geneva Avenue would remain similar to Existing conditions or improve through the implementation of a bicycle lane.

As noted above, implementation of transit bulbs on San Bruno, Visitacion, Sunnydale, and Geneva avenues and on Hahn and Santos streets may delay bicyclists when the 8X Bayshore Express and 8BX Bayshore Express buses stop in the mixed-flow lane to pick up and drop off passengers at the transit bulbs, particularly on streets with one travel lane in each direction (i.e., all of the above-noted streets, except for Geneva Avenue, which has two mixed-flow lanes in each direction). The increased delay to non-transit vehicles, including bicyclists would only occur when a bus is present at a bus stop, and would not substantially affect bicycle circulation. With the exception of Geneva Avenue, these streets are not designated bicycle routes.

- **TTRP.9 Moderate Alternative** – Implementation of the TTRP.9 Moderate Alternative would enhance pedestrian conditions at intersections and transit stops along 11th Street, Potrero Avenue, and Bayshore Boulevard and would not result in overcrowding of sidewalks, or create new potentially hazardous conditions. Pedestrian improvements would include pedestrian bulbs and refuge islands at the intersections of Potrero Avenue at Alameda, 15th, 16th, 17th, Mariposa, 18th, 19th, 20th, 21st, 22nd (east and west), 23rd, 24th and 25th streets; pedestrian refuge along Potrero Avenue; a new crosswalk across Potrero Avenue would be installed on the north side of 23rd Street. Outside of the improvements proposed, pedestrian conditions on sidewalks and crosswalks would not substantially change from Existing conditions.

- The inbound and outbound stops on Potrero Avenue at 17th, 18th, 20th, and 22nd streets would be removed, and replaced by new stops at Mariposa, 19th, and 21st streets (in the outbound direction, stops at 20th and 22nd streets would be consolidated into the existing stop at 21st Street). In addition, the outbound (i.e., southbound) stops on Potrero Avenue at 22nd and 23rd would be removed and replaced with a stop between these two blocks, on the farside of the existing midblock signalized crosswalk, to serve the San Francisco General Hospital. On Bayshore Boulevard, the inbound (i.e., northbound) flag stop at Jerrold Street would be moved approximately 550 feet to the south and a 35-foot transit bulb would be provided. A 90-foot transit bulb would be installed at the existing inbound stop on Bayshore Boulevard at Cortland Street. The outbound stop on Bayshore at Cortland Street would be moved from nearside to farside and a 90-foot transit bulb would also be provided. In addition, on Bayshore Boulevard, the inbound and outbound stops at Oakdale Avenue would be optimized, and relocated from nearside bus zones to a farside transit bulbs. Other stops along the route would be removed including on 11th Street at Howard Street (in both directions) and at Mission Street (in the inbound direction), and on Bayshore Boulevard at Alemany Boulevard (in both directions) and on Potrero Avenue at 23rd and at 25th streets (in the outbound direction).

- Some passengers using these stops on Potrero Avenue, 11th Street and Bayshore Boulevard may need to walk farther to the relocated or other nearby stops, and some passengers may be inconvenienced. However, the additional distance would not result in hazards or reduced transit access, and would be consistent with SFMTA's proposed transit stop spacing guidelines. Other transit passengers may experience shorter distances to the new transit stops. As part of the Service Improvements, no service headway changes are proposed on the 9 San Bruno or on the 9L San Bruno Limited in the p.m. peak. However, service frequency would increase on the 9L San Bruno Limited inbound during the a.m. peak period from a 12-minute headway to a ten-minute headway, and this Service Improvement would be included as part of the TTRP.9 Moderate Alternative. The increase of one additional 9L San Bruno Limited bus in the inbound direction each hour in the a.m. peak hour could result in a minor increase in potential for pedestrian and transit conflicts. However, this increased service, in combination with the TTRP.9 Moderate Alternative, would not result in hazardous conditions for pedestrians. Overall, the impact of the TTRP.9 Moderate Alternative on pedestrians would be less than significant.

- Implementation of the TTRP.9 Moderate Alternative would not substantially affect bicycle travel. Within the TTRP.9 corridor, there are bicycle lanes (Class II) in both directions on 11th and Division streets for Bicycle Route 25 and 30, and on Potrero Avenue for Bicycle Route 25. Within the TTRP.9 corridor, Bicycle Route 25 on Bayshore Boulevard is primarily a Class II route.

- On the segment of Potrero Avenue between 18th and 24th streets, the TTRP.9 Moderate Alternative would maintain the southbound and northbound bicycle lane facilities (Class II) and add an outbound (southbound) transit-only lane. The TTRP.9 Moderate Alternative would retain two mixed-flow travel lanes in both directions. The impact on bicyclists at locations where transit bulbs would be implemented adjacent to a bicycle lane (for example, on 11th Street and on Potrero Avenue) would be similar to Existing conditions when buses travel across the bicycle lane to a curbside bus zone. However, in this case, the bus would be stopped within the bicycle lane, and bicyclists would be able to pass the bus, conditions permitting, or would, similar to vehicle traffic, need to wait behind the bus. Implementation of transit bulbs adjacent to bicycle lanes would not reduce conflicts between buses and bicyclists; however, transit-bicycle conflicts would not substantially increase over Existing conditions. Other TTRP.9 Moderate Alternative improvements, such as pedestrian bulbs would not affect bicycle lane travel on 11th Street, Potrero Avenue, and Bayshore Boulevard because the existing bicycle lanes would be maintained. Implementation of the TTRP.9 Moderate Alternative improvements corridor would not substantially affect the travel lanes, and conditions for bicyclists would be similar to Existing conditions. Therefore, the impact of the TTRP.9 Moderate Alternative on bicycle facilities and their operation would be less than significant.

TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 – With implementation of the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2, the proposed median transit boarding island at the intersection of Mission/Fremont streets, new transit bulbs and extensions of existing transit bulbs would enhance pedestrian conditions at intersections along Mission Street by providing additional refuge space to wait. The majority of the improvements that would provide additional area for passengers at the transit stops would occur south of 13th Street. New transit bulbs would be constructed in one or both directions of travel at 11th, 16th, 20th, and Richland streets; at Silver Avenue; and Lowell Street. At 30th Street and at Goethe/Evergreen streets, the existing transit bulbs would be extended. Two existing transit bulbs at Otis and 22nd streets would be removed to provide for additional travel lane width for buses to pass each other. The sidewalks at both locations would remain of sufficient widths to safely allow for continued pedestrian activity in the area.

Bus stops are proposed for removal in both the inbound and outbound directions on Mission Street at 15th, 19th, 21st, 23rd, and 29th streets as well as at Highland Avenue. Outbound bus stops on Mission Street at Precita Avenue and 4080 Mission Street would be removed as would the inbound bus stop on Mission Street at Brazil Avenue. In addition, TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 would include transit stop consolidation (see Table 10 on p. 2-138), primarily in the segment of Mission Street south of Cesar Chavez Street. For each of the pairs of transit stops removed noted above, a new transit stop would be established at the following locations: on Mission Street at Powers Avenue, Ocean Avenue, Ottawa Avenue, and Farragut Avenue. In addition to the stop consolidation in the southern portion of the corridor, the outbound farside stops on Mission Street at Spear and Beale streets would be consolidated to a farside stop at Main Street.

Due to stop removal and stop consolidation, passengers may need to walk further to access a bus stop, and some passengers may be inconvenienced. However, the additional distance would not result in hazards or reduced access and would be consistent with the SFMTA's proposed transit stop spacing guidelines. Removing or consolidating bus stops would affect all routes running along the TTRP.14 corridor and using the bus stops (i.e., the 14 Mission, 14L Mission Limited, 14X Mission Express, 49 Van Ness-Mission, and the 88 BART shuttle). While the stop removals noted above may increase the physical effort required to reach the 14 Mission, 14L Mission Limited, 14X Mission Express, 49 Van Ness-Mission and the 88 BART shuttle routes, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 would not substantially affect bicycle conditions. Bicycle Route 30 runs westbound on Mission Street as a signed route with sharrows between Tenth Street and South Van Ness Avenue. Implementation of the farside transit bulb on Mission Street at 11th Street may delay bicyclists as the bus would stop in the travel lane to pick up and drop off passengers at the transit bulb. The increased delay to non-transit vehicles, including bicyclists, would only occur when a bus is present at the bus stop and would not substantially affect bicycle circulation.

Bicycle Route 30 does not run on Mission Street south of McCoppin Street (which is located between 12th and 13th streets). The new transit-only lanes on Mission Street south of 13th Street are not anticipated to result in substantial increases in traffic volumes on other nearby bicycle network streets due to diversions, such as on Valencia or Alemany streets.

Bicyclists traveling along Mission Street would benefit from the left-turn restrictions, which would reduce conflicts between turning vehicles and bicyclists, and removal of on-street parking would reduce conflicts between parked vehicle and bicyclists. Implementation of the transit-only lane would increase the number of vehicles in the mixed-flow lane, which would result in a potential increase in conflicts between vehicles and bicyclists traveling in that lane. However, this potential increase in conflicts would not result in bicycle hazards, as it would not represent a substantial change over similar Existing conditions along bicycle routes throughout the City, and therefore, bicycle travel in the area would be similar to Existing conditions. Bicycles traveling along the corridor would likely travel along Valencia Street, which has bicycle lanes in both directions, and signal timing adjusted to enhance bicycle travel along the street.

TTRP.22_1 Moderate Alternative – With implementation of the TTRP.22_1 Moderate Alternative, the proposed bus transit bulbs and new bus stops would enhance pedestrian conditions at intersections along 16th Street by providing additional space for passengers to wait and shortening crossing distances. Turn restrictions at intersections along 16th Street would reduce potential conflicts between turning vehicles, particularly left-turning vehicles, and pedestrians at intersections. Pedestrian conditions on sidewalks and other crosswalks would not substantially change from Existing conditions.

Implementation of the TTRP.22_1 Moderate Alternative would not substantially affect bicycle conditions along 16th Street or create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility. Bicycle Route 40 runs on 16th Street between Illinois and Henry Adams streets (as a Class II bicycle lane), with the exception of the block east of the project area between Third and Illinois streets, which is a signed route only (Class III). Under the TTRP.22_1 Moderate Alternative, there would not be any changes to the existing bicycle lanes on 16th Street. However, along 16th Street between Henry Adams and Third streets (i.e., where there is a bicycle lane), transit bulbs are proposed on 16th Street at Fourth, Missouri, Wisconsin, and Rhode Island streets. As discussed in Chapter 2, Project Description, under Section 2.5.2.1 (see Table 8, pp. 2-80 to 2-81, with implementation of the Service Improvements the 22 Fillmore route would be extended along 16th Street from Connecticut Street to Third Street, which would introduce bicycle-bus conflicts to this roadway section, although conditions would be similar to those on 16th Street to the west. On 16th Street where bicycle lanes are provided, buses stopping at the transit bulbs would pull into the bicycle lane, and non-transit vehicles, including bicyclists, would be required to wait or pass the bus, as conditions permit, using the other mixed-flow travel lane in each direction. Similar to the pedestrian discussion above, turn restrictions at intersections along 16th Street would likewise reduce the potential for conflicts between left-turning vehicles and bicyclists at these intersections.

TTRP.28_1 Moderate Alternative – Implementation of the TTRP.28_1 Moderate Alternative would enhance pedestrian conditions for the following reasons. The proposed sidewalk bulbs would shorten the street crossing distance. Transit bulbs would improve pedestrian conditions by providing additional pedestrian space and space for transit shelters, landscaping, and other amenities and shortening the street crossing distance.

Under the TTRP.28_1 Moderate Alternative, both inbound and outbound stops would be removed on 19th Avenue at Irving, Kirkham, Moraga, Pacheco, Santiago, Ulloa, and Wawona streets and at Ocean Avenue. At some locations, passengers may need to walk further to access a bus stop, and some passengers may be inconvenienced; however, the additional distance would not result in hazards or reduced access and would be consistent with the SFMTA's proposed transit stop spacing guidelines. Removing or consolidating bus stops would affect all bus routes running along the TTRP.28_1 corridor and using the bus stops (i.e., the 28 19th Avenue and the 28L 19th Avenue). The stop removals noted above may increase the physical effort required to reach the 28 19th Avenue and/or the 28L 19th Avenue Limited; however, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.28_1 Moderate Alternative would not substantially affect bicycle travel. Within the corridor, Bicycle Route 75 (Class III, signed route with sharrows in some locations) runs along 20th Avenue, and the proposed improvements along 19th Avenue (for example, transit bulbs, relocation of bus stops from nearside to farside, and stop removal pedestrian bulbs) would not affect bicycle conditions along 20th Avenue. Bicycles remaining on 19th Avenue could experience some delays at transit bulbs, as all non-transit vehicles, including bicycles, would be required to yield, or pass as traffic permits. This delay would only occur when buses are present at the stop, and would not represent a substantial delay to non-transit vehicles, including bicycle travel. In addition, Bicycle Route 86 (Class III signed route with sharrows) runs along Winston Drive and through the study intersection of Winston Drive/19th Avenue, but would not be affected by the proposed transit bulb on 19th Avenue.

TTRP.30_1 Moderate Alternative – Implementation of the TTRP.30_1 Moderate Alternative would enhance pedestrian conditions at locations where new transit bulbs on North Point Street, Columbus Avenue, and Stockton Street are proposed by providing additional space for passengers to wait and shortening crossing distances. Bus stops would be removed on North Point Street at Larkin Street (inbound and outbound) and at Van Ness Avenue (inbound only) and on Columbus Avenue at Francisco Street (inbound and outbound), at Lombard Street (inbound only), and at Filbert Street (inbound only). However, new stops would be created on Columbus Avenue at Greenwich Street (inbound only) and on Stockton Street at Washington Street (outbound only). At some locations, passengers may need to walk further to access a bus stop, and some passengers may be inconvenienced. Removing or consolidating bus stops would affect all routes running along the TTRP.30_1 corridor and using the bus stops on North Point Street, Van Ness Avenue, and Columbus Avenue (i.e., the 30 Stockton and/or the 47 Van Ness). The stop removals noted above may increase the physical effort required to reach the 30 Stockton, and 47 Van Ness; however, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.30_1 Moderate Alternative would not substantially affect bicycle travel for the following reasons. Within the corridor, Bicycle Route 17 (Class III) runs along Stockton Street, Bicycle Route 11 runs along Columbus Avenue (Class III), and Bicycle Route 2 runs along North Point Street (a Class II bicycle lane) and the TTRP.30_1 Moderate Alternative would not change these bicycle facilities. The TTRP.30_1 Moderate Alternative would implement transit bulbs on Columbus Avenue, and on North Point and Stockton streets. Transit bulbs currently exist on Stockton Street, and therefore, implementation of the TTRP.30_1 Moderate Alternative would result in conditions similar to Existing conditions. On North Point Street, which currently has a bicycle lane and one mixed-flow lane in each direction, conditions with the implementation of TTRP.30_1 Moderate Alternative would be similar to Existing conditions when buses travel across the bicycle lane to a curbside bus zone. However, in this case, the bus would be stopped within the bicycle lane, and non-transit vehicles, including bicyclists, would be required to yield, or pass the bus, conditions permitting. This delay would only occur when buses are present at the stop, and would not represent a substantial delay to non-transit vehicles, including bicycle travel. Implementation of transit bulbs adjacent to bicycle lanes would not reduce conflicts between buses and bicyclists; however, transit-bicycle conflicts would not increase from Existing conditions. Overall, implementation of the TTRP.30_1 Moderate Alternative improvements would not affect the bicycle lanes, bicycle access, or vehicular travel on these streets.

- **TTRP.71_1 Moderate Alternative** – Implementation of the TTRP.71_1 Moderate Alternative would enhance pedestrian conditions at intersections and transit stops along Haight Street and would not result in overcrowding of sidewalks, or create new potentially hazardous conditions. Pedestrian improvements would include pedestrian bulbs at one or more corners of the intersections of Haight Street at Baker Street/Buena Vista East Avenue, at Belvedere Street, at Cole Street, and at Lyon Street. In addition, new transit bulbs would be constructed on Haight Street at Fillmore and Divisadero streets, at Masonic Avenue, and at Stanyan Street in the inbound direction, and on Haight Street between Shrader and Stanyan streets in the outbound direction. Outside of the improvements proposed, pedestrian conditions on sidewalks and crosswalks would not substantially change from Existing conditions.

- The inbound and outbound stops on Haight Street at Clayton and Pierce streets and the inbound stop on Haight Street at Buchanan Street would be relocated from the nearside to the farside of the intersection. The closely-spaced inbound and outbound stops at the intersection of Haight Street and Central/Buena Vista West and the intersection of Haight Street and Baker/Buena Vista East would be consolidated into new farside stops at Haight Street at Lyon Street in both directions. In addition, the inbound and outbound stops on Haight Street at Cole Street would be removed. Additionally, the new farside stops at Haight Street and Clayton Street would be converted to local-only stops. Therefore, in conjunction with the proposed Service Improvements, including the 6 Parnassus route restructuring and changes to the 71 Haight-Noriega, the inbound and outbound stops on Clayton Street would be served by the 6 Parnassus but not by the 71L Haight-Noriega Limited. Some passengers using these stops on Haight Street that would be removed or relocated, or converted to local-only stops, may need to walk farther to reach adjacent stops, and some passengers may be inconvenienced; however, the additional distance would not result in hazards or reduced access to transit, and would be consistent with SFMTA's proposed transit stop spacing guidelines. Other transit passengers may experience shorter distances to the new transit stops.

- Under the TTRP.71_1 Moderate Alternative, traffic signals would be installed on Haight Street at the all-way stop-controlled intersections with Laguna, Buchanan, Webster, Pierce, Scott and Broderick streets, Baker Street/Buena Vista East Avenue, and Central, Clayton, and Shrader streets. At these intersections installing a traffic signal could improve pedestrian safety by clarifying the right-of-way for crossing the street.

- Minimal service headway changes are proposed as part of the Service Improvements on the 6 Parnassus and the existing 71L Haight-Noriega Limited.[59] As discussed above, some passengers using local only (non-limited) stops on Haight Street may need to walk farther to adjacent stops. The minor increase of not more than one additional bus each hour could result in an increased potential for pedestrian, bicycle, and transit conflicts; however, this minor increase in service, in combination with the TTRP.71_1 Moderate Alternative, would not result in hazardous conditions for pedestrians. Overall, the impact of the TTRP.71_1 Moderate Alternative on pedestrians would be less than significant.

- Implementation of the TTRP.71_1 Moderate Alternative would not substantially affect bicycle travel. Within the TTRP.71_1 corridor, Bicycle Route 30 (Class III) runs along Haight Street for one block between Pierce and Scott streets. With the TTRP.71_1 Moderate Alternative, conversion of the all-way stop sign controlled intersections of Haight/Pierce streets and Haight/Scott streets to a signalized intersection would reduce the frequency with which

[59] The 71L Haight-Noriega Limited operates only in the peak period and peak direction under Existing conditions. However, under the proposed Service Improvements, the 71 Haight-Noriega would no longer operate and the 71L Haight-Noriega Limited would provide all day limited-stop service on Haight Street in both directions.

bicyclists would have to stop and start, which would be an improvement for bicyclists. The remainder of the TTRP.71_1 corridor, specifically along Haight Street, is not part of a designated bicycle route, and therefore improvements along Haight Street would not affect designated bicycle facilities, nor substantially affect bicycle travel on Haight Street. The proposed TTRP.71_1 Moderate Alternative improvements, such as transit bulbs and pedestrian bulbs on Haight Street, would not affect bicycle lane travel on Haight Street because bicyclists would continue to share the travel lane with vehicles, as under Existing conditions. However, because Haight Street generally has one travel lane in each direction, a bus stopped at a transit bulb could require a bicyclist behind the bus, similar to motor vehicles, to wait while the passengers boarded, rather than the existing configuration that allows buses to pull out of the travel lane to board passengers. Under the TTRP.71_1 Moderate Alternative, the stop signs at all approaches at the intersection of Haight/Clayton streets would be replaced with a traffic signal, which would reduce delays for bicyclists traveling northbound or southbound on Clayton Street which is part of Bicycle Route 55 (Class III). Implementation of the TTRP.71_1 Moderate Alternative improvements along the TTRP.71_1 corridor would not affect the travel lanes, and conditions for bicyclists would be similar to Existing conditions. Therefore, the impact of the TTRP.71_1 Moderate Alternative on bicycle facilities and operation would be less than significant.

● In summary, for the reasons discussed above, the impact of TTRP Moderate Alternative, including the specific TTRP corridors: TTRP.J Moderate Alternative, TTRP.L Moderate Alternative, TTRP.N Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.9 Moderate Alternative, TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, TTRP.22_1Moderate Alternative, TTRP.28_1 Moderate Alternative, TTRP.30_1 Moderate Alternative, or TTRP.71_1 Moderate Alternative on pedestrian and bicycle facilities and operation would be less than significant.

● **Impact TR-45: Implementation of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1 Expanded Alternative, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, or TTRP.71_1 would not result in significant impacts to pedestrians and bicyclists. (Less than Significant)**

Implementation of the TTRP Expanded Alternative projects, which include the Service Improvements or Service Variants, would enhance pedestrian conditions at intersections by facilitating safe and easy pedestrian crossings, by providing safe spaces for pedestrians to wait, by increasing access to transit, by slowing traffic, and by increasing pedestrian visibility to drivers. For the reasons noted above, the 11 project-level TTRP Expanded Alternative proposals would not result in overcrowding of sidewalks or create new potentially hazardous conditions for pedestrians. The proposed Service Improvements or Service Variants would result in an increase in transit vehicles along the routes and may introduce transit service on streets that currently do not have transit, which, as analyzed in Transit Impacts above (Impact TR-21) could result in an increased potential for pedestrian, bicycle, and transit conflicts. However, this increased service, in combination with the TTRP Expanded Alternative improvements, would not result in new hazardous conditions for pedestrians because, as described above, the TTRP improvements would enhance pedestrian conditions at intersections.

Some TTRP Expanded Alternative projects would include relocating, consolidating, or removing bus stops, and some passengers may need to walk farther to access a transit stop. The increased distances may inconvenience some passengers; however, the additional distance would be minimal, and overall transit stop spacing would be consistent with the SFMTA's *Proposed Revisions to Transit Stop Spacing Guidelines* regarding bus stop spacing.[60] See the discussion in Impact TR-7 regarding the effects of removing or consolidating transit stops on pedestrians, including the elderly and disabled. While stop removal may increase the physical effort required to reach a transit line/route, posing a challenge to some riders, the stop removal would remain consistent with the SFMTA bus stop spacing guidelines and would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas.

TTRP.J Expanded Alternative – Similar to the TTRP.J Moderate Alternative, the TTRP.J Expanded Alternative would enhance pedestrian conditions at intersections along Church Street, as discussed below. Pedestrian conditions on sidewalks and crosswalks would not change from Existing conditions, and the new traffic signal at the intersection of 24th/Church streets would include pedestrian countdown signals. The TTRP.J Expanded Alternative would include additional traffic calming measures compared to the TTRP.J Moderate Alternative, including pedestrian bulbs, as well as speed humps on Church Street at Day Street, which would enhance pedestrian conditions at these intersections. These measures would generally involve improving crossing conditions for pedestrians, slowing traffic, and reducing right-of-way conflicts between pedestrians and other traffic, and would be included to facilitate safe and easy pedestrian crossings across streets where traffic no longer has to stop at a stop sign.

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[60] Ibid.

Similar to the TTRP.J Moderate Alternative, the inbound and outbound stops at the intersection of the J Church right-of-way and Liberty Street and the inbound stop on Church Street at 30th Street would be discontinued. Passengers using the stop on the J Church right-of-way at Liberty Street would need to walk to the stop on the J Church right-of-way at 21st Street or to the stop on the J Church right-of-way at 20th Street, and passengers using the inbound stop on Church Street at 30th Street would need to walk to the stop on Church Street at Day Street. Stop removal at the intersection of the J Church right-of-way and Liberty Street, and at Church Street at 30th Street, may increase the physical effort required to reach the J Church line; however, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.J Expanded Alternative would not substantially affect bicycle travel in the area for the following reasons. The proposed TTRP.J Expanded Alternative improvements, such as transit bulbs, boarding island extensions, stop relocations, and pedestrian bulbs on Church Street and San Jose Avenue, would not affect bicycle lane travel on San Jose Avenue (i.e., Bicycle Route 45) or Sanchez Street (i.e., Bicycle Route 49) because no changes are proposed to the bicycle lanes on San Jose Avenue, and bicyclists on Sanchez Street would continue to share the travel lane with vehicles, as under Existing conditions.

Under the TTRP.J Expanded Alternative, with conversion of the intersections of Church/25th streets, Church/26th streets, Cesar Chavez/Church streets, and Church/Day streets from all-way stop-controlled to two-way stop-controlled, bicyclists traveling northbound and southbound on Church Street would no longer need to stop at these intersections. Traffic, including bicyclists, travelling east and west at these intersections, may experience some additional delay, as they would be required to stop and wait for a gap in traffic to proceed. However, similar to the discussion under Traffic Impacts, lower volumes and/or sufficient gaps in traffic should allow traffic to proceed, or bicyclists may choose to divert to other nearby bicycle routes where controls (signals or stops) are retained. With reconfiguration of Randall Street between Mission Street and San Jose Avenue, a bicycle lane/path would be maintained to provide bicycle access in both directions.

Under the TTRP.J Expanded Alternative, a transit-only lane would be established on Church Street between Duboce Avenue and 16th Street by removing one mixed-flow lane in both directions. Church Street is not a designated bicycle route, and the improvements installed on Church Street would not affect the bicycle lane on Duboce Avenue. With elimination of one mixed-flow lane in each direction, bicyclists would share the mixed-flow lane with a greater number of vehicles in the remaining mixed-flow lanes; however, this would not create a potentially hazardous condition for bicyclists and would not substantially affect bicycle operations or access, as it would not represent a substantial change over similar Existing conditions along bicycle routes throughout the City.

- **TTRP.L Expanded Alternative** – Similar to the TTRP.L Moderate Alternative, the TTRP.L Expanded Alternative would enhance pedestrian conditions at intersections and transit stops along Taraval Street and would not result in overcrowding of sidewalks or create new potentially hazardous conditions. As with the TTRP.L Moderate Alternative, pedestrian improvements under the TTRP.L Expanded Alternative would include pedestrian refuge islands on Taraval Street at 44th Avenue, a nearside transit bulb in the outbound direction at Taraval Street and 15th Avenue, and intersection signalization with pedestrian countdown signals at Taraval/17th, Taraval/18th, Taraval/22nd, Taraval/24th, Taraval/35th. Similar to the TTRP.L Moderate Alternative, the inbound and outbound nearside flag stops on Taraval Street at 22nd (outbound only), 26th, 28th, 30th, 32nd, 40th and 42nd avenues would have new 150-foot-long or extended (to 235-foot-long) boarding islands, enhancing pedestrian safety at these stops. Under the TTRP.L Expanded Alternative, intersection signalization with pedestrian countdown signals would also be implemented at existing all-way stop-controlled intersections on Taraval Street at 26th, 28th, 30th, 32nd, and 40th Avenues. Existing all-way stop-controlled intersections on Ulloa Street at 15th Avenue and on Taraval Street at 42nd, 44th, and 46th Avenues would be converted to two-way stop-controlled intersections, and vehicles, including transit would not be required to stop. However, additional traffic calming measures would be implemented at Ulloa Street/15th Avenue and Taraval Street/42nd Avenue to address pedestrian safety at these locations. The TTRP.L Expanded Alternative would also establish a full-time transit-only lane in both directions on Taraval Street between 15th Avenue and 46th Avenue by converting one mixed-flow lane to a transit-only lane in both directions while maintaining the existing parking lanes. Outside of the improvements proposed, pedestrian conditions on sidewalks and crosswalks would not substantially change from Existing conditions.

- Similar to the TTRP.L Moderate Alternative, the nearside flag stops on Taraval Street at 17th Avenue in both directions would be relocated to 18th Avenue with new 210-foot-long boarding islands and accessible platforms for wheelchair accessibility. The proposed inbound and outbound islands located between 18th and 19th avenues would serve as the stop for 19th Avenue (inbound and outbound). Similarly the inbound and outbound stop at 24th Avenue would be removed, replaced outbound with a transit island located nearer to 22nd Avenue. Other stop locations to be removed include Ulloa Street (at 46th Avenue), 44th Avenue (and Taraval Street), 35th Avenue, and Ulloa Street (at 15th Avenue). Some passengers using these stops may need to walk farther to adjacent stops and some passengers may be inconvenienced. However, the additional distance to reach the 18th Avenue stop or other relocated stops would not result in hazards or reduced transit access, and would be consistent with SFMTA's proposed transit stop spacing guidelines. Other transit passengers may experience shorter distances to the new transit stops. Minimal service headway changes are proposed for the L Taraval as part of the Service Improvements, and would be included as part of the TTRP.L Expanded Alternative. These minor headway adjustments would not substantially change the existing pedestrians conditions and this change in service, in combination with the TTRP.L Expanded Alternative, would not result in hazardous conditions for pedestrians. Overall, similar to the TTRP.L Moderate Alternative, the impact of the TTRP.L Expanded Alternative on pedestrians would be less than significant.

- Implementation of the TTRP.L Expanded Alternative would not substantially affect bicycle travel. Bicycle Route 60 runs along the TTRP.L Taraval corridor for a few blocks on Ulloa Street between 15th and Forest Side Avenues as a Class II bicycle lane and on Vicente Street between 46th and 47th Avenues as a Class III bicycle route. The proposed TTRP.L Expanded Alternative improvements, such as transit bulbs, transit boarding island extensions, stop relocations, and pedestrian bulbs on Taraval Street, would not affect bicycle travel. Under the TTRP.L Expanded Alternative, the intersection of Ulloa Street/15th Avenue would be converted from an all-way stop-controlled to two-way stop-controlled intersection, removing the stop signs for westbound and southbound traffic, allowing bicyclists traveling westbound in the Ulloa Street bicycle lanes to, similar to motor vehicle traffic, no longer stop at this intersection, though they would have to navigate around the traffic calming treatment in the intersection. A transit-only lane would also be established on Taraval Street between 15th and 46th avenues by converting one mixed-flow lane to a transit-only lane in both directions while maintaining the existing parking lanes. Taraval Street is not a designated bicycle facility, and the improvements installed on Taraval Street would not affect bicycle traffic on Vicente Street. With the elimination of one mixed-flow travel lane in each direction, bicyclists on Taraval Street would share the remaining mixed-flow lane with a greater number of vehicles. However, this would not substantially affect bicycle operations or access nor create a potentially hazardous condition for bicyclists, as it would not represent a substantial change over Existing conditions.

- No other changes are proposed to the bicycle facilities or travel lanes on Ulloa or Vicente streets. Bicyclists would continue to have a designated bicycle lane on Ulloa Street and share the travel lane with vehicles on Vicente Street, as under Existing conditions. Therefore, similar to the TTRP.L Moderate Alternative, the impact of the TTRP.L Expanded Alternative on bicycle facilities and operation would be less than significant.

TTRP.N Expanded Alternative – Similar to the TTRP.N Moderate Alternative, the TTRP.N Expanded Alternative would enhance pedestrian conditions at intersections along Carl, Irving, and Judah streets. Pedestrian conditions on sidewalks and crosswalks would improve over Existing conditions, as explained below, and the new traffic signals at the intersections on Judah Street at 18th and at 31st avenues, and at the intersection of Irving Street/Fourth Avenue would include pedestrian countdown signals. The TTRP.N Expanded Alternative would include removing the stop signs on Judah Street at the intersections with Tenth, Funston, 22nd, 23rd, and 41st avenues, and installing traffic calming measures, including pedestrian bulbs, and speed humps on Judah Street, and special striping in advance of the crosswalk on Judah Street at the intersections with Tenth, Funston, 22nd, 23rd, and 41st avenues to enhance pedestrian conditions. These measures would generally involve improving crossing conditions for pedestrians, slowing traffic, and reducing right-of-way conflicts between pedestrians and other traffic and would be included to facilitate safe and easy pedestrian crossings across streets where traffic no longer has to stop at a stop sign.

Similar to the TTRP.N Moderate Alternative, the intersection at Arguello Boulevard/Carl Street would be reconfigured to simplify the right-of-way, and median islands would be constructed. At the intersections of Irving Street/Fourth Avenue and Irving Street/Seventh Avenue, the existing flag stops in the inbound and outbound directions would be removed, and the stops would be consolidated into a new outbound stop at the farside of Irving Street/Fifth Avenue and a new inbound stop at the farside of Irving Street/Sixth Avenue. In addition, at the intersection of Judah Street/Funston Avenue, the flag stops in the inbound and outbound directions would be removed. While stop removal at the intersections of Judah Street/Funston Avenue, Irving Street/Fourth Avenue, and Irving Street/Seventh Avenue may increase the physical effort required to reach the N Judah line, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.N Expanded Alternative would not substantially affect bicycle travel along the TTRP.N corridor. There are no bicycle routes on Carl Street, Irving Street, Ninth Avenue, or Judah Street, and, similar to the TTRP.N Moderate Alternative, the TTRP.N Expanded Alternative improvements (for example, transit bulbs, extension of existing transit boarding islands, stop relocation, flag stop removal, median islands, and pedestrian bulbs) would substantially affect bicycle conditions on these non-bicycle network streets, nor affect bicycle travel on nearby designated eastbound/westbound routes such as on Kirkham Street or northbound-southbound routes such as Sixth (Bicycle Route 65), Seventh (Bicycle Route 65), 20th (Bicycle Route 75), and 34th (Bicycle Route 85) avenues. Under the TTRP.N Expanded Alternative, with conversion of the intersections of Judah Street with Tenth, Funston, 22nd, 23rd, and 41st avenues from all-way stop-controlled to two-way stop-controlled, bicyclists traveling eastbound and westbound on Judah Street would no longer need to stop at these intersections. Traffic, including bicyclists, travelling northbound and southbound at these intersections, may experience some additional delay, as they would be required to stop and wait for a break in traffic to proceed. However, similar to the discussion under Traffic Impacts, lower volumes and/or sufficient gaps in traffic flow should allow for traffic to proceed, or bicyclists may choose to divert to other nearby routes where controls (signals or stops) are retained.

TTRP.5 Expanded Alternative – With implementation of the TTRP.5 Expanded Alternative, the proposed transit bulbs, pedestrian refuge islands, and pedestrian bulbs would enhance pedestrian conditions at intersections along Fulton and McAllister streets. Pedestrian conditions on sidewalks and crosswalks would not change from Existing conditions. At the intersections of McAllister Street with Steiner, Scott, Broderick, Laguna, Pierce, and Lyon streets, the all-way stop-controls would be replaced with traffic circles. At the intersection of McAllister Street/Central Avenue, the all-way stop-controls would be removed and replaced with a six-foot-wide pedestrian bulb on the southwest corner of the intersection. These measures would generally improve pedestrian crossing conditions, by slowing traffic, reducing right-of-way conflicts between pedestrians and other traffic, and facilitating safe and easy pedestrian crossings across streets where traffic no longer has to stop at a stop sign.

Pedestrian crossings at the proposed traffic circles on McAllister Street, which would be uncontrolled (i.e., traffic would yield depending on movement) operations, would be similar to pedestrian conditions at unsignalized intersections, where pedestrians have the right-of-way at crosswalks, and vehicles at either approach are required to stop and yield to pedestrians. However, removal of stop signs may make it more difficult for pedestrians to cross the street because moving vehicles may not always yield to pedestrians, as required. Additionally, the turning radii of vehicles around the circle may cause vehicles to encroach on crosswalks, depending on their location and the configuration of the circle. During the design phase, SFMTA would consider whether crosswalks may need to be set-back from the intersection to account for these movements.

As under the TTRP.5 Moderate Alternative, the inbound and outbound bus stops at the intersection of McAllister/Polk streets, McAllister/Octavia streets, McAllister/Webster streets,

- McAllister/Broderick streets, McAllister Street/Central Avenue, Fulton Street/12th Avenue, Fulton Street/16th Avenue, and Fulton Street/20th Avenue would be removed under the TTRP.5 Expanded Alternative. In addition, the inbound stop on Fulton Street/36th Avenue and the outbound stop at Fulton Street/38th Avenue would be removed. The stop removals noted above on McAllister and Fulton streets may increase the physical effort and distance required to reach the 5 Fulton and 5L Fulton

Limited routes; however, as noted above, impacts on pedestrians would be less than significant. Similar to the TTRP.5 Moderate Alternative, new inbound and outbound bus stops would be added on McAllister Street at the intersection of McAllister/Lyon streets.

Implementation of the TTRP.5 Expanded Alternative would not substantially affect bicycle travel on Fulton or McAllister streets. Bicycle Route 20 (a Class III bicycle route) runs westbound on McAllister Street between Market Street and Masonic Avenue and although not part of the 5 Fulton route, it runs eastbound/westbound on Fulton Street (as a Class II bicycle lane) between Octavia and Baker streets. Implementation of right-turn pockets on McAllister Street at Fillmore and Divisadero streets and traffic circles at the intersections of McAllister/Laguna streets, McAllister/Scott streets, McAllister/Steiner streets, McAllister/Pierce streets, McAllister/Broderick streets, and McAllister/Lyon streets would not substantially affect bicycle operations along McAllister Street. Implementation of right-turn pockets could benefit bicyclists by providing clearer lane designations at an intersection approach and reducing the chance of right hook collisions occurring when drivers make a right turn at the last moment across a bicycle lane or facility and in front of a bicyclist. Conversion of all-way stop-controls to traffic circles at these intersections would reduce the frequency with which bicyclists would have to stop and start, which would be an improvement for bicyclists.

As under TTRP.5 Moderate Alternative, the implementation of transit bulbs on McAllister Street as part of the with TTRP.5 Expanded Alternative, which has one travel lane in each direction west of Van Ness Avenue, may delay bicyclists as the bus would stop in the mixed-flow lane to pick up and drop off passengers at the transit bulb. The increased delay to non-transit vehicles, including bicyclists, would only occur when a bus is at the bus stop and would not substantially affect bicycle circulation.

TTRP.8X Expanded Alternative – With implementation of the TTRP.8X Expanded Alternative, the proposed transit bulbs, pedestrian refuge islands, and pedestrian bulbs would enhance pedestrian conditions at intersections along San Bruno, Visitacion, and Geneva avenues. At the intersections of Visitacion Avenue with Peabody, Cora, Britton, and Loehr streets, the all-way stop-controls would be replaced with stop signs on the cross streets and none on Visitation Avenue, and pedestrian bulbs would be added to all four corners of each intersection. Pedestrian refuge islands would also be added at the intersections of Visitation Avenue with Britton and with Loehr streets. These measures would generally involve improving crossing conditions for pedestrians, slowing traffic, and reducing right-of-way conflicts between pedestrians and other traffic, and would be included to facilitate safe and easy pedestrian crossings across streets where traffic no longer has to stop at a stop sign. Pedestrian conditions on sidewalks and crosswalks would improve over Existing conditions, and the new traffic signals at the intersections of Felton Street/San Bruno Avenue and Geneva Avenue/Cayuga Avenue would include pedestrian countdown signals.

As described above for the TTRP.8X Moderate Alternative, at a few locations on San Bruno and Geneva avenues, flag stops would be converted to bus zones, which would improve passenger loading/unloading operations. New stops would be added in both directions on San Bruno Avenue at Harkness Avenue (to consolidate stops at Wilde and Ward avenues, which would be removed) and a nearside bus stop would be established in both directions on Visitacíon Avenue at Desmond Avenue. A number of inbound and outbound stops would be removed on San Bruno Avenue, Bayshore Boulevard, Visitacion Avenue, Hahn Street, Santos Avenue, Geneva Avenue, and Moscow Street to provide for a more even transit stop spacing along the route. At some locations, passengers may need to walk further to access a bus stop, and some passengers may be inconvenienced. Removal of bus stops and stop relocation would affect all routes running along this TTRP corridor and using the bus stops (i.e., affecting the 8AX Bayshore Express, 8BX Bayshore Express, 9 San Bruno, and 9L San Bruno Limited, where the routes are on the same street as the 8X Bayshore Express). The stop removals along this route may increase the physical effort required to reach the 8X Bayshore Express, 8AX Bayshore Express, 8BX Bayshore Express, 9 San Bruno, or 9L San Bruno Limited routes, thus posing a challenge to some riders; however, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.8X Expanded Alternative would improve bicycle conditions along Geneva Avenue (Bicycle Route 90). Similar to the TTRP.8X Moderate Alternative, bicycle lanes would be established as part of the project in the westbound direction on Geneva Avenue on the block between Paris and London streets, and in the eastbound direction on Geneva Avenue along the two blocks between Mission and Paris streets (as also proposed for the TTRP.8X Moderate Alternative). However, under the TTRP.8X Expanded Alternative, a bicycle lane would also be provided in each direction of Geneva Avenue between Moscow and Santos streets.

There are no designated bicycle routes on Visitacion Avenue or any of the cross-streets where the TTRP.8X Expanded Alternative would convert four all-way stop-controlled intersections to two-way stop-controlled with stop signs removed from Visitacion Avenue (intersections of Visitacion Avenue/Peabody Street, Visitation Avenue/Cora Street, Visitacion Avenue/Britton Street, and Visitacion Avenue/Loehr Street). Traffic, including bicyclists, travelling northbound and southbound at these intersections, may experience some additional delay, as they would be required to stop and wait for a break in traffic to proceed. However, similar to the discussion under Traffic Impacts, lower volumes and/or sufficient gaps in traffic flow should allow for traffic to proceed, or bicyclists may choose to divert to other nearby bicycle routes where controls (signals or stops) would be retained.

As described for the TTRP.8X Moderate Alternative, implementation of transit bulbs on San Bruno, Visitacion, Sunnydale, and Geneva avenues and on Hahn and Santos streets may delay motor vehicles and bicyclists when the 8X Bayshore Express and 8BX Bayshore Express buses would stop in the travel lane to pick up and drop off passengers at the transit bulbs, particularly on streets with one travel lane in each direction (i.e., all of the above streets except for Geneva Avenue, which has two travel lanes in each direction). This increased delay to non-transit vehicles, including bicyclists, would only occur when a bus is at the bus stop, and would not substantially affect bicycle circulation. With the exception of Geneva Avenue, these streets are not designated bicycle routes. The installation of right-turn pockets along San Bruno and Geneva avenues could benefit bicyclists by providing clearer lane designations at an intersection approach and reducing the chance of right hook collisions occurring when drivers make a right turn at the last moment across a bicycle lane or facility and in front of a bicyclist.

- **TTRP.9 Expanded Alternative** – Similar to the TTRP.9 Moderate Alternative, implementation of the TTRP.9 Expanded Alternative would enhance pedestrian conditions at intersections and transit stops along 11th Street, Potrero Avenue, and Bayshore Boulevard and would not result in overcrowding of sidewalks, or create new potentially hazardous conditions. On the segment of Potrero Avenue between 22nd and 24th streets, the TTRP.9 Expanded Alternative would widen the sidewalk on the east side of Potrero Avenue from 9 to 15 feet. Similar to the TTRP.9 Moderate Alternative, pedestrian improvements would include pedestrian bulbs and refuge islands at the intersections of Potrero Avenue at Alameda, 15th, 16th, 17th, Mariposa, 18th, 19th, 20th, 21st, 22nd (east and west), 23rd, 24th, and 25th streets; pedestrian refuge along Potrero Avenue; a new crosswalk across Potrero Avenue would be installed on the north side of 23rd Street; and the sidewalk on the east side of Potrero Avenue between 22nd and 24th streets would be widened by removing the parking lane on the east side of the street. Outside of the improvements proposed, pedestrian conditions on sidewalks and crosswalks would not substantially change from Existing conditions.

- Similar to the TTRP.9 Moderate Alternative, the inbound and outbound stops on Potrero Avenue at 17th, 18th, and 20th streets would be removed and replaced by new stops at Mariposa, 19th, and 21st streets (inbound). Similarly, the outbound (i.e., southbound) stops on Potrero Avenue at 22nd and 23rd streets would be removed and replaced with a stop between these two blocks. On Bayshore Boulevard, the inbound (i.e., northbound) flag stop at Jerrold Avenue would be moved approximately 550 feet to the south and a 35-foot transit bulb would be provided. A 90-foot transit bulb would be installed at the existing inbound transit stop on Bayshore Boulevard at Cortland Street. The outbound stop at Cortland Street would be moved from nearside to farside and a 90-foot transit bulb would also be provided. In addition, on Bayshore Boulevard, the inbound and outbound stops at Oakdale Avenue would be optimized, and relocated from nearside bus zones to farside transit bulbs. Other stops along the route would be removed including on 11th Street at Howard Street (in both directions) and at Mission Street (in the inbound direction), and on Bayshore Boulevard at Alemany Boulevard (in both directions) and on Potrero Avenue at 23rd and at 25th streets (in the outbound direction).

- Some passengers using these stops on Potrero Avenue, 11th Street and Bayshore Boulevard may need to walk farther to adjacent stops and some passengers may be inconvenienced. However, the additional distance would not result in hazards or reduced access to transit, and would be consistent with SFMTA's proposed transit stop spacing guidelines. Other transit passengers may experience shorter distances to the new transit stops. As part of the Service Improvements, no service headway changes are proposed on the 9 San Bruno or on the 9L San Bruno Limited in the p.m. peak. However, service frequency would be increased on the 9L San Bruno Limited inbound during the a.m. peak period from a 12-minute headway to a ten-minute headway, and this Service Improvement would be included as part of the TTRP.9 Expanded Alternative. The increase of one additional bus each hour in the inbound direction during the a.m. peak hour could result in an increased potential for pedestrian, bicycle, and transit conflicts. However, this minor increase in service, in combination with the TTRP.9 Expanded Alternative, would not result in hazardous conditions for pedestrians. Overall, similar to the TTRP.9 Moderate Alternative, the impact of TTRP.9 Expanded Alternative on pedestrians would be less than significant.

- Implementation of the TTRP.9 Expanded Alternative would not substantially affect bicycle travel. Within the TTRP.9 corridor, there are bicycle lanes (Class II) in both directions on 11th and Division streets for Bicycle Route 25 and 30, and on Potrero Avenue for Bicycle Route 25. Within the TTRP.9 corridor, Bicycle Route 25 on Bayshore Boulevard is primarily a Class II route. Similar to the TTRP.9 Moderate Alternative, the impact on bicyclists at locations where transit bulbs would be implemented adjacent to a bicycle lane (for example, on 11th Street and on Potrero Avenue) would be similar to Existing conditions when buses travel across the bicycle lane to a curbside bus zone. However, in this case, the bus would be stopped within the bicycle lane, and bicyclists would be able to pass the bus, conditions permitting, or would, similar to vehicle traffic, need to wait behind the bus. Implementation of transit bulbs adjacent to bicycle lanes would not reduce conflicts between buses and bicyclists; however, transit-bicycle conflicts would not substantially increase over Existing conditions.

- Other TTRP.9 Expanded Alternative improvements, such as transit bulbs and pedestrian bulbs would not affect bicycle travel on 11th Street, Potrero Avenue, and Bayshore Boulevard because the bicycle lanes would be maintained. Therefore, similar to the TTRP.9 Moderate Alternative, the impact of the TTRP.9 Expanded Alternative on bicycle facilities and operation would be less than significant.

TTRP.14 Expanded Alternative – With implementation of the TTRP.14 Expanded Alternative, the proposed median boarding island at the intersection of Mission/Fremont streets, new transit bulbs and extensions of existing transit bulbs would enhance pedestrian conditions at intersections along Mission Street. The majority of the improvements that would provide additional area for passengers at the transit stops would occur south of 13th Street. New transit bulbs would be constructed in one or both directions of travel on Mission Street at 11th, 16th, 20th, and Richland streets; at Silver Avenue; and Lowell Street. On Mission Street at 30th Street and at Goethe/Evergreen streets, the existing transit bulbs would be extended. Two existing transit bulbs on Mission Street at Otis and 22nd streets would be removed to provide for additional lane width for buses to pass each other. On Mission Street, between 14th and Cesar Chavez streets, forced right turns at every intersection for northbound non-transit vehicles would generally increase conflicts between these vehicles and pedestrians, but would not represent a significant hazardous condition for pedestrians, as drivers would be required to yield right-of-way to pedestrians.

Bus stops would be removed in both the inbound and outbound directions on Mission Street at 15th, 19th, 21st, 23rd, and 29th streets as well as at Highland Avenue. Outbound bus stops on Mission Street at Precita Avenue and 4080 Mission Street would be removed as would the inbound bus stop on Mission Street at Brazil Avenue. In addition, TTRP.14 Expanded Alternative would include transit stop consolidation (see Table 10 on p. 2-138), primarily in the segment of Mission Street south of Cesar Chavez Street. For each of the pairs of transit stops (noted above) removed, a new transit stop would be established at the following locations: on Mission Street at Powers, Ocean, Ottawa, and Farragut avenues. In addition to the stop consolidation in the southern portion of the corridor, the outbound farside stops on Mission Street at Spear and Beale streets would be consolidated to a farside stop at Main Street.

Removing or consolidating bus stops would affect all routes running along the TTRP.14 corridor and using the bus stops (i.e., the 14 Mission, 14L Mission Limited, the 14X Mission Express, and the 49 Van Ness-Mission). The stop removals noted above may increase the physical effort required to reach the 14 Mission, 14L Mission Limited, 14X Mission Express, and 49 Van Ness-Mission routes; however, as noted above, impacts on pedestrians would be less than significant.

Implementation of the TTRP.14 Expanded Alternative would not substantially affect bicycle conditions. Bicycle Route 30 runs westbound on Mission Street as a signed route with sharrows between Tenth Street and South Van Ness Avenue. Implementation of the farside transit bulb on Mission Street at 11th Street would eliminate a potential bicycle-bus conflict associated with buses pulling into and out of the curbside bus stop. Bicycle Route 30 does not run on Mission Street south of McCoppin Street (which is located between 12th and 13th streets). The new transit-only lanes on Mission Street south of 13th Street are not anticipated to result in substantial increases in traffic volumes on nearby bicycle network streets due to diversions, such as on Valencia or Alemany streets. Bicyclists traveling along Mission Street would benefit from the left-turn restrictions, which would reduce conflicts between turning vehicles and bicyclists, and removal of parking would reduce conflicts between parked vehicle and bicyclists. Extension or implementation of right-turn pockets on Mission Street throughout the corridor at locations identified in the Project Description, p. 2-139, could benefit bicyclists by providing clearer lane designations at an intersection approach and reducing the chance of right hook collisions occurring when drivers make a right turn at the last moment across a bicycle lane or facility and in front of a bicyclist. Implementation of the transit-only lane would increase the number of vehicles in the mixed-flow lane, which would result in a potential increase in conflicts between vehicles and bicyclists traveling in that lane. However, this potential increase in conflicts would not result in bicycle hazards as similar conditions exist for bicyclists throughout the City, and bicycle travel would be similar to Existing conditions where bicyclists would continue to share a travel lane with vehicles. Bicycles traveling along the corridor would likely travel along Valencia Street, which has bicycle lanes in both directions, and signal timing adjusted to enhance bicycle travel along the street.

TTRP.22_1 Expanded Alternative – With implementation of the TTRP.22_1 Expanded Alternative, the proposed median boarding islands (instead of transit bulbs proposed under the TTRP.22_1 Moderate Alternative), new pedestrian bulbs, and new bus stops would enhance pedestrian conditions at intersections along 16th Street. Boarding islands would require pedestrians to cross to the median to access the bus, which may result in increased conflicts between pedestrians and vehicles but would not result in new hazardous conditions for pedestrians because pedestrians would use the crosswalk to access the median boarding islands, and because pedestrian countdown signals would be provided at intersections where median boarding islands are proposed. The TTRP.22_1 Expanded Alternative would include accommodation for future sidewalk widening from 10 to 18 feet on both sides of 16th Street between Potrero Avenue and Seventh Street. The widening would not be implemented as part of the transit-only lane but would occur gradually over time, as the 16th Street corridor is redeveloped and/or funding is available for implementation by the City. This improvement would require elimination of on-street parking on both sides of the street. Parking/delivery bays could be recessed into the widened sidewalks based on specific land use demands. Sidewalk widening would improve pedestrian conditions on the sidewalks along 16th Street between Potrero Avenue and Seventh Street.

With implementation of the TTRP.22_1 Expanded Alternative, the existing bicycle lanes on 16th Street (Bicycle Route 40) between Seventh and Kansas streets would be relocated to 17th Street between Seventh and Kansas streets. On 17th Street at Kansas Street, the relocated bicycle lane would connect with the existing bicycle lane on the same street to the west (part of Bicycle Route 40 – a Class II bicycle lane), while at the east end, the bicycle lane would connect with the bicycle lane on Mississippi Street that runs between Mariposa Street and 16th Street (at Seventh Street). The relocation of the bicycle lane (and therefore, Bicycle Route 40) would not substantially affect bicycle operations or access for the following reasons: because 17th Street in this segment is more heavily used by bicyclists continuing to or from the bicycle lane to the west, traffic volumes along 17th Street are lower than along 16th Street, and connections with the bicycle lane on 16th Street to the east of Seventh Street (i.e., to Mission Bay) would be provided via a bike lane on Mississippi Street.

A separate project, the University of California, San Francisco (UCSF) expansion plan includes changes at the intersections of 16th/Owens streets and 16th/Third streets, calling for a second northbound left-turn lane on Owens Street at 16th Street when certain traffic volume triggers are met. At the intersection of 16th/Owens streets, in order to accommodate a second northbound left-turn lane from Owens Street onto westbound 16th Street and maintain the proposed center-running transit-only lanes, the existing westbound bicycle lane on 16th Street would be removed for about 215 feet west of Owens Street, and instead sharrows would be painted within the mixed-flow lane. All on-street parking would be removed from the south side (eastbound direction) of 16th Street between Seventh and Third streets, in order to create two receiving westbound mixed-flow lanes. At the intersection of 16th/Third streets, traffic volume triggers could require reconfiguring the eastbound and westbound approaches to this intersection; however, this would be accommodated by restriping the lane widths. West of Third Street, 16th Street would have two five-foot wide bicycle lanes (one in each direction), two westbound lanes (one mixed-flow lane and one transit only lane), and four eastbound lanes (one transit-only lane, one left/though lane, one through lane, and one right-turn only lane). Therefore, the bicycle lanes on 16th Street between Third and Fourth streets would not be affected. As indicated, these modifications would only be necessary if future traffic volumes become sufficiently large enough to exceed capacity thresholds.

Under the TTRP.22_1 Expanded Alternative Variant 1 and TTRP.22_1 Expanded Alternative Variant 2, which would include lane modifications to the segment of 16th Street between Bryant and Church streets, bicycle conditions on 16th Street between Bryant and Church streets would not be substantially affected. West of Kansas Street, Bicycle Route 40 runs along 17th Street as a Class II facility (bicycle lane), and the impacts of the TTRP.22_1 Expanded Alternative Variant 1 and TTRP.22_1 Expanded Alternative Variant 2 on bicyclists would be similar to the TTRP.22_1 Expanded Alternative.

TTRP.28_1 Expanded Alternative – The TTRP.28_1 Expanded Alternative would also include the same sidewalk bulbs, transit bulbs, and optimization and removal of bus stops as included in the TTRP.28_1 Moderate Alternative. The proposed sidewalk bulbs would shorten the street crossing distance, while transit bulbs would improve pedestrian conditions by providing additional pedestrian space and space for transit shelters, landscaping, and other amenities. Both inbound and outbound stops would be removed on 19th Avenue at Irving, Kirkham, Moraga, Pacheco, Santiago, Ulloa, and Wawona streets and at Ocean Avenue. Removing or consolidating bus stops would affect all routes running along the TTRP.28 corridor and using the bus stops (i.e., the 28 19th Avenue and the 28L 19th Avenue). The stop removals noted above may increase the physical effort required to reach the 28 19th Avenue and/or the 28L 19th Avenue Limited; however, as noted above, impacts on pedestrians would be less than significant. The improvements proposed as part of the TTRP.28_1 Expanded Alternative at the intersection of Winston Drive/19th Avenue (shortening the left-turn pocket) would not affect pedestrians crossing at this intersection.

Implementation of the TTRP.28_1 Expanded Alternative would not substantially affect bicycle travel for the following reasons. Within the corridor, Bicycle Route 75 (Class III, with sharrows in some locations) runs along 20th Avenue, and similar to the TTRP.28_1 Moderate Alternative, proposed improvements along 19th Avenue (for example, transit bulbs, relocation of bus stops from nearside to farside, and stop removal pedestrian bulbs) would not affect bicycle conditions along 20th Avenue. Bicyclists remaining on 19th Avenue could experience some delays at transit bulbs, as all non-transit vehicles, including bicycles, would be required to yield, or pass as traffic permits. This delay would only occur when buses are present at the stop, and would not represent a substantial delay to non-transit vehicles, including bicycle travel. In addition, Bicycle Route 86 (Class III route with sharrows) runs along Winston Drive and through the study intersection of Winston Drive/19th Avenue, but would not be affected by the proposed alterations to that intersection. The existing volume of bicyclists on 19th Avenue is very low.

TTRP.30_1 Expanded Alternative – Implementation of the TTRP.30_1 Expanded Alternative would also enhance pedestrian conditions at locations where new transit bulbs on Van Ness Avenue, North Point Street, Columbus Avenue, and Stockton Street are proposed by providing additional space for passengers to wait and shortening crossing distances. Similar to the TTRP.30_1 Moderate Alternative, bus stops would be removed on North Point Street at Larkin Street (inbound and outbound) and at Van Ness Avenue (inbound only) and on Columbus Avenue at Francisco Street (inbound and outbound), at Lombard Street (inbound only), and at Filbert Street (inbound only). However, new stops would be created on Columbus Avenue at Greenwich Street (inbound only) and on Stockton Street at Washington Street (outbound only). Removing or consolidating bus stops would affect all routes running along the TTRP.30_1 corridor and using the bus stops on North Point Street, Van Ness Avenue, and Columbus Avenue (the 30 Stockton and/or the 47 Van Ness). The stop removals noted above may increase the physical effort required to reach the 30 Stockton, or the 47 Van Ness, posing a challenge to some riders; however, as noted above, impacts on pedestrians would be less than significant. Implementation of TTRP.30_1 Expanded Alternative Variant 1 and TTRP.30_1 Expanded Alternative Variant 2 would widen mixed-flow lanes on Stockton Street, which would not substantially affect pedestrian conditions.

Implementation of the TTRP.30_1 Expanded Alternative would not substantially affect bicycle travel for the following reasons. Within the corridor, Bicycle Route 17 (Class III) runs along Stockton Street, Bicycle Route 11 runs along Columbus Avenue (Class III), and Bicycle Route 2 runs along North Point Street (a Class II bicycle lane). The TTRP.30_1 Expanded Alternative would not change these bicycle facilities. Similar to the TTRP.30_1 Moderate Alternative, the TTRP.30_1 Expanded Alternative would implement transit bulbs on Columbus Avenue, and on North Point and Stockton streets. Transit bulbs currently exist on Stockton Street, and therefore, with implementation of the TTRP Moderate Alternative conditions for bicyclists would remain similar to Existing conditions. On North Point Street, which currently has a bicycle lane and one travel lane in each direction, conditions for bicyclists would be similar to Existing conditions when buses travel across the bicycle lane to a curbside bus zone. However, in this case, the bus would be stopped within the bicycle lane, and non-transit vehicles, including bicyclists, would be required to yield, or pass the bus, conditions permitting. This delay would only occur when buses are present at the stop, and would not represent a substantial delay to non-transit vehicles, including bicycle travel. Implementation of transit bulbs adjacent to bicycle lanes would not reduce conflicts between buses and bicyclists; however, transit-bicycle conflicts would not increase over Existing conditions.

TTRP.30_1 Expanded Alternative would implement a transit-only lane on Kearny Street between Market and Sutter streets, which would not affect nearby bicycle facilities. Kearny

Street currently has three mixed-flow northbound lanes (proposed to be two mixed-flow and a transit-only lane), and implementation of the transit-only lane would increase the number of vehicles in the two remaining mixed-flow lanes, which would result in a potential increase in conflicts between vehicles and bicyclists traveling in that lane. However, this potential increase in conflicts would not represent a bicycle hazard, as similar conditions exist for bicyclists throughout the City.

- Implementation of TTRP.30_1 Expanded Alternative Variant 1 and TTRP.30_1 Expanded Alternative Variant 2 would widen mixed-flow lanes on Stockton Street for a two-block segment (approximately 650 feet), which would enhance bicycle travel on this Class III facility.

- **TTRP.71_1 Expanded Alternative** – Similar to the TTRP.71_1 Moderate Alternative, implementation of the TTRP.71_1 Expanded Alternative would enhance pedestrian conditions at intersections and transit stops along Haight Street and would not result in overcrowding of sidewalks, or create new potentially hazardous conditions. Pedestrian improvements would include pedestrian bulbs at one or more corners of the intersections of Haight Street at Baker Street/Buena Vista East Avenue, at Belvedere Street, at Cole Street, and at Lyon Street. In addition, new transit bulbs would be constructed on Haight Street at Fillmore and Divisadero streets, at Masonic Avenue, and at Stanyan Street in the inbound direction, and on Haight Street between Shrader and Stanyan streets in the outbound direction. The TTRP.71_1 Expanded Alternative would include replacement of the all-way stop signs with traffic calming measures instead of the traffic signals proposed in the TTRP.71_1 Moderate Alternative at the following intersections with Haight Street: Laguna, Webster, Pierce, Scott, Central, and Shrader streets. The traffic calming measures would consist of the installation of six-foot pedestrian bulbs at all four corners of each intersection, except at Pierce Street where only the northeast and southwest corners would receive pedestrian bulbs. While vehicles, including transit, would no longer be required to stop, the traffic calming features would address crossing conditions and safety for pedestrians, slowing traffic. Outside of the improvements proposed, pedestrian conditions on sidewalks and crosswalks would not substantially change from Existing conditions.

- Similar to the TTRP.71_1 Moderate Alternative, the inbound and outbound stops on Haight Street at Clayton and Pierce streets and the outbound stop on Haight Street at Buchanan Street would be relocated from the nearside to the farside of the intersection. The closely-spaced inbound and outbound stops at the intersection of Haight Street and Central/Buena Vista West Avenue and the intersection of Haight Street and Baker Street/Buena Vista East Avenue would be consolidated into new farside stops at Haight Street at Lyon Street in both directions. In addition, the inbound and outbound stops on Haight Street at Cole Street would be removed. Additionally, the new farside stops at Haight Street and Clayton Street would be converted to local-only stops. Therefore, under the proposed Service Improvements, including the 6 Parnassus route restructuring and changes to the 71 Haight-Noriega, the inbound and outbound stops on Clayton Street would be served by the 6 Parnassus but not by the 71L Haight-Noriega Limited. Some passengers using these stops on Haight Street that would be removed, relocated, or converted to local-only stops, may need to walk farther to reach adjacent stops, and some passengers may be inconvenienced; however, the additional distance would not result in hazards or reduced access to transit, and would be consistent with SFMTA's proposed transit stop spacing guidelines. Other transit passengers may experience shorter distances to the new transit stops.

- Similar to the TTRP.71_1 Moderate Alternative, traffic signals would be installed on Haight Street at the all-way stop-controlled intersections with Buchanan, Broderick and Clayton streets, and at Baker Street/Buena Vista East Avenue. At these intersections installing a traffic signal could improve pedestrian safety by clarifying the right-of-way for crossing the street. As noted above, the TTRP.71_1 Expanded Alternative would include replacement of the all-way stop signs with traffic calming measures instead of the traffic signals proposed in the TTRP.71_1 Moderate Alternative at intersections of Haight Street with Laguna, Webster, Pierce, Scott, Central, and Shrader streets.

- Minimal service headway changes are proposed as part of the Service Improvements on the 6 Parnassus and the 71L Haight-Noriega Limited.[61] As discussed above, some passengers using local only (non-limited) stops on Haight Street may need to walk further to adjacent stops. The minor increase of not more than one additional bus each hour could result in an increased potential for pedestrian, bicycle, and transit conflicts; however, this minor increased service, in combination with the TTRP.71_1 Expanded Alternative, would not result in hazardous conditions for pedestrians. Overall, similar to the TTRP.71_1 Moderate Alternative, the impact of TTRP.71_1 Expanded Alternative on pedestrians would be less than significant.

- Implementation of the TTRP.71_1 Expanded Alternative would not substantially affect bicycle travel. Within the TTRP.71_1 corridor, Bicycle Route 30 (Class III) runs along Haight Street for one block between Pierce and Scott streets. With the TTRP.71_1 Expanded Alternative, conversion of all-way stop sign controlled intersections of Haight/Pierce streets and Haight/Scott streets to two-way stop controlled intersections would reduce the frequency with which bicyclists would have to stop and start, which would be an improvement for bicyclists.

- [61] The 71L Haight-Noriega Limited operates only in the peak period and peak direction under Existing conditions. However, under the proposed Service Improvements, the 71 Haight-Noriega would be eliminated and the 71L Haight-Noriega Limited would provide all day limited-stop service on Haight Street in both directions.

The remainder of the TTRP.71_1 corridor, specifically along Haight Street, is not part of a designated bicycle route, and therefore improvements along Haight Street would not affect designated bicycle facilities, nor substantially affect bicycle travel on Haight Street. Similar to the TTRP.71_1 Moderate Alternative, the proposed TTRP.71_1 Expanded Alternative improvements, such as transit bulbs and pedestrian bulbs on Haight Street, would not affect bicycle lane travel on Haight Street because bicyclists would continue to share the travel lane with vehicles, as under Existing conditions. However, because Haight Street generally has one travel lane in each direction, a bus stopped at a transit bulb could require a bicyclist behind the bus, similar to motor vehicles, to wait while the passengers boarded, rather than the existing configuration that allows buses to pull out of the travel lane to board passengers.

- Similar to the TTRP.71_1 Moderate Alternative, the stop signs at all approaches at the Haight Street intersections of Clayton, Buchanan, and Broderick streets, and at the intersection of Baker Street/Buena Vista East Avenue would be replaced with traffic signals, which would reduce delays for bicyclists traveling northbound or southbound on intersecting streets, particularly on Clayton Street which is part of Bicycle Route 55 (Class III). Under the proposed TTRP.71_1 Expanded Alternative, the stop signs on Haight Street would be removed at its intersections with Laguna, Webster, Pierce, Scott and Shrader streets. Bicycle travel on Haight Street, similar to motor vehicle traffic would experience less delay eastbound/westbound, but traffic on the intersecting streets may experience some additional delay, as they would be required to stop and wait for a break in the Haight Street traffic to proceed. As discussed above under Traffic, due to anticipated traffic and bicycle volumes, this would not be considered a significant change to operating conditions. Implementation of the TTRP.71_1 Expanded Alternative improvements along the TTRP.71_1 corridor would not affect the travel lanes, and conditions for bicyclists would be similar to Existing conditions. Therefore, similar to the TTRP.71_1 Moderate Alternative, the impact of the TTRP.71_1 Expanded Alternative on bicycle facilities and operation would be less than significant.

- In summary, the impact of the TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, TTRP.9 Expanded Alternative, TTRP.14 Expanded Alternative, TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, TTRP.22_1 Expanded Alternative Variant 2, TTRP.28_1 Expanded Alternative, TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, TTRP.30_1 Expanded Alternative Variant 2, or TTRP.71_1 Expanded Alternative on pedestrians and bicycle facilities and operation would be less than significant.

Commercial Loading Impacts

Impact TR-46: Implementation of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, or TTRP.71_1 would not result in significant loading impacts. (Less than Significant)

Implementation of the project-level TTRP.J Moderate Alternative, TTRP.L Moderate Alternative, TTRP.N Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.9 Moderate Alternative, TTRP.22_1 Moderate Alternative, TTRP.28_1 Moderate Alternative, or TTRP.71_1 Moderate Alternative would not result in an increase in loading demand nor result in a reduction in the number of on-street commercial loading spaces in the vicinity of any of the affected TTRP corridors. The impact of each of the TTRP Moderate Alternative proposals listed in Impact TR-46 with respect to commercial loading spaces and passenger loading/unloading zones is presented below.

TTRP.J Moderate Alternative – Implementation of the TTRP.J Moderate Alternative would not change the number or location of existing on-street commercial loading spaces or passenger loading/unloading zones.

TTRP.L Moderate Alternative – The TTRP.L Moderate Alternative improvements related to transit boarding islands and stop optimization would include the relocation of two commercial loading spaces from Taraval Street (i.e., one east of 19th Avenue and one west of 26th Avenue) to new locations within 250 feet of their existing locations. Therefore, there would be no net reduction in the number of commercial loading spaces, and commercial loading activities would not change substantially from Existing conditions. The TTRP.L Moderate Alternative would also affect two passenger loading/unloading zones on Taraval Street that would be relocated to the adjacent side streets on 18th and on 30th avenues, and therefore, passenger loading/unloading activities on Taraval Street would not substantially change from Existing conditions.

TTRP.N Moderate Alternative – As part of the TTRP.N Moderate Alternative improvement to install inbound and outbound transit bulbs at the intersection of Irving Street/Ninth Avenue, two on-street commercial loading spaces would be relocated from the west side of Ninth Avenue south of the existing bus zone to the south side of Irving Street between Ninth and

Tenth avenues, and therefore the number and general location of commercial loading spaces would not change.

TTRP.5 Moderate Alternative – As part of the TTRP.5 Moderate Alternative, the installation of a right-turn pocket in the eastbound direction at the intersection of McAllister Street/Van Ness Avenue would require that three on-street commercial loading spaces on McAllister Street near the intersection of McAllister Street/Van Ness Avenue be relocated to the west on McAllister Street between Van Ness Avenue and Gough Street. Implementation of transit bulbs on McAllister Street would require shifting an existing passenger loading/unloading zone on McAllister Street at Larkin Street to the west; however, passenger loading/unloading activities at this location would not substantially change from Existing conditions.

TTRP.8X Moderate Alternative – As part of the TTRP.8X Moderate Alternative improvements to extend bus zones and optimize bus stops, six on-street commercial loading spaces along San Bruno Avenue at Silver Avenue, Felton Street, Bacon Street, and Paul Avenue/Dwight Street would be relocated either adjacent to their current location or on the same block, and two on-street commercial loading spaces on Geneva Avenue at the intersection of Geneva Avenue/Mission Street would be relocated across the street, which may require some goods to be carted slightly longer distances. The curbside transit-only lanes on Geneva Avenue between Delano and San Jose avenues would be established by removing the existing passenger loading/unloading zone and narrowing the painted median, and the elimination of parking spaces would be primarily on San Bruno Avenue and Visitacion Avenue to facilitate bus turning maneuvers on San Bruno Avenue, and as part of the implementation of transit bulbs. Passenger loading/unloading zones provide a place to load and unload passengers for adjacent businesses and residences and are intended as a convenience for passengers for quick drop-off and pick-up. Passenger loading/unloading zones are annual permits managed by the SFMTA. The loss of passenger loading/unloading zones anywhere in the City may be an inconvenience, and passengers may need to walk further to access their destination; however, these circumstances would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles and would not be considered a significant impact.

- **TTRP.9 Moderate Alternative** – The TTRP.9 Moderate Alternative improvements related to transit bulbs would require the relocation of two commercial loading spaces on 11th Street to new locations within 250 feet of their existing locations; therefore, there would be no net reduction in the number of commercial loading spaces as a result of TTRP.9 Moderate Alternative, and commercial loading activities would not change substantially from Existing conditions. The TTRP.9 Moderate Alternative would not affect any passenger loading/unloading zones within the corridor.

TTRP.22_1 Moderate Alternative – As part of the TTRP.22_1 Moderate Alternative improvements, the installation of a transit bulb on 16th Street at Wisconsin Street would require shifting two commercial loading spaces to the east, thereby displacing about two existing general parking spaces. The TTRP.22_1 Moderate Alternative would not affect any passenger loading/unloading zones along the TTRP.22_1 corridor.

TTRP.28_1 Moderate Alternative – As part of TTRP.28_1 Moderate Alternative, the addition of a bus zone on 19th Avenue at Judah Street would require shifting an existing passenger loading/unloading zone on northbound 19th Avenue northerly about 60 feet north of its current position. Therefore, passenger loading/unloading activities at this location would not substantially change from Existing conditions.

- **TTRP.71_1 Moderate Alternative** – The TTRP.71_1 Moderate Alternative improvements related to transit bulbs, pedestrian bulbs, turn pockets, and stop optimization would include the relocation of 15 commercial loading spaces on Haight Street (i.e., in the vicinity of Stanyan, Cole, Clayton, Masonic and Fillmore streets) to within 250 feet of their existing locations. Therefore, there would be no net reduction in the number of loading spaces as a result of TTRP.71_1 Moderate Alternative, and commercial loading activities would not change substantially from Existing conditions. The TTRP.71_1 Moderate Alternative would also affect one passenger loading/unloading zone on Haight Street at Masonic Avenue that would be relocated approximately 125 feet to the west. Therefore, passenger loading/unloading activities on Haight Street would not substantially change from Existing conditions.

- Because implementation of the TTRP.J Moderate Alternative, TTRP.L Moderate Alternative, TTRP.N Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.9 Moderate Alternative, TTRP.22_1 Moderate Alternative, TTRP.28_1 Moderate Alternative, or TTRP.71_1 Moderate Alternative would not result in a reduction in the on-street loading supply on individual blocks, the impact on loading would be less than significant.

- **Impact TR-47: Implementation of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1, or TTRP.71_1 would not result in significant loading impacts. (Less than Significant)**

- Implementation of the TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, TTRP.9 Expanded Alternative, TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, TTRP.22_1 Expanded Alternative Variant 2, TTRP.28_1 Expanded Alternative, or TTRP.71_1 Expanded Alternative would not result in an increase in loading demand, or result in a reduction in the number of on-street commercial loading spaces in the vicinity of the TTRP corridors described above. The impact of each TTRP Expanded Alternative project with respect to commercial loading spaces and passenger loading/unloading zones is presented below.

  TTRP.J Expanded Alternative – Implementation of the TTRP.J Expanded Alternative would not alter the number or location of existing on-street commercial loading spaces or passenger loading/unloading zones.

- **TTRP.L Expanded Alternative** – The TTRP.L Expanded Alternative improvements related to transit boarding islands and stop optimization would include the relocation of three commercial loading spaces from Taraval Street (i.e., one east of 19th Avenue and two east of 26th Avenue) to within 250 feet of their existing locations. Therefore, there would be no net reduction in the number of commercial loading spaces as a result of TTRP.L Expanded Alternative, and commercial loading activities would not change substantially from Existing conditions. The TTRP.L Expanded Alternative would also affect one passenger loading/unloading zone on Taraval Street that would be relocated to the adjacent side street on 18th Avenue, and therefore, passenger loading/unloading activities on Taraval Street would not substantially change from Existing conditions.

  TTRP.N Expanded Alternative – Similar to the TTRP.N Moderate Alternative, as part of the TTRP.N Expanded Alternative the proposed inbound and outbound transit bulbs at the intersection of Irving Street/Ninth Avenue would require relocation of two on-street commercial loading spaces on the west side of Ninth Avenue south of the existing bus zone to the south side of Irving Street between Ninth and Tenth avenues. Implementation of a pedestrian bulb on Judah Street west of Funston Avenue would require shifting a passenger loading/unloading zone at 850 Judah Street about 20 feet to the west.

  TTRP.5 Expanded Alternative – As part of the TTRP.5 Expanded Alternative, the installation of a right-turn pocket in the eastbound direction at the intersection of McAllister Street/Van Ness Avenue would require that three on-street commercial loading spaces on McAllister Street near the intersection of McAllister Street/Van Ness Avenue be relocated further to the west on McAllister Street between Van Ness Avenue and Gough Street. Similar to the TTRP.5 Moderate Alternative, implementation of transit bulbs on McAllister Street as part of the TTRP.5 Expanded Alternative would require shifting an existing passenger loading/unloading zone on McAllister Street at Larkin Street to the west; however, passenger loading/unloading activities at this location would not substantially change from Existing conditions.

TTRP.8X Expanded Alternative – As part of the TTRP.8X Expanded Alternative improvements, five on-street commercial loading spaces along San Bruno Avenue at Silver Avenue, Felton Street, Bacon Street, and Paul Avenue/Dwight Street would be relocated adjacent to their current location. As with the TTRP.8X Moderate Alternative, the curbside transit-only lanes on Geneva Avenue between Delano and San Jose avenues as part of the TTRP.8X Expanded Alternative would be established by removing the existing passenger loading/unloading zone and narrowing the painted median, and, as discussed below, the elimination of parking spaces would be primarily on San Bruno and Visitacion avenues to facilitate bus turning maneuvers on San Bruno Avenue and as part of implementation of transit bulbs. Passenger loading/unloading zones provide a place to load and unload passengers for adjacent businesses and residences and are intended as a convenience for passengers for quick drop-off and pick-up. Passenger loading/unloading zones are annual permits managed by the SFMTA. The loss of passenger loading/unloading zones anywhere in the City may be an inconvenience, and passengers may need to walk further to access their destination; however, these circumstances would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles and would not be considered a significant impact.

- **TTRP.9 Expanded Alternative** – The installation of transit bulbs for the TTRP.9 Expanded Alternative improvements would require the relocation of two commercial loading spaces on 11^{th} Street to within 250 feet of their existing locations; therefore there would be no net reduction in the number of commercial loading spaces as a result of TTRP.9 Expanded Alternative, and commercial loading activities would not change substantially from Existing conditions. The TTRP.9 Expanded Alternative would not affect any passenger loading/unloading zones within the corridor.

TTRP.22_1 Expanded Alternative – As part of the TTRP.22_1 Expanded Alternative, implementation of transit islands, pedestrian bulbs, sidewalk extensions, and the transit-only lane would require relocation of 27 commercial loading spaces on 16th Street at Wisconsin Street, at Kansas Street, and at Potrero Avenue to the east of their existing location (along 16th Street) or to commercial loading bays on the north side of the street that would be recessed into the widened sidewalk (for example, between Wisconsin and Arkansas streets). Relocation of the commercial loading spaces would require adjustment on the part of business owners and delivery drivers as to the location of the commercial loading spaces, and may also require some goods to be carted slightly longer distances. However, because the commercial loading spaces would be located within an acceptable distance of their former location, and are not anticipated to create potentially hazardous conditions or significant delays affecting traffic, transit, bicycles, or pedestrians, loading activities would not be substantially affected and would be less than significant. In addition, the TTRP.22_1 Expanded Alternative would not affect any passenger loading/unloading zones.

TTRP.22_1 Expanded Alternative Variant 1 – As part of the TTRP.22_1 Expanded Alternative Variant 1, the peak period tow-away regulations required to implement the transit-only lanes between Bryant and Church streets would temporarily (during peak periods) restrict access to the on-street commercial loading spaces on 16th Street between Bryant and Church streets. However, these spaces would be available for commercial loading activities during the non-peak hours, and additional commercial loading spaces would be provided on the adjacent side streets (i.e., to Capp, Julian, Hoff, and Albion streets) within 250 feet of their existing locations. Implementation of TTRP.22_1 Expanded Alternative Variant 1 would affect six passenger loading/unloading zones on 16th Street between Bryant and Church streets that could not be relocated in the nearby vicinity. Passenger loading/unloading zones supporting residences and businesses would require a permit from the SFMTA; these permits require annual renewals. The loss of passenger loading/unloading zones anywhere in the City may be an inconvenience but would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles, and would therefore, not be considered a significant impact.

TTRP.22_1 Expanded Alternative Variant 2 – The TTRP.22_1 Expanded Alternative Variant 2 which would maintain the parking lane between Bryant and Church streets at all times (i.e., this TTRP variant would provide one mixed-flow lane and a parking lane in each direction, plus a 24-hour westbound side-running transit-only lane), would not affect the on-street loading supply). Therefore, similar to the TTRP.22_1 Expanded Alternative, the TTRP.22_1 Expanded Alternative Variant 2 would not result in a change in the number of the commercial loading spaces between Bryant and Church streets. Between Bryant and Third Street, impacts of TTRP.22_1 Expanded Alternative Variant 1 would be the same as those described above for the TTRP.22_1 Expanded Alternative. Implementation of transit islands, pedestrian bulbs, sidewalk extensions, and the transit-only lane on 16th Street between Bryant and Third streets would require relocation of 27 commercial loading spaces on 16th Street. Similar to the TTRP.22_1 Expanded Alternative, the TTRP.22_1 Expanded Alternative Variant 2 would not affect any passenger loading/unloading zones along the TTRP.22_1 corridor.

TTRP.28_1 Expanded Alternative – There are no commercial loading spaces along the TTRP.28_1 corridor on 19th Avenue, and therefore, on-street commercial loading supply would not be affected. Similar to the TTRP.28_1 Moderate Alternative, implementation of a bus zone on northbound 19th Avenue at Judah Street would require shifting an existing passenger loading/unloading zone on 19th Avenue northerly about 60 feet north of its current position; therefore, passenger loading/unloading activities at this location would not substantially change from Existing conditions.

- **TTRP.71_1 Expanded Alternative** – The TTRP.71_1 Expanded Alternative improvements related to transit bulbs, pedestrian bulbs, turn pockets, and stop optimization would require the relocation of up to 15 commercial loading spaces on Haight Street (i.e., at Stanyan, Cole, Clayton, and Fillmore streets and Masonic Avenue) to within 250 feet of their existing locations; therefore, there would be no net reduction in the number of loading spaces as a result of TTRP.71_1 Expanded Alternative, and commercial loading activities would not change substantially from Existing conditions. The TTRP.71_1 Expanded Alternative would also affect one passenger loading/unloading zone on Haight Street at Masonic Avenue that would be relocated to the west, and therefore, passenger loading/unloading activities on Haight Street would not substantially change from Existing conditions.

- Because implementation of the TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, TTRP.9 Expanded Alternative, TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, TTRP.22_1 Expanded Alternative Variant 2, TTRP.28_1 Expanded Alternative, or TTRP.71_1 Expanded Alternative, would not result in a reduction in the on-street loading supply within 250 feet of removed spaces, the impact on loading from these TTRP Expanded Alternative proposals would be less than significant.

Impact TR-48: Implementation of project-level TTRP.14 Moderate Alternative Variant 1 would result in a reduction in on-street commercial loading supply on Mission Street such that the existing loading demand during the peak hour of loading activities could not be accommodated within on-street loading supply and may create a potentially hazardous condition or significant delay that may affect traffic, transit, bicycles, or pedestrians. (Significant and Unavoidable with Mitigation)

The TTRP.14 Moderate Alternative Variant 1 would not result in an increase in loading demand. Overall, implementation of TTRP.14 Moderate Alternative Variant 1 would eliminate up to 179 commercial loading spaces. Of the 179 commercial loading spaces that would be eliminated, 146 spaces would be relocated to within 250 feet of their original location, and therefore, TTRP.14 Moderate Alternative Variant 1 would result in a net loss of 33 commercial loading spaces. Relocation of the 146 commercial loading spaces would require adjustment on the part of business owners and delivery drivers as to the location of the loading spaces and may also require some goods to be carted slightly longer distances. Because Mission Street is an active commercial street, a net loss of multiple commercial loading spaces could reduce the overall loading supply such that loading activities could not be accommodated within convenient on-street loading zones. Furthermore, the loss of a substantial number of commercial loading spaces could result in double-parking within the transit-only lane. The distribution of changes in the number of commercial loading spaces by route segment is as follows:

- The TTRP.14 Moderate Alternative Variant 1 would eliminate 52 commercial loading spaces on the route segment on Mission Street between Beale and Tenth streets between the hours of 7 a.m. and 7 p.m. All of these commercial loading zones are currently subject to p.m. peak tow-away restrictions, and 30 of these loading zones are also subject to a.m. peak tow away restrictions. Of these, 40 spaces would be relocated to within 250 feet of their location. Therefore, there would be a net loss of 12 commercial loading spaces within this route segment between 7 a.m. and 7 p.m.

- For the segment on Mission Street between 13th and Cesar Chavez streets, the TTRP.14 Moderate Alternative Variant 1 improvements related to transit-only lanes (which include peak period tow-away zones for the parking lanes on both sides of Mission Street from 13th to Cesar Chavez Street) would eliminate 86 commercial loading spaces between 7 a.m. and 7 p.m., of which 77 spaces would be relocated to within 250 feet of their original location, resulting in a net loss of nine commercial loading spaces within this route segment.

- For the segment on Mission Street south of Cesar Chavez Street, the TTRP.14 Moderate Alternative Variant 1 would eliminate 41 commercial loading spaces during the a.m. or p.m. peak period (only removed in the peak direction during the peak period), of which 29 would be relocated to within 250 feet of their original location and therefore result in a net loss of 12 commercial loading spaces within this route segment.

The net-loss of 33 commercial loading spaces would be considered a significant loading impact on this corridor, which already experiences double-parking and some interference with vehicular, transit, and bicycle travel. As part of the design of the TTRP.14 Moderate Alternative Variant 1, the SFMTA investigated all options available for relocation of these 33 commercial loading spaces to within 250 feet of their existing location and did not find any feasible locations. Therefore, there are no additional feasible mitigation measures related to relocation of commercial loading spaces available to reduce potential impacts to a less-than-significant level.

Mitigation Measure M-TR-48: Enforcement of Parking Violations

On streets where implementation of project-level TTRPs would result in a net reduction of on-street commercial loading spaces, the SFMTA shall enforce parking regulations in transit-only lanes through the use of video cameras on transit vehicles and/ or other parking enforcement activities.

With implementation of Mitigation Measure M-TR-48: Enforcement of Parking Violations, the impacts related to loss of commercial loading spaces on transit and traffic operations would be reduced. Mitigation Measure M-TR-48 would, through enforcement, maintain unimpeded traffic and transit flow along the corridor and would not result in new secondary impacts on the transportation network. However, because the effectiveness of the use of camera video enforcement on the new transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, and because there would be a net loss of 33 commercial loading spaces on this corridor that could not be replaced, project-related impacts related to loading would remain significant and unavoidable.

Implementation of TTRP.14 Moderate Alternative Variant 1 would affect 20 passenger loading/unloading zones along the Mission Street corridor, of which six zones would be relocated in the nearby vicinity, resulting in a net loss of 14 zones. Passenger loading/unloading zones provide a place to load and unload passengers for adjacent businesses and residences and are intended as a convenience for passengers for quick drop-off and pick-up. Passenger loading/unloading zones are annual permits managed by the SFMTA. The loss of passenger loading/unloading zones anywhere in the City may be an inconvenience, and passengers may need to walk further to access their destination. However, these circumstances would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles, and would not be considered a significant impact.

