SAN FRANCISCO
PLANNING DEPARTMENT

Second Street Improvement Project
Draft Supplemental Environmental Impact Report

Supplement to the San Francisco Bicycle Plan Environmental Impact Report

Appendices

City and County of San Francisco Planning Department
Case No. 2007.0347E
State Clearinghouse No. 2008032052

Draft Supplemental EIR Publication Date:	**February 11, 2015**
Draft Supplemental EIR Public Hearing Date:	**March 19, 2015**
Draft Supplemental EIR Public Review Period:	**February 12, 2015 – March 30, 2015**

Written comments should be sent to:

Sarah B. Jones, Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103
or
sarah.b.jones@sfgov.org

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SECOND STREET IMPROVEMENT PROJECT
DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT
CASE NO. 2007.0347E

LIST OF APPENDICES

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APPENDIX A

Neighborhood Notice

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SAN FRANCISCO
PLANNING DEPARTMENT

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

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Notification of Project Receiving Environmental Review

Date:	July 7, 2014
Case No.:	**2007.0347E, Second Street Improvement Project Supplement to the San Francisco Bicycle Plan Final Environmental Impact Report (FEIR)**
Project Address:	**Second Street Corridor, between Market and King Streets in San Francisco**
Zoning:	N/A - within the public right-of-way
Block/Lot:	N/A - within the public right-of-way
Lot Size:	N/A
Staff Contact:	Debra Dwyer – (415) 575-9031 or Debra.Dwyer@sfgov.org

The Second Street Improvement Project follows on prior City proposals to implement bicycle facilities along Second Street from Market to King Streets in the South of Market neighborhood of San Francisco. In particular, the proposed project is a refinement to the proposals for near-term improvement Project 2-1 in the 2009 San Francisco Bicycle Plan, which proposed the installation of bicycle lanes and other bicycle facilities along Second Street. Environmental impacts from the 2009 San Francisco Bicycle Plan, including Project 2-1, were reviewed pursuant to the California Environmental Quality Act ("CEQA"), Public Resources Code sections 21000 et seq, in the 2009 San Francisco Bicycle Plan Environmental Impact Report ("EIR"), certified by the San Francisco Planning Commission on June 25, 2009. The SFMTA Board of Directors approved the San Francisco Bicycle Plan on May 7, 2013. Subsequent to certification of the 2009 Bicycle Plan EIR, the San Francisco Department of Public Works (DPW) and the San Francisco Municipal Transportation Agency (SFMTA) conducted a community planning process to refine the proposal for Second Street. The Planning Department's Environmental Planning Division has determined that a supplement to the 2009 Bicycle Plan Environmental Impact Report is required due to the proposed changes to Project 2-1, as described below.

PROJECT DESCRIPTION:

The proposed project would implement changes along Second Street between Market and King Streets as well as some streets that cross Second Street. In the East SoMa Area Plan, Second Street is identified as a primary pedestrian, bicycle and transit thoroughfare and a green connection[1] for the neighborhood. This project would transform the corridor into a multi-modal corridor and improve safety and access for pedestrians, bicyclists and transit riders as well as drivers.

[1] A green connection is a special street or path that connects people to parks, open spaces, and the waterfront, while enhancing the ecology of the street environment. Source: *The Green Connections Final Plan*. San Francisco Planning Department. 2014. Available online at http://www.sf-planning.org/ftp/files/Citywide/green_connections/GC_Final_Report-CH3_The_Green_Connections_Network.pdf. Accessed May 7, 2014.

The proposed project would include the introduction of one-way cycletracks[2] painted green in each direction along Second Street between Stevenson and King Streets as well as other streetscape improvements described in more detail below. Buffers and transition areas between the cycletracks and adjacent parking or travel lanes would be striped. To accommodate the changes, the proposed project would result in a reduction in the number of travel lanes in both directions along Second Street from two southbound travel lanes to one travel lane and from two northbound lanes in most segments to one travel lane. Right-turn pockets would be installed at a number of Second Street intersections. Most left-turns from Second Street would be restricted to lessen delays to transit. On-street parking spaces and commercial loading spaces on Second Street, or on cross streets such as Hawthorne and Harrison Streets, would also be removed and in some cases relocated or reconfigured. In addition, the proposed project would include the rehabilitation or replacement of sewer infrastructure along the Second Street corridor, and also the potential relocation underground of above-ground utility wires located on the east side of Second Street between Stillman Street south up to Townsend Street.

In addition to the cycletracks, the proposed project would include the installation of bicycle boxes[3] on Second Street in the northbound direction at the intersections of Second Street with Market Street and Townsend Street. Approximately 42 bicycle racks would also be installed on the sidewalk along the Second Street corridor distributed such that some bicycle racks would be installed on every block. The proposed project would alter the signal phasing at all Second Street intersections to include a bicycle phase in order to reduce conflicts between right-turning vehicles and bicyclists and pedestrians.

In addition to the bicycle facilities, the proposed project would include other streetscape improvements to benefit pedestrian and transit travel. These improvements would include installation of raised crosswalks on Second Street across all alleys, the installation of planted medians, site furnishings (trash receptacles and benches), widening of the sidewalk on Second Street from 10 feet to 15 feet between Harrison and Townsend Streets, the addition of pedestrian-scale streetlights on Second Street, the installation of pedestrian bulbs at some intersections, the closure of the two channelized right-turn lanes[4] from northbound Second Street at Harrison Street, and the installation of ADA-compliant curb-ramps. Transit stops for the 10 Sansome and 12 Pacific-Folsom would be reduced in number from 13 stops to 10 stops along the Second Street corridor. In addition, with the exception of a bus zone on the northwest corner of Townsend Street at Second Street, the remaining nine transit stops would be optimized and replaced with eight-foot-wide by up to 80-foot-long transit boarding islands located between the travel

[2] A cycletrack is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycletrack is intended to be exclusively or primarily used for bicycles, and is located within the right-of-way but physically separated from motor vehicle travel lanes, parking lanes, and sidewalks. Cycletracks may be one-way or two-way, and may be at street level, at sidewalk level, or at an intermediate level (i.e. raised). Source: National Association of City Transportation Officials. 2014. Online at http://nacto.org/cities-for-cycling/design-guide/cycle-tracks/. Accessed April 28, 2014.

[3] Bicycle boxes are striped and painted waiting areas for bicyclists situated behind a crosswalk and in front of a motor vehicle stop bar. The motor vehicle stop bar is moved back 6 to 12 feet from the crosswalk to accommodate the bicycle box. Bicycle boxes allow bicyclists approaching an intersection in a bicycle lane to move to the front of a queue of motor vehicles during the red traffic signal indication, and position themselves for turning movements at the intersection.

[4] A channelized right turn lane means that right-turning vehicles at an intersection need to yield to cross traffic, pedestrians and bicyclists in order to proceed, but are otherwise not required to stop.

lane and the cycletracks. A traffic signal would be installed at the intersection of Second and South Park Streets. The proposed project would include installation of infill street trees along the entire corridor, as well as pedestrian bulbouts on the north and south corners of South Park and Second Streets. The project would also include roadway resurfacing, concrete curb reconstruction, and upgrades to the traffic signal system.

The sewer scope of work would include the rehabilitation and/or replacement of portions of the existing sewer pipe along Second Street as well as side sewers, as needed. In addition, certain streetscape elements proposed as part of the project would require new drainage facilities including catch basins and culverts along Second Street.

Finally, DPW would coordinate with PG&E regarding the potential relocation underground of currently above-ground utility wires located on the east side of Second Street between Stillman Street south up to Townsend Street as part of this project.

For additional information regarding the details of this proposal, please see the web site at the Department of Public Works, http://www.sfdpw.org/index.aspx?page=1489.