Because the implementation of TTRP.14 Alternative Variant 1 would result in a net loss of up to 33 commercial loading spaces along Mission Street, which has existing double parking hazards related to trucks, that cannot be accommodated within 250 feet of their existing location, and because the feasibility of Mitigation Measure M-TR-48 is uncertain, the impact of the TTRP.14 Alternative Variant 1 on loading would be significant and unavoidable with mitigation.

Impact TR-49: Implementation of project-level TTRP.14 Moderate Alternative Variant 2 would result in a reduction in on-street commercial loading supply on Mission Street such that the existing loading demand during the peak hour of loading activities could not be accommodated within on-street loading supply and may create a potentially hazardous condition or significant delay that may affect traffic, transit, bicycles, or pedestrians. (Significant and Unavoidable with Mitigation)

Implementation of TTRP.14 Moderate Alternative Variant 2 would not result in an increase in loading demand. Overall, implementation of TTRP.14 Moderate Alternative Variant 2 would eliminate up to 130 commercial loading spaces. Of the 130 commercial loading spaces that would be eliminated, 103 spaces would be relocated to within 250 feet of their original location, and therefore, TTRP.14 Moderate Alternative Variant 2 result in a net loss of up to 27 commercial loading spaces. Relocation of the 103 commercial loading spaces would require adjustment on the part of business owners and delivery drivers as to the location of the loading spaces and may also require some goods to be carted slightly longer distances. However, because Mission Street is an active commercial street, a net loss of multiple commercial loading spaces could reduce the overall loading supply such that loading activities could not be accommodated within convenient on-street loading zones. Furthermore, the loss of commercial loading spaces could result in double-parking within the transit-only lane, and double-parked vehicles would result in increased interference with vehicular and bicycle travel. The distribution of changes in the number of commercial loading spaces by route segment is as follows:

- The TTRP.14 Moderate Alternative Variant 2 would eliminate 52 commercial loading spaces on the route segment on Mission Street between Beale and Tenth streets between the hours of 7 a.m. and 7 p.m. All of these commercial loading zones are currently subject to p.m. peak tow-away restrictions, and 30 of these loading zones are also subject to a.m. peak tow away restrictions. Of these, 40 spaces would be relocated to within 250 feet of their location; therefore, there would be a net loss of 12 commercial loading spaces within this route segment between 7 a.m. and 7 p.m.

- For the segment on Mission Street between 13th and Cesar Chavez streets, the TTRP.14 Moderate Alternative Variant 2 would permanently remove parking from one side of Mission Street from 14th to Cesar Chavez streets (the parking lane removal would alternate between sides of Mission Street every two blocks from 14th Street to Cesar Chavez Street). The TTRP.14 Moderate Alternative Variant 2 would eliminate 37 commercial loading spaces. Of these, 34 spaces would be relocated to within 250 feet of their location. Therefore, there would be a net loss of three commercial loading spaces under the TTRP.14 Moderate Alternative Variant 2 within this route segment.

- For the segment on Mission Street south of Cesar Chavez Street, the TTRP.14 Moderate Alternative Variant 2 would be the same as the TTRP.14 Moderate Alternative Variant 1, and would eliminate 41 commercial loading spaces during the a.m. or p.m. peak period (only removed in the peak direction during the peak period), of which 29 would be relocated to within 250 feet of their original location and therefore result in a net loss of 12 commercial loading spaces within this route segment.

The net-loss of up to 27 commercial loading spaces would be considered a significant impact on this corridor, which already experiences double-parking and some interference with vehicular and bicycle travel. With implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, the impacts related to loss of commercial loading spaces on transit and traffic operations would be reduced. However, because the effectiveness of the use of camera video enforcement on the new transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, and because there would be a net loss of up to 27 commercial loading spaces that could not be replaced, project-related impacts related to loading would remain significant and unavoidable.

Similar to TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2 would affect 20 passenger loading/unloading zones along the Mission Street corridor, of which six zones would be relocated in the nearby vicinity. The loss of 14 passenger loading/unloading zones along Mission Street may be an inconvenience and passengers may need to walk further to access their destination, however, as described above in Impact TR-48, these circumstances would not create potentially hazardous conditions or result in significant delays to traffic, transit, pedestrians, or bicycles.

Because implementation of TTRP.14 Moderate Alternative Variant 2 would result in a net loss of up to 27 commercial loading spaces along the Mission Street corridor that cannot be accommodated within 250 feet of their existing location, and because the feasibility of Mitigation Measure M-TR-48 is uncertain, the impact of the TTRP.14 Moderate Alternative Variant 2 on loading would be significant and unavoidable even with mitigation.

Impact TR-50: Implementation of project-level TTRP.14 Expanded Alternative would result in a reduction in on-street commercial loading supply on Mission Street such that the existing loading demand during the peak hour of loading activities could not be accommodated within on-street loading supply and may create a potentially hazardous condition or significant delay that may affect traffic, transit, bicycles, or pedestrians. (Significant and Unavoidable with Mitigation)

Implementation of the TTRP.14 Expanded Alternative would not result in an increase in loading demand. Overall, implementation of the TTRP.14 Expanded Alternative would eliminate up to 46 commercial loading spaces. Of the 46 commercial loading spaces that would be eliminated, 35 spaces would be relocated to within 250 feet of their original location and therefore, the TTRP.14 Expanded Alternative would result in a net loss of 11 loading spaces. Because the TTRP.14 Expanded Alternative would include converting a mixed-flow lane into a transit-only lane and would not involve the removal of on-street parking on the segments south of 13th Street, only commercial loading spaces between Beale and Tenth Streets would be affected. Relocation of the 35 commercial loading spaces would require adjustment on the part of business owners and delivery drivers as to the location of the spaces and may also require some goods to be carted slightly longer distances. Since these commercial loading spaces would be located within an acceptable distance of their former location, loading activities would not be substantially affected. However, because Mission Street is an active commercial street, a net loss of multiple commercial loading spaces could reduce the overall loading supply such that loading activities could not be accommodated within convenient on-street loading zones. Furthermore, the loss of commercial loading spaces could result in double-parking within the transit-only lane and double-parked vehicles would result in increased interference with vehicular and bicycle travel.

The net-loss of 11 commercial loading spaces along Mission Street would be considered a significant impact on this corridor. As part of the design of the TTRP.14 Expanded Alternative, the SFMTA investigated all options available for relocation of these 11 commercial loading spaces to within 250 feet of their existing location and did not find suitable options for relocation; therefore, there are no feasible mitigation measures related to relocation to reduce potential impacts to a less-than-significant level. With implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, the impacts related to loss of commercial loading spaces on transit and traffic operations would be reduced. However, because the effectiveness of the use of camera video enforcement on the new transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, project-related impacts related to loading would remain significant and unavoidable.

Implementation of the TTRP.14 Expanded Alternative would affect 12 passenger loading/unloading zones along the TTRP.14 Mission Street corridor, five of which would be relocated in the nearby vicinity. As described earlier in Impact TR-48, passenger loading/unloading zones to support residences and businesses require a permit from the

SFMTA, and these permits require annual renewals. The loss of seven passenger loading/unloading zones along Mission Street may be an inconvenience, and would require passengers to walk further to their destination, but would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles.

Because implementation of the TTRP.14 Expanded Alternative would result in a net loss of 11 commercial loading spaces along Mission Street along the TTRP.14 corridor that cannot be accommodated within 250 feet of their existing location, and because the feasibility of Mitigation Measure M-TR-48 is uncertain, the impact of the TTRP.14 Expanded Alternative on loading would be significant and unavoidable even with mitigation.

Impact TR-51: Implementation of project-level TTRP.30_1 Moderate Alternative would result in a reduction in on-street commercial loading supply on Stockton Street such that the existing loading demand during the peak hour of loading activities could not be accommodated within on-street loading supply and may create a potentially hazardous condition or significant delay that may affect traffic, transit, bicycles, or pedestrians. (Significant and Unavoidable with Mitigation)

Implementation of the TTRP.30_1 Moderate Alternative would not result in an increase in loading demand. The TTRP.30_1 Moderate Alternative improvements related to transit bulbs and stop optimization would eliminate 16 commercial loading spaces on North Point and Stockton streets; however, 10 spaces on North Point and Stockton streets would be relocated within an acceptable distance of the existing locations within the corridor, for a net loss of six commercial loading spaces on Stockton Street. Relocation of the loading spaces would require adjustment on the part of business owners and delivery drivers as to the location of the loading spaces and may also require some goods to be carted slightly longer distances. Because these commercial loading spaces would be located within an acceptable distance of their existing locations, loading activities for those spaces would not be substantially affected. However, because Stockton Street is an active commercial street, a net loss of multiple commercial loading spaces could reduce the overall loading supply such that loading activities could not be accommodated within convenient on-street loading zones. The loss of loading zones could result in double-parking within the transit-only lane and double-parked vehicles would result in increased interference with vehicular and bicycle travel. Therefore, the net loss of six commercial loading spaces on Stockton Street along the TTRP.30_1 corridor would be considered a significant impact. As part of the design of the TTRP.30_1 Moderate Alternative, the SFMTA investigated all options available for relocation of these six loading spaces to within 250 feet of their existing location and did not find suitable options for relocation; therefore, there are no feasible mitigation measures related to relocation to reduce potential impacts to a less-than-significant level. With implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, the impacts related to loss of commercial loading spaces on transit and traffic operations would be reduced. However, because the effectiveness of the use of camera video enforcement on the new

- transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, project-related impacts of the TTRP.30_1 Moderate Alternative related to commercial loading on Stockton Street would remain significant and unavoidable.

Bus stop optimization at the intersection of North Point/Hyde streets would require relocating or shifting an existing dual commercial vehicle/passenger loading/unloading zone on North Point Street. One of three options for relocation would be implemented (relocate to Hyde Street, relocate about 50 feet west of current location, or split the zone into two with zones on Hyde Street and to the west of current location). Therefore, passenger loading/unloading activities at this location would not substantially change from Existing conditions.

Because implementation of the TTRP.30_1 Moderate Alternative would result in a net loss of six loading spaces along Stockton Street, which has existing double parking issues related to trucks, that cannot be accommodated within 250 feet of their existing location, the impact of the TTRP.30_1 Moderate Alternative on commercial loading on Stockton Street along the TTRP.30_1 corridor would be significant and unavoidable even with mitigation.

Impact TR-52: Implementation of project-level TTRP.30_1 Expanded Alternative would result in a reduction in on-street commercial loading supply on Stockton Street such that the existing loading demand during the peak hour of loading activities could not be accommodated within on-street loading supply and may create a potentially hazardous condition or significant delay that may affect traffic, transit, bicycles, or pedestrians. (Significant and Unavoidable with Mitigation)

Implementation of the TTRP.30_1 Expanded Alternative improvements related to transit bulbs, stop optimizations, and lane modifications would not result in an increase in loading demand. Similar to TTRP.30_1 Moderate Alternative, the TTRP.30_1 Expanded Alternative improvements related to transit bulbs and stop optimization would eliminate 16 commercial loading spaces on North Point and Stockton streets; however, 10 spaces would be relocated within an acceptable distance of the existing spaces within the corridor, for a net loss of six commercial loading spaces on Stockton Street. Relocation of the commercial loading spaces would require adjustment on the part of business owners and delivery drivers as to the location of the commercial loading spaces and may also require some goods to be carted slightly longer distances. Since these commercial loading spaces would be located within an acceptable distance of their former location, loading activities for those spaces would not be substantially affected. However, because Stockton Street is an active commercial street, a net loss of multiple commercial loading spaces could reduce the overall loading supply such that loading activities could not be accommodated within convenient on-street loading zones and the loss of loading zones could result in double-parking within the transit-only lane with double-parked vehicles interfering with and delaying vehicular (including transit) and bicycle travel. Therefore, the net-loss of six commercial loading spaces on Stockton Street along the TTRP.30_1 corridor would be considered a significant impact.

As part of the design of the TTRP.30_1 Expanded Alternative, SFMTA investigated all options available for relocation of these six commercial loading spaces to within 250 feet of their existing location, and did not find suitable options for relocation. Therefore, there are no feasible mitigation measures related to relocation available to reduce potential impacts to a less-than-significant level. With implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, the impacts related to loss of commercial loading spaces on transit and traffic operations would be reduced. However, because the effectiveness of the use of camera video enforcement on the new transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, project-related impacts of the TTRP.30_1 Expanded Alternative related to loading would remain significant and unavoidable.

Bus stop optimization at the intersection of North Point/Hyde streets would require relocating an existing dual commercial vehicle/passenger loading/unloading zone on North Point Street. One of three options for relocation would be implemented (relocate to Hyde Street, relocate about 50 feet west of current location, or split zone into two with zones on Hyde Street and to the west of current location); therefore, passenger loading/unloading activities on North Point Street at this location would not substantially change from Existing conditions.

Because implementation of TTRP.30_1 Expanded Alternative would result in a net loss of six commercial loading spaces along Stockton Street that cannot be accommodated within 250 feet of their existing location, the impact of the TTRP.30_1 Expanded Alternative on commercial loading on Stockton Street along the TTRP.30_1 corridor would be significant and unavoidable even with mitigation.

Impact TR-53: Implementation of project-level TTRP.30_1 Expanded Alternative Variant 1 would result in a reduction in on-street commercial loading supply on Stockton Street such that the existing loading demand during the peak hour of loading activities could not be accommodated within on-street loading supply and may create a potentially hazardous condition or significant delay that may affect traffic, transit, bicycles, or pedestrians. (Significant and Unavoidable with Mitigation)

Implementation of TTRP.30_1 Expanded Alternative Variant 1 would be similar to TTRP.30_1 Moderate Alternative described in Impact TR-51 above. Because implementation of TTRP.30_1 Expanded Alternative Variant 1 would result in a net loss of six commercial loading spaces along Stockton Street that cannot be accommodated within 250 feet of their existing location, the impact of the TTRP.30_1 Expanded Alternative Variant 1 on commercial loading would be significant and unavoidable. With implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, the impacts related to loss of commercial loading spaces on transit and traffic operations would be reduced. However, because the effectiveness of the use of camera video enforcement on the new transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, project-related impacts of the TTRP.30_1 Expanded Alternative Variant 1 related to commercial loading on Stockton Street along the TTRP.30_1 corridor would remain significant and unavoidable even with mitigation.

Impact TR-54: Implementation of project-level TTRP.30_1 Expanded Alternative Variant 2 would result in a reduction in on-street commercial loading supply on Stockton Street such that the existing loading demand during the peak hour of loading activities could not be accommodated within on-street loading supply and may create a potentially hazardous condition or significant delay that may affect traffic, transit, bicycles, or pedestrians. (Significant and Unavoidable with Mitigation)

Implementation of TTRP.30_1 Expanded Alternative Variant 2 would be similar to TTRP.30_1 Expanded Alternative and TTRP.30_1 Expanded Alternative Variant 1 described in Impacts TR-52 and TR-53 above, with the exception that on-street parking would also be removed from the east side of Stockton Street between Columbus Avenue and Broadway. TTRP.30_1 Expanded Alternative Variant 2 would eliminate 28 commercial loading spaces on North Point and Stockton streets; however, 20 commercial loading spaces would be relocated within an acceptable distance of the existing loading spaces within the corridor, for a net loss of eight commercial loading spaces on Stockton Street. Because implementation of TTRP.30_1 Expanded Alternative Variant 2 would result in a net loss of eight commercial loading spaces along Stockton Street that cannot be accommodated within 250 feet of their existing location, the impact of the TTRP.30_1 Expanded Alternative Variant 2 on loading would be significant and unavoidable. With implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, the impacts related to loss of commercial loading spaces on transit and traffic operations would be reduced. However, because the effectiveness of the use of camera video enforcement on the new transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, project-related impacts of the TTRP.30_1 Expanded Alternative Variant 2 related to commercial loading on Stockton Street along the TTRP.30_1 corridor would remain significant and unavoidable.

Emergency Vehicle Access Impacts

Impact TR-55: Implementation of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14 Variant 1, TTRP.14 Variant 2, TTRP.22_1, TTRP.28_1, TTRP.30_1, or TTRP.71_1 would not result in significant impacts on emergency vehicle access. (Less than Significant)

Implementation of the TTRP Moderate Alternative including the TTRP.J Moderate Alternative, TTRP.L Moderate Alternative, TTRP.N Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.9 Moderate Alternative, TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, TTRP.22_1 Moderate Alternative, TTRP.28_1 Moderate Alternative, TTRP.30_1 Moderate Alternative, or TTRP.71_1 Moderate Alternative would not change the ability of emergency service providers to travel along the corridors or access adjacent land uses.

Implementation of project-level TTRPs that convert mixed-flow lanes to transit-only lanes (for example, the TTRP.14 Moderate Alternative Variant 1) would increase overall intersection delay due to the reduction in capacity for mixed-flow vehicles. With implementation of transit-only lanes, emergency vehicle providers may adjust travel routes to respond to incidents; however, emergency vehicle access along the TTRP corridors would not be substantially affected. Emergency vehicles would be permitted full use of any transit-only lanes and would not be subject to turn restrictions. Widened mixed-flow lanes would facilitate emergency vehicle access for large fire and rescue vehicles. Furthermore, regardless of the number of travel lanes on a street or intersection control (for example, signalized, all-way stop controlled, two-way stop-controlled, or uncontrolled intersection), all drivers must comply with the California Vehicle Code § 21806, which requires that drivers yield right-of-way to authorized emergency vehicles, drive to the right road curb or edge, stop, and remain stopped until the emergency vehicle has passed. Therefore, implementation of the TTRP Moderate Alternative proposals, including those that would widen mixed-flow lanes through lane reductions and implementation of transit-only lanes, would not substantially affect emergency vehicle access.

Implementation of pedestrian bulbs would result in tighter turning radii at the corners, which could affect emergency vehicle turning ability, especially larger vehicles such as fire trucks. However, the pedestrian bulbs would be designed consistent with SFFD applicable standards and would be reviewed by the SFFD to make sure they meet those applicable standards. The design of median islands (for example, pedestrian refuge islands and transit boarding islands) and transit bulbs would also be reviewed to ensure that their design would meet emergency vehicle clearance requirements, particularly on the streets with one mixed-flow lane in each direction, such as McAllister Street. In addition to the preliminary review conducted by TASC, the SFFD, along with other City agencies, reviews the details of proposals that modify sidewalks as part of the sidewalk legislation process. In accordance with the DPW's Order No. 172,512, the San Francisco Board of Supervisors must approve changes to the City's sidewalks. As part of this approval, public agencies and private contractors submit necessary plans and information to the DPW Bureau of Street Use and Mapping (BSM), a division of the DPW, for review and approval. The BSM refers the plans to many City agencies, including the DPH, SFFD, the Port, and the SFPUC as well as outside utility companies, including PG&E and a number of telecommunications infrastructure providers. This review ensures that any potential safety issues, including emergency access, are resolved prior to permit issuance.

Under the TTRP.N Moderate Alternative, the installation of a transit boarding island that would extend through the closely spaced intersections of Judah Street with 36^{th} and 37^{th} avenues would require northbound and southbound right-turn only restrictions at 36^{th} and 37^{th} avenues. The island would be designed with a low profile "cut out" in the middle wide enough for emergency vehicles to continue through the intersection. This condition would be similar to the transit boarding island at the intersection of Judah Street/16th Avenue, where vehicles, except for emergency vehicles, are not permitted to continue through this intersection. The SFMTA would work with the SFFD regarding notification of right-turn only restrictions and the “cut out” design of the transit boarding island; therefore, emergency vehicle access in the vicinity of these intersections would not change over Existing conditions.

- Under the TTRP.9 Moderate Alternative, emergency vehicle (i.e., ambulances) access to the San Francisco General Hospital complex located east of Potrero Avenue would be maintained. Emergency vehicle access is currently from 23rd Street East, about one block east of Potrero Avenue, but in the future the emergency department will move to 22nd Street East.[62] Under TTRP.9 Moderate Alternative, the median (added as part of the Mission District Streetscape Plan Project) on Potrero Avenue would be extended through the 23rd Street West intersection, which would restrict the eastbound 23rd Street West approach at Potrero Avenue to right-turn-only (i.e., left turns onto Potrero Avenue northbound would no longer be possible with the extension of the median). Emergency vehicles traveling eastbound on 23rd Street West would be able to turn right onto Potrero Avenue southbound and make a left turn onto 23rd Street East to access the existing emergency vehicle access for the hospital. If accessing 22nd Street East, where the future emergency department will be located, emergency vehicles would likely use alternate streets such as 21st Street or 22nd Street West. The TTRP.9 Moderate Alternative would not change access from Potrero Avenue to either 22nd Street East or 23rd Street East and therefore, would not affect emergency vehicle access to the San Francisco General Hospital. In addition, similar to Existing conditions in the northbound direction, emergency vehicles would be permitted full use of the proposed southbound transit-only lane, which would have fewer vehicles in it than the adjacent mixed-flow travel lanes, and therefore, implementation of the southbound transit-only lane on Potrero Avenue between 18th and 22nd streets would not substantially affect emergency vehicle access.

Therefore, the impact of the TTRP Moderate Alternative including the TTRP.J Moderate

- Alternative, TTRP.L Moderate Alternative, TTRP.N Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.9 Moderate Alternative, TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, TTRP.22_1 Moderate Alternative, TTRP.28_1 Moderate Alternative, TTRP.30_1 Moderate Alternative, or TTRP.71_1 Moderate Alternative on emergency vehicle access would be less than significant.

- [62] The 24-acre San Francisco General Hospital campus is bounded to the west by Potrero Avenue, to the south by 23rd and 24th streets, to the east by Vermont Street and U.S. 101, and to the north by U.S. 101 and 20th Street. The Potrero Avenue and 23rd and 22nd street intersections have west and east approaches offset. Therefore, for the ease of discussion, 23rd Street West or 22nd Street West refers to the approaches to the west of Potrero Avenue, and 23rd Street East or 22nd Street East the approaches to the east.

Impact TR-56: Implementation of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, or TTRP.71_1 would not result in significant impacts on emergency vehicle access. (Less than Significant)

Implementation of the TTRP Expanded Alternative including the TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, TTRP.9 Expanded Alternative, TTRP.14 Expanded Alternative, TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, TTRP.22_1 Expanded Alternative Variant 2, TTRP.28_1 Expanded Alternative, TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, TTRP.30_1 Expanded Alternative Variant 2, or TTRP.71_1 Expanded Alternative would not change the ability of emergency service providers to travel along the corridors or access adjacent land uses.

Implementation of project-level TTRPs that convert mixed-flow travel lanes to transit-only lanes (for example, the TTRP.22 Expanded Alternative which would provide a center-running transit-only lane, plus one mixed-flow lane in each direction) would increase overall intersection delay due to reduction in capacity for mixed-flow vehicles. With implementation of transit-only lanes, emergency vehicle providers may adjust travel routes to respond to incidents; however, emergency vehicle access along the TTRP corridors would not be substantially affected. Emergency vehicles would be permitted full use of any transit-only lanes and would not be subject to turn restrictions. Widened travel lanes would facilitate emergency vehicle access for large fire and rescue vehicles. Furthermore, regardless of the number of travel lanes on a street or intersection control (for example, signalized, all-way stop controlled, two-way stop-controlled, or uncontrolled intersection), all drivers must comply with the California Vehicle Code § 21806, which requires that drivers yield right-of-way to authorized emergency vehicles and drive to the right road curb or edge, stop, and remain stopped until the emergency vehicle has passed. Therefore, implementation of the TTRP

Expanded Alternative proposals, including those that would widen travel lanes through lane reductions and implementation of transit-only lanes, would not substantially affect emergency vehicle access.

Implementation of pedestrian bulbs would result in tighter turning radii at the corners, which could affect emergency vehicle turning ability, especially larger vehicles such as fire trucks. However, the pedestrian bulbs would be designed consistent with SFFD applicable standards and would be reviewed by the SFFD to make sure they meet those applicable standards. The design of median islands (for example, pedestrian refuge islands and transit boarding islands) and transit bulbs would also be reviewed to ensure that their design would meet emergency vehicle clearance requirements, particularly on the streets with one travel lane in each direction, such as McAllister Street. In addition to the preliminary review conducted by TASC, the SFFD, along with other City agencies, reviews the details of proposals that modify sidewalks as part of the sidewalk legislation process. This review ensures that any potential safety issues, including emergency access, are resolved prior to permit issuance.

Similar to the TTRP.N Moderate Alternative, the installation of a transit boarding island that would extend through the closely spaced intersections of Judah Street with 36th and 37th avenues under the TTRP.N Expanded Alternative would require right-turn only restrictions in both the northbound and southbound directions at 36th and 37th avenues. As noted in Impact TR-55 above, the transit boarding island would be designed with a low profile “cut out” in the middle wide enough for emergency vehicles to continue through the intersection. The SFMTA would work with the SFFD regarding notification of right-turn only restrictions and the “cut out” design of the transit boarding island. Under the TTRP.L Expanded Alternative emergency vehicles would be able to travel north and south through the intersection of Taraval Street/42nd Avenue where a transit boarding island with a low profile “cut out” in the middle wide enough for emergency vehicles to continue through the intersection would be installed. Therefore, emergency vehicle access in the vicinity of these intersections would remain similar to Existing conditions.

Similar to the TTRP.9 Moderate Alternative, under TTRP.9 Expanded Alternative, the median (installed as part of the Mission District Streetscape Plan Project) on Potrero Avenue would be extended through the 23rd Street West intersection, which would restrict the eastbound 23rd Street West approach at Potrero Avenue to right-turn-only. Emergency vehicles traveling eastbound on 23rd Street West would be able to turn right onto Potrero Avenue southbound and make a left turn onto 23rd Street East to access the existing emergency vehicle access for the hospital. Emergency vehicles accessing 22nd Street East, where the future emergency department will be located (currently outpatient service access), would likely use alternate streets such as 21st Street or 22nd Street West. The TTRP.9 Expanded

Alternative would not change access from Potrero Avenue to either 22nd Street East or 23rd Street East and therefore, would not affect emergency vehicle access to the San Francisco General Hospital. In addition, similar to Existing conditions in the northbound direction, emergency vehicles would be permitted full use of the proposed southbound transit-only lane, which would have fewer vehicles in it than the adjacent mixed-flow travel lanes, and therefore, implementation of southbound transit-only lane on Potrero Avenue between 18th and 24th streets would not substantially affect emergency vehicle access. Emergency vehicle access would remain similar to Existing conditions.

The design of traffic circles (for example, TTRP.5 Expanded Alternative) would be reviewed by the SFFD to make sure that they meet all applicable standards and to ensure that emergency vehicle access is maintained. If needed, fire and rescue vehicles would be able to mount the traffic circle as they travel through the intersection.

Therefore, the impact of the TTRP Expanded Alternative including the TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, TTRP.9 Expanded Alternative, TTRP.14 Expanded Alternative, TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, TTRP.22_1 Expanded Alternative Variant 2, TTRP.28_1 Expanded Alternative, TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, TTRP.30_1 Expanded Alternative Variant 2, or TTRP.71_1 Expanded Alternative on emergency vehicle access would be less than significant.

Parking Impacts

Impact TR-57: Implementation of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14 Variant 1, TTRP.14 Variant 2, TTRP.22_1, TTRP.28_1, TTRP.30_1, or TTRP.71_1 would not result in a significant parking impact. (Less than Significant)

Parking conditions are not static, as parking supply and demand varies from day to day, from day to night, from month to month, etc. Hence, the availability of parking spaces (or lack thereof) is not a permanent physical condition, but changes over time as people change their modes and patterns of travel. While parking conditions change over time, a substantial deficit in parking caused by a project that creates hazardous conditions or significant delays to traffic, transit, bicycles or pedestrians could adversely affect the physical environment. Whether a deficit in parking creates such conditions will depend on the magnitude of the shortfall, availability of other on-street or off-street parking, and the ability of drivers to change travel patterns or switch to other travel modes. If a substantial deficit in parking caused by a project creates hazardous conditions or significant delays in travel, such a condition could also result in secondary physical environmental impacts (e.g., air quality or noise impacts caused by congestion), depending on the project and its setting.

For the TEP, the analysis of potential hazards or delays considered conditions such as: whether the parking loss would lead to additional traffic circling in the area that could result in vehicles consistently double parking in a bicycle lane or in mixed-flow/transit-only lanes, particularly when it is a one-lane roadway in each direction; whether vehicles would substantially increase instances of blocking the sidewalks and/or driveways in an attempt to locate parking; and whether vehicles could form a queue in a mixed-flow/transit-only lane in an attempt to enter off-street parking facilities.

The absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, induces many drivers to seek and find alternative parking facilities, shift to other modes of travel, or change their overall travel habits. Any such resulting shifts to transit service or other modes (walking and biking), would be in keeping with the City's *Transit First* Policy and numerous *San Francisco General Plan* Polices, including those in the Transportation Element. The City's *Transit First* Policy, established in the City's Charter Article 8A, § 8A.115, provides that "parking policies for areas well served by public transit shall be designed to encourage travel by public transportation and alternative transportation."

The transportation analysis accounts for potential secondary effects, such as cars circling and looking for a parking space in areas of limited parking supply, by assuming that all drivers would attempt to find parking at or near the project site and then seek parking farther away if convenient parking is unavailable. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to others who are aware of constrained parking conditions in a given area, and thus choose to reach their destination by other modes (i.e., walking, biking, transit, taxi). If this occurs, any secondary environmental impacts that may result from a shortfall of parking in the vicinity of the proposed project would be minor, and the traffic assignments used in the transportation analysis, as well as in the associated air quality, noise and pedestrian safety analyses, would reasonably address potential secondary effects.

- Implementation of the 11 TTRP Moderate Alternative proposals would not result in an increase in parking demand. The TTRP Moderate Alternative proposals would, in most cases, result in the elimination of on-street parking spaces along the TTRP corridors. Table 19A summarizes the changes in the on-street parking supply due to the project-level TTRP Moderate Alternative proposal, and indicates where on-street parking would be restricted due to new or expanded part-time tow-away regulations. Implementation of transit-only lanes through part-time peak period tow-away or permanent curbside parking restrictions would result in the greatest parking losses. In some locations, the parking demand that would be displaced due to part-time (for example, implementation of tow-away parking restrictions) and permanent loss of parking spaces could be accommodated on nearby streets, which would result in increased competition for other on-street, and potentially off-street, parking supply. If replacement parking cannot be provided or accommodated on nearby streets (if existing parking demand is high) the reduction in parking supply could result in parking shortfalls and be considered substantial. However, as indicated above, the affected project-related areas would be well served by transit, particularly because the TEP is proposing improvements on the Rapid Network corridors, as well as by other modes, presenting the opportunity for drivers to change travel patterns or switch to other travel modes. At some locations, drivers would have to circle in search of parking or walk further between the parking space and destination, or switch to transit or other modes. A decrease in the on-street parking supply would be considered an inconvenience, but would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles, such as consistently blocking sidewalks, mixed-use lanes, transit or bicycle lanes or forming persistent queues to off-street parking facilities. Hence, the TTRP Moderate Alternative's impact related to parking would be less than significant.

Table 19A: Change in On-Street Parking Supply for TTRP Moderate Alternative for Project-Level TTRPs

	Removed (24 hours)[1]	Removed (part-time)[2]	Added (24 hours)[3]	Net Change (24 hours)
TTRP.J Moderate	30	0	10	-20
● TTRP.L Moderate	90	0	15	-75
● TTRP.N Moderate	130	0	5	-125
● TTRP.5 Moderate	170	20	90	-80
TTRP.8X Moderate	140	0	50	-90
● TTRP.9 Moderate	100	0	70	-30
TTRP.14 Moderate with Variant 1				
● North of 13th Street/Duboce	20	360[4]	10	-10
● 13th/Duboce – Cesar Chavez St	65	415[5]	50	-15
● South of Cesar Chavez	85	355[6]	80	-5
TTRP.14 Moderate with Variant 1 total	170	1,130	140	-30
TTRP.14 Moderate with Variant 2				
● North of 13th Street	20	360[4]	10	-10
13th – Cesar Chavez St	280	0	50	-230
● South of Cesar Chavez	85	355[6]	80	-5
TTRP.14 Moderate with Variant 2 total	385	715	140	-245
TTRP.22_1 Moderate	30	0	40	+10
TTRP.28_1 Moderate	30	0	40	+10
TTRP.30_1 Moderate	30	0	50	+20
● TTRP.71_1 Moderate	65	0	20	-45

Notes:

1. Removed (24 hours, all-day) includes existing parking spaces removed at all times.
2. Remove (part-time) tow-away identifies the number of parking spaces that would not be available during certain times of day when tow-away restrictions are in effect (varying by proposal), but would otherwise be available. Tow-away periods could range from 7 a.m. to 9 a.m. or 4 p.m. to 6 p.m. or both and could also extend for much of the day from 7 a.m. to 7 p.m.
3. Added includes the parking-space equivalent of the curb space that is regained (for example, due to removal of bus stops) that could be converted into parking spaces.

● 4. These 360 parking spaces are proposed to be tow-away 7 a.m. to 7 p.m. and are all currently subject to an existing a.m. and/or p.m. peak tow-away restriction.

● 5. These 415 parking spaces are proposed to be tow-away from 7 a.m. to 7 p.m.

● 6. Of these 355 parking spaces, 210 are proposed to be tow-away from 7 a.m. to 9 a.m., and 145 are proposed to be tow-away from 3 p.m. to 7 p.m.

● Source: SFMTA, December 2013.

It is important to note that under Existing conditions, collision rates are higher on Rapid Network streets, where TTRPs are proposed, than those along corridors that are parallel to the TTRPs; this is particularly the case with sideswipe collisions for transit and private vehicles that occur as a result of narrow travel lanes (9 feet).[63] The TTRP projects are anticipated to improve these conditions with widened travel lanes. Thus, while removal of parking may result in some conflicts due to double parking and vehicles blocking driveways or bicycle lanes, the proposed project may also reduce collisions due to widened travel lanes that reduce friction between transit vehicles and other vehicles.

TTRP.J Moderate Alternative - Implementation of the TTRP.J Moderate Alternative along Church Street between Duboce and San Jose avenues and on San Jose Avenue between Santa Rose and Santa Ynez streets would result in a net decrease in the number of on-street parking spaces by about 20 spaces over the entire four-and-one-half-mile corridor (30 total parking spaces removed and 10 spaces added). While the parking removal per block would vary, the average removal over the corridor would be less than one space per block. The greatest loss would be on the segment of Church Street between 24th and 28th streets (where up to 25 spaces could be removed), due primarily to new boarding islands, transit bulbs, and pedestrian bulbs on this segment of Church Street.

The net decrease in the number of on-street parking spaces with implementation of the TTRP.J Moderate Alternative would increase the on-street, and possibly off-street, parking occupancy in the vicinity of the TTRP.J corridor. The segment of Church Street between 24th and 28th streets is primarily residential in nature with a few commercial uses. On-street parking is available on the side streets perpendicular to this section of Church Street, including Jersey, 25th, Clipper, 26th, Cesar Chavez, 27th, Duncan, and 28th streets and Comerford Alley. Off-street parking is also available at the 16-space public parking lot on 24th Street between Sanchez and Noe streets. With implementation of the TTRP.J Moderate Alternative, up to seven parking spaces would be added to the portion of Church Street between Duboce Avenue and 18th Street. Because the net reduction in the number of parking spaces would be relatively few (i.e., net loss of 20 spaces over the TTRP.J corridor), it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated. Additionally, this corridor is well served by transit as well as by other

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[63] Tanner, Britt, 2013. SFMTA analysis using Crossroads/SWITRS Database. Collisions gathered from Crossroads Software's Traffic Collision Database on 6/26/13 for time period between 11/1/2006 and 10/31/2011 for each street between 14th and Cesar Chavez, including intermediate and limit intersections. Crossroads uses SWITRS (Statewide Integrated Traffic Records System) data which is maintained by the California Highway Patrol. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission St, Suite 400, as part of Case File No. 2011.0558E.

modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 20 parking spaces along the entire corridor would not be considered a substantial deficit and therefore, would not result in hazardous conditions or significant delays in travel for other modes.

- **TTRP.L Moderate Alternative** – Implementation of the TTRP.L Moderate Alternative along Taraval Street, 46th Avenue, Ulloa Street and 15th Avenue would result in a net decrease of about 75 on-street parking spaces over the entire 2.6-mile corridor (90 total parking spaces removed and 15 spaces added). While the parking removal per block would vary, the removal would generally be spread out over the corridor and the average removal would be about two spaces per block. In the following specific locations the parking loss would be greater than that. There would be a net decrease of 17 spaces on the segment between 15th Avenue/Ulloa Street and 20th Avenue/Taraval Street, 11 spaces on the segment of Taraval Street between 20th and 27th avenues, 20 spaces on the segment of Taraval Street between 27th and 33rd avenues, 8 spaces on the segment of Taraval Street between 33rd and 41st avenues, and 18 spaces on the segment between Taraval Street/41st Avenue and 46th Avenue/Ulloa Street. The parking spaces removed would result from the extension of existing transit board islands, new transit boarding islands, new transit bulbs, and new pedestrian bulbs.

- The net decrease in the number of on-street parking spaces with implementation of the TTRP.L Moderate Alternative would increase the on-street, and possibly off-street, parking demand in the vicinity of the TTRP.L corridor. At locations along the route where parking is proposed to be removed, unrestricted on-street parking is generally provided on the side streets perpendicular to those sections of Taraval Street. Because the net reduction in the number of parking spaces would be relatively few (i.e., net loss of 70 spaces over the TTRP.L corridor), it is anticipated that the existing parking demand could be accommodated within existing on-street parking spaces within a reasonable distance of the parking spaces that would be eliminated. Additionally, this corridor is well served by transit, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 70 parking spaces along the entire corridor would not be considered substantial, and therefore, would not result in hazardous conditions or significant travel delays for other modes.

- **TTRP.N Moderate Alternative** - Implementation of the TTRP.N Moderate Alternative along Carl, Irving, and Judah streets would result in a net decrease in the number of on-street parking spaces by about 125 spaces (130 total parking spaces removed and 5 spaces added), primarily due to installation of new transit islands and the extension of existing transit islands. In general, the elimination of parking spaces would be spread over the approximately three-and-one-half-mile long route segment between the intersection of Carl Street/Stanyan Street and Judah Street/La Playa Street.

The net decrease in the number of on-street parking spaces with implementation of the TTRP.N Moderate Alternative would increase the on-street, and possibly off-street, parking occupancy in the vicinity of the TTRP.N corridor. Nearby on-street parking is available on these or adjacent side streets including on Third through 48th avenues, as well as off-street public parking facilities on Irving Street at 20th Avenue (24 spaces) and at Seventh Avenue (36 spaces), and at Ninth Avenue (41 spaces). Because the elimination of 125 parking spaces would be spread out over the route, it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. This corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 125 parking spaces would not be considered a substantial deficit and therefore, would not result in hazardous conditions or significant delays in travel for other modes.

TTRP.5 Moderate Alternative - Implementation of the TTRP.5 Moderate Alternative along Fulton and McAllister streets would result in a net decrease in the number of on-street parking spaces by about 100 spaces (190 total parking spaces removed, including 170 spaces removed permanently, and 20 spaces removed part-time due to tow-away restrictions, and 90 spaces added), primarily due to installation of turn pockets, pedestrian bulbs, transit bulbs, and tow-away lanes. In general, the greatest number of parking spaces (i.e., 22 spaces), would be removed on the route segment of Fulton Street between the intersections of Central Avenue/Fulton Street and Fulton Street/Shrader Street. This loss includes the proposed part-time tow-away zone (i.e., 7 a.m. to 3 p.m.) on Central Avenue between Fulton and McAllister streets, which would temporarily restrict access to 20 parking spaces along this segment during the peak periods**.** On McAllister Street, the elimination of parking spaces would be distributed over the approximately five-and-one-half mile route segment between Larkin Street and Central Avenue. While the parking removal per block would vary, the average removal over the corridor would be about one space per block.

The net decrease in the number of on-street parking spaces with implementation of the TTRP.5 Moderate Alternative would increase the on-street, and possibly off-street, parking occupancy in the vicinity of the TTRP.5 corridor. Along Fulton Street, on-street parking is available on Cole, Clayton, Ashbury, Masonic, and Grove streets. Along McAllister Street, nearby on-street parking is available on the adjacent cross-streets. Because the net elimination of 100 parking spaces (80 on a permanent basis and 20 on a part-time basis) would be spread out over the corridor on both Fulton and McAllister streets, it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces at a reasonable distance of the parking spaces that would be lost. The TTRP.5 corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 100 parking spaces would not be considered a substantial deficit and therefore, would not result in hazardous conditions or significant delays in travel for other modes.

TTRP.8X Moderate Alternative – Implementation of the TTRP.8X Moderate Alternative along 8X Bayshore Express route would result in a net decrease in the number of on-street parking spaces by about 90 spaces (140 total parking spaces removed and 50 spaces added) along the approximately four-and-one-half mile long corridor, primarily due to extension of bus zones, new stops, converting flag stop to bus zones, and installation of transit bulbs. In general, the elimination of parking spaces would be primarily on San Bruno Avenue and Visitacion Avenue (to facilitate bus turning maneuvers on San Bruno Avenue, and as part of implementation of transit bulbs), with limited parking loss on Geneva Avenue. Removal of parking spaces on San Bruno Avenue would occur along San Bruno Avenue between Silver and Arleta avenues, but would be concentrated in the area between Silver Avenue and Wayland Street. While the parking removal per block would vary, the average removal over the corridor would be about one space per block.

The net decrease in the number of on-street parking spaces with implementation of the TTRP.8X Moderate Alternative would increase the on-street, and possibly off-street, parking occupancy in the vicinity of the TTRP.8X corridor. On-street parking adjacent to the corridor is available on side streets intersecting San Bruno Avenue including Silliman, Felton, Burrows, and Bacon streets, as well as in the 10-space surface parking lot on Felton Street near San Bruno Avenue. The other concentrated area of parking removal would be on Visitacion Avenue between Britton and Hahn streets, Hahn Street between Visitacion and Sunnydale avenues, and on Sunnydale Avenue between Hahn and Santos streets. Nearby on-street parking in this area is available on adjacent side streets. Because the net elimination of 90 parking spaces would be spread out over the corridor on numerous streets, it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be removed. Additionally, this corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 90 parking spaces would not be considered a substantial deficit and therefore, would not result in hazardous conditions or significant delays in travel for other modes.

- **TTRP.9 Moderate Alternative** – Implementation of the TTRP.9 Moderate Alternative along 11^{th} Street between Market and Division streets, Potrero Avenue between Division Street and Bayshore Boulevard, and Bayshore Boulevard between Jerrold and Silver avenues would result in a net decrease in the number of on-street parking spaces by an estimated 30 spaces over the entire 3.4-mile corridor (about 100 total parking spaces removed and 70 spaces added). The greatest net loss would be on the segment of Potrero Avenue between 17^{th} and 20^{st} streets where there would be a net loss of 20 spaces, due primarily to implementation of the transit-only lane in the southbound direction and new pedestrian bulbs on this segment of Potrero Avenue. In addition, on some blocks there would be a net gain in parking spaces; for example, about four parking spaces would be added to the portion of 11^{th} Street between Market and Division streets, and six spaces would be added to the portion of Potrero Avenue between 21^{st} and 23^{rd} streets.

- The net decrease in the number of on-street parking spaces with implementation of the TTRP.9 Moderate Alternative would increase the parking demand for on-street, and possibly off-street, parking in the vicinity of the TTRP.9 corridor. The segment of Potrero Avenue between 20^{h} and 21^{st} streets is primarily residential in nature with some commercial uses, and subject to RPP Area “W” regulations. On-street parking is available on the side streets perpendicular to this section of Potrero Avenue, including 19^{th}, 20^{th}, and 21^{st} streets (which are also subject to RPP Area “W” regulations). Off-street parking is also available at the San Francisco General Hospital Medical Center campus, including about 1,600 parking spaces in a public parking garage located on 24^{th} Street between Utah Street and San Bruno Avenue (one block, approximately 270 feet east of Potrero Avenue) and surface lots elsewhere on the campus. With implementation of the TTRP.9 Moderate Alternative, about four parking spaces would be added to the portion of 11^{th} Street between Market and Division streets.

- Because the net reduction in the number of parking spaces would be relatively small (i.e., net loss of about 30 spaces over the TTRP.9 corridor), it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated. Additionally, this corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 30 parking spaces along the entire corridor would not be considered substantial, and therefore, would not result in hazardous conditions or significant delays in travel for other modes.

TTRP.14 Moderate Alternative Variant 1 – Implementation of the TTRP.14 Moderate Alternative Variant 1 would result in a net decrease in the number of on-street parking spaces of up to 1,160 spaces over the entire approximately seven-mile Mission Street corridor between the vicinity of The Embarcadero and Daly City (1,160 total parking spaces removed and 140 spaces added), the majority of which (1,130 spaces) would be removed due to part-time tow-away regulations for implementation of the tow-away lanes and transit-only lanes. Approximately 30 parking spaces would be removed all day (24 hours) on a permanent basis to implement turn pockets, new transit islands, extension of bus zones, and transit islands. As shown on Table 19A, the reduction in parking spaces would be mostly evenly distributed on the three segments of Mission Street north of 13th Street, between 13th and Cesar Chavez streets, and south of Cesar Chavez Street (i.e., about 400 to 450 parking spaces per segment). The parking removal over the approximately seven mile corridor would vary by block, but would average in the removal of about ½ space to one parking space per block over the whole corridor.

Mission Street between Spear and 13th streets – This segment of Mission Street north of 13th Street is located within downtown and its periphery. As noted on Table 19A, implementation of the TTRP.14 Moderate Alternative Variant 1 would result in a net decrease of 10 full-time parking spaces on a permanent basis (20 parking spaces removed and 10 parking spaces added) on this segment. TTRP.14 Moderate Alternative Variant 1 would change how most of the existing spaces are used. All 360 parking spaces that are proposed for part-time tow-away zones are currently not available for parking for some portion of the day due to existing tow-away regulations; these parking spaces would not be available for use during longer periods than under Existing conditions (i.e., the peak-period tow-away parking restrictions would be extended to be in effect 7 a.m. – 7 p.m. in both directions). Of the 370 spaces affected by the proposal, 360 parking spaces would not be available between 7 a.m. and 7 p.m. The 360 part-time tow-away spaces would be available during the non-peak hours (primarily evenings). As stated above, these 360 spaces are already not available during peak periods due to existing tow-away regulations (for example, existing tow-away regulation include 7 to 9 a.m., 3 to 6 p.m., 4 to 6 p.m., and/or 7 a.m. to 6 p.m.), and with implementation of the TTRP.14 Moderate Alternative Variant 1, the tow-away periods would be made consistent along the corridor and extended for the period between 7 a.m. and 7 p.m.

- Within about 1,000 feet (about two to three blocks) of the TTRP.14 corridor between Spear and 13th streets, there are about 23,400 on-street and off-street publicly-available parking spaces.[64] In the downtown area, there are a number of large public parking garages that have capacity to accommodate demand, depending on time of day, as well as numerous garages

- [64] Publicly-available parking spaces based on data collected and compiled by SFpark. On-street parking supply includes all regulated and unregulated spaces where vehicles can legally be parked, including commercial loading spaces and passenger loading/unloading zones, short-term parking, ADA spaces, and residential permit parking spaces. Off-street parking supply includes paid or free parking spaces in off-street garages and surface lots that are available on-demand to the public. SFMTA, SFpark On-street and Off-street Parking Supply Data, December 2013.

associated with office buildings that are open to the general public. For example, the Fifth & Mission Garage, centrally located on this segment of the corridor, contains 2,586 parking spaces, and is about 52 percent occupied during weekday midday.[65] Other public garages in the area include the Moscone Garage (752 parking spaces and about 70 percent occupied during the midday), the SFMOMA Garage (410 parking spaces and about 80 percent occupied during the midday), the Hearst Garage (796 parking spaces and about 95 percent occupied during the midday), and the Jessie Square Garage (372 parking spaces and about 75 percent occupied during the midday).[66] As noted, these public parking garages currently have availability throughout the day. Other larger off-street parking garages further from the Mission Street corridor are located north of Market Street in the Union Square area, and include the Ellis O'Farrell Garage (800 parking spaces), the Union Square Garage (800 parking spaces), and the Sutter Stockton Garage (1,650 parking spaces). Additionally, on-street parking is available on side streets perpendicular to Mission Street throughout this segment. East of Fifth Street, on-street parking generally consists of one-hour standard metered spaces and 30-minute commercial vehicle metered spaces. On most streets, the commercial vehicle meters are in effect from 9:00 a.m. to 3:00 p.m. Overall, the on-street parking spaces are well utilized throughout the day, with availability during the overnight hours at the commercial loading spaces. Considering the location in the downtown area with multiple alternative parking and travel modes available (including local and regional transit), the parking loss in this segment of the corridor would not be considered substantial.

Mission Street between 13th and Cesar Chavez streets – As noted on Table 19A, implementation of the TTRP.14 Moderate Alternative Variant 1 would result in a net decrease of 15 parking spaces on a permanent basis, and 415 spaces on a part-time basis (total of 480 spaces removed and 50 spaces added) on Mission Street between 13th and Cesar Chavez streets. Of these spaces 415 would be unavailable on a part-time basis as a result of peak period tow-away lanes. Under TTRP.14 Moderate Alternative Variant 1, peak period (i.e., 7 a.m. to 7 p.m.) tow-away regulations would be established on Mission Street between 14th and Cesar Chavez streets, and therefore on-street parking would be removed from both
● sides of Mission Street during the 7 a.m. to 7 p.m. tow-away period. Within about 1,000 feet (about two to three blocks) of the TTRP.14 corridor between 13th and Cesar Chavez streets, there are about 7,800 on-street and off-street publicly-available parking spaces.[67] Nearby

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[65] SFMTA, SFpark Parking Garage Data, LCW Consulting, March and June 2013. A copy of this spreadsheet is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

[66] Ibid.

● [67] SFMTA, SFpark On-street and Off-street Parking Supply Data, December 2013.

on-street parking is available on side streets from 14th to 26th streets, and some off-street parking spaces are available in a few public parking garages. For example, the 16th and Hoff Garage has a total of 58 parking spaces and is about 65 percent occupied during the midday, while the Mission Bartlett Garage has about 205 parking spaces and is about 70 percent occupied during the midday.[68] The El Capitan Hotel parking lot, located on Mission Street between 19th and 20th Streets, also provides public parking and is open 24-hours a day. In general, the on-street and off-street parking supply is well utilized throughout the day. Further, this segment of Mission Street is well served by local as well as regional transit (BART). Nevertheless, given the nature of the adjacent neighborhood commercial land uses and density as well as the relatively high occupancy of existing on- and off-street parking spaces, TTRP.14 Variant 1 would be expected to result in a substantial parking shortfall.

Mission Street between Cesar Chavez and Goethe streets – As noted on Table 19A, implementation of the TTRP.14 Moderate Alternative Variant 1 would remove up to 360 parking spaces on this segment. It would result in a net decrease of five parking spaces on a permanent basis (85 parking spaces removed and 80 spaces added) on Mission Street south of Cesar Chavez Street, and also the loss of 355 parking spaces on a part-time basis. Because the tow-away regulations would be established for the peak direction during the peak period (i.e., inbound/northbound in the a.m. and outbound/southbound in the p.m.), the actual reduction in parking spaces would be less during the peak periods: a decrease of 210 parking spaces on the east (i.e., northbound) side of Mission Street during the a.m. peak period, and a decrease of 145 parking spaces on the west (i.e., southbound) side of Mission Street during the p.m. peak period. This segment of Mission Street south of Cesar Chavez Street has a mix of residential and commercial uses. Within about 1,000 feet (about two to three blocks) of the TTRP.14 corridor between Cesar Chavez and Goethe streets, there are about 11,400 on-street parking spaces.[69] Nearby on-street parking is available on side streets perpendicular to Mission Street, and there are no off-street public parking facilities. In general, on-street parking spaces are well utilized throughout the day. The parking removal on this segment of Mission Street would not be considered substantial.

Summary of the corridor - The net decrease in the number of on-street parking spaces with implementation of the TTRP.14 Moderate Alternative Variant 1 would increase the on-street and off-street parking occupancy in the vicinity of the TTRP.14 corridor. As described above, in the downtown area, substantial amounts of alternative parking and travel modes are available, and in other locations nearby on-street parking is available on the side streets perpendicular to Mission Street throughout the corridor; however, on-street parking is generally well utilized, particularly in the 13th to Cesar Chavez streets portion of the corridor. Therefore, between 13th and Cesar Chavez streets, it is not anticipated that the entire existing parking demand associated with the spaces removed would be accommodated in

[68] Ibid.

[69] SFMTA, SFpark On-street and Off-street Parking Supply Data, December 2013.

existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated, primarily on a part-time basis. Therefore, the TTRP.14 Moderate Alternative Variant 1 would result in a parking shortfall on the corridor between 13th and Cesar Chavez streets. As indicated above, the corridor segment north of 13th Street is well served by alternate parking facilities and local and regional transit as well as other modes such as taxis. Therefore, parking loss in this segment would not be considered substantial. Parking changes in the segment between 13th and Cesar Chavez streets, on the other hand, would be considered substantial given the nature of the adjacent neighborhood commercial land uses and the relatively high occupancy of existing on-street spaces as well as relatively low amounts of off-street parking. The segment south of Cesar Chavez Street would experience similar parking changes (although the tow-away restrictions would only be in the peak direction) but given the character of the adjacent land uses and the availability of other parking options, this change would not be considered a substantial loss. Overall, this corridor is well served by transit and other modes, and improvements to transit and pedestrian conditions would occur as a result of the proposed project. Drivers may seek and find alternative parking facilities further from Mission Street, shift to other modes of travel, or change their overall travel habits. It is not anticipated that the substantial net loss in parking spaces between 13th and Cesar Chavez streets would result in concentrated hazardous conditions such as vehicles consistently double parking in a bicycle lane, the mixed-flow travel lanes, or transit-only lanes.

In addition, it is important to note that under Existing conditions, collision rates, on average, are higher on Rapid Network streets, where TTRPs are proposed, than those along corridors that are parallel to the TTRPs; this is particularly the case with sideswipe collisions for transit and private vehicles that occur as a result of narrow travel lanes (9 feet).[70] The TTRP projects are anticipated to improve these conditions with widened travel lanes. Thus, while a deficit in parking supply may result in some additional conflicts, this could be offset by a reduction in collisions due to widened travel lanes. The net loss of 30 parking spaces on a permanent basis and 1,130 parking spaces on a part-time basis along the entire seven-mile corridor therefore, would not be considered to result in hazardous conditions or significant delays in travel for other modes. Therefore, parking impacts would be less than significant.

TTRP.14 Moderate Alternative Variant 2 – Under the TTRP.14 Moderate Alternative Variant 2, which would affect parking only on one side of Mission Street between 13th and Cesar Chavez streets, the net decrease in on-street parking would be less than for the TTRP.14 Moderate Alternative Variant 1. Under Variant 2, up to 245 parking spaces would be removed on a permanent basis and 715 parking spaces would not be available due to part-time tow-away restrictions.

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[70] Tanner, Britt, 2013. SFMTA analysis using Crossroads/SWITRS Database. Collisions gathered from Crossroads Software's Traffic Collision Database on 6/26/13 for time period between 11/1/2006 and 10/31/2011 for each street between 14th and Cesar Chavez, including intermediate and limit intersections. Crossroads uses SWITRS (Statewide Integrated Traffic Records System) data which is maintained by the California Highway Patrol. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission St, Suite 400, as part of Case File No. 2011.0558E.

Mission Street between Spear and 13th streets – As noted on Table 19A, implementation of the TTRP.14 Moderate Alternative Variant 2 would be the same as TTRP.14 Moderate Alternative Variant 1. Please refer to the discussion above for a full explanation of why changes in parking along this segment of Mission Street would not be considered substantial.

Mission Street between 13th and Cesar Chavez streets – As noted on Table 19A, implementation of the TTRP.14 Moderate Alternative Variant 2 would result in a net decrease of 230 parking spaces (280 parking spaces removed and 50 spaces added) on Mission Street between 13th and Cesar Chavez streets. Unlike Variant 1, none of these parking space removals would be part-time, (i.e. related to peak period tow-away lanes). Under TTRP.14 Moderate Alternative Variant 2, a parking lane would be permanently removed from one side of Mission Street between 14th and Cesar Chavez streets, and the parking lane removal would alternate between sides of Mission Street approximately every two blocks from 14th Street to Cesar Chavez Street. As indicated above, within about 1,000 feet of Mission Street between 13th and Cesar Chavez streets, there are about 7,800 on-street and off-street publicly-available parking spaces.[71] Nearby on-street parking is available on side streets from 14th to 26th streets, and some off-street parking spaces are available in a few public parking garages. For example, the 16th and Hoff Garage has a total of 58 parking spaces and is about 65 percent occupied during the midday, while the Mission Bartlett Garage has about 205 parking spaces and is about 70 percent occupied during the midday.[72] El Capitan Hotel parking lot, located on Mission Street between 19th and 20th Streets also provides public parking and is open 24-hours a day. In general, the on-street and off-street parking supply is well utilized throughout the day. Further, this segment of Mission Street is well served by local as well as regional transit (BART). Nevertheless, given the nature of the adjacent neighborhood commercial land uses and density as well as the relatively high occupancy of existing on- and off-street parking spaces, TTRP.14 Variant 2 would be expected to result in a substantial parking shortfall.

Mission Street between Cesar Chavez and Goethe streets – As noted on Table 19A, implementation of the TTRP.14 Moderate Alternative Variant 2 would be the same as TTRP.14 Moderate Alternative Variant 1. Please refer to the discussion above for a full explanation of why changes in parking along this segment of Mission Street would not be considered substantial.

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[71] SFMTA, SFpark On-street and Off-street Parking Supply Data, December 2013.

[72] SFMTA, SFpark Parking Garage Data, LCW Consulting, March and June 2013. A copy of this spreadsheet is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

Summary of the corridor - On-street and off-street parking supply along the TTRP.14 corridor is described above, and includes larger parking garages within the segment north of 13th Street, and primarily on-street parking on side streets south of 13th Street. The net decrease in the number of on-street parking spaces with implementation of the TTRP.14 Moderate Alternative Variant 2 would increase the competition for on-street and off-street parking in the vicinity of the TTRP.14 corridor. As described above, nearby on-street parking is available on the side streets perpendicular to Mission Street throughout the corridor; however, on-street parking is generally well utilized, particularly in the 13th to Cesar Chavez streets portion of the corridor. Therefore, between 13th and Cesar Chavez streets it is not anticipated that the entire existing parking demand associated with the spaces removed would be accommodated within existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated, and therefore, the TTRP.14 Moderate Alternative Variant 2 would result in a parking shortfall on this segment of the corridor. As indicated above, the corridor segment north of 13th Street is well-served by alternate parking facilities and local and regional transit as well as other modes such as taxis. Therefore, parking loss in this segment would not be considered substantial. Parking changes in the segment between 13th and Cesar Chavez streets, on the other hand, would be considered substantial given the nature of the adjacent neighborhood commercial land uses and the relatively high occupancy of existing on-street spaces as well as relatively low amounts of off-street parking spaces. The segment south of Cesar Chavez Street would experience similar parking changes (although the tow-away restrictions would only be in the peak direction) but given the character of the adjacent land uses and the availability of other parking options, this change would not be considered a substantial loss. Overall, this corridor is well served by transit and other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. Drivers may need to seek and find alternative parking facilities further from Mission Street, shift to other modes of travel, or change their overall travel habits. It is not anticipated that the substantial net loss in parking spaces between 13th and Cesar Chavez streets would result in concentrated hazardous conditions such as vehicles consistently double parking in a bicycle lane, the mixed-flow travel lanes, or transit-only lanes. Therefore, the net loss of 245 parking spaces on a permanent basis and 715 parking spaces on a part-time basis along the entire seven-mile corridor would not be considered a substantial deficit that would result in hazardous conditions or significant delays in travel for other modes.

TTRP.22_1 Moderate Alternative – Implementation of the TTRP.22_1 Moderate Alternative along 16th Street would result in a net increase in the number of on-street parking spaces by 10 spaces (30 total parking spaces removed and 40 spaces added), primarily due to stop optimization and transit bulb optimization. At locations along the route where parking is proposed to be removed, nearby on-street parking is available on the side streets perpendicular to 16th Street between Third and Bryant streets. Because the TTRP.22_1 Moderate Alternative would add more spaces than it would remove, it is anticipated that the existing parking demand could be accommodated within existing on-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. Furthermore, the 16th

Street corridor is well served by transit, as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project.

TTRP.28_1 Moderate Alternative – Implementation of the TTRP.28_1 Moderate Alternative would result in a net increase in the number of on-street parking spaces on 19th Avenue by 10 spaces (30 total parking spaces removed and 40 spaces added), primarily due to stop optimization. The segment with the greatest net parking loss would be between the intersections of 19th Avenue/Ulloa Street and 19th Avenue/Wawona Street. At locations along the route where parking is proposed to be removed, nearby on-street parking is available on Ulloa and Wawona streets, and other adjacent streets. Because the TTRP.28_1 Moderate Alternative would add more spaces than it would remove, it is anticipated that the existing parking demand could be accommodated within existing on-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. The 19th Avenue corridor is well served by transit, as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project.

TTRP.30_1 Moderate Alternative – Implementation of the TTRP.30_1 Moderate Alternative would result in a net increase in the number of on-street parking spaces by 20 spaces (30 total parking spaces removed and 50 spaces added), primarily due to stop optimization and transit bulb extensions. At locations along the route where parking would be removed, nearby on-street parking is available on the side streets perpendicular to North Point Street, Columbus Avenue, and Stockton Street.

Because the TTRP.30_1 Moderate Alternative would add more spaces than it would remove, it is anticipated that the existing parking demand could be accommodated could within existing on-street parking at a reasonable distance of the parking spaces that would be eliminated. The TTRP.30_1 corridor is well served by transit, as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project.

- **TTRP.71_1 Moderate Alternative** – Implementation of the TTRP.71_1 Moderate Alternative along Haight Street between Laguna and Stanyan streets would result in a net decrease in the number of on-street parking spaces by about 45 spaces over the entire 1.6-mile corridor (65 total parking spaces removed and 20 spaces added). The greatest net loss (up to 40 spaces) would be on the segments of Haight Street between Fillmore and Laguna streets, Divisadero and Pierce streets, and Belvedere and Clayton streets, due primarily to moving transit stops, signalizing intersections, left-turn and right-turn pockets, transit bulbs, and pedestrian bulbs on this segment of Haight Street. The net decrease in the number of on-street parking spaces with implementation of the TTRP.71_1 Moderate Alternative would increase the on-street parking occupancy in the vicinity of the TTRP.71_1 corridor. On-street unrestricted or RPP Area regulated parking is available on the side streets perpendicular to this section of Haight Street.

- Because the net reduction in the number of parking spaces would be relatively few (i.e., net loss of 45 spaces over the TTRP.71_1 corridor), it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated. Additionally, this corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 45 parking spaces along the entire corridor would not be considered substantial, and therefore, would not result in hazardous conditions or significant delays in travel for other modes.

- Therefore, the impact of the TTRP Moderate Alternative including the TTRP.J Moderate Alternative, TTRP.L Moderate Alternative, TTRP.N Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.9 Moderate Alternative, TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, TTRP.22_1 Moderate Alternative, TTRP.28_1 Moderate Alternative, TTRP.30_1 Moderate Alternative, or TTRP.71_1 Moderate Alternative on parking would be less than significant.

- **Impact TR-58: Implementation of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, or TTRP.71_1 would not result in a significant parking impact. (Less than Significant)**

- As described above in Impact TR-57, implementation of the 11 TTRP Expanded Alternative proposals would not result in an increase in parking demand. The TTRP

Expanded Alternative proposals would in most cases, but not all, result in elimination of on-street parking spaces along the TTRP corridor. Table 19B summarizes the changes in the on-street parking supply due to the project-level TTRP Expanded Alternative proposals.

Along these corridors, the parking demand that would be displaced due to part-time and permanent loss of parking spaces would be accommodated on other nearby streets, which could result in increased competition for the remaining other on-street, and potentially off-street, parking supply. If replacement parking cannot be provided or parking demand is high in particular areas, the reduction in parking supply could result in parking shortfalls. However, the affected project-related areas would be well served by transit, as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. At some locations, drivers and passengers would have to circle in search of parking or walk further between the parking space and destination, or switch to transit or other modes. The decrease in the on-street parking supply along these corridors would be considered an inconvenience, but would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles such as consistently blocking sidewalks, mixed-use lanes, transit or bicycle lanes or forming persistent queues to off-street parking facilities. Hence, the TTRP Expanded Alternative's impact related to parking supply for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, or TTRP.71_1 would be less than significant.

It is important to note that under Existing conditions, collision rates, on average, are higher on Rapid Network streets, where TTRPs are proposed, than those along corridors that are parallel to the TTRPs; this is particularly the case with sideswipe collisions for transit and private vehicles that occur as a result of narrow travel lanes (9 feet).[73] The TTRP projects are anticipated to improve these conditions with widened travel lanes. Thus, while removal of parking may result in some conflicts due to double parking and vehicles consistently blocking driveways or bicycle lanes, the proposed project may also reduce collisions due to widened travel lanes that reduce friction between transit vehicles and other vehicles.

[73] Tanner, Britt, 2013. SFMTA analysis using Crossroads/SWITRS Database. Collisions gathered from Crossroads Software's Traffic Collision Database on 6/26/13 for time period between 11/1/2006 and 10/31/2011 for each street between 14th and Cesar Chavez, including intermediate and limit intersections. Crossroads uses SWITRS (Statewide Integrated Traffic Records System) data which is maintained by the California Highway Patrol. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission St, Suite 400, as part of Case File No. 2011.0558E.

Table 19B: Change in On-Street Parking Supply for TTRP Expanded Alternative for Project-Level TTRPs

	Removed (24 hours)[1]	Removed (part-time)[2]	Added (24 hours)[3]	Net Change (24 hours)
TTRP.J Expanded	30	0	10	-20
● TTRP.L Expanded	95	0	15	-80
● TTRP.N Expanded	135	0	5	-130
● TTRP.5 Expanded	200	20	110	-90
TTRP.8X Expanded	140	0	60	-80
● TTRP.9 Expanded	100	0	70	-30
TTRP.14 Expanded				
● North of 13th Street	155	235[4]	10	-145
13th – Cesar Chavez St	60	0	50	-10
South of Cesar Chavez	95	0	80	-15
TTRP.14 Expanded Total	310	235	140	-170
TTRP.22_1 Expanded	300	0	10	-290
● TTRP.22_1 Expanded with Variant 1	320	240[5]	40	-280
TTRP.22_1 Expanded with Variant 2	320	0	40	-280
TTRP.28_1 Expanded	30	0	40	+10
TTRP.30_1 Expanded	30	0	50	+20
TTRP.30_1 Expanded with Variant 1	30	0	50	+20
TTRP.30_1 Expanded with Variant 2	50	0	50	0
● TTRP.71_1 Expanded	80	0	20	-60

Notes:

1. Removed (24 hours, all-day) includes existing parking spaces removed at all times.
2. Remove (part-time) tow-away identifies the number of parking spaces that would not be available during certain times of day when tow-away restrictions are in effect (varying by proposal), but would otherwise be available. Tow-away periods could range from 7 a.m. to 9 a.m. or 4 p.m. to 6 p.m. or both and could also extend for much of the day from 7 a.m. to 7 p.m.
3. Added includes the parking-space equivalent of the curb space that is regained (for example, due to removal of bus stops) that could be converted into parking spaces.

● 4. These 235 parking spaces are proposed to be tow-away 7 a.m. to 7 p.m. and are all currently subject to an existing a.m. and/or p.m. peak tow-away restriction.

● 5. These 240 parking spaces are proposed to be tow-away from 7 a.m. to 9 a.m. and 3 p.m. to 7 p.m.

● Source: SFMTA, December 2013.

TTRP.J Expanded Alternative – Implementation of the TTRP.J Expanded Alternative along Church Street between Duboce and San Jose avenues, and on San Jose Avenue between Church and Santa Ynez streets would result in a net decrease in the number of on-street parking spaces of about 20 spaces over the length of the four-and-a-half-mile corridor (30 total parking spaces removed and 10 spaces added), the same as for the TTRP.J Moderate Alternative. While the parking removal per block would vary, the average removal over the corridor would be less than one space per block.

The net decrease in the number of on-street parking spaces with implementation of the TTRP.J Expanded Alternative would increase the on-street, and possibly off-street, parking occupancy in the vicinity of the TTRP.J corridor. At locations along the route where parking is proposed to be removed, nearby on-street parking is available on the side streets perpendicular to this section of Church Street, including Jersey, 25th, Clipper, 26th, Cesar Chavez, 27th, Duncan, and 28th streets and Comerford Alley. Off-street parking is also available at the 16-space public parking lot at 24th Street between Sanchez and Noe streets. With implementation of the TTRP.J Expanded Alternative, up to seven parking spaces would be added to the portion of Church Street between Duboce Avenue and 18th Street. Because the net reduction in the number of parking spaces would be relatively low (i.e., net loss of 20 spaces over the TTRP.J corridor), it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated. Additionally, this corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 20 parking spaces along the entire corridor would not be considered a substantial deficit that would result in hazardous conditions or significant delays in travel for other modes.

- **TTRP.L Expanded Alternative** – Implementation of the TTRP.L Expanded Alternative along Taraval Street, 46th Avenue, Ulloa Street and 15th Avenue would result in a net decrease of about 80 on-street parking spaces over the entire 2.6-mile corridor (95 total parking spaces removed and 15 spaces added). While the parking removal per block would vary, the removal would generally be spread out over the corridor and the average removal would be about two spaces per block. In the following specific locations the parking loss would be greater than that. There would be a net decrease of 19 spaces on the segment between 15th Avenue/Ulloa Street and 20th Avenue/Taraval Street, 8 spaces on the segment of Taraval Street between 20th and 27th avenues, 25 spaces on the segment of Taraval Street between 27th and 33rd avenues, 11 spaces on the segment of Taraval Street between 33rd and 41st avenues, and 14 spaces on the segment between Taraval Street/41st Avenue and 46th Avenue/Ulloa Street. The parking spaces removed would result from the extension of existing transit board islands, new transit boarding islands, new transit bulbs, and new pedestrian bulbs.

- Similar to the TTRP.L Moderate Alternative, the net decrease in the number of on-street parking spaces with implementation of the TTRP.L Expanded Alternative would increase the on-street, and possibly off-street, parking demand in the vicinity of the TTRP.L corridor. At locations along the route where parking is proposed to be removed, unrestricted on-street parking is generally provided on the side streets perpendicular to those sections of Taraval Street. Because the net reduction in the number of parking spaces would be relatively few (i.e., net loss of 80 spaces over the TTRP.L corridor), it is anticipated that the existing parking demand could be accommodated within existing on-street parking spaces within a reasonable distance of the parking spaces that would be eliminated. Additionally, this corridor is well served by transit, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 80 parking spaces along the entire corridor would not be considered substantial, and therefore, would not result in hazardous conditions or significant delays in travel for other modes.

- **TTRP.N Expanded Alternative** – Implementation of the TTRP.N Expanded Alternative along Carl, Irving, Ninth Avenue and Judah streets would result in a net decrease in the number of on-street parking spaces by about 130 spaces (135 total parking spaces removed and 5 spaces added), primarily due to new transit islands and the extension of existing transit islands. As with the TTRP.N Moderate Alternative, the removal of parking spaces would be spread over the approximately three-and-one-half mile route segment between the intersection of Carl/Stanyan Street and Judah Street/48th Avenue.

  The net decrease in the number of on-street parking spaces with implementation of the TTRP.N Expanded Alternative would increase the on-street, and possibly off-street, parking occupancy in the vicinity of the TTRP.N corridor. At locations along the route where parking is proposed to be removed, nearby on-street parking is available on these or adjacent side streets including on Third through 48th avenues, as well as off-street public parking facilities on Irving Street at 20th Avenue (24 spaces) and at Seventh Avenue (36 spaces), and at Ninth

Avenue (41 spaces). Because the elimination of 130 parking spaces would be spread out over the route with generally between two to four spaces eliminated per block, it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. This corridor is well served by transit as well as by other modes and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 130 parking spaces would not be considered a substantial deficit that would result in hazardous conditions or significant delays in travel for other modes.

TTRP.5 Expanded Alternative – Implementation of the TTRP.5 Expanded Alternative along Fulton and McAllister streets would result in a net decrease in the number of on-street parking spaces by about 110 spaces (220 total parking spaces removed, including 200 spaces removed permanently and 20 spaces removed part-time due to tow-away restrictions, and 110 spaces added) over the approximately five-and-one-half-mile-long corridor, primarily due to installation of turn pockets, pedestrian bulbs, transit bulbs and traffic circles, extension of bus zones, and tow-away regulations on Central Avenue between Fulton and McAllister streets (tow-away from 7 a.m. to 3 p.m.). The route segment with the greatest parking reduction would be on McAllister Street, between the intersections of McAllister/Larkin streets and McAllister Street/Central Avenue. The increase in the number of parking spaces removed in the TTRP.5 Expanded Alternative compared to the TTRP.5 Moderate Alternative is due to implementation of the traffic circles on McAllister Street that are included in the TTRP.5 Expanded Alternative. While the parking removal per block would vary, the average removal over the corridor would be about one parking space per block.

As described above for the TTRP.5 Moderate Alternative, the net decrease in the number of on-street parking spaces with implementation of the TTRP.5 Expanded Alternative would increase the on-street, and possibly off-street, parking occupancy on streets adjacent to the TTRP.5 corridor. Along Fulton Street, some on-street parking is available on Cole, Clayton, Ashbury, Masonic, and Grove streets. Along McAllister Street, nearby on-street parking is available on the adjacent cross-streets. Because the net elimination of 110 parking spaces (90 on a permanent basis and 20 on a part-time basis) would be spread out over the corridor on both Fulton and McAllister streets, it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. The TTRP.5 corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 110 parking spaces would not be considered a substantial deficit that would result in hazardous conditions or significant delays in travel for other modes.

TTRP.8X Expanded Alternative – Implementation of the TTRP.8X Expanded Alternative along the approximately four-and-one-half mile corridor would result in a net decrease in the number of on-street parking spaces by about 80 spaces (140 total parking spaces removed and 60 spaces added) primarily due to extension of bus zones, new stops, converting flag stop to bus zones, and transit bulbs, overall slightly fewer than under the TTRP.8X Moderate Alternative. In general, the elimination of parking spaces would be primarily on San Bruno Avenue and Visitacion Avenue (to facilitate bus turning maneuvers on San Bruno Avenue, and as part of installation of transit bulbs), with limited parking loss on Geneva Avenue. Removal of parking spaces on San Bruno Avenue would be concentrated in the segment between Silver Avenue and Wayland Street, but would occur along San Bruno Avenue between Silver and Arleta avenues. On-street parking in this immediate area is available on side streets intersecting San Bruno Avenue including Silliman, Felton, Burrows, and Bacon streets, as well as in the 10-space surface parking lot on Felton Street near San Bruno Avenue. The other concentrated area of parking removal would be on Visitacion Avenue between Britton and Hahn streets, Hahn Street between Visitacion and Sunnydale avenues, and on Sunnydale Avenue between Hahn and Santos streets. Nearby on-street parking in this area is available on adjacent side streets. While the parking removal per block would vary, the average removal over the corridor would be about one parking space per block.

The net decrease in the number of on-street parking spaces with implementation of the TTRP.8X Expanded Alternative would increase the on-street, and possibly off-street, parking occupancy in the vicinity of the TTRP.8X corridor. Because the net elimination of 80 parking spaces would be spread out over the corridor on numerous streets, it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated. Additionally, this corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 80 parking spaces would not be considered a substantial deficit that results in hazardous conditions or significant delays in travel for other modes.

- **TTRP.9 Expanded Alternative** – Implementation of the TTRP.9 Expanded Alternative along 11th Street between Market and Division streets, Potrero Avenue between Division Street and Bayshore Boulevard, and Bayshore Boulevard between Jerrold and Silver streets would result in a net decrease of approximately 55 on-street parking spaces over the entire 3.4-mile corridor (125 total parking spaces removed and 70 spaces added). The greatest net loss would be on the segment of Potrero Avenue between 17th and 20rd streets where there would be a net loss of 20 spaces due primarily to implementation of the transit-only lane in the southbound direction and new pedestrian bulbs on this segment of Potrero Avenue. In addition, on some blocks there would be a net gain in parking spaces; for example, about four parking spaces would be added to the portion of 11th Street between Market and Division streets.

- The net decrease of 55 off-street parking spaces with implementation of the TTRP.9 Expanded Alternative would minimally increase the on-street parking demand in the vicinity of the TTRP.9 corridor. As indicated in the Impact TR-57 above, on-street parking is available on the side streets perpendicular to this section of Potrero Avenue, including 23rd, 24th, and 25th streets. Off-street parking is also available at the San Francisco General Hospital Medical Center campus, including about 1,600 parking spaces within the public parking garage that is located on 24th Street between Utah Street and San Bruno Avenue (one block east of Potrero Avenue) and on other surface lots within the campus. Because the net reduction in the number of parking spaces would be few (i.e., net loss of 55 spaces over the TTRP.9 corridor), it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated. Additionally, this corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 55 parking spaces along the entire corridor would not be considered substantial, and therefore, would not result in hazardous conditions or significant delays in travel for other modes.

TTRP.14 Expanded Alternative – Implementation of the TTRP.14 Expanded Alternative would result in a net decrease in the number of on-street parking spaces of about 405 spaces over the whole corridor (545 total parking spaces removed and 140 spaces added) primarily due to permanent or part-time tow-away regulations for implementation of the transit-only lanes north of 13th Street, turn pockets (including for forced right turns south of 13th Street), new transit islands, extension of bus zones and transit islands, about 755 and 555 fewer parking spaces lost than under the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2, respectively. An estimated 235 of the 545 parking spaces would be temporarily removed as part of proposed part-time tow-away lanes. Under the TTRP.14 Expanded Alternative, the reduction in parking spaces would be primarily on the segments of Mission Street north of 13th Street, where there would be a net reduction of about 380 spaces, of which 145 spaces would be a permanent reduction and 235 would be on a part-time basis.

Mission Street between Spear and 13th streets – This segment of Mission Street north of 13th Street is located within downtown and its periphery. As noted on Table 19B, implementation of the TTRP.14 Expanded Alternative would result in a net decrease of 380 parking spaces (390 parking spaces removed and 10 spaces added) on Mission Street between Spear and 13th streets. Of the 380 net parking spaces removed on this segment, 145 spaces would be removed permanently. The remaining 235 spaces that are proposed for part-time tow-away zones are currently not available for parking for some portion of the day due to existing tow-away regulations; these parking spaces would not be available for use during longer periods than under Existing conditions (i.e., the peak-period tow-away parking restrictions would be extended to be in effect 7 a.m. – 7 p.m. in both directions). Of the 380 spaces affected by the proposal, 235 parking spaces would not be available between 7 a.m. and 7 p.m. The 235 part-time tow-away spaces would be available during the non-peak hours (primarily evenings). As stated above, these 235 spaces are already not available during peak periods due to existing tow-away regulations (for example, existing tow-away regulation include 7 to 9 a.m., 3 to 6 p.m., 4 to 6 p.m., and/or 7 a.m. to 6 p.m.), and with implementation of the TTRP.14 Expanded Alternative, the tow-away periods would be made consistent along the corridor and extended for the period between 7 a.m. and 7 p.m.

As indicated in the TTRP.14 Moderate Alternative discussion, in the downtown area, there are a number of large public parking garages (Fifth & Mission, Jessie Square, and Moscone Garages) that have capacity to accommodate demand, depending on time of day, as well as numerous garages associated within office or other buildings (SFMOMA and Hearst Garages) which are open to the general public. Additionally, on-street parking, although well-utilized in some areas, is available on side streets perpendicular to Mission Street throughout this segment. Further, this area is well served by local and regional transit as well as other modes such as taxis and bicycle facilities. Considering the location in the downtown area with multiple alternative parking and travel modes available, the parking loss in this section would not be considered substantial.

Mission Street between 13th and Cesar Chavez streets – As noted on Table 19B, implementation of the TTRP.14 Expanded Alternative would result in a net decrease of 10 parking spaces (60 parking spaces removed and 50 spaces added) on Mission Street between 13th and Cesar Chavez streets. Under TTRP.14 Expanded Alternative, a transit-only lane in the outbound (southbound) direction would be established by converting the four existing mixed-flow lanes into one outbound side-running transit-only lane, one outbound mixed-flow lane, one inbound mixed-flow lane with forced right turns at every intersection for non-transit vehicles, and parking would be maintained on both sides of the street. Therefore, the TTRP.14 Expanded Alternative would result in substantially less reduction in the on-street parking supply on this segment of Mission Street, as compared to TTRP.14 Moderate Alternative Variants 1 or 2.

Mission Street between Cesar Chavez and Goethe streets – As noted on Table 19B, implementation of the TTRP.14 Expanded Alternative would result in a net decrease of 15 parking spaces (95 parking spaces removed and 80 spaces added) on Mission Street south of Cesar Chavez Street. In this segment a side-running transit-only lane would be established in both directions by converting one mixed-flow lane in each direction into a transit-only lane. Therefore, the TTRP.14 Expanded Alternative would result in substantially less reduction in the on-street parking supply of Mission Street, as compared to TTRP.14 Moderate Alternative Variants 1 or 2.

Summary of the corridor - The net decrease in the number of on-street parking spaces with implementation of the TTRP.14 Expanded Alternative would increase the on-street and off-street parking occupancy in the vicinity of the TTRP.14 corridor. For the entire corridor the loss or change of use in parking spaces would be spread out between The Embarcadero and Daly City. It is anticipated that the existing parking demand could be accommodated in existing on-street and off-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. Due to the difficulty in finding alternate on-street parking, drivers may park off-street, further from their destination along Mission Street, or switch to transit, car-share, carpools, walking, or bicycling. However, this corridor is well served by local and regional transit and other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. Drivers may choose to seek alternative parking facilities further from Mission Street, shift to other modes of travel, or change their overall travel habits. It is not anticipated that the net loss in parking spaces would result in vehicles double parking in a bicycle lane, the mixed-flow travel lanes, or transit-only lanes. The net loss of 405 parking spaces (235 of these related to peak period tow-away lanes) along the entire corridor would not be considered a substantial deficit that would result in hazardous conditions or significant delays in travel for other modes.

TTRP.22_1 Expanded Alternative – Implementation of the TTRP.22_1 Expanded Alternative along 16th Street between Third and Bryant streets (about 1.2 miles) would result in a net decrease in the number of on-street parking spaces by approximately 290 spaces (300 total parking spaces removed and 10 spaces added). The reduction in parking spaces would be primarily due to installation of transit bulbs, sidewalk widening, and implementation of the transit-only lanes throughout the 16th Street corridor between Third and Bryant streets. As discussed under the traffic analysis above, implementation of the center-running transit-only lanes as part of the TTRP.22_1 Expanded Alternative (and Variant 1 and Variant 2) would require restricting access into and out of the Potrero Center shopping center to right-turn-in and right-turn-out only for the three driveways on 16th Street. The garage entrances/exits on Potrero Avenue and Bryant Street into the lower level of the garage would not be affected by implementation of the TTRP.22_1 Expanded Alternative. While the parking removal per block would vary, the average removal over the corridor would be about seven parking spaces per block.

The net decrease in the number of on-street parking spaces with implementation of the TTRP.22_1 Expanded Alternative would increase the on-street, and possibly off-street (for example, at the parking garage at the Potrero Center shopping center), parking occupancy in the vicinity of the TTRP.22_1 corridor. Within about 1,000 feet (i.e., about two to three blocks) of the TTRP.22_1 corridor between Third and Church streets, there are about 12,900 on-street and off-street publicly-available parking spaces.[74] At locations along the route where parking is proposed to be removed, nearby on-street parking is generally available on the side streets perpendicular to 16th Street between Third and Bryant streets. However, it is not anticipated that the entire existing parking demand associated with the spaces removed would be accommodated in existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated, and therefore, the TTRP.22_1 Expanded Alternative would result in a parking shortfall. Furthermore, local traffic may increase on side streets as more vehicles circle to find parking (such as on Bryant Street and on Potrero Avenue related to the Potrero Center shopping center driveways). However, this corridor is well served by transit and other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. Drivers may choose to seek alternative parking facilities further from 16th Street (e.g., particularly within Mission Bay as additional parking facilities are constructed), shift to other modes of travel, or change their overall travel habits. It is not anticipated that the net loss in parking spaces would result in hazardous conditions such as vehicles double parking in a bicycle lane, the mixed-flow travel lanes, or center-running transit-only lanes or forming long-lasting queues to existing off-street facilities. The net loss of 290 parking spaces along the entire corridor would be a substantial parking loss but it would not result in hazardous conditions or significant delays in travel for other modes.

TTRP.22_1 Expanded Alternative Variant 1 – Under TTRP.22_1 Expanded Alternative Variant 1, the parking lanes on either side of 16th Street between Bryant and Church streets would have tow-away restrictions and would be used as curbside transit-only lanes. Therefore, during the peak periods, access to an additional 240 parking spaces between

[74] SFMTA, SFpark On-street and Off-street Parking Supply Data, December 2013.

Bryant and Church streets would be restricted on a part-time basis. This would result in a net decrease of about 520 parking spaces (560 total parking spaces removed and 40 parking spaces added) on the entire approximately two-mile long TTRP.22_1 corridor between Third and Church streets. While the parking removal per block would vary, the average removal over the corridor would be about seven parking spaces per block.

- As described above, within about 1,000 feet of the TTRP.22_1 corridor between Third and Church streets, there are about 12,900 on-street and off-street publicly-available parking spaces, and the net decrease in the number of on-street parking spaces with implementation of the TTRP.22_1 Expanded Alternative Variant 1 would increase the on-street, and possibly off-street (for example, at the parking garage at the Potrero Center shopping center), parking occupancy in the vicinity of the TTRP.22_1 corridor. At locations along the route where parking is proposed to be removed, nearby on-street parking is generally available on the side streets perpendicular to 16th Street between Third and Church streets. However, it is not anticipated that the entire existing parking demand associated with the spaces removed would be accommodated in existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated, and therefore, the TTRP.22_1 Expanded Alternative Variant 1 would result in a parking shortfall. This corridor is well served by transit and other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. Drivers may choose to seek alternative parking facilities further from 16th Street, shift to other modes of travel, or change their overall travel habits. It is not anticipated that the net loss in parking spaces would result in vehicles double parking in a bicycle lane, the mixed-flow travel lanes, or transit-only lanes or form long-lasting queues for off-street parking facilities. The net loss of 520 parking spaces along the entire corridor, of which 240 spaces would be restricted on a part-time basis on 16th Street between Bryant and Church streets, would result in a substantial deficit but is not expected to cause hazardous conditions or significant delays in travel for other modes.