PURPOSE OF NOTICE:

The Planning Department's Environmental Planning Division has determined that a supplement to the 2009 Bicycle Plan Environmental Impact Report is required due to the changes to the Bicycle Plan Near-term Improvement Modified Project 2-1, as described above. The 2009 Bicycle Plan Environmental Impact Report can be found online at http://www.sf-planning.org/index.aspx?page=1828, or is available for review at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, California 94103. P**lease contact the staff identified above by July 21, 2014** if you wish to be further informed regarding the environmental review of this proposal.

Please note that the proposed project would receive funding through the One Bay Area Grant program (OBAG) from the Federal Highway Administration (FHWA). Therefore, the proposed project is required to comply with the National Environmental Policy Act (NEPA). The lead agency for the NEPA review is the California Department of Transportation District 4 (CalTrans) Office of Local Assistance for the Federal Highway Administration (FHWA). Please contact Sandy Ngan at DPW at (415) 558-4092 or Sandy.Ngan@sfdpw.org for more information regarding the NEPA review for this project.

Environmental review provides information on physical environmental effects and does not make recommendations on the project itself. Other review or approval actions may be required for the project. These actions may involve further public notification and public hearings. If you have comments on the proposed project that pertain to matters other than physical environmental effects, please contact Michael Rieger at DPW at (415) 558-4492 or Michael.Rieger@sfdpw.org.

Members of the public are not required to provide personal identifying information when they communicate with the Commission or the Department. All written or oral communications, including submitted personal contact information, may be made available to the public for inspection and copying upon request and may appear on the Department's website or in other public documents.

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APPENDIX B

Transportation Impact Study (without Appendices)

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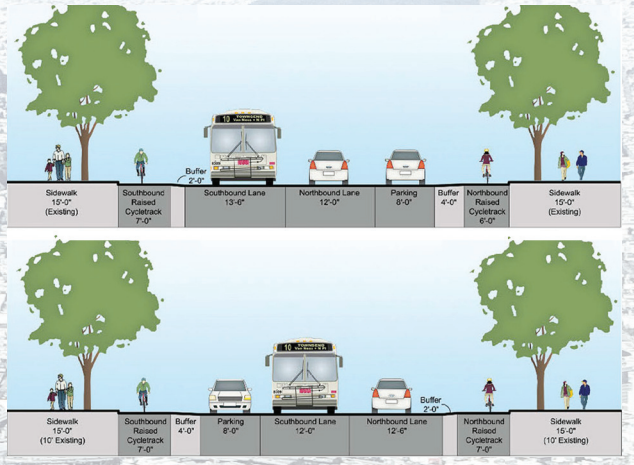
Second Street Improvement Project

Transportation Impact Study - Final

Prepared for:

City and County of San Francisco Planning Department
City and County of San Francisco Department of Public Works
San Francisco Municipal Transportation Agency



Prepared by:
CHS Consulting Group
July 7, 2014

CHS Consulting Group

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INTRODUCTION

This Transportation Impact Study (TIS) has been prepared as a resource document for the Environmental Evaluation of the Second Street Improvement Project ("proposed project") based on project plans dated March 29, 2013. The proposed project also includes the rehabilitation or replacement of portions of the sewer infrastructure underneath Second Street as well as utility relocation underground along Second Street between the Interstate 80 (I-80) overpass south to Townsend Street (0.29 miles). The study has been prepared according to the San Francisco Planning Department's *Transportation Impact Analysis Guidelines for Environmental Review,* October 2002, (*SF Guidelines*). The analyses presented in this TIS will be summarized in the CEQA/NEPA documents for the proposed project. The following topics are addressed in this analysis:

- Traffic conditions;
- Transit conditions;
- Pedestrian conditions;
- Bicycle conditions;
- Loading conditions;
- Emergency vehicle access conditions;
- Parking conditions;
- Game Day[1] conditions; and
- Conditions during project construction.