TTRP.22_1 Expanded Alternative Variant 2 – Under TTRP.22_1 Expanded Alternative Variant 2, the parking lanes on 16th Street between Bryant and Church streets would be maintained and therefore, parking conditions would be similar to those identified for the TTRP.22_1 Expanded Alternative. Implementation of the TTRP.22_1 Expanded Alternative Variant 2 along 16th Street would result in a net decrease in the number of on-street parking spaces by approximately 280 spaces (320 total parking spaces removed and 40 spaces added) on the entire TTRP.22_1 corridor between Third and Church streets. While the parking removal per block would vary, the average removal over the corridor would be about seven parking spaces per block.

- As described above, within about 1,000 feet of the TTRP.22_1 corridor between Third and Church streets, there are about 12,900 on-street and off-street publicly-available parking spaces, and the net decrease in the number of on-street parking spaces with implementation of the TTRP.22_1 Expanded Alternative Variant 2 would increase the on-street, and possibly off-street, parking occupancy in the vicinity of the TTRP.22_1 corridor, although less than under TTRP.22 Expanded Alternative Variant 1. At locations along the route where parking is proposed to be removed, nearby on-street parking is generally available on the side streets perpendicular to 16th Street between Third and Church streets, however, it is not anticipated that the entire existing parking demand associated with the spaces removed would be accommodated in existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated, and therefore, the TTRP.22_1 Expanded Alternative Variant 2 would result in a parking shortfall. As noted above, this corridor is well served by transit and other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. Drivers may choose to seek alternative parking facilities further from 16th Street, shift to other modes of travel, or change their overall travel habits. It is not anticipated that the net loss in parking spaces would result in vehicles double parking in a bicycle lane, the mixed-flow travel lanes, or transit-only lanes. The net loss of 280 parking spaces along the entire corridor would be considered a substantial deficit but would not result in hazardous conditions or significant delays in travel for other modes.

TTRP.28_1 Expanded Alternative – Implementation of the TTRP.28_1 Expanded Alternative would result in a net increase in the number of on-street parking spaces by 10 spaces (30 total parking spaces removed and 40 spaces added), and would be the same as for the TTRP.28_1 Moderate Alternative. The spaces added would be due to stop consolidation. The changes to the intersection of Winston Drive/19th Avenue would not affect any on-street parking supply. At locations along the route where parking is proposed to be removed, nearby on-street parking is available on Ulloa and Wawona streets, as well as other adjacent streets. Because the TTRP.28_1 Expanded Alternative would add more spaces than it would remove, it is anticipated that the existing parking demand could be accommodated within existing on-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. The 19th Avenue corridor is well served by transit, as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project.

TTRP.30_1 Expanded Alternative – Implementation of the TTRP.30_1 Expanded Alternative would be similar to the TTRP.30_1 Moderate Alternative. Under TTRP.30_1 Expanded Alternative, there would be a reduction of 30 spaces primarily due to stop optimization and transit bulb extensions, plus an increase of 50 new parking spaces, primarily on Van Ness Avenue and North Point Street between the intersections of Van Ness Avenue/Chestnut Street and North Point/Hyde streets, and on Columbus Avenue between the intersections of North Point Street/Columbus Avenue and Columbus Avenue/Filbert Street, and thereby resulting in a net increase of 20 parking spaces. At locations along the route where parking is proposed to be removed, nearby on-street parking is available on the side streets perpendicular to North Point Street, Columbus Avenue, and Stockton Street. Because the TTRP.30_1 Expanded Alternative would add more spaces than it would remove, it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. The TTRP.30_1 corridor is well served by transit, as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project.

TTRP.30.1 Expanded Alternative Variant 1 – The parking changes associated with TTRP.30.1 Expanded Alternative Variant 1, which would maintain parking on both sides of Stockton Street, would be similar to the TTRP.30_1 Expanded Alternative (i.e., a net increase of 20 parking spaces). Similar to the TTRP.30_1 Expanded Alternative conditions described above, because the TTRP.30_1 Expanded Alternative Variant 1 would add more spaces than it would remove, it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. The TTRP.30_1 corridor is well served by transit, as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project.

- **TTRP.30.1 Expanded Alternative Variant 2** – Under TTRP.30_1 Expanded Alternative Variant 2, parking would be permanently eliminated on the west side of Stockton Street for the two block segment between the intersections of Green/Stockton streets and Stockton Street/Broadway (approximately 650 feet), for a total loss of 50 parking spaces on Stockton Street. Similar to the TTRP.30_1 Expanded Alternative and TTRP.30_1 Expanded Alternative Variant 1, TTRP.30_1 Expanded Alternative Variant 2 would add 50 new parking spaces, and therefore, while the TTRP.30_1 Expanded Alternative and TTRP.30_1 Expanded Alternative Variant 1 would result in a net increase of 20 parking spaces, the TTRP.30_1 Expanded Alternative Variant 2 would result in no net gain or loss of parking spaces. Because the TTRP.30_1 Expanded Alternative Variant 2 would add the same number of parking spaces that it would remove, it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces at a reasonable distance of the parking spaces that would be eliminated. The TTRP.30_1 corridor is well served by transit, as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project.

- **TTRP.71_1 Expanded Alternative** – Implementation of the TTRP.71_1 Expanded Alternative along Haight Street between Laguna and Stanyan streets would result in a net decrease in the number of on-street parking spaces by about 60 spaces over the entire 1.6-mile corridor (80 total parking spaces removed and approximately 20 spaces added). The greatest net loss (up to 50 spaces) would be on the segments of Haight Street between Fillmore and Laguna streets, Divisadero and Pierce streets, and Belvedere and Clayton streets, due primarily to moving transit stops, converting all-way stop controlled intersections to two-way stop-controlled intersections, left-turn and right-turn pockets, transit bulbs, and pedestrian bulbs on these segment of Haight Street.

- The net decrease in the number of on-street parking spaces with implementation of the TTRP.71_1 Moderate Alternative would increase the on-street parking occupancy in the vicinity of the TTRP.71_1 corridor. On-street unrestricted or RPP Area regulated parking is available on the side streets perpendicular to this section of Haight Street. Because the net reduction in the number of parking spaces would be relatively few (i.e., net loss of 60 spaces over the TTRP.71_1 corridor), it is anticipated that the existing parking demand could be accommodated within existing on-street and off-street parking spaces within a reasonable distance of the parking spaces that would be eliminated. Additionally, this corridor is well served by transit as well as by other modes, and improvements to transit and pedestrian conditions would occur as a result of the project. The net loss of 60 parking spaces along the entire corridor would not be considered substantial, and therefore, would not result in hazardous conditions or significant delays in travel for other modes.

Therefore, the impact of the TTRP Expanded Alternative including the TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, TTRP.9 Expanded Alternative, TTRP.14 Expanded Alternative, TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, TTRP.22_1 Expanded Alternative Variant 2, TTRP.28_1 Expanded Alternative, TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, TTRP.30_1 Expanded Alternative Variant 2, or TTRP.71_1 Expanded Alternative on parking would be less than significant.

4.2.4.7 CUMULATIVE IMPACTS

The geographic context for the analysis of cumulative transportation impacts is transit operations within San Francisco and the local roadway network serving the transit system. The discussion of Cumulative Transportation Impacts assesses the degree to which the proposed TEP elements would affect the transportation network in conjunction with other reasonably foreseeable projects. The analysis examines the following scenarios: 2035 Cumulative plus Service Improvements, 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative, and 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative.

The proposed Policy Framework would not result in direct physical changes in the environment. The Policy Framework sets forth the transit service delivery objectives and actions to meet these objectives. Implementation of the TEP would be guided by the Policy Framework, which would help determine how investments should be made to the transit system. The TEP projects are illustrative and provide a good example of the type of projects that would result from the implementation of the Policy Framework's objective and actions items. Therefore, the impacts of the TEP projects are also representative of the type, size, and scope of impacts that could result indirectly from the Policy Framework (i.e., Service Improvements and Service Variants, Service-related Capital Improvements, and transit Travel Time Reduction Proposals (TTRPs) and TTRP Variants).

The proposed Service-related Capital Improvements would be implemented to support the Service Improvements and Service Variants and would only result in construction impacts, not operational impacts. For example, the bypass overhead wires (OWE.4), a Service-related Capital Improvement, would be installed at six locations along the 5 Fulton route to allow operation of the proposed 5L Fulton Limited service. As a Service Improvement, the 5L Fulton Limited service electric trolleys would then be able to pass the local service trolleys. The TTRP projects would implement roadway and transit stop changes to reduce delays on the most heavily used (i.e., Rapid Network) routes that will make up the backbone of the Muni system.

The project-level Service Improvements and Service Variants, project-level and program-level Service-related Capital Improvements, and the project-level and program-level TTRPs and TTRP Variants that could result from the implementation of the Policy Framework are assumed in all three of the 2035 Cumulative plus Project scenarios identified above. For instance, the 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative (including the Service Variants and TTRP Moderate Alternative Variants) is representative of the type of project that could result from implementation of the Policy Framework. Similarly, the 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative (including Service Variants and TTRP Expanded Alternative Variants) is representative of the implementation of the Policy Framework. Proposed project operational impacts related to passenger loading/unloading and emergency vehicle access would be site specific and localized, and would not contribute to cumulative impacts associated with other non-local development and infrastructure projects in San Francisco. Furthermore, passenger loading/unloading zones provide a place to load and unload passengers for adjacent businesses and residences and are intended as a convenience for passengers for quick drop-off and pick-up. These zones require a permit from SFMTA, and the permits are renewed annually. With implementation of the TEP, the ability of past, present and reasonably foreseeable development in San Francisco to obtain permits for passenger loading/unloading zones may be restricted at some locations; however, this would be considered an inconvenience, and would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles, and therefore, impacts related to passenger loading/unloading zones would be considered less than significant.

The transportation-related construction impacts of the TEP proposals would be near-term because implementation of project-level proposals would be initiated in Fiscal Year 2015 and estimated to be completed by 2019.[75] Construction activities of the TEP proposals may overlap with the construction of other projects in the vicinity (for example, the Central Subway project along Fourth Street) as well as other development projects, and could affect traffic, transit, pedestrian, bicycle, emergency vehicle access and parking conditions in the vicinity. However, given the type of construction proposed under the TEP proposals, the construction-related cumulative transportation impacts of multiple construction projects (including the TEP proposals) in proximity to each other would be less than significant, because the construction would be temporary in duration, and the proposed project would coordinate with various City departments through the TASC to develop coordinated construction management plans to address construction-related vehicle routing, bicycle and pedestrian movements adjacent to the construction area for the duration of any construction overlap of cumulative projects. Therefore, the future year 2035 Cumulative impacts were analyzed for transit, traffic, pedestrian, bicycle, loading and parking conditions.

Cumulative Transit Impacts

Impact C-TR-1: The Service Policy Framework and Service Improvements or Service Variants, in combination with past, present and reasonably foreseeable development in San Francisco, would contribute considerably to a significant cumulative impact on transit, resulting in an exceedance of Muni's capacity utilization standard on the Mission corridor within the Southeast screenline of the Downtown screenlines under 2035 Cumulative plus Service Improvements only conditions. (Significant and Unavoidable with Mitigation)

Tables 20 and 21 below summarize the transit capacity utilization for 2035 Cumulative conditions without any components of the proposed project (2035 Cumulative No Project), for

[75] The TEP implementation schedule is subject to change, as specific funding and resources will be identified by the SFMTA and subject to City funding.

Table 20: Muni Screenlines – 2035 Cumulative and 2035 Cumulative plus Project Conditions – A.M. Peak Hour

Screenline/ Corridor	2035 Cumulative (No Project)			2035 Cumulative + Service Improvements (SI)			2035 Cumulative + SI + TTRP Moderate				2035 Cumulative + SI + TTRP Expanded			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
Northeast														
Kearny/Stockton	2,505	3,347	74.8%	2,419	3,761	64.3%	2,406	64.0%	2,457	65.3%	2,412	64.1%	2,498	66.4%
Other lines	452	903	50.0%	668	1,785	37.4%	659	36.9%	682	38.2%	726	40.7%	759	42.5%
Subtotal	*2,957*	*4,250*	*69.6%*	*3,088*	*5,546*	*55.7%*	*3,065*	*55.3%*	*3,139*	*56.6%*	*3,139*	*56.6%*	*3,258*	*58.7%*
Northwest														
Geary	2,842	3,952	71.9%	2,912	3,764	77.4%	2,512	66.7%	2,702	71.8%	2,417	64.2%	2,673	71.0%
California	1,658	2,306	71.9%	1,802	2,369	76.0%	1,867	78.8%	1,890	79.8%	1,893	79.9%	1,894	79.9%
Sutter/Clement	271	630	43.1%	497	756	65.7%	486	64.3%	518	68.5%	473	62.5%	523	69.2%
Fulton/Hayes	1,129	1,470	76.8%	1,162	1,977	58.8%	**1,755**	**88.8%**	**1,812**	**91.7%**	**1,756**	**88.9%**	**1,816**	**91.9%**
Balboa	690	1,008	68.4%	621	1,008	61.6%	584	58.0%	610	60.5%	584	57.9%	600	59.5%
Subtotal	*6,590*	*9,366*	*70.4%*	*6,994*	*9,874*	*70.8%*	*7,206*	*73.0%*	*7,531*	*76.3%*	*7,123*	*72.1%*	*7,505*	*76.0%*
Southeast														
Third	1,247	3,332	37.4%	1,269	3,332	38.1%	1,264	37.9%	1,257	37.7%	1,247	37.4%	1,245	37.4%
Mission	2,349	2,836	82.8%	**2,729**	**3,008**	**90.7%**	**2,904**	**96.6%**	**2,979**	**99.0%**	**2,720**	**90.4%**	**2,894**	**96.2%**
San Bruno/ Bayshore	**1,778**	**2,087**	**85.2%**	1,814	2,197	82.6%	1,799	81.9%	1,823	83.0%	**1,872**	**85.2%**	1,848	84.1%
Other Lines	1,387	1,801	77.0%	1,481	2,027	73.1%	1,544	76.2%	1,714	84.6%	1,556	76.8%	1,674	82.6%
Subtotal	*6,761*	*10,056*	*67.2%*	*7,294*	*10,564*	*69.0%*	*7,511*	*71.1%*	*7,774*	*73.6%*	*7,396*	*70.0%*	*7,661*	*72.5%*
Southwest														
Subway lines	**5,851**	**6,552**	**89.7%**	5,921	7,244	81.7%	6,025	83.2%	6,051	83.5%	6,032	83.3%	6,101	84.2%
Haight/Noriega	1,241	1,554	79.9%	1,295	1,596	81.1%	1,292	81.0%	1,325	83.0%	1,321	82.8%	1,328	83.2%
Other lines	212	627	33.8%	175	560	31.3%	175	31.3%	178	31.8%	176	31.5%	177	31.6%
Subtotal	*7,304*	*8,703*	*83.9%*	*7,391*	*9,400*	*78.6%*	*7,491*	*79.7%*	*7,554*	*80.4%*	*7,529*	*80.1%*	*7,606*	*80.9%*
Total All Screenlines	*23,612*	*32,375*	72.9%	*25,765*	*35,383*	70.0%	*25,272*	71.4%	*25,998*	73.5%	*25,188*	71.2%	*26,028*	73.6%

Note: Bold indicates exceedance of capacity utilization standard (85% utilization).
Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP.

Table 21: Muni Screenlines – 2035 Cumulative and 2035 Cumulative plus Project Conditions – P.M. Peak Hour

Screenline/ Corridor	2035 Cumulative (No Project)			2035 Cumulative + Service Improvements (SI)			2035 Cumulative + SI + TTRP Moderate				2035 Cumulative + SI + TTRP Expanded			
							Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability		Travel Time Reduction		Travel Time Reduction plus Enhanced Reliability	
	Rider-ship	Capa-city	Utili-zation	Rider-ship	Capa-city	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation	Rider-ship	Utili-zation
Northeast														
Kearny/Stockton	1,841	2,359	78.1%	1,737	2,617	66.4%	1,798	68.7%	1,879	71.8%	1,837	70.2%	1,872	71.5%
Other lines	799	1,218	65.6%	1,044	2,065	50.6%	992	48.0%	1,013	49.1%	1,127	54.6%	1,175	56.9%
Subtotal	*2,640*	*3,577*	*73.8%*	*2,781*	*4,682*	*59.4%*	*2,790*	*59.6%*	*2,892*	*61.8%*	*2,965*	*63.3%*	*3,048*	*65.1%*
Northwest														
Geary	**3,267**	**3,826**	**85.4%**	3,168	3,826	82.8%	3,129	81.8%	3,078	80.4%	3,053	79.8%	3,165	82.7%
California	1,178	1,841	64.0%	1,478	2,065	71.6%	1,600	77.5%	1,620	78.4%	1,580	76.5%	1,638	79.4%
Sutter/Clement	433	630	68.7%	553	756	73.2%	553	73.1%	581	76.9%	538	71.1%	583	77.1%
Fulton/Hayes	1,081	1,386	78.0%	1,578	1,877	84.1%	**1,694**	**90.2%**	**1,617**	**86.1%**	**1,652**	**88.0%**	**1,746**	**93.0%**
Balboa	730	929	78.6%	766	974	78.7%	740	76.0%	778	79.9%	724	74.4%	759	77.9%
Subtotal	*6,689*	*8,611*	*77.7%*	*7,544*	*9,497*	*79.4%*	*7,716*	*81.2%*	*7,673*	*80.8%*	*7,547*	*79.5%*	*7,891*	*83.1%*
Southeast														
Third	1,974	2,856	69.1%	1,628	2,856	57.0%	1,626	56.9%	1,650	57.8%	1,618	51.3%	1,636	57.3%
Mission	2,104	2,836	74.2%	**2,570**	**3,008**	**85.4%**	2,390	79.5%	**2,656**	**88.3%**	2,419	80.4%	**2,651**	**88.1%**
San Bruno/Bayshore	1,739	2,134	81.5%	1,663	2,134	77.9%	1,722	80.7%	1,705	79.9%	1,688	79.1%	1,724	80.8%
Other Lines	1,189	1,801	66.0%	1,233	1,927	64.0%	1,270	65.9%	1,340	69.5%	1,254	65.1%	1,321	68.6%
Subtotal	*7,007*	*9,627*	*72.7%*	*7,093*	*9,925*	*71.5%*	*7,008*	*70.6%*	*7,351*	*74.1%*	*6,978*	*70.3%*	*7,332*	*73.9%*
Southwest														
Subway lines	5,157	6,624	77.9%	5,112	7,028	72.7%	5,159	73.4%	5,256	74.8%	5,156	73.4%	5,312	75.6%
Haight/Noriega	1,248	1,554	80.3%	1,170	1,596	73.3%	1,178	73.8%	1,216	76.2%	1,176	73.7%	1,160	72.7%
Other lines	318	840	37.9%	378	840	45.0%	298	35.4%	377	44.9%	371	44.1%	382	45.5%
Subtotal	*6,723*	*9,018*	*74.5%*	*6,660*	*9,464*	*70.4%*	*6,634*	*70.1%*	*6,849*	*72.4%*	*6,702*	*70.8%*	*6,853*	*72.4%*
Total All Screenlines	*23,059*	*30,833*	*74.8%*	*24,078*	*33,568*	*71.7%*	*24,148*	*71.9%*	*24,765*	*73.8%*	*24,192*	*72.1%*	*25,125*	*74.8%*

Note:
Bold indicates exceedance of capacity utilization standard (85% utilization)

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP.

2035 Cumulative conditions with Service Improvements only, and for 2035 Cumulative conditions with Service Improvements and the TTRPs (for the Moderate and Expanded Alternatives, respectively).

Under 2035 Cumulative plus Service Improvements only conditions, overall transit capacity utilization would decrease over 2035 Cumulative No Project conditions, with transit capacity utilization for the four screenlines and would range between 55.7 and 78.6 percent during the a.m. peak hour and between 59.4 and 79.4 percent during the p.m. peak hour, and therefore, the screenlines would operate at less than the 85 percent capacity utilization standard. As shown in Tables 20 and 21, under 2035 Cumulative plus Service Improvements only, all transit corridors within the Northeast, Northwest, and Southwest screenlines (for example, the Geary corridor within the Northwest corridor), would also operate at less than the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours. Capacity utilization under the 2035 Cumulative plus Service Improvements only conditions would decrease for three corridors (Geary under the Northwest, San Bruno/Bayshore under the Southeast, and Subway lines under the Southwest screenlines) as compared to 2035 Cumulative No Project conditions, where these three corridors are projected to operate at greater than the 85 percent capacity utilization standard.

For the Southeast screenline under 2035 Cumulative plus Service Improvements only conditions, the screenline capacity utilization would not exceed the 85 percent capacity utilization standard. However, the Mission corridor (i.e., the 14 Mission, 14L Mission Limited, 49L Van Ness-Mission Limited, and 14X Mission Express) within the Southeast screenline would increase from 82.8 percent under 2035 Cumulative No Project conditions to 90.7 percent under 2035 Cumulative plus Service Improvements only conditions during the a.m. peak hour, and from 74.2 percent under 2035 Cumulative No Project conditions to 85.4 during the p.m. peak hour under 2035 Cumulative plus Service Improvements only conditions, and would therefore, exceed the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours under the 2035 Cumulative plus Service Improvements only conditions. Because this would be an increase over the 85 percent capacity utilization standard as compared to 2035 Cumulative No Project conditions, it would therefore be considered a significant transit impact of the 2035 Cumulative plus Service Improvements only conditions.

To improve capacity utilization on the Mission corridor routes, so that the corridor routes would operate within the 85 percent capacity utilization standard, increased capacity in the form of reduced headways or supplemental transit routes would be required to accommodate the ridership demand at 85 percent capacity utilization.

While capacity utilization of more than 85 percent would indicate a significant transit impact under CEQA, for purposes of transit planning and operations, capacity utilization of 85 percent or slightly higher is most often a desirable operating condition on the part of the transit operator because it reflects efficient resource allocation of transit service. At capacity utilization of slightly more than 85 percent, such as on the Mission corridor during the p.m. peak hour (85.4 percent), only minimal changes to service would be required on lines serving a corridor or screenline to ensure that the passengers are reasonably accommodated on the buses (for example, not "crush load" conditions, in which there is little or no space between passengers and one more passenger cannot enter without causing serious discomfort to other passengers).

The TEP, as a transit improvement project, was not meant to accommodate all future population growth in the City, and impacts to specific corridors under future cumulative conditions were anticipated. While private development projects, using the capacity utilization standard would, if an impact to transit service screenlines or corridors occurred from the project's new transit trips, be expected to contribute their share for the provision of additional service, as a public transit agency, the SFMTA has an ongoing responsibility of monitoring and increasing or decreasing citywide transit service to meet their service goals and in response to City and transit system service needs.

Mitigation Measure M-C-TR-1: SFMTA Monitoring of Muni Service

The SFMTA, shall, to the extent feasible and consistent with annual budget appropriations, continue to monitor Muni service citywide, reporting as required on service goals, including the capacity utilization standard, and where needed, and as approved by decision makers and under budgetary appropriations, strive to improve upon Muni operations, including peak hour transit capacity on screenlines and corridors.

Providing additional capacity and reducing peak hour capacity utilization to less than the capacity utilization standard as identified in **Mitigation Measure M-C-TR-1: SFMTA Monitoring of Muni Service** would reduce the cumulative impact on the affected corridor to a less-than-significant level. However, because the SFMTA cannot commit to future funding appropriations nor be certain of its ability to provide additional service citywide to maintain the capacity utilization standard, among other service goals, the feasibility of this mitigation measure is uncertain. Therefore, the cumulative impact on transit would be considered significant and unavoidable.

It is important to note, as discussed above, that this finding of significance does not preclude the SFMTA from seeking reimbursement from individual development projects for their fair share of mitigation measures (i.e., for the provision of additional service) or identifying other sources to address significant impacts on Muni service or operations. Additionally, when identified and as appropriate, development projects would continue to be subject to the Transit Impact Development Fee (TIDF) or any successor fee(s).

Impact C-TR-2: The Service Policy Framework, TPS Toolkit elements as applied in the program-level TTRP corridors, and the Service Improvements with the TTRP Moderate Alternative, in combination with past, present and reasonably foreseeable development in San Francisco, would contribute considerably to significant cumulative impacts on transit, resulting in exceedances of Muni's capacity utilization standard on the Fulton/Hayes corridor within the Northwest screenline and on the Mission corridor within the Southeast screenline of the Downtown screenlines under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions. (Significant and Unavoidable with Mitigation)

Under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative (including TTRP Moderate Alternative Variants), without and with enhanced reliability, capacity utilization for the four screenlines would range between 55.3 and 80.4 percent during the a.m. peak hour and between 59.6 and 81.2 percent during the p.m. peak hour and therefore all four screenlines would operate at less than the 85 percent capacity utilization standard.

As shown in Tables 20 and 21, under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative, all corridors within the Northeast and Southwest screenlines would also operate at less than the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours. Within the Southwest screenline, capacity utilization would decrease on the Subway lines corridor as compared to 2035 Cumulative No Project conditions, where this corridor is projected to operate at greater than the 85 percent capacity utilization standard.

For the Northwest and Southeast screenlines under 2035 Cumulative plus Service Improvements and TTRP Moderate Alternative conditions, without and with enhanced reliability, the overall capacity utilization of the screenlines would not exceed the 85 percent capacity utilization standard, however, the capacity utilization on the Fulton/Hayes corridor within the Northwest screenline (i.e., the 5 Fulton, 21 Hayes, 5L Fulton Limited) and the Mission corridor within the Southeast screenline (i.e., the 14 Mission, 14L Mission Limited, 49L Van Ness-Mission Limited, and 14X Mission Express) would under 2035 Cumulative plus Service Improvements and TTRP Moderate Alternative conditions increase and exceed the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours. Capacity utilization on the Fulton/Hayes corridor within the Northwest screenline would increase from 76.8 percent during the a.m. peak hour under 2035 Cumulative No Project conditions to between 88.8 and 91.7 percent under 2035 Cumulative plus Service Improvements and TTRP Moderate Alternative conditions, without and with enhanced reliability, respectively, and from 78.0 percent during the p.m. peak hour under 2035 Cumulative No Project conditions to between 86.1 and 90.2 percent under 2035 Cumulative plus Service Improvements and TTRP Moderate Alternative conditions, without and with enhanced reliability, respectively. Capacity utilization on the Mission corridor within the

Southeast screenline would increase from 82.8 percent during the a.m. peak hour under 2035 Cumulative No Project conditions to between 96.6 and 99.0 percent under 2035 Cumulative plus Service Improvements and TTRP Moderate Alternative conditions, without and with enhanced reliability, respectively, and from 74.2 percent during the p.m. peak hour under 2035 Cumulative No Project conditions to between 79.5 and 88.3 percent under 2035 Cumulative plus Service Improvements and TTRP Moderate Alternative conditions, without and with enhanced reliability. Because this would be an increase over the 85 percent capacity utilization standard as compared to 2035 Cumulative No Project conditions, it would therefore, be considered a significant transit impact of the 2035 Cumulative plus Service Improvements and TTRP Moderate Alternative conditions.

As discussed above under Impact C-TR-1, the TEP, as a transit improvement project was designed to address current transit service needs in combination with regional growth assumptions, but it was not meant to accommodate all future population growth in the City. Furthermore, for purposes of transit planning and operations, a capacity utilization of 85 percent or slightly higher could represent desirable operating conditions since it reflects efficient resource allocation of transit service. Typically, if development projects have a transit impact on the screenlines or corridors, the developer would be expected to contribute their share of the provision of additional service. However, as a public transit agency, the SFMTA has an ongoing responsibility of monitoring and increasing or decreasing citywide transit service to meet their service goals and in response to City and transit system service needs.

Providing additional capacity and reducing peak hour capacity utilization to less than the capacity utilization standard as identified in **Mitigation Measure C-M-TR-1: SFMTA Monitoring of Muni Service**, could reduce the 2035 Cumulative plus Service Improvements and TTRP Moderate Alternative's cumulative impact on the Fulton/Hayes and Mission corridors to a less-than-significant level. However, because SFMTA cannot commit to future funding appropriations nor be certain of its ability to provide additional service citywide to maintain the capacity utilization standard, among other service goals, the feasibility of this mitigation measure is uncertain. Therefore, the 2035 Cumulative plus Service Improvements and TTRP Moderate Alternative's impact on the Fulton/Hayes corridor of the Northwest screenline and on the Mission corridor of the Southeast screenline would be significant and unavoidable.

Impact C-TR-3: The Policy Framework, the TPS Toolkit elements as applied in the program-level TTRP corridors, and the Service Improvements with the TTRP Expanded Alternative, in combination with past, present and reasonably foreseeable development in San Francisco, would contribute considerably to significant cumulative impacts on transit, resulting in exceedances of Muni's capacity utilization standard on the Fulton/Hayes corridor within the Northwest screenline and on the Mission corridor within the Southeast screenline of the Downtown screenlines under

2035 Cumulative conditions plus Service Improvements and the TTRP Expanded Alternative conditions. (Significant and Unavoidable with Mitigation)

Under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative (including TTRP Expanded Alternative Variants), without and with enhanced reliability, capacity utilization for the four screenlines would range between 56.6 and 80.9 percent during the a.m. peak hour and between 63.3 and 83.1 percent during the p.m. peak hour, and therefore all four screenlines would operate at less than the 85 percent capacity utilization standard.

As shown in Tables 20 and 21, under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative, all corridors within the Northeast and Southwest screenlines would operate at less than the 85 percent capacity utilization standard during both the a.m. and p.m. peak hours. Furthermore, within the Southwest screenline, capacity utilization would decrease on the Subway lines corridor as compared to 2035 Cumulative No Project conditions, where this corridor is projected to operate at greater than the 85 percent capacity utilization standard.

Under 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative conditions, during the a.m. peak hour, the capacity utilization for the San Bruno/Bayshore corridor on the Southeast screenline would be 85.2 percent under both the 2035 Cumulative No Project and the 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative conditions and would therefore exceed the 85 percent capacity utilization standard. Because the 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative would not change the capacity utilization, the 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative would not substantially alter or contribute to this exceedance of the capacity utilization standard during the a.m. peak hour on the San Bruno/Bayshore corridor on the Southeast screenline.

For the Northwest and Southeast screenlines under 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative conditions, without and with enhanced reliability, the overall capacity utilization on the screenlines would not exceed the 85 percent capacity utilization standard; however, the capacity utilization on the Fulton/Hayes corridor within the Northwest screenline (i.e., the 5 Fulton, 21 Hayes, and 5L Fulton Limited) and the Mission corridor within the Southeast corridor (i.e., the 14 Mission, 14L Mission Limited, 49L Van Ness-Mission Limited, and 14X Mission Express) would under 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative conditions increase and exceed the 85 percent capacity utilization standard during both the a.m. and/or p.m. peak hours. Capacity utilization on the Fulton/Hayes corridor within the Northwest screenline would increase from 76.8 percent during the a.m. peak hour under 2035 Cumulative No Project conditions to between 88.9 and 91.9 percent under 2035 Cumulative plus Service

Improvements and TTRP Expanded Alternative conditions, without and with enhanced reliability, respectively, and from 78.0 percent during the p.m. peak hour under 2035 Cumulative No Project conditions to between 88.0 and 93.0 percent under 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative conditions, without and with enhanced reliability, respectively. Capacity utilization on the Mission corridor within the Southeast screenline would increase from 82.8 percent during the a.m. peak hour under 2035 Cumulative No Project conditions to between 90.4 and 96.2 percent under 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative conditions, without and with enhanced reliability, respectively, and from 74.2 percent during the p.m. peak hour under 2035 Cumulative No Project conditions to between 80.4 and 88.1 percent under 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative conditions, without and with enhanced reliability. Because this would be an increase over the 85 percent capacity utilization standard as compared to the 2035 Cumulative No Project conditions, these exceedances on the Fulton/Hayes corridor of the Northwest screenline and for the Mission corridor of the Southeast screenline under 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative conditions would be considered a significant impact.

As discussed above under Impact C-TR-1, the TEP as a transit improvement project was designed to address today's transit service needs in combination with regional growth assumptions, but it was not meant to accommodate all future population growth in the City. Furthermore, for purposes of transit planning and operations, a capacity utilization of 85 percent or slightly higher could represent desirable operating conditions since it reflects efficient resource allocation of transit service. Typically, if development projects have a transit impact on the screenlines or corridors, the developer would be expected to contribute their share of the provision of additional service. However, as a public transit agency, the SFMTA has an ongoing responsibility of monitoring and increasing or decreasing citywide transit service to meet their service goals and in response to City and transit system service needs.

Providing additional capacity and reducing peak hour capacity utilization to less than the standard, as identified **in Mitigation Measure M-C-TR-1: SFMTA Monitoring of Muni Service**, would reduce the 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative's cumulative impact on the Fulton/Hayes and Mission corridors to a less-than- significant level. However, because the SFMTA cannot commit to future funding appropriations nor be certain in its ability to provide additional service citywide to maintain the capacity utilization standard, among other service goals, the feasibility of this mitigation measure is uncertain. Therefore, the 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative's impact on the Fulton/Hayes corridor of the Northwest screenline and on the Mission corridor of the Southeast screenline would be considered significant and unavoidable. It is important to note that this finding of significance does not preclude the SFMTA from seeking reimbursement from individual development projects for their fair share of mitigation measures or identifying other sources to address significant impacts to Muni service or operations. Additionally, when identified and as appropriate, development projects would continue to be subject to the TIDF or any successor fee(s).

Impact C-TR-4: Implementation of the Service Improvements or Service Variants, in combination with past, present and reasonably foreseeable development in San Francisco, would not contribute considerably to ridership at the regional transit screenlines on AC Transit, Caltrain, Golden Gate Transit, SamTrans, and other regional ferry service under 2035 Cumulative plus Service Improvements only conditions. (Less than Significant)

Tables 22 and 23 present the 2035 Cumulative capacity utilization analysis for the regional screenlines for the a.m. and p.m. peak hours, respectively. During both peak hours (a.m. and p.m.), all regional transit service providers are projected to operate under the capacity utilization standard of 100 percent. The proposed TEP program would not substantially affect travel demand into and out of San Francisco because it is designed to enhance transit effectiveness and accessibility within San Francisco. Therefore, the projected 2035 Cumulative Conditions regional transit ridership would remain unchanged between 2035 Cumulative No Project and the 2035 Cumulative plus Service Improvements only, 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative, and 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions.

As discussed in Impact TR-18 on p. 4.2-121, the increased service proposed on the 14L Mission Limited and 17 Parkmerced would result in additional buses at the Daly City BART Station. The SFMTA is currently working with BART, as well as other agencies and jurisdictions including Caltrans, SamTrans, Parkmerced, SFCTA, San Francisco State University, and Daly City, on the Daly City Station Access Improvement Plan to increase capacity at the station for Muni and SamTrans buses, improve the bus intermodal facility, as well as address bicycle and pedestrian safety in the station vicinity.[76]

In addition, the realignment of the 29 Sunset from Geneva Avenue to Ocean Avenue would require pedestrians to access BART at the Balboa Park Station from the Ocean Avenue side of the station via an existing pedestrian pathway on the west side of the station. The SFMTA

[76] BART, Daly City Station Access Improvement Plan, June 2012. Available online at: http://www.bart.gov/about/planning/dalycity.aspx. Accessed March 27, 2013.

Table 22: Regional Transit Screenline Analysis – Existing and 2035 Cumulative Conditions – A.M. Peak Hour

Screenline/ Operator	Existing A.M. Peak Hour			2035 Cumulative A.M. Peak Hour		
	Ridership	Capacity	Capacity Utilization	Ridership	Capacity	Capacity Utilization
East Bay						
BART	19,716	22,050	89.4%	28,780	33,170	86.8%
AC Transit	1,568	2,829	55.4%	7,000	12,000	58.3%
Ferries	810	1,170	69.2%	4,682	5,940	78.8%
Subtotal	*22,094*	*26,049*	*84.8%*	*40,462*	*51,110*	*79.2%*
North Bay						
GGT buses	1,330	2,543	52.3%	1,990	2,543	78.3%
Ferries	1,082	1,959	55.2%	1,619	1,959	82.6%
Subtotal	*2,412*	*4,502*	*53.6%*	*3,609*	*4,502*	*80.2%*
South Bay						
BART	10,682	14,910	71.6%	13,847	24,182	57.3%
Caltrain	2,171	3,100	70.0%	2,310	3,600	64.2%
SamTrans	255	520	49.0%	271	520	52.1%
Ferries	0	0	0.0%	59	200	29.5%
Subtotal	*13,108*	*18,530*	*70.7%*	*16,487*	*28,502*	*57.8%*
Total All Screenlines	*37,615*	*49,081*	*76.6%*	*60,558*	*84,114*	*72.0%*

Source: Fehr & Peers, 2013. Research, studies, and analysis for TEP

Table 23: Regional Transit Screenline Analysis – Existing and 2035 Cumulative Conditions – P.M. Peak Hour

Screenline/ Operator	Existing P.M. Peak Hour			2035 Cumulative P.M. Peak Hour		
	Ridership	Capacity	Capacity Utilization	Ridership	Capacity	Capacity Utilization
East Bay						
BART	19,716	22,050	89.4%	28,780	33,170	86.8%
AC Transit	2,256	3,926	57.5%	7,000	12,000	58.3%
Ferries	805	1,615	49.8%	5,319	5,940	89.5%
Subtotal	*22,777*	*27,591*	*82.6%*	*41,099*	*51,110*	*80.4%*
North Bay						
GGT buses	1,384	2,817	49.1%	2,070	2,817	73.5%
Ferries	968	1,959	49.4%	1,619	1,959	82.6%
Subtotal	*2,352*	*4,776*	*49.2%*	*3,689*	*4,776*	*77.2%*
South Bay						
BART	10,682	14,910	71.6%	13,847	24,182	57.3%
Caltrain	2,377	3,100	76.7%	2,529	3,600	70.3%
SamTrans	141	320	44.1%	150	320	46.9%
Ferries	0	0	0.0%	59	200	29.5%
Subtotal	*13,200*	*18,330*	*72.0%*	*16,585*	*28,302*	*55.6%*
Total All Screenlines	*38,330*	*50,697*	*75.6%*	*61,373*	*84,188*	*72.9%*

Source: Fehr & Peers, 2013. Research, studies, and analysis for TEP is working with the SFCTA and BART on the Balboa Park Station Area Circulation Study, which includes implementation of pedestrian and bicycle improvements around the station to ensure similar or improved pedestrian access and crossings to the station.[77]

Impact C-TR-5: The TPS Toolkit elements as applied in the program-level TTRP corridors, and Service Improvements with the TTRP Moderate Alternative would not contribute considerably to ridership at the regional transit screenlines on AC Transit, Caltrain, Golden Gate Transit, SamTrans, and other regional ferry service under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions. (Less than Significant)

As noted in Impact C-TR-4, the proposed project would not affect cumulative ridership on regional transit service; therefore, the 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative's cumulative impacts on regional transit capacity utilization would be less than significant.

Impact C-TR-6: The TPS Toolkit elements as applied in program-level TTRP corridors, and Service Improvements with the TTRP Expanded Alternative, in combination with past, present and reasonably foreseeable development in San Francisco, would not contribute considerably to ridership at the regional transit screenlines on AC Transit, Caltrain, Golden Gate Transit, SamTrans, and other regional ferry service under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions. (Less than Significant)

As noted in Impact C-TR-4, the proposed project would not affect cumulative ridership on regional transit service; therefore, the 2035 Cumulative plus Service Improvements and TTRP Expanded Alternative's cumulative impacts on regional transit capacity utilization would be less than significant.

Cumulative Traffic Impacts

Impact C-TR-7: Implementation of the Service Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 and TPS Toolkit categories: Lane Modifications and Pedestrian Improvements as applied in program-level TTRP corridors, in combination with past, present and reasonably foreseeable development in San Francisco, would result in cumulative traffic impacts at intersections along the corridors under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions. (Significant and Unavoidable with Mitigation)

[77] Fehr & Peers and San Francisco County Transportation Authority, Balboa Park Station Area Circulation Study, March 2013. Available online at: http://www.sfcta.org/transportation-planning-and-studies/current-research-and-other-projectsstudies/balboa-park-station-area-circulation-study. Accessed March 27, 2013.

As described in Impact TR-3, implementation of Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 could result in implementation of TPS Toolkit elements and route realignments. Implementation of the TPS Toolkit elements within categories Lane Modifications and Pedestrian Improvements along program-level TTRP corridors may result in significant impacts on traffic operations, because some proposals would reduce mixed-flow capacity such that the vehicle traffic flow would not be accommodated in the remaining mixed-flow travel lanes. It is anticipated that implementation of transit-only lanes, widening of mixed-flow travel lanes through lane reductions, or widening of sidewalks could occur on a number of TTRP corridors that are being analyzed at a program level.

As described in Impact TR-14 above, implementation of the Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 and implementation of TPS Toolkit categories: Lane Modifications and Pedestrian Improvements as applied to the program-level TTRP corridors would have indirect significant impacts on the physical environment with respect to traffic as evidenced by the analysis of the project-level TTRP proposals. Because applying these toolkit items to the program-level TTRP corridors could result in significant impacts under Existing plus Project conditions, it could also result in impacts under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions. As noted in Impact TR-14, impacts could potentially occur at, but not be limited to the following 28 intersections on the program-level TTRP corridors:

- TTRP.1: California/Arguello, California/Park Presidio, California/Cherry, California/Locust, California/Presidio, and California/Divisadero
- TTRP.9: Potrero/Division, Potrero/16th, Potrero/17th, Potrero/21st, Potrero/23rd, Potrero/24th, Potrero/25th, Jerrold/Bayshore/U.S. 101 Northbound On-ramp, Bayshore/Oakdale, Bayshore/Industrial, and Bayshore/Silver
- TTRP.22_2: Fillmore/Lombard
- TTRP.71: Haight/Masonic, Stanyan/Haight, Stanyan/Frederick
- TTRP.K: Ocean/Junipero Serra, Ocean/Geneva/Phelan, Ocean/Lee, Ocean/Miramar, Ocean/Brighton
- TTRP.L: Taraval/19th, Taraval/Sunset

Mitigation Measure M-TR-8, which would optimize intersection geometries and traffic control measures to the greatest extent feasible when developing detailed design of the TTRP proposals, would minimize or reduce traffic impacts at intersections, including those listed above, and along roadway segments. However, because this mitigation measure may not be adequate to mitigate intersection operations to less-than-significant levels, and because the feasibility of providing additional capacity is unknown nor is it always possible to optimize the intersection such that LOS falls below LOS E, the impact on traffic operations would remain significant and unavoidable. Therefore, the impact of implementation of the Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 and TPS Toolkit categories Lane Modifications and Pedestrian Improvements under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions on traffic operations would be significant and unavoidable.

Impact C-TR-8: Implementation of the Service Policy Framework Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 and any of the TPS Toolkit elements within categories: Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant traffic impacts under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions, and therefore would not contribute to any significant cumulative traffic impacts. (Less than Significant)

As described above in Impact TR-2, Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 would not have a physical impact on the transportation network. The physical effects of the TEP project that may result from these actions would be the implementation of Service Improvements, Service Variants, and Service-related Capital Improvements. As described in the discussion under Impact TR-9 in the TPS Toolkit analysis, TPS Toolkit categories Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes would not involve travel lane reductions, and therefore, the impact of these TPS Toolkit elements, as applied to the program-level TTRP corridors on traffic operations would be less than significant.

Accordingly, the impact of implementation of the Policy Framework Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 and TPS Toolkit categories Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions on traffic operations would be less than significant.

Impact C-TR-9: Implementation of the Service Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 and TPS Toolkit categories: Lane Modifications and Pedestrian Improvements as applied in program-level TTRP corridors would result in cumulative traffic impacts at intersections along the corridors under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions. (Significant and Unavoidable with Mitigation)

As described in Impact C-TR-7 above for 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions, implementation of the Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 and implementation of TPS Toolkit categories Lane Modifications and Pedestrian Improvements as applied in program-level TTRP corridors would have indirect significant impacts on the physical environment with respect to traffic as evidenced by the analysis of the project-level TTRP proposals. Because the program-level TTRP corridors could result in significant impacts under Existing plus Project conditions, they could also result in impacts under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions. Impacts could potentially occur at, but not be limited to the following 28 intersections on the program-level TTRP corridors:

- TTRP.1: California/Arguello, California/Park Presidio, California/Cherry, California/Locust, California/Presidio, and California/Divisadero
- TTRP.9: Potrero/Division, Potrero/16th, Potrero/17th, Potrero/21st, Potrero/23rd, Potrero/24th, Potrero/25th, Jerrold/Bayshore/U.S. 101 Northbound On-ramp, Bayshore/Oakdale, Bayshore/Industrial, and Bayshore/Silver
- TTRP.22_2: Fillmore/Lombard
- TTRP.71: Haight/Masonic, Stanyan/Haight, and Stanyan/Frederick
- TTRP.K: Ocean/Junipero Serra, Ocean/Geneva/Phelan, Ocean/Lee, Ocean/Miramar, and Ocean/Brighton
- TTRP.L: Taraval/19th, and Taraval/Sunset

Mitigation Measure M-TR-8, which would optimize intersection geometries and traffic control measures to the greatest extent feasible when developing detailed design of the TTRP proposals, would minimize or reduce traffic impacts at intersections, including those listed above, and along roadway segments. However, because this mitigation measure may not be adequate to mitigate intersection operations to less-than-significant levels, and because the feasibility of providing additional capacity is unknown nor is it always possible to optimize the intersection such that LOS falls below LOS E, the impact on traffic operations would remain significant and unavoidable. Therefore, the impact of implementation of the Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 and TPS Toolkit categories Lane Modifications and Pedestrian Improvements under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions on traffic operations would be significant and unavoidable.

Impact C-TR-10: Implementation of the Service Policy Framework Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 and any of the TPS Toolkit elements within categories: Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant traffic impacts under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions, and therefore would not contribute to any significant cumulative traffic impacts. (Less than Significant)

As described above in Impact TR-2, Policy Framework Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 would not have a physical impact on the transportation network. The physical effects of the TEP project that may result from these actions would be the implementation of Service Improvements, Service Variants, and Service-related Capital Improvements. In addition, TPS Toolkit categories Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes would not involve travel lane reductions, and therefore, the impact of these TPS Toolkit elements, as applied to the program-level TTRP corridors on traffic operations would be less than significant.

Accordingly, the impact of implementation of the Policy Framework Objective A, Actions A.1, A.2, and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4 and TPS Toolkit categories Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions on traffic operations would be less than significant.

Impact C-TR-11: Implementation of the Service Improvements or Service Variants, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant traffic impacts under 2035 Cumulative plus Service Improvements only conditions, and therefore would not contribute to any significant cumulative traffic impacts. (Less than Significant)

Tables 24 and 25, on pp. 4.2-283 to 4.2-289, present the comparison of intersection LOS for 2035 Cumulative No Project conditions, 2035 Cumulative plus Service Improvements only, and 2035 Cumulative plus Service Improvements and both the TTRP Moderate and Expanded Alternatives for the a.m. and p.m. peak hours, respectively. Intersections operating at LOS E or LOS F are shown in bold and the shaded portions of Table 24 and 25 represent significant project impacts. Under 2035 Cumulative plus Service Improvements only, 23 of the 78 study intersections would operate at LOS E or LOS F conditions during the a.m. and/or p.m. peak hours.

Table 24: Intersection Level of Service – 2035 Cumulative and 2035 Cumulative plus Project Conditions – A.M. Peak Hour

Intersection	2035 Cumulative No Project		2035 Cumulative plus Service Improvements[5]		2035 Cumulative plus TTRP Moderate Alternative		2035 Cumulative plus TTRP Expanded Alternative	
	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
8. Broadway/Columbus	25	C	24	C	24	C	29	C
11. Sutter/Kearny	18	B	20	C	29	C	44	D
12. Market/Kearny/Third	33	C	32	C	27	C	33	C
13. Mission/Third	48	D	47	D	50	D	47	D
14. Mission/Fifth	49	D	48	D	43	D	**56**	**E**
15. Mission/South Van Ness/12th/Otis	51	D	51	D	50	D	50	D
16. 13th/Duboce/Mission/Otis	**>80 (1.48)**	**F**	**>80 (1.47)**	**F**	**>80 (1.48)**	**F**	**>80 (1.43)**	**F**
19. 16th/Mission	**75**	**E**	**76**	**E**	**71**	**E**	16	B
24. 16th/Seventh	**>80 (1.27)**	**F**	**>80 (1.29)**	**F**	**>80 (1.29)**	**F**	**>80 (1.71)**	**F**
25. 16th/Third	**>80 (1.40)**	**F**	**>80 (1.40)**	**F**	**>80 (1.40)**	**F**	**>80 (1.29)**	**F**
32. Randall/San Jose[6]	**>80 (1.13)**	**F**	**>80 (1.10)**	**F**	**>80 (1.11)**	**F**	**>80 (1.10)**	**F**
34. Randall/Mission[1,6]	33 (nb)	D	30 (nb)	D	28 (nb)	D	12	B
● 48. Geneva/I-280 Northbound On-ramp	**>80 (1.51)**	**F**	**>80 (1.49)**	**F**	**>80 (1.52)**	**F**	**>80 (1.45)**	**F**
49. Geneva/I-280 Southbound Off-ramp	51	D	49	D	42	D	43	D
50. Winston/19th	**>80 (1.32)**	**F**	**>80 (1.31)**	**F**	**>80 (1.30)**	**F**	**>80 (1.31)**	**F**
66. McAllister/Scott[1,7]	13 (nb)	B	13 (nb)	B	12	B	12 (nb)	B
67. 16th/Owens	**>80 (1.08)**	**F**	**>80 (1.09)**	**F**	**>80 (1.07)**	**F**	**>80 (1.79)**	**F**
68. 16th/Fourth	19	B	20	B	19	B	**79**	**E**
69. Guerrero/20th	29	C	31	C	32	C	39	D
70. South Van Ness/20th	19	B	19	B	20	C	21	C

Notes:

1. Unsignalized Intersections. Delay and LOS presented for worst approach, indicated in ( ) nb = northbound, sb = southbound, eb = eastbound, wb = westbound
2. Delay presented in seconds per vehicle.
3. Intersections operating at LOS E or LOS F highlighted in **bold.** For signalized intersections operating at LOS E or LOS F, the overall intersection v/c ratio is presented in ( ).
4. Shaded indicates project impact.
5. Due to diversion, minor redistribution of traffic volumes, or conversion of auto trips to transit trips as determined by SF-CHAMP, some peak hour intersection operating conditions may improve or degrade slightly when compared to 2035 Cumulative No Project conditions. In addition, based on the HCM methodology, delay and Level of Service is calculated based on an average of the total vehicular delay per approach, weighted by the number of vehicles at each approach. Increases in traffic volumes at an intersection usually result in increases in the overall intersection delay. However, if there are increases in the number of vehicles at movements with low delays, the average weighted delay per vehicle may remain the same or decrease. See Methodology section for additional discussion.
6. The existing all-way stop-controlled intersection of Randall/Mission (#34) and the signalized intersection of Randall/San Jose (#32) would be reconfigured under TTRP Expanded, and intersection of Randall/Mission would be signalized.
7. The existing all-way stop-controlled intersection of McAllister/Scott (#66) would be signalized under TTRP Moderate and reconfigured with a traffic circle under TTRP Expanded.

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP.

Table 25: Intersection Level of Service – 2035 Cumulative and 2035 Cumulative plus Project Conditions – P.M. Peak Hour

Intersection	2035 Cumulative No Project		2035 Cumulative plus Service Improvements[5]		2035 Cumulative plus TTRP Moderate Alternative		2035 Cumulative plus TTRP Expanded Alternative	
	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
1. North Point/Van Ness[1]	17 (wb)	C	17 (wb)	C	18 (wb)	C	18 (wb)	C
2. Chestnut/Van Ness	12	B	12	B	12	B	12	B
3. Filbert/Columbus	14	B	14	B	10	A	19	B
4. Columbus/Mason	9	A	7	A	10	A	13	B
5. Union/Columbus	19	B	19	B	18	B	20	C
6. Columbus/Green/Stockton	44	D	44	D	45	D	**75**	**E**
7. Vallejo/Stockton	15	B	17	B	17	B	18	B
8. Broadway/Columbus	18	B	18	B	18	B	19	B
9. Broadway/Sansome	21	C	27	C	27	C	25	C
10. Washington/Sansome	17	B	16	B	17	B	20	C
11. Sutter/Kearny	28	C	26	C	27	C	48	D
12. Market/Kearny/Third	**>80 (0.95)**	**F**	**>80 (0.94)**	**F**	**>80 (0.95)**	**F**	**>80 (0.94)**	**F**
13. Mission/Third	34	C	30	C	31	C	30	C
14. Mission/Fifth	39	D	38	D	32	C	**>80 (1.17)**	**F**
15. Mission/South Van Ness/12th/Otis	**57**	**E**	**56**	**E**	52	D	51	D
16. 13th/Duboce/Mission/Otis	**>80 (1.03)**	**F**	**>80 (1.02)**	**F**	**>80 (0.94)**	**F**	**>80 (0.93)**	**F**
17. Market/Church/14th	**>80 (1.23)**	**F**	**>80 (1.24)**	**F**	**>80 (1.20)**	**F**	**>80 (1.37)**	**F**
18. 16th/Guerrero	**80**	**E**	**78**	**E**	**65**	**E**	**72**	**E**
19. 16th/Mission	**76**	**E**	**74**	**E**	**61**	**E**	**>80 (1.30)**	**F**
20. 19th/Mission	17	B	16	B	18	B	15	B
21. 16th/Bryant	40	D	38	D	39	D	**>80 (1.42)**	**F**
22. 16th/Potrero	**78**	**E**	**70**	**E**	**65**	**E**	**>80 (1.65)**	**F**

Table 25: Intersection Level of Service – 2035 Cumulative and 2035 Cumulative plus Project Conditions – P.M. Peak Hour (continued)

Intersection	2035 Cumulative No Project		2035 Cumulative plus Service Improvements[5]		2035 Cumulative plus TTRP Moderate Alternative		2035 Cumulative plus TTRP Expanded Alternative	
	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
23. 16th/De Haro	37	D	37	D	36	D	53	D
24. 16th/Seventh	**>80 (1.29)**	**F**	**>80 (1.26)**	**F**	**>80 (1.19)**	**F**	**>80 (1.78)**	**F**
25. 16th/Third	**>80 (1.23)**	**F**	**>80 (1.23)**	**F**	**68**	**E**	**63**	**E**
● 26. 25th/Church[1,6]	23 (sb)	C	24 (sb)	C	10	B	**> 50 (wb)**	**F**
● 27. Cesar Chavez/Church[1,7]	18 (sb)	C	20 (sb)	C	8	A	**> 50 (eb)**	**F**
28. 24th/Mission	**58**	**E**	**60**	**E**	32	C	29	C
29. Cesar Chavez/Mission	35	D	34	C	42	D	27	C
30. Precita/Mission	18	B	17	B	17	B	19	B
31. 30th/Mission	15	B	15	B	12	B	23	C
32. Randall/San Jose[8]	**> 80 (1.09)**	**F**	**> 80 (1.09)**	**F**	**> 80 (1.09)**	**F**	**77**	**E**
33. Cortland/Mission	27	C	27	C	32	C	23	C
34. Randall/Mission[1,8]	33 (sb)	D	33 (sb)	D	33 (nb)	D	12	B
35. Silver/San Bruno	**>80 (1.18)**	**F**	**>80 (1.18)**	**F**	**75**	**E**	**65**	**E**
36. Felton/San Bruno[1,9]	**>50 (nb)**	**F**	**>50 (nb)**	**F**	**>50 (nb)**	**F**	31	C
37. Arleta/San Bruno/Bayshore	**>80 (1.45)**	**F**	**>80 (1.43)**	**F**	**>80 (1.45)**	**F**	**>80 (1.45)**	**F**
38. Geneva/Santos	14	B	13	B	13	B	16	B
39. Geneva/Carter	**78**	**E**	**78**	**E**	**78**	**E**	**>80 (1.37)**	**F**
40. Geneva/Moscow	40	D	38	D	39	D	**>80 (1.29)**	**F**
41. Templeton/Mission[1,10]	13 (sb)	B	15 (sb)	B	8	A	7	A
42. Geneva/Mission	26	C	25	C	18	B	22	C
43. Persia/Mission	20	B	20	C	19	B	24	C
44. Excelsior/Mission	10	B	10	B	12	B	16	B

Table 25: Intersection Level of Service – 2035 Cumulative and 2035 Cumulative plus Project Conditions – P.M. Peak Hour (continued)

Intersection	2035 Cumulative No Project		2035 Cumulative plus Service Improvements[5]		2035 Cumulative plus TTRP Moderate Alternative		2035 Cumulative plus TTRP Expanded Alternative	
	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
45. Silver/Mission	22	C	21	C	17	B	36	D
46. Geneva/Cayuga[1,11]	19	B	19	B	8	A	8	A
47. Geneva/San Jose	28	C	27	C	25	C	25	C
48. Geneva/I-280 Northbound On-ramp	**>80 (1.61)**	**F**	**>80 (1.57)**	**F**	**>80 (1.61)**	**F**	**>80 (1.55)**	**F**
49. Geneva/I-280 Southbound Off-ramp	**58**	**E**	**57**	**E**	45	D	44	D
50. Winston/19th [18]	**>80 (1.73)**	**F**	**>80 (1.70)**	**F**	**>80 (1.71)**	**F**	**>80 (1.73)**	**F**
● 51. Taraval/19th	42	D	42	D	37	D	52	D
52. Irving/Fourth[1,12]	15 (wb)	C	15 (wb)	B	9	A	10	A
53. Judah/36th [1]	18 (nb)	C	18 (nb)	C	12 (nb)	B	12 (nb)	B
54. Judah/23rd [1,13]	12 (wb)	B	12 (wb)	B	8	A	**43 (sb)**	**E**
55. Judah/19th	49	D	49	D	44	D	41	D
56. Judah/18th [1,14]	12 (eb)	B	12 (eb)	B	7	A	7	A
57. Judah/Tenth[1,15]	13 (wb)	B	15 (eb)	B	9	A	**> 50 (sb)**	**F**
58.Carl/Stanyan	35	C	37	D	32	C	32	C
59. Fulton/Stanyan	**>80 (1.09)**	**F**	**78**	**E**	**74**	**E**	**75**	**E**
60. Fulton/Parker	**60**	**E**	**60**	**E**	**60**	**E**	**68**	**E**
61. Fulton/Masonic	23	C	23	C	24	C	**79**	**E**
62. McAllister/Central[1,16]	9 (sb)	A	9 (sb)	A	9 (sb)	A	17 (sb)	C
63. McAllister/Baker[1]	9 (sb)	A	10 (sb)	A	10 (sb)	A	10 (sb)	A
64. Fulton/Baker	16	B	18	B	17	B	17	B
65. McAllister/Divisadero	17	B	19	B	19	B	19	B

Table 25: Intersection Level of Service – 2035 Cumulative and 2035 Cumulative plus Project Conditions – P.M. Peak Hour (continued)

Intersection	2035 Cumulative No Project		2035 Cumulative plus Service Improvements[5]		2035 Cumulative plus TTRP Moderate Alternative		2035 Cumulative plus TTRP Expanded Alternative	
	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
66. McAllister/Scott[1,17]	13 (sb)	B	13 (sb)	B	13	B	11 (sb)	B
67. 16th/Owens	34	C	33	C	32	C	**>80 (1.36)**	**F**
68. 16th/Fourth	33	C	34	C	34	C	**>80 (1.05)**	**F**
69. Guerrero/20th	16	B	16	B	15	B	17	B
70. South Van Ness/20th	14	B	14	B	16	B	16	B
● 71. Taraval/Sunset	27	C	26	C	27	C	27	C
● 72. Ulloa/15th [19]	11 (wb)	B	10 (eb)	B	13	B	7 (eb)	A
● 73. Potrero/23rd	**>80 (1.23)**	**F**	**>80 (1.22)**	**F**	24	C	26	C
● 74. Potrero/24th	**>80 (1.29)**	**F**	**>80 (1.30)**	**F**	**>80 (1.29)**	**F**	**>80 (1.28)**	**F**
● 75. Potrero/25th	44	D	44	D	19	B	19	B
● 76. Haight/Shrader [20]	11 (wb)	B	11 (wb)	B	28	C	**>50 (nb/sb)**	**F**
● 77. Haight/Masonic	36	D	36	D	25	C	24	C
● 78. Haight/Buchanan [21]	27 (eb)	D	27 (eb)	D	20	C	19	B

Notes:

1. Unsignalized Intersection. Delay and LOS presented for worst approach, indicated in ( ) nb = northbound, sb = southbound, eb = eastbound, wb = westbound
2. Delay presented in seconds per vehicle.
3. Intersections operating at LOS E or LOS F highlighted in **bold.** For signalized intersections operating at LOS F, the overall intersection v/c ratio is presented in ( ).
4. Shaded indicates project impact.
5. Due to diversion, minor redistribution of traffic volumes, or conversion of auto trips to transit trips as determined by SF-CHAMP, some peak hour intersection operating conditions may improve or degrade slightly when compared to 2035 Cumulative No Project conditions. In addition, based on the HCM methodology, delay and Level of Service is calculated based on an average of the total vehicular delay per approach, weighted by the number of vehicles at each approach. Increases in traffic volumes at an intersection usually result in increases in the overall intersection delay. However, if there

Table 25: Intersection Level of Service – 2035 Cumulative and 2035 Cumulative plus Project Conditions – P.M. Peak Hour (continued)

Intersection	2035 Cumulative No Project		2035 Cumulative plus Service Improvements[5]		2035 Cumulative plus TTRP Moderate Alternative		2035 Cumulative plus TTRP Expanded Alternative	
	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS

are increases in the number of vehicles at movements with low delays, the average weighted delay per vehicle may remain the same or decrease. See Methodology section for additional discussion.

6. The existing all-way stop-controlled intersection of 25th/Church (#26) assumed signalized under TTRP Moderate, and two-way stop-controlled with stop signs on eastbound and westbound approaches under TTRP Expanded.
7. The existing all-way stop-controlled intersections of Cesar Chavez/Church (#27) assumed signalized under TTRP Moderate, and two-way stop-controlled with stop signs on eastbound and westbound approaches under TTRP Expanded.
8. The existing all-way stop-controlled intersection of Randall/Mission (#34) and signalized intersection of Randall/San Jose (#32) reconfigured under TTRP Expanded, and intersection of Randall/Mission would be signalized.
9. The existing all-way stop-controlled intersection of Felton/San Bruno (#36) assumed signalized under TTRP Expanded.
10. The existing all-way stop-controlled intersection of Templeton/Mission (#41) assumed signalized under TTRP Expanded.
11. The existing all-way stop-controlled intersection of Geneva/Cayuga (#46) assumed signalized under TTRP Moderate and TTRP Expanded.
12. The existing all-way stop-controlled intersection of Irving/Fourth (#52) assumed signalized under TTRP Moderate and TTRP Expanded.

Table 25: Intersection Level of Service – 2035 Cumulative and 2035 Cumulative plus Project Conditions – P.M. Peak Hour (continued)

Intersection	2035 Cumulative No Project		2035 Cumulative plus Service Improvements[5]		2035 Cumulative plus TTRP Moderate Alternative		2035 Cumulative plus TTRP Expanded Alternative	
	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS

13. The existing all-way stop-controlled intersection of Judah/23rd (#54) assumed signalized under TTRP Moderate, and two-way stop-controlled with stop signs on the northbound and southbound approaches under TTRP Expanded.
14. The existing all-way stop-controlled intersection of Judah/18th (#56) assumed signalized under TTRP Moderate and TTRP Expanded.
15. The existing all-way stop-controlled intersection of Judah/Tenth (#57) assumed signalized under TTRP Moderate, and two-way stop-controlled with stop signs on the northbound and southbound approaches under TTRP Expanded.
16. The existing all-way stop-controlled intersection of McAllister/Central (#62) assumed two-way stop-controlled with stop signs on the eastbound and westbound approaches under TTRP Moderate.
17. The existing all-way stop-controlled intersection of McAllister/Scott (#66) would be signalized under TTRP Moderate and reconfigured with a traffic circle under TTRP Expanded.
18. The intersection of Winston Drive/19th Avenue would operate at LOS F during the weekend p.m. peak hour under 2035 Cumulative No Project conditions, and would continue to operate at LOS F under 2035 Cumulative plus Service Improvements conditions, 2035 Cumulative plus TTRP Moderate Alternative conditions, and 2035 Cumulative plus TTRP Expanded Alternative conditions.

- 19. The existing all-way stop-controlled intersection of Ulloa/15th (#72) assumed signalized under the TTRP Moderate Alternative, and stop-sign controlled for the northbound and eastbound approaches under TTRP Expanded Alternative.
- 20. The existing all-way stop-controlled intersection of Haight/Shrader (#76) assumed signalized under the TTRP Moderate Alternative, and two-way stop-controlled with stop signs on the northbound and southbound approaches, and eastbound and westbound left turns restricted under TTRP Expanded Alternative.
- 21. The existing all-way stop-controlled intersection of Haight/Buchanan (#78) assumed signalized under the TTRP Moderate Alternative and TTRP Expanded Alternative conditions. The new signal would include a transit queue jump on Haight Street in the eastbound direction.

Source: SFMTA, Fehr & Peers, 2013. Research, studies, and analysis for TEP

- During the a.m. peak hour, eight of the 20 study intersections would operate at LOS E or LOS F conditions (13th/Duboce/Mission/Otis, 16th/Mission, 16th/Seventh, 16th/Third, Randall/San Jose, Geneva/I-280 northbound on-ramp, Winston/19th, and 16th/Owens)
- During the p.m. peak hour, 22 of the 78 study intersections would operate at LOS E or LOS F conditions (Market/Kearny/Third, Mission/South Van Ness/12th/Otis, 13th/Duboce/Mission/Otis, Market/Church/14th, 16th/Guerrero, 16th/Mission, 16th/Potrero, 16th/Seventh, 16th/Third, 24th/Mission, Randall/San Jose, Silver/San Bruno, Felton/San Bruno, Arleta/San Bruno/Bayshore, Geneva/Carter, Geneva/I-280 Northbound On-ramp, Geneva/I-280 Southbound Off-ramp, Winston/19th, Fulton/Stanyan, Fulton/Parker, Potrero/23rd, and Potrero/24th).

Under the 2035 Cumulative plus Service Improvements only, increases in traffic volumes were reviewed at the critical movements at intersections that would operate at LOS E or F under 2035 Cumulative No Project and 2035 Cumulative plus Service Improvements conditions to determine whether the proposed project increases would contribute considerably to the poor operating conditions. Detailed calculations and a discussion of the Service Improvements' contribution to specific intersections are included in the project's transportation impact study (TIS) and the supplemental memorandum for analysis of the project-level TTRP.L, TTRP.9, and TTRP.71_1 projects.[78] 2035 Cumulative plus Service Improvements only would not result in any reduction in roadway capacity, and therefore, the v/c ratio at the study intersections was not reviewed to determine if the project would result in an increase in overall intersection v/c ratio of more than 10 percent.

Under 2035 Cumulative plus Service Improvements only, the Service Improvements would have less-than-significant contributions to the 23 study intersections that would operate at LOS E or LOS F under 2035 Cumulative conditions (Market/Kearny/Third, Mission/South Van Ness/12th/Otis, 13th/Duboce/Mission/Otis, Market/Church/14th, 16th/Guerrero, 16th/Mission, 16th/Potrero, 16th/Seventh, 16th/Third, 24th/Mission, Randall/San Jose, Silver/San Bruno, Felton/San Bruno, Arleta/San Bruno/Bayshore, Geneva/Carter, Geneva/I-280 Northbound On-ramp, Geneva/I-280 Southbound Off-ramp, Winston/19th, Fulton/Stanyan, Fulton/Parker, 16th/Owens, Potrero/23rd, and Potrero/24th). The remaining 55 of the 78 study intersections would operate at LOS D or better under both 2035 Cumulative No Project and 2035 Cumulative plus Service Improvements only conditions. Therefore, the 2035 Cumulative plus Service Improvements only would not contribute considerably to cumulative operating conditions at the study intersections operating at LOS E or LOS F, and the

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[78] Fehr & Peers and LCW Consulting, *San Francisco Transit Effectiveness Project Transportation Impact Study*, July 10, 2013. Fehr & Peers and LCW Consulting, *TEP TIS – Supplemental Analysis for TTRP.L, TTRP.9 and TTRP.71_1*, Final Memorandum, December 30, 2013. Copies of these documents are available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

cumulative traffic impact under 2035 Cumulative plus Service Improvements only conditions would be less than significant.

Impact C-TR-12: Implementation of the TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14 Variant 1, TTRP.14 Variant 2, TTRP.22_1, TTRP.28_1, TTRP.30_1, or TTRP.71_1 would have less-than-significant traffic impacts under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions, and therefore would not contribute to any significant cumulative traffic impacts. (Less than Significant)

Under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative, 19 of the 78 study intersections would operate at LOS E or LOS F conditions during the a.m. and/or p.m. peak hours.

- During the a.m. peak hour, eight of the 20 study intersections would operate at LOS E or LOS F conditions (13th/Duboce/Mission/Otis, 16th/Mission, 16th/Seventh, 16th/Third, Randall/San Jose, Geneva/I-280 Northbound On-ramp, Winston/19th, and 16th/Owens).
- During the p.m. peak hour, 18 of the 78 study intersections would operate at LOS E or LOS F conditions (Market/Kearny/Third, 13th/Duboce/Mission/Otis, Market/Church/14th, 16th/Guerrero, 16th/Mission, 16th/Potrero, 16th/Seventh, 16th/Third, Randall/San Jose, Silver/San Bruno, Felton/San Bruno, Arleta/San Bruno/Bayshore, Geneva/Carter, Geneva/I-280 Northbound On-ramp, Winston/19th, Fulton/Stanyan, Fulton/Parker, and Potrero/24th).

Under the 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative, increases in traffic volumes were reviewed at the critical movements at intersections that would operate at LOS E or LOS F under 2035 Cumulative No Project and 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions to determine whether the increases would contribute considerably to the poor operating conditions. Detailed calculations are included in the project's TIS and memorandum for analysis of project-level TTRP.L, TTRP.9, and TTRP.71_1 projects.[79] The TTRP Moderate Alternative does not propose any reduction in roadway capacity at any study intersections that would operate at LOS E or LOS F under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative, thus the change in overall intersection v/c ratio was not reviewed to determine if the project would result in an increase in overall intersection v/c ratio of more than 10 percent.

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[79] Ibid, Appendix C.

Under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions, there would be less-than-significant project-specific impacts as a result of the TTRP Moderate Alternative (i.e., the TTRP Moderate Alternative plus Service Improvements would not cause intersection LOS operating conditions at study intersections to deteriorate from LOS D or better to LOS E or LOS F, or from LOS E to LOS F). The TTRP Moderate Alternative would have less-than-significant contributions to the above-noted 19 study intersections that would operate at LOS E or LOS F during the a.m. and/or p.m. peak hours under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions. The remaining 59 of the 78 study intersections would operate at LOS D or better under both 2035 Cumulative No Project and 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions. Therefore, the 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative would not contribute considerably to cumulative operating conditions at the study intersections operating at LOS E or LOS F, and the cumulative traffic impact under 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions would be less than significant.

Impacts C-TR-13 to C-TR-37: Implementation of the TTRP Expanded Alternative for the TTRP.J, TTRP.5, TTRP.8X, TTRP.14, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.30_1, and TTRP.30_1 Variant 1, or TTRP.30_1 Variant 2, in combination with past, present and reasonably foreseeable development in San Francisco, would result in cumulative traffic impacts at 13 study intersections that would operate at LOS E or LOS F under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions. (Significant and Unavoidable)

Under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative, 29 study intersections would operate at LOS E or LOS F conditions during the a.m. and/or p.m. peak hours.

- During the a.m. peak hour, nine of the 20 study intersections would operate at LOS E or LOS F conditions (Mission/Fifth, 13th/Duboce/Mission/Otis, 16th/Seventh, 16th/Third, Randall/San Jose, Geneva/I-280 Northbound On-ramp, Winston/19th, 16th/Owens, and 16th/Fourth).

- During the p.m. peak hour, 29 of the 78 study intersections would operate at LOS E or LOS F (Columbus/Green/Stockton, Market/Kearny/Third, Mission/Fifth, 13th/Duboce/Mission/Otis, Market/Church/14th, 16th/Guerrero, 16th/Mission, 16th/Bryant, 16th/Potrero, 16th/Seventh, 16th/Third, 25th/Church, Cesar Chavez/Church, Randall/San Jose, Silver/San Bruno, Arleta/San Bruno/Bayshore, Geneva/Carter, Geneva/Moscow, Geneva/I-280 Northbound On-ramp, Winston/19th, Judah/23rd, Judah/Tenth, Fulton/Stanyan, Fulton/Parker, Fulton/Masonic, 16th/Owens, 16th/Fourth, Potrero/24th, and Haight/Shrader).

At study intersections that would operate at LOS E or LOS F under 2035 Cumulative No Project conditions and which would continue to operate at LOS E or LOS F under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions, changes in traffic volumes were reviewed at the critical movements to determine whether the proposed project increases would contribute considerably to the critical movements. In addition, under the TTRP Expanded Alternative, the proposals for TTRP.J, TTRP.8X, TTRP.9, TTRP.14, TTRP.22, TTRP.28, and TTRP.30 would include Lane Modification proposals that would convert mixed-flow lanes to transit-only lanes. Therefore, the overall intersection v/c ratio at the study intersections along these corridors (Market/Church/14th, Geneva/Carter, Geneva/Moscow, 13th/Duboce/Mission/Otis, 16th/Mission 19th/Mission, 16th/Bryant, 16th/Potrero, 16th/Seventh, 16th/Owens, 16th/Fourth, 16th/Third, Winston/Drive/19th Avenue, Columbus/Green/Stockton, Market/Kearny/Third, and Potrero/24th) that would operate at LOS E or LOS F under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative was reviewed to determine if the project would result in an increase in overall intersection v/c ratio of more than 10 percent.

In general, the evaluation found the following:

- As noted earlier, the TTRP Expanded Alternative would result in project-specific significant impacts identified at five intersections under Existing plus Project conditions, therefore the TTRP Expanded Alternative would also result in cumulatively considerable impacts at these intersections (Columbus/Green/Stockton, 16th/Bryant, 16th/Potrero, 16th/Seventh, and Randall/San Jose) under the 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative, as identified and described below.

- The TTRP Expanded Alternative would also result in project-specific significant and cumulatively considerable impacts under 2035 Cumulative conditions plus Service Improvements and the TTRP Expanded Alternative at seven additional intersections (Mission/Fifth, Mission/16th, Geneva/Carter, Geneva/Moscow, Fulton/Masonic, 16th/Owens, and 16th/Fourth) by worsening intersection operating conditions from LOS D or better to LOS E or LOS F, or from LOS E to LOS F) as identified and described below.

- The TTRP Expanded Alternative would contribute considerably at one intersection that would operate at LOS E or LOS F under 2035 Cumulative plus the TTRP Expanded Alternative conditions (i.e., either a contribution to critical movements or increase in intersection v/c ratio), and the contributions would be considered a significant cumulative impact (Market/Church/14th) as identified and described below.

Each of the intersections at which the 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative would result in a significant cumulative impact was reviewed to determine if mitigation measures could reduce the impact to less-than-significant levels or lessen the severity of the project's contribution to significant cumulative impacts. A detailed discussion of the feasibility of mitigation measures for each intersection where the project would result in significant cumulative impacts is provided in the project's TIS.[80] Overall, no feasible mitigation measures were found to mitigate significant cumulative impacts for the affected intersections. The cumulative traffic impacts would generally be due not just to the proposed project, but also to increases in traffic in the region caused by long-term anticipated growth. Generally, additional travel lane capacity would be needed on one or more approaches to the intersection in order to mitigate LOS E or LOS F intersection operating conditions. The provision of additional travel lane capacity would typically require the narrowing of sidewalks, removal of on-street parking, removal of bicycle lanes, and/or the conversion of existing transit-only lanes to mixed-flow lanes. These actions would generally be inconsistent with the transit, bicycle, and pedestrian environment encouraged by the City's *Transit First* Policy because it would remove space dedicated to pedestrians, bicycles, and/or transit and increase the distances required for pedestrians to cross streets. Additional improvements, such as changes to the signal timing cycle length and/or green time allocations, may improve conditions slightly but generally would not reduce significant cumulative impacts to less-than-significant levels. Thus, the identified cumulative traffic impacts under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions, would remain significant and unavoidable.

Specifically, implementation of the 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative proposals, in conjunction with long-term growth in Bay Area and the City of San Francisco, would result in significant cumulative traffic impacts at the following intersections:

- Impact C-TR-13: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.J Expanded Alternative would contribute considerably to cumulative traffic impacts at the intersection of Market/Church/14th streets during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-14: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.5 Expanded Alternative would result in cumulative traffic impacts at the intersection of Fulton Street/Masonic Avenue during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-15: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.8X Expanded Alternative would result in cumulative traffic impacts at the intersection of Geneva Avenue/Carter Street during the p.m. peak hour. (Significant and Unavoidable)

[80] Fehr & Peers and LCW Consulting, *San Francisco Transit Effectiveness Project Transportation Impact Study*, July 10, 2013. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

- Impact C-TR-16: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.8X Expanded Alternative would result in cumulative traffic impacts at the intersection of Geneva Avenue/Moscow Street during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-17: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.14 Expanded Alternative would result in project and cumulative traffic impacts at the intersection of Randall Street/San Jose Avenue during the a.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-18: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.14 Expanded Alternative would result in cumulative traffic impacts at the intersection of Mission/Fifth streets during the a.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-19: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.14 Expanded Alternative would result in cumulative traffic impacts at the intersection of Mission/16th streets during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-20: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative would result in project and cumulative traffic impacts at the intersection of 16th/Bryant streets during the p.m. peak hour. With implementation of **Mitigation Measure M-TR-26: Intersection Restriping at 16th Street/Bryant Street**, intersection operations would improve to LOS E but not to less-than-significant levels (i.e., to LOS D or better conditions in the p.m. peak hour). (Significant and Unavoidable with Mitigation)

- Impact C-TR-21: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 1 would result in project and cumulative traffic impacts at the intersection of 16th/Bryant streets during the p.m. peak hour. With implementation of **Mitigation Measure M-TR-26: Intersection Restriping at 16th Street/Bryant Street**, intersection operations would improve to LOS E but not to less-than-significant levels. (Significant and Unavoidable with Mitigation)

- Impact C-TR-22: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 2 would result in project and cumulative traffic impacts at the intersection of 16th/Bryant streets during the p.m. peak hour. With implementation of **Mitigation Measure M-TR-26: Intersection Restriping at 16th Street/Bryant Street**, intersection operations would improve to LOS E but not to less-than-significant levels. (Significant and Unavoidable with Mitigation)

- Impact C-TR-23: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative would result in project and cumulative traffic impacts at the intersection of 16th/Potrero streets during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-24: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 1 would result in project and cumulative traffic impacts at the intersection of 16th/Potrero streets during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-25: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 2 would result in project and cumulative traffic impacts at the intersection of 16th/Potrero streets during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-26: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative would result in cumulative traffic impacts at the intersection of 16th/Owens streets during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-27: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 1 would result in cumulative traffic impacts at the intersection of 16th/Owens streets during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-28: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 2 would result in cumulative traffic impacts at the intersection of 16th/Owens streets during the p.m. peak hour. (Significant and Unavoidable)

- Impact C-TR-29: Implementation of the 2035 Cumulative plus Service Improvements plus the TTRP.22_1 Expanded Alternative would result in cumulative traffic impacts at the intersection of 16th/Fourth streets during the a.m. and p.m. peak hours. (Significant and Unavoidable)

- Impact C-TR-30: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 1 would result in cumulative traffic impacts at the intersection of 16th/Fourth streets during the a.m. and p.m. peak hours. (Significant and Unavoidable)

- Impact C-TR-31: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 2 would result in cumulative traffic impacts at the intersection of 16th/Fourth streets during the a.m. and p.m. peak hours. (Significant and Unavoidable)
- Impact C-TR-32: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative would result in project and cumulative traffic impacts at the intersection of 16th/Seventh streets during the a.m. and p.m. peak hours. (Significant and Unavoidable)
- Impact C-TR-33: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 1 would result in project and cumulative traffic impacts at the intersection of 16th/Seventh streets during the a.m. and p.m. peak hours. (Significant and Unavoidable)
- Impact C-TR-34: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.22_1 Expanded Alternative Variant 2 would result in project and cumulative traffic impacts at the intersection of 16th/Seventh streets during the a.m. and p.m. peak hours. (Significant and Unavoidable)
- Impact C-TR-35: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.30_1 Expanded Alternative would result in project and cumulative traffic impacts at the intersection of Columbus Avenue/Green Street/Stockton Street. (Significant and Unavoidable)
- Impact C-TR-36: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.30_1 Expanded Alternative Variant 1 would result in project and cumulative traffic impacts at the intersection of Columbus Avenue/Green Street/Stockton Street. (Significant and Unavoidable)
- Impact C-TR-37: Implementation of the 2035 Cumulative plus Service Improvements and the TTRP.30_1 Expanded Alternative Variant 2 would result in project and cumulative traffic impacts at the intersection of Columbus Avenue/Green Street/Stockton Street. (Significant and Unavoidable)

- **Impact C-TR-38: Implementation of the TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, or TTRP.71_1, in combination with past, present and reasonably foreseeable development in San Francisco, would not contribute considerably to significant cumulative traffic impacts at 16 study intersections that would operate at LOS E or LOS F under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions. (Less than Significant)**

- As noted in the summary discussion of Impacts C-TR-13 to C-TR-37, under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative, 29 of the 78 study intersections would operate at LOS E or LOS F conditions during the a.m. and/or p.m. peak hours. The 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative would contribute to significant cumulative impacts at 13 of the 29 intersections described and identified above. The cumulative contributions at the remaining 16 intersections projected to operate at LOS E or F under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions (i.e., at Market/Kearny/Third, 13th/Duboce/Mission/Otis, 16th/Guerrero, 16th/Third, 25th/Church, Cesar Chavez/Church, Silver/San Bruno, Arleta/San Bruno/Bayshore, Geneva/I-280 Northbound On-ramp, Winston/19th, Judah/23rd, Judah/Tenth, Fulton/Stanyan, Fulton/Parker, Potrero/24th, and Haight/Shrader) would not be considerable. Therefore, cumulative traffic impacts for the 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative at these 16 intersections would be less than significant.

- **Impact C-TR-39: Implementation of the TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, or TTRP.71_1 would not result in significant cumulative traffic impacts at 48 study intersections that would operate at LOS D or better under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions. (Less than Significant)**

- As shown in Tables 24 and 25, on pp. 4.2-283 to 4.2-289, 48 of the study intersections would operate at LOS D or better under 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions. Because these intersections would operate within acceptable standards, the cumulative traffic impacts as a result of the 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative at 48 intersections would be less than significant.

Cumulative Pedestrian and Bicycle Impacts

Impact C-TR-40: Implementation of the Service Policy Framework and any of the TPS Toolkit elements within categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, and Pedestrian Improvements as applied in program-level TTRP corridors, Service Improvements or Service Variants, and Service-related Capital Improvements, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative pedestrian and bicycle impacts. (Less than Significant)

Pedestrian Impacts. Implementation of the Policy Framework would not result in direct physical effects. Any indirect effects of the Policy Framework would result from projects developed to implement its objectives. The TEP projects provide a reasonable representation of the type and scope of physical changes that would be expected to occur as a result of implementing the Policy Framework. Therefore, the analysis of the environmental impacts of the TEP project components for pedestrians provides a good understanding of the indirect impacts related to pedestrians of the Policy Framework as described below.

Implementation of any of the TPS Toolkit elements within the categories of Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, and Pedestrian Improvements as applied in program-level TTRP corridors would enhance pedestrian conditions at intersections due to the implementation of elements such as pedestrian bulbs, transit bulbs, pedestrian refuge islands, crosswalks, and wider sidewalks in addition to installation of traffic calming measures and the conversion of flag stops to transit zones in some locations. The resulting TTRP improvements would not result in overcrowding of sidewalks or create new potentially hazardous conditions for pedestrians. In general, the elements identified above would improve pedestrian conditions by facilitating safe and easy pedestrian crossings, by providing safe spaces for pedestrians to wait, by increasing access to transit, by slowing traffic, and by increasing pedestrian visibility to drivers. The exception would be Lane Modifications, if implemented without other TPS Toolkit elements; pedestrian conditions would remain similar to Existing conditions.

Transit service levels would be expected to change over time. The SFMTA monitors transit operations and makes adjustments to meet transit demand, as necessary and according to resource availability. This would continue to occur under future cumulative conditions. Anticipated growth within San Francisco would result in increased transit demand and crowding on certain transit screenlines and corridors as discussed in Impact C-TR-1. The proposed Service Improvements or Service Variants would result in an increase in transit vehicles along some routes and may introduce transit service on streets that currently do not have transit, which, as analyzed in Impact TR-18, could result in an increased potential for pedestrian, bicycle, and transit conflicts. However, this increased service would not result in new hazardous conditions for pedestrians. The increased frequency of transit service would result in persons being able to board without waiting for a long time. Once at their destination, alighting passengers typically would disperse in different directions depending on their destination. Therefore, walk trips associate with transit operations under the Service Improvements would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas under cumulative conditions.

The Service-related Capital Improvements would be needed to implement the Service Improvements or Service Variants. These projects would result in construction of elements such as transit and pedestrian bulbs that would improve pedestrian conditions by adding space to wait, improving pedestrian safety, shortening the street crossing distance, and improving pedestrian visibility. Overall, they would provide safer access to transit. The overhead wire projects would increase sidewalk furniture, but, given the spacing and size of the support poles, would not materially affect the existing sidewalk environment. The Service-related Capital Improvements would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas under cumulative conditions.

For the above reasons, there would not be significant cumulative pedestrian impacts as a result of the Policy Framework and any of the TPS Toolkit elements within categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, and Pedestrian Improvements as applied in program-level TTRP corridors, or as a result of the Service Improvements or Service Variants, or the Service-related Capital Improvements.

Bicycle Impacts. The TEP projects provide a reasonable representation of the type and scope of physical changes that would be expected to occur as a result of implementing the Policy Framework. Therefore, the analysis of the environmental impacts of the TEP project components for bicycles provides a good understanding of the indirect impacts related to bicycles of the Policy Framework as described below.

Implementation of any of the TPS Toolkit elements within categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, and Pedestrian Improvements as applied in program-level TTRP corridors would not substantially affect bicycle facilities because the majority of the TTRP corridors are not designated bicycle routes (with the exception of Bicycle Route 25 on Potrero Avenue and Bicycle Route 90 on Ocean Avenue), or only overlap bicycle routes in certain one- to two-block segments, and in most locations do not have existing bicycle lanes. In some cases, as analyzed under TTRP.22_1 Expanded Alternative (and Variants), lane modifications may result in the shifting or replacement of bicycle facilities on to nearby streets (such as moving the bicycle lanes from 16th Street to 17th Street between Kansas and Seventh streets), potentially reducing vehicle-bicycle conflicts by shifting the bicycle facilities away from Rapid Network corridors and major arterial streets. In general, transit-bicycle interactions would remain substantially the same as under Existing conditions. For example, when a transit vehicle stops at a transit bulb next to a bicycle lane, the bicyclists would need to wait behind the bus similar to vehicular traffic. In some instances, conditions for bicycles would improve such as removal of parking, which would decrease parked vehicle-bicycle conflicts. Also, turn restrictions would reduce the potential for conflicts between vehicles and bicycles. Pedestrian improvements such as pedestrian bulbs and pedestrian refuge islands would not impede bicycle travel. Therefore, the TPS Toolkit categories Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, and Pedestrian Improvements, as applied to the TTRP program-level corridors would not result in hazardous conditions for bicyclists or otherwise substantially interfere with bicycle facilities or accessibility, and were determined to have less-than-significant cumulative bicycle impacts.

Some transit routes with Service Improvements overlap with the bicycle route network or other bicycle facilities. The proposed Service Improvements would result in an increase in transit vehicles along some routes and may introduce transit service on streets that currently do not have transit, which, as analyzed in Impact TR-18, could result in an increased potential for pedestrian, bicycle, and transit conflicts. However, this overlap in service with bicycle routes would not affect the operation of the bicycle facilities, and the typical increase in a few buses per hour as well as the increase in numbers of bicyclists as a result of citywide growth or changes in mode would not substantially affect bicycle travel along the route. In some instances where multiple routes travel on the same street, the increase in buses per hour would be greater. Although with additional buses and bicycle riders there would be increased conflicts between bicycles and buses, the Service Improvements would not result in hazardous conditions for bicyclists or otherwise substantially interfere with bicycle facilities or accessibility. Therefore, the Service Improvements or Service Variants were determined to have less–than-significant cumulative bicycle impacts.

The Service-related Capital Improvements would be needed to implement the Service Improvements or Service Variants. Bicycle conditions would not change substantially over Existing conditions as a result of the Service-related Capital Improvements. The Terminal and Transfer Point Improvements would install pedestrian bulbs, transit bulbs and may extend transit zones. At some locations, transit bulbs are proposed adjacent to a bicycle lane (for example, program-level TTPI.4 on Potrero Avenue), and with implementation of the transit bulbs, buses would be stopped within the bicycle lane. However, similar delays and crossing of bicycle lanes by buses currently occur under Existing conditions at other locations throughout the City. These improvements would not substantially affect bicycle facilities and conditions for bicycles would remain similar to Existing conditions. Overhead wire expansion projects would not affect travel lanes in the right-of-way. Accessible platforms typically could be accommodated without affecting the adjacent travel lane or bicycle lanes. Under the SCI.2, the contraflow lane extension would not affect bicycle access along Bicycle Route 11 on Sansome Street. As discussed under Impact TR-19, hazards for bicyclists would not be increased. Therefore, the Service-related Capital Improvements would not result in potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility.

Anticipated growth within San Francisco would result in increased traffic with deterioration in intersection operating conditions at some intersections as demonstrated by changes to the level of service under 2035 Cumulative No Project conditions. The increase in transit service as a result of the TEP proposals would contribute to these conditions. Similarly, with an increase of all traffic, including transit, there could be an increase in vehicle-bicycle conflicts. However, as described above, the TPS Toolkit elements within categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, and Pedestrian Improvements as applied in program-level TTRP corridors, or as a result of the Service Improvements or Service Variants, or the Service-related Capital Improvements would not materially alter the operation of bicycle facilities. Considering the TEP Policy Framework and the TPS Toolkit, the Service Improvements, or the Service-related Capital Improvements cumulatively with past, present and reasonably foreseeable future projects and growth throughout the City, the cumulative effects of these TEP projects and elements would similarly not result in hazardous conditions for bicyclists or otherwise substantially interfere with bicycle facilities or accessibility. Furthermore, the *San Francisco Bicycle Plan* (*Bicycle Plan*) provides a plan for improving bicycle facilities throughout the City in order to increase safe bicycle use, including minimizing conflicts with traffic and transit. Past, present, and future projects will continue to be reviewed for consistency with the *Bicycle Plan*, *Transit First* Policy, and other applicable policies and codes addressing bicycle facilities and safety within the City.

For the above reasons, there would not be significant cumulative bicycle impacts as a result of the Policy Framework and any of the TPS Toolkit elements or as a result of the Service Improvements, or the Service-related Capital Improvements.

- **Impact C-TR-41: Implementation of the Service Improvements or Service Variants and the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14 Variant 1 and TTRP Variant 2, TTRP.22_1, TTRP.28_1, TTRP.30_1, or TTRP.71_1, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative pedestrian and bicycle impacts. (Less than Significant)**

- **Pedestrian Impacts**. Implementation of the 11 project-level TTRP Moderate Alternative proposals or their variants, including the Service Improvements or Service Variants, would enhance pedestrian conditions at intersections due to the implementation of elements such as pedestrian bulbs, transit bulbs, pedestrian refuge islands, crosswalks, and wider sidewalks in addition to installation of traffic calming measures and the conversion of flag stops to transit zones in some locations. The TTRP Moderate Alternative would not result in overcrowding of sidewalks or create new potentially hazardous conditions for pedestrians. In general, the elements identified above would improve pedestrian conditions by facilitating safe and easy pedestrian crossings, by providing safe spaces to wait, by increasing access to transit, by slowing traffic, and by increasing pedestrian visibility to drivers. The exception would be Lane Modifications, if implemented without other TPS Toolkit elements; pedestrian conditions would remain similar to Existing conditions. The proposed Service Improvements or Service Variants would result in an increase in transit vehicles along some routes and may introduce transit service on streets that currently do not have transit, which, as analyzed in

Impact TR-18, could result in an increased potential for pedestrian, bicycle, and transit conflicts. However, this increased service, in combination with the TTRP improvements as well as the overall growth in pedestrians as a result of City development, would not result in new hazardous conditions for pedestrians.

Some TTRP projects would include relocating, consolidating, or removing bus stops, and some passengers may need to walk farther to access a transit stop. The increased distances may inconvenience some passengers; however, the overall transit stop spacing would be consistent with the SFMTA's *Proposed Revisions to Transit Stop Spacing Guidelines*.[81] See the discussion in Impact TR-7 regarding the effects on pedestrians of removing or consolidating transit stops, including the effects on the elderly and disabled. While bus stop removal may increase the physical effort required to reach the transit line/route, thus posing a challenge to some riders, the stop removal would remain consistent with the SFMTA bus stop spacing guidelines and would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas.

Transit service levels would be expected to change over time. The SFMTA monitors transit operations and makes adjustments to meet transit demand, as necessary and according to resource availability. This would continue to occur under future cumulative conditions. Anticipated growth within San Francisco would result in increased transit demand and crowding on certain transit screenlines and corridors as discussed in Impact C-TR-1. However, the increased frequency of transit service would result in persons being able to board without waiting for a long time. Once at their destination, alighting passengers typically would disperse in different directions depending on their destination. In addition, TEP improvements at transit stops would provide adequate space for additional passengers to wait for the next transit vehicle. Therefore, walk trips associate with transit operations under the TTRP Moderate Alternative would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas under cumulative conditions. For the above reasons and because there would be less-than-significant project-level pedestrian impacts, the TTRP Moderate Alternative, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative pedestrian impacts.

[81] SFMTA, *Proposed Revisions to Transit Stop Spacing Guidelines*, February 16, 2012. This report is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

Bicycle Impacts. Implementation of the TTRP Moderate Alternative for the TTRPs and their variants, in combination with the Service Improvements or Service Variants, would result in an increase in transit trips and changes to some transit routes throughout the City, as well as the implementation of physical improvements along the TTRP corridors. These physical changes within the City rights-of-way would include new transit bulbs, establishment of transit-only lanes, signalization of intersections, installation of traffic circles, and other TPS Toolkit elements specified in described in Chapter 2, Project Description, Section 2.5.2.2, on pp. 2-102 to 2-110. These physical improvements included in the TTRP Moderate Alternative would not create new potentially hazardous conditions for bicyclists but in some cases, may result in a slight delay for bicyclists. For example, on streets with one travel lane in each direction, a bus stopped at a transit bulb could require a bicyclist behind the bus to wait while the passengers boarded, rather than the existing configuration that allows buses to pull out of the travel lane to board passengers. Other TPS Toolkit elements may reduce hazards for bicyclists, such as the signalization of intersections that holds traffic on side streets while the bicyclist clears the intersection. As discussed above, the proposed Service Improvements or Service Variants would result in an increase in transit vehicles along some street segments and may introduce transit service on streets that currently do not have transit, resulting in an increased potential for bicycle, traffic, and transit conflicts. However, many of these street segments are not part of the bicycle route network, and as such, alternative routes would be available to bicyclists, as bicycles are permitted to use any street within the City's street network. These changes to transit service would not present a hazard to bicyclists. While implementation of the TEP would not reduce or eliminate existing conflicts between bicycles, traffic, and transit vehicles, implementation of the project would not result in a substantial increase in conflicts over Existing conditions, nor would the proposals result in hazardous conditions for bicyclists. The increase in transit service and reduction in travel time along major transit corridors could also be beneficial for bicyclists (most transit buses have bicycle racks) in that it would improve the transit leg of a multi-modal trip or provides improved access to destinations such as the Marin Headlands and the Golden Gate Bridge.

Considering the TTRP Moderate Alternative for the TTRPs and their variants, in combination with the Service Improvements or Service Variants, cumulatively with past, present and reasonably foreseeable future projects and growth throughout the City, the cumulative effects of these TEP projects would similarly not result in hazardous conditions for bicyclists or otherwise substantially interfere with bicycle facilities or accessibility.

The *San Francisco Bicycle Plan* (*Bicycle Plan*) adopted in 2009 provides a plan for improving bicycle facilities throughout the City in order to increase safe bicycle use, including minimizing conflicts with traffic and transit. Past, present, and future public and private projects will continue to be reviewed for consistency with the *Bicycle Plan*, *Transit First* Policy, and other applicable policies and codes addressing bicycle facilities and safety within the City. The project's compliance with the City's *Transit First* Policy would support the goal of making travel by public transit, by bicycle, and on foot an attractive alternative to travel by private automobile.

The *Bicycle Plan* considered future growth in vehicle trips, including transit, in its planned network and street improvements. The plan acknowledges that new public projects, such as the Better Market Street Plan, Van Ness and Geary BRT projects, etc., will need to adequately incorporate the planned bicycle facilities in the Plan. For the above reasons, the TTRP Moderate Alternative or its variants, in combination with past, present and reasonably foreseeable development in San Francisco, would have a less-than-significant cumulative impact on bicycles.

- **Impact C-TR-42: Implementation of the Service Improvements or Service Variants and the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, or TTRP.71_1 in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative pedestrian and bicycle impacts. (Less than Significant)**

- **Pedestrian Impacts.** Similar to the TTRP Moderate Alternative, implementation of the 11 project-level TTRP Expanded Alternative proposals or their variants, including the Service Improvements or Service Variants, would enhance pedestrian conditions at intersections due to the implementation of elements such as pedestrian bulbs, transit bulbs, pedestrian refuge islands, crosswalks, and wider sidewalks in addition to installation of traffic calming measures and the conversion of flag stops to transit zones in some locations. The TTRP Expanded Alternative would not result in overcrowding of sidewalks or create new potentially hazardous conditions for pedestrians. As described in Impact C-TR-41, in general, the elements identified above would improve pedestrian conditions by facilitating safe and easy pedestrian crossings, by providing safe spaces to wait, by increasing access to transit, by slowing traffic, and by increasing pedestrian visibility to drivers. The proposed Service Improvements or Service Variants would result in an increase in transit vehicles along some routes and may introduce transit service on streets that currently do not have transit, this increased service, in combination with the TTRP improvements, would not result in new hazardous conditions for pedestrians.

As described in Impact C-TR-41 above, some TTRP projects would include relocating, consolidating, or removing bus stops, increasing the distance passengers walk to access a transit stop. While bus stop removal may increase the physical effort required to reach the transit line/route, thus posing a challenge to some riders, the stop removal would remain consistent with the SFMTA bus stop spacing guidelines and would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas.

Transit service levels would be expected to change over time. The SFMTA monitors transit operations and makes adjustments to meet transit demand, as necessary and according to resource availability. This would continue to occur under future cumulative conditions. As described in Impact C-TR-41 above, walk trips associate with transit operations under the TTRP Expanded Alternative would, similar to the TTRP Moderate Alternative, not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to a particular site and adjoining areas under cumulative conditions. For the above reasons, the TTRP Expanded Alternative, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative pedestrian impacts.

Bicycle Impacts. Similar to the TTRP Moderate Alternative, implementation of the TTRP Expanded Alternative for the TTRPs and their variants, in combination with the Service Improvements or Service Variants, and Service-related Capital Improvements, would result in an increase in transit trips and changes to some transit routes throughout the City, as well as the implementation of physical improvements along many of the major transit corridors. These physical changes within the City rights-of-way would include new transit bulbs, establishment of transit-only lanes, signalization of intersections, construction of traffic circles, and other TPS Toolkit elements described in Chapter 2, Project Description, Section 2.5.1.3 on pp. 2-23 to 2-51. The TTRP.22_1 Expanded Alternative (and Variants), would result in shifting the bicycle lanes located on 16th Street to nearby 17th Street, potentially reducing vehicle-bicycle conflicts by shifting the bicycle facilities away from this corridor. Under TTRP.5 Expanded Alternative, conversion of all-way stop-controls to traffic circles at intersections along McAllister Street would reduce the frequency with which bicyclists on McAllister Street would have to stop and start, which would be an improvement for bicyclists. These physical improvements included in the TTRP Expanded Alternative would not create new potentially hazardous conditions for bicyclists but in some cases, may results in a slight delay for bicyclists. For example, on streets with one travel lane in each direction, a bus stopped at a transit bulb could require a bicyclist behind the bus to wait while the passengers boarded, rather than the existing configuration that allows buses to pull out of the travel lane to board passengers. Other TPS Toolkit elements implemented under the TTRP Expanded Alternative may reduce hazards for bicyclists, such as the conversion of flag stops to bus zones that eliminates accidents from people opening doors of parked cars in the path of an oncoming bicyclist or the signalization of intersection that holds traffic on side streets while the bicyclist clears the intersection. As discussed above, the proposed Service Improvements or Service Variants, and Service-related Capital Improvements would result in an increase in transit vehicles along some routes and may introduce transit service on streets that currently do not have transit, resulting in an increased potential for bicycle, traffic, and transit conflicts. However, many of these street segments are not part of the bicycle route network, and as such, alternative routes are available to bicyclists, as bicyclists are permitted to use any street within the City's street network. These changes to transit service would not present a hazard to bicyclists. While implementation of the TEP would not reduce or eliminate existing conflicts between bicycles, traffic, and transit vehicles, implementation of the proposed project would not result in a substantial increase in conflicts nor would it result in hazardous conditions for bicyclists. The increase in transit service and reduction in travel time along major transit corridor could also be beneficial for bicyclists (most transit buses have bicycle racks) in that it would improve the transit leg of a multi-modal trip or provide improved access to more special destinations, such as the Marin Headlands and Golden Gate Bridge.

Considering the TTRP Expanded Alternative for the TTRPs and their variants, in combination with the Service Improvements or Service Variants, cumulatively with past, present and reasonably foreseeable future projects and growth throughout the City, the cumulative effects of these TEP projects would similarly not result in hazardous conditions for bicyclists or otherwise substantially interfere with bicycle facilities or accessibility.

As described in Impact C-TR-41, all future public and private projects, including the proposed TTRP Expanded Alternative and its variants, have and will continue to be reviewed for consistency with the *Bicycle Plan* and other applicable policies and codes addressing bicycle facilities and safety within the City. The City continues to fund and construct capital projects to improve bicycle facilities within the public right-of-way. Past, present, and future private development projects are reviewed for their consistency with the *Bicycle Plan* and *Transit First* Policy, in part to minimize conflicts with bicycle facilities, i.e. driveway locations, eliminating parking queues from backing up into the travel lane. The projects compliance with the City's *Transit First* Policy seeks to make travel by public transit, by bicycle, and on foot an attractive alternative to travel by private automobile. The *Bicycle Plan* considered future growth in vehicle trips, including transit, in its planned network and street improvements. The plan acknowledges that new public projects, such as the Better Market Street Plan, Van Ness and Geary BRT projects, etc., will need to adequately incorporate the planned bicycle facilities in the Plan. For the above reasons, the TTRP Expanded Alternative or its variants, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative bicycle impacts.

Cumulative Loading Impacts

Impact C-TR-43: Implementation of the Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5, and TPS Toolkit Categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements as applied to the program-level TTRP corridors in combination with past, present and reasonably foreseeable development in San Francisco, would result in cumulative loading impacts. (Significant and Unavoidable with Mitigation)

The impact related to the loss of on-street commercial loading spaces would depend on the number of commercial loading spaces that would be eliminated, the location of the spaces, the availability of alternate locations to accommodate loading/unloading activities, and whether the loss of loading would result in potentially hazardous conditions or significant delay affecting transit, traffic, bicycles, or pedestrians. In situations where large amounts of commercial loading spaces are removed, where loading demand cannot be reasonably accommodated within existing adjacent locations, and roadway right-of-way is constrained, such that a potentially hazardous condition is created or significant delay affecting traffic, transit, bicycles or pedestrians occurs, potential significant cumulative impacts to loading may result.

The commercial loading impacts identified under the project-level TTRP corridors for components of the TEP are representative of the indirect effects of the Policy Framework related to commercial loading. Therefore, as identified in Impact TR-5, Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 and the TPS Toolkit categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements, as applied to the program level TTRPs may result in indirect impacts to commercial loading. In addition, the application of the following TPS Toolkit categories to the program-level TTRP corridors may result in significant cumulative impacts on loading: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements. Therefore, the indirect cumulative commercial loading impacts of these TEP components would also be considered significant. Implementation of **Mitigation Measure M-TR-10** could reduce the indirect cumulative loading impacts of the Policy Framework as represented by the TTRPs to a less-than-significant level. However, in some locations with a high volume of loading demand, and at locations where mitigation is incompatible with the proposed improvement, or where roadway geometry precludes implementation of mitigation, these indirect commercial loading impacts may not be reduced to a less-than-significant level; therefore, the Policy Framework Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5 and the TPS Toolkit categories: Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements, as applied to the program-level TTRP projects may result in significant cumulative loading impacts, and these indirect commercial loading impacts would be considered significant and unavoidable.

Impact C-TR-44: Implementation of the project-level TTRP Moderate Alternative including the TTRP.14 Variant 1, TTRP.14 Variant 2, and TTRP.30_1 in combination with past, present and other reasonably foreseeable development in San Francisco, would result in cumulative loading impacts. (Significant and Unavoidable with Mitigation)

The project level TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, and TTRP.30_1 Moderate Alternative would result in project-specific loading impacts under Existing plus Project conditions on Mission and Stockton streets along the TTRP corridors, and therefore these would also result in significant cumulative impacts to loading on Mission and Stockton streets. With implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, the impacts related to loss of commercial loading spaces on transit and traffic operations would be reduced. However, because the effectiveness of the use of camera video enforcement on the new transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, cumulative impacts to loading of the TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, and TTRP.30_1 Moderate Alternative on these corridors would remain significant and unavoidable.

Impact C-TR-45: Implementation of the project-level TTRP Expanded Alternative including the TTRP.14, TTRP.30_1, TTRP.30_1 Variant 1, and TTRP.30_1 Variant 2, in combination with past, present and reasonably foreseeable development in San Francisco, would result in project and cumulative loading impacts. (Significant and Unavoidable with Mitigation)

The project-level TTRP.14 Expanded Alternative, TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, and TTRP.30_1 Expanded Alternative Variant 2 would result in project-specific commercial loading impacts under Existing plus Project conditions on Mission and Stockton streets along the TTRP corridors, and therefore these would also result in significant cumulative impacts to commercial loading on these corridors. With implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, the impacts related to loss of commercial loading spaces on transit and traffic operations would be reduced. However, because the effectiveness of the use of camera video enforcement on the new transit-only lanes is not known, and because the implementation of video equipment is dependent on annual budget appropriations, project-related cumulative impacts on loading as a result of the TTRP.14 Expanded Alternative, TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, and TTRP.30_1 Expanded Alternative Variant 2 on Mission and Stockton streets would remain significant and unavoidable.

Impact C-TR-46: Implementation of the Policy Framework Objective A, Actions A.1, A.2 and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4, TPS Toolkit Category Traffic Signal and Stop Sign Changes as applied in program-level TTRP corridors, Service Improvements, and Service-related Capital Improvements, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative loading impacts. (Less than Significant)

Implementation of Policy Framework Objective A, Actions A.1, A.2, and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4, as discussed under Impact TR-6, would not result in any indirect impacts to commercial loading activities. Similarly, the implementation of the TPS Toolkit category Traffic Signal and Stop Sign Changes as applied to the program level TTRP corridors would not result in an increase in loading demand, and would result in limited or no loss of on-street loading spaces. Considering the potential loss of commercial loading spaces over time related to the implementation of the TPS Toolkit category Traffic Signal and Stop Sign Changes, and Policy Framework Objective A, Actions A.1, A.2, and A.4, Objective B, Actions B.1 through B.4, Objective C, Actions C.1 and C.2, and Objective D, Actions D.1 through D.4, in combination with the cumulative changes to the commercial loading environment, the commercial loading impacts of these TEP elements would not be considered cumulatively considerable, and therefore the cumulative impact to commercial loading would be considered less than significant.

As discussed under Impact TR-18, the Service Improvements and Service Variants would result in limited loss of on-street loading spaces (limited or no commercial loading spaces in any one location) in a limited number of locations where these TEP components would be implemented. Similarly, Service-related Capital Improvements such as Terminal and Transfer Point Improvements (TTPI), Overhead Wire Expansions (OWE), or Systemwide Capital Infrastructure (SCI) would not result in substantial loss of on-street loading spaces in any one location. Therefore, in combination with the cumulative changes to the commercial loading environment, the loss of commercial loading related to the Service Improvements and Service-related Capital Improvements, would not be cumulatively considerable, and therefore, the cumulative impact related to commercial loading would be considered less than significant.

Impact C-TR-47: Implementation of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, or TTRP.71_1, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative loading impacts. (Less than Significant)

Implementation of the project-level TTRP.J Moderate Alternative, TTRP.L Moderate Alternative, TTRP.N Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.9 Moderate Alternative, TTRP.22_1 Moderate Alternative, TTRP.28_1 Moderate Alternative, or TTRP.71_1 Moderate Alternative would not result in an increase in loading demand nor result in a substantial reduction in the number of on-street commercial loading spaces in the vicinity of any of the affected TTRP corridors. These site-specific removals or relocations of commercial loading spaces would not substantially alter the cumulative commercial loading environment along these corridors. Therefore, the cumulative loading impacts of the TTRP.J Moderate Alternative, TTRP.L Moderate Alternative, TTRP.N

Moderate Alternative, TTRP.5 Moderate Alternative, TTRP.8X Moderate Alternative, TTRP.9 Moderate Alternative, TTRP.22_1 Moderate Alternative, TTRP.28_1 Moderate Alternative, or TTRP.71_1 Moderate Alternative would be considered less than significant.

Impact C-TR-48: Implementation of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.22_1 Variant 1, TTRP.22_1

Variant 2, TTRP.28_1, or TTRP.71_1, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant loading impacts. (Less than Significant)

- Implementation of the project-level TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, TTRP.9 Expanded Alternative, TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, TTRP.22_1 Expanded Alternative Variant 2, TTRP.28_1 Expanded Alternative, or TTRP.71_1 Expanded Alternative would not result in an increase in loading demand nor result in a substantial reduction in the number of on-street commercial loading spaces in the vicinity of any of the affected TTRP corridors. The site-specific commercial loading space removals, or temporary loss of commercial loading space (as under TTRP.22_1 Expanded Alternative Variant 1), would not substantially alter the cumulative commercial loading environment along these corridors. Therefore, the cumulative loading impacts of the TTRP.J Expanded Alternative, TTRP.L Expanded Alternative, TTRP.N Expanded Alternative, TTRP.5 Expanded Alternative, TTRP.8X Expanded Alternative, TTRP.9 Expanded Alternative, TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, TTRP.22_1 Expanded Alternative Variant 2, TTRP.28_1 Expanded Alternative, or TTRP.71_1 Expanded Alternative would be considered less than significant.

Cumulative Parking Impacts

Impact C-TR-49: Implementation of the Service Policy Framework Objective A, Action A.3 and Objective C, Actions C.3, C.4 and C.5, and the TPS Toolkit categories: Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements as applied in program-level TTRP corridors, in combination with past, present and reasonably foreseeable development in San Francisco, may result in significant cumulative parking impacts. (Significant and Unavoidable with Mitigation)

Implementation of the Policy Framework Objective A, Action A.3 and Objective C, Actions C.3, C.4 and C.5, and the TPS Toolkit categories: Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements as applied to the program-level TTRP corridors would not result in direct physical effects. Any indirect effects of these aspects of the Policy Framework would result from projects developed to implement its objectives. The TEP projects provide a reasonable representation of the type and scope of physical changes that would be expected to occur as a result of implementing the Policy Framework. Therefore, the analysis of the environmental impacts of the TEP project components identified to parking provides a good understanding of the indirect impacts related to parking of the Policy Framework as described below.

The TPS Toolkit elements within categories: Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements as applied in program-level TTRP corridors, may result in substantial parking removal. Lane Modifications could temporarily or permanently restrict access to on-street parking spaces if parking spaces are removed to implement transit-only lanes. Parking and turn restrictions could temporarily or permanently limit access to on-street parking spaces. Parking restrictions could be implemented either during peak periods, such as 7 to 9 a.m. or 4 to 6 p.m., or permanently to facilitate bus travel on streets with narrow travel lanes. Pedestrian Improvements such as the installation of pedestrian bulbs would result in one to two parking spaces being removed in any one location. However, sidewalk widening may result in substantial loss of parking along the corridor depending upon the existing sidewalk and parking conditions.

Although the detailed designs are not yet developed for the program-level TTRP corridors, the analysis of the project-level TTRPs illustrates that there would likely be a decrease in the overall on-street parking supply that may or may not be able to be replaced. The parking spaces that would be displaced due to part-time (for example, implementation of tow-away parking restrictions) and permanent loss of parking spaces along the TTRP corridors may be accommodated on other nearby streets, or in other off-street parking facilities, depending on the area. This could result in increased competition for the remaining other on-street, and potentially off-street, parking supply in these areas. At some locations, drivers and passengers would have to walk further between the parking space and destination, or switch to transit or other modes. By design, the TTRPs would be implemented on the Rapid Network and therefore, land uses along these corridors would be well served by transit. These corridors already accommodate pedestrians, and bicycle facilities are often located on nearby streets. Although the loss of parking along these corridors as a result of the installation of TPS Toolkit elements, particularly Lane Modifications (transit-only lanes or lane reductions), Parking and Turn Restrictions, and Pedestrian Improvements categories, could be high, it would generally be distributed along the length of the affected corridor. The parking loss along a particular corridor as a result of these TPS Toolkit elements would not be considered substantial at the project level because the TTRP corridors are well served by public transit and other modes, and the proposed project improvements would improve transit and pedestrian conditions.

Considering cumulative parking conditions, over time, due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking is likely to increase. Additionally, through the implementation of the City's *Transit First* Policy and City's Better Streets program and related projects, especially along commercial corridors, on-street parking may be further removed to promote alternative modes of travel and sustainable street designs.

Under cumulative conditions the loss of parking resulting from implementation of the TPS Toolkit elements, in combination with future cumulative growth and potential cumulative parking loss along these corridors, could contribute to substantial parking shortfalls such that transportation system users experience hazardous conditions or there are significant delays to traffic, transit, bicycles or pedestrians. As such, the Policy Framework Objective A, Action

A.3 and Objective C, Actions C.3, C.4 and C.5, and the TPS Toolkit categories: Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements would result in cumulatively considerable contribution to a significant cumulative parking impact. Mitigation Measure M-C-TR-49 to Explore the Implementation of Parking Management Strategies in the project area may address some of the issues related to parking.

Mitigation Measure M-C-TR-49: Explore the Implementation of Parking Management Strategies.

SFMTA shall explore whether implementation of parking management strategies would be appropriate and effective in this and other parts of the City to more efficiently manage the supply of on-street parking over time.

The SFMTA is piloting the use of such parking supply management strategies as the SFpark Program, as one example of a parking management strategy that could be implemented.[82] The program provides real-time information about the availability of parking supply as well as adjusts parking rates to better manage parking demand. The use of technologies to inform drivers searching for parking where available spaces are reduces circling and other secondary environmental effects related to constrained parking conditions. The pilot has been implemented in a number of areas in the City, including the Financial District, SoMa/Mission Bay, Fisherman's Wharf, the Marina, and the Mission. However, the effectiveness of this program is still under study; an evaluation of the program is not anticipated to occur until the fall 2013 or spring 2014. While the use of the SFpark Program or other similar parking management strategies would improve transportation conditions within an area, it is uncertain if these would mitigate a significant cumulative parking impact to a less-than-significant level. Therefore, the cumulative parking impact would be considered significant and unavoidable with mitigation, and the parking loss with respect to implementing Service Policy Framework Objective A, Action A.3 and Objective C, Actions C.3, C.4 and C.5, and the TPS Toolkit categories: Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements would result in a significant and unavoidable considerable contribution to this cumulative parking impact.

Impact C-TR-50: Implementation of the Service Policy Framework Objective A, Actions A.1, A.2, and A.4, Objective B all actions, Objective C, Actions C.1 and C.2, and Objective D all actions, and any of the TPS Toolkit elements within categories: Transit Stop Changes and Traffic Signal and Stop Sign Changes, and Pedestrian Improvements as applied in program-level TTRP corridors, Service Improvements, and Service-related Capital Improvements, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative parking impacts. (Less than Significant)

[82] Information on the SFpark program is available online at http://sfpark.org/. Accessed July 5, 2013.

Implementation of the Policy Framework Objective A, Actions A.1, A.2, and A.4, Objective B, all actions, Objective C, Actions C.1 and C.2, and Objective D, all actions would not result in direct physical effects. Any indirect effects of these aspects of the Policy Framework would result from projects developed to implement its objectives. The TEP projects provide a reasonable representation of the type and scope of physical changes that would be expected to occur as a result of implementing the Policy Framework. Therefore, the analysis of the environmental impacts of the TEP project components with respect to parking provides a good understanding of the indirect impacts related to parking of the Policy Framework as described below.

The TPS Toolkit elements within categories: Transit Stop Changes and Traffic Signal and Stop Sign Changes as applied in program-level TTRP corridors, would not result in substantial parking removal. Transit stop changes would result in the introduction or removal of transit stops in conjunction with the conversion from a flag stop to a transit zone, the installation of transit bulbs and lengthening bulbs or zones. Typically new stops would result in the removal of two to five parking spaces in one location. Transit bulbs would typically be installed where an existing transit zone exists, and therefore, parking would not be removed. Traffic Signal and Stop Sign Changes would result in the loss of up to eight parking spaces at any one location. The parking loss along a particular corridor as a result of these TPS Toolkit elements would not be considered substantial. In addition, parking loss as a result of these improvements would be less-than-significant because the corridors are well served by public transit and other modes, and the proposed project improvements would improve transit and pedestrian conditions.

The Service Improvements or Service Variants would not result in substantial parking removal, and would similarly not affect commercial loading spaces or passenger loading/unloading zones. For the proposed route realignments, some parking would be removed for new transit stops (two to five spaces per stop), and some parking would be added where transit stops are removed. In addition, changes to the location of a route terminal may result in the removal of up to five parking spaces in one location. The parking removal would not be concentrated in one location and also would not be substantial. This parking removal would be considered a less-than-significant project-level parking impact as a result of the Service Improvements or Service Variants.

The Service-related Capital Improvements would result in removal of a limited number of parking spaces. Terminal and Transfer Point Improvements may result in changes to terminal locations and the installation or extension of transit zones or transit bulbs. Parking removal would be limited, typically up to five parking spaces in any one location. In general, the Overhead Wire Extension projects would not affect on-street parking supply for the installation of the overhead wire infrastructure. The Systemwide Capital Improvements consist of the Sansome Street Contraflow Lane Extension (SCI.2) and the Accessible Platforms (SCI.1). SCI.1 would result in the loss of up to six parking spaces in any one location. SCI.2 would result in the conversion of up to 17 parking spaces to commercial loading spaces. Therefore, the parking loss as a result of the Service-related Capital Improvements would not be substantial and would result in a less-than-significant project-level parking impact.

Considering cumulative parking conditions, over time, due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking is likely to increase. Additionally, through the implementation of the City's *Transit First* Policy and City's Better Streets program and related projects, especially along commercial corridors, on-street parking may be further removed to promote alternative modes of travel and sustainable street designs. The loss of parking under the TEP components described above would not be considered substantial and would not result in an increased parking demand. In consideration with the above cumulative conditions, the Policy Framework Objective A, Actions A.1, A.2, and A.4, Objective B, all actions, Objective C, Actions C.1 and C.2, and Objective D, all actions, and any of the TPS Toolkit elements within categories: Transit Stop Changes and Traffic Signal and Stop Sign Changes as applied in program-level TTRP corridors, Service Improvements or Service Variants, and Service-related Capital Improvements, in combination with past, present and reasonably foreseeable development in San Francisco, would not result in significant cumulative parking impacts.

- **Impact C-TR-51: Implementation of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1, or TTRP.71_1, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative parking impacts. (Less than Significant)**

Implementation of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1, and TTRP.71_1 would not result in an increase in parking demand. These TTRP Moderate Alternative proposals would in most cases, but not all, result in the elimination of some on-street parking spaces along the TTRP corridor. Some of the corridors under the TTRP Moderate Alternative would result in the addition of on-street parking. Any loss of parking spaces could be accommodated on other nearby streets, which could result in increased competition for the remaining other on-street, and potentially off-street, parking supply. However, in addition to the parking losses, if any, not being substantial, the affected corridors are well served by transit (particularly because the TEP is proposing transit improvements on the Rapid Network corridors), as well as by other modes, with transit and pedestrian improvements proposed as part of the project.

A decrease in the on-street parking supply, where it would occur, would be considered an inconvenience, but would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles. Hence, as described under Impact TR-57, the parking loss along the TTRP corridors as a result of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1, and TTRP.71_1 would not be substantial and would be considered a less-than-significant project-level parking impact.

Considering cumulative parking conditions, over time, due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking is likely to increase. Additionally, through the implementation of the City's *Transit First* Policy and City's Better Streets program and related projects, especially along commercial corridors, on-street parking may be further removed to promote alternative modes of travel and sustainable street designs. Where parking removal would occur under the TTRP Moderate Alternative, the removal would likely be spread out over the TTRP corridor, and therefore, in combination with other development along the corridors would not represent a substantial portion of the parking shortfalls that could occur over time. The TTRP proposals in the TTRP Moderate Alternative would encourage transit use through the reduction of transit travel time and increase of transit reliability, which may further lead to a mode shift from private passenger vehicles to transit. Furthermore, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel (for example, transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, may induce drivers to shift to other modes of travel, or change their overall travel habits. The loss of parking under these TTRP proposals would not be considered substantial and these TTRP Moderate Alternative proposals would not result in an increased parking demand, and in consideration with the above cumulative conditions, the TTRP Moderate Alternative proposals for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1,and TTRP.71_1 would not result in significant cumulative parking impacts.

Impact C-TR-52: Implementation of the project-level TTRP Moderate Alternative for the TTRP.14 Variant 1 or the TTRP.14 Variant 2, in combination with past, present and reasonably foreseeable development in San Francisco, would result in significant cumulative parking impacts. (Significant and Unavoidable with Mitigation)

As described under Impact TR-57, TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 would result in a net decrease in the number of on-street parking spaces over the entire Mission Street corridor of approximately 1,160 and 960 parking spaces respectively.[83] Of these spaces, 1,130 spaces for TTRP.14 Moderate Alternative Variant 1 and 715 spaces for TTRP.14 Moderate Alternative Variant 2 would be

[83] For the purposes of this analysis, parking loss numbers have been rounded to whole numbers wherever feasible, and therefore, approximations of parking losses on segments may not be equivalent to estimates on the entire corridor.

available outside of the part-time tow-away periods (enforced for the TTRP.14 corridor from 7 a.m. to 7 p.m.), and would therefore be available for parking in the area in the evening and, in some locations, for overnight parking. Therefore, TTRP.14 Moderate Alternative Variant 1 would result in a permanent loss of approximately 30 spaces, and TTRP.14 Moderate Alternative Variant 2, a permanent loss of approximately 245 spaces. Under the TTRP.14 Moderate Alternative Variant 1, on Mission Street north of 13th Street approximately 370 parking spaces would be lost; of these 360 would be part-time parking spaces, available for parking outside of the 7 a.m. to 7 p.m. tow-away period (10 permanent parking space removals). It is important to note that approximately 360 of these spaces are already not available during the tow-away peak period and the propose project would simply be extending the hours during which parking lanes have tow-away restrictions on them (for a detailed discussion of this, please see Impact TR-57). Between 13th Street and Cesar Chavez Street, there would be a net change of 430 parking spaces eliminated; of these, 415 spaces would be part-time, tow-away spaces and 15 would be permanent parking space removals. South of Cesar Chavez Street, there would be a net change of 360 parking spaces eliminated; of these 355 would be part-time, tow-away spaces and five would be permanent parking space removals.

Under the TTRP.14 Moderate Alternative Variant 2, on Mission Street north of 13th Street approximately 370 parking spaces would be lost, of these 360 would be part-time tow-away spaces, available for parking outside of the 7 a.m. to 7 p.m. tow-away period and would be 10 permanent parking space removals. It is important to note that approximately 360 of these spaces are already not available during the tow-away peak period and the proposed project would simply be extending the hours during which parking lanes have tow-away restrictions on them (for a detailed discussion of this, please see Impact TR-57). Between 13th Street and Cesar Chavez Street, there would be a net loss of 230 permanent parking spaces eliminated related to side-running transit only lanes in this segment. South of Cesar Chavez Street, there would be a net change of 360 parking spaces eliminated; of these 355 would be part-time tow-away spaces and five would be permanent parking space removals.

The parking loss would be considered substantial as a result of either the TTRP.14 Moderate Alternative Variant 1 or TTRP.14 Moderate Alternative Variant 2 for the 13th Street to Cesar Chavez segment of this corridor. However, at a project level, this parking loss was found to be less-than-significant because this corridor is well served by public transit and other modes, and the proposed project improvements would improve transit and pedestrian conditions and because the magnitude of the parking loss would not be expected to result in hazardous conditions or substantially delay transit.

It is important to note that under Existing conditions collision rates, on average, are higher on Rapid Network streets, where TTRPs are proposed, than those that are parallel to the

TTRPs; this is particularly the case with sideswipe collisions for transit and private vehicles that occur as a result of narrow travel lanes (9 feet).[84] The TTRP projects are anticipated to improve these conditions with widened travel lanes. Thus while removal of parking may result in some conflicts due to double parking and vehicles blocking driveways or bicycle lanes, the proposed project may also reduce collisions due to widened travel lanes that reduce friction between transit vehicles and other vehicles.

Considering cumulative parking conditions, over time, due to the land use development and increased density anticipated along this corridor, particularly for the corridor segments between 13th and Cesar Chavez streets, parking demand and competition for on-street and off-street parking is likely to increase. Additionally, through the implementation of the City's *Transit First* Policy and City's Better Streets program and related projects, especially along commercial corridors, on-street parking may be further removed to promote alternative modes of travel and sustainable street designs, or altered to accommodate other types of parking (commercial or passenger loading/unloading). Furthermore, the availability of alternate on-street or off-street parking locations in the future is uncertain. The TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 would encourage transit use through the reduction of transit travel time and increase in transit reliability, which may further lead to a mode shift from private passenger vehicles to transit, however, the extent of this mode shift is unknown. Thus, in combination with future cumulative growth and potential cumulative parking loss, the parking loss related to the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 for the segment between 13th and Cesar Chavez streets may result in increased levels of traffic circling looking for parking, increased instances of double parking and parking on the sidewalk or in the driveways, or longer and more persistent queues to enter off-street parking facilities that could create hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. The extent of this potential impact is unknown, as a shortage of parking supply could also cause some residents and commuters to alter their mode of travel or travel behavior. Therefore, the parking loss related to the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 for the segment between 13th and Cesar Chavez streets would be considered to contribute to significant cumulative parking impacts on this corridor.

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[84] Tanner, Britt, 2013. SFMTA analysis using Crossroads/SWITRS Database. Collisions gathered from Crossroads Software's Traffic Collision Database on 6/26/13 for time period between 11/1/2006 and 10/31/2011 for each street between 14th and Cesar Chavez, including intermediate and limit intersections. Crossroads uses SWITRS (Statewide Integrated Traffic Records System) data which is maintained by the California Highway Patrol. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission St, Suite 400, as part of Case File No. 2011.0558E.

Mitigation Measure M-C-TR-49 to Explore Implementation of Parking Management Strategies in the project area may address some of the issues related to parking. The SFMTA is piloting the use of such parking supply management strategies as the SFpark Program, as one example, which provides real-time information about the availability of parking supply as well as adjusts parking rates to better manage parking demand. The use of technologies to inform drivers searching for parking where available spaces are reduces circling and other secondary environmental effects related to constrained parking conditions. The pilot is being implemented in the Mission District as well as in downtown and other areas, however, the effectiveness of this program is still under study. While the use of the SFpark Program or other similar parking management strategies would improve transportation conditions within an area, it is uncertain if these would mitigate this significant cumulative parking impact to a less-than-significant level. Therefore, the cumulative parking impact would be significant and unavoidable even with mitigation, and the parking loss as a result of either the TTRP.14 Moderate Alternative Variant 1 or TTRP.14 Moderate Alternative Variant 2 for the segment between 13th and Cesar Chavez streets along this corridor would contribute considerably to this significant parking impact.

- **Impact C-TR-53: Implementation of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, or TTRP.71_1, in combination with past, present and reasonably foreseeable development in San Francisco, would have less-than-significant cumulative parking impacts. (Less than Significant)**

- Implementation of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, and TTRP.71_1 would not result in an increase in parking demand. These TTRP Expanded Alternative proposals would in most cases, but not all, result in the elimination of some on-street parking spaces along the TTRP corridors. Some of the corridors under the TTRP Expanded Alternative (TTRP.28_1 and TTRP.30_1 and TTRP.30_1 Variants) would result in no change or the addition of on-street parking, and some corridors (TTRP.J, TTRP.L, TTRP.N, TTRP.8X,TTRP.9, TTRP.14, and TTRP.71_1) would result in similar or less parking removal as compared to the TTRP Moderate Alternative. The implementation of transit-only lanes through part-time peak period tow-away or permanent curbside parking restrictions would result in the greatest parking losses. Any permanent loss of on-street parking spaces could be accommodated on other nearby streets, which could result in increased competition for the remaining other on-street, and potentially off-street, parking supply. However, in addition to the parking losses, if any, not being substantial, the affected corridors are well served by transit (particularly since the TEP is proposing transit improvements on the Rapid Network corridors), as well as by other modes, with transit and pedestrian improvements proposed as part of the project. A decrease in the on-street parking supply, where it would occur, would be considered an inconvenience, but would not create potentially hazardous conditions or significant delays to traffic, transit, pedestrians, or bicycles. Hence, as described under Impact TR-58, the parking loss along the TTRP corridors as a result of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, and TTRP.71_1 would not be considered substantial, and the TTRP Expanded Alternative's project-level parking impact for these corridors was determined to be less than significant.

Considering cumulative parking conditions, over time, due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking is likely to increase. Additionally, through the implementation of the City's *Transit First* Policy and City's Better Streets program and related projects, especially along commercial corridors, on-street parking may be further removed to promote alternative modes of travel and sustainable street designs. Where parking removal would occur under the TTRP Expanded Alternative, the removal would likely be spread out over the TTRP corridor, and therefore, in combination with other development along the corridors would not represent a substantial portion of the parking shortfalls that could occur over time. The TTRP proposals in the TTRP Expanded Alternative would encourage transit use through the reduction of transit travel time and increase of transit reliability, which may further lead to a mode shift from private passenger vehicles to transit. Furthermore, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel (for example, transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, may induce drivers to shift to other modes of travel, or change their overall travel habits. The loss of parking under these TTRP proposals would not be considered substantial and these TTRP Expanded Alternative proposals would not result in an increased parking demand, and in consideration with the above cumulative conditions, the TTRP Expanded Alternative proposals for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, and TTRP.71_1 would not result in significant cumulative parking impacts.

Impact C-TR-54: Implementation of the project-level TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, or TTRP.22_1 Variant 2, in combination with past, present and reasonably foreseeable development in San Francisco, would result in significant cumulative parking impacts. (Significant and Unavoidable with Mitigation)

As described under Impact TR-58, the TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2, with the implementation of a center-running transit-only lane would result in a net decrease in the number of on-street parking spaces along the 16th Street corridor east of Mission Street of approximately 290 parking spaces, 520 parking spaces and 280 parking spaces, respectively. Of these spaces, 240 spaces under TTRP.22_1 Expanded Alternative Variant 1, which includes tow-away zones would not be permanently removed (enforced for the TTRP.22 corridor for peak periods) and would be available outside of the tow-away time periods for daytime and overnight parking. Therefore, TTRP.22_1 Expanded Alternative Variant 1 would result in a permanent loss of approximately 280 spaces, similar to the TTRP.22_1 Expanded Alternative (290 spaces) and TTRP.22_1 Expanded Alternative Variant 2 (280 spaces). The reduction in parking spaces would be due to the installation of transit bulbs, sidewalk widening, and the installation of transit-only lanes. The parking loss along the corridor would be considered substantial as a result of the TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2. However, at a project level, this parking impact was found to be less than significant because this corridor is well served by public transit and other modes, and the proposed project improvements would improve transit and pedestrian conditions, and because the parking loss would not be expected to result in hazardous conditions or substantial delays to various modes.

Although the parking loss under Existing plus the TTRP Expanded Alternative conditions for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2 would not be expected to result in hazardous conditions or substantial delays, over time, additional land use development and increased density anticipated along or near the 16th Street corridor would likely increase parking demand and competition for on-street and off-street parking. Additionally, through the implementation of the City's *Transit First* Policy and City's Better Streets Plan policies and related projects, on-street parking may be further removed to promote alternative modes of travel and sustainable street designs, or altered to accommodate other types of use (commercial or passenger unloading). Furthermore, the availability of alternate on-street or off-street parking locations in the future is uncertain. The TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2 would encourage transit use through the reduction of transit travel time and increase in transit reliability, which may further lead to a mode shift from private passenger vehicles to transit; however, the extent of this mode shift is unknown. Thus, the parking removal along these corridors, in combination with other development and projects, may result in increased levels of traffic circling looking for parking, increased instances of double parking and parking on the sidewalk or in the driveways, or longer and more persistent queues to enter off-street parking facilities that could create hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. The extent of this potential impact is unknown, as a shortage of parking supply could also cause some residents and commuters to alter their mode of travel or travel behavior. Therefore, the parking loss as a result of TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1 and TTRP.22_1 Variant 2 could contribute to significant cumulative parking impacts on this corridor.

Mitigation Measure M-C-TR-49: Explore the Implementation of the Parking Management Strategies would reduce this cumulative parking impact through the better management of on-street parking spaces and parking demand. However, the effectiveness of such programs as the SFpark Program is still being studied, and the implementation of parking management strategies in other areas of the City is unknown. As noted in Impact C-TR-49, although implementation of the SFpark Program, or other parking management strategies, would improve transportation conditions in the area, cumulative parking impacts related to the TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2 would remain significant and unavoidable even with mitigation.

4.3 Noise and Vibration

4.3.1 INTRODUCTION

The Initial Study for the proposed project analyzed the topic of Noise (see Appendix 2, pp. 233–235) and concluded that the proposed transit project would not be substantially affected by existing noise levels nor would it introduce any new noise-sensitive uses. It also determined that the proposed project is not within an airport land use plan area, within two miles of a public airport, or within the vicinity of a private airstrip; therefore, no noise conflict with airport operations would occur. The Initial Study found, however, that construction activities and planned operational changes resulting from implementation of the Policy Framework and Transit Effectiveness Project (TEP) components could cause potentially significant short-term and permanent noise and vibration impacts. These potential noise and vibration impacts are evaluated in this section to determine their significance, and identify mitigation to reduce adverse impacts as applicable.

The noise and vibration analysis is organized into the following main sections: Environmental Setting, Regulatory Framework, and Impacts and Mitigation Measures. The Impact and Mitigation Measures section contains the following subsections: Significance Criteria, Project Features, and Approach to Analysis, followed by Impact Evaluation. The Impact Evaluation subsection addresses Construction Impacts, Operations Impacts, and Cumulative Impacts.

The TEP includes both program- and project-level components. With the exception of the E Line Independent Terminal at Beach and Jones streets (TTPI.3), program-level proposals have been developed with sufficient detail to analyze noise and vibration impacts at the project level. TTPI.3 would involve the development of a new, independent terminal stop for the E Embarcadero historic streetcar line at the north end of the route near Jones and Beach streets along the existing F Market & Wharves historic streetcar line. Development of the new terminal would require the installation of new bypass rails, track turnouts, track switches, and overhead wires and poles, and possibly sidewalk modifications. Although the general project vicinity for the TTPI.3 is known, the exact location and design of the E Embarcadero Independent Terminal is not known. When design details are developed, additional environmental review would be conducted, as appropriate.

4.3.2 ENVIRONMENTAL SETTING

NOISE BACKGROUND

Sound is characterized by various parameters that describe the rate of oscillation (frequency) of sound waves, the distance between successive troughs or crests in the sound wave, the speed that it travels, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the intensity of sound. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale, the decibel (dB) scale, is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called “A-weighting,” expressed as “dBA.” The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to 140 dBA. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated.

Noise is typically defined as unwanted sound. A typical noise environment consists of a base of steady ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway or stationary mechanical equipment. Table 26 shows some representative noise sources and their corresponding noise levels in dBA.

Table 26: Typical Sound Levels Measured in the Environment

Activities	Noise Level (dBA)
Common Outdoor Activities	
Ambulance at 10 feet[1]	111 -116
Jet Fly-over at 1,000 feet	105
Gas Lawnmower at 3 feet	95
Diesel Truck traveling 50 mph at 50 feet	85
Motorcycle at 50 feet[2]	80
Noisy Urban Area during Daytime	75
Gas Lawnmower at 100 feet	70
Commercial Area	65
Heavy Traffic at 300 feet	60
Quiet Urban Area during Daytime	50
Quiet Urban Area during Nighttime	40
Quiet Suburban Area during Nighttime	35
Quiet Rural Area during Nighttime	25
Common Indoor Activities	
Rock Band	110
Food Blender at 3 feet	85
Garbage Disposal at 3 feet	80
Vacuum Cleaner at 10 feet	70

Activities	Noise Level (dBA)
Normal Speech at 3 feet	65
Large Business Office	55
Dishwasher in Next Room	50
Theater, Large Conference Room (background)	40
Library	30
Bedroom at Night, Concert Hall (background)	25
Broadcast/Recording Studio	15

Notes: dBA = A-Weighted decibels; mph = miles per hour.

[1] San Francisco Department of Public Health, *Noise, Sirens, and Health*, October 7, 2008, p. 16. Available online at: http://www.sfdph.org/dph/files/EHSdocs/ehsNoise/Noise.Sirens.Health_Presentation.pdf. Accessed May 6, 2013.

[2] Noise limit for motorcycle manufactured after 1985 from California Motor Vehicle Code 27202.

Source: California Department of Transportation, *Technical Noise Supplement*, November 2009, p. 2-21 (except as noted above). Available online at: http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf. Accessed May, 2013.

Planning for acceptable noise exposure must take into account the types of activities and corresponding noise sensitivity in a specified location for a generalized land use type. Some general guidelines are as follows: sleep disturbance can occur at levels above 35 dBA; interference with human speech begins at about 60 dBA; and hearing damage can result from prolonged exposure to noise levels in excess of 85 to 90 dBA.[1] Studies have shown that a 3 dBA increase in noise is barely perceptible by the human ear.[2]

Noise from Multiple Sources

Since sound pressure levels in decibels are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical way. Adding a new noise source to an existing noise source, both producing noise at the same level, will not double the noise level. Table 27 demonstrates the result of adding noise from multiple sources.

[1] United States Environmental Protection Agency (US EPA), *Public Health and Welfare Criteria for Noise*, July 27, 1973. Available online at: www.nonoise.org/epa/Roll1/roll1doc3.pdf. Accessed February 22, 2013.

[2] Federal Highway Administration, *Highway Traffic Noise, Analysis and Abatement Guidance*. Available online at: http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/polguide01.cfm. Accessed March 23, 2013.

Table 27: Rules for Combining Sound Levels by "Decibel Addition" *

When two decibel values differ by	Add the following amount to the higher decibel value	Example
0 to 1 dB	3 dB	60 dB + 61 dB = 64 dB
2 to 3 dB	2 dB	60 dB + 63 dB = 65 dB
4 to 9 dB	1 dB	60 dB +69 dB = 70 dB
10 dB or more	0 dB	60 dB + 75 dB = 75 dB

Note:
* This methodology provides an estimate of the resulting sound level and is accurate to ±1 decibel.

In general, if the difference between two noise sources is 0 to 1 dBA, the resultant noise level will be 3 dBA higher than the higher noise source, or both sources if they are equal. If the difference between two noise sources is 2 to 3 dBA, the resultant noise level will be 2 dBA above the higher noise source. If the difference between two noise sources is 4 to 10 dBA, the resultant noise level will be 1 dBA higher than the higher noise source. If the difference between two noise sources is 10 dBA or more, the higher noise source will dominate and the resultant noise level will be equal to the noise level of the higher noise source.

Attenuation of Noise

Sound from a localized source (point source) radiates uniformly outward in a spherical pattern as it travels away from its source. Noise from point sources, such as equipment at a construction site, attenuate (lessen) at a rate of 6.0 dBA over a hard surface and 7.5 dBA over a soft surface, per doubling of the distance from the source.

However, roadway traffic or rail line noise is not a single, stationary point source of sound. The movement of the closely-spaced vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point source when evaluated over some time interval. This results in a cylindrical spreading pattern rather than the spherical spreading of a point source. Noise from line sources, such as highways and rail lines, attenuate at a rate of 3.0 dBA over a hard surface and 4.5 dBA over a soft surface, per doubling of distance from the source.

Noise from transit systems that operate with intermittent bypasses is not characteristic of a point source or a line source and, therefore, the Federal Transit Administration (FTA) has developed attenuation rates specific to different types of transit vehicles or transit systems.[3]

Since the TEP occurs within an urban environment, this analysis assumes the attenuation rates based on hard surfaces, as opposed to soft surfaces, such as lawns and cropland that one would find in rural communities.

Lmax, Leq, Ldn, and SEL

The maximum noise level (Lmax) is the maximum instantaneous noise level measured during the specified measurement period. Time variations in noise exposure are typically expressed in terms of a steady-state energy level (Leq) that represents the acoustical energy of a given measurement. Leq is used to describe noise over a specified period of time in terms of a single numerical value. The Leq is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, for planning purposes, an increment of 10 dB is added to nighttime (10:00 p.m. to 7:00 a.m.) noise levels to form a 24-hour noise descriptor called the day-night noise level (Ldn).

The Sound Exposure Level (SEL) describes a receiver's cumulative noise exposure from a single noise event. The fact that SEL is a cumulative measure means that louder events have greater SELs than do quieter ones, and events that last longer in time have greater SELs than do shorter ones. SELs are used for evaluating a single transit-noise event because unlike Lmax, SEL increases with the duration of a noise event, which is important in evaluating community reaction and, therefore, allows a uniform assessment method for transit-vehicle bypasses.

The Lmax, Leq, Ldn, SEL, and the other statistical descriptors for noise that are used in this analysis are defined in terms of dBA using the A-weighted decibel scale, also called sound level or noise level.

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[3] Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment*, May 2006, p. 6-22. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed February 18, 2013.

Health Effects of Environmental Noise

According to the World Health Organization (WHO), perhaps the best source of knowledge about the health impacts of noise, sleep disturbance can occur when continuous indoor noise levels exceed 30 dBA or when intermittent interior noise levels reach 45 dBA, particularly if background noise is low. With the bedroom window slightly open (a noise reduction from outside to inside of 15 dBA), the WHO criteria suggest that exterior continuous (ambient) nighttime noise levels should be 45 dBA or below, and short-term events should not generate noise in excess of 60 dBA. WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability to fall asleep.[4]

Other potential health effects of noise identified by WHO include decreased performance on complex cognitive tasks, such as reading, attention, problem solving, and memorization; physiological effects such as hypertension and heart disease (often workers who are constantly exposed to high noise levels for many years); and hearing impairment (again, generally after long-term occupational exposure, although shorter-term exposure to very high noise levels can result in hearing impairment, for example, exposure several times a year to concert noise at 100 dBA). Finally, noise can cause annoyance and trigger emotional reactions like anger, depression, and anxiety. WHO reports that during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA or moderately annoyed by activities with noise levels below 50 dBA.

VIBRATION BACKGROUND

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Vibration amplitudes are usually expressed as peak particle velocity (PPV) in inches per second; PPV is appropriate for evaluating the potential for building damage.

Effects of Vibration

With the exception of long-term occupational exposure, vibration levels rarely affect human health. Instead, most people consider vibration to be an annoyance that can affect concentration or disturb sleep. People may tolerate infrequent, short duration vibration levels, but human annoyance to vibration becomes more pronounced if the vibration is

[4] World Health Organization, *Guidelines for Community Noise*, 1999, p. 46 and p. 59. Available online at: http://www.who.int/docstore/peh/noise/guidelines2.html. Accessed February 18, 2013.

continuous or occurs frequently. High levels of vibration can damage fragile buildings or interfere with sensitive equipment.

EXISTING CONDITIONS

Ambient Noise Levels

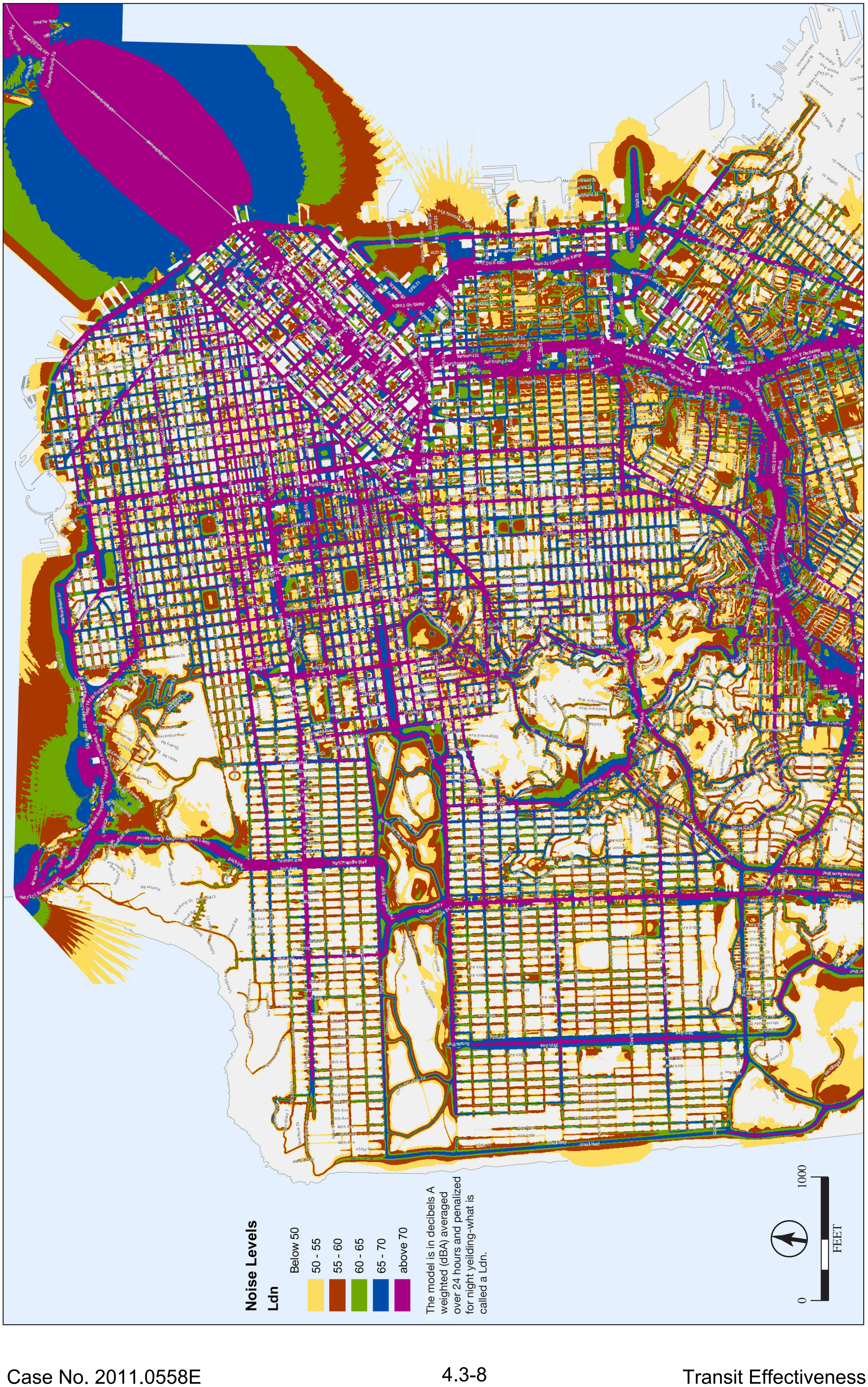
Ambient noise levels in the vicinity of proposed TEP construction projects and along the various transit corridors are typical of noise levels throughout San Francisco, which are dominated by vehicular traffic, including cars, trucks, Muni buses and streetcars, and emergency vehicles. In addition to vehicle traffic, continuous operation of electromechanical equipment, such as air handlers and chillers, ventilation and refrigeration systems, and transformers, can contribute to ambient noise levels in the urban environment. Short-term noise such as back-up beepers and car doors slamming contribute very little to overall 24-hour ambient noise levels but can cause annoyance and/or sleep disturbance to nearby residents.

The San Francisco Department of Public Health (DPH) mapped ambient noise levels from transportation sources in San Francisco based on modeled baseline traffic volumes derived from the San Francisco County Transportation Authority travel demand model (SF-CHAMP). This map is incorporated into the General Plan as Map 1 of the Environmental Protection Element.[5] A copy of this noise contour map is reproduced as Figure 26. The Background Noise Levels - 2009 map shows that the noise levels along most of the Muni transit routes are above 70 dBA (Ldn), and that along some of the streets with lower traffic volumes, the sound levels typically range between 60 dBA and 65 dBA (Ldn).

Existing Ground-Borne Vibration

Typical sources of ground-borne vibration in San Francisco are large-scale construction projects that involve pile driving or underground tunneling, and Muni Metro's light rail vehicles (LRVs) and historic streetcars. Vibration is also caused by transit vehicles in the subway system under Market Street, including Muni Metro LRVs and Bay Area Rapid Transit (BART) trains. Because rubber tires provide vibration isolation, rubber tire vehicles, such as Muni

[5] City and County of San Francisco, *San Francisco General Plan,* Environmental Protection Element, Map 1: Background Noise Levels – 2009. Available online at: http://www.sf-planning.org/ftp/General_Plan/images/I6.environmental/ENV_Map1_Background_Noise%20Levels.pdf. Accessed February 7, 2013.



SOURCE: San Francisco Planning Department and Department of Public Health

TRANSIT EFFECTIVENESS PROJECT

FIGURE 26: BACKGROUND NOISE LEVELS, 2009

buses, trucks, and automobiles, rarely create substantial ground-borne vibration effects unless there is a discontinuity or bump in the road that causes the vibration.[6]

Sensitive Receptors

Sensitive noise receptors are populations that are more susceptible to the effects of noise than others, such as the elderly and children. Therefore, sensitive receptors are generally considered to include hospitals, nursing homes, senior citizen centers, schools, churches, libraries, and residences, including hotels. Sensitive vibration receptors include structures (especially older masonry structures), people (especially land uses with residents, the elderly in senior citizen centers and nursing homes, and sick people in nursing homes and hospitals), and vibration-sensitive equipment (such as scientific or medical lab equipment).

These types of land uses and structures are present throughout the City. The TEP project components would be located along various street corridors throughout the City, many of which have sensitive receptors. The construction of the TEP projects and the increases in transit vehicle service frequencies, establishment of new routes, or changes in established routes could affect all or most of these types of sensitive receptors along the length of these corridors.

4.3.3 REGULATORY FRAMEWORK

FEDERAL

US Environmental Protection Agency

The federal Noise Control Act of 1972 addressed the issue of noise as a threat to human health and welfare, particularly in urban areas. In response to the Act, the United States Environmental Protection Agency (US EPA) published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*.[7] According to these recommendations, under ideal conditions the yearly average Leq should not exceed 55 dBA outdoors and 45 dBA indoors in noise-sensitive areas, i.e. residential areas. The US EPA identified an increase of 5 dBA as an adequate margin of safety relative to a baseline noise exposure level of 55 dBA (Ldn) before a noticeable increase in adverse community reaction would be expected. The US EPA does not promote these recommendations as universal standards or regulatory goals with

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6 FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, p. 7-9. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed February 18, 2013.

7 US EPA, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, March 1974. Available online at: http://www.nonoise.org/library/levels74/levels74.htm. Accessed February 18, 2013.

mandatory applicability to all communities, but as advisory exposure levels below which there would be no reason to suspect that there would be risk from any of the identified health or welfare effects of noise.

Federal Transit Administration

The Federal Transit Administration (FTA) developed a methodology and significance criteria to evaluate noise impacts from operation of surface transportation modes (i.e. passenger cars, trucks, buses, and rail) in their guidance document: *Transit Noise Impact and Vibration Assessment* (FTA Guidelines).[8] All mass transit projects receiving any federal funding must use these guidelines to predict and assess potential noise and vibration impacts. The FTA incremental noise impact criteria are based on US EPA recommended levels and studies of community annoyance from transportation noise. The scientific rationale for the choice of these criteria is explained in the FTA Guidelines. Starting from the US EPA's definition of minimal noise impact as a 5 dBA change from an established protective ambient level of 55 dBA, the FTA extended the US EPA's incremental impact criteria to higher baseline ambient levels. As ambient levels increase, smaller and smaller increments of noise are recommended to limit community annoyance. This is because in areas with high ambient noise, it takes a smaller increase in noise to attain the same percentage increase in highly annoyed people as a larger increase in noise in areas with low ambient noise.

STATE

Governor's Office of Planning and Research

The Governor's Office of Planning and Research (OPR) *General Plan Guidelines 2003* (GP Guidelines) promotes the use of Ldn or Community Noise Equivalent Level (CNEL)[9] for evaluating the compatibility of various land uses with respect to their noise exposure. The GP Guidelines provide ranges of community noise exposure for specific types of land use that are "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." The designation of a level of noise exposure as "normally acceptable" for a given land use category implies that the interior noise levels would be acceptable to the occupant without the need for any special structural acoustic treatment. "Conditionally acceptable" indicates that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements has been made

[8] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 13, 2013.

[9] Similar to the Ldn, the CNEL is a 24-hour average Leq with a 5 dBA "weighting" during the hours of 7:00 to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

and needed noise insulation features included in the design; conventional construction but with closed windows and fresh air supply systems or air conditioning will normally suffice. “Normally unacceptable” indicates that new construction or development should generally be discouraged; if new construction does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. “Clearly unacceptable” indicates that new construction or development should generally not be undertaken. The GP Guidelines provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences and existing ambient noise levels.

California Vehicle Code

Division 12, Chapter 5, Article 2.5, §§ 27202 through 27207 of the California Vehicle Code establishes maximum allowable noise from vehicles licensed for use on public highways. The maximum allowable noise varies based on the type of vehicle (motorcycles, heavy vehicles, and passenger vehicles and light trucks) and manufacture date. The allowable noise level for most vehicles is 80 dBA at 50 feet. For heavy vehicles the allowable noise varies by gross vehicle weight rating; for motor vehicles such as buses and transit vans,[10] with a gross vehicle weight rating of more than 10,000 pounds, the limit is generally 88 dBA at 50 feet.

California Noise Insulation Standards

The California Building Code and Title 24 of the California Code of Regulations establish uniform noise insulation standards for residential projects. State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are collectively known as the California Noise Insulation Standards. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor-ceiling assemblies must block or absorb sound. For limiting noise from exterior sources, the noise insulation standards establish an interior standard of 45 dBA (Ldn) in any habitable room and, where such units are proposed in areas subject to exterior noise levels greater than 60 dBA (Ldn), a demonstration of how dwelling units have been designed to meet this interior standard is required. If the interior noise level depends on windows being closed, the design for the structure must also include a heating, ventilation, and air

[10] A prototypical transit van being considered for SFMTA procurement is the EC-II Elkhart Coach that has a gross vehicle weight rating (GVWR) of 14,500 pounds.

conditioning (HVAC) system that will provide for adequate fresh air ventilation as specified by the California Building Code.

LOCAL

San Francisco General Plan

The Environmental Protection Element of the *San Francisco General Plan* contains Land Use Compatibility Guidelines for Community Noise.[11] These guidelines, which are similar to but differ somewhat from state guidelines promulgated by OPR, indicate maximum acceptable exterior noise levels for various newly-developed land uses.

The maximum "satisfactory" noise level without incorporating noise insulation into a project is 60 dBA (Ldn) for residential and hotel uses; 65 dBA (Ldn) for school classrooms, libraries, churches, and hospitals; 70 dBA (Ldn) for playgrounds, parks, office buildings, retail commercial uses, and noise-sensitive manufacturing/ communications uses; and 77 dBA for other commercial uses such as wholesale, some retail, industrial/manufacturing, transportation, communications, and utilities.[12] If these uses are proposed to be located in areas with noise levels that exceed these guidelines, a detailed analysis of noise reduction requirements will normally be necessary prior to final review and approval, and new residential or retail construction or development will require that noise insulation features be included in the design.

Section 6530 of the California Government Code requires all cities and counties to include a Transportation Noise Element in their general plans. The *San Francisco General Plan* includes a Transportation Noise section in the Environmental Protection Element. The objectives and related policies of the Transportation Noise section primarily concern avoiding or mitigating the adverse effects of transportation noise. The objectives and policies relevant to the proposed TEP are summarized below:

> **Objective 9** Much can be done to reduce noise at the source. Technological means are available for reducing vehicular noise emissions well below present levels.

[11] City and County of San Francisco, *San Francisco General Plan,* Environmental Protection Element, Policy 11.1. Available online at: http://www.sf-planning.org/ftp/General_Plan/I6_Environmental_ Protection.htm. Accessed February 7, 2013.

[12] For residential uses, the guidelines are based on maintaining an interior noise level of interior noise standard 45 dBA (Ldn), as required by the California Noise Insulation Standards in Title 24, Part 2 of the California Code of Regulations. Available online at: http://publicecodes.cyberregs.com /st/ca/st/b200v10/st_ca_st_b200v10_12_sec001.htm. Accessed June 3, 2013.

Policy 9.1 Enforce noise emission standards for vehicles. The noise emission standards of the State Vehicle Code are enforced by the California Highway Patrol on the freeways and by the local police on the city streets. The Noise Abatement Unit of the Police Department is responsible for identifying vehicles that violate the noise emission standards and for securing the correction of the problem. This work should be continued and expanded.

Policy 9.2 Impose traffic restrictions to reduce transportation noise. Transportation noise levels vary according to the predominance of vehicle type, traffic volume, and traffic speed. Curtailing any of these variables ordinarily produces a drop in noise level. In addition to setting the speed limit, the City has the authority to restrict traffic on city streets, and it has done so on a number of streets. In addition, certain movement restraints can be applied to slow down traffic or divert it to other streets. These measures should be employed where appropriate to reduce noise.

Policy 9.3 Limit City purchases of vehicles to models with the lowest noise emissions and adequately maintain City-owned vehicles and travel surfaces. The City owns and operates over a thousand vehicles in addition to its large fleet of automobiles. Street noise performance specifications for City vehicles (transit; trucks; specialized vehicles, such as street sweepers, brush chippers, etc.) should be included in the purchasing procedures of the City so that the City will obtain the quietest available models.

With proper maintenance, the City's inventory of vehicles can be kept in good working order, thereby reducing the noise they generate. Proper emphasis must also be placed on smooth street surfaces and on smooth rails for the streetcars and cable cars. Trackbeds for the rail vehicles also require special attention as do the various underground elements of the cable car traction system.

Policy 9.5 Electric trolley buses are quiet, economical, and relatively pollution-free in their use. These benefits outweigh the adverse environmental impact of power generation or fossil fuel utilization. Electric trolleys should be retained where feasible and consideration should be given to electrifying selected existing diesel bus routes.

Policy 9.6 Discourage changes in streets which will result in greater traffic noise in noise-sensitive areas. Widening streets for additional traffic lanes or converting streets to one-way direction can induce higher traffic volume and faster speeds. Other techniques such as tow-away lanes and traffic light synchronization also facilitate heavier traffic flows. Such changes should not be undertaken on residential streets if they will produce an excessive rise in the noise level of those streets.

San Francisco Noise Ordinance

Construction noise is regulated by the San Francisco Noise Ordinance (Article 29 of the Police Code), amended in November 2008. Article 29 states that the City's policy is to prohibit unnecessary, excessive, and offensive noises from all sources subject to police power. Sections 2907 and 2908 of Article 29 regulate construction equipment and construction work at night. Section 2909 establishes limits on increases in ambient noise levels for residential, commercial, industrial, and public properties, as well as absolute indoor residential limits on noise generated by fixed noise sources such as stationary-source noise from machinery and equipment. Sections 2907 and 2908 are enforced by the Department of Building Inspection (DBI), and § 2909 is enforced by the DPH. Summaries of these and other relevant sections are presented below.

Section 2907 of the ordinance requires that noise levels from individual pieces of construction equipment, other than impact tools, not exceed 80 dBA at a distance of 100 feet from the source. Impact tools (jackhammers, hoe rams, impact wrenches) must have both intake and exhaust muffled to the satisfaction of the Director of Public Works or the Director of Building Inspection. Section 2908 of the ordinance prohibits construction work between 8:00 p.m. and 7:00 a.m. if noise would exceed the ambient noise level by 5 dBA at the project property line, unless a special permit (Night Noise Permit) is authorized by the Director of Public Works or the Director of Building Inspection. Construction activities performed as part of the TEP must comply with construction noise regulations set forth in the Noise Ordinance.

If work is planned within the public right-of-way between the hours of 8 p.m. and 7 a.m., the contractor must first obtain a Night Noise Permit from the Bureau of Street Use and Mapping in San Francisco Department of Public Works (DPW). Section 2908 of the San Francisco Police Code authorizes the Director of Public Works to impose conditions on this permit. One condition imposed on all permits prohibits high level or impact noise after 10 p.m. and a DPW Inspector conducts a site inspection to ensure compliance with this requirement.[13]

Section 2909 of the Noise Ordinance establishes not-to-exceed limits for increases in ambient noise levels for noise produced by any machine, device, music, entertainment, or any combination thereof, on residential, commercial, industrial, and public properties, as well

[13] San Francisco Department of Public Works, Night Noise Authorization Application Form. Available online at: http://sfdpw.org/modules/showdocument.aspx?documentid=1471. Accessed May 7, 2013.

as absolute indoor noise limits for sleeping and living rooms of residential properties. For residential properties, no person shall produce, or allow to be produced, a noise level more than 5 dBA above the local ambient level at any point outside of the property line nor should interior levels exceed 45 dBA between 10 p.m. and 7 a.m. and 55 dBA from 7 a.m. to 10 p.m. At commercial and industrial properties, § 2909 states that noise may not be generated that increases the noise level more than 8 dBA above the local ambient level at any point outside of the property line. An additional low-frequency criterion applies to licensed places of entertainment. On public properties, no person shall produce or allow to be produced a noise level more than 10 dBA above the local ambient level at a distance of 25 feet or more from the source, unless the machine or device is being operated to serve or maintain the property, or as otherwise provided in the Noise Ordinance. Noise generated from the operation of transit vehicles is not regulated by the San Francisco Noise Ordinance.

San Francisco Public Works Code and San Francisco Department of Public Works Orders

Article 2.4 of the Public Works Code[14] governs excavation within the public right-of-way that is under the jurisdiction of the DPW.[15] The article requires any person excavating in the public right-of-way to obtain an excavation permit and comply with Orders and Regulations of the DPW.

Order No. 176,707, Regulations for Excavating and Restoring Streets in San Francisco establishes rules and regulations for excavating and restoring streets in San Francisco that are under the jurisdiction of DPW. Order No. 176,707 requires contractors to conduct their operations in a manner that causes the least possible noise consistent with normal construction efficiency. These regulations are intended to "balance the needs to preserve and maintain public health, safety, welfare, and convenience" by minimizing disruption to neighborhoods and the traveling public while upgrading and maintaining utility services.[16] Any operation or the use of any equipment that makes excessive or unusual noise is not allowed. Compressors must have effective mufflers and be mounted and insulated to the maximum extent feasible to minimize the noise of operation.

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[14] Excavation is defined as "any work in the surface or subsurface of the public right-of-way, including, but not limited to opening the public right-of-way; installing, servicing, repairing or modifying any facility(ies) in or under the surface or subsurface of the public right-of-way, and restoring the surface and subsurface of the public right-of-way."

[15] San Francisco Public Works Code, Article 2.4. Available online at: http://www.sfdpw.org/index.aspx?page=739. Accessed December 4, 2012.

[16] San Francisco Department of Public Works, Order No. 176-707 (Revised), Regulations for Excavating and Restoring Streets in San Francisco, March 26, 2007. Available online at: http://www.sfdpw.org/index.aspx?page=295. Accessed March 27, 2013.

SFMTA Blue Book

The Blue Book is a manual that has been prepared as a guide for City agencies (DPW, SFMTA, San Francisco Public Utilities Commission [SFPUC], Port of San Francisco, etc.), utility crews, private contractors, and others doing work in San Francisco streets. Its main purpose is to establish rules so that work can be done safely and in a way that will cause the least possible interference with pedestrians, bicycle, transit and other vehicular traffic. In addition to the regulations in this manual, a contractor is responsible for complying with all City, state and federal codes, rules, and regulations. The Blue Book requires a Night Noise Permit for any construction work done between the hours of 8 p.m. and 7 a.m. in the roadway or sidewalk area.

San Francisco Municipal Railway Bulletin 99-116

Bulletin 99-116 issued to all Muni drivers states that pursuant to Rule 47 of the SFMTA Official Rule Book, bus operators must turn their vehicles off immediately at arriving at terminals and not to restart their vehicles until ready to move up in the queue or leave the terminal. The intention of the rule is to eliminate idling, a stationary noise source, at terminal locations on the transit routes, thus minimizing noise.

4.3.4 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The significance criteria used in this analysis are consistent with the environmental checklist in Appendix G of the California Environmental Quality Act Guidelines, which has been adopted and modified by the San Francisco Planning Department. For the purpose of this analysis, the following applicable thresholds were used to determine whether implementing the project would result in a significant noise or vibration impact. Implementation and operation of the proposed TEP would have a significant noise or vibration impact if it were to:

- Expose people to or generate noise levels in excess of standards established in the *San Francisco General Plan* or noise ordinance (Article 29 of the San Francisco Police Code) or applicable standards of other agencies;
- Expose people to or generate excessive ground-borne vibration or ground-borne noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Noise and vibration that could be generated by the TEP would fall into two categories: temporary from construction activities and ongoing from operational changes.

The City considers temporary noise from construction performed in compliance with the San Francisco Noise Ordinance, Article 2.4 of the San Francisco Public Works Code/DPW Order No. 176-707, and the SFMTA Blue Book to be less than significant. These regulations require that construction not produce noise from any construction equipment (except impact tools) that would exceed 80 dBA at 100 feet or generate construction noise between 8:00 p.m. and 7:00 a.m. that exceeds the ambient noise level by 5 dBA at the nearest property line without procuring a Night Noise Permit. Pursuant to § 2907 of the San Francisco Noise Ordinance, impact tools and equipment must be equipped with intake and exhaust mufflers recommended by the manufacturers and approved by the Director of Public Works for maximum noise attenuation, and pavement breakers and jackhammers must be equipped with acoustically attenuating shields or shrouds.[17] Per the Night Noise Permit, the use of construction equipment that generates high level of noise and impact equipment is not allowed after 10:00 p.m.

Vibration impacts from construction would be significant if the activities were to expose people to excessive ground-borne vibrations or result in damage to buildings. With the exception of pile driving or other activities that generate high vibration impacts, temporary exposure to vibration from standard construction equipment would not be considered excessive, and therefore, exposing people to excessive ground-borne vibrations would be considered a less-than-significant impact. Vibration from construction would be considered significant if it exceeds the FTA’s building vibration damage criteria of 0.5 PPV for reinforced-concrete, steel, or timber buildings.[18,19]

Potential operational noise and vibration impacts as a result of the TEP would be associated with Service Improvements and Service Variants. As a result of the proposed Service Improvements and Service Variants, operational noise increases could result from the addition of transit vehicles such as diesel motor coaches, diesel hybrid-electric motor coaches, Muni Metro LRVs, historic streetcars, and vans on to the City’s roadway system,

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[17] San Francisco Municipal Code, Police Code, Article 29 – Regulation of Noise. Available online at: http://www.sfdph.org/dph/files/EHSdocs/ehsNoise/NoiseOrd.pdf. Accessed June 3, 2013.

[18] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, p. 12-13. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 13, 2013.

[19] The cultural and paleontological resources impact evaluation performed for the Initial Study for the proposed project concluded that the construction of program-level and project-level components of the TEP present no particular threat to historic architectural resources in the vicinity of such work resulting from vibration. Also, no particularly fragile historic architectural resources have been identified within or adjacent to program-level and project-level components of the TEP (see Initial Study p. 211, in Appendix 2 to this EIR).

including streets that previously did not have transit. Operational vibration increases could result from the addition of Muni Metro LRVs and historic streetcars to the City's rail system with implementation of the proposed Service Improvements; no Service Variants are proposed for Muni Metro rail lines.

Federal Transit Administration Significance Criteria

The FTA has developed a methodology and significance criteria to evaluate noise impacts from mass transit projects (i.e., buses, and light-rail) in *Transit Noise Impact and Vibration Assessment* (FTA Guidelines). The incremental noise impact criteria included in the FTA Guidelines are based on US EPA recommendations and on subsequent studies of annoyance in communities affected by transportation noise and thus are appropriate for evaluating operational noise and vibration impacts from the TEP.

The FTA Guidelines consider three types of land use:

> **Outdoor Quiet** (Category 1) – Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
>
> **Residential** (Category 2) – Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
>
> **Institutional** (Category 3) – Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

The FTA land use categories may be considered a consolidation of the land use categories contained in the Land Use Compatibility Chart for Community Noise contained in the *San Francisco General Plan* Environmental Protection Element.[20] The Outdoor Quiet category

[20] City and County of San Francisco, *San Francisco General Plan*, Environmental Protection Element, Policy 11.1. Available online at: http://www.sf-planning.org/ftp/General_Plan/I6_Environmental_Protection.htm. Accessed February 7, 2013.

(Category 1) includes *General Plan* land use categories for auditoriums, concert hall, amphitheaters, music shells, and noise-sensitive manufacturing and communications; the Residential category (Category 2) includes *General Plan* land use categories for residential, transient lodging, hospitals, and nursing homes; and the Institutional category (Category 3) includes *General Plan* land use categories for schools, libraries, churches, sport area, outdoor spectator sports, playgrounds, parks, golf courses, riding stables, water–based recreation areas, retail, movie theaters, restaurants, wholesale and some retail, industrial manufacturing, transportation, and communication and utilities. It is the City's policy (Environmental Protection Element Policy 11.1) to discourage new development projects in areas where the noise level exceeds the noise compatibility guidelines. However, since the TEP project is not a new development project and since older existing land uses along the major transportation corridors within the City may not conform to the Land Use Compatibility Chart for Community Noise (for example older residences along major transportation corridors), the FTA Guidelines are used to determine the impact on existing land uses. Originally published in 1995, the FTA Guidelines were developed specifically to analyze the noise and vibration impacts of new transit projects on existing communities. Consistent with these Guidelines, the noise impact is evaluated to determine whether the noise from implementation of the TEP would result in a substantial or noticeable increase in existing noise levels at existing land uses, rather than whether the noise levels would meet the noise compatibility guidelines contained in the *San Francisco General Plan*. Since the proposed Service Improvements would not increase transit service or create new routes in areas that would affect outdoor amphitheaters, concert pavilions, or historic landmarks with significant outdoor use, the Outdoor Quiet category (Category 1) is not considered in this noise impact evaluation. The measure of noise exposure is expressed in units of dBA (Ldn) for Residential (Category 2) land uses and dBA (Leq) for Institutional (Category 3) land uses.

The FTA Guidelines define three levels of potential noise impacts of a transit project on the environment: No Impact, Moderate, and Severe. No Impact reflects that, on average, the introduction of the project would not result in a substantial increase in the number of people highly annoyed by the additional or new noise. At the moderate level, the change in the existing noise level is noticeable to most people, but may not be sufficient to cause strong, adverse reactions from the community. At this level, the FTA Guidelines recommend that other project-specific factors be considered, (such as the existing noise level, predicted level of increase over existing noise levels, and the types and numbers of noise-sensitive land uses affected) to determine the magnitude of the impact and the need for mitigation. At the severe level, a substantial percentage of people would be highly annoyed by the additional or new noise and the FTA Guidelines recommend mitigation, if feasible. For this evaluation, noise impacts that reach or exceed the moderate threshold will be evaluated considering the specific affected land uses, discussed above. Noise impacts that reach or exceed the severe threshold are considered significant and require mitigation to the extent feasible.