1.1 Project Location

The proposed project is located along Second Street, from Market Street to the north to King Street to the south, approximately 0.95 miles. Second Street is located in the South of Market (SoMa) neighborhood and connects to various San Francisco neighborhoods, including Rincon Hill, East SoMa, and downtown (Financial District). Second Street is a north-south road surrounded by various land uses and diverse urban forms, with high-rise buildings along the northern portion of the street (near downtown) and an array of mid-level mixed-use commercial, retail, industrial, and residential buildings in the middle and southern portions of the street.[2]

The project study area is generally bounded by Market Street to the north, First Street to the east, King Street to the south, and Third Street to the west. The study area also includes portions of Fifth and Bryant Streets, near the I-80 freeway ramp locations.

1.2 Project Background

Second Street was identified by the community as a primary pedestrian, bicycle and transit thoroughfare and a "green connector"[3] for the neighborhood as part of the *East SoMa Area Plan*, which is included in the City's *2009 Eastern Neighborhoods Plan*. It is also identified as Bicycle Route 11 in the City's

[1] Game Day conditions refers to transportation conditions that occur on days when there is a home baseball game at AT&T Park.

[2] Streets in SoMa are generally parallel or orthogonal to Market Street, which is oriented at approximately 44 degrees off true north. However, streets parallel to Market Street are generally described as "east-west" streets, while streets orthogonal to Market Street are generally described as running "north-south."

[3] Green Connections Plan is a 2-year effort by the San Francisco Planning Department to identify select city streets as green connectors that will be upgraded incrementally over the next 20 years to make it safer and more pleasant to travel to parks by walking, biking, and other forms of active transportation.

bicycle route network and several proposed bicycle facility designs for this corridor referred to as near-term improvement Project 2-1 Options 1, 2 and Modified Option 1 were evaluated in the *San Francisco Bicycle Plan EIR*.

In early 2012, the Department of Public Works (DPW), San Francisco Municipal Transportation Agency (SFMTA), and the San Francisco Planning Department began the planning process to refine prior proposals for the Second Street corridor and develop the design of the proposed project. The project goals are to improve safety along the street, provide a more attractive pedestrian environment, provide a dedicated bicycle facility, and facilitate Muni bus transit operations. The key elements of the streetscape portion of the proposed project would include pedestrian and bicycle improvements, landscaping, street furnishings, pavement renovation, and ADA Compliant curb ramps. The City departments led three community meetings in May, September, and November of 2012. In May, existing conditions and project goals were discussed. Then the meeting participants developed design alternatives for the corridor. Four design themes emerged: 1) bicycle lanes, 2) bicycle lanes with a center-turn lane, 3) one-way cycle tracks; 4) and a two-way cycletrack. At the September meeting, these four options were presented to the community and a survey was conducted to collect feedback. The survey results indicated that the design concept with one-way cycletracks was the community's preferred alternative. In November, this design concept was presented in more detail to the community. Subsequently in May of 2013, a more refined plan with right-turn pockets and detailed traffic configuration was presented to the public. In addition to the public workshops and meetings, DPW and SFMTA staff walked door to door to all of the buildings on Second Street between Market and King Streets to notify tenants about the project. In addition, DPW and SFMTA staff have met with multiple neighborhood and merchant associations to provide project updates.

Major projects that are adjacent to the Second Street project area include the Transbay Transit Center and the Planning Department's *Central SoMa Plan*. City staff continues to meet with and coordinate with the Transbay Transit Center staff to ensure that there are no conflicts between the projects and to facilitate circulation from Second Street into the Transit Center. Additional coordination efforts include ongoing discussions with City staff involved in the *Central SoMa Plan* and with the San Francisco County Transportation Authority (SFCTA) on its *Core Circulation Plan* to assure the changes made by the Second Street project are reflected in those concurrent plans.