Starting from the US EPA's definition of minimal noise impact as a 5 dBA change from an established protective ambient level of 55 dBA (Ldn), the FTA Guidelines extend the US EPA's incremental impact criteria to higher baseline ambient levels. Based on the FTA Guidelines' criteria, to ameliorate community annoyance caused by noise, the acceptable (i.e., less than moderate) noise increment is based on the baseline ambient noise level; the higher the baseline noise level, the lower the increment that is considered acceptable. For example, in residential areas with a baseline ambient noise level of 55 dBA (Ldn), a 3 dBA increase in noise levels would be a moderate impact, while in residential areas with a baseline ambient noise level of 70 dBA (Ldn), a 1 dBA increase would be considered a moderate impact. The impact criteria for various types of land uses are summarized in Table 28.

The FTA has also developed criteria for evaluating operational vibration impacts produced by transportation sources. The FTA Guidance states that for rail corridors with more than 12 trains per day, an approximate doubling (or 100 percent increase) of the number of rail vehicles per day bypassing a single spot along the rail line is required before there would be a significant increase in ground-borne vibration and ground-borne noise effects.[21]

PROJECT FEATURES

The SFMTA proposes a Policy Framework for its transit service. In addition, the proposed TEP project is comprised of three components: Service Improvements, Service-related Capital Improvements, and Travel Time Reduction Proposals (TTRPs). The project features are described in detail in Chapter 2, Project Description. Key features of the proposed project that relate to potential noise and vibration impacts, for both construction and operations, are discussed below. As explained in Chapter 2, some components of the TEP are well-defined and are described at a project-level of detail, while other components are not as well defined and are described at a program-level. Although there is less detail available about the program-level components of the TEP, except for TTPI.3 E Line Independent Terminal at Beach and Jones streets as previously discussed, sufficient information is available to provide a project-level analysis of noise impacts of both program- and project-level TEP components.

[21] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, p. 8-5. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 19, 2013.

Table 28: Federal Transit Administration Impact Criteria for Noise-Sensitive Land Uses

Existing (Ldn dBA)	Moderate Noise Increase (Ldn dBA)	Severe Noise Increase (Ldn dBA)
Category 2 - Residences and Buildings Where People Normally Sleep[1]		
55	3	7
60	2	5
65	1	4
70	1	3
75	0	2

Existing Peak Hour[2] (Leq dBA)	Moderate Noise Increase (Leq dBA)	Severe Noise Increase (Leq dBA)
Category 3 - Institutional Land Uses with Primarily Daytime and Evening Uses[3]		
55	6	12
60	5	9
65	3	7
70	3	6
75	1	5

Notes:

Ldn = day-night sound level; Leq = hourly equivalent sound level; dBA = A-weighted decibels

[1] This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.

[2] Highest hourly Leq during a 24-hour period.

[3] This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading materials.

Source: FTA, *Transit Noise and Vibration Impact Assessmen*t, May 2006. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 13, 2013.

Service Policy Framework

The Policy Framework is a policy document with objectives and actions developed to guide the provision of reliable and efficient transit service throughout the City. Adoption of the Policy Framework would not directly result in any physical changes to the physical environment, and therefore, would not cause any physical environmental impacts related to noise and vibration. However, the Policy Framework may indirectly result in changes to the physical environment as projects, including the TEP and future similar projects, proposed under it are approved and implemented. The TEP projects provide good representative examples of the types of projects, both in size and scope that could be proposed under the Policy Framework. Thus, indirect noise and vibration impacts that could result from the Policy Framework would be expected to be similar to those resulting from the TEP project components that are analyzed below. Future projects resulting from the Policy Framework may need to undergo additional CEQA analysis at the time they are proposed.

Service Improvements

The Service Improvements would include changes to transit routes, transit vehicle types, and the frequency and span of transit service for certain routes. Route changes would include the alteration of existing alignments, the elimination of existing routes or route segments, and the introduction of new routes. Some route changes would result in transit vehicles operating on City streets that currently do not have any transit vehicles. Vehicle types for some routes would also change, including the introduction of smaller diesel vans to replace larger diesel buses on some routes. Also, the frequency and span of service for some routes would change. The Service Improvements would result in changes to operational noise levels in some locations due to transit service changes, such as increased/decreased frequencies, change in vehicle types, and change in service routes. The operational noise impacts from Service Improvements were evaluated by analyzing several worst case scenarios to determine the maximum noise impact, which would occur along the roadway or rail line segments with the highest daily increases in service frequency.

Ground-borne vibration impacts from rubber–wheeled transit vehicles (buses and vans) are not a concern since the rubber tires and suspension systems provide vibration isolation.[22] Ground-borne vibration impacts from light rail (Muni Metro LRVs and historic streetcars) may occur due to the propagation of vibrations from the interaction of the steel wheels and steel tracks through the ground surface to nearby structures and are influenced by physical parameters such as the type and condition of the rails, the type of rail support system, surrounding geology, and the construction of the surrounding buildings (train vibration may be perceptible to people who are outdoors, but it is very rare for outdoor vibration to cause complaints).[23]

Limited construction (curb ramps in some locations) would be necessary to implement the Service Improvements and could result in temporary construction noise and vibration effects that would be similar to but less extensive than construction noise and vibration activities discussed below for the Service-related Capital Improvements and TTRPs.

Service-related Capital Improvements and TTRPs

The Service-related Capital Improvements and TTRPs would include construction activities, such as the installation of Transit Preferential Streets (TPS) Toolkit elements, overhead wires and related infrastructure, terminal and transfer point improvements, extension of a

[22] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, p. 7-9. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 13, 2013.

[23] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, p. 7-10. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 13, 2013.

contraflow commercial-transit-only lane, and accessible platforms. Upon completion of these physical improvements, there would be no ongoing operational noise or vibration (such as fan motors, transformers or other mechanical components) resulting from the facilities. They are intended to support the Service Improvements. No changes to the existing light rail tracks used by the Muni Metro LRVs and historic streetcars are planned, although the proposed Service-related Capital Improvements include the installation of bypass rail tracks at the proposed E Line terminal in Fisherman's Wharf (TTPI.3, the E Line Independent Terminal at Beach and Jones streets). As stated earlier, although the general project vicinity is known, the exact location and design of the E Embarcadero Independent Terminal is not. When design details are developed, additional environmental review will be conducted, as appropriate. The SFMTA has determined that the tracks would be welded and embedded, similar to the design of the existing tracks in that area.

A range of potential combinations of TPS Toolkit elements is being considered by the SFMTA for the TTRPs in order to reduce transit travel time. The range of TTRP treatments being analyzed has been bracketed by: 1) a moderate option referred to as the TTRP Moderate Alternative; and 2) an expanded option referred to as the TTRP Expanded Alternative. The difference between these two alternatives is that the TTRP Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental effects as a result of the substantial changes they would create in traffic, bicycle, or pedestrian circulation, whereas the TTRP Moderate Alternative is expected to have fewer of these physical environmental effects due to the nature of the TPS Toolkit elements chosen. Once constructed, the various TPS Toolkit elements that are proposed to implement the TTRPs would not have noise and vibration impacts. With respect to construction, the TTRP Expanded Alternative would not necessarily result in greater noise or vibration impacts, compared to the TTRP Moderate Alternative. This is because the TPS Toolkit elements for these alternatives would be constructed along the same corridors, and the magnitude and duration of construction activities for both of these alternatives would be similar, although in some instances the TTRP Expanded Alternative would result in the construction of more TPS Toolkit elements along a particular segment than the TTRP Moderate Alternative. Therefore, the noise and vibration evaluation considers the impacts of a representative combination of the various TPS Toolkit elements along the TTRP Moderate Alternative or the TTRP Expanded Alternative.

Variants

Several project variants are under consideration by the SFMTA to allow for flexibility in the phasing and implementation of the TEP. Proposed Service Variants to the Service Improvements would modify portions of a route, add additional service, or change the type of vehicle used on routes. TTRP Variants would modify the locations of one or more TPS

Toolkit Elements along the corridor. For areas where more than one variant is proposed, only one of the variants would be implemented.

In evaluating the operational noise impact from Service Improvements, the proposed Service Variants were considered in determining the worst-case scenarios. If implementing a particular Service Variant would result in a larger increase in service frequency than the related Service Improvement, the Service Variant was used to evaluate the noise impact. Since no Service Variants are proposed for the Muni Metro LRV and historic street car lines, and as previously stated, an increase in frequency of rubber-tired transit vehicles would not result in vibration impacts, it was not necessary to consider Service Variants in analyzing operational vibration impacts.

The various TPS Toolkit elements proposed under the TTRP Variants would not have noise and vibration impacts once constructed. Similar to the evaluation of the TTRP Moderate and Expanded Alternatives, the proposed TTRP Variants consist of the same set of TPS Toolkit elements and therefore, it was not necessary to evaluate TTRP Variants separately.

APPROACH TO ANALYSIS

Construction

Temporary construction-related noise impacts are evaluated by using published noise emission levels for the types of construction equipment that are expected to be used to construct Service-related Capital Improvements, TTRPs comprised of TPS Toolkit elements, and Service Improvements (curb ramps), and by determining if the noise levels from construction equipment usage would exceed 80 dBA at 100 feet.

Temporary, construction-related vibration impacts are evaluated by using published vibration levels for the types of construction equipment that would be expected to generate vibration and would be used to construct Service-related Capital Improvements, TTRPs comprised of TPS Toolkit elements and Service Improvements (curb ramps). The types of construction equipment used and the duration of the vibration impact are used to determine if the impact would be excessive. The expected vibration level within various distances of construction activity is calculated and compared against the FTA's building vibration damage criteria.

Operation

Transit noise modeling for the proposed project was completed using the FTA Guidelines, as discussed in Sections 4.3.3 and 4.3.4. A screening methodology was used to evaluate the increase in noise due to the project-related change in transit vehicle frequencies or introduction of transit vehicles to new streets. Due to the additive properties of noise (see Section 4.3.2, in particular pp. 4.3-3 to 4.3-4), the increase in noise from transit vehicles is dependent on the existing ambient noise level. To evaluate the potential for the proposed Service Improvements to result in significant noise impacts from motor coaches and trolley coaches, the routes selected for evaluation were those proposed to have the highest daily increase in service frequency and include a representation of the range in existing ambient noise conditions within San Francisco. Therefore, the roadways with the highest daily increase were identified within these areas where the ambient noise level is low [55 to 59 dBA (Ldn)], medium [60 to 69 dBA (Ldn)], and high [70 dBA (Ldn) or greater], as shown on the DPH's Background Noise Levels - 2009 map (Figure 26, p. 4.3-8). In some cases, multiple routes were evaluated within these ambient noise environments because the daily increase in transit vehicles includes variations in daytime and nighttime service changes and in the proportion of motor coach versus trolley coach service.

Since the routes with the highest daily increases represent the worst-case noise increases associated with the proposed TEP project, the results of this evaluation may be used to make an assessment of the noise impact potential for other routes in similar ambient noise environments, but with lower transit vehicle frequency increases.

Operational ground-borne vibration impacts are evaluated by determining the maximum increase in Muni Metro LRV and historic streetcars that would pass by a single point for the various rail lines. The evaluation assesses the increases against the number of bypasses that would be required to produce a significant increase in the ground-borne vibration level in accordance with the FTA Guidelines.

IMPACT EVALUATION

Construction Impacts

Impact NO-1: Construction activities, occurring indirectly as a result of the proposed Service Policy Framework, and as proposed under the TEP for the Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants would not result in a substantial temporary or periodic increase in noise levels above existing ambient conditions. (Less than Significant)

Though the Policy Framework itself would not directly result in noise impacts, construction that could occur as a result of projects developed to implement its objectives and actions would have the potential to generate temporary construction noise impacts. The construction projects proposed as part of the TEP for the Service-related Capital Improvements, and the TTRPs and TTRP Variants (including the application of TPS Toolkit elements along the program-level TTRP corridors) provide good representative examples of the types of construction projects, both in size and scope, that could be proposed under the Policy Framework. Thus, by analyzing the construction projects proposed under these TEP project components, the potential indirect construction noise effects of the Policy Framework have been identified.

The construction of curb ramps that would occur under the Service Improvements and Service Variants at some locations would involve activities and equipment similar to those used in the construction of transit bulbs or pedestrian bulbs, as described below. However, the amount of construction equipment used and the duration of construction would be substantially less. Therefore, the noise impacts from construction related to Service Improvements and Service Variants would be similar to those analyzed for the Service-related Capital Improvements and TTRPs and are not considered separately. Where curb ramps would be constructed near Service-related Capital Improvements and TTRPs and TTRP Variants, the activity would not substantially add to the noise level because construction of curb ramps would not require the use of equipment that would generate noise in excess of the equipment already being used and due to the additive properties of noise (Section 4.3.2, pp. 4.3-3 to 4.3-4), a doubling of the noise generating activities would be required in order for the additional work to be perceptible, which would not occur due to the minimal equipment and duration of its use necessary to construct curb ramps.

Construction activities proposed as part of the Service-related Capital Improvements and the TTRPs, including the application of the TPS Toolkit elements for the program-level corridors, would include construction of transit bulbs, pedestrian bulbs, pedestrian refuge islands, transit boarding islands, traffic circles, traffic signals, sidewalk expansions, overhead wire installations, extension of a contraflow commercial-transit-only lane, and accessible platforms. The amount of time to construct most of the individual elements would be 15 days or less.[24] However, some of the proposed Service-related Capital Improvements, TTRPs, or curb ramps are located near each other; therefore, construction could occur for two to three months within one work area.[25] While construction implementation details have yet to be finalized, it is possible that portions of the TEP project components may be constructed at night in order to minimize disruption to daytime transit operations; this work would include pulling cable, striping,[26] pouring concrete, and installing overhead wires.[27]

[24] BASELINE Environmental Consulting, *Final Air Quality Technical Report - Transit Effectiveness Project*, May 10, 2013, Tables D-1 through D-5. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

[25] Ibid.

[26] Pavement striping would not result in substantial noise because the time spent in any one location would be short as the stripping crew moves along the roadway, and stripping does not require a large number of workers or equipment.

[27] San Francisco Planning Department, Memorandum – TEP CEQA – Response to Consultant Noise Analysis Issues and Questions from December 12th, January 9, 2013. A copy of this memorandum is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

The noise levels generated by construction equipment would vary greatly, depending on factors such as the activity being performed, the type of equipment, the specific equipment model, and the condition of the equipment. Construction equipment can be considered to operate in two modes: stationary and mobile. Construction activities that would be performed under the Service-related Capital Improvements and the TTRPs include demolition of the existing sidewalk and portions of the street. This activity would be expected to require the use of stationary equipment such as generators to power concrete/pavement saws and compressors to power jackhammers. It is estimated that the sidewalk and pavement demolition phase of the various proposed TPS Toolkit elements would last two to four days.[28] Mobile equipment, such as backhoes or compactors, tend to move around the construction area with power applied in cyclic fashion; they are used throughout the duration of certain construction phases. Loaded trucks delivering supplies or removing construction debris travel to and from the site throughout the day and throughout the construction duration.

Construction activities typically require the use of several pieces of noise-generating equipment simultaneously. However, for construction projects within the City right-of-way, space constraints tend to limit the size of the equipment (i.e., smaller backhoes or bobcats instead of larger backhoes or large excavators) and the number of pieces of construction equipment that can be used at one time. Where multiple pieces of construction equipment are used at once, the noise generated is typically determined by the loudest piece of equipment. The dominant source of noise from most construction equipment is the engine, usually a diesel engine, especially if the equipment is older with a poorly muffled exhaust system. However, San Francisco's Clean Construction Ordinance requires that for all City projects that result in 20 or more cumulative days of construction, off-road equipment and off-road engines with 25 horsepower or greater must meet or exceed US EPA Tier 2 standards[29] for off-road engines or operate with the most effective verified diesel emission control technology (see Section 4.4). Tier 2 construction equipment is manufactured no earlier than 2001; therefore, with the exception of equipment with small, low-horsepower engines, older construction equipment would not be expected to be used to construct the TEP project components. In some cases, such as street or sidewalk demolition with an impact hammer mounted on a bulldozer (commonly referred to as a hoe ram) the dominant noise is due to the interaction between the equipment and asphalt or concrete. The sound from pneumatic jackhammers is a combination of the explosive air exhaust and hammering on the asphalt or concrete surface.

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[28] BASELINE Environmental Consulting, *Final Air Quality Technical Report - Transit Effectiveness Project*, May 10, 2013, Tables D-1 through D-5. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

[29] Federal emission standards (Tier 1 through 4) for off-road diesel engines, including construction equipment, are based on the engine horsepower and year manufactured.

Construction activities proposed for the Service Improvements and Service Variants, the Service-related Capital Improvements, and the TTRPs and TTRP Variants would be required to comply with the existing San Francisco Noise Ordinance and DPW Article 2.4, DPW Order 176,707 and Blue Book regulations, including:

- Any construction between the hours of 8 p.m. and 7 a.m. shall not produce noise levels in excess of 5 dBA above the ambient noise level at the property line, unless a special permit (Night Noise Permit) is approved by DPW. If a Night Noise Permit is granted, DPW prohibits high levels of noise or impact noise after 10 p.m.

- Limit noise from any individual piece of construction equipment, except impact tools, to 80 dBA at 100 feet.

- Require use of impact tools and equipment that have approved intake and exhaust mufflers and pavement breakers and jackhammers that are equipped with approved acoustically attenuating shields or shrouds to achieve maximum noise attenuation.

The activities that would occur during the construction of curb ramps, transit bulbs, pedestrian bulbs, pedestrian refuge islands, transit boarding islands, traffic signals or circles, sidewalk expansions, the extension of a commercial-transit only contraflow lane and accessible platforms are similar and would require many of the same types of construction equipment. Typical construction activities to install the above-noted features would include the demolition of a portion of the existing sidewalk and street; preparation of the surface by removing unsuitable soil and adding base rock or engineered fill, as necessary; compaction of the surface; preparation of concrete forms; and restoration of the sidewalk and street by pouring new concrete and laying down new asphalt. In some cases, the existing stormwater catch basins and associated sewer pipes would require relocation because the catch basins are typically located at the corners where the construction of curb ramps and TPS Toolkit elements such as transit or pedestrian bulbs would occur.

The loudest noise levels are typically generated by impact equipment (e.g., hoe ram or jackhammers) that would be required for the demolition of the existing sidewalk and street and from paving equipment during street restoration. Trucks also produce high levels of noise, but truck use would be intermittent and short-term (since it is a mobile noise source); therefore, the noise impact from trucks would not be as great as the noise impact from the stationary impact and paving equipment that do not leave the construction site.

The construction activities performed for traffic signal installations would be similar to the activities described above, but the amount of sidewalk and street demolition would be less. Traffic signal installations generally consist of erecting two traffic signal mast-arm poles along the main transit route, each of which requires a hole approximately 9 feet in depth and 3 feet in diameter within the sidewalk, and up to six standard traffic signal poles at the various corners and possibly within the median, each of which requires a hole approximately 3 feet in depth and 1 foot in diameter. The installation of traffic signals would also include use of a truck equipped with an auger to dig the hole for placement of the signal poles and the use of a boom truck with a crane to place the signal poles in place. Typically the noise from these activities is dominated by the truck's diesel engine. Some narrow, shallow excavations within the street would be required to install the wiring for operating the traffic signals. Typically, the width of electrical wiring trenches is two feet or less, and this work may not require a hoe ram or jackhammer because the overlaying asphalt could be cut with a saw and removed with a backhoe prior to soil excavation.

Construction work for the Service Improvements (curb ramps), Service-related Capital Improvements, and the TTRPs described above would typically occur during the daytime hours, although limited nighttime work may be necessary to minimize impact on transit operations. Other methods that have been previously employed by the SFMTA to avoid night work are contemplated, such as the rerouting of the Routes 14 Mission and 49 Van Ness-Mission on South Van Ness during major road work on Mission Street or the use of multiple concurrent crews for applying paint to transit-only lanes.

OWE projects would include the installation of additional overhead wires and related infrastructure (e.g., support poles, conduit [including pulling cable], and electrical duct banks) for certain electric trolley coach routes. The installation of bypass wires would require less construction activity than OWE expansions since much of the related infrastructure is already in place, while the expansion of electric trolley routes would require most if not all new related infrastructure. Most of the construction activities for OWE projects would be similar to the activities described above, although the construction of electrical duct bank would require excavations up to 12 feet deep and installation of overhead wire (described below). The overhead wire support poles typically require a hole 3 feet in diameter and 12 feet deep and are installed every 90 to 100 feet along a street segment. This construction of the OWE-related infrastructure would occur during normal working hours, but the installation of overhead bypass wires is anticipated to occur on weekend nights between 10 p.m. and 10 a.m. in two 12-hour shifts to minimize transit system interruptions.[30] Therefore, this construction would require a Night Noise Permit from DPW.

[30] Email communication from Sean Kennedy of SFMTA to Debra Dwyer of San Francisco Planning Department, May 3, 2013. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

Two of the project-level OWE projects proposed under the Service-related Capital Improvements would consist of installing bypass wires along the existing transit route and, therefore, may include night work to minimize interruption of the existing transit service:

- OWE.2 - Bypass Wires at Various Terminal Locations, including Lyon and Union streets, and Presidio Avenue and Sacramento Street; and
- OWE.4 - 5 Fulton Limited/Local Bypass Wires.

Overhead wire is installed by lift trucks that elevate the workers and the wire for installation at the top of the support poles. Typically two trucks are needed for installing wire, and the lift truck's diesel engines need to be running to power the lift's hydraulic system. The lift truck engines would be the primary source of noise during overhead wire installation and, while the lifts are being raised, the trucks' diesel engines increase their idle rate, thereby increasing the noise from the diesel engines. Other noise would be from striking of metal on metal while connecting the wires to metal poles using metal brackets. While the noise from these activities would not be expected to generate high levels of noise that would noticeable during daytime hours, they may be perceptible at night when the ambient noise level is low.

The land uses in the areas of OWE.2 and OWE.4 include residential or mixed residential with ground-floor commercial. Residents along the streets where nighttime overhead wire installation would occur would likely be subjected to an increase in noise levels in excess of 5 dBA for some small portion of the construction period, which is expected to last several weeks. However, the noise impact to any one receptor location would be temporary as the work moves along the street alignment.

In the future, OWE.6 New Overhead Wire - Extension to West Portal Station would install overhead wires from the current 6 Parnassus terminal at 14th Avenue and Quintara Street to West Portal Station. The exact route for OWE.6 is unknown at this time, but the project would require installation of new overhead wires where none exist; therefore, OWE.6 would not be expected to include night work.

Although proposed TEP construction activities would occur over a period of approximately six years, the construction activities that would impact noise sensitive receptors at any one location would be temporary, occurring for up to about six weeks, assuming that three TEP construction projects such as a transit bulb, overhead wires, and a traffic signal were constructed sequentially at one location. The loudest construction activities, such as sidewalk or street removal, would occur over a fraction of the total construction period for the given phase. No pile-driving equipment would be used to construct the proposed TEP improvements. In addition, when the particular noise-generating construction activity is completed, the associated noise would no longer be experienced by the affected sensitive receptors. For example, following the demolition of the existing sidewalk (a noisy construction activity), the preparation of concrete forms prior to pouring concrete to install a transit bulb or other similar TPS Toolkit element would not be expected to generate high levels of noise. In addition, although the distance of construction noise-generating activities from sensitive receptors may be less than 25 feet at some locations, the streets on which most of the physical improvements would be constructed are part of the City's proposed Rapid Network and, thus are in areas with high existing ambient noise levels. Due to the additive properties of noise (Section 4.3.2, page 4.3-1), additional noise is less perceptible in areas with high ambient noise levels than in areas with lower ambient noise levels.

Although TEP construction projects along different routes may occur simultaneously within the City, the construction noise from individual projects would attenuate with distance. For instance, for a piece of construction equipment generating 80 dBA at 50 feet, the noise level would be reduced to 68 dBA at 200 feet. The noise from construction equipment would be further attenuated by intervening buildings and other structures. At a distance where the construction noise levels attenuate to ambient levels, they would no longer be perceptible. Therefore, a combined noise impact would not be expected from several TEP construction projects occurring in different areas of the City.

Construction activities could result in temporary increases in ambient noise levels near the construction zones. As previously stated, the amount of time to construct most of the individual elements would be two weeks or less. However, some of the proposed Service-related Capital Improvements, TTRPs, or curb ramps are located near each other; therefore, project-related construction could occur for several months within one work area. Typical noise levels at a distance of 50 and 100 feet, respectively, from various types of equipment that may be used during construction projects proposed for the TEP are listed in Table 29. Noise levels would fluctuate depending on the construction phase, equipment type and duration of use, distance between the noise source and receptor, and presence or absence of noise attenuation barriers.

Table 29: Typical Noise Levels from Construction Equipment

Construction Equipment	Noise Level [dBA (Leq) at 50 feet]	Noise Level [dBA (Leq) at 100 feet]*
Air Compressor	81[1]	75
Backhoe	80[1]	74
Compactor	82[1]	76
Concrete Mixer	85[1]	79
Concrete Pump	82[1]	76
Concrete Vibrator	76[1]	70
Crane Mobile	83[1]	77

Construction Equipment	Noise Level [dBA (Leq) at 50 feet]	Noise Level [dBA (Leq) at 100 feet]*
Drill Rig Truck	79[3]	76
Dump Truck	84[2]	78
Generator	81[1]	75
Paver	77[2]	71
Roller	74[1]	68
Saw	76[1]	70

Notes: dBA = A-weighted decibels; Leq = equivalent noise level

* Noise level at 100 feet assumed a noise attenuation rate of 6 dBA for a doubling of distance from the source at 50 feet.

Sources:

[1] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 19, 2013.

[2] U.S. Department of Transportation, *Federal Highway Administration, Effective Noise Control during Nighttime Construction*. Available online at: http://ops.fhwa.dot.gov/wz/workshops/accessible/Schexnayder_paper.htm. Accessed March 19, 2013.

[3] Federal Highway Administration, *FHWA Roadway Construction Noise Model User's Guide*, January 2006, p. 3. Available online at: http://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.cfm. Accessed March 19, 2013.

As shown on Table 29, the expected noise level from construction equipment used for Service-related Capital Improvements, the TTRPs, and Service Improvements (curb ramps) would not emit noise in excess of 80 dBA at 100 feet. Therefore, with adherence to the San Francisco Noise Ordinance, including limiting the noise levels from individual pieces of construction equipment (other than impact tools) to 80 dBA at a distance of 100 feet, equipping impact tools with both intake and exhaust muffled, and obtaining a noise permit for night work from DPW, as well as compliance with the Public Works Code and other DPW regulations, these temporary construction noise impacts from the TEP would be less than significant. No mitigation measures are necessary.

Impact NO-2: Construction activities, occurring indirectly as a result of the proposed Service Policy Framework, and as proposed under the TEP for the Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants would not expose persons and structures to excessive temporary ground-borne vibration or ground-borne noise levels. (Less than Significant)

While the Policy Framework would not directly result in vibration impacts, construction that could occur as a result of implementing actions and objectives proposed pursuant to the Policy Framework could cause temporary vibration effects. The construction projects proposed for the Service Improvements and Service Variants, the Service-related Capital Improvements, and the TTRPs and TTRP Variants provide a good representative example of the types of construction projects, both in size and scope, that could be undertaken to implement the Policy Framework. Thus, by analyzing the construction projects proposed under these elements, the potential indirect construction vibration effects of the Policy Framework have been analyzed.

The construction of curb ramps that would occur under the Service Improvements and Service Variants at some locations would involve activities and equipment similar to the construction of transit bulbs or pedestrian bulbs, described below, although the amount of construction equipment and the construction duration would be substantially less. Therefore, the vibration impacts from construction related to Service Improvements would be within the magnitude of those analyzed for the Service-related Capital Improvements and TTRPs, and are not considered separately. Where curb ramps would be constructed near Service-related Capital Improvements and TTRPs and TTRP Variants, the activity would not substantially add to the vibration impacts since the primary vibration impact from the construction of curb ramps would be related to removal of the existing curb and a small area of sidewalk. Such activity could be completed within a matter of hours, would generally be incorporated into the existing work schedule, and therefore, is not considered separately.

The vibration from most rubber-tired construction vehicles moving slowly through the construction area would not be expected to result in significant vibration impacts, although fully loaded trucks may result in ground-borne vibration impacts, as shown on Table 30. Impact equipment, such as bulldozers with impact hammers (hoe ram) and jackhammers used to demolish the existing curb, sidewalk, and street during the construction of transit bulbs, pedestrian bulbs, pedestrian refuge islands, transit boarding islands, traffic circles, sidewalk expansions, and accessible platforms would cause ground-borne vibration. Construction of TEP projects would not require construction activities such as pile driving or underground tunneling that produce high levels of vibration.

It is estimated that the use of vibration-generating construction equipment may be as close as 10 feet to buildings at some project locations, such as where sidewalk demolition is required. Typical vibration levels at a distance of 10, 15, and 25 feet from various types of equipment that may be used during construction projects proposed for the Service Improvements (curb ramps), Service-related Capital Improvements, and the physical improvements along the TTRPs are listed in Table 30.

Table 30: Vibration Source Levels for Construction Equipment

Equipment	PPV at 10 ft (in/sec)	PPV at 15 ft (in/sec)	PPV at 20 ft (in/sec)	PPV at 25 ft (in/sec)
Hoe Ram (impact hammer)	0.35	0.19	0.12	0.089
Loaded Trucks	0.30	0.16	0.11	0.076
Jackhammer	0.14	0.075	0.044	0.035
Small Bulldozer	0.01	0.006	.004	0.003
Notes: PPV = peak particle velocity; ft = feet; in/sec = inches per second Reference vibration levels at 10, 15 and 20 feet were calculated from the reference level at 25 feet using the equation: PPV distance = PPV 25 ft X $(25/\text{Distance})^{1.5}$.				
Source: FTA, *Transit Noise and Vibration Impact Assessmen*t, May 2006, p. 12-12. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 19, 2013.				

As previously stated, the amount of time to construct most of the individual elements for the TEP would be two weeks or less and the use of impact equipment for sidewalk and street demolition would only occur for two or four days.[31] The amount of time that any one receptor would be impacted would be further limited by the fact that since the construction would be along the public right-of-way and the projects are linear in nature, the construction activity would move along the street or sidewalk as the work progresses. Since ground-borne vibration is a localized impact and attenuates rapidly with distance, vibration impacts from various construction activities would not be expected to have an additive affect. Since the construction projects proposed under the various Service-related Capital Improvements, TPS Toolkit elements for the TTRPs, and Service Improvements (curb ramps) would use standard construction equipment and would not include activities such as pile driving or underground tunneling, the vibration impact would be temporary and would not be excessive. Therefore, the project's construction vibration impact on people would be less than significant.

The potential for damage from ground-borne vibration to buildings was evaluated by comparing the expected vibration levels in Table 30 against the FTA's construction damage criteria of 0.5 PPV for reinforced-concrete, steel, or timber buildings. Vibration from the types of equipment that would be used for construction of the various Service-related Capital Improvements, TPS Toolkit elements for the TTRPs, and Service Improvements (curb ramps) would not be expected to result in damage to buildings. Therefore, the potential impact to buildings from ground-borne vibration from construction would be less than significant, and no mitigation measures are necessary.

[31] BASELINE Environmental Consulting, *Final Air Quality Technical Report – Transit Effectiveness Project*, May 10, 2013, Tables D-1 through D-5. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

Vibration from construction also has the potential to damage subsurface 19th century brick sewers that are located within certain areas of the City. However, prior to performing any construction activities within the public right-of-way, the SFMTA is required to obtain permits from the DPW Bureau of Street Use and Mapping (BSM) in accordance with Article 2.4 of the Public Works Code. As part of its plan check process, the BSM refers all plans to City agencies for review, including the SFPUC, the agency responsible for maintaining the City's sewer system. If the SFPUC determines that the proposed construction work may damage the older brick sewers, the BSM may impose specific conditions as part of the permit process to abate the potential for damage; therefore, this potential construction vibration impact of the project would be less than significant. No mitigation measures are necessary.

Operational Impacts

Once constructed, the projects for the Service-related Capital Improvements and the TTRPs and TTRP Variants, comprised of the TPS Toolkit elements, would not have any ongoing operational noise or vibration impacts. The curb ramps, overhead wire installations, transit bulbs, boarding platforms, and other similar structures would not include fans, transformers, or other electromechanical equipment that typically produce stationary source operational noise. Therefore, Service-related Capital Improvements, TTRPs and TTRP Variants, and curb ramps constructed in association with the Service Improvements and Service Variants would not have an operational noise or vibration impact.

Impact NO-3: The proposed Service Policy Framework and operation of the Service Improvements and Service Variants would not result in a substantial increase in permanent noise levels along affected transit routes above existing ambient conditions. (Less than Significant)

Although adoption and implementation of the Policy Framework itself would not result in any direct operational noise impacts, noise impacts from changes in transit system operations could occur as a result of implementing projects proposed pursuant to the Policy Framework. The TEP's proposed Service Improvements and Service Variants, including modifications of service frequencies, changes in routes, or implementation of new routes, could result in operational noise impacts, and therefore are evaluated below. The evaluation provides representative operational noise impacts both in size and scope that could be contemplated under the actions and objectives of the Policy Framework. Thus, by analyzing the proposed Service Improvements, the potential indirect operational noise effects of the Policy Framework have been analyzed.

The proposed TEP would increase transit service on select motor coach routes, trolley coach routes, and rail lines. The increase in transit service along existing routes and the establishment of new routes has the potential to increase the noise level along the public right-of-way. The increase in, or introduction of, transit vehicles bypassing a single point is an additional source of noise to sensitive receptors located along affected routes. There may be sensitive receptors in residential or institutional land uses along many of the affected routes. The routes with the highest daily increases in transit service, which represent the worst-case noise increases associated with the proposed Service Improvements and Service Variants, have been estimated and allow for an assessment of the potential noise impact from routes with lower transit vehicle frequency increases.

This evaluation of noise impacts from transit vehicles accounts for the additive effect of increased frequency of transit vehicles from multiple routes along the same street segment. For proposed Service Improvements that would be implemented along different streets, the noise from the transit vehicles would attenuate with distance and would be further attenuated by intervening buildings and other structures. Therefore, a combined operational noise impact from implementation of multiple Service Improvements would not be expected within the City.

The types of transit vehicles that are included on routes proposed for Service Improvements include:

- Electric Trolley Coaches;
- Diesel Motor Coaches;
- Diesel Hybrid-Electric Motor Coaches;
- Vans;
- Light Rail Vehicles; and
- Historic Streetcars.

This analysis assumes that the Muni's standard diesel motor coaches would be used on all motor coach routes evaluated. The SFMTA's pull-away testing of standard diesel motor coaches and diesel hybrid-electric motor coaches indicated that the standard diesel motor coaches emit higher noise levels.[32] In the future, some routes would be served by smaller vans, which would be expected to generate a lower noise level than the current standard motor coaches or diesel hybrid-electric motor coaches serving those routes. However, in the near-term, these routes would continue to be served by standard motor coaches or diesel

[32] Email communication between Sean Kennedy of SFMTA and Debra Dwyer of San Francisco Planning Department, February 4, 2013. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

hybrid-electric motor coaches. Therefore, assuming standard diesel motor coach service for all motor coach routes (diesel and diesel hybrid-electric) provides a conservative, worst-case estimation of the noise that would be generated from implementation of the proposed project.

The roadways/rail lines and routes evaluated, along with the ambient noise levels and assumed distance to the nearest receptor, are summarized in Table 31 and shown on Figure 27. Considering the ambient noise conditions in the City, particularly along transit corridors, and based on the consultant's expertise, the analysis categorized areas as having low, medium, or high existing ambient noise levels. Then the increase in transit vehicle frequency in a representative sample of areas within each category was reviewed for noise impacts. The low [55 to 59 dBA (Ldn)], medium [60 to 69 dBA (Ldn)], and high [70 dBA and greater (Ldn)] ambient noise levels were estimated from the DPH's Background Noise Levels - 2009 map (Figure 26, p. 4.3-8) by conservatively assuming that the existing ambient noise at a particular location was the lower of the contour range. Using the low end of the contour is a conservative assumption due to the additive properties of noise in which adding new noise in a lower ambient noise environment produces a greater increase in the noise when compared to adding new noise in a higher ambient noise environments (see pages 4.3-3 and 4.3-4). The new E Embarcadero historic streetcar line was specifically evaluated because implementation would result in the maximum daily increase in rail trips as compared to the other light rail lines. With the exception of the F Market & Wharves, other proposed Service Improvements would have only minor increases in daily rail trips; the number of daily trips on the F Market & Wharves line would decrease.

As shown on Table 28, noise exposure is expressed in units of dBA (Ldn) for residential land uses and dBA (Leq) for institutional land uses. Existing ambient noise or Ldn values for the assessment of impacts on residential land uses were estimated from the DPH's Background Noise Levels - 2009 map (Figure 26, p. 4.3-8) by conservatively assuming that the existing ambient noise or Ldn value at a particular location was the lower of the contour range. As previously stated, this is a conservative assumption due to the additive properties of noise in which adding new noise in a lower ambient noise environment produces a greater increase in the noise when compared to adding new noise in a higher ambient noise environments (see pages 4.3-3 and 4.3-4). Ambient noise or Leq values for the assessment of institutional land uses were estimated from the Ldn values by assuming that the Leq values were 2 dBA lower than the reported Ldn values. The general rule is that the Ldn is within plus or minus 2

Table 31: Routes Evaluated for Noise Impacts

Street	Contributing Routes	Roadway Segment	Vehicle Type	Existing Ambient Noise Level[1] (dBA Ldn)	Existing Ambient Noise Level[2] (dBA Leq)	Assumed Distance to Nearest Receptor (ft)	Daily Increase (decrease) in Transit Vehicle One-Way Trips (veh/day)
Motor Coach and Trolley Coach Routes							
Low Ambient Traffic Noise under Existing Conditions							
22nd Avenue[3]	71L Haight-Noriega Limited	Noriega Street to Lincoln Way	MC	55	53	30	116
Medium Ambient Traffic Noise under Existing Conditions							
Lincoln Boulevard	43 Masonic	Graham Street to Letterman Street	MC	60	58	30	176
Utah Street	10 Sansome 19 Polk 48 Quintara/24th 58 24th Street	23rd Street to 24th Street	MC	60	58	30	198
14th Avenue	6 Parnassus 48 Quintara/24th	Quintara Street to Santiago Street	TC MC	65	63	30	184 (-11)
16th Street[4]	33 Stanyan 22 Fillmore 22 Filmore	Mission Street to Potrero Avenue	TC MC	65	63	30	51 289
High Ambient Traffic Noise under Existing Conditions							
16th Street[4]	33 Stanyan 10 Sansome 22 Fillmore	Irwin Street to Connecticut Street	TC MC	70	68	30	148 530

Table 31: Routes Evaluated for Noise Impacts (continued)

Street	Contributing Routes	Roadway Segment	Vehicle Type	Existing Ambient Noise Level[1] (dBA Ldn)	Existing Ambient Noise Level[2] (dBA Leq)	Assumed Distance to Nearest Receptor (ft)	Daily Increase (decrease) in Transit Vehicle One-Way Trips (veh/day)
23rd Street	10 Sansome 19 Polk 48 Quntara/24th 58 24th St	Utah Street to Kansas Street	MC	70	68	30	396 [5]
Rail Routes							
Embarcadero South	E Embarcadero T Third Street N Judah	Market Street to King Street	HSC LRV LRV	70	68	50	120 3 15
Jefferson, Jones, Beach Streets Loop	E Embarcadero F Market & Wharves	Jefferson, Jones, and Beach streets	HSC	60	58	25	37 [6]

Notes: Locations are shown on Figure 27. TC = trolley coach; MC = motor coach; LRV = light rail vehicle; HSC = historic street car; dBA = A-weighted decibels; Ldn = day/night level; Leq = one-hour equivalent noise level; ft = feet; veh/day = vehicles per day.

1 Lower of range of noise contours from DPH transportation noise map.

2 Estimated from Ldn, assumed that the Leq was 2 dBA lower than Ldn.

3 71L Haight/Noriega Limited Service Variant.

4 22 Fillmore Service Variant 1.

5 The daily increase in transit vehicles for the 23rd Street segment used in the noise evaluation (396 vehicles per day) differs from the daily increase in transit vehicle used in the air dispersion modeling (448 vehicles per day, see Section 4.4) because the air dispersion modeling used data from the San Francisco County Transportation Authority's travel demand model (SF-CHAMP); which yielded an overestimation of emissions. The noise evaluation used the SFMTA's SPASM model and is based on proposed transit vehicle headways and is more representative of the expected increase in numbers of transit vehicles along the roadway segment.

6 Jefferson, Jones, Beach streets are a one-way loop. The F Market & Wharves line has a daily decrease of 44 veh/day.

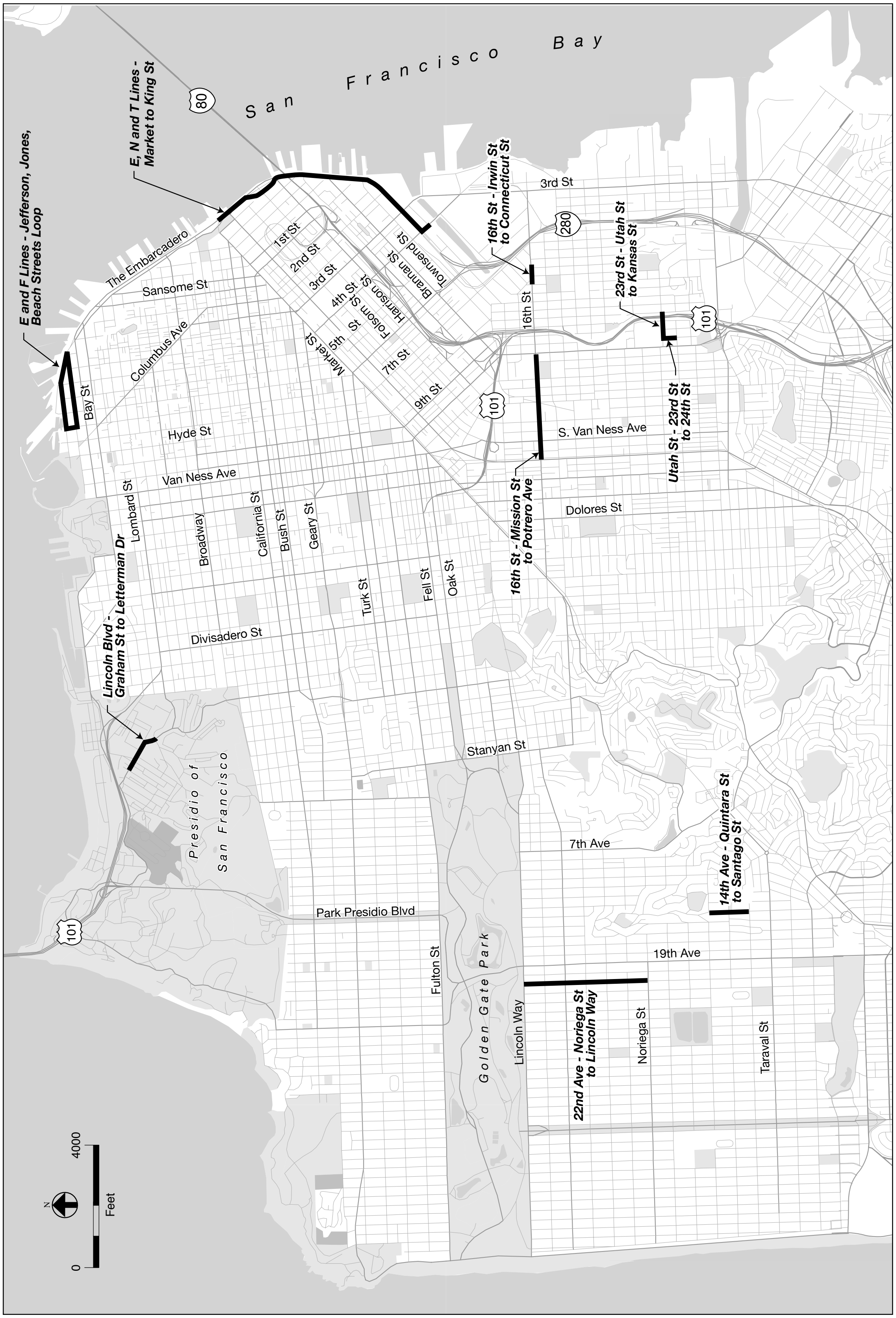

FIGURE 27 - NOISE EVALUATION LOCATIONS

TRANSIT EFFECTIVENESS PROJECT

dBA of the Leq during the peak traffic hour under normal traffic conditions.[33] Therefore, the ambient noise or Leq was conservatively assumed to be 2 dBA lower than the Ldn, which typically yields higher noise impact results; that is, a greater increase in noise at a given distance from the source than if the ambient noise level is assumed to be 2 dBA higher than the ambient Ldn.

For rubber tire vehicles, the noise from the interaction of the tire and the roadway is the dominate source of noise at normal operating speeds.[34] The primary noise source from rail vehicles is the interaction between the rail track and the metal vehicle wheels.[35] As the speed increases, the level of noise generated increases. The increase in noise from the proposed Service Improvements was determined using FTA's methodology for evaluating transit noise impacts.[36] The FTA methodology uses the following parameters to calculate the noise from transit systems:

- Reference Sound Exposure Levels or SELs[37] from specific types of transit vehicles;
- The average transit vehicle bypass-events during the daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) for residential land uses;
- The maximum number of transit vehicle bypass events during a single hour for institutional land uses;
- The speed of the vehicle; and
- The distance to the nearest receptor.

The SEL for motor coaches was based on FTA's reference SEL for diesel-powered buses; for trolley coaches, the SEL was based on FTA's reference SEL for electric buses; and for Muni Metro LRVs, the SEL was based on FTA's reference level for at-grade rail transit. Because the FTA Guidance does not provide reference levels for historic street cars, the

[33] California Department of Transportation, *Technical Noise Supplement*, November 2009, p. 2-60. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf. Accessed February 22, 2013.

[34] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, p. 2-6. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 19, 2013.

[35] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, p. 2-6. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 19, 2013.

[36] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 19, 2013.

[37] An SEL is a sound level metric that accounts for the variation of noise as the vehicle approaches, passes, and departs, as well as the duration from such an event, and is used to allow a uniform assessment for transit vehicle bypasses.

SEL reference level that was used in this evaluation was based on actual measurements of the SEL from the F Market & Wharves line historic streetcars from the environmental review documents for Extension of the F Line Streetcar Service to Fort Mason Center.[38] Only the data from Presidents' Conference Committee (PCC) streetcars were used, as double-ended cars are required for the E Embarcadero Line due to the lack of a terminal loop to turn the vehicle around at the Caltrain southern terminus.

The increase in transit frequency was based on SFMTA's estimated headways for each route, which is the scheduled time interval between any two in-service transit vehicles operating in the same direction on a route. As part of the evaluation, the greatest increase in transit vehicles for each segment as a result of the Service Improvements and Service Variants proposed by the TEP was identified based on the changes to service frequencies.

Trolley and motor coach vehicle travel speeds were assumed to be 15 miles per hour during the day (7 a.m. to 10 p.m.) and 20 miles per hour during the night (10 p.m. to 7 a.m.). These speeds were based on testing performed by SFMTA.[39] The historic streetcar speeds were assumed to be 20 miles per hour based on information from the environmental review of the Extension of F- Market & Wharves Streetcar Service to Fort Mason Center project.[40]

For the analysis of motor coach and trolley coach routes, the distance to the receptor was assumed to be 30 feet from the roadway centerline. This accounts for the nearest likely sensitive receptor to the roadway because, at a minimum, most roadways consist of two 12-foot-wide travel lanes, two 8-foot-wide parking lanes, and at least 10 feet of sidewalk on either side. In many cases, the receptor's setback from the roadway would be greater than 30 feet from the roadway centerline; however, this conservative assumption was used to ensure that the results of the evaluation would be applicable to locations throughout the City. The distance to the nearest receptor for the E Embarcadero line south of Market Street, which would run on the same track as the existing N Judah and T Third Street lines, was assumed to be 50 feet because the rail track is located within the roadway median and the

[38] National Park Service, U.S. Department of the Interior, *Final Environmental Impact Statement for Extension of F-Line Streetcar Service to Fort Mason Center*, February 17, 2012, Appendix F. Available online at: http://parkplanning.nps.gov/document.cfm?parkID=303&projectID=15547&documentID=45807. Accessed March 19, 2013.

[39] Email communication with attachment between Debra Dwyer of San Francisco Planning Department and James McCarty of BASELINE Environmental Consulting, March 20, 2013. The attachment includes data from the Automatic Passenger Count (APC) units of representative motor coaches. This document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

[40] Wilson, Ihrig & Associates, Inc., Noise and Vibration Setting Report, San Francisco Muni Historic Streetcar Service to For Mason, April 2009, p. 9. Available online at: http://parkplanning.nps.gov/document.cfm?parkID=303&projectID=15547&documentID=44149. Accessed March 19, 2013.

distance to the nearest receptor is located no closer than 50 feet from the railway centerline. Because the E Embarcadero line in the Jefferson, Jones, and Beach streets loop (which was identified as the area with the lowest ambient noise environment along that line) would run on the same rail as the existing F Market & Wharves line and the rail line runs curbside for some segments of Jefferson, Jones, and Beach streets in the Fisherman's Wharf area, the receptor distance was assumed to be 25 feet.

The noise from the increase in the number of transit vehicles for each of the roadway segments listed in Table 31 was calculated using the FTA's Noise Impact Assessment Spreadsheet, and then added to the existing ambient noise levels to estimate what the ambient noise level would be with the proposed Service Improvements. The resultant noise increases were compared to the criteria presented on Table 28 and are summarized in Table 32, p. 4.3-46. The FTA Noise Impact Assessment spreadsheets are included in Appendix 4 to the EIR, provided on the CD enclosed with this Draft EIR.

To evaluate the impact of the Service Improvements proposed in a low ambient noise environment [55 to 59 dBA (Ldn)], the increase in transit service along 22nd Avenue from Noriega Street to Lincoln Way was calculated using the FTA Noise Impact Assessment Spreadsheet. The increase would be due to increased frequency of service of the 71L Haight-Noriega Limited with implementation of the 71L Haight-Noriega Limited Service Variant for two-way transit operation on 22nd Avenue. The 71L Haight-Noriega Limited Service route would include inbound/outbound service on the 22nd/23rd Avenue couplet. The 71L Haight-Noriega Limited Service Variant would utilize two-way, inbound/outbound service on 22nd Avenue, to improve connections to the N Judah line. The proposed Service Improvements would result in an increase of 116 motor coaches per day, as shown in Table 31. The evaluation shows that there would be an increase of 2 dBA in the maximum hourly Leq, from 53 to 55 dBA (Leq) and an increase of 3 dBA in Ldn, from 55 to 58 dBA (Ldn), as summarized in Table 32. Since the other proposed Service Improvements in low ambient noise environments have lower motor coach or trolley coach frequency increases, these results indicate that implementation of the proposed Service Improvements would not cause a moderate or severe noise impact in low ambient noise areas for any route. The proposed project would result in a less-than-significant impact because in a low ambient noise environment the addition of transit vehicles would not exceed the Leq and Ldn thresholds as presented in Table 28.

To evaluate the impact of the Service Improvements proposed in a medium ambient noise environment [60 to 69 dBA (Ldn)], the increase in transit service along Lincoln Boulevard in the Presidio of San Francisco from Graham Street to Letterman Drive, along Utah Street from 23rd to 24th streets, along 14th Avenue from Quintara to Santiago streets, and along 16th Street from Mission Street to Potrero Avenue were modeled using the FTA Transit

Assessment spreadsheets. The maximum increase evaluated was along the 16th Street segment with an increase of 51 trolley coaches and 289 motor coaches per day, as shown in Table 31. This large increase is primarily due the 22 Fillmore Service Variant 1. The 22 Fillmore Service Variant 1 would include new motor coach service to the Mission Bay terminus from the 16th Street BART Station while continuing the trolley coach service to Third and 20th streets prior to implementation of 22 Fillmore Extension to Mission Bay (OWE.5). The evaluation shows that there would be an increase of approximately 1 dBA in the ambient noise level, from 63 to 64 dBA (Leq) and from 65 to 66 dBA (Ldn), as summarized on Table 32. Since the other proposed Service Improvements in medium ambient noise areas have lower motor coach or trolley coach frequency increases, these results indicate that implementation of the proposed Service Improvements would not cause a moderate or severe noise impact in medium ambient noise areas for any route. The proposed project would result in a less-than-significant impact because in a medium ambient noise environment the addition of transit vehicles would not exceed the Leq and Ldn thresholds as presented in Table 28.

To evaluate the impact of the Service Improvements proposed in a high ambient noise environment [70 dBA (Ldn) or greater], the increase in motor coaches along 16th Street from Irwin to Connecticut streets and along 23rd Street from Utah to Kansas streets were modeled using the FTA Transit Assessment spreadsheets. The maximum increase evaluated was along the 16th Street segment, with an increase of 148 trolley coaches and 530 motor coaches per day, as shown on Table 31. This large increase is primarily due the 22 Fillmore Service Variant 1, the reroute of the 33 Stanyan, and the introduction of the 10 Sansome route along this street segment. The evaluation shows that there would be no increase in the maximum hourly Leq, but a 1 dBA increase in the ambient noise level from 70 to 71 dBA (Ldn), as summarized on Table 32. Because the other proposed Service Improvements in high ambient noise areas have lower motor coach or trolley coach frequency increases, these results indicate that implementation of the proposed Service Improvements would not cause a moderate or severe noise impact in high ambient noise areas for any route. The proposed project would result in a less-than-significant noise impact because in a high ambient noise environment the addition of transit vehicles would not exceed the Leq and Ldn thresholds as presented in Table 28.

The proposed introduction of the E Embarcadero historic streetcar line from Market Street to King Street was performed using the FTA equations for determining noise from transit vehicles because the FTA Noise Impact Assessment spreadsheets do not include evaluation of historic streetcars. These equations compute the noise exposure in Leq and Ldn at 50 feet for fixed-guideway transit systems using the SEL as measured at 50 feet from the railway centerline.[41] As previously stated (page 4.3-34), the SEL reference level that was used in this evaluation was based on actual measurements of the SEL from the F Market & Wharves historic streetcars from the environmental review documents for Extension of the F Line Streetcar Service to Fort Mason Center. The detailed calculations and the equations used are provided in Appendix 4. The proposed service would add 120 new historic streetcar and 18 Muni Metro LRV trips per day along the same track currently being used by the N Judah and T Third Street lines, as shown on Table 31. The evaluation shows that there would be no increase in the maximum hourly Leq or Ldn, as summarized on Table 32. These results indicate that the implementation of the proposed Service Improvements would not cause a moderate or severe noise impact. The proposed project would result in a less-than-significant impact because the addition of the E Line from Market Street to King Street would not exceed the Leq and Ldn thresholds as presented in Table 28.

The evaluation of the proposed introduction of the E Embarcadero line from Market Street to Jones Street was also evaluated using the FTA equations, as discussed above. Because the Fisherman's Wharf area was identified on the City's Background Noise Levels - 2009 map as the lowest ambient noise environment along the E Embarcadero line north of Market Street (Figure 4.3-2), the Jefferson-Jones-Beach streets loop was evaluated. Since the route in this area is one way, the proposed service changes would result in 37 new historic streetcar trips per day along the track, as shown on Table 31, which is currently being used by the F Market & Wharves line. Because there are hotels along Beach Street located immediately adjacent to the sidewalk, the distance to the nearest receptor was evaluated at 25 feet from the center line of the existing rail line. The evaluation shows that there would a 3 dBA increase in the maximum hourly Leq and a 3 dBA increase in the Ldn, as summarized on Table 32. When compared to the thresholds presented on Table 28, these results indicate that the operation of the proposed Service Improvements would not cause a moderate or severe noise impact for institutional land uses (Category 3, as measured in Leq) but would equal the threshold for a moderate impact for residences and buildings where people normally sleep (Category 2, as measured in Ldn). While no residential land uses would be impacted, as stated above, there are hotels within the evaluated receptor distance. However, the proposed Service Improvements for the E Embarcadero and the F Market & Wharves lines would only result in an increase in streetcar frequency between the hours of 7:00 a.m. and 10:00 p.m. The frequency of streetcar service between 10:00 p.m. and 7:00 a.m. would be reduced. Since the hotels in this area are primarily serving tourists visiting Fisherman's Wharf and the nearby commercial establishments, the moderate increase in noise during the daytime hours would occur at a time when hotel guests are generally

[41] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, Table 5-1, p. 5-5. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 19, 2013.

Table 32: Results of Evaluation of Noise Increase from Service Improvements

Street	Maximum Hourly Increase (veh/hr)	Existing Ambient Noise Level[2] (dBA Leq)	Noise Level with Project (dBA Leq)	Increase in Noise Level (dBA Leq)	Impact Institutional Land Use [1]	Average Daytime Events (veh/hr)	Average Nighttime Events (veh/hr)	Existing Ambient Noise Level (dBA Ldn)	Noise Level with Project (dBA Ldn)	Increase in Noise Level (dBA Ldn)	Impact Residential Land Use [1]
Motor Coach and Trolley Coach Routes											
22nd Avenue Noriega Street to Lincoln Way	MC 7.4	53	55	2	No	MC 6.3	MC 2.4	55	58	3	No
Lincoln Boulevard Graham Street to Letterman Drive	MC 15	58	59	1	No	MC 10.1	MC 2.7	60	61	1	No
Utah Street 23rd Street to 24th Street	MC 14	58	59	1	No	MC 10.9	MC 3.9	60	62	2	No
14th Avenue Quintara Street to Santiago Street	TC 12 MC -2.0	63	63	0	No	TC 9.7 MC -1.0	TC 4.2 MC 0.5	65	65	0	No
16th Street Mission Street to Potrero Avenue	TC 14.7 MC 27	63	64	1	No	TC 3.0 MC 15.4	TC 0.7 MC 6.4	65	66	1	No
16th Street Irwin Street to Connecticut Street	TC 8.0 MC 40	68	68	0	No	TC 7.6 MC 28.9	TC 3.8 MC 10.7	70	71	1	No
23rd Street Utah Street to Kansas Street	MC 28	68	68	0	No	MC 21.7	MC 7.9	70	70	0	No

Table 32: Results of Evaluation of Noise Increase from Service Improvements (continued)

Street	Maximum Hourly Increase (veh/hr)	Existing Ambient Noise Level[2] (dBA Leq)	Noise Level with Project (dBA Leq)	Increase in Noise Level (dBA Leq)	Impact Institutional Land Use [1]	Average Daytime Events (veh/hr)	Average Nighttime Events (veh/hr)	Existing Ambient Noise Level (dBA Ldn)	Noise Level with Project (dBA Ldn)	Increase in Noise Level (dBA Ldn)	Impact Residential Land Use [1]
Rail Routes											
Embarcadero Market Street to King Street	LRV 4.7 HSC 8.0	68	68	0.4	No	LRV 1.2 HSC 8.0	LRV 0 HSC 0	70	70	0.2	No
Jefferson, Jones, Beach Streets Loop	HSC 4.0	58	61	3	No	HSC 2.5	HSC -0.1	60	63	3	No

Notes: TC = trolley coach; MC = motor coach; LRV = light rail vehicle; HSC = historic street car; veh/hr = vehicles per hour, including vehicle type; dBA = A-weighted decibels; Leq = one-hour equivalent noise level; Ldn = day/night noise level; ft = feet.

[1] Based on the severe impact thresholds presented in Table 28.

sightseeing and not in their hotel rooms, and therefore, not result in a substantial noise impact. During the hours that the hotel guests would normally return to their rooms to sleep, implementation of the proposed Service Improvements would result in lower transit-generated noise. Therefore, any noise impacts resulting from increases in noise levels due to the changes in transit operations would be less than significant and no mitigation measures are necessary.

Impact NO-4: The proposed Service Policy Framework and the Service Improvements and Service Variants proposed by the TEP would not expose people to or generate excessive ground-borne vibration or noise levels along affected transit routes. (Less than Significant)

Although adoption of the Policy Framework would not result in any direct operational vibration impacts, changes in transit system operations that could occur as a result of implementing projects pursuant to the Policy Framework could result in additional or new sources of vibration. The indirect vibration impacts that would occur as a result of the Policy Framework implementation, in large part, would be similar to those identified for the TEP components. The TEP projects provide a representative example of the types of projects, both in size and scope, that may result from the Policy Framework. Analysis of the TEP projects informs the analysis of the potential indirect effects of the Policy Framework. Future projects proposed as a result of the Policy Framework, once developed, may require additional environmental review.

The Service-related Capital Improvements include construction of the program-level E Embarcadero Line Independent Terminal at Jones and Beach streets. Terminal improvements made to facilitate operation of the E Embarcadero Line would include new bypass rails, track turnouts, track switches, and overhead wires and poles, along with possible sidewalk modifications. Once the E Embarcadero Line Independent Terminal is constructed, the proposed terminal would not have any operational vibration impacts independent of operation of the E Embarcadero light rail line service evaluated below.

Operational vibration impacts from the proposed Service Improvements may occur due to the change in frequency of Muni Metro LRVs or historic streetcars and the introduction of new historic streetcar service for the new E Embarcadero line. Muni Metro LRVs or historic streetcars may cause vibrations from the interaction between the steel wheels and the track and propagate through the ground from the source. Rubber-tired transit vehicles, such as motor coaches and trolley coaches, do not typically generate vibration impacts because the rubber tires and suspension systems provide vibration isolation.[42] It is unusual for vibration

[42] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, p. 7-9. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 13, 2013.

from buses to be perceptible, even in locations close to major roads.[43] Therefore, only the proposed Service Improvements for the SFMTA's rail service have the potential to generate any ongoing, or operational, vibration impacts. As previously stated, no Service Variants are proposed for the Muni Metro LRV or historic street car lines.

The proposed Service Improvements would be implemented on existing rail lines and therefore, any vibration impacts would be a result of an increase in vibration events due to more frequent rail service. The change in frequencies proposed in the Service Improvements for the SFMTA's existing and proposed rail lines is summarized in Table 33. Note that the number of transit vehicles discussed below includes both inbound and outbound vehicles to represent the total number of vehicles passing a single point along the route.

Table 33: Increase in Rail line Frequencies

Rail Line	Type of Vehicle	Existing Frequency (veh/day)	Proposed TEP Frequency (veh/day)	Change in Frequency (veh/day)
E Embarcadero	Historic Streetcar	0	120	120
F Market & Wharves	Historic Streetcar	371	324	-47
J Church	Light Rail Vehicle	248	251	3
T Third	Light Rail Vehicle	217	221	4
L Taraval	Light Rail Vehicle	236	238	2
M Ocean View	Light Rail Vehicle	211	215	4
N Judah	Light Rail Vehicle	264	279	15

Notes: veh/day = vehicles per day; veh/day is rounded to the nearest whole number and includes both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods.

Source: SFMTA, SPASM Model, 2012.

Because the individual rail line routes share track along The Embarcadero north of Market Street (Market Street to Jefferson Street), south of Market Street (Market Street to King Street), and along Market Street (Duboce Avenue to Main Street), changes in transit frequencies along these rail lines were combined as shown in Table 34 to evaluate potential combined vibration impacts. The vehicles per day increase on the Jefferson-Jones-Beach streets loop portion of the railway north of Market Street would be reduced by half from 73 to 37 due to the one-way configuration of this terminal loop.

[43] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 19, 2013.

Table 34: Increase in Rail Line Frequencies

Rail Line	Type	Existing Frequency (veh/day)	Proposed TEP Frequency (veh/day)	Change in Frequency (veh/day)	Percentage Increase
E Embarcadero	Historic Streetcar	0	120	120	
F Market & Wharves	Historic Streetcar	371	324	-47	
Total North of Market Street		371	444	73	20%
E Embarcadero	Historic Streetcar	0	120	120	
T Third	Light Rail Vehicle	217	221	4	
N Judah	Light Rail Vehicle	264	279	15	
Total South of Market Street		481	620	139	29%
J Church	Light Rail Vehicle	248	251	3	
T Third	Light Rail Vehicle	217	221	4	
L Taraval	Light Rail Vehicle	236	238	2	
M Ocean View	Light Rail Vehicle	211	215	4	
N Judah	Light Rail Vehicle	264	279	15	
Total in the Downtown Subway		1,176	1,204	28	2%
F Market & Wharves	Historic Streetcar	371	324	-47	
Total on Market Street		371	324	-47	-13%

Notes: veh/day = vehicles per day; veh/day is rounded to the nearest whole number and includes both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods.

Source: SFMTA, SPASM Model, 2012.

The FTA Guidance states that for rail corridors with more than 12 trains per day, an approximate doubling (or 100 percent increase) of the number of rail vehicles per day bypassing a single spot along the rail line is required before there would be a significant increase in ground-borne vibration and ground-borne noise effects.[44] Because the maximum increase in rail vehicles would be less (-13 to 29 percent), the ground-borne vibration impact

[44] FTA, *Transit Noise and Vibration Impact Assessment*, May 2006, p. 8-5. Available online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed March 19, 2013.

from the increase in rail vehicles would not substantially increase in ground-borne vibration or ground-borne noise above the existing ambient condition and no further evaluation is required. Therefore, since the increase in service frequency of rubber-tired transit vehicles would not produce vibration impacts and the increase in service frequency of rail vehicles would not expose people to or generate excessive ground-borne vibration or ground-borne noise levels, the vibration impacts from the implementation of the Service Improvements or Service Variants would be less than significant. No mitigation measures are necessary.

Cumulative Impacts

Impact C-NO-1: The Service Policy Framework and the construction and operation of the proposed TEP project, including Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants, in combination with other past, present, and reasonably foreseeable future projects, would not increase construction noise and vibration or operational noise and vibration levels along affected transit routes substantially above existing ambient conditions. (Less than Significant)

Cumulative impacts occur when impacts from a proposed project combine with similar impacts from other past, present, or reasonably foreseeable projects in a similar geographic area. The geographic context for cumulative construction noise and operational noise and vibration impacts is the San Francisco streets (public rights-of-way) and their vicinity affected by the proposed TEP. Other projects occurring in the public right-of-way in San Francisco that may combine with the effects of the TEP would include projects implemented by the SFPUC, DPW, the Planning Department, and other divisions within the SFMTA. The SFPUC implements projects to address water infrastructure, including sewer and stormwater management throughout the City. DPW is responsible for maintenance of the City's streets, including the condition of pavement in the roadways. The Planning Department often includes public realm improvements as part of area plans in the *San Francisco General Plan*. The SFMTA operates Muni, regulates parking and loading facilities, plans bicycle and pedestrian improvements for the public right-of-way, and oversees traffic operations within the transportation network of the City.

Construction

The construction projects proposed under the TTRP (TPS Toolkit elements), Service-related Capital Improvements, and Service Improvements (curb ramps) would be temporary and would occur within the public right-of-way. Construction noise is a localized impact that reduces as distance from the source increases. Intervening features, such as buildings, increase the attenuation of noise with distance by providing barriers to sound wave propagation. Similar to noise, vibration impacts are localized because vibration attenuates rapidly from the source.

All construction activity within the City would be required to comply with the San Francisco Noise Ordinance, which prohibits construction activities between 8:00 p.m. and 7:00 a.m. and limits noise from any individual pieces of construction equipment, except impact tools approved by DPW, to 80 dBA at 100 feet. Nighttime construction would require a noise permit from DPW. Impact tools and equipment must be equipped with intake and exhaust mufflers recommended by the manufacturers and approved by the Director of Public Works for maximum noise attenuation, and pavement breakers and jackhammers must be equipped with acoustically attenuating shields or shrouds. Construction projects performed within the City right-of-way require permits and review by DPW in accordance with Article 2.4 of the Public Works Code and, if performed within the street right-of-way, traffic permits from SFMTA. These agencies coordinate improvements within the public right-of-way in order to minimize disruption to transit, traffic, and surrounding land uses. The Department of Public Works also coordinates a 5-year repaving plan of the different City streets in order to aggregate public right-of-way improvements by various agencies and utilities.

Cumulative noise and vibration impacts could occur if several construction projects occur within the immediate area of one another. The City's permitting and planning requirements minimize the potential for temporary construction projects within the public right-of-way to occur adjacent to one another and within the same time period. However, development projects may be located along the alignment and, as a result, construction activities from both the development project and proposed TPS Toolkit elements, Service-related Capital Improvements, or Service Improvements (curb ramps) could be performed concurrently and adjacent to one another. Since the noise and vibration impacts from construction of the proposed TPS Toolkit elements, Service-related Capital Improvements, and Service Improvements (curb ramps) would be temporary as the construction moves along the route alignment, the cumulative noise and vibration impact at any single receptor location would be short-term. Development projects' construction activities would be required to comply with the San Francisco Noise Ordinance, which limits the noise from construction equipment, and due to the additive properties of noise, the noise from two or more construction projects using equipment producing similar noise levels would not result in a substantial noise increase when added together. Therefore, while construction activities from individual TEP proposals and other projects may occur at the same time as construction of the TEP components, the noise impacts would not be cumulatively considerable. Since none of the construction activities proposed under the TEP include activities such as pile driving or underground tunneling that would produce substantial vibration impacts, the operation of typical construction equipment would not be expected to contribute considerably to cumulative vibration impacts. In addition, since the construction activities proposed would be temporary, they would not have a cumulative impact with future construction projects, including those implemented as part of the Policy Framework.

Operation

Once constructed, the TTRP TPS Toolkit elements and Service-related Capital Improvements would not result in operational noise and vibration impacts. Noise and vibration impacts would occur from implementation of the Service Improvements and Service Variants. Since the TEP is a transit project, a cumulative noise impact could occur if the TEP resulted in a cumulatively considerable contribution to the existing or future noise along the public rights-of-ways. Operational noise from the TEP Service Improvements and Service Variants was evaluated to determine the impact in combination with other transportation-related noise sources modeled in the City's Background Noise Levels - 2009 map and was not found to contribute considerably to an existing cumulative impact. Due to the additive properties of noise, a doubling of traffic in the future would be required to increase the traffic-related noise by 3 dBA, the level perceptible to most people. Between existing conditions and the year 2035, San Francisco is projected to experience a growth of an additional 69,000 residential units (a 20 percent increase over existing conditions) and 161,000 jobs (an increase of 30 percent over existing conditions).[45] The resulting increase in roadway traffic would be distributed throughout the City's streets and would not be expected to result in a doubling of traffic along any transit corridors. The operational noise from the TEP Service Improvements and Service Variants would not be expected to contribute considerably to future expected noise levels and thus, cumulative noise impacts would be less than significant. The operational noise that would be generated by future development projects would be dependent on the particular development and would require site- and project-specific modeling once those details are known; however, as mechanical equipment noise generated by development projects would be required to comply with the San Francisco Noise Ordinance, no significant cumulative noise impacts would be expected to occur, and the TEP Service Improvements and Service Variants would not contribute considerably to a cumulative noise impact from new mechanical equipment associated with new development in the future.

Since the vibration impacts from the TEP would be limited to the Service Improvements proposed for the rail transit, and the Service Improvements do not propose any new rail lines, vibration impacts are limited to the existing rail lines and it was not necessary to evaluate the introduction of new rail line routes. There were no Service Variants proposed for the rail lines so the Service Variants would not result in vibration impacts. Operational vibration from the proposed Service Improvements was evaluated to determine the impact along with the

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● [45] Fehr & Peers and LCW Consulting, *San Francisco Transit Effectiveness Project Transportation Impact Study*, July 10, 2013, p. 223. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

existing rail service and was not found to result in an existing cumulative impact. Future sources of vibration impacts would not be expected to be located along the railway right-of-way. Sources of operational vibration impacts are not typically associated with future development projects and therefore, future development projects along the rail lines would not be expected to contribute to the rail line's vibration impact.

Therefore, the cumulative operational noise and vibration impacts would be less than significant and no mitigation measures are necessary. However, as stated previously, if new rail lines are proposed under the Policy Framework in the future, additional evaluation of noise and vibration impacts may be required.

4.4 Air Quality

4.4.1 INTRODUCTION

The Initial Study for the proposed project evaluated the topic of Air Quality (see Appendix 2, pp. 235-237) and concluded that the proposed project would not create objectionable odors and therefore, would not result in odor impacts. The Initial Study found, however, that construction activities for the various TEP improvements could result in short-term air quality impacts, and that operational activities of the project, referred to as the Service Improvements, including increasing service frequencies, creating new routes, or changing established routes, could also result in air quality impacts. This section summarizes and incorporates the results of the *Transit Effectiveness Project Air Quality Technical Report* (AQTR),[1] which evaluated the potential air quality impacts related to project construction and operational criteria pollutants as well as health risks from exposure to fine particulate matter concentrations and toxic air contaminants resulting from implementation of the TEP projects. These potential air quality impacts are evaluated in this section to determine their significance and mitigation measures are proposed, as applicable.

The air quality analysis is organized into the follow main sections: Environmental Setting, Regulatory Framework, and Impacts and Mitigation Measures. The Impacts and Mitigation Measures section contains the following subsections: Significance Criteria, Project Features, Approach to Analysis, followed by Impact Evaluation. The Impact Evaluation subsection addresses Construction Impacts, Operational Impacts, and Cumulative Impacts.

The TEP includes both program- and project-level components. As previously discussed, the Policy Framework would not result in direct physical changes to the environment. However, implementation of projects developed pursuant to the Policy Framework may result in indirect air quality impacts. The TEP projects described below provide a representative sample of the types of projects both in size and scope that may be proposed under the Policy Framework. Thus, the analysis of these projects informs and reasonably addresses the potential indirect air quality effects of the Policy Framework. However, implementation of the Policy Framework over time may result in other projects for the transit network that could result in currently unknown indirect physical changes to the environment, which may be greater than those effects analyzed in this EIR. Such future projects, once developed, may require additional environmental review.

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[1] BASELINE Environmental Consulting, *Final Air Quality Technical Report Transit Effectiveness Project*, May 10, 2013. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

Indirect effects of the Policy Framework would result from implementation of the Service Improvements and Service Variants, the Service-related Capital Improvements, and the transit TTRPs and TTRP Variants. With the exception of the E Line Independent Terminal at Beach and Jones streets (TTPI.3), discussed below, the program-level proposals have been developed with sufficient detail to analyze air quality impacts at the project level. For example, with respect to construction, the general locations of construction activity are known (the public right-of-way along the TTRP corridors as well as the general vicinity of terminals or transfer points). In addition, the types of equipment needed to construct the TEP components as well as the typical construction methods and duration of construction are known. In order to evaluate the construction impacts from implementation of the TEP, the SFMTA has identified a maximum construction scenario that consists of the TTRP.5 Expanded Alternative in combination with an Overhead Wire Expansion project for the 5 Fulton and 5L Fulton Limited. Evaluation of the emissions from the maximum construction scenario allows for the conservative evaluation of other TEP construction projects that would require similar or less construction activity. Therefore, it is not necessary to understand the specific location of every TPS Toolkit element for the program-level TTRPS in order to evaluate construction air quality impacts for both project-level and program-level components of the TEP. Operational air quality impacts from the TEP would result from the Service Improvements and Service Variants along with the proposed TTRPs, which are expected to result in a travel mode shift from privately-owned vehicles to public transit due to reduced travel times and improvements in transit reliability. Therefore, with the exception of TTPI.3, the analysis in this section is sufficient to provide a project-level analysis for the TEP in its entirety.

TTPI.3 would involve the development of a new independent terminal stop for the E Embarcadero historic streetcar line at the north end of the route near Jones and Beach streets along the existing F Market & Wharves historic streetcar line. Development of the new terminal would require the installation of new bypass rails, track turnouts, track switches, and overhead wires and poles, and possibly sidewalk modifications. Although the general project vicinity for the TTPI.3 is known, the exact location and design of the E Embarcadero independent terminal is not yet known. Since the historic streetcars are electric vehicles, they would not result in any operational air quality impacts. However, the construction of the new independent terminal may result in air quality impacts. When design details are developed, additional environmental review will be conducted, as appropriate.

4.4.2 ENVIRONMENTAL SETTING

REGIONAL AIR QUALITY

The project sites and vicinity are within the nine-county jurisdiction of the Bay Area Air Quality Management District (BAAQMD), which oversees the region’s efforts to achieve and maintain state and federal ambient air quality standards through development and implementation of air quality plans. BAAQMD maintains the regional emission inventory of air pollution sources, including stationary, mobile, and areawide sources. BAAQMD is also responsible for implementing programs and issuing permits to construct and operate stationary sources of pollutants. Prevailing winds, topography, and weather, including sunlight and high temperatures, play a role in regional air quality. Warmer temperatures create conditions that can increase ozone formation. In addition, higher temperatures would likely result in increased electricity use to power air conditioners and refrigerators, which may subsequently result in increased operation of the region's fossil-fuel-fired power plants to meet the demand.

Climate, Topography, and Meteorology

The San Francisco Bay Area has a Mediterranean climate characterized by mild, dry summers and mild, moderately wet winters (about 90 percent of the annual total rainfall occurs during the November to April period), moderate daytime onshore breezes, and moderate humidity. The climate is dominated by a strong, semi-permanent, subtropical high-pressure cell over the northeastern Pacific Ocean. Weather is moderated by the adjacent oceanic heat reservoir that leads to fog. In summer, the northwest winds to the west of the coastline are drawn into the interior valleys through the Golden Gate and over the lower elevations of the San Francisco Peninsula. These topographic conditions channel the wind so that it sweeps eastward and widens downstream across the region. In winter, periods of storminess tend to alternate with periods of stagnation and light winds. Onshore winds from the west dominate within San Francisco, carrying emissions east over the San Francisco Bay.

Criteria Air Pollutants

As required by the 1970 federal Clean Air Act, the United States Environmental Protection Agency (US EPA) has identified six air pollutants that are pervasive in urban environments and for which state and federal health-based ambient air quality standards have been established. US EPA calls these pollutants "criteria air pollutants" because the agency has regulated them by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. The federal government and the State of California focus on the following six criteria air pollutants as indicators of ambient air quality: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$)[2] and lead.

[2] PM_{10} is particulate matter less than 10 microns in diameter and $PM_{2.5}$ is particulate matter less than 2.5 microns in diameter.

The BAAQMD operates 28 air quality monitoring stations throughout the San Francisco Bay Area Air Basin (SFBAAB), providing information on ambient concentrations of criteria air pollutants within the SFBAAB. In San Francisco, the BAAQMD operates an air quality monitoring station at 16th and Arkansas streets (10 Arkansas Street), in the lower Potrero Hill area, which measures ozone, CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$.[3] Table 35 presents five years of the most currently available data and compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (state or federal). Bold font numerical values identified in Table 35 indicate criteria pollutant concentrations that exceed an applicable air quality standard.

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NOx). The main sources of ROG and NOx, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Table 35 shows that the most stringent applicable standards (state 1-hour standard of 9 parts per hundred million [pphm] and the state 8-hour standard of 7 pphm) were not exceeded at the Arkansas Street air monitoring station between 2007 and 2011.

Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. As shown in Table 35, the more stringent state CO standards (state 1-hour standard of 20 parts per million [ppm] and the state 8-hour standard of 9 ppm) were not

[3] Data from this single location do not describe pollutant levels throughout San Francisco, as levels may vary depending on distance from key emissions sources and local meteorology. However, the BAAQMD monitoring network does provide a reliable picture of pollutant levels over time.

Table 35: Summary of San Francisco Air Quality Monitoring Data (2007–2011)

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured				
		2007	2008	2009	2010	2011
Ozone						
-Days 1-hour Std. Exceeded	>9 pphm [a]	0	0	0	0	0
-Max. 1-hour Conc. (pphm)		6.0	8.2	7.2	7.9	7.0
-Days 8-hour Std. Exceeded	>7 pphm [a]	0	0	0	0	0
-Max. 8-hour Conc. (pphm)		4.9	6.6	5.6	5.1	5.4
Carbon Monoxide (CO)						
-Days 1-hour Std. Exceeded	>20 ppm [a]	0	0	0	0	0
-Max. 1-hour Conc. (ppm)		2.5	5.7	4.3	1.8	1.8
-Days 8-hour Std. Exceeded	>9 ppm [a]	0	0	0	0	0
-Max. 8-hour Conc. (ppm)		1.6	2.3	2.9	1.4	1.2
Particulate Matter (PM_{10})						
-Days 24-hour Std. Exceeded [c]	>50 µg/m^3 [a]	2	0	0	0	0
-Max. 24-hour Conc. (µg/m3)		**70**	41	36	40	46
-Annual Average (µg/m3)	>20 µg/m^3	**21.9**	**22.0**	18.7	19.9	19.5
Particulate Matter ($PM_{2.5}$)						
-Days 24-hour Std. Exceeded	>35 µg/m^3	5	0	1	3	2
-Max. 24-hour Conc. (µg/m^3)		**45.2**	29.4	**35.6**	**45.3**	**47.5**
-Annual Average (µg/m^3)	>12 µg/m^3 [a,e]	8.7	9.8	9.7	10.5	9.5
Nitrogen Dioxide (NO_2)						
-Days 1-hour Std. Exceeded	>100 ppb [b,d]	0	0	0	0	0
-Max. 1-hour Conc. (ppb)		69	62	59	93	93
-Annual Average (ppb)	>30 ppb [a]	16	16	15	13	14
Sulfur Dioxide (SO_2)						
-Days 24-hour Std. Exceeded	>40 ppb [a]	0	0	NM	NM	NM
-Max. 24-hour Conc. (µg/m^3)		6	5	NM	NM	NM

Notes: Bold values are in excess of applicable standard. NM indicates the pollutant was not monitored at the site. An Exceedance is not necessarily a violation of the standard and only persistent exceedances result in designation of an air quality planning area as nonattainment.

Conc. = concentration; pphm = parts per hundred million; ppm = parts per million; ppb = part per billion; µg/m^3 = micrograms per cubic meter; > means greater than.

[a] State standard, not to be exceeded.

[b] Federal standard, not to be exceeded.

[c] Based on a sampling schedule of 1 out of every 6 days, for a total of approximately 60 samples per year.

[d] In 2010, the US EPA introduced a new national 1-hour NO_2 standard of 100 ppb; based on a 3-year average of the 98th percentile of daily highest samples.

[e] On December 14, 2012, US EPA lowered the federal primary $PM_{2.5}$ annual standard from 15.0 to 12.0 µg/m^3 and future monitoring will be evaluated based on this standard.

Source: Bay Area Air Quality Management District (BAAQMD). Information available online at: http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx. Accessed February 19, 2013.

exceeded between 2007 and 2011. Measurements of CO indicate hourly maximums ranging between 9 to 22 percent of the state standard, and maximum 8-hour CO levels ranging between 13 to 32 percent of the allowable 8-hour standard.

Particulate Matter

Particulate matter is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from manmade and natural sources. Particulate matter is measured in two size ranges: PM_{10} for particles less than 10 microns in diameter, and $PM_{2.5}$ for particles less than 2.5 microns in diameter.

In the Bay Area, motor vehicles generate about one-half of the SFBAAB's particulates through tailpipe emissions as well as brake pad and tire wear.[4] Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of such fine particulates. These fine particulates are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. According to the California Air Resources Board (ARB), studies in the United States and elsewhere "have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks," and studies of children's health in California have demonstrated that particle pollution "may significantly reduce lung function growth in children." The ARB also reports that statewide attainment of particulate matter standards could prevent thousands of premature deaths, lower hospital admissions for cardiovascular and respiratory disease and asthma-related emergency room visits, and avoid hundreds of thousands of episodes of respiratory illness in California.[5] Among the criteria pollutants that are regulated, particulates are a serious ongoing health hazard, contributing to the death of approximately 200 to 500 people per year in the Bay Area. High levels of particulate matter can exacerbate chronic respiratory ailments, such as bronchitis and asthma, and have been associated with increased emergency room visits and hospital admissions.[6, 7]

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4 Bay Area Air Quality Management District (BAAQMD), *California Environmental Quality Act Guidelines*, updated May 2012 (hereinafter referred to as BAAQMD, *CEQA Air Quality Guidelines*, updated May 2012), pp. C-15 to C-16. Available online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en. Accessed February 21, 2013.

5 California Air Resources Board (ARB), *Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates, Staff Report*, May 3, 2002, pp. 9-18 to 9-24. Available online at: http://www.arb.ca.gov/research/aaqs/std-rs/pm-final/pm-final.htm. Accessed February 20, 2013.

6 ARB, *Air Quality and Land Use Handbook: A Community Health Perspective,* April 2005, p. 12. Available online at: http://www.arb.ca.gov/ch/landuse.htm. Accessed February 20, 2013.

7 BAAQMD, *CEQA Air Quality Guidelines*, updated May 2012, p. 5-2.

Compelling evidence suggests that $PM_{2.5}$ is by far the most harmful air pollutant in the SFBAAB in terms of the associated impact on public health.[8] A large body of scientific evidence indicates that both long-term and short-term exposure to $PM_{2.5}$ can cause a wide range of health effects (e.g., aggravating asthma and bronchitis, causing visits to the hospital for respiratory and cardio-vascular symptoms, and contributing to heart attacks and deaths).[9] The US EPA estimates the number of annual $PM_{2.5}$-related premature deaths in California is 9,200 with an uncertainty range of 7,300 – 11,000.[10]

Table 35, shows that two exceedances of the state PM_{10} 24-hour standard were measured in 2007 at the 10 Arkansas Street monitoring station.[11] No exceedances were reported in 2008, 2009, 2010, and 2011. However, the state annual average PM_{10} standard was exceeded in 2007 and 2008. Since 2008, the annual average PM_{10} concentration, as measured to the 10 Arkansas Street monitoring station, has been below the state annual average PM_{10} standard.

Table 35 shows that exceedances of the state $PM_{2.5}$ 24-hour standard were measured at the 10 Arkansas Street monitoring station in 2007, 2009, 2010, and 2011. The state annual average standard was not exceeded at the 10 Arkansas Street monitoring station between 2007 and 2011. The US EPA has revised the national ambient air quality standard (NAAQS) for $PM_{2.5}$ from 15 micrograms per cubic meter ($\mu g/m^3$) to 12.0 ($\mu g/m^3$), which is now consistent with the state ambient air quality standards; the new federal standard is discussed in more detail in Section 4.4.3.

Nitrogen Dioxide

NO_2 is a reddish-brown, highly reactive gas that is a by-product of combustion processes. Mobile sources (motor vehicles and other transportation sources) and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels. Table 35 shows that the current state standard for NO_2 is being met at the 10 Arkansas Street monitoring station.

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[8] Ibid, p. 5-2.

[9] Ibid, p. 5-2.

[10] ARB, *Estimate of Premature Deaths Associated with Fine Particle Pollution ($PM_{2.5}$) in California Using a U.S. Environmental Protection Agency Methodology*, August 31, 2010, p. 1. Available online at: www.arb.ca.gov/research/health/pm-mort/pm-report_2010.pdf. Accessed February 21, 2013.

[11] PM_{10} is sampled every sixth day; therefore, actual days over the standard can be estimated to be six times the numbers listed in Table 4.4-1.

In 2010, the US EPA implemented a new 1-hour NO_2 standard at the level of 100 parts per billion (ppb). Currently, the ARB is recommending that the SFBAAB be designated as attainment for the new standard. The US EPA has also established requirements for a new monitoring network to measure NO_2 concentrations near major roadways in urban areas with a population of 500,000 or more. Sixteen new near-roadway monitoring sites will be required in California, three of which will be in the Bay Area. Monitors were required to be deployed by January 2013. The ARB will revise the area designation recommendations, as appropriate, once sufficient monitoring data becomes available. The new federal standard is discussed in more detail in Section 4.4.3.

Sulfur Dioxide

SO_2 is a colorless acidic gas with a strong odor. It is produced by combustion of sulfur-containing fuels such as coal, diesel, and oil. SO_2 has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease. Table 35 shows that the state standard for SO_2 is being met at the 10 Arkansas Street monitoring station, and data from this monitoring station and other monitoring stations within the SFBAAB suggest that the SFBAAB will continue to meet this standard for the foreseeable future.

In 2010, the US EPA implemented a new 1-hour SO_2 standard.[12] On February 15, 2013, US EPA published notice in the Federal Register of proposed nonattainment designations for the 2010 primary federal SO_2 standards. No California areas are included in the proposal; all areas of the state remain undesignated. Similar to the new federal standard for NO_2, the US EPA has established requirements for a new monitoring network to measure SO_2 concentrations to be operational by January 2013. No new monitoring stations were required in San Francisco County.[13]

Lead

Leaded gasoline (phased out in the United States in 1973), paint (on older houses and on cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which puts children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially

[12] The new 1-hour SO_2 standard is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations and became effective on August 23, 2010. The US EPA also revoked both the existing 24-hour SO_2 standard of 0.14 ppm and the annual primary SO_2 standard of 0.030 ppm, effective August 23, 2010.

[13] BAAQMD, *2011 Air Monitoring Network Report*, July 1, 2012, p. 19 and Table 7. Available online at: http://www.baaqmd.gov/Divisions/Technical-Services/Ambient-Air-Monitoring/AAMN-Plan.aspx. Accessed February 20, 2013.

since leaded gasoline was eliminated from use. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California. On October 15, 2008, the US EPA strengthened the national ambient air quality standard for lead by lowering it from 1.5 to 0.15 μg/m^3. The US EPA revised the monitoring requirements for lead in December 2010. These requirements focus on airports and large urban areas, resulting in three new monitors at Bay Area airports. No new monitoring stations are required in San Francisco County.[14]

Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. Potential human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity; the health risks from TACs are a function of both concentration and duration of exposure. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than that of another.

TACs do not have ambient air quality standards, but are regulated by the BAAQMD using a risk-based approach. This approach uses a health risk assessment to determine what sources and pollutants to control as well as the degree of control. A health risk assessment is an analysis in which human health exposure to toxic substances is estimated, and considered together with information regarding the toxic potency of the substances, to provide quantitative estimates of health risks.[15]

In addition to monitoring criteria air pollutants, both the BAAQMD and the ARB operate TAC monitoring networks in the SFBAAB. These stations measure 10 to 15 TACs, depending on the specific station. The TACs selected for monitoring are those that have traditionally been found in the highest concentrations in ambient air, and therefore tend to be substantial contributors to community health risk. The BAAQMD operates an ambient TAC monitoring station at its 16th and Arkansas streets facility, which is the only monitoring site for air toxics in the City. Table 36 shows ambient concentrations of carcinogenic TACs measured at the Arkansas Street station and the estimated cancer risks from lifetime (70 years) exposure to these substances. When TAC measurements at this station are compared to ambient concentrations of various TACs for the Bay Area as a whole, the cancer risks associated with mean TAC concentrations in the City are similar to those for the Bay Area. Therefore, the

[14] Ibid, pp. 13 and 22, Tables 10 and 11.

[15] In general, a health risk assessment is required if the BAAQMD concludes that projected emissions of a specific air toxic compound from a proposed new or modified stationary source suggest a potential public health risk. Such an assessment evaluates the chronic, long-term health effects, calculating the increased risk of cancer as a result of exposure to one or more TACs for the source in question.

estimated average lifetime cancer risk resulting from exposure to TAC concentrations measured at the Arkansas Street air monitoring station do not appear to be any greater than for the Bay Area as a region.

Table 36: Carcinogenic Toxic Air Contaminants – Annual Average Ambient Pollutant Concentrations and Estimated Cancer Risk from Lifetime Exposure

Substance	Concentration	Cancer Risk Per Million [a]
Gaseous TACs	(ppb)	
Acetaldehyde	0.68	3
Benzene	0.23	21
1,3-Butadiene	0.044	17
Para-Dichlorobenzene	0.15	10
Carbon Tetrachloride	0.088	23
Ethylene Dibromide	0.006	3
Formaldehyde	1.32	10
Perchloroethylene	0.018	0.7
Methlylene Chloride	0.12	0.4
Methyl tertiary-Butyl Ether (MTBE)	0.26	0.3
Chloroform	0.023	0.6
Trichloroethylene	0.01	0.1
Particulate TACs	(ng/m^3)	
Chromium (Hexavalent)	0.05	8

Notes: All values are from BAAQMD 2011 monitoring data from the Arkansas Street station, except for Para-Dichlorobenzene (2006), Ethylene Dibromide (1992), MTBE (2003).

ppb=parts per billion; ng/m^3 = nanograms per cubic meter

[a] Cancer risks were estimated by applying published unit risk values to the measured concentrations.

Source: California Air Resources Board (ARB), *Ambient Air Toxics Summary*, 2011. Information available online at: http://www.arb.ca.gov/adam/toxics/sitesubstance.html. Accessed February 20, 2013.

Roadway-Related Air Pollutants

Vehicle tailpipe emissions contain diverse forms of particles and gases, and also contribute to particulates by generating road dust and through tire wear. Epidemiologic studies have demonstrated that people living in proximity to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children.[16] Air pollution monitoring

[16] San Francisco Department of Public Health, *Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review*, May 2008, p. 7. Available online at: http://www.sfdph.org/dph/EH/Air/MitRoadway111907.pdf. Accessed April 18, 2012.

done in conjunction with epidemiological studies has confirmed that roadway-related health effects vary with modeled exposure to particulate matter and NO_2.[17]

In traffic-related studies, the additional noncancer health risk attributable to roadway proximity appeared within 1,000 feet of high-traffic roadways and was strongest within 300 feet.[18]

Diesel Particulate Matter

The ARB identified diesel particulate matter (DPM) as a toxic air contaminant in 1998, primarily based on evidence demonstrating cancer effects in humans.[19] The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks, buses, and, to a much lesser extent, automobiles are some of the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways. The estimated cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other toxic air pollutant routinely measured in the region.

In 2000, the ARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Subsequent ARB regulations apply to new trucks and to diesel fuel. With new controls and fuel requirements, 60 trucks built in 2007 would have the same soot exhaust emissions as one truck built in 1988.[20] The ARB estimated the average Bay Area cancer risk from DPM, based on a population-weighted average ambient diesel particulate concentration, at about 480 in one million as of 2000, representing a 36 percent drop between 1990 and 2000.[21,22] While the ARB has not provided more recent estimates for the SFBAAB, the average statewide cancer

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[17] Ibid, pp. 5 and 7.

[18] ARB, *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005, pp. 8-11. Available online at: http://www.arb.ca.gov/ch/handbook.pdf. Accessed February 20, 2013.

[19] ARB, F*act Sheet, The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines*, October 1998. Available online at: http://www.arb.ca.gov/toxics/dieseltac/factsht1.pdf. Accessed February 20, 2013.

[20] Pollution Engineering, *New Diesel Fuel Rules Start*. Available online at http://www.pollutioneng.com/CDA/. Accessed April 18, 2012.

[21] ARB, *California Almanac of Emissions and Air Quality - 2009 Edition*, Figure 5-14 and Table 5-44. Available online at: http://www.arb.ca.gov/aqd/almanac/almanac09/chap509.htm. Accessed February 20, 2013.

[22] The calculated cancer risk values from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is more than 40 percent (based on a sampling of 17 regions nationwide), or greater than 400,000 in one million, according to the National Cancer Institute.

risk from DPM was estimated to have declined from 540 in one million in 2000 to 450 in one million in 2010, indicating that the health risk from DPM continues to decline.[23]

SENSITIVE RECEPTORS

Air quality does not affect every individual in the population in the same way, and some groups are more susceptible to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young; population subgroups with higher rates of respiratory disease, such as asthma and chronic obstructive pulmonary disease; and populations with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases.

Sensitive receptors are defined by BAAQMD as: “Facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals and residential areas.” Compared to commercial and industrial areas, people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions.[24] Workers are not considered sensitive receptors because all employers must follow regulations set out by the Occupational Safety and Health Administration to ensure the health and well-being of their employees.[25] The proximity of sensitive receptors to motor vehicles is an air pollution concern, especially in San Francisco. As discussed above, epidemiologic studies have consistently demonstrated that children and adults living in proximity to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections, and decreased pulmonary function and lung development in children.

Since the TEP is a citywide project intended to improve transit connections between many areas in the City, sensitive receptors are present along portions of all of the TTRP corridors, routes affected by the proposed Service Improvements, and in the vicinity of many of the Service-related Capital Improvement projects. Construction of the TEP project components and increases in transit vehicle service frequencies, establishment of new routes, or changes in established routes could increase the exposure of these sensitive receptors to localized air pollutants from construction equipment and diesel-fueled motor coaches.

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[23] ARB, *California Almanac of Emissions and Air Quality - 2009 Edition*, p. 5-44 and Figure 5-12. Available online at: http://www.arb.ca.gov/aqd/almanac/almanac09/chap509.htm. Accessed February 20, 2013.

[24] The factors responsible for variation in exposure are also often similar to factors associated with greater susceptibility to air quality health effects.

[25] BAAQMD, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May 2012, p. 11. Available online at: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx. Accessed February 20, 2013.

4.4.3 REGULATORY FRAMEWORK

FEDERAL/STATE

Federal Ambient Air Quality Standards

The 1970 Clean Air Act (CAA), last amended in 1990, requires that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled in order to achieve all standards by the deadlines specified in the Clean Air Act. These ambient air quality standards are intended to protect public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above the ambient air quality standards before adverse health effects are observed.

The determination of whether a region's air quality is healthful or unhealthful is made by comparing contaminant levels in ambient air samples to the NAAQS. Data from regional monitoring stations is used to establish a region's attainment status for criteria air pollutants. The purpose of these designations is to identify planning areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used for an area that cannot be classified on the basis of available information as meeting or not meeting the standards.

The current attainment status for the SFBAAB with respect to federal standards is summarized in Table 37. In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal standards, except for ozone and particulate matter (PM_{10} and $PM_{2.5}$), for which standards are exceeded periodically.

In June 2004, the SFBAAB was designated as marginal nonattainment for the national 8-hour ozone standard. The US EPA lowered the national 8-hour ozone standard from 0.80 to 0.75 ppm, effective May 27, 2008. On February 7, 2012, the US EPA proposed a rule that

Table 37: Air Quality Standards[a] and Attainment Status

Pollutant	Averaging Time	California Standards		National Standards	
		Concentration	Attainment Status	Concentration	Attainment Status
Ozone	8-Hour	0.070 ppm	N	0.075 ppm	N
	1-Hour	0.09 ppm	N	Revoked by US EPA 2005	
Carbon Monoxide (CO)	8-Hour	9.0 ppm	A	9 ppm	A
	1-Hour	20 ppm	A	35 ppm	A
Nitrogen Dioxide (NO_2)	1-Hour	0.18 ppm	A	0.100 ppm	U
	Annual Arithmetic Mean	0.030 ppm		0.053 ppm	A
Sulfur Dioxide (SO_2)	24-Hour	0.04 ppm	A	0.14 ppm	A
	1-Hour	0.25 ppm	A	0.075 ppm	A
	Annual Arithmetic Mean			0.030 ppm	A
Particulate Matter – Course (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N		
	24-Hour	50 µg/m^3	N	150 µg/m^3	U
Particulate Matter – Fine ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	N	15 µg/m^3 [b]	A
	24-Hour			35 µg/m^3	N
Sulfates	24-Hour	25 µg/m^3	A		
Lead	30-Day Average	1.5 µg/m^3	A		
	Calendar Quarter			1.5 µg/m^3	A
	Rolling 3-Month Average			0.15 µg/m^3	U/A
Hydrogen Sulfide	1-Hour	0.03 ppm	U		
Vinyl Chloride	24-Hour	0.010 ppm	No information available		
Visibility Reducing Particles	8 Hour (10:00 to 18:00 PST)		U		

Notes: A=Attainment; N=Nonattainment; U=Unclassified; U/A = Unclassifiable/Attainment; mg/m^3=milligrams per cubic meter; ppm=parts per million; µg/m^3=micrograms per cubic meter.

[a] The Federal standards shown are the "primary standards" designed to protect public health.

[b] On December 14, 2012, U.S. EPA lowered the federal primary $PM_{2.5}$ annual standard from 15.0 to 12.0 µg/m^3. The new annual standard will become effective 60 days after publication in the Federal Register, which was published on January 15, 2013. The US EPA anticipates making initial attainment/nonattainment designations by December 2014, with those designations likely becoming effective in early 2015.

Source: BAAQMD. Information available online at: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm. Accessed February 20, 2013.

takes necessary steps to implement the 2008 national 8-hour ozone standard, establishing an approach for nonattainment classification for planning areas not meeting the 2008 national 8-hour ozone standard.[26]

On January 22, 2010, the US EPA revised the health-based NAAQS for NO_2.[27] A new 1-hour NO_2 standard was set at the level of 100 ppb, a level that defines the maximum allowable concentration anywhere in an area. To determine compliance with the 2010 standard, the US EPA, at that time, also established new ambient air monitoring and reporting requirements for NO_2. These included monitors near major roads in urban areas as well as in other locations where maximum concentrations are expected and additional monitors in large urban areas to measure the highest concentrations of NO_2 that occur more broadly across communities. In addition the US EPA, working with the states, will site a subset of monitors in locations to help protect communities that are susceptible and vulnerable to NO_2-related health effects. On March 7, 2013, the US EPA issued a final rule to revise the deadlines by which the near-road monitors within the NO_2 monitoring network are to be operational. This monitoring network will collect data that are compared to the NAAQS for NO_2. The US EPA has established a series of deadlines that require states and local agencies to begin operating the near-road component of the NO_2 network in phases between January 1, 2014 and January 1, 2017. This replaces the 2010 rule requirement that originally required all new NO_2 monitors to begin operating on January 1, 2013.

The US EPA issued final area designations for lead on November 8, 2011, with the SFBAAB being designated as Unclassifiable/Attainment; the US EPA uses this designation in practice for initial designations to mean that available information does not indicate that the air quality in these areas exceeds the 2008 lead NAAQS.[28] The SFBAAB is in attainment for other criteria pollutants, with the exception of the 24-hour standards for PM_{10} and $PM_{2.5}$, for which the SFBAAB is designated "Unclassified" and "Nonattainment," respectively.

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[26] United States Environmental Protection Agency (US EPA), *Fact Sheet, Proposed Rule - Implementation of the 2008 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications Approach and Attainment Deadlines*. Available online at: www.epa.gov/glo/pdfs/20120203factsheet.pdf. Accessed February 20, 2013.

[27] US EPA, *Factsheet, Revisions to Ambient Nitrogen Dioxide Monitoring Requirements*. Available online at: http://www.epa.gov/oaqps001/nitrogenoxides/pdfs/20130307fs.pdf. Accessed May 8, 2013.

[28] US EPA, *Federal Register*, Volume 76, No. 225, November 22, 2011, p. 72106. Available online at: http://www.gpo.gov/fdsys/pkg/FR-2011-11-22/pdf/2011-29460.pdf. Accessed February 20, 2013.

On December 14, 2012, the US EPA revised the national ambient air quality standard (NAAQS) for $PM_{2.5}$ to 12.0 μg/m^3.[29] The US EPA is also making updates and improvements to the nation's $PM_{2.5}$ monitoring network that include relocating a small number of monitors to measure fine particulates near heavily traveled roads in areas with populations of 1 million or more. These relocations will be phased in over two years (2015-2017) and will not require additional monitors. The US EPA anticipates making initial attainment/nonattainment designations by December 2014, with those designations likely becoming effective in early 2015. States would have until 2020 (five years after designations are effective) to meet the revised annual $PM_{2.5}$ attainment standard, although a state may request a possible extension to 2025, depending on the severity of an area's fine particle pollution problems and the availability of pollution controls.

State Ambient Air Quality Standards

In 1988, California passed the California Clean Air Act (California Health and Safety Code §§ 39000 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or nonattainment, but based on state ambient air quality standards rather than the federal standards. Although the federal CAA established NAAQS, individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in California, there is considerable diversity between the California ambient air quality standards (CAAQS) and the NAAQS, as shown in Table 37. CAAQS tend to be at least as protective as NAAQS and are often more stringent. As indicated in Table 37, the SFBAAB is designated as "nonattainment" for state ozone, PM_{10}, and $PM_{2.5}$ standards, and attains the state standards for other pollutants.

Fleet Rule for Transit Agencies

In February 2000, the ARB adopted the Fleet Rule for Transit Agencies and more stringent exhaust emission standards for new Urban Bus (UB) engines and vehicles. The regulation also promotes advanced technologies by providing for zero-emission bus (ZEB) demonstration projects and requiring ZEB acquisitions applicable to larger transit agencies.[30]

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[29] US EPA, *Factsheet – Overview of EPA's Revision to the Air Quality Standards for Particle Pollution (Particulate Matter)*. Available online at: http://www.epa.gov/airquality/particlepollution/2012/decfsoverview.pdf. Accessed May 8, 2013.

[30] Under the current regulations, large transit agencies (those with a fleet size of 200 or more urban buses) are required to acquire 15 percent of all new annual urban bus purchases as ZEBs. The purchase schedule begins with model year 2011 for agencies on the diesel path and model year 2012 for agencies on the alternative fuel path and continues through 2026. However, at the July 23, 2009, Board meeting in San Diego, California, a technology update was provided to the Board on the commercial readiness of ZEBs with the recommendation to postpone the purchase requirements and establish technology performance metrics that can be used to assess commercial readiness and trigger a future purchase requirement for affected transit agencies.

An UB is a passenger-carrying vehicle owned or operated by a public transit agency, powered by a heavy heavy-duty engine, or of a type normally powered by a heavy heavy-duty diesel engine, intended primarily for intra-city operation. A bus normally powered by a heavy heavy-duty diesel engine is usually 35 feet or longer, and/or greater than 33,000 pounds gross vehicle weight rating.

New UBs operated in California are required to have engines that meet the more stringent California UB engine exhaust emission standard through the 2006 model year, after which, starting with the 2007 model year, the standard aligns with the California heavy-duty engine exhaust emission standard. Transit operators are required to choose a fuel path: diesel or alternative fuel.[31] The fuel path choice affects UB purchases and dictates emission reduction deadlines. To qualify for the alternative fuel path, at least 85 percent of annual UB purchases must be fueled by alternative fuel. Alternative fuel includes compressed natural gas, propane, ethanol, methanol, gasoline/electric hybrid, hydrogen, electricity, fuel cells, or advanced technologies that do not rely on diesel fuel. As of December 31, 2010, UB fleets must demonstrate an 85 percent reduction of PM from a 2002 baseline and a NOx fleet average of 4.8 grams per brake-horsepower-hour and are require to report annually to the ARB.

Diesel Risk Reduction Plan

In October 2000, the ARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines.[32] In 2008, as part of the Plan, the ARB approved a new regulation for existing heavy-duty diesel vehicles that will require retrofitting and replacement of vehicles (or their engines) over time such that by 2023, all vehicles must have a 2010 model year engine or equivalent. The regulation is anticipated to result in an 80 percent decrease in statewide diesel health risk in 2020 from the 2000 risk levels.[33] Additional regulations apply to new trucks and to diesel fuel.

In 2005, the ARB approved a regulatory measure to reduce emissions of toxic and criteria pollutants by limiting the idling of new heavy-duty diesel vehicles (California Air Resources Board Idling Regulations). The regulations generally limit idling of commercial motor vehicles (including buses and trucks) within 100 feet of a school or residential area for more than five

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[31] The SFMTA is on the diesel fuel path.

[32] ARB, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, October 2000. Available online at: http://www.arb.ca.gov/diesel/documents/rrpFinal.pdf. Accessed May 8, 2013.

[33] ARB, *Facts About Truck and Bus Regulation Emissions Reductions and Health Benefits*, February 25, 2009. Available online at: http://www.bcaqmd.org/page/_files/tbhealthfs.pdf. Accessed February 20, 2013.

consecutive minutes or periods aggregating more than five minutes in any one hour.[34] Buses or vehicles also must turn off their engines upon stopping at a school and must not start their engines more than 30 seconds before beginning to depart from a school. Also, state law SB351 (adopted in 2003) prohibits locating public schools within 500 feet of a freeway or busy traffic corridor.

In addition to implementing more stringent engine controls (diesel engines produced today have one-eighth the tailpipe exhaust of a truck or bus built in 1990), diesel fuel is required to have lower levels of sulfur. As of June 1, 2006, at least 80 percent of on-road diesel fuel refined in the United States is required to be ultra-low sulfur diesel, which has resulted in a reduction in sulfur emissions by 97 percent. All of the diesel fuel sold in California for use with on-road trucks is now ultra-low sulfur diesel. PM emissions are projected to be reduced by about 7 tons per day in 2014 and another 3 tons per day in 2023; NOx emissions are projected to be reduced by about 88 tons per day in 2023.[35] These reductions are critical to meeting federal clean air standards. The regulation would also reduce diesel PM emissions by the maximum level achievable from in-use trucks and buses. ARB staff estimates that approximately 3,500 premature deaths statewide would be avoided from implementation of the regulation.[36]

Bay Area Air Quality Management District

The BAAQMD is the regional agency with jurisdiction over the nine-county region located in the SFBAAB. Association of Bay Area Governments (ABAG), Bay Area Metropolitan Transportation Commission (MTC), county transportation agencies, cities and counties, and various nongovernmental organizations also join in the efforts to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as implementation of extensive education and public outreach programs.

The BAAQMD is responsible for attaining and/or maintaining air quality in the SFBAAB within federal and state air quality standards. Specifically, the BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the SFBAAB and to develop and implement strategies to attain the applicable federal and state standards.

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[34] There are 12 exceptions to this requirement (e.g., emergency situations, military, adverse weather conditions, etc.), including: when a vehicle's power takeoff is being used to run pumps, blowers, or other equipment; when a vehicle is stuck in traffic, stopped at a light, or under direction of a police officer; when a vehicle is queuing beyond 100 feet from any restricted area; or when an engine is being tested, serviced, or repaired.

[35] ARB, *Facts About Truck and Bus Regulation Reducing Emissions from Existing Diesel Vehicles*, July 20, 2012. Available online at: www.arb.ca.gov/msprog/onrdiesel/documents/fsoverview.pdf. Accessed February 20, 2013.

[36] Ibid.

Bay Area Air Quality Planning Relative to State and Federal Standards

Air quality plans developed to meet federal requirements are referred to as State Implementation Plans. The federal and state Clean Air Acts require plans to be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the state PM_{10} standard). The *2010 Bay Area Clean Air Plan* was adopted on September 15, 2010, by the BAAQMD, in cooperation with the MTC, the Bay Conservation and Development Commission (BCDC), and ABAG. The *2010 Clean Air Plan* outlines a multi-pollutant approach for addressing ozone, particulate matter, air toxics, and greenhouse gas emission reductions in a single, integrated strategy. The primary objectives of the plan are to improve local and regional air quality, protect public health, and minimize climate change impacts. The *2010 Clean Air Plan* replaces the Bay Area *2005 Ozone Strategy*, adopted in 2006.

The *2010 Clean Air Plan* updates the *2005 Ozone Strategy* in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone; provides a control strategy to reduce ozone, particulate matter, toxic air contaminants, and greenhouse gases in a single, integrated plan; reviews progress in improving air quality in recent years; and establishes emission control measures to be adopted or implemented in the 2010 – 2012 time frame. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local governments, transit agencies, and others. The *2010 Clean Air Plan* also represents the Bay Area's most recent triennial assessment of the region's strategy to attain the state one-hour ozone standard.[37]

LOCAL

San Francisco General Plan Air Quality Element

The *San Francisco General Plan* includes the 1997 Air Quality Element.[38] The objectives specified by the City include the following:

Objective 1: Adhere to state and federal standards and regional programs.

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[37] BAAQMD, *Bay Area 2010 Clean Air Plan*. Available online at: http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx. Accessed February 20, 2013.

[38] City and County of San Francisco, *San Francisco General Plan*, Air Quality Element, 1997, updated 2000. Available online at: http://www.sf-planning.org/ftp/General_Plan/I10_Air_Quality.htm. Accessed April 9, 2013.

Objective 2: Reduce mobile sources of air pollution through implementation of the Transportation Element of the San Francisco General Plan.

Objective 3: Decrease the air quality impacts of development by coordination of land use and transportation decisions.

Objective 4: Improve air quality by increasing public awareness regarding the negative health effects of pollutants generated by stationary and mobile sources.

Objective 5: Minimize particulate matter emissions from road and construction sites.

Objective 6: Link the positive effects of energy conservation and waste management to emission reductions.

San Francisco Health Code Construction Dust Control Ordinance

The San Francisco Health Code Article 22B and San Francisco Building Code § 106A.3.2.6 collectively constitute the City's Construction Dust Control Ordinance (adopted in July 2008). The Construction Dust Control Ordinance requires that all site preparation work, demolition, or other construction activities within the City that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specific dust control measures whether or not the activity requires a permit from the Department of Building Inspection (DBI). For projects over one-half acre, the Construction Dust Control Ordinance requires that the project sponsor submit a Dust Control Plan for approval by the San Francisco Department of Public Health (DPH) prior to issuance of a building permit by the DBI.

The Construction Dust Control Ordinance requires project sponsors and contractors responsible for construction activities to control construction dust on the site or implement other practices that result in equivalent dust control that are acceptable to the Director of Public Health. Dust suppression activities, referred to as best management practices (BMPs), may include watering all active construction areas sufficiently to prevent dust from becoming airborne; increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water must be used if required by Article 21, § 1100 et seq. of the San Francisco Public Works Code. The Construction Dust Control Ordinance has a mandate for "no visible dust." Section 1247 of Article 22B of the Public Health Code requires that all City Agencies that authorize construction or other improvements on City property adopt rules and regulations to ensure that the dust control requirements identified in Article 22B are followed. The BMPs employed in compliance with the City's Construction Dust Control Ordinance provide an effective strategy for controlling fugitive dust. Since the proposed project would be required to comply with the Construction Dust Control Ordinance, particulate matter from fugitive dust is not quantified for this EIR.

San Francisco Health Code Clean Construction Ordinance

Section 6.25 of Chapter 6 of the San Francisco Administrative Code (Clean Construction Ordinance) requires clean construction practices for all City projects that consist of 20 or more cumulative days of construction. The Clean Construction Ordinance requires that off-road equipment and off-road engines with 25 horsepower or greater: 1) be fueled by biodiesel fuel grade B20 or higher; and 2) if used more than 20 hours, either meet or exceed Tier 2 emissions standards[39] for off-road engines or operate with the most effective verified diesel emission control technology. The requirement does not apply to portable or stationary generators (engines).

4.4.4 IMPACTS AND MITIGATION MEASURES

Air quality impacts from the TEP projects could result from project construction and operation, as summarized below.

Construction emissions would result from the installation of TPS Toolkit elements along the TTRP corridors, including the painting of transit-only lanes; the installation of Service-related Capital Improvements; and curb ramps to support the Service Improvements. In general, construction associated with the TEP projects would result in dust generated by earth-moving activities and air pollutants emitted by construction equipment exhaust, which would have a short-term effect on air quality. These short-term effects on air quality have been analyzed in the AQTR prepared for this project and the results are presented in the Impact Evaluation for construction air quality impacts.

As discussed previously, transportation-related sources account for a majority of air pollutant emissions. Therefore, a major focus of the BAAQMD is directed towards reducing vehicle trips. Changes in operational air pollutant emissions would result from implementation of the TEP Service Improvements and Service Variants, and indirectly from a potential mode shift from privately-owned vehicle trips to transit trips. Specifically, the Service Improvements are expected to result in an increase in operational emissions because the number of transit trips, including diesel motor coach trips within San Francisco, would increase as a consequence of the additional 350,000 yearly service hours. Implementation of the TEP proposals is expected to result in a travel mode shift to public transit by providing a more efficient transit system, which would reduce emissions of criteria pollutants and ozone precursors from privately-owned vehicles. Implementation of some TPS Toolkit elements as part of the TTRPs, such as the introduction of new transit-only lanes, has the potential to result in an increase in non-transit vehicle congestion that could cause an increase in criteria

[39] Federal emission standards (Tier 1 through 4) for off-road diesel engines, including construction equipment, are based on the engine horsepower and year manufactured.

pollutant and ozone precursor emissions due to longer idle times at intersections. Therefore, air quality effects related to Service Improvements and Service Variants, in combination with the proposed TTRPs, were evaluated in the AQTR, and the results are presented the Impact Evaluation for operational air quality impacts.

As discussed in the Introduction to this chapter, implementation of the Policy Framework would not result in any direct air quality impacts; however, indirect air quality impacts of the Policy Framework would result from the implementation of projects developed pursuant to these policies. The TEP projects provide a representative example of the types of projects, both in size and scope that may be proposed under the Policy Framework. Therefore, the indirect air quality impacts of the Policy Framework have been evaluated through the air quality assessment of the physical TEP components—the Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants. Implementation of the Policy Framework over time may result in other projects for the transit network that could result in additional indirect air quality impacts than those reported in this EIR. Such future projects, once developed, may require additional environmental review.

SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts in this analysis are consistent with the environmental checklist in Appendix G of the *CEQA Guidelines*, which has been adopted and modified by the San Francisco Planning Department. For the purpose of this analysis, the following applicable thresholds were used to determine whether implementing the project would result in a significant impact on air quality. Implementation of the proposed project would have a significant effect on air quality if the project would:

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations;
- Conflict with or obstruct implementation of the applicable air quality plan; or
- Create objectionable odors affecting a substantial number of people.

The Initial Study addressed the potential for the proposed project to result in objectionable odors and determined that the proposed project would not result in significant odor impacts. Thus, odor impacts are not evaluated further in this EIR.

Thresholds of Significance

This section discusses the thresholds for determining whether a project would result in a significant air quality impact in compliance with the significance criteria identified above.

Criteria Pollutants and Ozone Precursors

In determining whether construction or operation of a proposed project would violate an air quality standard, contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase of any criteria air pollutant, this analysis considers whether the proposed TEP projects would result in emissions of criteria pollutants and ozone precursors in excess of the levels provided in Table 38. A discussion of these significance thresholds is provided below.

Table 38: CEQA Criteria Pollutant and Ozone Precursor Significance Thresholds

	Construction Thresholds	Operational Thresholds	
Criteria Pollutant or Ozone Precursor	**Average Daily Emissions (lbs/day)**	**Average Daily Emissions (lbs/day)**	**Maximum Annual Emissions (tons/year)**
Reactive Organic Gases (ROG)	54	54	10
Oxides of Nitrogen (NOx)	54	54	10
Coarse Particulate Matter (PM_{10})	82	82	15
Fine Particulate Matter ($PM_{2.5}$)	54	54	10
Carbon Monoxide (CO)	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Note: lbs/day = pounds per day.			
Source: BAAQMD, *Revised Draft Options and Justification Report: California Environmental Quality Act Thresholds of Significance*, October 2009, p. 7. Available online at: http://www.baaqmd.gov /~/media/Files/Planning%20and%20Research/CEQA/Revised%20Draft%20CEQA%20Thresholds%20%20Justification%20Report%20Oct%202009.ashx?la=en. Accessed April 9, 2013.			

Ozone Precursors

The SFBAAB is currently designated as non-attainment for ozone. The potential for a project to result in a cumulatively considerable net increase in criteria air pollutants, which may contribute to an existing or projected air quality violation, is based on emissions limits for stationary sources set in the state and federal Clean Air Acts. The federal New Source

Review (NSR) program was created by the federal Clean Air Act to ensure that stationary sources of air pollution are constructed in a manner that is consistent with attainment of federal health- based ambient air quality standards. Similarly, to ensure that new stationary sources do not cause or contribute to a violation of an air quality standard, BAAQMD Regulation 2, Rule 2 requires that any new source that emits criteria air pollutants above a specified emissions limit must offset those emissions. For ozone precursors, ROG and NOx, the offset emissions level is an annual average of 10 tons per year (or 54 pounds per day). These levels represent emissions by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants.[40]

Although this regulation applies to new or modified stationary sources, transit projects such as the TEP may result in ROG and NOx emissions as a result of increases in transit vehicle trips and construction activities. Therefore, the above thresholds can be applied to the construction and operational phases of transit projects. Projects that result in emissions below these thresholds would not be considered to contribute to an existing or projected air quality violation or result in a cumulatively considerable net increase in ROG and NOx emissions. Because construction activities are temporary in nature, only the average daily thresholds are applicable to construction phase emissions.

Particulate Matter (PM_{10} and $PM_{2.5}$)

The SFBAAB is also currently designated as non-attainment for coarse and fine particulate matter (PM_{10} and $PM_{2.5}$, respectively). The BAAQMD has not established an offset limit for $PM_{2.5}$ and the current federal Prevention of Significant Deterioration (PSD) offset limit of 100 tons per year for PM_{10} would not be an appropriate significance threshold for the SFBAAB considering its nonattainment status for PM_{10}. More appropriate significance thresholds for the SFBAAB are the emissions limits provided in the federal NSR regulations that apply to stationary sources that emit criteria air pollutants in areas that are currently designated as nonattainment for PM_{10} and $PM_{2.5}$. The emissions limits for PM_{10} and $PM_{2.5}$ under the NSR regulations are 15 tons per year (82 pounds per day) and 10 tons per year (54 pounds per day), respectively. These emissions limits represent levels at which a source is not expected to have an impact on air quality.[41] Transit projects may result in particulate matter emissions as a result of increases in transit vehicle trips and construction activities. Therefore, the above thresholds can be applied to the construction and operational phases of a transit project. Those projects that result in average daily or annual emissions below the NSR emission limits would not be considered to contribute to an existing or

[40] BAAQMD, *Revised Draft Options and Justification Report: California Environmental Quality Act Thresholds of Significance*, October 2009, pp. 1 - 2. Available online at: http://www.baaqmd.gov /~/media/Files/Planning%20and%20Research/CEQA/Revised%20Draft%20CEQA%20Thresholds%20%20Justification%20Report%20Oct%202009.ashx?la=en. Accessed April 9, 2013.

[41] Ibid, pp. 1 - 2.

projected air quality violation or result in a cumulatively considerable net increase in PM_{10} and $PM_{2.5}$ emissions. Because construction activities are temporary in nature, only the average daily thresholds are applicable to construction-phase emissions.

Other Criteria Pollutants

Regional concentrations of CO have not exceeded the CAAQS in the past 11 years, and SO_2 concentrations have never exceeded the standards. The primary source of CO impacts from transit projects is vehicle traffic. Construction-related SO_2 emissions represent a negligible portion of the total basin-wide emissions and construction-related CO emissions represent less than 5 percent of the total basin-wide CO emissions.[42] The SFBAAB is designated as attainment for both CO and SO_2. Furthermore, the BAAQMD has demonstrated that in order to exceed the CAAQS of 9.0 ppm (8-hour average) or 20.0 ppm (1-hour average) for CO, project traffic in addition to existing traffic would need to exceed 44,000 vehicles per hour at affected intersections (or 24,000 vehicles per hour where vertical and/or horizontal mixing is limited).[43] Therefore, given the SFBAAB's attainment status and the limited CO and SO_2 emissions that could result from a transit project such as the TEP, the proposed project would not result in a cumulatively considerable net increase in CO or SO_2, and quantitative analysis is not required.

Fugitive Dust

Fugitive dust emissions are typically generated during construction phases. Studies have shown that the application of best management practices (BMPs) at construction sites substantially control fugitive dust.[44] Individual measures have been shown to reduce fugitive dust by anywhere from 30 percent to 90 percent.[45] The BAAQMD has identified a number of BMPs to control fugitive dust emissions from construction activities and the City's Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008) requires many of these measures, as well as others, to be implemented during construction. The

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[42] Ibid, p. 27.

[43] BAAQMD, *CEQA Air Quality Guidelines*, May 2010. Available online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx?la=en. Accessed February 21, 2013.

[44] Western Regional Air Partnership, *Fugitive Dust Handbook*, September 7, 2006, p. 3-16. Available online at: http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf. Accessed February 16, 2013.

[45] BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, p. 27. Available online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Revised%20Draft%20CEQA%20Thresholds%20%20Justification%20Report%20Oct%202009.ashx?la=en. Accessed April 9, 2013.

BMPs employed in compliance with the City's Construction Dust Control Ordinance provide an effective strategy for controlling fugitive dust.

Health Risks to Sensitive Populations

Construction activities typically require the use of heavy-duty diesel vehicles and equipment, which emit DPM. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways. Projects that require a substantial amount of heavy-duty diesel vehicles and equipment would result in emissions of DPM and possibly other TACs that may affect nearby sensitive receptors. Construction-phase TACs, however, would be temporary, and current health risk modeling methodologies are associated with longer-term exposure periods of 9, 40 and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities, resulting in difficulties with producing accurate modeling results.[46] Nevertheless, DPM is a known TAC, and therefore appropriate thresholds are identified to ensure that a project does not expose sensitive receptors to substantial pollutant concentrations.

Similar to criteria pollutant thresholds identified above, the BAAQMD Regulation 2, Rule 5 sets cancer risk limits for new and modified sources of TACs at the maximally exposed individual sensitive receptor (MEI). In accordance with Regulation 2, Rule 5, the BAAQMD Air Pollution Control Officer shall deny any permit to operate a source that results in an increased cancer risk of 10 per million at the MEI. This threshold is designed to ensure that the source does not contribute to a cumulatively significant health risk impact.[47]

In addition, particulate matter, primarily associated with mobile sources (vehicular emissions) is strongly associated with mortality, respiratory diseases, and impairment of lung development in children, and other endpoints such as hospitalization for cardiopulmonary disease. Based on toxicological and epidemiological research, smaller particles and those associated with traffic appear to be more closely related to adverse health effects.[48] Therefore, estimates of $PM_{2.5}$ impacts from a new source can be used to approximate broader potential adverse health effects. In 2010, the US EPA established a Significant Impact Level (SIL) for $PM_{2.5}$ of 0.3 $\mu g/m^3$ (annual average concentration). The SIL

46 Ibid, p. 29.

47 BAAQMD, *CEQA Air Quality Guidelines*, May 2011, p. D-40. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

48 San Francisco Department of Public Health, *Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review*, May 2008, p. 5. Available online at: http://www.sfdph.org/dph/EH/Air/MitRoadway111907.pdf. Accessed April 18, 2012.

represents the level of incremental $PM_{2.5}$ impact that would result in a significant contribution to non-attainment in regions that are currently designated as nonattainment for $PM_{2.5}$.[49] Therefore, the US EPA $PM_{2.5}$ SIL of 0.3 $\mu g/m^3$ is an appropriate threshold for determining the significance of a source's $PM_{2.5}$ impact.

Potential health risks from new sources to sensitive receptors are assessed within a 1,000-foot zone of influence based upon guidance from BAAQMD, the ARB's *Land Use Compatibility Handbook,* and Health and Safety Code § 42301.6 (Notice for Possible Source Near School).[50] Health risks from new sources that exceed any of the following thresholds at the MEI are determined to be significant: excess cancer risk of 10 per one million and/or an annual average $PM_{2.5}$ increase of 0.3 $\mu g/m^3$.

Consistency with Applicable Air Quality Plan

As discussed in Section 4.4.3 - Regulatory Framework, the BAAQMD has published the *2010 Clean Air Plan*, representing the most current applicable air quality plan for the SFBAAB region. Consistency with this plan is the basis for determining whether the proposed project would conflict with or obstruct implementation of an applicable air quality plan. To determine consistency with the *2010 Clean Air Plan* (CAP), this analysis considers whether or not the project would (1) support the primary goals of the CAP, (2) include applicable control measures from the CAP, and (3) disrupt or hinder implementation of control measures identified in the CAP.

Cumulative Air Quality Impacts

Regional air quality impacts are by their very nature cumulative impacts. Emissions from past, present and future projects contribute to adverse regional air quality impacts on a cumulative basis. No single project by itself would be sufficient in size to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts. As described above, the project-level thresholds for criteria air pollutants are based on levels at which new sources are not anticipated to contribute substantially to an air quality violation or result in a cumulatively considerable net increase in criteria air pollutants. Therefore, if a project's emissions are below the project-level thresholds, the project would not be considered to result in a considerable contribution to cumulative regional air quality impacts.

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[49] BAAQMD, *CEQA Air Quality Guidelines*, May 2011, p. D-36. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

[50] Ibid, pp. D-38 and D-40.

With respect to localized health risks, while most of San Francisco is endowed with good air quality, portions of the City that are close to freeways, busy roadways, and other sources of air pollution experience higher concentrations of air pollutants. These air pollution hot spots result in additional health risks for affected populations. In an effort to identify air pollution hot spots, San Francisco partnered with the BAAQMD to inventory and assess air pollution and exposures from mobile, stationary, and area sources within San Francisco. This modeling effort included dispersion modeling of emissions from the primary sources of air pollutants in San Francisco, and therefore, the results represent a comprehensive assessment of cumulative exposures to air pollution throughout the City. The BAAQMD conducted citywide dispersion modeling using American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD)[51] to assess the emissions from the following primary sources: roadways, permitted stationary sources, port and maritime sources, and Caltrain. PM_{10}, $PM_{2.5}$ and total organic gases (TOG) were modeled on a 20 meter by 20 meter receptor grid covering the entire City. The methodology and technical documentation for modeling citywide air pollution is available in the document entitled, *The San Francisco Community Risk Reduction Plan: Technical Support Documentation.*[52]

Using the citywide air pollution model results, air pollution hot spots for San Francisco were identified based on two health-protective criteria: (1) excess cancer risk from the contribution of emissions from all modeled sources, and (2) cumulative $PM_{2.5}$ concentrations. In determining the additional health impacts from $PM_{2.5}$ exposure, $PM_{2.5}$ concentrations throughout the City were modeled from the primary sources listed above and ambient $PM_{2.5}$ concentrations were then added to determine total $PM_{2.5}$ exposure concentrations. The following health protective criteria are used to determine air pollution hot spots and are further discussed below:

- Excess cancer risk from all sources greater than 100 per one million population; and
- $PM_{2.5}$ concentrations from all sources including ambient concentrations greater than10 $\mu g/m^3$.

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[51] AERMOD is the US EPA's preferred/recommended steady state air dispersion plume model. For more information on AERMOD and to download the *AERMOD Implementation Guide*, see: http://www.epa.gov/ttn/scram/dispersion_prefrec.htm#aermod. Accessed May 3, 2012.

[52] BAAQMD, San Francisco Department of Public Health, and San Francisco Planning Department, *The San Francisco Community Risk Reduction Plan: Technical Support Documentation*, December 2012. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

Excess Cancer Risk

The above-noted 100 per one million persons (100 excess cancer risk) criteria is based on US EPA guidance for conducting air toxic analyses and making risk management decisions at the facility and community-scale level.[53] As described by the BAAQMD, the US EPA considers a cancer risk of 100 per million to be within the "acceptable" range of cancer risk. Furthermore, in the 1989 preamble to the benzene National Emissions Standards for Hazardous Air Pollutants (NESHAP) rulemaking,[54] the US EPA states that it "…strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately one in one million and (2) limiting to no higher than approximately one in ten thousand (100 in one million) the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years." The 100 per one million excess cancer cases is also consistent with the ambient cancer risk in the most pristine portions of the SFBAAB based on BAAQMD regional modeling.[55]

Fine Particulate Matter

In April 2011, the US EPA published *Policy Assessment for the Particulate Matter Review of the National Ambient Air Quality Standards*, "Particulate Matter Policy Assessment." The purpose of the Particulate Matter Policy Assessment is to "bridge the gap" between the scientific information and the judgments required of the US EPA Administrator in determining whether it is appropriate to retain or revise the particulate matter standards. In this document, US EPA concludes that the currently available information calls into question the adequacy of the federal standard of 15 $\mu g/m^3$ for $PM_{2.5}$ and that consideration should be given to revising the standards to provide increased public health protection. US EPA staff further concludes that the current annual $PM_{2.5}$ standard should be revised to a level within the range of 13 to 11 $\mu g/m^3$, with evidence strongly supporting a standard within the range of 12 to 11 $\mu g/m^3$.

On December 14, 2012, the US EPA finalized the revised fine particulate matter standard under the federal CAA, reducing the national ambient air quality standard from 15 $\mu g/m^3$ to

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[53] BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, p. 67. Available online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Revised%20Draft%20CEQA%20Thresholds%20%20Justification%20Report%20Oct%202009.ashx?la=en. Accessed April 9, 2013.

[54] 54 *Federal Register* 38044, September 14, 1989.

[55] BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, p. 67. Available online at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Revised%20Draft%20CEQA%20Thresholds%20%20Justification%20Report%20Oct%202009.ashx?la=en. Accessed April 9, 2013.

12 μg/m^3.[56] This revised annual standard is equivalent to California's fine particulate matter standard of 12 μg/m^3.[57]

Identified air pollution hot spots in San Francisco are based on the health protective $PM_{2.5}$ standard of 11 μg/m^3, as supported by the US EPA's Particulate Matter Policy Assessment. However, San Francisco's air pollution hot spots have been identified using a lower $PM_{2.5}$ concentration of 10 μg/m^3 in order to be even more health protective and to account for uncertainty in accurately predicting air pollution concentrations using air dispersion modeling programs.

Projects within these air pollution hot spots require special consideration to determine whether the project's activities would expose sensitive receptors to substantial air pollutant concentrations or add emissions to areas already adversely affected by poor air quality. The Planning Department considers a project to contribute considerably to cumulative health risks if the proposed project would result in the following at the maximally exposed individual sensitive receptor:

- A considerable contribution to cumulative excess cancer risk greater than 100 per one million persons exposed; or

- A considerable contribution to cumulative $PM_{2.5}$ concentrations that exceed 10 μg/m^3 (inclusive of ambient $PM_{2.5}$ concentrations).

As discussed above, the BAAQMD considers projects that result in an excess cancer risk of less than 10 per one million persons exposed and/or an annual average $PM_{2.5}$ concentration of less than 0.3 μg/m^3, to not contribute considerably to cumulatively significant levels of health risk.[58] Therefore, project-related emissions of TACs and $PM_{2.5}$ concentrations below these levels would not result in a cumulatively considerable contribution to localized health risks.

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[56] US EPA, *Press Release: USEPA Announces Next Round of Clean Air Standards to Reduce Harmful Soot Pollution*, December 14, 2012. Available online at: http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/a7446ca9e228622b85257ad400644d82!OpenDocument. Accessed February 7, 2013.

[57] ARB, *Ambient Air Quality Standards (AAQS) for Particulate Matter*, November 24, 2009. Available online at: http://www.arb.ca.gov/research/aaqs/pm/pm.htm#3. Accessed February 27, 2013.

[58] BAAQMD, *CEQA Air Quality Guidelines*, May 2011, pp D-39 to D-40. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

APPROACH TO ANALYSIS

Project Features

The SFMTA proposes a Policy Framework for its transit service. In addition, the proposed TEP is comprised of three components: Service Improvements, Service-related Capital Improvements, and TTRPs. Project features are described in detail in Chapter 2, Project Description. Key features of the proposed project that could have potential air quality impacts, for both construction and operations, are discussed below. As explained in Chapter 2, some components of the TEP are well-defined and are described at a project-level of detail, while other components are less defined and are described at a program-level. Although there is less detail available about the program-level components of the TEP, there is generally sufficient information available to provide project-level analysis of air quality impacts of both program- and project-level TEP components. This is because operational air quality impacts of the TEP would result from the Service Improvements and Service Variants, and these components are defined at the project level. In addition, the air pollutant emissions from Service-related Capital Improvements and TTRPs relate primarily to construction emissions, which have been estimated for the types of construction activities that are expected to occur for both project- and program-level components. With the exception of TTPI.3, which would involve the development of a new independent terminal stop for the E Embarcadero historic streetcar line the construction of which may result in air quality impacts and for which design details have not yet been developed, the air quality analysis covers the entirety of the TEP at a project level.

Service Policy Framework

The Policy Framework is a policy document with objectives and actions developed to guide the provision of reliable and efficient transit service throughout the City. Adoption of the Policy Framework would not directly result in any physical changes and therefore, would not cause any physical environmental impacts related to air quality. However, the Policy Framework may indirectly result in changes to the physical environment as projects, including the TEP and future similar projects, proposed under it are approved and implemented. Thus, indirect air quality impacts that could result from the types of future projects developed to implement the Policy Framework would be expected to be similar to those resulting from the TEP project components that are analyzed below. Future projects may require additional analysis at the time they are proposed if the scope of the project differs substantially from the project- and program-level proposals analyzed as part of this environmental review.

Service Improvements

The Service Improvements and Service Variants would include changes to transit routes, transit vehicle types, and the frequency and span of transit service. Route changes would include alteration of existing alignments, elimination of existing routes or route segments, and the introduction of new routes. Some route changes would result in transit vehicles operating on City streets that currently do not have any transit vehicles. Vehicle types for some routes would also change, including the use of smaller diesel vans to replace larger diesel buses on some routes. Also, the frequency and span of service for some routes would change. The Service Improvements would result in changes to operational air pollutant emissions in some locations due to transit service changes, such as increased/ decreased frequencies, change in vehicle types, and change in service routes. Limited construction (curb ramps in some locations) would be necessary to implement the Service Improvements and Service Variants and could result in temporary construction air quality impacts.

Service-related Capital Improvements and TTRPs

The Service-related Capital Improvements and TTRPs and TTRP Variants would include construction activities, such as the installation of TPS Toolkit elements, overhead wires and related infrastructure, terminal and transfer point improvements, extension of a contraflow commercial-transit-only lane, and accessible platforms. Upon completion of these physical improvements, there would be no direct ongoing operational air quality impacts as a result of the Service-related Capital Improvements, TTRPs, and TTRP Variants. However, implementation of the Service-related Capital Improvements and TTRPs and TTRP Variants is expected to result in a travel mode shift from privately-owned vehicles to public transit, which would result in an indirect impact on regional emissions of criteria pollutant and ozone precursor emissions.

With respect to the TTRPs, a range of potential combinations of TPS Toolkit elements is being considered by the SFMTA to reduce transit travel time. The range of TTRP treatments being analyzed has been bracketed by: 1) the TTRP Moderate Alternative; and 2) the TTRP Expanded Alternative. The difference between these two alternatives is that the TTRP Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental effects as a result of the substantial changes to traffic, bicycle, or pedestrian circulation, whereas the TTRP Moderate Alternative is expected to have fewer physical environmental effects due to the nature of the TPS Toolkit elements chosen.

The TTRP Expanded Alternative would not necessarily result in greater air quality impacts, compared to the TTRP Moderate Alternative. The air quality evaluation considers the "worst-case" with respect to air quality impacts of the TPS Toolkit elements as a screening approach to determine whether the activities proposed under either the TTRP Moderate

Alternative or TTRP Expanded Alternative would result in significant air quality impacts. For construction purposes, there would be little difference between the TTRP Moderate Alternative and the TTRP Expanded Alternative. For any individual TTRP proposal, both project alternatives would be comprised of a combination of TPS Toolkit elements, so construction of either project alternative would consist of the same construction activities for a similar duration along the same corridor. As a screening level approach, a worst-case construction scenario was developed that consists of the maximum construction activity that would be expected to occur within a contiguous area. Therefore, a combination of TPS Toolkit elements together with an OWE project (on the 5 Fulton corridor) was identified as having the potential to result in the greatest construction air quality impact and thus, effectively provides analysis for all kinds of combinations of TPS Toolkit elements irrespective of whether they constitute a TTRP Moderate Alternative or a TTRP Expanded Alternative. This approach facilitates the evaluation of potential worst-case construction air quality impacts from other components of the TEP, since it is anticipated that construction of other components would result in less substantial air quality impacts. The quantification of air pollutant emissions from the maximum construction scenario was also used to evaluate the construction air quality impact from multiple construction projects being conducted simultaneously throughout the City.

A similar approach was used in the analysis of operational air quality impacts. The Service Improvements and Service Variants implemented would be the same under either the TTRP Moderate Alternative or the TTRP Expanded Alternative. As a worst-case scenario, the street segment where the TEP would result in the greatest increase in diesel-fueled transit vehicles operating along that segment was identified and the emissions that would result from the increase in transit trips were estimated. These emissions were used to evaluate potential health risk impacts. In addition, the change in air pollutant emissions from a potential mode shift was evaluated by estimating the change in vehicle miles traveled (VMT) for transit and non-transit vehicles. This change in VMT was evaluated for both the TTRP Moderate Alternative and TTRP Expanded Alternative in combination with the Service Improvements and Service Variants to calculate change in criteria pollutant and ozone precursor emissions that would result from the implementation of the TEP.

Project Variants

Several project variants are under consideration by the SFMTA to allow for flexibility in the phasing and implementation of the TEP. Proposed Service Variants to the Service Improvements would modify portions of a route or change the type of vehicle used on routes. TTRP Variants would change the locations of one or more TPS Toolkit elements along the corridor. For portions of the project area for which more than one variant is proposed, only one variant would be implemented. Similar to the evaluation of the TTRP Moderate and Expanded Alternatives, a screening level approached was used to evaluate the potential air quality impact by assuming the worst-case from the proposed variants. For example, TTRP.22_1 would extend the 22 Fillmore route into Mission Bay. This route currently operates with electric trolley service necessitating OWE.5 (22 Fillmore Extension to Mission Bay) to provide the overhead wires for the extension. The TEP includes TTRP.22 Service Variant to operate diesel motor coaches on the route from the 16th Street BART Station to Mission Bay until the OWE.5 is completed. Since diesel motor coaches have a greater air quality impact than electric trolley coaches, the air quality analysis assumed worst-case conditions, i.e., the use of diesel motor coaches for this segment instead of electric trolleys in identifying which streets would experience the greatest increase in diesel motor coaches as a result of the TEP.

Evaluation of Construction Impacts

The air quality impacts from construction of the TEP components have been evaluated by considering the maximum construction that would be expected to occur within a contiguous area and the number of construction projects what would be expected to be occurring simultaneously within the City, as discussed in the impact evaluation below. An estimation of the ROG emissions from painting transit-only lanes was also performed.

Construction elements proposed for the TEP's Service-related Capital Improvement Projects, TTRPs and TTRP Variants, and Service Improvements and Service Variants would include the following types of transit supportive infrastructure: transit bulbs, pedestrian bulbs, curb ramps, pedestrian refuge islands, transit boarding islands, traffic circles, traffic signals, sidewalk expansions, and accessible platforms. In some cases, construction would involve the expansion or removal of existing transit supportive infrastructure. Quantification of emissions from construction activities for the proposed project was prepared as part of the AQTR and the results of that report are summarized and presented in the Impact Evaluation.

Since the TEP proposes the construction of a large number of individual transit supportive infrastructure facilities (for instance, there are over 100 transit bulbs proposed under the TTRP Moderate Alternative), the proposed construction activities have been categorized under five general types of construction activity to aid in the air quality impact evaluation: Curb Work, Non-Curb Work, Traffic Signal Installations, Overhead Wire Expansion installations, and the installation of Accessible Platforms. These general types of construction activities were used to estimate emissions from the maximum construction scenario that could occur within a contiguous area. Average daily emissions of criteria pollutants and precursors were estimated by multiplying the emissions from the maximum construction scenario by the total number of TEP construction projects what would be expected to occur simultaneously.

Emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ from the five general types of construction activities were estimated based on the type of equipment that would be used, the expected equipment horsepower rating, the number of days and hours the equipment would be operated, and the miles traveled by various vehicles for each of the general categories of construction identified above. The quantification of ROG, NOx, PM_{10}, and $PM_{2.5}$ accounted for San Francisco's Clean Construction Ordinance, which requires that construction equipment with 25 horsepower or greater use Tier 2 engines. For construction equipment less than 25 horsepower, emission rates are based on the average emission rates for construction equipment typically used in San Francisco and include construction equipment manufactured in various years. Emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ from construction equipment were calculated using pollutant emission rates from the ARB's OFFROAD inventory model (2011) (for off-road equipment greater than 25 horsepower) and from California Emission Estimator Model (CalEEMod), Version 2011.1 User's Guide, Appendix D (for off-road equipment less than 25 horsepower).

Emissions from a representative worst-case TEP construction project were estimated based on the average daily emissions from each of the general construction activities. It is anticipated that the greatest amount of construction in any one location would occur along the 5 Fulton route on McAllister Street between Divisadero and Pierce streets. At this location, the TEP would implement the TTRP.5 project in addition to the OWE.4 project. Proposed TPS elements of both the TTRP.5 Moderate Alternative and Expanded Alternative were considered in determining the maximum amount of construction that could occur within this area. Construction activities performed would include the following work:

- Two 90-foot long transit bulbs at the intersection of McAllister and Divisadero streets;
- A traffic circle at the intersection of McAllister and Scott streets;
- Two traffic signal mast-arm poles and six traffic signal poles at the intersection of McAllister and Pierce streets; and
- Overhead bypass wire installation at the intersection of McAllister and Pierce streets.

The above project represents the maximum construction scenario within a contiguous two-block area and was used to estimate the worst-case average daily emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$. This approach is consistent with excavations that occur within the public right-of-way, which are limited to 1,200 feet (typically two blocks and one intersection) at any one time pursuant to Public Works Code § 2.4.52. The specific schedule for all aspects of project construction has not been determined at this time and it is likely that the construction work along routes would occur sequentially. However, the calculation of average daily emissions conservatively assumed that construction of the transit bulbs, traffic circle, traffic signals, and overhead wire identified for this construction scenario would occur concurrently. The total citywide average daily emission of ROG, NOx, PM_{10}, and $PM_{2.5}$ from construction activities performed under the TEP has been estimated by assuming up to three construction projects similar to the maximum construction scenario would occur concurrently. This assumption is based on information provided by the SFMTA regarding the likelihood of multiple construction projects in any one year during project implementation as provided in its 5-year Capital Improvement Program, *Capital Expense Budget Fiscal Years 2013 - 2017*: *Capital Program: Transit Optimization/Expansion.*[59]

- Since the Draft EIR was published on July 10, 2013, three TTRPs previously analyzed at a program level have been designed at a project level, TTRP.L, TTRP.9, and TTRP.71_1. The project-level analysis prepared supplements the program level analysis already presented in the Draft EIR. A review of the designs for these TTRPs determined that construction air quality impacts of these TTRPs would be similar to those of the other eight project-level TTRPs because the same TPS Toolkit would be used and the same general types of construction equipment would be used. However, the results of the construction criteria air pollutant analysis indicate that the TTRP.9 Expanded Alternative represents a supplemental maximum construction scenario as described below.[60] That scenario, for the TTRP.9 Expanded Alternative, would include construction for the following TPS Toolkit elements:
    - Four pedestrian bulbs; and
    - Sidewalk widening along a two-block segment.
- These TPS Toolkit elements would be installed along a two-block segment of Potrero Avenue between 22nd and 24th streets (a segment of approximately 2,100 feet in length). The analysis of this supplemental construction scenario conservatively assumed that construction of the pedestrian bulbs and sidewalk widening would occur concurrently, and that the sidewalk widening construction would take place simultaneously in four locations along the two block segment.

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[59] San Francisco Municipal Transportation Agency (SFMTA), *Capital Expense Budget Fiscal Years 2013 - 2017: Capital Program: Transit Optimization/Expansion*. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

[60] BASELINE Environmental Consulting, *Supplemental Air Quality Analysis for SFMTA Transit Effectiveness Projects TTRP.L, TTRP.9, and TTRP.71.1*, memorandum to Debra Dwyer, EIR Coordinator, San Francisco Planning Department, February 19, 2014. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

The establishment of flag stops, modification of transit stops and traffic lanes, and changes to parking zones, such as designating no-parking or loading zones, would require the use of thermoplastic traffic marking paint. A relatively small amount of criteria pollutants or ozone precursors would be released from heating and application of the thermoplastics, which was determined to be negligible,[61] as were emissions from painting curbs as part of the TPS Toolkit elements or other TEP projects.

The SFMTA is considering the use of red traffic marking paint for transit-only lanes. Over the course of implementing the entirety of the TEP, a relatively large area within street segments throughout the City could be painted to increase the visibility of full-time 24-hour transit-only lanes. The application of large areas of traffic marking paint would result in emissions of volatile organic compounds (VOCs). For analysis purposes, the terms ROG and VOCs are essentially synonymous.[62] Therefore, the maximum amount of VOCs or ROG that would be emitted has been estimated.

Evaluation of Operational Impacts

Operational air quality impacts have been evaluated by considering the maximum increase in diesel-fueled motor coaches along any roadway segment based on the proposed Service Improvements, including proposed Service Variants, and the travel mode shift expected from both the TTRP Moderate and Expanded Alternatives. The difference between the two

[61] BASELINE Environmental Consulting, *Final Air Quality Technical Report Transit Effectiveness Project*, May 10, 2013, Appendix A, p. 23. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

[62] US EPA, *Federal Register, Approval of Air Quality Implementation Plans; California; South Coast; Attainment Plan for 1997 8-Hour Ozone Standard*; Final Rule, March 1, 2012. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

alternatives is that the TTRP Moderate Alternative would result in less of a mode shift from private vehicles to transit than the TTRP Expanded Alternative. Additionally, air pollutant emissions from increases in traffic congestion have been evaluated by examining the estimated intersection delays provided in the Transportation Impact Study (TIS).[63]

Changes in transit vehicle criteria pollutant and ozone precursor emissions as a result of the Service Improvements or Service Variants would occur from discontinuation of routes, implementation of new routes, and increased frequency of service or hours of operation along existing routes, depending on the type of transit vehicle serving the route. The change in the amount of criteria pollutants and ozone precursors emitted from implementation of the TEP is directly related to the change in VMT for diesel-fueled transit vehicles. Only Muni's diesel-fueled motor coaches and diesel hybrid-electric motor coaches (DHEBs) would result in emissions of air pollutants because Muni's trolley coaches, light rail vehicles, and streetcars are powered electrically and do not result in tailpipe emissions.

Service Improvements and Service Variants proposed under the TEP would result in more diesel-fueled motor coaches per hour in some locations and would add diesel-fueled motor coaches to some streets that currently do not have transit. These diesel-fueled motor coaches would result in an increase in emissions of air pollutants from transit vehicles. Implementation of the proposed TTRP Moderate and Expanded Alternatives, in combination with the proposed Service Improvements would increase transit reliability and reduce transit travel times, which is expected to result in a travel mode shift as more people would be expected to use public transit instead of traveling by privately-owned vehicles. The net change in criteria pollutant and ozone precursor emissions from implementation of the TEP would be the sum of the changes in transit vehicle and non-transit vehicle criteria pollutant and ozone precursor emissions. Thus, while implementation of the TEP would increase the diesel-fueled transit VMT, it would also reduce the non-transit vehicle VMT.

In addition, implementation of the TEP may result in an increase in traffic congestion, which could result in an increase in vehicle emissions due to longer idle times at intersections. For instance, changing a mixed-flow travel lane to a transit-only lane could result in an increase in the time that vehicles must wait before clearing an intersection; this increase in delay would result in an increase in criteria pollutant and ozone precursor emissions relative to existing conditions. However, the results of the intersection LOS evaluation performed for the TIS conducted for the TEP (see Section 4.2, Transportation and Circulation for the results) indicated that implementation of the Service Improvements and Service Variants,

[63] Fehr & Peers and LCW Consulting, *San Francisco Transit Effectiveness Project Transportation Impact Study*, July 10, 2013. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

TTRP Moderate Alternative (including the Service Improvements), or TTRP Expanded Alternative (including the Service Improvements) would result in an increase in a.m. and p.m. peak hour vehicle delays at some intersections and a decrease at others. Among all intersections analyzed, the TIS estimated that implementation of the Service Improvements and TTRP Moderate Alternative would result in a combined net decrease in average p.m. peak hour delays and a combined net one to two second increase in average a.m. peak hour delays. With implementation of the TTRP Expanded Alternative, the intersections studied would experience an average increase in both the a.m. and p.m. peak hour delays. These delays would result in a small increase in the emissions of criteria pollutants or ozone precursors, since vehicles would be expected to spend more time idling while waiting to clear the intersection. However, because changes in criteria pollutant and ozone precursor emissions are evaluated on an average daily and maximum annual basis and, since the longest average delay under the TTRP Expanded Alternative was estimated to be less than four and a half minutes per vehicle and would only occur during the peak traffic period, the air quality impact from vehicle delays at intersections was determined to be relatively minor and would not result in substantial differences in the results presented below.

IMPACT EVALUATION

Construction Impacts

Impact AQ-1: The Service Policy Framework and construction activities proposed under the Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants would not result in a violation of air quality standards or contribute substantially to an existing or projected air quality violation; nor would it result in a cumulatively considerable net increase of criteria air pollutants, for which the project region is in nonattainment under an applicable ambient air quality standard. (Less than Significant)

Emissions of criteria pollutants and ozone precursors from construction of curb ramps related to Service Improvements and Service Variants, and construction of Service-related Capital Improvements and TPS Toolkit elements were quantified as described below. The majority of emissions would result from construction equipment exhaust. Emissions of ROG would also be expected to occur from the application of traffic marking paint used to paint transit-only lanes. With the exception of E Line Independent Terminal at Beach and Jones streets (TTPI.3), the project-level construction equipment and activities evaluated would be similar to program-level construction equipment and activities; therefore, this analysis provides an assessment of both project- and program-level proposals. As previously stated, when design details are developed for the E Embarcadero Independent Terminal project, additional environmental review would be conducted, as appropriate.

Average daily emissions of criteria pollutants and ozone precursors from TEP construction projects were estimated based on the emissions from the maximum construction scenario that would be expected to occur within a contiguous area and then multiplied by the number of construction projects what would be expected to be occurring simultaneously within the City. Average daily emission estimates of ROG, NOx, PM_{10}, and $PM_{2.5}$ were compared against the criteria pollutants and ozone precursor thresholds of significance. As stated earlier, it is anticipated that the greatest amount of construction in any one location would occur along the 5 Fulton route on McAllister Street between Divisadero and Pierce streets, with the maximum construction activity consisting of a combination of the TPS Toolkit elements proposed under the TTRP Moderate Alternative and the TTRP Expanded Alternative. At this location, the TEP would implement the TTRP.5 project in addition to the OWE.4 project. The estimated emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ are summarized in Table 39 below.

Table 39: Average Daily Criteria Pollutant and Ozone Precursors Emissions from Maximum Construction Scenario

Construction Activity	ROG (lbs/day)	NOx (lbs/day)	PM_{10} (exhaust) (lbs/day)	$PM_{2.5}$ (exhaust) (lbs/day)
Two Transit Bulbs	0.46	4.2	0.22	0.20
Traffic Circle	0.41	3.7	0.15	0.14
Traffic Signals	0.24	2.2	0.12	0.11
Overhead Wire Expansion	0.29	2.5	0.14	0.13
Total Average Daily Emission *	1.4	13	0.63	0.58
Thresholds of Significance	54	54	82	54

Notes: ROG = reactive organic gases; NOx = nitrogen oxides; PM_{10} = particulate matter 10 microns and smaller; $PM_{2.5}$ = particulate matter 2.5 microns and smaller; lbs/day = average pounds per day.
* Assumes that the construction activities would be performed concurrently.

As shown in Table 39, the emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ from the maximum construction scenario would be less than the significance thresholds.

- Average daily emission estimates of the criteria pollutants ROG, NOx, PM_{10} and $PM_{2.5}$ for the TTRP.9 Expanded Alternative supplemental maximum construction scenario used the same methodology used to evaluate the maximum construction scenario above and are summarized in Table 39A below.

- **Table 39A: Average Daily Criteria Air Pollutant and Ozone Precursors, TTRP.9 Expanded Alternative Maximum Construction Scenario**

Construction Activity	ROG (lbs/day)	NOx (lbs/day)	PM_{10} (exhaust) (lbs/day)	$PM_{2.5}$ (exhaust) (lbs/day)
Pedestrian Bulb	0.92	8.4	0.44	0.4
Sidewalk Widening	0.92	8.4	0.44	0.4
Total Average Daily Emissions*	1.8	17	0.88	0.80
Thresholds of Significance	54	54	82	54

Notes: ROG = reactive organic gases; NOx = nitrogen oxides; PM_{10} = particulate matter 10 microns and smaller; $PM_{2.5}$ = particulate matter 2.5 microns and smaller; lbs/day = average pounds per day.
* Assumes that the construction activities would be performed concurrently.

- As shown in Table 39A, the emissions of ROG, NOx, PM_{10} and $PM_{2.5}$ from the TTRP.9 Expanded Alternative scenario also would be less than the significance thresholds.

  However, multiple construction projects may be undertaken within the City at any given time. As previously stated, information related to TEP implementation provided by the SFMTA on its 5-year Capital Improvement Program was used to estimate the number of construction projects that have the potential to occur simultaneously. Based on this information, the SFMTA has confirmed that up to three such construction projects could occur simultaneously. Therefore, the estimated maximum daily average ROG, NOx, PM_{10}, and $PM_{2.5}$ exhaust emission on a citywide basis that would occur with the implementation of the TEP was conservatively calculated based the implementation of three construction projects equivalent to the maximum construction scenario analyzed and is summarized in Table 40.

● In addition, the emissions from three construction projects, each equivalent to the TTRP.9 Expanded Alternative supplemental construction scenario, were estimated and are also shown in Table 40. The average daily construction emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ would not exceed the criteria pollutant and ozone precursor significance thresholds.

Table 40: Average Daily Criteria Air Pollutant and Ozone Precursors Emissions from Citywide Construction Activities

Construction Activity	**ROG (lbs/day)**	**NOx (lbs/day)**	**PM_{10} (exhaust) (lbs/day)**	**$PM_{2.5}$ (exhaust) (lbs/day)**
Construction of Three Service-related Capital Improvements TPS Toolkit Elements Curb Ramps *	4.2	39	1.9	1.7
● Construction of Four Pedestrian Bulbs and Two-Block Sidewalk Widening*	5.5	50	2.6	2.4
Thresholds of Significance	54	54	82	54

Notes: ROG = reactive organic gases; NOx = nitrogen oxides; PM_{10} = particulate matter 10 microns and smaller; $PM_{2.5}$ = particulate matter 2.5 microns and smaller; lbs/day = average pounds per day.

* Based on the estimated emission from the maximum construction scenario and assumes that up to three
● separate but similar construction projects under the TEP would occur concurrently citywide.

Transit-only lanes are one of the TPS Toolkit elements used by the SFMTA to prioritize transit service and improve transit operations. However, drivers do not always comply with the transit-only designation. In order to increase the visibility and effectiveness of these lanes, the SFMTA proposes to paint transit-only lanes red.[64] VOCs from painting transit-only lanes were estimated based on the manufacturer's Material Safety Data Sheets (MSDS) for StreetBondCL, with a VOC content of 11 grams per liter. The SFMTA estimates that the maximum application per day would be approximately three blocks. To estimate the maximum average daily emissions from painting 24-hour transit-only lanes, it has been assumed that the application would consist of two twelve-foot wide lanes and that the length of the three blocks would be 2,730 feet; a conservative estimate because it assumes a block

[64] Transit-only lanes already exist in the City, and eventually, all transit only lanes would be painted red. However, painting the existing transit-only lanes is not proposed as part of TEP.

length of 910 feet, approximately the maximum block length found in the City.[65] The application of marking paint would generally not occur concurrently with other construction projects and therefore the emissions from marking paint are not included in the estimation of maximum average daily emissions from construction activities shown in Table 40. The

[65] BASELINE Environmental Consulting, *Final Air Quality Technical Report Transit Effectiveness Project*, May 10, 2013, Appendix I, Attachment 2. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

maximum daily emissions of VOCs (ROG) from painting transit-only lanes are estimated at 43 pounds per day and would not exceed the significance threshold of 54 pounds per day.

Unmitigated emissions of criteria air pollutants during construction of the proposed project, including painting of transit-only lanes, would be below the applicable criteria air pollutant and ozone precursor significance thresholds. Project construction-phase criteria air pollutant and ozone precursor emissions that are at levels below the applicable thresholds would not violate, or result in a violation of, an existing ambient air quality standard, contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in emissions of any criteria air pollutant. Therefore, the air quality impact of the proposed project with respect to construction criteria air pollutant emissions would be less than significant. No mitigation measures are necessary.

Impact AQ-2: The Service Policy Framework and construction activities proposed under the Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants would not generate emissions of $PM_{2.5}$ and toxic air contaminants, including diesel particulate matter, at levels that would expose sensitive receptors to substantial pollutant concentrations. (Less than Significant)

As discussed above, a proposed project would result in a significant health risk impact if construction activities would result in the following at the MEI: excess cancer risk of 10 per million or annual average $PM_{2.5}$ concentrations in excess of 0.3 micrograms per cubic meter.

Since a screening approach was used based on the maximum construction scenario for the types of construction proposed under the TEP, with the exception of the E Line Independent Terminal at Beach and Jones streets (TTPI.3), the analysis presented below applies to both program- and project-level components. As previously stated, when design details are developed for the E Embarcadero Independent Terminal, additional environmental review would be conducted, as appropriate.

The AQTR prepared for the proposed project analyzed the health effects of the maximum construction scenario on nearby sensitive receptors. The analysis considered sensitive receptors within a 1,000-foot zone of influence and conservatively assumed the exposed population would be a resident child by weighting the cancer risk using age-sensitivity factors from the state Office of Environmental Health Hazard Assessment (OEHHA) to account for possible increases in cancer risk associated exposure to construction emissions during early life stages. This analysis weighted the impact of construction-related cancer risk by a factor of 10, consistent with OEHHA recommendations for exposures that occur from the third trimester of pregnancy to 2 years of age.[66] Adult exposures would be substantially less than those reported below.

Diesel-powered construction equipment generates emissions of PM_{10}. Emissions of PM_{10} were conservatively assumed to be entirely DPM,[67] an identified TAC. Mass emissions of construction-related DPM and $PM_{2.5}$ in the diesel exhaust from on-site diesel-powered construction equipment were modeled using the US EPA's recommended air dispersion model, AERMOD, to estimate air concentrations of DPM and $PM_{2.5}$.

Construction emissions were modeled as volume sources with a release height of 12 feet to correspond with typical equipment tailpipe locations. Nested receptor grids were used to evaluate health risks to potential sensitive receptors near construction areas out to a distance of 1,000 feet. Receptors points within the first 80 meters (approximately 262 feet) away from the construction area were located at 5-meter intervals (approximately 16 feet). A larger receptor grid with 25-meter spacing was used for a distance of 304.8 meters (1,000 feet) laterally from the proposed construction area. Since the construction health risk evaluation was performed as a screening level assessment that can be used to estimate the greatest anticipated health impact from implementation of the TEP project citywide, the analysis was conducted using both north-south and east-west oriented source areas to evaluate worst-case scenarios that take into account prevailing wind directions. Receptor heights were modeled at 1.5 (approximately 5 feet) and 6.0 meters (approximately 20 feet) above ground level. The 6.0 meter receptor heights are included to analyze impacts at the second floor of a building in cases where the ground floor is occupied by a retail or commercial use and the second floor is assumed to be residential. Comprehensive methodology on the air dispersion modeling, including details on source parameters, meteorological parameters, and receptor parameters for the modeling and risk calculations are discussed in the AQTR.

As stated earlier, it is anticipated that the greatest amount of construction in any one location would occur along the 5 Fulton route on McAllister Street between Divisadero and Pierce streets where the TEP would include construction of facilities for the TTRP.5 project in addition to the OWE.4 project. The greatest amount of construction for the three project-level TTRPs added following publication of the Draft EIR is estimated to occur along the 9 San Bruno/9L San Bruno Limited route on Potrero Avenue between 22nd and 24th Streets

[66] OEHHA, *Air Toxics Hot Spots Program Risk Assessment Guidelines, Technical Support Document for Exposure Assessment and Stochastic Analysis*, August 2012, pp. 1-12 to 1-13. Available online at: http://oehha.ca.gov/air/hot_spots/SRP/index.html. Accessed March 5, 2013.

[67] Almost all of the diesel particle mass is PM_{10}. Available online at: http://www.arb.ca.gov/toxics/dieseltac/de-fnds.htm. Accessed March 5, 2013.

where the TEP would include construction of facilities for the TTRP.9 project. To determine the worst-case cancer risk, it was assumed that the construction would occur sequentially and therefore would last for approximately 67 days. The air quality analysis for the proposed TEP determined that under these scenarios the following excess cancer risk and $PM_{2.5}$ concentrations would occur at the MEI which would be located at ground level (1.5 meters) adjacent to the construction zone (approximately 10 feet from the existing curb). The results for both construction scenarios are summarized in Table 41 below.

Table 41: Estimated Maximum Construction Excess Cancer Risk and $PM_{2.5}$ Concentration

Health Risk	Unit of Measurement	● Health Risk at Maximally Exposed Individual (MEI) TTRP.5	● Health Risk at Maximally Exposed Individual (MEI) TTRP.9	Threshold of Significance
● Excess Cancer Risk (per million)	Probability per One Million Population	0.88	1.4	10
● Annual Average $PM_{2.5}$	Micrograms per cubic meter ($\mu g/m^3$)	0.053	0.083	0.3

While multiple construction projects under the TEP would likely occur within the City, the concentrations of air pollutants from construction activities would decrease rapidly with distance from the source, and therefore the health risk impacts would be localized and are therefore assessed within a 1,000-foot zone of influence. In addition, construction projects performed within the City right-of-way require permits and review by Department of Public Works in accordance with Article 2.4 of the Public Works Code and, if performed within the street right-of-way, also require traffic permits from SFMTA. These agencies coordinate improvements within the public right-of-way in order to minimize disruption to transit, traffic, and surrounding land uses. Therefore, it is not expected that multiple TEP projects would be under construction simultaneously in proximity to each other.

Unmitigated emissions from construction of the proposed TEP components would not result in an excess cancer risk above 10 in a million at the project MEI, or result in an increase in the annual average $PM_{2.5}$ concentration of greater than 0.3 $\mu g/m^3$. Therefore, the impact of the proposed project with respect to construction health risks would be less than significant. No mitigation measures are necessary.

Operational Impacts

Impact AQ-3: The Service Policy Framework and the proposed project-level Service Improvements and Service Variants in combination with the TTRPs and TTRP Variants would not result in a violation of air quality standards or contribute substantially to an existing or projected air quality violation nor result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is in nonattainment under an applicable ambient air quality standard. (Less than Significant)

Emissions of criteria pollutants and ozone precursors from implementation of the Service Improvements and Service Variants, in combination with the TTRP Moderate Alternative or TTRP Expanded Alternative, have been evaluated by determining the change in transit and non-transit VMT and calculating emissions using appropriate emissions factors for these types of vehicles.

Implementation of the TEP would result in an increase in standard motor coach and DHEB VMT due to the increase in operating frequency or operating hours of transit vehicles as proposed. Based on the results of the SF-CHAMP model, it is estimated that implementation of the TEP would result in a decrease in privately-owned automobile VMT. (Detailed VMT calculations for transit and non-transit vehicles are presented in the AQTR.) Therefore, while the proposed Service Improvements and Service Variants would increase transit VMT, and therefore result in increased emissions, this increase is partially offset by an expected mode shift from privately-owned vehicles to public transit, which would result in a decrease in emissions from non-transit vehicles. The expected travel mode shift from implementation of both the TTRP Moderate Alternative and TTRP Expanded Alternative were evaluated. This evaluation also incorporates the SFMTA's replacement of 62 standard diesel motor coaches with 62 new DHEBs by the end of 2013, as discussed below.

The SFMTA's transit fleet consists of electric trolley coaches, diesel motor coaches (standard motor coaches), DHEBs, light rail vehicles, and cable cars. In 2013, the SFMTA will be replacing 62 of the 1999 standard motor coaches with 62 new 40-foot DHEBs.[68] The replacement of older standard diesel motor coaches with DHEBs is identified in SFMTA's Climate Action Strategy to reduce fleet emissions. Since the first group of Service Improvements are anticipated to be rolled out in FY 2015 (see Section 2.5.4 Project Schedule, page 2-162), the estimation of criteria pollutant and ozone precursors emissions from the increase in motor coaches VMT includes the new DHEBs that would be in service. The makeup of the 2014 Muni fleet is shown on Table 42. Electric trolley coaches, light rail vehicles, and cable cars are considered "zero-emission transit vehicles" or vehicles that produce zero exhaust emissions of any criteria pollutant (or ozone precursor) under any and all possible operational modes and conditions. The operation of zero-emission transit vehicles would not contribute to air quality impacts and are therefore not considered further in the evaluation of operational air quality impacts for this project. Only motor coaches (standard motor coaches and DHEBs) emit tailpipe emissions and are thus evaluated.

[68] SFMTA Memorandum from Elson Hao to Debra Dwyer of San Francisco Planning Department, March 13, 2013. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

Table 42: 2014 Muni Fleet

Vehicle Type	Number of Vehicles	Power	Percent of Fleet
Trolley Coaches	313	Electric	28%
Motor Coaches	358	Biodiesel	34%
Hybrid Motor Coaches (DHEBs)	148	Electric/Biodiesel	14%
Light Rail Vehicles	151	Electric	14%
Historic Streetcars	40	Electric	4%
Cable Cars	40	Electric	4%

By 2014, the SFMTA's motor coach fleet will consists of 358 standard diesel motor coaches with engines manufactured in years 1999, 2000, 86 2002 DHEBs with engines manufactured in 2006, and the 62 new DHEBs purchased in 2013.

Standard motor coach and DHEB emissions were estimated assuming a speed of five miles per hour[69] using the ARB's 2011 EMission FACtors (EMFAC2011) database, which includes emission rates in grams per mile for Urban Buses specific to San Francisco County based on engine manufacture year and vehicle speed.[70] The emission rates for the SFMTA's standard motor coaches were estimated using emission rates from EMFAC2011 and applying the 85 percent DPM and 25 percent NOx reduction to account for the fact that the SFMTA has retrofitted their motor coaches with Cleaire Longview ARB-verified Level 3 emission control technology. SFMTA's 2006 DHEBs emissions were estimated by using EMFAC2011 emission rates for a 2006 Urban Bus and applying a 25 percent NOx reduction to those emissions because manufacturers of 2004 through 2006 model year DHEBS may claim a 25 percent reduction in engine NOx emissions when compared to a non-hybrid 2004 through 2006 model year bus.[71] The 2013 DHEB emission rates were estimated using EMFAC2011 database, also assuming a speed of five miles per hour. The new DHEBs received in 2013 would have lower ROG and NOx emission rates than the standard motor coaches currently in use; the emission of PM_{10} and $PM_{2.5}$ would be essentially the same.[72]

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[69] Assuming a speed of five miles per hour is conservative since the emission rate, in grams per mile, increases as the speed decreases. Muni's motor coach and DHEBs typically travel at a higher average speed.

[70] ARB, EMission FACtors (EMFAC) Database, 2011. Available online at: http://www.arb.ca.gov/msei/modeling.htm. Accessed July 12, 2012.

[71] ARB, *California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes*, adopted October 24, 2002, p. 6. Incorporated in Sections 19156.1 and 19156.8, Title 13 CCR by reference. Available online at: http://www.arb.ca.gov/regact/bus02/ip.pdf. Accessed July 1, 2013.

[72] The emission rates from EMFAC0211 for 2013 through 2020 Urban Buses are the same.

Emission rates for non-transit vehicles were estimated using average emission factors for passenger cars and light duty trucks[73] for San Francisco County from EMFAC2011 since it is assumed that any mode shift from privately-owned vehicles to public transit would only pertain to these types of vehicles (i.e., the deviation of emission rates for non-transit vehicles did not include certain types of vehicles, such as large trucks, which would not be expected to shift to public transit). A weighted average emission rate for a non-transit vehicle in San Francisco County was determined by dividing the annual emissions of passenger cars and light duty trucks by the number of vehicles and the annual VMT.

The changes in emissions of ROG, NOx, PM_{10}, and $PM_{2.5}$ were calculated based on the change in VMT for standard motor coaches, DHEBs, and non-transit vehicles from the SF-CHAMP model and the emission rates as discussed above. Based on the SF-CHAMP model, the TTRP Moderate Alternative would result in less of a mode shift than the TTRP Expanded Alternative. For both the TTRP Moderate Alternative and TTRP Expanded Alternative, the net impacts, in terms of criteria air pollutants and ozone precursors, from implementation of the TEP are summarized in Table 43. The emissions of ROG, PM_{10}, and $PM_{2.5}$ would be reduced below existing levels; the emissions of NOx would increase but would remain below the significance thresholds of 54 average pounds per day and annual maximum of 10 tons per year.

Table 43: Net Change in Operational Criteria Pollutant and Ozone Precursor Emissions

TEP Alternatives	ROG		NOx		PM_{10}		$PM_{2.5}$	
	lbs/day	tons/yr	lbs/day	tons/yr	lbs/day	tons/yr	lbs/day	tons/yr
Moderate Alternative	-14	-2.5	18	3.3	-2.0	-0.35	-0.19	-0.04
Expanded Alternative	-22	-3.7	12	2.3	-3.4	-0.60	-0.80	-0.15
Thresholds of Significance	54	10	54	10	82	15	54	10

Notes: ROG = reactive organic gases; NOx = nitrogen oxides; PM_{10} = particulate matter less than 10 microns in size; $PM_{2.5}$ = particulate matter less than 2.5 microns in size; lbs/day = pounds per day, ton/yr = tons per year. Includes the replacement of 62 1999 standard diesel motor coaches with 62 new DHEBs in 2013.

The proposed project would generate emissions as a result of adding up to 350,000 annual service hours, of which a portion would include diesel-fueled motor coaches and therefore, would increase criteria pollutant and ozone precursor. However, with the exception of NOx, this increase in emissions would be offset by the reduction in emissions from privately-owned vehicles shifting travel modes to public transit as a result of implementation of the Service

[73] Up to 3,750 pounds in weight.

Improvements in combination with the TTRPs, which would reduce travel times and increase Muni system reliability, thus making public transit a more viable option. While NOx emissions would increase with implementation of the TEP, this expected increase would be below the NOx significance threshold.

Unmitigated operational emissions of criteria air pollutants and ozone precursors would be below the applicable significance thresholds for both the TTRP Moderate Alternative and TTRP Expanded Alternative. Project operational-phase criteria air pollutant and ozone precursor emissions that are below the applicable thresholds would not violate or result in a violation of an existing ambient air quality standard, contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase in emissions of any criteria air pollutant. Therefore, the impact of the proposed project with respect to operational criteria air pollutant or ozone precursor emissions would be less than significant. No mitigation measures are necessary.

Impact AQ-4: The Service Policy Framework and proposed project-level Service Improvements and Service Variants would not generate emissions of $PM_{2.5}$ and toxic air contaminants, including diesel particulate matter, at levels that would expose sensitive receptors to substantial pollutant concentrations. (Less than Significant)

A health risk analysis similar to the analysis performed for construction emissions was conducted to determine the potential impact of proposed Service Improvements, including the Service Variants. As discussed above, a proposed project would result in a significant health risk impact if its operation would result in the following at the maximally exposed individual sensitive receptor (MEI): excess cancer risk of 10 per million or annual average $PM_{2.5}$ concentrations in excess of 0.3 $\mu g/m^3$.

Similar to the evaluation of cancer risks from construction, diesel-fueled transit vehicles generate emissions of PM_{10}, which were conservatively assumed to be entirely DPM. The excess cancer risk was estimated based on DPM concentrations, which accounts for the individual TACs contained within DPM.

The AQTR prepared for the proposed project analyzed the health effects from increases in the number of diesel motor coaches on nearby sensitive receptors. Only Muni's diesel-fueled motor coaches and DHEBs would result in emissions of DPM since the trolley coaches, light rail vehicles, and streetcars are powered electrically and do not result in tailpipe emissions. A screening level approach was used to determine if increased emissions would result in $PM_{2.5}$ concentrations or an excess cancer risk above the significance thresholds.

Based on the SF-CHAMP model, implementation of the TEP would result in the greatest daily increase in motor coach frequency along 23rd Street between Utah and Kansas streets.

The existing motor coach frequency for this roadway segment is 309 motor coaches per day, with routes 10 Townsend and the 48 Quintara/24th Street traveling along this segment of 23rd Street. With the implementation of the TEP, motor coach frequency for this roadway segment would increase to 757 motor coaches per day. The bus routes that would utilize this section of 23rd Street would include the 10 Sansome, 19 Polk, 48 Quintara/24th Street, and 58 24th Street routes. With implementation of the TEP, the number of motor coaches along this segment of the roadway would increase by 448 motor coaches per day.[74]

The analysis considered sensitive receptors within a 1,000-foot zone of influence and conservatively assumed a 70 year lifetime exposure period. Age-sensitivity factors, as recommended by OEHHA, were included in the analysis to account for the possible differences in risk associated with a lifetime exposure. This analysis weighted the lifetime cancer risk by a factor of 1.7, consistent with BAAQMD recommendations for exposures that occur from the third trimester of pregnancy to 70 years of age.[75] Similar to construction equipment, diesel-fueled motor coaches generate emissions of DPM and $PM_{2.5}$.

Mass emissions of DPM and $PM_{2.5}$ in the diesel exhaust from motor coaches were used in the AERMOD dispersion model to estimate air concentrations of DPM and $PM_{2.5}$. Motor coach emissions were modeled as volume sources with a release height of 10 feet to correspond with motor coach exhaust pipes. A tiered fenceline grid with 10-meter (approximately 33 feet) spacing along the modeled roadway was used to evaluate health risks to sensitive receptors near roadways. Receptors within the first 25 meters (approximately 82 feet) away from the roadway were located at 1-meter intervals (approximately 3.3 feet). A larger receptor grid with 25-meter spacing was used for a distance of 304.8 meters (1,000 feet) laterally from the roadway. The roadway was modeled as both a north-south oriented and an east-west oriented segment to evaluate worst-case prevailing wind conditions. Receptor heights were modeled at 1.5 and 6.0 meters above ground level (the 6.0 meter receptor height analyze impacts at the second floor of a building in cases where the ground floor is occupied by a retail or commercial use). Detailed methodology on the air dispersion modeling, including details on source parameters, meteorological parameters, and receptor parameters for the refined modeling and risk calculations, is discussed in the AQTR.

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[74] Note that the air dispersion modeling was performed prior to updates to the SF-CHAMP model and the increase in motor coaches was somewhat less in the updated results. In addition, the SFMTA's SPASM model, which is more representative of the expected increase in numbers of transit vehicles, indicated the increase would be 396 motor coaches per day. Therefore, the air quality analysis provides an overestimate of emissions.

[75] BAAQMD, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May 2012. Available online at: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx. Accessed March 5, 2013.

As presented in the AQTR, under this scenario the following excess cancer risk and $PM_{2.5}$ concentration would occur at the MEI located at ground level (1.5 meters), about 23 feet from the curb. The results are summarized in Table 44 below. These results are conservative since they do not take into account a mode shift that could occur along a given roadway segment from implementation of the TEP, which would result in less emissions from privately-owned vehicles.

Table 44: Maximum Excess Cancer Risk and $PM_{2.5}$ Concentrations

Health Risk Type	Unit of Measurement	Health Risk at The Maximally Exposed Individual (MEI)	Threshold of Significance
Excess Cancer Risk (per million)	Probability per One Million Population	8.5	10
Annual Average $PM_{2.5}$	Micrograms per cubic meter ($\mu g/m^3$)	0.014	0.3

Based on the above analysis emissions from implementation of the proposed Service Improvement would not result in an excess cancer risk above 10 in a million at the project MEI or result in an increase in annual average $PM_{2.5}$ concentration of 0.3 $\mu g/m^3$. The increase in cancer risk and $PM_{2.5}$ concentrations from roadway segments with smaller increases in diesel-fueled motor coaches would result in lower cancer risk and $PM_{2.5}$ concentrations. Therefore, the proposed project would not expose sensitive receptors to substantial levels of air pollutants and operational health risks would be less than significant. No mitigation measures are necessary.

Compliance with Applicable Air Quality Plan

Impact AQ-5: The Service Policy Framework, and construction and operation of the proposed TEP, including the Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants, would not conflict with or obstruct implementation of the 2010 Clean Air Plan, the Bay Area's applicable air quality plan. (Less than Significant)

The most recently adopted air quality plan for the SFBAAB is the 2010 Clean Air Plan (2010 CAP).[76] The 2010 CAP is a road map showing how the San Francisco Bay Area will achieve compliance with the state ozone standards as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. In

[76] BAAQMD, *Bay Area 2010 Clean Air Plan*, September 15, 2010. Available online at: http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx. Accessed May 9, 2013.

determining consistency with the 2010 CAP this analysis considers whether the project would: (1) support the primary goals of the 2010 CAP, (2) include applicable control measures from the 2010 CAP, and (3) disrupt or hinder implementation of control measures identified in the 2010 CAP.

The primary goals of the 2010 CAP are to attain air quality standards, reduce pollutant exposure and protect public health, and reduce greenhouse gas (GHG) emissions. The discussion of project GHG emissions presented in the Initial Study demonstrated that the proposed project would comply with the applicable provisions of the City's Greenhouse Gas Reduction Strategy (see pp. 237 – 256 in Appendix 2 to this EIR, provided on the Appendix CD that accompanies the EIR).

The proposed TEP is a transit project with the goal of making the SFMTA's Muni system more efficient, thus attracting a greater portion of intercity trips. Implementation of the Service-related Capital Improvements and TTRPs, and curb ramps at some locations under the proposed Service Improvements, would result in short-term criteria pollutant emissions during construction (see Tables 39, 39A, 40, and 41). Implementation of the TEP, along with the planned replacement of standard motor coaches with DHEBs, would result in a decrease in ROG, PM_{10}, and $PM_{2.5}$ due to a predicted travel mode change from privately-owned motor vehicles to public transit (see Table 43). Implementation of the TEP would result in a net increase in NOx emissions, but this increase would not exceed the applicable significance threshold of 54 pounds per day or 10 tons per year. The analysis above illustrates that neither construction nor operation of the TEP would result in emissions of criteria air pollutants that would impede attainment of air quality standards (Impacts AQ-1 and AQ-3). The construction and operational health risk evaluation presented above (Impacts AQ-2 and AQ-4) demonstrates that implementation of the TEP would not substantially increase risks to public health.

As the proposed TEP would not result in substantial, long-term increases in criteria air pollutants, would not expose receptors to substantial pollutant concentrations, and would not result in substantial, long-term increases in GHG emissions (as discussed in the Initial Study), the proposed project would support the primary goals of the 2010 CAP.

The TEP was also evaluated to determine if the proposed project would be consistent with strategies to reduce air pollution, as proposed in the 2010 CAP. To meet the primary goals of the 2010 CAP, the 2010 CAP recommends specific control measures and actions. These control measures are grouped into various categories and include stationary and area source measures, mobile source measures, transportation control measures, land use measures, and energy and climate measures. The 2010 CAP recognizes that to a great extent, community design dictates individual travel modes and that a key long-term control strategy to reduce emissions of criteria pollutants, air toxics, and GHGs from motor vehicles is to channel future Bay Area growth into vibrant urban communities where goods and services are close at hand, and people have a range of viable transportation options. To this end, the 2010 CAP includes 55 control measures aimed at reducing air pollution in the SFBAAB.

The 2010 CAP control strategies consist of the following:

- 18 Stationary Source Measures;
- 10 Mobile Source Measures;
- 17 Transportation Control Measures;
- 6 Land Use and Local Impact Measures; and
- 4 Energy and Climate Measures.

The measures most applicable to the proposed project are transportation control measures (TCMs), which are strategies to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. The 2010 CAP includes 17 TCMs to improve transit service, improve system efficiency, encourage sustainable travel behavior, support focused growth, and implement pricing strategies. The TCMs for the 2010 CAP were developed by reviewing the 2005 Ozone Strategy measures and modifying and expanding them based on new investment and policy decisions. In particular, the TCMs have been updated to reflect the policy and investment decisions made in the Metropolitan Transportation Commission's regional transportation plan, Transportation 2035: Change in Motion.[77] Implementation of the TEP would be consistent with the following 2010 CAP TCMs:

TCM A-1 Improve Local and Areawide Bus Service - Improve transit by providing new Express Bus or Bus Rapid Transit on major travel corridors, fund replacement of older buses, and implementing Transit Priority Measures on key transit routes.

TCM A-2 Improve Local and Regional Rail Service - Improve rail service by sustaining and expanding local and regional rail services and by providing funds to maintain railcars, stations, and other rail capital assets.

TCM D-3 Support Local Land Use Strategies - Promote land use patterns, policies, and infrastructure investments that support mixed-use, transit-oriented development that reduce motor vehicle dependence and facilitate walking, bicycling and transit use.

[77] Metropolitan Transportation Commission, *Change in Motion, Transportation 2035 Plan for the San Francisco Bay Area, Final*, April 2009. Available online at: http://www.mtc.ca.gov/planning/2035_plan/. Accessed May 9, 2013.

An evaluation of the 2010 CAP's 55 control measures determined that the proposed TEP would not disrupt or hinder implementation of any of the CAP's 55 control measures. For the reasons stated above, the proposed project would support, not interfere with implementation of the 2010 CAP. Therefore, the proposed project would be consistent with the most recent air quality plan that shows how the region will improve ambient air quality and achieve state and federal ambient air quality standards, and this impact would be less than significant. No mitigation measures are necessary.

Cumulative Impacts

Impact C-AQ-1: The Service Policy Framework, and construction and operation of the proposed TEP, including the Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants, in combination with other past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is in nonattainment under applicable ambient air quality standards. (Less than Significant)

As discussed above, regional air pollution is by its very nature largely a cumulative impact. Emissions from past, present and future projects contribute to the region's adverse air quality on a cumulative basis. No single project by itself would be sufficient in size to result in nonattainment of regional ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts.[78] The project-level thresholds for criteria pollutants and ozone precursors are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a cumulatively considerable net increase in criteria air pollutants. Therefore, because the proposed project's construction (Impact AQ-1) and operational (Impact AQ-3) emissions would not exceed the project-level thresholds for criteria pollutants and ozone precursors, the proposed project would not be considered to result in a cumulatively considerable contribution to regional air quality impacts. No mitigation measures are necessary.

Impact C-AQ-2: The Service Policy Framework, and construction and operation of the proposed TEP, including the Service Improvements and Service Variants, Service-related Capital Improvements, and TTRPs and TTRP Variants, in combination with other past, present, and reasonably foreseeable future projects, would not generate emissions of $PM_{2.5}$ and toxic air contaminants, including diesel particulate matter, at levels that would expose sensitive receptors to substantial pollutant concentrations. (Less than Significant)

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[78] BAAQMD, *CEQA Air Quality Guidelines*, June 2010; and adopted Thresholds of Significance, June 2010, pp. 2-1 to 2-3. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

To evaluate the proposed TEP's cumulative health risk impact, the citywide air pollution model was queried to determine existing health risks at the construction and operational MEI locations described above. This model includes emissions from the primary sources of air pollutants in San Francisco, and therefore, represents a comprehensive assessment of existing cumulative exposures to air pollution throughout the City. The maximum existing excess cancer risk and $PM_{2.5}$ concentrations for the above locations are provided in Table 45 below.

Table 45: Existing Maximum Excess Cancer Risk and $PM_{2.5}$ Concentrations

	Location	Excess Cancer Risk (per million)	Average Annual PM2.5 Concentration (µg/m3)
Construction	McAllister Street between Divisadero and Pierce streets	39	8.75
● Supplemental Construction	Potrero Avenue between 22nd and 24th Streets	63	9.41
Operation	23rd Street between Utah and Kansas streets	123	11.49

● San Francisco defines air pollution hot spots as areas with an excess cancer risk burden that is greater than 100 per one million population exposed or areas where total $PM_{2.5}$ concentrations exceed 10 µg/m³. While neither McAllister Street between Divisadero and Pierce streets nor Potrero Avenue between 22nd and 24th streets are within an existing air pollution hot spot,[79] 23rd Street between Utah and Kansas streets currently exceeds these health protective standards.

As discussed previously, construction activities do not lend themselves to analysis of long-term health risks because of their temporary and variable nature. As explained in the BAAQMD's *CEQA Air Quality Guidelines*:

> "Due to the variable nature of construction activity, the generation of TAC emissions in most cases would be temporary, especially considering the short amount of time such equipment is typically within an influential distance that would result in the exposure of sensitive receptors to substantial concentrations. Concentrations of mobile-source diesel PM emissions are typically reduced by 70

● [79] While the supplemental maximum construction scenario for the TTRP.9, located on Potrero Avenue between 22nd and 24th streets is not within an air pollution hot spot, it is adjacent to one, which was considered in the analysis.

percent at a distance of approximately 500 feet.[80] In addition, current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 40, and 70 years, which do not correlate well

[80] ARB, *Air Quality and Land Use Handbook: A Community Health Perspective,* April 2005, p. 6. Available online at: http://www.arb.ca.gov/ch/landuse.htm. Accessed February 20, 2013.

> with the temporary and highly variable nature of construction activities. This results in difficulties with producing accurate estimates of health risk."[81]

Therefore, project-level analyses of construction activities have a tendency to produce overestimated assessments of long-term health risks. However, dispersion modeling of health risks associated with construction of the TEP was conducted. As in Table 41, under

- the supplemental maximum construction scenario for the TTRP.9 on Potrero Avenue between 22nd and 24th streets, the proposed project has the potential to result in an excess cancer risk of less than 1.4 and would contribute 0.083 µg/m^3 to annual average $PM_{2.5}$ concentrations during the approximately 67-day construction period only.

- As shown above, neither the maximum construction scenario for the TTRP.5 nor the supplemental maximum construction scenario for the TTRP.9 are located within an air pollution hot spot and would therefore, not have the potential to contribute considerably to any cumulative health risk impact. However, construction activities associated with other improvements would occur in existing air pollution hot spots. For example, TTRP.14 includes a number of construction-related improvements, some of which would occur in existing air pollution hot spots along Mission Street. The highest $PM_{2.5}$ concentrations and excess cancer risk along Mission Street occurs at the intersection of Mission and Fremont streets. At this location, the existing excess cancer risk is 230 per one million persons exposed, with an annual average $PM_{2.5}$ concentration of approximately 10.45 µg/m^3. Under the maximum construction scenario, the proposed TEP has the potential to increase excess lifetime cancer risk by less than one and increase average $PM_{2.5}$ concentrations by 0.053 µg/m^3 during the construction period, anticipated to be no longer than 67 days. Under the supplemental maximum construction scenario, the proposed TEP has the potential to increase excess lifetime cancer risk by 1.4 per one million population and increase average $PM_{2.5}$ concentrations by 0.083 µg/m^3 during the construction period, anticipated to be no longer than 67 days. The BAAQMD considers projects that result in an excess cancer risk of less than 10 per one million persons exposed or an annual average $PM_{2.5}$ concentration of less than 0.3 µg/m^3, to not contribute considerably to cumulatively significant health risks.[82] Therefore, even within air pollution hot spots, TEP-related construction activities would not contribute considerably to existing health risks.

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[81] BAAQMD, *CEQA Air Quality Guidelines*, May 2011, p. 8-6. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

[82] Ibid, pp. D-39 to D-40.

As shown in Table 44, the service changes proposed under the TEP have the greatest potential to increase localized health risks along 23rd Street between Utah and Kansas streets. At this location, the TEP would increase the frequency of buses by 448 buses per day, resulting in an increase in excess cancer risk of 8.5 per one million persons exposed and an annual average $PM_{2.5}$ concentration of 0.014 µg/m^3. These results are conservative because 1) the analysis assumes a lifetime exposure, i.e., a receptor located along the roadway segment evaluated for 70 years when an evaluation of residency duration by OEHHA has shown that from 2006 to 2009, in over 91 percent of California households the residents had lived at their current home address for less than 30 years, and residents in over 63 percent of households had lived at their current residence for 9 years or less[83]; 2) it does not account for reductions in transit vehicle emissions over the next 70 years due to improvements in diesel particulate filter technologies or replacement of diesel-fueled transit vehicles in the future with alternate technologies such as fuel cell or all electric buses; and 3) it does not take into account a potential mode shift from private passenger vehicles to transit as a result of the TEP projects. The majority of the existing health risk at this location is attributable to vehicle emissions from traffic on Highway 101, which contributes to over 90 percent of the existing health risk. Although the proposed TEP would result in an increase in health risk along 23rd Street, this increase would be below levels (excess cancer risk of 10 per one million persons exposed and an annual average $PM_{2.5}$ concentration of 0.3 $\mu g/m^3$) that the BAAQMD considers to contribute considerably to cumulative significant health risks; therefore, the TEP would not result in a cumulatively considerable contribution to cumulative health risk impacts, even within air pollution hot spots. No mitigation measures are necessary.

[83] OEHHA, *Air Toxics Hot Spots Program Risk Assessment Guidelines, Technical Support Document for Exposure Assessment and Stochastic Analysis*, August 2012, p. L-1. Available online at: http://oehha.ca.gov/air/hot_spots/pdf/2012tsd/TOC2012.pdf. Accessed June 4, 2012.

CHAPTER 5: OTHER CEQA ISSUES

5.1 GROWTH INDUCING IMPACTS

As required by Section 15126.2(d) of the *CEQA Guidelines*, an EIR must consider the ways in which the proposed project could directly or indirectly foster economic or population growth, or the construction of additional housing. Growth-inducing impacts can result from the elimination of obstacles to growth; through increased stimulation of economic activity that would, in turn, generate increased employment or demand for housing and public services; or as a result of policies or measures which encourage or do not effectively minimize premature or unplanned growth. Examples of projects likely to have substantial or adverse growth-inducing effects include expansion of infrastructure systems, such as extensions or increased capacity of roadway systems, electrical lines, water and wastewater treatment facilities beyond what is needed to serve current demand in the project vicinity; and development of new residential uses in areas that are currently sparsely developed or undeveloped.

Growth inducing effects of the proposed project would be the same at both the program level and project level, including the project-level Service Variants and TTRP Variants, because the elements of both are sufficiently defined to determine whether they would foster economic or population growth, or encourage construction of new housing. Therefore, the following discussion of growth inducing impacts evaluates both program- and project-level environmental effects of the proposed project in its entirety.

Impact GR-1: Implementation of the Service Policy Framework and the TEP project components would not result in growth inducing impacts. (Less than Significant)

The proposed project would be implemented primarily within the existing public right-of-way and would not extend or improve existing roads, utilities, or other infrastructure besides making improvements to transit facilities within the existing street grid in the City. The following discussion considers how implementation of the proposed project could potentially affect growth in San Francisco and in the region.

Service Policy Framework

The Policy Framework sets forth transit service delivery objectives that include the effective allocation of transit resources, efficient delivery of service, improvement of service reliability and reduction in transit travel time, and improvement in customer service. Adoption of the Policy Framework would not result in direct growth inducing impacts because its adoption would not cause any change to the physical environment. As discussed on pp. 2-19 to 2-23, adoption of the Policy Framework could result in future implementation of similar non-TEP projects. The type and severity of growth-inducing effects of these projects would be expected to be similar to the effects described below for the TEP components. Implementation of the Policy Framework would not induce unplanned population and employment growth or new housing development beyond what has already been anticipated and planned for through 2035 by citywide land use and development projections and the Association of Bay Area Government's (ABAG) regional growth projections. Planned and projected citywide and regional growth would likely occur whether or not the proposed project is implemented and would not be stimulated by access to improved transit service. For these reasons, adoption and implementation of the program-level Policy Framework would not have direct or indirect significant growth-inducing impacts on population growth and the construction of new housing in the City or region.

Service Improvements

The Service Improvements and Service Variants would include changes to transit routes, alteration of existing route alignments, elimination of existing routes or route segments, and introduction of new routes, some of which would operate on City streets that currently do not have any transit service. Implementation of the Service Improvements and Service Variants would not directly or indirectly induce population or employment growth beyond growth that has already been planned for and anticipated within citywide and regional population projections. Population growth in the City through 2035 would occur as planned and forecast irrespective of whether or not the Service Improvements and Service Variants are implemented. While the TEP has the potential to affect the mode by which people travel or the particular Muni routes that they elect to use, it is not anticipated to induce population growth beyond what is expected to occur without the proposed project. Moreover, the TEP is not expected to shift travel patterns in the City in any fundamental way such that growth would occur in neighborhoods where growth has not otherwise already been anticipated, and the TEP would not encourage construction of new housing beyond development already planned for in the Planning Department's growth, land use and development projections. While the Service Improvements would result in an increase of up to 350,000 annual service hours, this increase would represent approximately 10 percent of the total transit service hours provided by SFMTA and as such, would not materially alter the City’s transit service.[1] Based on the discussion above, the project-level Service Improvements and Service Variants would not result in significant indirect or direct growth-inducing impacts related to population growth, or the construction of new housing in the City or region.

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[1] Email communication between Viktoriya Wise of San Francisco Planning Department and Grahm Satterwhite of SFMTA, May 29, 2013. A copy of this document is available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File 2011.0558E.

Service-related Capital Improvements

The program- and project-level Service-related Capital Improvements would include the installation of new and extended overhead electrical wires and related infrastructure, terminal and transfer point improvements, and systemwide capital infrastructure improvements such as accessible platforms and the extension of a contraflow commercial-transit-only lane. Overall, these physical improvements would infill and enhance the existing Muni infrastructure to support implementation of proposed Service Improvements and Service Variants, and improve transit service reliability and effectiveness on the TTRP corridors. As such, these improvements by themselves would not result in direct or indirect growth inducing effects related to population growth, and would not encourage development of new housing. For these reasons, implementation of the proposed Service-related Capital Improvements would not have significant growth inducing effects in the City or the region.

Transit Preferential Streets (TPS) Toolkit and TTRPs

Detailed designs for the project-level TTRPs were developed by the SFMTA utilizing the TPS Toolkit elements. In addition, a combination of the TPS Toolkit elements would be applied along the program-level TTRP Rapid Network corridors included in the TEP. The TTRPs are intended to improve reliability and reduce travel time and support the TTRP routes as transit priority corridors. The TPS Toolkit elements would involve physical roadway changes that include: transit stop changes, lane modifications, parking and turn restrictions, traffic signal and stop sign changes, and pedestrian improvements. These physical improvements are already being implemented by the SFMTA throughout the Muni system to support existing transit service.

Implementation of the TPS Toolkit elements on the proposed TTRP corridors would not have direct growth inducing impacts because the proposed TPS Toolkit elements would not extend or materially increase the capacity of the existing surface roadway network or the transit system. Implementation of the TPS Toolkit elements would not directly result in population or employment growth, or the development of new housing and other uses. Potential economic and population growth on the TTRP corridors have been anticipated and planned through 2035 by the City in its growth, land use and development projections and by ABAG in its regional growth projections. As such, physical improvements to improve reliability and reduce transit travel time on the TTRP corridors would not induce unplanned population and employment growth, and would not encourage development of new housing beyond what has already been accounted and planned for in Citywide and regional growth projections. For the reasons cited above, implementation of the TPS Toolkit elements on the TTRP corridors would not have significant growth inducing effects.

Conclusion

Implementation of the entirety of the TEP would result in an estimated 150 to 200 new SFMTA employees (refer to the Initial Study, Population and Housing pp. 198-199 in Appendix 2 to the EIR, provided on the Appendix CD that accompanies the EIR). This incremental increase in new employees would not induce substantial growth or increase demand for housing beyond that already accounted for within projected employment and housing growth in the City and region.

In conclusion, and for the reasons articulated above, the Policy Framework and TEP components would not have indirect or direct significant growth inducing effects, and no mitigation measures are necessary.

5.2 SIGNIFICANT UNAVOIDABLE IMPACTS

In accordance with Section 21067 of CEQA and with Sections 15126(b) and 15126.2(b) of the *CEQA Guidelines*, the purpose of this section is to identify significant environmental impacts that could not be eliminated or reduced to less-than-significant levels through implementation of mitigation measures included as part of the proposed project, or by other mitigation measures that could be implemented, as identified in Chapter 4, Environmental Setting, Impacts, and Mitigation. This section is subject to final determination by the San Francisco Planning Commission as part of the CEQA findings for this EIR. If necessary, this chapter will be revised in the Final EIR to reflect the findings of the Planning Commission.

Construction

As previously stated, the Policy Framework would not result in direct physical changes to the environment, including those related to construction. The construction impacts of the TEP components are representative of the type and scope of the construction effects that may indirectly result from implementation of the Policy Framework. The TEP is a program of proposed project components. All components would require varying amounts of construction to implement them. The Service Improvements or Service Variants would only require minor construction such as curb ramp changes, striping, and signage that may be associated with new transit zones and route terminus locations. The Service-related Capital Improvements and the program-level and project-level TTRPs would require construction activities as follows. Construction of the Service-related Capital Improvements would include a combination of the following elements, as specified in the respective descriptions of the projects: curb and sidewalk changes, the application and removal of pavement markings, the installation or removal of parking meters and signs, the installation of overhead wire support poles and wires and underground duct banks, the installation of traffic signals and related signal control equipment, the installation of new bypass rails and switches, and the installation and relocation of curb ramps and associated utilities. The construction activities for implementation of TTRPs would include curb and sidewalk changes; the application and removal of pavement markings (paint); the installation or removal of parking meters and signs; the installation of traffic signal poles, both with and without mast arms, with associated signal control equipment, stop signs, and traffic calming measures at intersections; the installation of pedestrian light poles; and the installation or relocation of curb ramps and the potential relocation of other utility infrastructure. As discussed in this EIR, these construction activities would not result in any significant and unavoidable impacts on transportation and circulation, noise and vibration, and air quality due to the temporary duration, nature and the scope of the proposed improvements.

Operation

Similarly, operational impacts of the TEP project components are representative of the type and scope of the operational effects that may result indirectly from implementation of the Policy Framework. The Service-related Capital Improvements, consisting of the Terminal and Transfer Point Improvements (TTPI), Overhead Wire Expansion projects (OWE), and Systemwide Capital Infrastructure (SCI), would be needed to support some of the proposed Service Improvements or Service Variants. The Service-related Capital Improvements alone would not result in any operational impacts because they would not include any ongoing operational activities (such as mechanical components), nor would they result in substantial changes to transit operations by themselves but are proposed to support the Service Improvements or Service Variants. Therefore, there would be no significant and unavoidable operational impacts on transportation and circulation, noise and vibration, and air quality resulting from the Service-related Capital Improvement projects.

The goal of the TTRPs is to reduce transit travel time and increase transit reliability by introducing traffic engineering changes to prioritize transit operations along the Rapid Network corridors. The operational impacts with respect to transit related to the TTRPs would be reflected in the impacts of the Service Improvements or Service Variants once the corridors have been modified to prioritize transit operations. The changes in the public right-of-way as a result of the TTRPs may result in operational impacts with respect to traffic, commercial loading and parking.

With respect to project operations, under Existing plus Project for either project alternative there would be commercial loading impacts. In addition, under Existing plus TTRP Expanded Alternative, there would be significant and unavoidable traffic impacts. Under 2035 Cumulative plus project conditions, implementation of the project- and program-level TTRPs would result in significant and unavoidable operational impacts related to transit, traffic, commercial loading and parking. These impacts are listed in detail below.

There would be no significant and unavoidable noise and vibration or air quality impacts from either construction or operation of the Policy Framework or the TEP components.

The following is a list of significant and unavoidable transportation and circulation impacts identified in this EIR.

TRANSPORTATION AND CIRCULATION

Transit

The TEP components and Policy Framework would not result in project-specific significant impacts on transit in the Existing plus Project scenario. (Impact TR-2) However, the following significant and unavoidable impacts on transit under 2035 Cumulative conditions (TEP project plus other non-TEP growth anticipated in 2035) were identified:

- The Service Improvements or Service Variants would contribute considerably to a significant 2035 Cumulative transit impact from an exceedance of Muni's capacity utilization standard on the Mission corridor within the Southeast screenline of the Downtown screenlines, even with implementation of **Mitigation Measure M-C-TR-1, SFMTA Monitoring of Muni Service**, because implementation of this mitigation measure is uncertain. (Impact C-TR-1)
- The Service Improvements or Service Variants in combination with the TTRP Moderate Alternative would contribute considerably to a significant 2035 Cumulative transit impact from the exceedances of Muni's capacity utilization standard on the Fulton/Hayes corridor within the Northwest screenline and on the Mission corridor within the Southeast screenline of the Downtown screenlines, even with implementation of Mitigation Measure M-C-TR-1. (Impact C-TR-2)
- The Service Improvements or Service Variants in combination with the TTRP Expanded Alternative would contribute considerably to a significant 2035 Cumulative transit impact from the exceedances of Muni's capacity utilization standard on the Fulton/Hayes corridor within the Northwest screenline and on the Mission corridor within the Southeast screenline of the Downtown screenlines, even with implementation of Mitigation Measure M-C-TR-1. (Impact C-TR-3)

Traffic

The Policy Framework could indirectly result in significant and unavoidable traffic impacts that may not have feasible mitigation measures if future projects designed to carry out its objectives and actions include TPS Toolkit elements, such as transit-only lanes, lane reductions, parking restrictions or sidewalk widening, that would reduce vehicle capacity and may reduce level of service at intersections to unacceptable levels or cause substantial reductions in volume to capacity (v/c) ratios at intersections already operating at LOS E or F. (Impact TR-3 and Impact TR-8)

Similarly, implementation of elements in the Lane Modifications and Pedestrian Improvements TPS Toolkit categories along program-level TTRP corridors may remove travel lanes, which could result in significant and unavoidable traffic impacts on roadway segments and intersections currently operating at capacity. (Impact TR-14) **Mitigation Measure M-TR-8: Optimization of Intersection Operations**, may not be adequate to mitigate these impacts on intersection service levels to less-than-significant levels at every location. Therefore, the program-level analysis identified these traffic impacts as significant and unavoidable. The following is a list of the intersections along the program-level TTRP corridors where these significant and unavoidable traffic impacts may occur:

- TTRP.1: California Street and Arguello Boulevard; California Street and Park Presidio Boulevard; California and Cherry streets; California and Locust streets; California Street and Presidio Avenue; and California and Divisadero streets.
- TTRP.9: Potrero Avenue and Division Street; Potrero Avenue and 16th Street; Potrero Avenue and 17th Street; Potrero Avenue and 21st Street; Potrero Avenue and 23rd Street; Potrero Avenue and 24th Street; Potrero Avenue and 25th Street; Jerrold Avenue and Bayshore Boulevard at the U.S. 101 Northbound on-ramp; Bayshore Boulevard and Oakdale Avenue; Bayshore Boulevard and Industrial Street; and Bayshore Boulevard and Silver Avenue.
- TTRP.22_2: Fillmore and Lombard streets.
- TTRP.71: Haight Street and Masonic Avenue; Stanyan and Haight streets; and Stanyan and Frederick streets.
- TTRP.K: Ocean Avenue and Junipero Serrra Boulevard; Ocean Avenue, Geneva Avenue and Phelan Avenue; Ocean and Lee avenues, Ocean and Miramar avenues; and Ocean and Brighton avenues.
- TTRP.L: Taraval Street and 19th Avenue, and Taraval Street and Sunset Boulevard.

Implementation of the TTRP Moderate Alternative, including any of the individual Moderate Alternative proposals for eight project-level TTRPs, in combination with Service Improvements, would not result in significant and unavoidable impacts to traffic operations at any of the 70 study intersections.

Implementation of the project-level TTRP Expanded Alternative in combination with the Service Improvements would result in significant and unavoidable traffic impacts at the following five study intersections under Existing plus TTRP Expanded Alternative conditions:

- Randall Street/San Jose Avenue – from implementation of the TTRP.14 Expanded Alternative. (Impact TR-24)

- 16th Street/Bryant Street – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.2_1 Expanded Alternative Variant 2, even with implementation of Mitigation Measure M-TR-26, Intersection Restriping at 16th and Bryant streets. (Impact TR-26, Impact TR-30, and Impact TR-34)

- 16th Street/Potrero Avenue – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.2_1 Expanded Alternative Variant 2. (Impact TR-27, Impact TR-31, and Impact TR-35)

- 16th Street/Seventh Street – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.2_1 Expanded Alternative Variant 2. (Impact TR-28, Impact TR-32, and Impact TR-36)

- Columbus Avenue/Green Street/Stockton Street – from implementation of the TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, or TTRP.30_1 Expanded Alternative Variant 2. (Impact TR-38, Impact TR-40, and Impact TR-42)

Implementation of the Policy Framework and TPS Toolkit elements in the Lane Modifications and Pedestrian Improvements categories along program-level TTRP corridors, may result in significant and unavoidable 2035 Cumulative impacts on traffic operations at some intersections under the 2035 Cumulative plus Service Improvements and the TTRP Moderate Alternative conditions (Impact C-TR-7) or under the 2035 Cumulative plus Service Improvements and the TTRP Expanded Alternative conditions (Impact C-TR-9). These significant and unavoidable 2035 Cumulative traffic impacts could occur at intersections along program-level TTRP corridors as identified in the Existing Conditions discussion above.

Implementation of the Service Improvements and the TTRP Expanded Alternative would result in significant and unavoidable 2035 Cumulative impacts at the same five study intersections identified for Existing plus Service Improvements and TTRP Expanded Alternative conditions discussed above, and would also result in significant and unavoidable 2035 Cumulative impacts at eight additional intersections. Specifically, implementation of the Service Improvements and TTRP Expanded Alternative proposals under 2035 Cumulative conditions would result in the following significant and unavoidable traffic impacts:

- Market Street/Church Street/14th Street – from implementation of the TTRP.J Expanded Alternative. (Impact C-TR-13.)

- Fulton Street/Masonic Avenue Street – from implementation of the TTRP.5 Expanded Alternative. (Impact C-TR-14.)
- Geneva Avenue/Carter Street – from implementation of the TTRP.8X Expanded Alternative. (Impact C-TR-15.)
- Geneva Avenue/Moscow Street – from implementation of the TTRP.8X Expanded Alternative. (Impact C-TR-16.)
- Randall Street/San Jose Avenue – from implementation of the TTRP.14 Expanded Alternative. (Impact C-TR-17.)
- Mission Street/Fifth Street – from implementation of the TTRP.14 Expanded Alternative. (Impact C-TR-18.)
- Mission Street/16th Street – from implementation of the TTRP.14 Expanded Alternative. (Impact C-TR-19.)
- 16th Street/Bryant Street – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.2_1 Expanded Alternative Variant 2, even with implementation of Mitigation Measure M-TR-26. (Impact C-TR-20, Impact C-TR-21, and Impact C-TR-22.)
- 16th Street/Potrero Avenue – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.2_1 Expanded Alternative Variant 2. (Impact C-TR-23, Impact C-TR-24, and Impact C-TR-25.)
- 16th Street/Owens Street – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.2_1 Expanded Alternative Variant 2. (Impact C-TR-26, Impact C-TR-27, and Impact C-TR-28.)
- 16th Street/Fourth Street – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.2_1 Expanded Alternative Variant 2. (Impact C-TR-29, Impact C-TR-30, and Impact C-TR-31.)
- 16th Street/Seventh Street – from implementation of the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1, or TTRP.2_1 Expanded Alternative Variant 2. (Impact C-TR-32, Impact C-TR-33, and Impact C-TR-34.)
- Columbus Avenue/Green Street/Stockton Street – from implementation of the TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, or TTRP.30_1 Expanded Alternative Variant 2. (Impact C-TR-35, Impact C-TR-36, and Impact C-TR-37.)

Loading

Implementation of some of the TPS Toolkit elements in both the TTRP Moderate and Expanded Alternatives would reduce the supply of on-street commercial loading. The relocation of a sufficient number of commercial loading spaces within a reasonable distance of businesses requiring their use would not be feasible on some street segments. The loss of commercial loading zones could result in double parking that may create potentially hazardous conditions, and that could result in delay that would interfere with traffic and transit travel, bicycles, and pedestrians; this could result in significant and unavoidable loading impacts in some locations.

Insofar as implementation of objectives and actions of the Policy Framework would indirectly result in the installation of TPS Toolkit elements that remove a substantial amount of on-street commercial loading spaces, the Policy Framework would cause significant and unavoidable loading impacts similar to those identified for the project-specific TTRPs. (Impact TR-5 and Impact TR-10) Similarly, implementation of TPS Toolkit elements in the Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements categories along program-level TTRP corridors may substantially reduce the on-street commercial loading supply, which could result in significant and unavoidable impacts related to loading if the existing loading demand could not be accommodated and substantial double parking occurred. (Impact TR-16) **Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces**, could relocate a sufficient number of commercial loading spaces within a reasonable distance, but may not be feasible in every location. In addition, while implementation of **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, to enforce parking regulations in transit-only lanes through the use of video cameras on transit vehicles and/ or other parking enforcement activities, could reduce the impact on transit and traffic operations related to the loss of commercial loading spaces, the effectiveness of this measure is not assured, and the implementation of video equipment is dependent on annual budget appropriations. Therefore, the program-level analysis identified these impacts as significant and unavoidable.

Significant and unavoidable loading impacts would result from implementation of the following project-level TTRPs under Existing plus Project conditions:

- TTRP.14 Moderate Alternative Variant 1 would result in a net loss of 33 commercial loading spaces along Mission Street (implementation of Mitigation Measure M-TR-48 is uncertain, and therefore this impact is identified as significant and unavoidable). (Impact TR-48)
- TTRP.14 Moderate Alternative Variant 2 would result in a net loss of 27 commercial loading spaces along Mission Street (implementation of Mitigation Measure M-TR-48

is uncertain, and therefore this impact is identified as significant and unavoidable). (Impact TR-49)

- TTRP.14 Expanded Alternative would result in a net loss of 11 commercial loading spaces along Mission Street (implementation of Mitigation Measure M-TR-48 is uncertain, and therefore this impact is identified as significant and unavoidable). (Impact TR-50)
- TTRP.30_1 Moderate Alternative would result in a net loss of six commercial loading spaces along Stockton Street (implementation of Mitigation Measure M-TR-48 is uncertain, and therefore this impact is identified as significant and unavoidable). (Impact TR-51)
- TTRP.30_1 Expanded Alternative would result in a net loss of six commercial loading spaces along Stockton Street (implementation of Mitigation Measure M-TR-48 is uncertain, and therefore this impact is identified as significant and unavoidable). (Impact TR-52)
- TTRP.30_1 Expanded Alternative Variant 1 would result in a net loss of six commercial loading spaces along Stockton Street (implementation of Mitigation Measure M-TR-48 is uncertain, and therefore this impact is identified as significant and unavoidable). (Impact TR-53)
- TTRP.30_1 Expanded Alternative Variant 2 would result in a net loss of eight commercial loading spaces along Stockton Street (implementation of Mitigation Measure M-TR-48 is uncertain, and therefore this impact is identified as significant and unavoidable). (Impact TR-54)

Implementation of objectives and actions of the Policy Framework, and TPS Toolkit categories of Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements applied to program-level TTRPs could contribute to reductions in on-street commercial loading supply in the future, and therefore, could result in significant cumulative loading impacts along some corridors under 2035 Cumulative conditions. Implementation of **Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces**, may reduce the impact on loading spaces; however, the feasibility of providing replacement loading spaces within 250 feet is unknown. Therefore, the impact of the Policy Framework and program-level TTRPs is identified as significant and unavoidable under 2035 Cumulative conditions. (Impact C-TR-43)

Some of the project-level TTRPs that would result in project-specific loading impacts would also result in significant 2035 Cumulative impacts on loading that may create potentially hazardous conditions or substantial amounts of delay. Significant and unavoidable cumulative loading impacts would result from implementation of the following project-level TTRPs under 2035 Cumulative conditions:

- TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, and TTRP.30_1 Moderate Alternative would result in a reduction in on-street loading on Mission and Stockton streets that would be an impact under cumulative conditions, and the effectiveness of implementation of Mitigation Measure M-TR-48 is uncertain. Therefore, this impact is identified as significant and unavoidable. (Impact C-TR-44)
- TTRP.14 Expanded Alternative, TTRP.30_1 Expanded Alternative, TTRP.30_1 Expanded Alternative Variant 1, and TTRP.30_1 Expanded Alternative Variant 2 would result in a reduction in on-street loading on Mission and Stockton streets that would be an impact under cumulative conditions, and the effectiveness of implementation of Mitigation Measure M-TR-48 is uncertain. Therefore, this impact is identified as significant and unavoidable. (Impact C-TR-45)

Parking

Implementation of some Policy Framework objectives and actions, and Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements elements of the TPS Toolkit could result in a substantial loss of on-street parking. In combination with future development along the affected corridors, the substantial parking loss has the potential to create hazardous conditions and/or delays to other modes of transportation such as transit. Therefore, it could contribute to significant cumulative parking impacts along certain corridors. The effectiveness of **Mitigation Measure M-C-TR-49: Explore Implementation of Parking Management Strategies** is uncertain. Therefore, implementation of some Policy Framework objectives and actions, and Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements elements of the TPS Toolkit could result in significant and unavoidable cumulative parking impacts, even with (Impact C-TR-49).

Some of the project-level TTRPs would result in a substantial loss of on-street parking. In combination with future development, the substantial parking loss has the potential to create hazardous conditions and/or delays to other modes of transportation such as transit. Therefore, it would contribute to significant cumulative parking impacts along certain corridors as described below. Significant and unavoidable cumulative parking impacts would result from implementation of the following project-level TTRPs under 2035 Cumulative conditions:

- TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 would result in a substantial reduction in on-street parking on Mission Street between 13th and Cesar Chavez streets. This substantial parking loss has the potential to be exacerbated as a result of future development along this segment of the corridor and thus, create hazardous conditions and/or delays to other modes of transportation such as transit. Therefore, implementation of the above-listed TTRPs would result in a significant parking impact under cumulative conditions. The effectiveness of **Mitigation Measure M-C-TR-49: Explore Implementation of Parking Management Strategies** is uncertain. Therefore, this impact is identified as significant and unavoidable, even with mitigation. (Impact C-TR-52)

- Under the TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2 parking loss along the 16th Street corridor would be substantial and, in combination with future development, would contribute to significant cumulative parking impacts along the 16th Street corridor. This substantial parking loss has the potential to be exacerbated as a result of future development along this segment of the corridor and thus, create hazardous conditions and/or delays to other modes of transportation such as transit. Therefore, implementation of the above-listed TTRPs would result in a significant parking impact under cumulative conditions. The effectiveness of **Mitigation Measure M-C-TR-49: Explore Implementation of Parking Management Strategies** is uncertain. Therefore, this impact is identified as significant and unavoidable, even with mitigation. (Impact C-TR-54)

5.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

In accordance with Section 21100(b)(2)(B) of CEQA, and Section 15126.2(c) of the *CEQA Guidelines*, an EIR must identify any significant irreversible environmental changes that would be caused by implementation of a proposed project that includes the adoption, enactment or amendment of a plan, policy, or ordinance of a public agency. Significant irreversible changes may include (1) uses of nonrenewable resources during the initial and continued phases of the project that may be considered to be irreversible since a large commitment of such resources makes removal or non-use unlikely in the reasonably foreseeable future, (2) primary impacts and/or secondary impacts that commit future generations to similar uses, and (3) project-related accidents that cause irreversible environmental damage. According to the *CEQA Guidelines*, irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

USE OF NON-RENEWABLE RESOURCES

Implementation of the TEP project components would result in the irreversible commitment of non-renewable energy resources from the use of construction vehicles and equipment for construction of curb ramps for the Service Improvements and Service Variants, construction of the Service-related Capital Improvements, and construction of TPS Toolkit elements, such as transit bulbs or pedestrian refuge islands, for the TTRPs. Haul trucks, trucks delivering supplies to the various construction sites, and construction worker vehicle trips would also contribute to the consumption of non-renewable resources. The increase in Muni service hours related to the implementation of the Service Improvements and Service Variants would not result in an increase in the use of non-renewable energy resources as biodiesel motor coaches use renewable fuel. In addition, the SFMTA would continue to use electric trolleys powered by hydro-electric power. With implementation of the TEP up to 60 new transit vehicles would be needed for Muni's fleet, which currently consists of 420 diesel-powered motor coaches (using B20 biodiesel), 86 diesel hybrid-electric motor coaches, 313 electric-powered trolley coaches, and 151 electric-powered LRVs. As discussed on pp. 337-339 in the Initial Study (see Appendix 2) under Mineral and Energy Resources, all new transit vehicles purchased as a result of the TEP would be diesel hybrid-electric coaches compatible with biodiesel fuel, a renewable energy resource. An increase in fleet service hours would not result in an increase in the use of nonrenewable energy resources as the other non-diesel transit vehicles in the Muni fleet operate using renewable electricity.[2] Thus, the proposed project would result in a limited increase in the use of non-renewable energy resources. Other non-renewable or slowly renewable resources that would be consumed during demolition and construction activities would include, but are not limited to, concrete, sand and gravel, asphalt, masonry, metals, and water.

As discussed on pp. 337-339 in the Initial Study (see Appendix 2) under Mineral and Energy Resources, the proposed TEP would not use energy in a wasteful, inefficient, or unnecessary manner. Furthermore, as discussed in the Initial Study under Greenhouse Gas Emissions, pp. 249-250, Table 10, the proposed TEP would comply with the energy efficiency requirements detailed in the City's "Healthy Air and Clean Transportation Ordinance" and "Biodiesel for Municipal Fleets" executive directive. Therefore, with implementation of the TEP, construction activities and future Muni operations would increase the consumption of non-renewable resources but would not involve a large commitment of non-renewable resources relative to supply, nor would it consume any of those resources wastefully.

CHANGES THAT COMMIT FUTURE GENERATIONS TO SIMILAR USES

The TEP is a citywide project; implementation of the Service Improvements and Service Variants, the Service-related Capital Improvements, and the transit TTRPs and TTRP Variants would improve transit service and reliability throughout San Francisco. Implementation of the Service improvements and/or Service Variants, Service-related Capital Improvements and TTRPs and TTRP Variants would require changes to the City public rights-of-way (streets). Although not irreversible, the effects of these improvements would be difficult to change in the short-run. However, these changes would not change the use of the

[2] Muni's trolley coaches and LRVs are powered by renewable hydroelectric power provided by the San Francisco Public Utilities' Hetch Hetchy System.

right-of-way for public travel. Since the TEP is not a land use project it would not commit future generations to a particular land use or set of land uses now or in the future.

IRREVERSIBLE DAMAGE FROM ENVIRONMENTAL ACCIDENTS

No significant irreversible environmental damage, such as an accidental spill or explosion of hazardous materials, would be expected to occur with implementation of the proposed TEP. Compliance with federal, state and local regulations related to use, storage and disposal of hazardous materials, as identified in the Initial Study under Hazards and Hazardous Materials, pp. 324-329, and implementation of **Mitigation Measured M-HZ-1, Hazardous Materials Soil Testing** (see Initial Study pp. 327-328) would reduce the possibility that hazardous substances used during construction activities as well as for continued Muni operations would cause significant and irreversible environmental damage.

CONCLUSION

Therefore, although irreversible environmental changes would result from implementation of the TEP, these changes are determined to be less than significant.

5.4 AREAS OF KNOWN CONTROVERSY AND ISSUES TO BE RESOLVED

Two public comment periods have been provided for the TEP during the CEQA environmental review process to date: a Notice of Preparation of an Environmental Impact Report and Notice of public scoping meetings in November and December 2011 (NOP), and an Initial Study (IS) circulated for public comment in January and February 2013. In addition, the SFMTA held numerous public meetings regarding draft TEP recommendations in 2008, and again in 2011/2012 regarding an updated set of TEP recommendations in the draft *TEP Implementation Strategy* published in April 2011. Many of the comments received both during public information meetings and during the CEQA process related to the merits of the proposed project and either support for or opposition to proposed components of the TEP. These are not issues concerning environmental impacts of the proposed project.

There are no areas of known controversy regarding physical environmental issues related to the TEP based on public comments received during the two CEQA-related public comment periods.[3] Public concerns related to relocation and removal of transit stops as part of stop

[3] San Francisco Planning Department, *TEP NOP Public Scoping Report – Written Comments and TEP NOP Public Scoping Report – Oral Comments*, September 27, 2012; and *TEP Initial Study Public Scoping Report*, July 8, 2013. Copies of these reports are available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2011.0558E.

consolidation, and elimination of specific routes and rerouting of others were raised in many of the public comments. Others made similar comments regarding accessibility of transit service for senior and disabled riders who may need to travel further to access a transit stop. A subset of comments focused on current and future transit service in the Rincon Hill/South of Market/Mission Bay areas. Many comments made very specific suggestions related to the Muni routes that that are located in their area of the City and expressed either support for or opposition to route changes and/or stop consolidations. While these issues are not physical environmental issues, they raise project-specific issues that decision makers will need to consider as part of their actions on the proposed project.

Physical environmental issues related to aesthetics of various transit facilities and the potential for impacts on archeological resources were covered in the Initial Study (see Appendix 2 to this EIR) and no new issues were raised about these or other topics fully addressed in the Initial Study during the Initial Study public comment period. There were no specific comments on the adequacy of the analysis of environmental topics addressed in the Initial Study.

Issues related to both beneficial and adverse air quality and transportation impacts with implementation of the proposed project were raised during the public scoping and Initial Study public comment periods. Concerns raised were additional air emissions due to increased operation of private passenger vehicles as a result of lack of service in the Rincon Hill and South of Market areas, loss of on-street parking and commercial loading zones on commercial streets such as Stockton, 16th, and Mission streets, effects on regional transit, and pedestrian safety. Potentially significant environmental impacts in the areas of air quality and transportation are addressed in this Draft EIR. Appropriate mitigation measures have been identified for significant impacts. Decision makers will be required to decide whether mitigation measures are feasible to implement, and whether to require that they be implemented. Some comments suggested alternative scenarios for one or more components of the TEP, such as providing a center-running transit-only lane for the 14 Mission corridor. As explained in Chapter 6, Alternatives, the EIR analyzes at an equal level of detail a range of feasible options for the Travel Time Reduction Proposals – the TTRP Moderate Alternative and the TTRP Expanded Alternative for each of the eight project-level TTRPs – that decision makers will need to choose from as individual projects are brought forward for implementation.

CHAPTER 6: ALTERNATIVES

6.1 INTRODUCTION

CEQA Guidelines § 15126.6(a) requires that an EIR evaluate "a range of reasonable alternatives to the project, or the location of the project, which would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects, and evaluate the comparative merits of the alternatives." An EIR need not consider every conceivable alternative to a proposed project. Rather, it must consider a range of potentially feasible alternatives governed by the "rule of reason" in order to foster informed decision-making and public participation (*CEQA Guidelines* § 15126.6(f)).

CEQA Guidelines §§ 15126.6(f)(1) and (f)(3) state that "among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries," and that an EIR "need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative." The final determination of feasibility will be made by project decision-makers based on substantial evidence in the record, which includes, but is not limited to, information presented in the EIR and its Notice of Preparation and Initial Study provided in Appendices 1 and 2 to the EIR (found on the Appendix CD), comments received on the Draft EIR, and responses to those comments.

A No Project Alternative is required by *CEQA Guidelines* § 15126.6 (e) to be included in the discussion of alternatives to the proposed project. Alternative A, No Project Alternative, is presented and evaluated in Section 6.2 in this chapter.

The TEP EIR does not contain the traditional alternatives analysis in a separate chapter with a comparison to the project sponsor's preferred project, the "proposed project." Rather, the TEP brackets a range of feasible options that would accomplish the project sponsor's objectives. The options are the TTRP Moderate Alternative and TTRP Expanded Alternative. Both the TTRP Moderate Alternative and the TTRP Expanded Alternative are described in Chapter 2: Project Description and are analyzed in equal detail in this EIR's Chapter 4: Environmental Setting, Impacts and Mitigation and in the Initial Study. In addition, the two alternatives are discussed as Alternatives B and C in Sections 6.3 and 6.4 of this chapter. The difference between these two alternatives is that the TTRP Expanded Alternative is comprised of TPS Toolkit elements that may have a greater potential to trigger physical environmental impacts as a result of the changes they would create in the topic area of transportation and circulation, whereas the TTRP Moderate Alternative is expected to have fewer physical environmental effects due to the nature of the TPS Toolkit elements chosen. Specifically, the TTRP Moderate Alternative does not include implementation of as many roadway capacity-reducing TPS Toolkit elements that result in significant traffic impacts at various intersections throughout the City. The TTRP Expanded Alternative, on the other hand, would implement elements of the TPS Toolkit, such as transit-only lanes, that would constrain the roadway and consequently result in significant and unavoidable traffic impacts. Therefore, the TTRP Moderate Alternative meets the requirements of CEQA to analyze an option that meets most of the basic project objectives but avoids or substantially reduces one or more of the significant impacts identified in an EIR. The Policy Framework would be adopted under either of the proposed project alternatives. In addition, both alternatives would include the proposed Service Improvements and Service Variants and the Service-related Capital Improvements.[1]

Information used in the discussion of Alternatives in Sections 6.3 and 6.4 in this chapter is taken from Chapter 4, Environmental Setting, Impacts, and Mitigation, as well as from the Initial Study in Appendix 2. Both alternatives will be considered equally by the decision-makers during the project approval process. Decision-makers may not necessarily adopt either the TTRP Moderate Alternative or the TTRP Expanded Alternative in its entirety. The SFMTA Board of Directors may consider approval of the TTRP Moderate Alternative improvements on some of the TTRP corridors, while approving the improvements included in the TTRP Expanded Alternative for the other corridors. Alternatively, a combination of TPS Toolkit elements from both alternatives (Moderate and Expanded) may be implemented on certain corridors. The two alternatives analyzed in this EIR's Chapter 4: Environmental Setting, Impacts and Mitigation provide a range, or bracket, the potential impacts of implementing only one or the other alternative and, thus, considered together, provide a reasonable range of alternatives. If a combination of elements from both alternatives were to be adopted, the resulting physical environmental impacts with respect to transportation and circulation would be less than those of implementing the TTRP Expanded Alternative in its entirety. As described below, neither the TTRP Moderate Alternative nor the TTRP Expanded Alternative would result in significant air quality or noise and vibration impacts. Noise and vibration impacts would be the same under both alternatives. While air quality impacts resulting from the two proposed project alternatives would be similar, there are differences, as discussed below. Nonetheless, if a combination of elements from both alternatives were to be adopted, the resulting physical environmental impacts with respect to air quality would be less than significant.

[1] While the specific service plan outlined in Table 8 of the Project Description is based on current conditions and best available information, the SFMTA would likely need to make minor adjustments in the service plan prior to implementation, but would stay within the maximum 350,000 additional annual service hours.

In Section 6.5 the environmentally superior alternative is identified from among the alternatives analyzed. The environmentally superior alternative is the alternative that would result in the least adverse effects on the environment. Section 6.6 presents alternatives that were considered by the SFMTA, but were not carried forward for detailed evaluation, and the reasons that they were rejected from further consideration.

6.2 ALTERNATIVE A, NO PROJECT ALTERNATIVE

CEQA Guidelines § 15126.6(e) requires that, among the project alternatives, a "no project" alternative be evaluated. *CEQA Guidelines* § 15126.6(e)(2) requires that the no project alternative analysis "discuss the existing conditions…as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and policies and consistent with the available infrastructure and community services." The No Project Alternative is included in the EIR to provide a comparison of the environmental impacts from the proposed project, in this case the proposed project alternatives, with those that would occur if neither one of the project alternatives is approved.

DESCRIPTION

Under the No Project Alternative, the SFMTA Board of Directors would not adopt the Policy Framework or the comprehensive program of TEP transit improvements. The SFMTA would not implement the service changes included in the Service Improvements component (including any Service Variants), the Service-related Capital Improvements required to implement the Service Improvements, or the construction of the TTRPs, consisting of TPS Toolkit elements applied along the identified Rapid Network corridors.

Some transit corridor improvements have already received, or are in the process of undergoing independent environmental review, apart from the Policy Framework and TEP analyzed here. If approved by the SFMTA Board, these improvement projects would be implemented regardless of whether the proposed Policy Framework and the TEP are approved. They include:

- 22 Fillmore extension along 16th Street to the Mission Bay area on Third Street and Mission Bay Commons North and South (one of the Service Improvements and OWE.5 Overhead Wire Extension to Mission Bay), analyzed in the Mission Bay Subsequent EIR.

- M Ocean View rerouting into Parkmerced (one of the Service Improvements) analyzed in the Parkmerced Project EIR.

In addition, an EIR/EIS is being prepared by the San Francisco County Transportation Authority for each of two planned bus rapid transit (BRT) projects, one on Geary Boulevard and the other on Van Ness Avenue that will be used by decision-makers during their consideration of whether to approve those two projects.

The SFMTA regularly monitors performance of the City's transit system and routinely makes adjustments to improve service when funding and other resources are available. This process would continue under the No Project Alternative. For example, the SFMTA would continue to make service changes to individual routes based on ridership information for that route. The SFMTA would continue to construct transit bulbs, accessible boarding islands, and other TPS Toolkit elements, as it does now, at locations where transit usage information indicates that these features are needed. However, without adoption of the TEP, these physical changes would not be made as part of a scheduled program for most of the Rapid Network or as part of a comprehensive systemwide program of improvements, as is proposed under the TEP project, and, therefore, would not meet any of the project objectives identified in Chapter 2, Project Description, Section 2.4.

Pedestrian improvements would continue to be constructed on a location-by-location basis, as occurs now, when the need is identified and budget and resources are available. Pedestrian improvements could be installed as part of existing City programs such as San Francisco's Great Streets Program implemented by the Department of Public Works (DPW), the SFMTA's Sustainable Streets program (a division implementing part of the City's interdepartmental Better Streets Plan), or other similar efforts. However, these pedestrian improvements would not likely be completed as part of a comprehensive corridor design to improve access to transit, as planned under the TEP. As a result, none of the SFMTA's objectives regarding the provision of enhanced transit service identified in Chapter 2 would be met.

ENVIRONMENTAL ANALYSIS

The impacts identified in the Initial Study (in Appendix 2 to the EIR) and in the EIR in Chapter 4, Environmental Setting, Impacts, and Mitigation, would not occur under the No Project Alternative, and some of the mitigation measures identified in the Initial Study (see Table S.2 in the Summary) and in Chapter 4 would not be necessary with this alternative. However, as stated above, some components or aspects of the TEP may be implemented under the No Project Alternative as part of the SFMTA's routine adjustments to improve transit service. These individual projects would undergo their own individual environmental review, with mitigation measures, if required.

Transportation

Less than significant transportation impacts for both Existing plus Project and Cumulative Conditions

As stated previously, under the No Project Alternative improvements by the SFMTA to prioritize and improve transit service would still occur, but would not be made on a systemwide or corridor basis as under the TEP. This EIR presents two alternatives at an equal level of detail, the TTRP Moderate Alternative and the TTRP Expanded Alternative. Implementation of either project alternative would include the project components common to both alternatives: the Policy Framework, Service Improvements or Service Variants, the Service-related Capital Improvements, and program-level TTRPs. Below is a brief summary and comparison of the less-than-significant environmental impacts for the proposed project alternatives with the No Project Alternative, including components common to both alternatives.

Less-than-significant transportation impacts resulting from the TTRP Moderate or Expanded Alternatives would not occur, or would occur but to a much lesser extent, in the No Project Alternative. This is because the planned 350,000 additional hours of transit service in the Service Improvements and the Service-related Capital Improvements proposed under both alternatives would not be implemented, nor would the planned TTRP improvements be implemented. Rather, some smaller extent of service changes and physical changes to transit facilities could be expected due to ordinary SFMTA operations. These less-than-significant transportation impacts would occur under the following topics:

Construction-related Impact

Impact TR-1

Under the No Project Alternative, the SFMTA may construct TPS Toolkit elements on the Rapid Network on an as-needed basis to improve transit service but would not undertake construction activities along an entire corridor as under either TEP project alternative. Therefore, the less-than-significant construction-related impact to transportation as a result of the TEP would not occur under the No Project Alternative.

Transit Impacts

Impacts TR-2, TR-7, TR-12, TR-13, TR-18, TR-19, TR-20, TR-21, C-TR-4, C-TR-5, and C-TR-6

In the No Project Alternative, the SFMTA may make service adjustments and other physical changes to improve transit service and reduce travel time as part of its normal operations. If neither the TTRP Moderate Alternative nor Expanded Alternative, including the project components common to both alternatives, is implemented, crowding on some transit lines would not be expected to change significantly from existing conditions.

Traffic Impacts

Impacts TR-2, TR-4, TR-9, TR-12, TR-15, TR-18, TR-19, TR-22, TR-23, TR-25, TR-29, TR-33, TR-37, TR-39, TR-41, TR-43, C-TR-8, C-TR-10, C-TR-11, C-TR-12, C-TR-38, and C-TR-39

As described in Chapter 4 in the above-referenced less-than-significant traffic impacts, under either project alternative, roadway changes to reduce transit travel time may increase delay for vehicles at some intersections, but the intersections would continue to operate at acceptable levels and the traffic impacts would be less than significant. These less-than-significant impacts and changes in traffic conditions would not occur under the No Project Alternative.

Loading Impacts

Impacts TR-2, TR-6, TR-11, TR-17, TR-46, TR-47, C-TR-46, C-TR-47, and C-TR-48

Under either project alternative, some roadway changes to reduce transit travel time, such as application of the Traffic Signal and Stop Sign Changes TPS Toolkit element category to program-level TTRP corridors, implementation of project-level TTRP Moderate Alternatives for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, or TTRP.71_1, or implementation of project-level TTRP Expanded Alternatives for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.22._1 Variant 1, TTRP.22_1 Variant 2, TTRP.28_1, or TTRP.71_1 would result in a reduction in the on-street loading supply; however, the loss in on-street loading would not be substantial in any one location and the loading demand could be accommodated in or replaced by other on-street loading spaces, resulting in less-than-significant impacts and less-than-significant cumulative impacts. These changes in on-street loading supply would not occur under the No Project Alternative.

Emergency Vehicle Access Impacts

Impacts TR-2, TR-7, TR-12, TR-13, TR-18, TR-19, TR-55, and TR-56

In the No Project Alternative, there would not be comprehensive physical changes to roadways along major transit corridors as proposed in both the TTRP Moderate and Expanded Alternatives. Therefore, in the No Project Alternative there would be no less-than-significant impacts to emergency vehicle access resulting from the implementation of TPS Toolkit elements, such as lane modifications and new transit bulbs.

Pedestrian and Bicycle Impacts

Impacts TR-2, TR-7, TR-12, TR-13, TR-18, TR-19, TR-44, TR-45, C-TR-40, C-TR-41, and C-TR-42

In the No Project Alternative, there would not be comprehensive physical changes to roadways along major transit corridors as proposed in both the TTRP Moderate and Expanded Alternatives. Therefore, in the No Project Alternative there would be no less-than-significant impacts to pedestrians and bicyclists resulting from the implementation of TPS Toolkit elements, such as lane modifications and new transit bulbs.

Parking Impacts

Impacts TR-2, TR-7, TR-12, TR-13, TR-18, TR-19, TR-57, TR-58, and C-TR-50

In the No Project Alternative, there would not be comprehensive physical changes to roadways along major transit corridors as proposed in both the TTRP Moderate and Expanded Alternatives. Therefore, in the No Project Alternative there would be fewer parking spaces removed than if the various TPS Toolkit elements were applied to the TTRP Moderate and Expanded Alternatives.

But, even under the No Project Alternative, over time, due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking is likely to increase. Additionally, through the implementation of the City's Transit First Policy and City's Better Streets program and related projects, especially along commercial corridors and dense mixed-use areas, on-street parking may be further removed to promote alternative modes of travel and sustainable street designs. The less-than-significant cumulative parking impacts along the TTRP Moderate Alternative corridors for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1, and TTRP .71_1 (Impact C-TR-51) and along the TTRP Expanded Alternative corridors for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, and TTRP.71_1 (Impact C-TR-53) would not occur with the No Project Alternative. The corresponding removal or addition of parking spaces to accommodate the TTRP proposals along sections of these corridors would not occur, unlike under either of the proposed project alternatives. Under the No Project Alternative, the SFMTA would still make improvements to transit infrastructure on a case-by-case basis, as the need is identified and funding and resources become available, that could result in the removal of parking in discrete locations throughout the City. However, these improvements would not affect parking supply on a systemwide or corridor basis.

Significant and unavoidable transportation impacts for both Existing plus Project and Cumulative Conditions

Traffic Impacts

- The significant and unavoidable traffic impacts that would result from the TTRP Expanded Alternative at five of the 78 study intersections under Existing Plus TTRP Expanded Alternative conditions throughout the City would not occur with the No Project Alternative, because the proposed implementation of the Service Improvements or Service Variants in combination with TTRP.14 Expanded Alternative (Impact TR-24), TTRP.22_1 Expanded Alternative (Impacts TR-26, TR-27, and TR-28), TTRP.22_1 Expanded Alternative Variant 1 (Impacts TR-30, TR-31, and TR-32), or TTRP.22_1 Expanded Alternative Variant 2 (TR-34, TR-35, and TR-36), TTRP.30_1 Expanded Alternative (Impact TR-38), TTRP.30_1 Expanded Alternative Variant 1 (Impact TR-40), and TTRP.30_1 Expanded Alternative Variant 2 (Impact TR-42) would not occur. Similarly, the significant and unavoidable indirect and program-level traffic impacts identified for the proposed Policy Framework, TTRPs and TPS Toolkit categories Lane Modifications and Pedestrian Improvements as applied to the proposed project alternatives also would not occur with the No Project Alternative (Impacts TR-8 and TR-14).

With the No Project Alternative, implementation of **Mitigation Measure M-TR-8: Optimization of Intersection Operations**, would not be necessary, although SFMTA would continue to optimize intersection geometries and signal timing, install transit-only lanes, and make similar improvements on a location-by-location basis as the need is identified and funding and resources become available. **Mitigation Measure M-TR-26: Intersection Restriping at 16th Street/Bryant Street** would also not be necessary, although SFMTA may consider these intersection improvements in the future as an individual project if the need arises and funding and other resources are available.

Loading Impacts

The significant and unavoidable impacts to on-street commercial loading along the Mission Street and Stockton Street corridors would not occur with the No Project Alternative, because the proposed TTRP.14 Moderate Alternative Variant 1 (Impact TR-48), TTRP.14 Moderate Alternative Variant 2 (Impact TR-49), TTRP.14 Expanded Alternative (Impact TR-50), TTRP.30_1 Moderate Alternative (Impact TR-51), TTRP.30_1 Expanded Alternative (Impact TR-52), and TTRP.30_1 Expanded Alternative Variant 1 (Impact TR-53) or TTRP.30_1 Expanded Alternative Variant 2 (Impact TR-54) would not be implemented, unlike under either of the proposed project alternatives. Similarly, the significant and unavoidable impacts to on-street commercial loading that may indirectly result from implementation of the Policy Framework (Impact TR-5) or the Transit Stop Changes, Land Modifications, Parking and

Turn Restrictions, and Pedestrian Improvement categories of TPS Toolkit elements applied along the program-level TTRP corridors (Impact TR-16) or elsewhere (Impact TR-10), would not occur with the No Project Alternative.

With the No Project Alternative, the implementation of **Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces**, would not be necessary. In addition, **Mitigation Measure, M-TR-48: Enforcement of Parking Violations**, enforcement by SFMTA of parking violations as part of ongoing parking enforcement and/or through the use of transit vehicle video cameras, would not be necessary, although SFMTA would continue to carry out existing enforcement mechanisms to reduce double parking along commercial streets.

<u>Cumulative Transit Impacts</u>

Under the No Project Alternative (as shown by the analysis of the Service Improvements only), with expected future development and related population and employment growth, conditions on some heavily-used Muni routes would continue to get more crowded, and would not be improved without implementation of TEP components. In particular, under future 2035 Cumulative baseline conditions without the TEP project (that is, under the No Project Alternative), the San Bruno/Bayshore corridor within the Southeast screenline, the Subway lines corridor within the Southwest screenline, and the Geary corridor within the Northwest screenline would exceed the capacity utilization standard. Without the TEP project (that is, under the No Project Alternative), transit travel times would also be expected to become longer as growth and development occur throughout the City and traffic volumes increase.

The significant and unavoidable cumulative impacts on transit identified for the TEP would not occur with the No Project Alternative. Thus, if the Policy Framework and the planned Service Improvements or Service Variants were not implemented, Muni's capacity utilization standard on the Mission corridor within the Southeast screenline would not be exceeded under 2035 Cumulative plus Project conditions (Impact C-TR-1). Under the No Project Alternative, the Policy Framework, the TPS Toolkit elements as applied to program-level TTRP corridors, and the Service Improvements or Service Variants, in combination with the TTRP Moderate Alternative (Impact C-TR-2) or in combination with the TTRP Expanded Alternative (Impact C-TR-3) would not be implemented, and therefore would not contribute to significant and unavoidable cumulative transit impacts that would result in exceedances of the capacity utilization standard on the Fulton/Hayes corridor within the Northwest screenline and on the Mission corridor within the Southeast screenline, under 2035 Cumulative conditions even with mitigation. These cumulative transit impacts would differ from those under the No Project Alternative.

Cumulative Traffic Impacts

With the No Project Alternative, the proposed Service Improvements and the TTRP Expanded Alternative proposals would not be implemented. Therefore, the significant cumulative traffic impacts at 13 of the 78 study intersections throughout the City would not occur (Impacts C-TR-13 through C-TR-37).[2] Without implementation of the proposed Policy Framework, the program-level TTRPs, and certain categories of the TPS Toolkit elements, the significant cumulative traffic impacts that would occur with the TTRP Moderate Alternative or TTRP Moderate Alternative Variants (Impact C-TR-7) and the TTRP Expanded Alternative or TTRP Expanded Alternative Variants (Impact C-TR-9) would not occur under the No Project Alternative.

Cumulative Loading Impacts

In addition, significant cumulative impacts to the supply of on-street commercial loading spaces would not occur as a result of implementation of the No Project Alternative; thus, the significant cumulative impacts resulting from implementation of the Service Improvements or Service Variants in combination with the TTRP.14 Moderate Alternative Variant 1, TTRP.14 Moderate Alternative Variant 2, and TTRP.30_1 Moderate Alternative (Impact C-TR-44), and TTRP Expanded Alternative for TTRP.14 Expanded Alternative, TTRP.30_1 Expanded Alternative, and TTRP.30_1 Expanded Alternative Variants 1 and 2 (Impact C-TR-45) would not occur. Without implementation of the proposed Policy Framework, the program-level TTRPs, and certain element categories of the TPS Toolkit under either proposed project alternative, significant cumulative impacts to the on-street commercial loading supply in various corridors (Impact C-TR-43), would not occur under the No Project Alternative.

Cumulative Parking Impacts

As previously stated, even under the No Project Alternative, over time, due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking is likely to increase in areas throughout the City. Additionally, through the implementation of the City's Transit First Policy and City's Better Streets program and related projects, especially along commercial corridors and dense mixed-use areas, on-street parking may be removed to promote alternative modes of travel

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[2] It should be noted that with respect to variants, only the project or a variant would be implemented at one time at any given intersection or location, not both. For example, only one of the three - TTRP.22_1 Expanded Alternative, or TTRP.22_1 Expanded Alternative Variants 1 and 2 – would be implemented at the analyzed intersection (16th/7th Streets). Therefore, only one of the cumulative impacts [C-TR-32, C-TR-33, and C-TR-34] identified for the intersection of 16th/7th Streets would occur. The three impact statements, C-TR-32, C-TR-33, and C-TR-34, reflect the implementation of the project and the two variants at the same intersection but are essentially the same impact.

and sustainable street designs, or converted to commercial or passenger loading/unloading spaces. Under the No Project Alternative, the TEP's contribution to the significant cumulative parking impacts along segments of the Mission Street and 16th Street corridors would not occur, because the parking removal proposed under the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 (Impact C-TR-52), and under the TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, or TTRP.22_1 Variant 2 (Impact C-TR-54) would not be implemented. Under the No Project Alternative, the SFMTA could still make improvements to transit infrastructure on a case-by-case basis, as the need is identified and funding and resources become available, and these improvements could result in the removal of parking in discrete locations throughout the City. Under cumulative conditions, these improvements would not substantially affect parking supply on a systemwide or corridor basis as would occur under the proposed project alternatives (TTRP Moderate Alternative for the TTRP.14 or TTRP Expanded Alternative for the TTRP.22).

With the No Project Alternative, implementation of **Mitigation Measure M-C-TR-49**: **Explore Implementation of Parking Management Strategies**, would not be necessary to mitigate project impacts, although SFMTA could continue to monitor parking conditions throughout these corridors and other locations citywide to determine whether or not the implementation of strategies to manage parking supply and demand are warranted. Depending on conditions, the SFMTA could undertake SFpark Program or similar parking management strategies on a case-by-case basis as the need is identified and funding and resources become available. One such program, SFpark, is currently being implemented by the SFMTA on a pilot basis.[3]

Noise and Vibration

Under the No Project Alternative, no coordinated program of capital improvements would be implemented nor would there be an increase of 350,000 additional hours of transit service in the Service Improvements component of the TEP. Therefore, there would be no noise or vibration impacts from construction of the TEP improvements. Improvements would be constructed over time, as they are now when a need arises and funding is available; construction activities would be short-term and temporary, and vibration would not be excessive, and these impacts would not be significant. Also, although there may be minor adjustments to the hours of transit service and various routes over time in the No Project Alternative, the increase in operational noise would occur in isolated locations and would be

[3] SFMTA, SFpark, 2013. SFMTA established SFpark to use new technologies and policies to improve parking in San Francisco and a pilot is underway to evaluate its effectiveness. Available online at: http://sfpark.org/. Accessed June 26, 2013.

minimal. Therefore, neither construction nor operational noise and vibration impacts would be significant and no mitigation would be necessary. The magnitude of the noise and vibration impacts for the No Project Alternative would be less than the magnitude of the less-than-significant impacts identified for the TEP Moderate and Expanded Alternatives, identified in NO-1 through NO-4 on pp. 4.3-25 through 4.3-51.

Air Quality

Like either the TTRP Moderate Alternative or the TTRP Expanded Alternative in combination with the Service Improvements or Service Variants, the No Project Alternative would not result in significant pollutant emissions from implementation of a program of transit improvements. As with either of the proposed project alternatives, construction of individual transit infrastructure improvements under the No Project Alternative would not be expected to result in significant air quality impacts (Impacts AQ-1 and AQ-2). Because the Service Improvements, including Service Variants and TTRPs or TTRP Variants, would not be implemented with the No Project Alternative, the less-than-significant increases in pollutant emissions from use of additional motor coaches identified for the proposed project alternatives would not occur (Impact AQ-3). Under the No Project Alternative or either of the proposed project alternatives, the SFMTA would continue to purchase low-emission diesel hybrid-electric motor coaches (DHEBs) to replace existing older diesel-fueled motor coaches, and transit vehicular emissions would decrease with either of the proposed project alternatives and with the No Project Alternative. There would be approximately 350,000 fewer service hours, and the additional 60 vehicles needed with either of the proposed alternatives to implement the Service Improvements or Service Variants would not be necessary with the No Project Alternative; therefore, less-than-significant emissions of oxides of nitrogen under the No Project Alternative would be expected to be reduced compared to the proposed project alternatives (Impact AQ-3). However, without the travel time reductions and increased reliability proposed by the TEP, the No Project Alternative would be expected to result in less of a mode shift from private automobiles to transit, resulting in less or no reduction in emissions from private automobiles. Thus, the No Project Alternative could result in an increase in emissions of reactive organic compounds (ROG) and particulates (PM_{10} and $PM_{2.5}$) compared to either the TTRP Moderate Alternative or the TTRP Expanded Alternative, although the increase would not be expected to exceed emissions thresholds and therefore, would not have a significant air quality impact.

The TTRP Moderate and Expanded Alternatives, in combination with the Service Improvements or Service Variants, would increase emissions of toxic air contaminants (TACs) from the additional motor-coach vehicle miles traveled with the increased bus frequencies on many Muni routes; the resulting excess cancer risk would not exceed the significance threshold and the impact would be less significant (Impact AQ-4). The No

Project Alternative would not provide for increases in motor coach frequencies on a systemwide basis, and therefore would not result in increased emissions of TACs.

Neither the Policy Framework nor construction and operation of the Service Improvements in combination with the TTRP Moderate or Expanded Alternative would conflict with implementation of the 2010 Clean Air Plan (Impact AQ-5). The No Project Alternative, while it would not conflict with the 2010 Clean Air Plan, would also not improve transit service, improve transit system efficiency, or promote a mode shift from private automobile use to public transit and therefore, would not support the 2010 Clean Air Plan transportation control measures as well as the Policy Framework and the TEP would.

As for the proposed project alternatives, the No Project Alternative would not contribute to significant cumulative air quality impacts (Impacts C-AQ-1 and C-AQ-2).

Overall, no significant air quality impacts would result from either of the proposed project alternatives or the No Project Alternative.

Other Topics

The No Project Alternative would not result in significant impacts in any of the environmental topics analyzed in the Initial Study, presented in Appendix 2 to this EIR (available on the Appendix CD accompanying this EIR). The significant impacts on cultural resources during construction that could occur with either of the proposed project alternatives, mitigated to less-than-significant levels with **Mitigation Measures M-CP-2a: Accidental Discovery of Archaeological Resources, M-CP-2b: Archaeological Monitoring, and M-CP-3: Paleontological Resources Accidental Discovery**, (see the Initial Study, pp. 212 – 230) would not occur as part of a program of transit system improvements with the No Project Alternative. Although Mitigation Measures M-CP-2a: Accidental Discovery of Archaeological Resources, M-CP-2b: Archaeological Monitoring, and M-CP-3: Paleontological Resources Accidental Discovery, would not be necessary under the No Project Alternative, some or all of these mitigation measures may be required during construction as part of separate environmental review of individual transit infrastructure improvements considered in the future. The need for these or other similar mitigation measures related to construction impacts on cultural resources would be considered on a project-by-project basis under the No Project Alternative rather than as part of an overall program of improvements under the proposed project alternatives.

The significant impacts from release of hazardous materials that may be encountered during construction of the proposed project alternatives, mitigated to less-than-significant levels with **Mitigation Measure M-HZ-1: Hazardous Materials Soil Testing** (see the Initial Study, pp. 321 – 334), would also not occur with the proposed project alternatives as part of a program of transit system improvements with the No Project Alternative. Mitigation Measure M-HZ-1: Hazardous

Materials Soil Testing, would not be necessary with the No Project Alternative. However, similar requirements may be placed on individual construction projects proposed by the SFMTA related to Muni that may be considered on a project-by-project basis during environmental review of any such proposed transit improvement projects.

Conclusion

The No Project Alternative would not result in any of the significant impacts identified for the proposed project alternatives in Chapter 4, Environmental Setting, Impacts, and Mitigation, and would not require any of the mitigation measures listed there for transportation impacts. Nor would the No Project Alternative require implementation of any of the mitigation measures identified in the Initial Study. Although some of the individual components of the proposed project alternatives would be expected to be implemented as part of the ongoing monitoring and improvements that SFMTA currently performs, there would be no organized, comprehensive and coordinated program of transit system improvements with the No Project Alternative. With the No Project Alternative, the transit system would be expected to become more crowded, particularly on heavily-used routes, as growth and development occur throughout the City and transit ridership increases in the future. Under future 2035 Cumulative baseline conditions, the San Bruno/Bayshore corridor, the Subway lines corridor, and the Geary corridor would exceed the capacity utilization standard. Further, with the No Project Alternative, transit travel time savings and mode shift from cars to buses would not be realized. The No Project Alternative would not meet any of the project sponsor’s objectives, listed in Chapter 2, Project Description, in Section 2.3 (pp. 2-2 to 2-7), to provide a more effective public transportation service by improving transit speed and reliability, by increasing transit ridership, by improving network efficiency, and by prioritizing transit operations over automobile delay.

6.3 INTRODUCTION TO PROPOSED PROJECT ALTERNATIVES

Chapter 4, Environmental Setting, Impacts and Mitigation, presents two alternatives that are analyzed at an equal level of detail, the TTRP Moderate Alternative and the TTRP Expanded Alternative. The proposed Policy Framework, Service Improvements and Service Variants, the Service-related Capital Improvements, and TPS Toolkit as applied to the program-level TTRP corridors would be implemented in combination with either of these alternatives. That is, these components would be exactly the same under either project alternative. The two alternatives bracket a range of the TPS Toolkit elements proposed to be installed along the same Rapid Network corridors. The TTRP Moderate Alternative was designed to include TPS Toolkit elements with fewer and less substantial physical environmental changes. The TTRP Expanded Alternative was designed to include TPS Toolkit elements with more substantial physical environmental changes.

Implementation of the Policy Framework may result in significant impacts on traffic and on-street commercial loading in combination with either the TTRP Moderate Alternative or the TTRP Expanded Alternative. The Service Improvements or Service Variants and the Service-related Capital Improvements alone would not result in significant impacts on transit, traffic, pedestrians, bicyclists, loading, emergency vehicle access, or parking. These TEP components, in combination with the TTRP Moderate and Expanded Alternatives, would not result in significant impacts on transit, pedestrians, bicyclists, emergency vehicle access, or parking, but would result in significant impacts on traffic and loading. The TPS Toolkit elements in the categories of Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, Traffic Signal and Stop Sign Changes, and Pedestrian Improvements, both themselves and as applied to the program-level TTRP corridors, also may result in significant impacts on traffic and on loading with either of the TTRP alternatives. The significant transportation and circulation impacts common to both TTRP Alternatives are summarized in the Environmental Analysis of the TTRP Moderate Alternative in Subsection 6.3.1, below. The Environmental Analysis of the TTRP Expanded Alternative in Subsection 6.3.2 then cross-references to the discussion of impacts common to both alternatives found in the TTRP Moderate Alternative subsection.

Noise and vibration impacts from construction and operation of both the TTRP Moderate and TTRP Expanded Alternatives would be less than significant. Air quality impacts from construction and operation of both of the proposed project alternatives would also be less than significant, although there would be less shift in travel mode from private automobile to transit in the TTRP Moderate Alternative, resulting in slightly higher emissions than in the TTRP Expanded Alternative, as discussed below in Subsection 6.3.1 under Air Quality.

Table 46: Comparison of Significant Transportation Impacts of TTRP Alternatives, pp. 6-17 to 6-21, presents a summary comparison of the significant transportation impacts of the TTRP Moderate Alternative and the TTRP Expanded Alternative. All significant and unavoidable impacts identified for the proposed project alternatives are in the topic of Transportation and Circulation.

6.3.1 ALTERNATIVE B, TTRP MODERATE ALTERNATIVE

DESCRIPTION

- The 11 TTRPs in the TTRP Moderate Alternative are described in detail in Chapter 2, Project Description, Section 2.5.2.3, on pp. 2-110 to 2-160. The TTRP Moderate Alternative for the 11 project-level TTRPs primarily includes transit stop changes, pedestrian improvements, parking and turn restrictions, and new traffic signals. New traffic signals would replace existing stop signs on the following corridors: on Church Street (5 intersections) for the TTRP.J; on Taraval Street (five intersections) and Ulloa Street (one intersection) for the TTRP.L; on Judah Street (seven intersections) and Irving Street (one intersection) for the TTRP.N; on McAllister Street (six intersections) and Fulton Street (two intersections) for the TTRP.5; on Geneva Avenue (one intersection) for the TTRP.8X; on Mission Street (one intersection) for the TTRP.14; and on Haight Street (ten intersections) for the TTRP.71_1.

In addition, lane modifications are proposed for two TTRP corridors, the TTRP.8X Moderate Alternative and the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2. The following lane modifications are proposed as part of the TTRP.8X Bayshore Express Moderate Alternative: side-running westbound transit-only lanes would be established on Geneva Avenue between Delano Street and the I-280 eastbound ramps; bicycle lanes would be established on Geneva Avenue westbound between Paris and London streets; and bicycle lanes would be established on Geneva Avenue eastbound between Mission and Paris streets. The TTRP.9 Moderate Alternative proposes side-running transit-only lanes in the southbound direction on Potrero Avenue between 18th and 24th streets, and the existing northbound transit-only lane between 200 feet north of 24th Street and 21st Street would be removed. The TTRP.14 Mission Moderate Alternative Variants 1 and 2 both propose lane modifications to provide for side-running transit-only lanes in both directions on Mission Street between 13th and Cesar Chavez streets (Variant 1 would limit the transit-only lanes to peak periods only, while Variant 2 would operate the transit-only lanes full time - 24 hours/day).

The TTRP.J Moderate Alternative is described in detail in Chapter 2 on pp. 2-113 to 2-114. The TTRP.L Moderate Alternative is described in detail on pp. 2-117a to 2-117c. The TTRP.N Moderate Alternative is described in detail on pp. 2-119 to 2-120. The TTRP.5 Moderate Alternative is described in detail on pp. 2-123 to 2-125. The TTRP.8X Moderate Alternative is described in detail on pp. 2-129 to 2-132. The TTRP.9 Moderate Alternative is described in detail on pp. 2-135a to 2-135c. The TTRP.14 Moderate Alternative is described in detail on pp. 2-136 to 2-141, including Variants 1 and 2. The TTRP.22_1 Moderate is described in detail on pp. 2-148 to 2-149. The TTRP.28_1 Moderate Alternative is described in detail on pp. 2-152 and 2-154. The TTRP.30_1 Moderate Alternative is described in detail on p. 2-157. The TTRP.71-1 Moderate Alternative is described in detail on pp. 2-160a to 2-160b.

ENVIRONMENTAL ANALYSIS

The impacts of the TTRP Moderate Alternative are identified and discussed in detail in Chapter 4, Sections 4.2, Transportation and Circulation, 4.3, Noise and Vibration, and 4.4, Air Quality in the EIR and in the Initial Study under environmental topics fully addressed there on pp. 176 to 343 in Appendix 2 to the EIR. The significant impacts that would result from implementation of this alternative are summarized below, and the mitigation measures that would be applicable to this alternative are noted. In addition, the discussion compares the impacts of this project alternative to those of the TTRP Expanded Alternative. Table 46: Comparison of Significant Transportation Impacts of TTRP Alternatives, presents a summary comparison of the significant transportation impacts of the TTRP Moderate Alternative and the TTRP Expanded Alternative.

Table 46: Comparison of Significant Transportation Impacts of TTRP Alternatives and Variants

Type and Location of Impact	TTRP Moderate Alternative (contributing TEP component identified for SU impacts)	TTRP Expanded Alternative (contributing TEP component identified for SU impacts)
Existing plus Project		
Traffic		
Program-Level		
Implementation of Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 to C.5.	SU Service Policy Framework (TR-3)	SU Service Policy Framework (TR-3)
Implementation of TPS Toolkit categories – Lane Modifications and Pedestrian Improvements – along Rapid Network.	SU TPS Toolkit elements within Lane Modifications and Pedestrian Improvements categories (TR-8)	SU TPS Toolkit elements within Lane Modifications and Pedestrian Improvements categories (TR-8)
Implementation of Lane Modifications and Pedestrian Improvements elements along program-level TTRP corridors.	SU TTRPs (TR-14)	SU TTRPs (TR-14)
Project-Level		
Randall/San Jose	LTS	SU TTRP.14 Expanded (TR-24)
16th/Bryant	LTS	SU TTRP.22_1 Expanded (TR-26), TTRP.22_1 Expanded Variant 1 (TR-30), or TTRP.22_1 Expanded Variant 2 (TR-34)
16th/Potrero	LTS	SU TTRP.22_1 Expanded (TR-27), TTRP.22_1 Expanded Variant 1 (TR-31), or TTRP.22_1 Expanded Variant 2 (TR-35)
16th/Seventh	LTS	SU TTRP.22_1 Expanded (TR-28), TTRP.22_1 Expanded Variant 1 (TR-32), or TTRP.22_1 Expanded Variant 2 (TR-36)

Table 46: Comparison of Significant Transportation Impacts of TTRP Alternatives and Variants (continued)

Type and Location of Impact	TTRP Moderate Alternative (contributing TEP component identified for SU impacts)	TTRP Expanded Alternative (contributing TEP component identified for SU impacts)
Columbus/Green/Stockton	LTS	SU TTRP.30_1 Expanded (TR-38), TTRP.30_1 Expanded Variant 1 (TR-40), or TTRP.30_1 Expanded Variant 2 (TR-42)
Loading		
Program-Level		
Implementation of Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 to C.5TPS	SU Service Policy Framework (TR-5)	SU Service Policy Framework (TR-5)
Implementation of TPS Toolkit categories – Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements.	SU TPS Toolkit elements within Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements categories (TR-10)	SU TPS Toolkit elements within Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements categories (TR-10)
Implementation of Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements elements along program-level TTRP corridors.	SU TTRPs (TR-16)	SU TTRPs (TR-16)
Project-Level		
Mission Street	SU TTRP.14 Moderate Variant 1 (TR-48) or TTRP.14 Moderate Variant 2 (TR-49)	SU TTRP.14 Expanded (TR-50)
Stockton Street	SU TTRP.30_1 Moderate (TR-51)	SU TTRP.30_1 Expanded (TR-52), TTRP.30_1 Expanded Variant 1 (TR-53), or TTRP.30_1 Expanded Variant 2 (TR-54)

Table 46: Comparison of Significant Transportation Impacts of TTRP Alternatives and Variants (continued)

Type and Location of Impact	TTRP Moderate Alternative (contributing TEP component identified for SU impacts)	TTRP Expanded Alternative (contributing TEP component identified for SU impacts)
Cumulative		
Cumulative Transit		
Mission Corridor – Downtown Screenlines	SU – Service Policy Framework and Service Improvements or Service Variants (C-TR-1)	SU – Service Policy Framework and Service Improvements or Service Variants (C-TR-1)
Fulton/Hayes Corridor and Mission Corridor – Downtown Screenlines	SU all TTRP Moderate Alternatives and Variants (C-TR-2)	SU all TTRP Expanded Alternatives and Variants (C-TR-3)
Implementation of Service Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5, and Lane Modifications and Pedestrian Improvements elements along program-level TTRP corridors.	SU –TTRP Moderate Alternatives (C-TR-7)	SU –TTRP Expanded Alternatives (C-TR-9)
Cumulative Traffic		
Market/Church/14th	LTS	SU TTRP.J Expanded (C-TR-13)
Fulton/Masonic	LTS	SU TTRP.5 Expanded (C-TR-14)
Geneva/Carter	LTS	SU TTRP.8X Expanded (C-TR-15)
Geneva/Moscow	LTS	SU TTRP.8X Expanded (C-TR-16)
Randall/San Jose	LTS	SU TTRP.14 Expanded (C-TR-17)
Mission/Fifth	LTS	SU TTRP.14 Expanded (C-TR-18)
Mission/16th	LTS	SU TTRP.14 Expanded (C-TR-19)
16th/Bryant	LTS	SU TTRP.22_1 Expanded (C-TR-20), TTRP.22_1 Expanded Variant 1 (C-TR-21), or TTRP.22_1 Expanded Variant 2 (C-TR-22)

Table 46: Comparison of Significant Transportation Impacts of TTRP Alternatives and Variants (continued)

Type and Location of Impact	TTRP Moderate Alternative (contributing TEP component identified for SU impacts)	TTRP Expanded Alternative (contributing TEP component identified for SU impacts)
16th/Potrero	LTS	SU TTRP.22_1 Expanded (C-TR-23), TTRP.22_1 Expanded Variant 1 (C-TR-24), or TTRP.22_1 Expanded Variant 2 (C-TR-25)
16th/Owens	LTS	SU TTRP.22_1 Expanded (C-TR-26), TTRP.22_1 Expanded Variant 1 (C-TR-27), or TTRP.22_1 Expanded Variant 2 (C-TR-28)
16th/Fourth	LTS	SU TTRP.22_1 Expanded (C-TR-29), TTRP.22_1 Expanded Variant 1 (C-TR-30), or TTRP.22_1 Expanded Variant 2 (C-TR-31)
16th/Seventh	LTS	SU TTRP.22_1 Expanded (C-TR-32), TTRP.22_1 Expanded Variant 1 (C-TR-33), or TTRP.22_1 Expanded Variant 2 (C-TR-34)
Columbus/Green/Stockton	LTS	SU TTRP.30_1 Expanded (C-TR-35), TTRP.30_1 Expanded Variant 1 (C-TR-36), or TTRP.30_1 Expanded Variant 2 (C-TR-37)
Cumulative Loading		
Implementation of the Service Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5, and Transit Stop Changes, Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements elements along program-level TTRP corridors.	SU Service Policy Framework and TTRPs (C-TR-43)	SU Service Policy Framework and TTRPs (C-TR-43)
Mission Street and Stockton Street	SU TTRP.14 Moderate Variant 1 or TTRP.14 Moderate Variant 2, and TTRP.30_1 Moderate (C-TR-44)	SU TTRP.14 Expanded, TTRP.30 Expanded, TTRP.30_1 Expanded Variant 1, or TTRP.30_1 Expanded Variant 2 (C-TR-45)

Table 46: Comparison of Significant Transportation Impacts of TTRP Alternatives and Variants (continued)

Type and Location of Impact	TTRP Moderate Alternative (contributing TEP component identified for SU impacts)	TTRP Expanded Alternative (contributing TEP component identified for SU impacts)
Cumulative Parking		
Implementation of the Service Policy Framework Objective A, Action A.3 and Objective C, Actions C.3 through C.5, and Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements elements along program-level TTRP corridors.	SU Service Policy Framework and program-level TTRPs (C-TR-49)	SU Service Policy Framework and program-level TTRPs (C-TR-49)
Mission Street	SU TTRP.14 Moderate Variant 1 or TTRP.14 Moderate Variant 2 (C-TR-52)	LTS
16th Street	LTS	TTRP.22_1 Expanded, TTRP.22_1 Expanded Variant 1, or TTRP.22_1 Expanded Variant 2 (C-TR-54)

Source: Fehr & Peers/LCW Consulting, 2013.

Transportation

**Impacts of Project Components Common to Both Project Alternatives:
Policy Framework, TPS Toolkit as applied to the Program-Level TTRPs, Service Improvements and Service Variants, and Service-related Capital Improvements**

The Policy Framework, TPS Toolkit elements applied to the program-level TTRP corridors, Service Improvements and Service Variants, and Service-related Capital Improvements would be implemented with both the TTRP Moderate Alternative and the TTRP Expanded Alternative. These components of the proposed project would result in the same impacts under either of the proposed TTRP alternatives, and are summarized here. In subsequent subsections is a summary of the transportation impacts from the TTRP Moderate Alternative compared to the TTRP Expanded Alternative.

Policy Framework

As discussed in Impact TR-1, implementation of the Policy Framework and the TEP components would not result in significant construction-related impacts in combination with either the TTRP Moderate Alternative or the TTRP Expanded Alternative. Implementation of the Policy Framework would not result in significant impacts on transit, pedestrians, bicyclists, emergency vehicle access, or parking with either alternative (Impact TR-2). Implementation of some objectives and actions of the Policy Framework may result in significant traffic and loading impacts (Impacts TR-3 and TR-5), while other objectives and actions would not (Impacts TR-4 and TR-6).

TPS Toolkit applied to the Program-level TTRPs

Implementation of any of the TPS Toolkit elements along the nine program-level TTRP corridors would not result in significant impacts on transit, pedestrians, bicyclists, emergency vehicle access, or parking (Impacts TR-7 and TR-13). Implementation of either the TTRP Moderate Alternative or the TTRP Expanded Alternative, together with TPS Toolkit categories Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, along the nine program-level TTRP corridors would not result in significant traffic impacts (Impacts TR-9 and TR-15), and Traffic Signal and Stop Sign Changes along the program-level TTRP corridors would not result in significant loading impacts (Impacts TR-11 and TR-17). Implementation of TPS Toolkit categories Lane Modifications and Pedestrian Improvements along the nine program-level TTRP corridors may result in significant traffic impacts (Impacts TR-8 and TR-14). Implementation of TPS Toolkit categories Transit Stop Changes, Lane Modifications, Parking and turn Restrictions, and Pedestrian Improvements, alone or along the program-level TTRP corridors may result in significant impacts to loading (Impacts TR-10 and TR-16).

Service Improvements, Service Variants, and Service-related Capital Improvements

Implementation of the Service Improvements or Service Variants in combination with the proposed project alternatives would not result in significant impacts on transit, traffic, pedestrians, bicyclists, loading, emergency vehicle access, or parking (Impact TR-18). Implementation of both program- and project-level Service-related Capital Improvements together with either the TTRP Moderate or TTRP Expanded Alternative also would not result in significant impacts on transit, traffic, pedestrians, bicyclists, loading, emergency vehicle access, or parking (Impacts TR-12 and TR-19).

Cumulative Impacts

Transit. The Policy Framework, TPS Toolkit Elements applied along program-level TTRP corridors, and Service Improvements or Service Variants would contribute considerably to significant cumulative impacts on transit on the Fulton/Hayes Corridor and the Mission Street corridor, in combination with either the TTRP Moderate or Expanded Alternative (Impacts C-TR-2 and C-TR-3).

Service Improvements in combination with either the TTRP Moderate or Expanded Alternative would not contribute considerably to significant impacts on regional transit carriers in the 2035 Cumulative plus Project scenario (Impacts C-TR-5 and C-TR-6).

Traffic. Implementation of some Policy Framework objectives and actions, and the TPS Toolkit elements in the Lane Modifications and Pedestrian Improvement categories, in combination with either the TTRP Moderate Alternative or TTRP Expanded Alternative would result in significant cumulative impacts at intersections along the program-level TTRP corridors in the 2035 Cumulative plus Project scenario (Impacts C-TR-7 and C-TR-9). In contrast, implementation of the Policy Framework and TPS Toolkit categories Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes, in combination with either the TTRP Moderate Alternative or the TTRP Expanded Alternative would not contribute to significant cumulative traffic impacts in the 2035 Cumulative plus Project scenario (Impacts C-TR-8 and C-TR-10).

Pedestrians and Bicycles: Implementation of the Policy Framework, TPS Toolkit elements, Service Improvements or Service Variants, and Service-related Capital Improvements would have less-than-significant cumulative pedestrian and bicycle impacts (Impacts C-TR-40, C-TR-41 and C-TR-42).

Loading: Implementation of some Policy Framework objectives and actions, the TPS Toolkit elements in the category Traffic Signal and Stop Sign Changes for the program-level TTRPs, Service Improvements or Service Variants, and Service-related Capital Improvements would have less-than-significant cumulative loading impacts (Impact C-TR-46). However, implementation of some Policy Framework objectives and actions, and TPS Toolkit categories Transit Stop Changes, Parking and Turn Restrictions, and Traffic Signal and Stop Sign Changes for the program-level TTRPs would result in significant and unavoidable cumulative loading impacts, even with mitigation (Impacts C-TR-43).

Parking: Implementation of some Policy Framework objectives and actions, the TPS Toolkit elements in the categories Transit Stop Changes and Traffic Signal and Stop Sign Changes for the program-level TTRPs, Service Improvements or Service Variants, and Service-related Capital Improvements would have less-than-significant cumulative parking impacts (Impact C-TR-50). However, implementation of some Policy Framework objectives and actions, and certain elements within the TPS Toolkit categories Lane Modifications, Parking and Turn Restrictions, and Pedestrian Improvements for the program-level TTRPs would result in significant and unavoidable cumulative parking impacts, even with the mitigation measure for SFMTA to explore parking management strategies (Impact C-TR-49).

Existing plus Service Improvements or Service Variants and the TTRP Moderate Alternative Conditions (referred to as Existing plus TTRP Moderate Alternative)

Transit, Traffic, Pedestrians, Bicycles, Emergency Vehicle Access, and Construction

Like the TTRP Expanded Alternative, the TTRP Moderate Alternative would result in less-than-significant impacts on transit, including impacts on regional transit in the Existing plus TTRP Moderate Alternative scenario (Impact TR-20 and TR-21). The TTRP Moderate Alternative would not result in any significant traffic impacts at the 78 study intersections under the Existing plus TTRP Moderate Alternative scenario (Impact TR-22), unlike the Existing plus Service Improvements and the TTRP Expanded Alternative scenario that would result in significant and unavoidable traffic impacts at five of the 78 study intersections. In addition, like the TTRP Expanded Alternative, the TTRP Moderate Alternative would result in less-than-significant impacts on pedestrians, bicycles, parking, or emergency vehicle access, and would not cause any significant transportation impacts during construction (Impacts TR-44, TR-45, TR-55, TR-56, TR-57, TR-58, and TR-1).

Loading

Like the TTRP Expanded Alternative for the TTRP.14 corridor, the TTRP Moderate Alternative for this corridor would result in a reduction in on-street commercial loading spaces along the Mission Street corridor with implementation of either the TTRP.14 Moderate Alternative Variant 1 or TTRP.14 Moderate Alternative Variant 2, which would be a significant and unavoidable impact, even with mitigation, due to the elimination of the parking lane along various segments to install transit-only lanes and other Lane Modifications in the TPS Toolkit (Impacts TR-48 and TR-49). In addition, the TTRP.30_1 Moderate Alternative also would result in a reduction of on-street loading spaces, causing a significant and unavoidable loading impact, even with mitigation, along Stockton Street in the TTRP.30_1 corridor (Impact TR-51), like the TTRP Expanded Alternative for the TTRP.30 corridor. **Mitigation Measure M-TR-48: Enforcement of Parking Violations**, could reduce, but may not eliminate, these significant loading impacts.

Parking

Under Existing plus Project conditions, implementation of either the TTRP Moderate Alternative or the TTRP Expanded Alternative would not result in an increase in parking demand. These TTRP proposals would in most cases, but not all, result in the elimination of some on-street parking spaces along the TTRP corridor. Some of the corridor projects would result in the addition of on-street parking.

- As described under Impact TR-57, the parking loss along the TTRP corridors as a result of the project-level TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1, and TTRP.71_1 (all corridors except the TTRP.14) would not be substantial and would be considered a less-than-significant project-level parking impact. Under the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 there would be a net decrease in the number of on-street parking spaces over the entire seven-mile Mission Street corridor of approximately 1,160 and 960 parking spaces respectively.[4] Of these spaces, 1,130 and 715 of these spaces would be removed as a result of part-time tow-away zones (generally enforced for the TTRP 14 corridor from 7 a.m. to 7 p.m., with tow-away regulations south of Cesar Chavez Street enforced for the peak period and peak direction only). These spaces would be available for parking outside of the tow-away time period. For example, between 13th Street and Cesar Chavez Street these parking spaces would be available in the evening and for overnight parking. Under the TTRP.14 Moderate Alternative with either variant, the substantial parking loss would only occur within the segment between 13th and Cesar Chavez streets. On this segment, 430 parking spaces would be removed for Variant 1 (15 on a permanent basis and 415 on a part-time basis) and 230 parking spaces would be removed for Variant 2 (230 on a permanent basis). The parking loss would be considered substantial as a result of either the TTRP.14 Moderate Alternative Variant 1 or TTRP.14 Moderate Alternative Variant 2 for this corridor. However, at a project level this parking loss would not be considered a significant impact because this corridor is well-served by public transit and other modes, the proposed project improvements would improve transit and pedestrian conditions, and the parking loss would

[4] For the purposes of this analysis, parking loss numbers have been rounded to whole numbers wherever feasible, and therefore, approximations of parking losses on segments may not be equivalent to estimates on the entire corridor.

not create hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians.

- As described under Impact TR-58, the parking loss along the TTRP corridors as a result of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, and TTRP.71_1 would not be substantially different from that under the TTRP Moderate Alternative for these corridors. The parking impacts for the TTRP Expanded Alternative for these nine corridors would be considered less than significant for the reasons described above.

In addition, for the TTRP.14 Expanded Alternative the loss of parking on the Mission Corridor would occur primarily north of 13th Street, where there would be a net reduction of about 380 spaces, of which 145 spaces would be removed on a permanent basis and 235 would be removed on a part-time basis due to tow-away restrictions. In the downtown area, there are a number of large public parking garages (Fifth & Mission, Jessie Square, and Moscone Garages) that have capacity to accommodate demand, depending on time of day, as well as numerous garages associated with office or other buildings (SFMOMA and Hearst Garages) that are open to the general public. Additionally, on-street parking, although well-utilized in some areas, is available on side streets perpendicular to Mission Street throughout this segment. Therefore, within the downtown context the loss of parking on Mission Street north of 13th Street would not be considered a substantial parking loss and the parking impacts as a result of the TTRP.14 Expanded Alternative would be considered less than significant.

Under the TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2 there would be a substantial parking loss. For the TTRP.22_1 the substantial parking loss would result from the implementation of center-running transit-only lanes; for the TTRP.22_1 Variant 1 the parking loss would result from implementation of the tow-away lanes in the peak period to accommodate transit-only lanes; and for TTRP.22_1 Variant 2 the parking loss would result from a westbound side-running transit-only lane. The TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2, would result in a net decrease in the number of on-street parking spaces of approximately 290 parking spaces, 520 parking spaces and 280 parking spaces, respectively. Parking removals in the tow-away zones would not be permanent (enforced for the TTRP.22_1 corridor for peak periods) and these parking spaces would be available outside of the tow-away time periods for daytime and overnight parking. Therefore, the TTRP.22_1 Expanded Alternative Variant 1 would result in a loss of 240 parking spaces on a part-time basis due to tow-away restrictions and a loss of approximately 280 spaces on a permanent basis, which would be similar to the TTRP.22_1 Expanded Alternative (290 spaces on a permanent basis) and TTRP.22_1 Expanded Alternative Variant 2 (280 spaces on a permanent basis).

However, at a project level the parking loss described above for the TTRP.14 and TTRP.22_1 corridors for both the TTRP Moderate and TTRP Expanded Alternatives was found to be less-than-significant. Because these corridors are well served by public transit and other modes, and the proposed project improvements would improve transit and pedestrian conditions, and the parking loss would not create hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. Although considered to be a substantial parking loss, Existing plus Project impacts related to parking for the TTRP Moderate Alternative for the TTRP.14 and for the TTRP Expanded Alternative for the TTRP.22 were determined to be less than significant.

In summary, both the TTRP Moderate Alternative and the TTRP Expanded Alternative would result in less-than-significant project-level parking impacts. However, the TTRP Moderate Alternative would result in a greater parking loss in the Mission corridor for the segment between 13th Street and Cesar Chavez Street due to the TTRP.14 Moderate Alternative Variant 1 or Variant 2 compared to the TTRP.14 Expanded Alternative. Conversely, the TTRP Expanded Alternative would result in a greater parking loss along the 16th Street corridor due to the TTRP.22 Expanded Alternative, TTRP.22 Expanded Alternative Variant 1 or Variant 2 compared to the TTRP.22 Moderate Alternative. For the remaining nine TTRP corridors, the parking conditions would not substantially change between the TTRP Moderate Alternative and the TTRP Expanded Alternative.

2035 Cumulative plus Service Improvements or Service Variants and the TTRP Moderate Alternative Conditions (referred to below as 2035 Cumulative plus the TTRP Moderate Alternative Conditions)

Cumulative Transit

Like the 2035 Cumulative plus the TTRP Expanded Alternative scenario, the TTRP Moderate Alternative, in combination with the Policy Framework, the TPS Toolkit elements applied to the program-level TTRP corridors, and the Service Improvements or Service Variants, would contribute considerably to significant cumulative impacts on transit in the Fulton/Hayes corridor within the Northwest screenline and the Mission corridor within the Southeast screenline, exceeding the capacity utilization standard during both a.m. and p.m. peak hours under future 2035 Cumulative plus Project conditions (Impact C-TR-2). Providing additional capacity and reducing peak hour capacity utilization to less than the standard as identified in **Mitigation Measure C-M-TR-1: SFMTA Monitoring of Muni Service**, could reduce the TTRP Moderate Alternative's significant cumulative transit impact on the Fulton/Hayes and Mission corridors to a less-than-significant level. However, because the SFMTA cannot commit to future funding appropriations nor be certain of its ability to provide additional service citywide to maintain the capacity utilization standard, among other service goals, the feasibility of this mitigation measure is uncertain and the TTRP Moderate Alternative's considerable contribution to significant cumulative transit impacts would remain even with mitigation, similar to that under the 2035 Cumulative plus the TTRP Expanded Alternative conditions.

Cumulative Traffic

- The 2035 Cumulative plus the TTRP Moderate Alternative would not result in significant cumulative traffic impacts at any of the 78 study intersections under future 2035 Cumulative conditions, unlike the TTRP Expanded Alternative which would result in cumulative traffic impacts at 13 intersections under future 2035 Cumulative conditions (Impact C-TR-12).

Cumulative Loading

- Both the TTRP Moderate and Expanded Alternatives would have less-than-significant cumulative impacts on loading on the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, and TTRP.71_1 corridors (Impact C-TR-47).

Similar to the 2035 Cumulative plus the TTRP Expanded Alternative, the 2035 Cumulative plus the TTRP Moderate Alternative, in combination with past, present, and reasonably foreseeable future development, could also contribute to reductions in on-street loading spaces, resulting in significant and unavoidable cumulative loading impacts along Mission Street and Stockton Street (Impact C-TR-44). Implementation of **Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces,** could reduce cumulative commercial loading impacts. However, in some locations with a high volume of loading demand, mitigation may be incompatible with the proposed improvement, or roadway geometry may preclude implementation of mitigation such that the significant loading impact would remain. Therefore, similar to the TTRP Expanded Alternative, significant cumulative commercial loading impacts with implementation of the TTRP Moderate Alternative may not be reduced to less-than-significant levels even with mitigation.

Cumulative Pedestrian and Bicycle

The TTRP Moderate Alternative would have less-than-significant cumulative pedestrian and bicycle impacts (Impact C-TR-41), similar to the TTRP Expanded Alternative.

Cumulative Parking

Considering cumulative parking conditions, over time, due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking is likely to increase. Additionally, through the implementation of the City's Transit First Policy and City's Better Streets program and related projects, especially along commercial and dense mixed-use corridors, on-street parking may be further removed to promote alternative modes of travel and sustainable street designs. Where parking removal would occur under either the TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1, and TTRP.71_1 or for the TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, and TTRP.71_1, the parking removal would be spread out over the TTRP corridor, or located in areas where transit and other options for parking are available. Therefore, in combination with other development along the corridors, the parking loss would not represent a substantial portion of the parking shortfall that could occur over time. The TTRP proposals in either the TTRP Moderate Alternative or the TTRP Expanded Alternative would encourage transit use through the reduction of transit travel time and increase in transit reliability, which may further lead to a mode shift from private passenger vehicles to transit. Furthermore, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, may induce drivers to shift to other modes of travel, or change their overall travel habits over time. The loss of parking under these TTRP proposals would not be considered substantial. These TTRP Moderate or Expanded Alternative proposals would not result in an increased parking demand, and in consideration of the above cumulative conditions, the TTRP Moderate Alternative proposals for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1, and TTRP.71_1 or the TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, and TTRP.71_1 would not result in significant cumulative parking impacts.

Significant and unavoidable cumulative parking impacts along the Mission Street corridor would occur with the TTRP Moderate Alternative, because the parking loss proposed under the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 (Impact C-TR-52) would be substantial within the segment between 13th Street and Cesar Chavez Street, and, in combination with reasonably foreseeable future development and other projects, the substantial parking loss has the potential to create hazardous conditions and/or delays to other modes of transportation such as transit. Therefore, it would contribute to significant cumulative parking impacts along this segment of the corridor. Under the TTRP Expanded Alternative for the TTRP.14, cumulative parking impacts would be less-than-significant because the parking loss would occur downtown where access to transit is plentiful and/or other options for parking are also available. Although the permanent parking loss (170 spaces) under the TTRP.14 Expanded Alternative would be similar in number to the TTRP.14 Moderate Alternatives (30-295 permanent spaces), the TTRP.14 Expanded

Alternative's cumulative parking impact would be reduced compared to the TTRP.14 Moderate Alternative Variant 1 or Variant 2 because the location of the parking loss would be within a transit-rich area as well as in consideration of the fact that there are multiple options for off-street parking. Under the TTRP.14 Expanded Alternative, substantially less parking would be removed between 13th and Cesar Chavez streets, where more of the TTRP.14 Moderate Variant 1 and Variant 2 parking losses would occur.

The TTRP Moderate Alternative for TTRP.22_1 would result in a net addition of 10 parking spaces along the 16th Street corridor so there would be no significant cumulative parking impact. In contrast, under the TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2 (Impact C-TR-54) the parking loss along the 16th Street corridor would be considered substantial, and in combination with reasonably foreseeable future development and other projects. The substantial parking loss has the potential to create hazardous conditions and/or delays to other modes of transportation such as transit. Therefore, this parking loss would contribute to significant cumulative parking impacts along the 16th Street corridor.

Implementation of **Mitigation Measure M-C-TR-49: Explore Implementation of Parking Management Strategies** in the project area may improve parking conditions through more efficient parking management along both the Mission and 16th corridors. Technology is available to provide real-time information about the availability of parking supply as well as to make adjustments to parking rates to better manage parking supply and demand. The use of such technologies to inform drivers about the availability of parking spaces reduces circling and other secondary environmental effects related to constrained parking conditions. SFMTA has initiated a pilot called SFpark Program to address these issues. The effectiveness of this pilot program is still under study. While the use of the SFpark Program or other similar parking management strategies would improve transportation conditions within an area, it is uncertain if these would mitigate a significant cumulative parking impact to a less-than- significant level.

In summary, both the TTRP Moderate Alternative and the TTRP Expanded Alternative would result in less-than-significant project-level parking impacts. There would be significant unavoidable cumulative parking impacts for the TTRP.14 Moderate Alternative Variant 1 and Variant 2, the TTRP.22 Expanded Alternative, TTRP.22 Expanded Alternative Variant 1, and TTRP.22 Expanded Alternative Variant 2. The TTRP.14 Moderate Alternative would result in a greater temporary parking loss in the Mission corridor, in particular along the segment between 13th Street and Cesar Chavez Street, as compared to the TTRP.14 Expanded Alternative. Conversely, the TTRP Expanded Alternative would result in a greater parking loss along the 16th Street corridor due to the TTRP.22 Expanded Alternative, TTRP.22 Expanded Alternative Variant 1, or TTRP.22 Expanded Alternative Variant 2 as compared to the TTRP.22 Moderate Alternative, which would result in an addition of parking spaces along the corridor. For the remaining nine TTRP corridors, the parking conditions would not substantially change between the TTRP Moderate Alternative and the TTRP Expanded Alternative. Thus, under 2035 Cumulative plus Project conditions the substantial parking loss for these two corridors has the potential to create hazardous conditions and/or delays to other modes of transportation such as transit. Therefore, the parking loss under the TTRP Moderate Alternative for the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2 would contribute to a significant and unavoidable cumulative parking impact even with mitigation, but the TTRP Expanded Alternative would result in a significant and unavoidable cumulative parking impact even with mitigation for the TTRP.22 Expanded Alternative, TTRP.22 Expanded Alternative Variant 1, or TTRP.22 Expanded Alternative Variant 2.

Noise and Vibration

As discussed in Section 4.3, Noise and Vibration, in Chapter 4, the TTRP Moderate Alternative, in combination with the Service Improvements and Service Variants, would result in less-than-significant noise and vibration impacts similar to the TTRP Expanded Alternative. No mitigation measures would be necessary.

Both the TTRP Moderate Alternative and the TTRP Expanded Alternative would involve construction activities throughout the City that would result in temporary increases in ambient noise levels and ground-borne vibration. The construction noise and vibration impacts related to the two TTRP project alternatives (Moderate and Expanded) would be similar, as the projects would occur on the same Rapid Network corridors as well as be comprised of similar features that would be constructed utilizing the same types of construction equipment. Construction noise would vary depending on the type of equipment, equipment condition, and the type of construction activity. For example, loaders and backhoes move around on a construction site whereas compressors tend to remain in one place. Construction projects within the City right-of-way are subject to requirements of not only the San Francisco Noise Ordinance but also the San Francisco Public Works Code and the Department of Public Works (DPW) Orders, among other requirements, as discussed in Section 4.3, Noise and Vibration, on pp. 4.3-12 to 4.3-16 and 4.3-25 to 4.3-32. With adherence to these requirements, the temporary construction noise impacts would be less than significant (Impact NO-1).

Construction activities could also result in temporary ground-borne vibration impacts from use of some types of construction equipment such as jack hammers. As noted above for noise, construction vibration effects would be the same for both the TTRP Moderate and Expanded alternatives. Construction activities would be short-term and temporary, typically approximately two weeks or less to construct most of the individual elements in any one location along a TTRP corridor or at a curb ramp installed as part of Service Improvements. Vibration from the types of equipment used would not be sufficient to damage nearby buildings, and would not be excessive. Therefore vibration impacts for either of the two project alternatives from construction would be less than significant (Impact NO-2).

Once constructed, the TPS Toolkit elements installed along the program-level TTRP corridors, Service-related Capital Improvements, and the project-level TTRP Moderate or Expanded Alternatives would not have ongoing operational noise or vibration impacts. The Service Improvements and Service Variants implemented as a result of TEP would be the same under either project alternative. Service Improvements and Service Variants would increase transit service on some City streets as well as introduce transit service to streets that currently do not have any; the increase in transit vehicle by-passes could increase the ambient noise levels in some locations. Based on an analysis of the increased number of transit vehicles on representative roadway segments where the TEP would provide increased frequencies of service, increases in average 24-hour noise levels would range from 0 to about 3 decibels (dBA) and would result in less-than-significant noise impacts (Impact NO-3) as a result of either the TTRP Moderate Alternative or TTRP Expanded Alternative. Therefore, operational noise impacts for the TTRP Moderate Alternative would be essentially the same as those for the TTRP Expanded Alternative.

There would be no change in vibration effects once the program-level TTRP projects, the Service-related Capital Improvements, and the project-level TTRP Moderate Alternative corridors are constructed. The greatest vibration effects from increases in numbers of transit vehicles as part of the Service Improvements would be from the light rail lines, including the historic streetcars. The analysis in Section 4.3, Noise and Vibration, shows that the increases in frequency of light rail vehicles or historic streetcars would not result in a doubling of the number of vehicles per day bypassing a single spot; therefore the vibration impact would be less than significant (Impact NO-4). This impact would be the same for both the TTRP Moderate Alternative and the TTRP Expanded Alternative.

The TTRP Moderate Alternative, in combination with the Service Improvements, Service-related Capital Improvements, and the Policy Framework, would not combine with other reasonably foreseeable projects to produce significant increases in noise or vibration impacts and would not contribute considerably to significant cumulative noise or vibration impacts (Impact C-NO-1).

Air Quality

As described in Section 4.4, Air Quality, in Chapter 4, like the TTRP Expanded Alternative, the TTRP Moderate Alternative, in combination with the Service Improvements and Service Variants, the Service-related Capital Improvements, and the Policy Framework, would not result in any significant air quality impacts with respect to either criteria pollutants or health risk, and no mitigation measures would be necessary.

Both the TTRP Moderate Alternative and the TTRP Expanded Alternative would involve construction activities throughout the City that would result in emissions of criteria air pollutants. The construction air quality analysis conducted for the TEP used a worst-case construction scenario assuming that multiple construction activities would occur simultaneously at a construction site. For criteria pollutants, the air quality analysis also assumed that up to three different construction projects could occur within the City simultaneously. With these conservative assumptions, criteria pollutant emissions during construction of the TEP would be approximately 5.5 pounds per day of reactive organic gases (ROG) and 50 pounds per day of oxides of nitrogen (NOx), both of which would be below the significance threshold of 54 pounds per day, and less than 3 pounds per day of PM_{10} and $PM_{2.5}$, both of which would be well below the thresholds of 82 and 54 pounds per day, respectively (Impact AQ-1). The air quality impacts of the three program-level TTRPs that were analyzed at a project level following publication of the Draft EIR were evaluated separately; the TTRP.L and TTRP.9 Expanded Alternatives include somewhat more construction activity than the representative construction scenario analyzed for the Draft EIR. Using the same conservative assumptions, that multiple construction activities would occur simultaneously at a construction area (e.g., installation of traffic signals at two intersections simultaneously, or installation of multiple transit bulbs or a two-block sidewalk widening simultaneously rather than linearly) and that three different construction projects could occur simultaneously within the City, emissions of criteria pollutants would be approximately 5.5 pounds per day of ROG and 50 pounds per day of NOx, both below the significance threshold of 54 pounds per day, and less than 3 pounds per day of PM_{10} and $PM_{2.5}$, both of which would be well below the thresholds for these pollutants (Impact AQ-1). Emissions of $PM_{2.5}$ and toxic air contaminants (TACs) would also occur during construction. The maximum health risks calculated for the supplemental maximum construction scenario for the TTRP.9 for $PM_{2.5}$ and TACs would result in an increase in excess cancer risk of about 1.4 in one million and $PM_{2.5}$ concentrations of 0.083 $\mu g/m^3$, well below the thresholds of 10 in a million and 0.3 $\mu g/m^3$, concentrations, respectively (Impact AQ-2). Based on these results, the construction air quality impacts would be less than significant for either the TTRP Moderate Alternative or the TTRP Expanded Alternative.

For construction health risk, the air quality effects would be the same for either the TTRP Moderate Alternative or the TTRP Expanded Alternative. With respect to construction criteria air pollutants, the air quality effects from the TTRP Expanded Alternative may be somewhat increased over those from the TTRP Moderate Alternative due to the fact that several of the TTRP Expanded Alternative proposals for individual TTRP corridors would construct more TPS Toolkit elements than under the TTRP Moderate Alternative for the same corridor. Construction activities for the TTRP Expanded Alternative may extend over a somewhat longer period of time. However, both alternatives would result in less than significant impacts for construction criteria air pollutants. No mitigation measures would be necessary.

No operational air quality impacts would result directly from the various TPS Toolkit elements installed for either the TTRP Moderate Alternative or the TTRP Expanded Alternative. Some TPS Toolkit elements could cause increased traffic congestion, which could result in increases in emissions from longer idle times at intersections. However, potential air quality impacts resulting from delays at intersections would be minor and less than significant. The Service Improvements and Service Variants that would be implemented in conjunction with the TTRP Moderate Alternative would be the same as those implemented under the TTRP Expanded Alternative. Therefore, both project alternatives would increase motor coach vehicle miles traveled based on approximately 350,000 hours of additional transit service per year, which would result in an increase in emissions of criteria pollutants, TACs and $PM_{2.5}$. This increase would be partly offset by an expected mode shift from privately-owned vehicles to public transit, which would result in a decrease in emissions of some criteria pollutants from privately-owned vehicles. The expected mode shift for the TTRP Moderate Alternative would be less than that estimated for the TTRP Expanded Alternative; therefore, the TTRP Moderate Alternative would have a smaller reduction in emissions of criteria pollutants than would occur with the TTRP Expanded Alternative.

Operational emissions from the proposed project alternatives would also be affected by planned changes to the SFMTA transit fleet. SFMTA will replace older motor coaches with new diesel hybrid-electric motor coaches (DHEBs), which will reduce overall fleet emissions. With replacement of 62 old diesel motor coaches with new DHEBs, the TTRP Moderate Alternative would result in a net increase in NOx emissions of approximately 3.3 tons per year, a net reduction in ROG emissions of approximately 2.5 tons per year, a net reduction in PM_{10} emissions of approximately 0.35 tons per year, and a net reduction in $PM_{2.5}$ emissions of approximately 0.04 tons per year (see Table 43 in Section 4.4, Air Quality, on p. 4.4-46). The net increase in NOx emissions would be well below the threshold of 10 tons per year, and other criteria pollutants would be reduced as a result of the TTRP Moderate Alternative (Impact AQ-3). The net reduction in emissions of criteria pollutants with the TTRP Expanded Alternative would be slightly greater for all three of the pollutants that would be reduced, and the net increase in NOx emissions would be approximately 2.3 tons per year, which would be less than the net increase with the TTRP Moderate Alternative. As explained above, the TTRP Expanded Alternative would have less impact than the TTRP Moderate Alternative because there is anticipated to be a greater mode shift from private automobile to transit use with the TTRP Expanded Alternative.

Operational emissions of $PM_{2.5}$ and TACs from additional transit vehicle miles traveled could result in increased health risks along corridors where Service Improvements and Service Variants provide increases in the number of diesel motor coaches. The excess cancer risk from these emissions would be 8.5 in one million, below the threshold of 10 in one million, and the annual average $PM_{2.5}$ would be 0.014 $\mu g/m^3$, well below the threshold of 0.3 $\mu g/m^3$. In addition, the result would be the same under either project alternative since the Service Improvements and Service Variants would be the same (Impact AQ-4). Therefore, like the TTRP Expanded Alternative, the operational impacts of the TTRP Moderate Alternative with respect to air quality health risk, in combination with the Service Improvements and Service Variants, would be less than significant, and no mitigation measures would be necessary.

As a transit-oriented project with the goal of making transit more efficient and effective, the TTRP Moderate Alternative, in combination with the Service Improvements and Service Variants, the Service-related Capital Improvements, the program level TTRP proposals, and the Policy Framework, would be consistent with and further the implementation of the Bay Area 2010 Clean Air Plan (Impact AQ-5). Therefore, no significant impact would occur and no mitigation measures would be necessary. This would be the same as for the TTRP Expanded Alternative, which would also result in a transit-oriented project with the goal of making transit more efficient and effective, and therefore, would be consistent with and further the implementation of the Bay Area 2010 Clean Air Plan.

Because the TEP’s construction and operational emissions would not exceed thresholds for criteria pollutants, neither of the proposed project alternatives would be considered to have a cumulatively considerable contribution to regional air quality impacts (Impact C-AQ-1). Implementation of the TEP, under either the TTRP Moderate Alternative or TTRP Expanded Alternative, each one in combination with the Service Improvements and Service Variants, the Service-related Capital Improvements, the program level TTRP proposals, and the Policy Framework, would not contribute considerably to existing health risk, even within existing air pollution hot spots (Impact C-AQ-2). Therefore, there would be no significant cumulative air quality impacts under either the TTRP Moderate Alternative or the TTRP Expanded Alternative.

Other Topics

The Initial Study prepared for the proposed project alternatives analyzed the TTRP Moderate Alternative at an equal level with the TTRP Expanded Alternative. Significant impacts were identified in the topic areas of Cultural Resources and Hazards and Hazardous Materials, mitigated to less-than-significant levels with **Mitigation Measures M-CP-2a: Accidental Discovery of Archaeological Resources, M-CP-2b: Archaeological Monitoring, M-CP-3: Paleontological Resources Accidental Discovery, and Mitigation Measure M-HZ-1: Hazardous Materials Soil Testing**, (see the Initial Study in Appendix 2 to this EIR, pp. 212–230 and 321–334). These impacts would be similar regardless of the project alternative chosen because the individual TTRP proposals would be constructed along the same Rapid Network corridors. Mitigation Measures M-CP-2a: Accidental Discovery of Archaeological Resources, M-CP-2b: Archaeological Monitoring, and M-CP-3: Paleontological Resources Accidental Discovery, would be applicable to this alternative as well as to the TTRP Expanded Alternative, and would reduce any significant impacts on cultural resources to less-than-significant levels. Mitigation Measure M-HZ-1: Hazardous Materials Soil Testing, would be applicable to the TTRP Moderate Alternative as well as to the TTRP Expanded Alternative in specified locations and would reduce this impact to a less-than-significant level. No other significant environmental impacts were identified for the TTRP Moderate Alternative.

Conclusion

The TTRP Moderate Alternative would include implementation of the same Policy Framework, Service Improvements, Service Variants, Service-related Capital Improvements, and application of TPS Toolkit elements to the program-level TTRP corridors as under the TTRP Expanded Alternative. Therefore, the significant impacts related to traffic and commercial loading under Existing plus Project conditions and also related to traffic, transit, commercial loading and parking under Cumulative plus Project conditions identified above for these components would equally occur under either the TTRP Moderate Alternative or the TTRP Expanded Alternative. References to the TTRP Moderate Alternative or the TTRP Expanded Alternative include as part of the alternative the components described above that are common to both (i.e. Policy Framework, Service Improvements, Service Variants, Service-related Capital Improvements, and application of TPS Toolkit elements to the program-level TTRP corridors).

Unlike the TTRP Expanded Alternative, which would result in significant and unavoidable traffic impacts at five intersections under Existing plus Project alternative conditions, the TTRP Moderate Alternative would not result in traffic impacts under Existing plus project alternative conditions. Like the TTRP Expanded Alternative, the TTRP Moderate Alternative would result in significant and unavoidable transportation impacts on the availability of on-street commercial loading spaces along the same two TTRP corridors – along Mission Street and Stockton Street under Existing plus project alternative and future 2035 Cumulative conditions. Both the TTRP Moderate Alternative and the TTRP Expanded Alternative would result in significant unavoidable cumulative impacts on transit service in the same two corridors/screenlines (Fulton/Hayes and Mission of the Downtown Screenlines), as well as significant traffic impacts at 28 intersections along the program-level TTRP corridors. Both the TTRP Moderate Alternative and the TTRP Expanded Alternative would result in a significant and unavoidable cumulative parking impact, but the impact would occur in different locations depending upon the alternative selected. Both TTRP.14 Moderate Alternative Variant 1 and Variant 2 would result in a cumulative parking impact due to the parking loss along the segment of the Mission Corridor between 13th and Cesar Chavez streets, but the cumulative parking impact under the TTRP.14 Expanded Alternative would be less than significant. Whereas the TTRP.22_1 Expanded Alternative and the TTRP.22_1 Expanded Alternative Variants 1 and 2 would result in a cumulative parking impact due to the parking loss along the segment of the 16th Street Corridor between Third and Bryant streets, but the cumulative parking impact under the TTRP.22 Moderate Alternative would be less than significant. All other significant impacts of the TTRP Moderate Alternative could be mitigated to less-than-significant levels.

The TTRP Moderate Alternative and Service Improvements would meet all of the project sponsor's objectives, listed in Section 2.3 on pp. 2-2 to 2-7 in Chapter 2, Project Description. The TTRP Moderate Alternative would provide somewhat less speed and reliability for transit service than under the TTRP Expanded Alternative and may provide a somewhat less efficient transit network than the TTRP Expanded Alternative. Therefore, while all project sponsor objectives would be met with both alternatives, the SFMTA's objectives for the TEP would be met to a lesser degree with the TTRP Moderate Alternative than with the TTRP Expanded Alternative.

6.3.2 ALTERNATIVE C, TTRP EXPANDED ALTERNATIVE

As discussed in Section 6.3, Introduction to Project Alternatives, the two alternatives are presented (in Chapter 2: Project Description, section 2.5.2.3, beginning on p. 2-110) and analyzed (in Chapter 4: Environmental Setting, Impacts and Mitigation) in this EIR at an equal level of detail. Additionally, the proposed Policy Framework, Service Improvements or Service Variants, the Service-related Capital Improvements, and the TPS Toolkit as applied to the program-level TTRP corridors would be implemented in combination with either alternative. The TTRP Expanded Alternative has been designed to result in greater reductions in transit travel times and includes TPS Toolkit elements that could result in more substantial physical changes to the environment than the TTRP Moderate Alternative, particularly with respect to traffic impacts.

DESCRIPTION

The TTRP Expanded Alternative is described in detail in Chapter 2, Project Description,

- Section 2.5.2.3, on pp. 2-110 to 2-160. The TTRP Expanded Alternative for the 11 project-level TTRPs generally includes the same transit stop changes, pedestrian improvements, and parking and turn restrictions as the TTRP Moderate Alternative; however, alternate traffic signal and stop sign changes as well as additional lane modifications and other improvements would be implemented. The difference between the TTRP Moderate Alternative and the TTRP Expanded Alternative for individual corridors varies. For example, the TTRP.8X Moderate Alternative would replace all-way stop signs with a traffic signal system at the intersection of Geneva and Cayuga streets; the TTRP.8X Expanded Alternative would also replace the all-way stop signs with traffic signals at the intersection of San Bruno Avenue and Felton Streets, and on Visitacion Avenue at Peabody, Cora, Britten and Lohr streets the all-way stop signs would be replaced with stop signs on the cross streets and none on Visitacion Avenue. The TTRP.22_1 Moderate Alternative would not include any new traffic signals, whereas with the TTRP.22_1 Expanded Alternative new traffic signals would be installed on 16th Street at San Bruno, Wisconsin, Connecticut, and Missouri streets.

- The TTRP.J Expanded Alternative, the TTRP.L Expanded Alternative, the TTRP.N Expanded Alternative, the TTRP.5 Expanded Alternative, and the TTRP.71_1 Expanded Alternative would replace stop signs at intersections along Church, Taraval, Judah, McAllister, and Haight streets with traffic calming measures, rather than traffic signals. New signals would be installed on Mission Street for the TTRP.14 Expanded Alternative (two intersections), 16th Street for the TTRP.22_1 Expanded Alternative (four intersections), and San Bruno Avenue for the TTRP.8X Expanded Alternative (one intersection), and Taraval Street for the TTRP.L Expanded Alternative (five intersections). All-way stop controlled intersections at four intersections on Visitacion Avenue would be converted to 2-way stop-controlled with additional traffic calming measures for the TTRP.8X Expanded Alternative.

- The TTRP Expanded Alternative would also establish transit-only lanes on Church Street between Duboce Avenue and 16th Street (for the TTRP.J Expanded Alternative); Taraval Street between 15th and 46th avenues (TTRP.L Expanded Alternative); on Geneva Avenue between Santos Street and Moscow Avenue (for the TTRP.8X Expanded Alternative); on Potrero Avenue in the southbound direction between 18th and 24th streets (TTRP.9 Expanded Alternative); on 16th Street between Third and Bryant streets and between Bryant and Church streets as variants (TTRP.22_1 Expanded Alternative Variants 1 and 2); and on Van Ness Avenue between Lombard and Bay streets, on Columbus Avenue between Filbert and Green streets, and on Kearny Street between Market and Sutter streets (for the TTRP.30_1 Expanded Alternative). The TTRP.9 Expanded Alternative would remove the existing northbound transit-only lane on Potrero Avenue between 200 feet north of 24th Street and 21st Street.

  The TTRP.14 Expanded Alternative would relocate the existing side-running transit-only lanes into center-running transit-only lanes from First to Fifth streets outbound and from Sixth to First streets inbound; transition the outbound transit-only lane back to its existing curbside configuration; and rescind the inbound transit-only lane from Seventh to Sixth streets; and then would establish a new outbound transit-only lane extending from 11th to Cesar Chavez streets. Between 11th and 13th streets this would be achieved by converting a southbound mixed-flow lane into a transit-only lane. Between 13th and Cesar Chavez streets the transit-only lane would be achieved by reducing the roadway from four lanes to three, with a transit-only lane and a mixed-flow lane in the southbound direction and single mixed-flow lane in the northbound direction. Between Cesar Chavez Street and Randall Avenue and between Silver and Geneva avenues, a mixed-flow lane in both directions would be converted to an all-day side-running transit-only lane.

- As part of the TTRP.5 Expanded Alternative, the number of lanes on Fulton Street between Stanyan Street and Central Avenue would be reduced from four lanes to three lanes to provide a center left-turn lane. In addition, as part of TTRP.5 Expanded Alternative, the number of lanes on westbound Fulton Street between Central Avenue and Baker Street would be reduced from two to one lane, and parking on the north side of the street would be converted from parallel to perpendicular. As part of the TTRP.28_1 Expanded Alternative, one of the two northbound left turn lanes on 19th Avenue at Winston Drive would be shortened.

- The TTRP.J Expanded Alternative is described in detail in Chapter 2, Project Description, in Section 2.5.2.3 on pp. 2-114 to 2-118. The TTRP.L Expanded Alternative is described in more detail on pp. 2-118c to 2-118f. The TTRP.N Expanded Alternative is described in more detail on pp. 2-120 to 2-122. The TTRP.5 Expanded Alternative is described in more detail on pp. 2-125 to 2-127. The TTRP.8X Expanded Alternative is described in more detail on pp. 2-132 to 2-135. The TTRP.9 Expanded Alternative is described in more detail on pp. 2-135d to 2-135i. The TTRP.14 Expanded Alternative is described in more detail on pp. 2-141 to 2-147. The TTRP.22_1 Expanded Alternative and Variants 1 and 2 are described in more detail on pp. 2-149 to 2-153. The TTRP.28_1 Expanded Alternative is described in more detail on pp. 2-154 to 2-156. The TTRP.30_1 Expanded Alternative is described in more detail on pp. 2-158 to 2-160. The TTRP.71_1 Expanded Alternative is described in more detail on p. 2-160c.

ENVIRONMENTAL ANALYSIS

The impacts of the TTRP Expanded Alternative are identified and discussed in Chapter 4, Sections 4.2, Transportation and Circulation, 4.3, Noise and Vibration, and 4.4, Air Quality in the EIR and in the Initial Study under environmental topics fully addressed there on pp. 176 to 343 in Appendix 2 to the EIR. The impacts that would result from implementation of this alternative are summarized below, and the mitigation measures that would be applicable to this alternative are noted. In addition, the discussion compares the impacts of this project alternative to those of the TTRP Moderate Alternative (and see Table 46, above on pp. 6-17 to 6-21).

Transportation

Project Components Common to both Project Alternatives

The Policy Framework, TPS Toolkit elements applied to the program-level TTRP corridors, Service Improvements and Service Variants, and Service-related Capital Improvements would be implemented with the TTRP Expanded Alternative, the same as for the TTRP Moderate Alternative. As noted in the discussion of transportation impacts for Alternative B, TTRP Moderate Alternative, the environmental impacts of these components would be the same under either of the proposed project alternatives. Transportation impacts common to both alternatives are summarized at the beginning of the Transportation subsection in the Environmental Analysis of Alternative B, TTRP Moderate Alternative (Subsection 6.3.1), on pp. 6-22 to 6-31.

Existing plus Service Improvements, or Service Variants, and the TTRP Expanded Alternative Conditions (referred to as Existing plus TTRP Expanded Alternative)

<u>Transit, Pedestrians, Bicycles, Emergency Vehicle Access, and Construction</u>

Similar to the TTRP Moderate Alternative, the TTRP Expanded Alternative would not result in any significant project-level impacts on transit, pedestrians, bicycles, or emergency vehicle access, and would not cause any significant transportation impacts during construction, as discussed above for the TTRP Moderate Alternative (Impacts TR-21, TR-45, TR-56, and TR-1).

<u>Traffic</u>

- Unlike the TTRP Moderate Alternative, the TTRP Expanded Alternative would result in significant and unavoidable project-level traffic impacts at the following five of the 78 study intersections:

- Randall Street/San Jose Avenue – from implementation of the TTRP.14 Expanded Alternative (Impact TR-24).

- 16th Street/Bryant Street – from implementation of the TTRP.22_1 Expanded Alternative (Impact TR-26), TTRP.22_1 Expanded Alternative Variant 1 (Impact TR-30), or TTRP.2_1 Expanded Alternative Variant 2 (Impact TR-34), even with implementation of Mitigation Measure M-TR-26.

- 16th Street/Potrero Avenue – from implementation of the TTRP.22_1 Expanded Alternative (Impact TR-27), TTRP.22_1 Expanded Alternative Variant 1 (Impact TR-31), or TTRP.2_1 Expanded Alternative Variant 2 (Impact TR-35).

- 16th Street/Seventh Street – from implementation of the TTRP.22_1 Expanded Alternative (Impact TR-28), TTRP.22_1 Expanded Alternative Variant 1 (Impact TR-32), or TTRP.2_1 Expanded Alternative Variant 2 (Impact TR-36).

- Columbus Avenue/Green Street/Stockton Street – from implementation of the TTRP.30_1 Expanded Alternative (Impact TR-38), TTRP.30_1 Expanded Alternative Variant 1 (Impact TR-40), TTRP.30_1 Expanded Alternative Variant 2 (Impact TR-42).

Loading

Similar to the TTRP Moderate Alternative, the TTRP Expanded Alternative would result in significant and unavoidable loading impacts even with mitigation. There would be a reduction in on-street commercial loading along the Mission Street corridor with implementation of the TTRP.14 Expanded Alternative, which would be a significant and unavoidable impact (Impact TR-50). The TTRP.30_1 Expanded Alternative and its Variants 1 and 2 also would result in a reduction in on-street loading spaces, causing a significant and unavoidable impact, even with mitigation, along Stockton Street in the TTRP.30_1 corridor (Impacts TR-52, TR-53, and TR-54). **Mitigation Measure M-TR-48 Enforcement of Parking Violations**, could reduce, but may not eliminate these significant loading impacts.

Parking

As described under the TTRP Moderate Alternative, under Existing plus Project conditions, implementation of either the TTRP Moderate Alternative or the TTRP Expanded Alternative would not result in an increase in parking demand. These TTRP proposals would in most cases, but not all, result in the elimination of some on-street parking spaces along the TTRP corridor. Some of the corridor projects would result in the addition of on-street parking.

As described under Impact TR-58, the parking loss along the TTRP corridors as a result of the project-level TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X,

TTRP.9, TTRP.14, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1, TTRP.30_1 Variant 2, and TTRP.71_1 would not be substantial and would be considered less-than-significant project-level parking impacts for the reasons described under the TTRP Moderate Alternative discussion. The TTRP.14 Expanded Alternative would result in a parking loss of 405 parking spaces, 170 on a permanent basis and an additional 235 parking spaces related to part-time tow-away regulations (generally 7 a.m. to 7 p.m. north of Cesar Chavez Street, with tow-away regulations south of Cesar Chavez Street during the peak period and peak direction only). The loss of 145 permanent parking spaces located on the Mission corridor primarily north of 13th Street would not be considered substantial in the context of downtown San Francisco, a transit rich area with alternative off-street parking opportunities. In addition, the loss of 10 parking spaces between 13th and Cesar Chavez streets as well as 15 spaces south of Cesar Chavez Street would not be considered substantial. Therefore, the parking impact for the TTRP.14 Expanded Alternative would not be significant.

Under the TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2 there would be a substantial parking loss. For the TTRP.22_1, TTRP.22_1_Variant 1 and TTRP.22_1 Variant 2 the substantial parking loss would be related to the implementation of center-running transit-only lanes, and the tow-away regulations associated with TTRP.22_1 Variant 1. The TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2, would result in a net decrease in the number of on-street parking spaces of approximately 290 parking spaces, 520 parking spaces and 280 parking spaces, respectively. Parking removals associated with the tow-away regulations would not be permanent (enforced for the TTRP.22_1 corridor for peak periods) and would be available outside of the tow-away time periods for daytime and overnight parking. Therefore, the TTRP.22_1 Expanded Alternative Variant 1 would result in a permanent loss of approximately 280 spaces, which would not substantially differ from the permanent loss of parking under TTRP.22_1 Expanded Alternative (290 spaces) and the TTRP.22_1 Expanded Alternative Variant 2 (280 spaces).

However, at a project level the parking loss for the TTRP.14 (Moderate Alternative) and TTRP.22_1 (Expanded Alternative) corridors was found to be less-than-significant because both corridors are well served by public transit and other modes, and the proposed project improvements would improve transit and pedestrian conditions. Therefore, the parking loss would not create hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. For the reasons described above, the Existing plus Project impacts related to parking for the TTRP Moderate Alternative for the TTRP.14 and for the TTRP Expanded Alternative for the TTRP.22 were determined to be less than significant.

In summary, both the TTRP Moderate Alternative and the TTRP Expanded Alternative would result in less-than-significant project-level impacts related to parking. However, the TTRP

Moderate Alternative would result in a greater parking loss in the Mission corridor along the segment between 13th and Cesar Chavez streets due to the TTRP.14 Moderate Alternative Variant 1 or Variant 2 compared to the TTRP.14 Expanded Alternative. Conversely, the TTRP Expanded Alternative would result in a greater parking loss along the 16th Street corridor due to the TTRP.22_1 Expanded Alternative, TTRP.22_1 Expanded Alternative Variant 1 or TTRP.22_1 Expanded Alternative Variant 2 compared to the TTRP.22 Moderate Alternative. For the remaining nine TTRP corridors, the parking conditions would not substantially change between the TTRP Moderate Alternative and the TTRP Expanded Alternative.

2035 Cumulative plus Service Improvements, or Service Variants, and the TTRP Expanded Alternative Conditions (referred to as 2035 Cumulative plus TTRP Expanded Alternative)

Cumulative Transit

Similar to the 2035 Cumulative plus the TTRP Moderate Alternative, the 2035 Cumulative plus the TTRP Expanded Alternative, would contribute to significant cumulative impacts on transit in the Fulton/Hayes corridor within the Northwest screenline and the Mission corridor within the Southeast screenline, exceeding the capacity utilization standard during both a.m. and p.m. peak hours under future 2035 Cumulative conditions (Impact C-TR-3). Providing additional capacity (either by increasing the number of buses operating on a route or by using a larger vehicle) and reducing peak hour capacity utilization to less than the standard as identified in **Mitigation Measure C-M-TR-1: SFMTA Monitoring of Muni Service**, could reduce the 2035 Cumulative plus the TTRP Expanded Alternative's cumulative impact on the Fulton/Hayes and Mission corridors to a less-than-significant level. However, because SFMTA cannot commit to future funding appropriations nor be certain of its ability to provide additional service citywide to maintain the capacity utilization standard, among other service goals, the feasibility of this mitigation measure is uncertain and the 2035 Cumulative plus the TTRP Expanded Alternative's considerable contribution to significant cumulative transit impacts would remain even with mitigation.

Cumulative Traffic

Unlike the 2035 Cumulative plus the TTRP Moderate Alternative, the 2035 Cumulative plus the TTRP Expanded Alternative would cause significant cumulative traffic impacts at 13 of the 78 study intersections under future 2035 Cumulative conditions. The locations and the related TTRP Expanded Alternative proposals are:

- Market Street/Church Street/14th Street – from implementation of the TTRP.J Expanded Alternative (Impact C-TR-13).

- Fulton Street/Masonic Avenue Street – from implementation of the TTRP.5 Expanded Alternative (Impact C-TR-14).
- Geneva Avenue/Carter Street – from implementation of the TTRP.8X Expanded Alternative (Impact C-TR-15).
- Geneva Avenue/Moscow Street – from implementation of the TTRP.8X Expanded Alternative (Impact C-TR-16).
- Randall Street/San Jose Avenue – from implementation of the TTRP.14 Expanded Alternative (Impact C-TR-17).
- Mission Street/Fifth Street – from implementation of the TTRP.14 Expanded Alternative (Impact C-TR-18).
- Mission Street/16th Street – from implementation of the TTRP.14 Expanded Alternative (Impact C-TR-19).
- 16th Street/Bryant Street – from implementation of the TTRP.22_1 Expanded Alternative (Impact C-TR-20), TTRP.22_1 Expanded Alternative Variant 1 (Impact C-TR-21), or TTRP.2_1 Expanded Alternative Variant 2 (Impact C-TR-22), even with implementation of Mitigation Measure M-TR-26.
- 16th Street/Potrero Avenue – from implementation of the TTRP.22_1 Expanded Alternative (Impact C-TR-23), TTRP.22_1 Expanded Alternative Variant 1 (Impact C-TR-24), or TTRP.2_1 Expanded Alternative Variant 2 (Impact C-TR-25).
- 16th Street/Owens Street – from implementation of the TTRP.22_1 Expanded Alternative (Impact C-TR-26), TTRP.22_1 Expanded Alternative Variant 1 (Impact C-TR-27), or TTRP.2_1 Expanded Alternative Variant 2 ((Impact C-TR-28).
- 16th Street/Fourth Street – from implementation of the TTRP.22_1 Expanded Alternative (Impact C-TR-29), TTRP.22_1 Expanded Alternative Variant 1 (Impact C-TR-30), or TTRP.2_1 Expanded Alternative Variant 2 (Impact C-TR-31).
- 16th Street/Seventh Street – from implementation of the TTRP.22_1 Expanded Alternative (Impact C-TR-32), TTRP.22_1 Expanded Alternative Variant 1 (Impact C-TR-33), or TTRP.2_1 Expanded Alternative Variant 2 (Impact C-TR-34).
- Columbus Avenue/Green Street/Stockton Street – from implementation of the TTRP.30_1 Expanded Alternative (Impact C-TR-35), TTRP.30_1 Expanded

Alternative Variant 1 (Impact C-TR-36), or TTRP.30_1 Expanded Alternative Variant 2 (Impact C-TR-37).

Similar to the TTRP Moderate Alternative, implementation of certain objectives and actions of the Policy Framework and the TPS Toolkit categories of Lane Modifications and Pedestrian Improvements as applied to the program-level TTRP corridors would result in significant cumulative traffic impacts at 28 intersections along the program-level TTRP corridors under 2035 Cumulative plus TTRP Expanded Alternative conditions (Impact C-TR-9). Implementation of **Mitigation Measure M-TR-8: Optimization of Intersection Operations**, would minimize traffic impacts at intersections along the program-level TTRP corridors. However, because the mitigation measure may not be adequate to mitigate intersection impacts to less-than-significant levels at all locations, and because the feasibility of providing additional capacity at impacted intersections is unknown, this impact would remain significant and unavoidable even with mitigation.

Cumulative Loading

- In combination with past, present, and reasonably foreseeable future development, the 2035 Cumulative plus the TTRP Expanded Alternative would have less-than-significant cumulative impacts on commercial loading on the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, and TTRP.71_1 corridors (Impact C-TR-48), similar to the TTRP Moderate Alternative because these TTRP proposals would not substantially affect loading conditions in these areas.

As for the 2035 Cumulative plus the TTRP Moderate Alternative, in combination with past, present, and reasonably foreseeable future development, the 2035 Cumulative plus the TTRP Expanded Alternative could also contribute to reductions in on-street commercial loading spaces, causing significant and unavoidable cumulative commercial loading impacts along Mission Street and Stockton Street (Impact C-TR-45) as well as on other streets with implementation of the program-level TTRPs (Impact C-TR-43). Implementation of **Mitigation Measure M-TR-10: Provision of Replacement Commercial Loading Spaces**, could reduce the cumulative loading impacts to less-than-significant levels. However, in some locations with a high volume of loading demand, at locations where mitigation is incompatible with the proposed improvement, or where roadway geometry precludes implementation of mitigation, significant cumulative loading impacts may not be reduced to less-than-significant levels and would remain significant and unavoidable even with mitigation.

Cumulative Pedestrians and Bicycles

- The TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.22_1, TTRP.28_1, TTRP.30, and TTRP.71_1 corridors would have less-than-significant cumulative pedestrian and bicycle impacts (Impact C-TR-42), similar to the TTRP Moderate Alternative.

Cumulative Parking

Considering cumulative parking conditions, over time, due to the land use development and increased density anticipated within the City, parking demand and competition for on- and off-street parking is likely to increase. Additionally, through the implementation of the City's Transit First Policy and City's Better Streets program and related projects, especially along commercial and dense mixed-use corridors, on-street parking may be further removed to promote alternative modes of travel and sustainable street designs. Where parking removal would occur under either the TTRP Moderate Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1, and TTRP.71_1 or for the TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1 and Variant 2, and TTRP.71_1, the parking removal would be spread out over the entire TTRP corridor, and therefore, in combination with other development along the corridors would not represent a substantial portion of the parking shortfall that could occur over time. The above noted TTRP proposals in either the TTRP Moderate Alternative or the TTRP Expanded Alternative would encourage transit use through the reduction of transit travel time and increase of transit reliability, which may further lead to a mode shift from private passenger vehicles to transit. Furthermore, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, may induce drivers to shift to other modes of travel, or change their overall travel habits over time. The loss of parking under these TTRP proposals would not be considered substantial and these TTRP Moderate or Expanded Alternative proposals would not result in an increase in parking demand. For the following nine TTRP corridors, the parking conditions would not substantially change between the TTRP Moderate Alternative and the TTRP Expanded Alternative: TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.28_1, TTRP.30_1 and its TTRP Variants, and TTRP.71_1.

In consideration of the above cumulative conditions, the TTRP Moderate Alternative proposals for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.22_1, TTRP.28_1, TTRP.30_1, and TTRP.71_1 or for the TTRP Expanded Alternative for the TTRP.J, TTRP.L, TTRP.N, TTRP.5, TTRP.8X, TTRP.9, TTRP.14, TTRP.28_1, TTRP.30_1, TTRP.30_1 Variant 1 and Variant 2, and TTRP.71_1 would not result in significant cumulative parking impacts.

Unlike for the TTRP.14 Moderate Alternative Variants 1 or 2, no significant and unavoidable cumulative parking impacts would occur along the Mission Street corridor with the TTRP Expanded Alternative, because the parking loss proposed under the TTRP.14 Expanded Alternative (Impact C-TR-53) would not be substantial, and, in combination with reasonably foreseeable future development and other projects, would contribute to significant parking impacts along the Mission Street corridor. The loss of 405 parking spaces as a result of the TTRP.14 Expanded Alternative (235 on a part-time basis and 170 on a permanent basis) would be reduced compared to the TTRP.14 Moderate Alternative Variants 1 and 2 (30-295 permanent spaces). Additionally, as compared to the TTRP.14 Moderate Alternative Variant 1 and TTRP.14 Moderate Alternative Variant 2, the parking loss under the TTRP.14 Expanded Alternative would be focused on the northern segment of the corridor (Civic Center/SOMA/Downtown), where additional off-street parking is available. This area is also served by multiple local and regional transit agencies. Therefore, the loss of parking as a result of the TTRP.14 Expanded Alternative would not be substantial.

Unlike the TTRP Moderate Alternative for TTRP.22_1, under the TTRP Expanded Alternative for the TTRP.22_1, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2 (Impact C-TR-54) parking loss along the 16th Street corridor would be substantial and, in combination with reasonably foreseeable future development and other projects, would contribute to significant cumulative parking impacts along the 16th Street corridor. In contrast, the TTRP Moderate Alternative for TTRP.22_1 would result in a net addition of 10 parking spaces along the 16th Street corridor.

Implementation of **Mitigation Measure M-C-TR-49: Explore Implementation of Parking Management Strategies** in the project area for the TTRP.22_1 Expanded Alternative and for the TTRP.14 Moderate Alternative Variants 1 and 2 may improve parking conditions through more efficient parking management along both the 16th and Mission corridors. While the use of parking management strategies would improve transportation conditions within an area, it is uncertain whether its implementation would mitigate a significant cumulative parking impact to a less than significant level. The substantial parking loss has the potential to create hazardous conditions and/or delays to other modes of transportation such as transit. Therefore, the cumulative impact would remain significant and unavoidable with mitigation.

In summary, both the TTRP Moderate Alternative and the TTRP Expanded Alternative would result in less-than-significant project-level impacts related to parking. There would be significant and unavoidable cumulative parking impacts for the TTRP.14 Moderate Alternative Variant 1 and Variant 2 due to the loss of parking on the segment of the corridor between 13th and Cesar Chavez streets, and also for the TTRP.22 Expanded Alternative, TTRP.22 Expanded Alternative Variant 1, and TTRP.22 Expanded Alternative Variant 2 due to the loss of parking on 16th Street between third and Bryant streets even with mitigation. The TTRP.14 Moderate Alternatives would result in a greater temporary parking loss in the Mission corridor, particularly along the segment between 13th Street and Cesar Chavez Street, as compared to the TTRP.14 Expanded Alternative, under which the loss of parking for the segment of Mission Street north of 13th Street would not be considered substantial. Conversely, the TTRP Expanded Alternative would result in a greater parking loss along the 16th Street corridor due to the TTRP.22 Expanded Alternative, TTRP.22 Expanded Alternative Variant 1 or Variant 2 as compared to the TTRP.22 Moderate Alternative. For the

- remaining nine TTRP corridors, the parking conditions would not substantially change between the TTRP Moderate Alternative and the TTRP Expanded Alternative. Under 2035 Cumulative plus Project conditions, the parking loss under the TTRP Expanded Alternative for the TTRP.14 Expanded Alternative and for the TTRP.22_1 Expanded Alternative, TTRP.22_1 Variant 1, and TTRP.22_1 Variant 2 would result in significant and unavoidable cumulative parking impacts even with mitigation.

Noise and Vibration

As for the TTRP Moderate Alternative, the TTRP Expanded Alternative would not result in significant construction-related noise and vibration impacts. Construction activities and equipment used for the TTRP Expanded Alternative would be the same as those for the TTRP Moderate Alternative, and would occur along the same Rapid Network corridors, regardless of the alternative or combination of alternative components selected by decision-makers; therefore construction-related noise and vibration impacts would not substantially differ from those identified for the TTRP Moderate Alternative, summarized above in Section 6.3.1, and would be less than significant.

Operational noise impacts would result from the Service Improvements and Service Variants, which would be implemented regardless of project alternative chosen (i.e. either with the TTRP Expanded Alternative or TTRP Moderate Alternative). Therefore, the operational noise and vibration impacts would be the same for the TTRP Expanded Alternative as described for the TTRP Moderate Alternative, and would be less than significant. Thus, no noise or vibration mitigation measures would be necessary for the TTRP Expanded Alternative.

As for the TTRP Moderate Alternative, the TTRP Expanded Alternative, in combination with the Service Improvements, Service-related Capital Improvements, program-level TTRPs, and the Policy Framework, would not combine with other reasonably foreseeable projects to produce significant increases in noise or vibration impacts and would not contribute considerably to significant cumulative impacts (Impact C-NO-1).

Air Quality

Construction air quality impacts for the TTRP Expanded Alternative would be similar to those for the TTRP Moderate Alternative because the construction activities and equipment used would be the same irrespective of the alternative or combination of alternative components chosen and would be less than significant (Impacts AQ-1 and AQ-2). In addition, the project construction activities would occur along the same Rapid Network corridors irrespective of whether the TTRP Moderate or TTRP Expanded Alternative is implemented. However, since in general there would be more TPS Toolkit elements installed under the TTRP Expanded

- Alternative, construction impacts would be somewhat greater than under the TTRP Moderate Alternative, though still less than significant. The representative construction scenario with the greatest criteria pollutant emissions and the greatest cancer risk and annual average $PM_{2.5}$ concentration was analyzed for the Expanded Alternative to ensure that the most conservative results were presented. As shown above in the discussion of Alternative B, TTRP Moderate Alternative, construction emissions under the conservative scenario assuming three similar groups of TPS Toolkit elements were installed simultaneously throughout the City, would be below significance thresholds and the air quality impacts would be less than significant.

Operational air quality impacts from the TEP would result from the Service Improvements and Service Variants, which would be implemented in combination with the TTRP Moderate Alternative or the TTRP Expanded Alternative. The same program of Service Improvements would be implemented with either the TTRP Moderate or TTRP Expanded Alternative resulting in the same transit vehicle miles traveled, based on approximately 350,000 hours of additional transit service, under either alternative. The increase in emissions of criteria pollutants that would result from this additional transit service would be affected by SFMTA's program of replacing older motor coaches with new DHEBs that will reduce overall fleet emissions. As discussed for the TTRP Moderate Alternative, operational air quality impacts would be less than significant (Impacts AQ-3, AQ-4, and AQ-5). However, as shown in the air quality analysis conducted for the TEP, there would likely be a greater mode shift from private passenger vehicles to transit under the TTRP Expanded Alternative (Service Improvements with greater transit travel time reductions and enhanced reliability) than under the TTRP Moderate Alternative. Therefore, with respect to criteria pollutants, the air quality impacts for TTRP Expanded Alternative would be somewhat less than under the TTRP Moderate Alternative with a smaller increase in NOx emissions of 2.3 tons per year compared to 3.3 tons per year increase with the TTRP Moderate Alternative, and would result in greater reductions in ROG (3.7 tons per year reduction compared to 2.5 tons per year), greater reductions in PM_{10} (0.6 tons per year reduction compared to 0.35 tons per year), and greater reductions in $PM_{2.5}$ (0.15 tons per year reduction compared to 0.15 tons per year). Operational health risk would be the same under either the TTRP Moderate Alternative or TTRP Expanded Alternative (see the discussion under Alternative B, TTRP Moderate Alternative, on pp. 6-33 to 6-35). Because the TEP's construction and operational emissions would not exceed thresholds for criteria pollutants, neither the TTRP Moderate Alternative nor the TTRP Expanded Alternative would be considered to have a cumulatively considerably contribution to regional air quality impacts, nor would either alternative contribute considerably to health risks.

As for the TTRP Moderate Alternative, the TTRP Expanded Alternative would not result in any significant air quality impacts, and no mitigation measures would be necessary.

Other Topics

The Initial Study prepared for the proposed project alternatives analyzed the TTRP Moderate Alternative and TTRP Expanded Alternative at an equal level of analysis. Significant but mitigable impacts were identified in the topic areas of Cultural Resources and Hazards and Hazardous Materials (see the Initial Study in Appendix 2 to this EIR, pp. 212–230 and 321–334). These impacts would be similar regardless of the project alternative chosen because the individual TTRP proposals would be constructed along the same Rapid Network corridors. **Mitigation Measures M-CP-2a: Accidental Discovery of Archaeological Resources, M-CP-2b: Archaeological Monitoring, and M-CP-3: Paleontological Resources Accidental Discovery**, would be applicable to the TTRP Expanded Alternative as well as to the TTRP Moderate Alternative and would reduce any significant impacts on cultural resources to less-than-significant levels. **Mitigation Measure M-HZ-1: Hazardous Materials Soil Testing**, would be applicable to the TTRP Expanded Alternative as well as to the TTRP Moderate Alternative and would reduce any hazards impact to a less-than-significant level. No other significant environmental impacts were identified for the TTRP Expanded Alternative.

Conclusion

The TTRP Expanded Alternative would include implementation of the same Policy Framework, Service Improvements, Service Variants, Service-related Capital Improvements, and application of TPS Toolkit elements to the program-level TTRP corridors as under the TTRP Moderate Alternative. Therefore, the significant impacts related to traffic, cumulative transit, commercial loading, and cumulative parking identified above for these components would occur under either the TTRP Moderate Alternative or the TTRP Expanded Alternative.

The TTRP Expanded Alternative would result in more significant and unavoidable impacts than would the TTRP Moderate Alternative. The TTRP Expanded Alternative would result in significant and unavoidable traffic impacts at five of the 78 study intersections, unlike the TTRP Moderate Alternative which would not result in significant traffic impacts under Existing plus Project alternative conditions. Both the TTRP Moderate Alternative and the TTRP Expanded Alternative would result in significant loading impacts based on a reduction in the availability of on-street commercial loading spaces in two TTRP corridors under both Existing plus Project and 2035 Cumulative plus Project conditions, as well as in various locations along the nine program-level TTRP corridors. Under 2035 Cumulative plus Project alternative conditions, both the TTRP Moderate Alternative and the TTRP Expanded Alternative would result in significant and unavoidable cumulative impacts on transit service on two corridors within two of the Downtown Muni analysis screenlines. Under 2035 Cumulative plus Project conditions, the TTRP Expanded Alternative would result in significant traffic impacts at up to 13 of the 78 study intersections for the project-level TTRPs, unlike the TTRP Moderate Alternative. Both alternatives could result in significant traffic impacts at up to 28 intersections throughout the City along the program-level TTRP corridors under 2035 Cumulative plus Project conditions. All other significant impacts of the TTRP Expanded Alternative could be mitigated to less-than-significant levels.

The TTRP Expanded Alternative with Service Improvements would meet all of the project sponsor's objectives, listed in Section 2.3 in Chapter 2, Project Description (pp. 2-2 to 2-7).

Because the TTRP Expanded Alternative would result in greater transit travel time reductions as well as well as increased reliability in transit service as compared to the TTRP Moderate Alternative, the TTRP Expanded Alternative would meet the SFMTA's objectives for the TEP more thoroughly than would the TTRP Moderate Alternative.

6.4 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The No Project Alternative is the environmentally superior alternative among all of the alternatives analyzed, because it would not result in any traffic, transit, commercial loading, or parking impacts. When the environmentally superior alternative is the No Project Alternative, the EIR must identify another environmentally superior alternative (*CEQA Guidelines* § 15126.6(e)(2)). The TTRP Moderate Alternative is the environmentally superior alternative compared to the TTRP Expanded Alternative (the other alternative analyzed). While the TTRP Moderate Alternative would result in greater significant impacts related to loss of on-street loading spaces and, in the cumulative context, related to the loss of on-street parking compared to the TTRP Expanded Alternative, it would not result in any significant project-specific or cumulative traffic impacts, unlike the TTRP Expanded Alternative, as shown in Table 46, pp. 6-17 to 6-21.

6.5 ALTERNATIVES CONSIDERED BUT REJECTED

This subsection identifies alternatives that were considered by the project sponsor, the SFMTA, but were eliminated from further consideration during development of the TEP proposals, and explains the reasons underlying the determination for each.

The TEP is a systemwide program to improve the existing transit infrastructure and service in the City and County of San Francisco. Therefore, alternative locations for the TEP would not be feasible. In addition, improvements have been proposed to an existing network of transit streets within the City's existing transportation system. While the proposed project alternatives would include minor changes to the transit network in terms of the addition of transit to streets or street segments, as well as the elimination of transit on some other streets or street segments, alternative locations for transit improvements in general may not be possible due to the need to maintain connectivity and geographic coverage within the existing transit network as well as within the City's existing transportation network.

Since 2008, the SFMTA has been developing proposals to improve upon the existing transit network. During this time period, the SFMTA considered several potential alternatives to aspects of the TEP projects from what are now proposed as the TTRP Moderate and TTRP Expanded Alternatives. These alternatives advanced through various stages of the vetting process before being removed from consideration. For example, some were evaluated by the SFMTA planners and engineers before being rejected, others were carried forward to internal stakeholder vetting by various City agencies, and still others were presented to public stakeholders and citizens. Alternatives considered and rejected include:

- Transit-only Streets along high transit ridership corridors. With the creation of Transit-only streets, all non-transit vehicle travel (with the exception of emergency vehicles) would be prohibited. This alternative was rejected due to community concerns over traffic, commercial loading and personal vehicle usage.

- Transit-only lanes along the entirety of all existing four-lane (or more) transit corridors. Instead of a blanket approach, the SFMTA has only pursued transit-only lanes on targeted streets, and segments of streets, where it is anticipated that an increase in travel time and/or transit reliability would be significant from such implementation.

- Stop sign removal and replacement with traffic signals at all stop sign locations on transit corridors. The SFMTA has only pursued stop sign replacement with traffic signals at intersection locations where there are current, or proposed, far side transit stop locations.

- Stop consolidation and optimization standards as recommended in best practices literature. As opposed to providing a blanket, hard and fast, stop spacing standard, the SFMTA has proposed stop removal only at key locations and has applied the stop spacing standards in a context-sensitive manner. Environmental (both built and natural) conditions vary greatly in the Muni service area, so ultimate stop spacing is based on additional metrics such as land use, street grade, stop activity, pedestrian activity that further refine the stop spacing proposals.

- Route terminal re-location and optimization was considered for some routes that had terminal locations at unproductive route segments or in low-transit demand locations. These alternative terminal locations were rejected due to operational restrictions such as operator restroom location and feasibility.

- Fleet mode change by route, such as servicing some routes that currently operate with existing trolley vehicles with diesel fleet or vice-versa was considered, these alternatives were rejected due to the high capital costs associated with overhead wire extension or community concerns about operating diesel vehicles on currently-electrified routes.

- Additional extensions to existing routes were considered. However, many of these alternatives were rejected due to operating costs, capital costs, technical infeasibility, or lack of community interest associated with the route extension.

- Modification of route tails (swapping one route segment with a different route's segment to serve the same transit corridor) was considered, but rejected due to low travel patterns between different neighborhoods and capital and operating cost assessments of the route switch.

- Route discontinuations and other route segment eliminations were considered but rejected as alternatives due to community concerns.

- Use of higher capacity vehicles on certain routes. The TEP does include proposals to serve some routes, like the 5 Fulton, with 60 foot vehicles even though 40 foot vehicles currently serve the route. However, other fleet modifications for some routes were rejected due to load weight constraints, right-of-way constraints, and topography.

- Streamlining routes for improved directness (i.e., reducing number of turns) was considered and is proposed for some lines. However, not all lines received the streamlining improvements due to street grade and bus operation feasibility.

- Modifying frequency (either by increasing or decreasing it) is proposed for some routes. However, not all routes received frequency adjustments due to route ridership or operating budget constraints.

- Reduction in span of service was considered for some routes but was rejected due to community concerns.

- Farside boarding islands at signalized intersections would take advantage of transit-signal priority. However, the alternative was rejected due to roadway constraints and concerns related to right-turn safety considerations.

CHAPTER 7: REPORT PREPARERS

EIR Authors

San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Acting Environmental Review Officer	Sarah B. Jones
Deputy Environmental Review Officer	Viktoriya Wise, AICP
Senior Environmental Planner	Devyani Jain
EIR Coordinator	Debra Dwyer
Transportation Planner	Susan Mickelsen
Environmental Planner	Heidi Kline
Environmental Planner (air quality)	Jessica Range
Environmental Planner (archeology)	Randall Dean
Preservation Planner	Richard Sucre

Office of the City Attorney, City and County of San Francisco
City Hall, Room 234
One Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

Deputy City Attorney	Marlena Byrne, Esq.
	Julia Friedlander, Esq.

Environmental Consultants

Turnstone Consulting
330 Townsend Street, Suite 216
San Francisco, CA 94107

Project Manager	Barbara W. Sahm
Deputy Project Manager	Donna R. Pittman
	Michael Kometani
	Peter A. Mye

Fehr & Peers (Transportation)
332 Pine Street, 4th floor
San Francisco, CA 94104

Chris Mitchell, P.E.
Eric Womeldorff

LCW Consulting (Transportation)
3990 20th Street
San Francisco, CA 94114

Luba C. Wyznyckyj, AICP

Circa (Historical Resources)
582 Market Street, Suite 1800
San Francisco, CA 94107
Sheila McElroy

Baseline (Geology, Hydrology, Hazards, Air Quality, Noise)
5900 Hollis Street, Suite D
Emeryville, CA 94608
Yane Nordhav, Principal
James McCarty, P.E.
Todd Taylor

Project Sponsors

San Francisco Municipal Transportation Agency
One South Van Ness Avenue, 7th Floor
San Francisco, CA 94102
Julie B. Kirschbaum, Manager of Operations Planning and Schedules
Sean Kennedy, AICP, TEP Planning Manager
Teresa Tapia, Transit Planner, Division of Sustainable Streets
Britt Tanner, P.E., Engineer, Division of Sustainable Streets
Cheryl Liu. P.E., Senior Engineer, Division of Sustainable Streets
Cathal Hennessy, P.E., Engineer, Division of Sustainable Streets

Office of the City Controller
City Hall, Room 316
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102
Peg Stevenson, Director
Corina Monzon, Project Manager
Chava Kronenberg, Project Analyst

Persons Consulted

Nick Elsner, San Francisco Department of Public Works
Javier Rivera, San Francisco Department of Public Works
Elyse Heilshorn, San Francisco Department of Public Health
Marty Mellera, San Francisco Municipal Transportation Agency
Tom Rivard and Megan Wier, San Francisco Department of Public Health
Irina P. Torrey, AICP, SFPUC Bureau of Environmental Management