1.3 Project Description

According to the San Francisco Department of Public Works "Complete Streets Policy" (Public Works Code 2.4.13) street design should prioritize improvements that enhance transit, pedestrian, bicycle, and carpool trips over other transportation modes. The Second Street Improvement Project (proposed project) would transform Second Street from an auto traffic-dominated roadway to a pedestrian- and bicycle-friendly "complete street."

The proposed project would provide 15-foot-wide sidewalks from Harrison to Townsend Streets and new curbside, buffered and raised cycle tracks from Market to Townsend streets, and transit boarding islands in the street. The travel lanes along the street would generally be reduced from two lanes in each direction to one lane in each direction, consistent with the *2009 San Francisco Bicycle Plan Environmental Impact Report* (EIR). Most left turns from Second Street would be eliminated to lessen delays to transit; except at the intersection of Second and Townsend Streets. Right-turn pockets would be provided at other intersections where right turns are allowed. Throughout the street, conflicts between turning traffic and people on foot or bicycle would be managed with modified timing and phasing of traffic signals and raised crosswalks at alleys. Between Harrison and Bryant Streets, there would be one southbound lane and two northbound lanes. To improve pedestrian safety at Second and Harrison Streets, the southeast corner would be reconfigured to eliminate the two existing, uncontrolled (channelized) northbound right-turn lanes and vehicles would be required to make turns at the intersection. With this change pedestrians

would have a shorter walking distance across Harrison Street. In addition, a new traffic signal is proposed at Second Street and South Park Street. It should be noted that construction of the Second Street Improvement Project would also include the construction of a new traffic signal at Second Street and Natoma Street; however, this signal was included as a component of the Transit Center District Plan, and was environmentally cleared through that project's environmental impact report.[4] The 10 Townsend and 12 Folsom bus routes currently operate along Second Street. Transit boarding islands would be provided at all bus stops in order to reduce bus pull-in and out delay and to facilitate passenger loading. There would be a reduction in the number of bus stops in both northbound and southbound directions, from 13 bus stops to 10 bus stops. All curbside Muni bus stops would be replaced with 8-foot wide and approximately 80 feet long transit boarding islands located between the cycletracks and general travel lane except for the bus zone on Townsend Street. To accommodate the proposed project, on-street parking would be removed along the street. In addition, loading zones would be removed or relocated. Approximately six on-street general metered parking spaces would be added to Brannan Street between Second and Delancey Streets under the proposed project through the conversion of parallel parking spaces to angled parking spaces. Additionally, the project would add approximately two parking spaces on the north side of Harrison Street immediately west of Second Street through the relocation of the existing bus stop at that location. Detailed project plans for the streetscape improvements are included in **Appendix A**.

The proposed project would also include sewer rehabilitation and replacement along portions of Second Street as well as utility relocation underground between I-80 south to Townsend Street (0.29 miles). The sewer work would include repair/rehabilitation, where possible, or full replacement. The proposed locations are: 2nd Street between Market and Mission streets, the intersection of 2nd and Howard streets, 2nd Street between Federal and DeBoom streets, and 2nd Street between Townsend and King streets. Also, all side sewers along the project alignment will be inspected and replaced, if necessary. The excavation for the sewers would be up to 21.1 feet in depth in places; however, the work would include trenching only, which would eventually be backfilled.

Utilities along the corridor are mostly underground, except for a 0.27 mile stretch from Stillman Street to Townsend Street. The current pole configuration is along the east sidewalk with power lines servicing the west side properties overhead. The proposed project would include coordination with Pacific Gas & Electric and other utility companies to underground these utilities.

1.3.1 Project Variant

The transportation impact analysis includes a project variant that would result in the same physical changes to Second Street except that the project variant would permit southbound left-turning movements from Second Street at the intersection of Brannan Street and the northbound right turn movement would be allowed to turn right on a permitted phase. Thus, the east-side crosswalk and cycletrack on the east side of the intersection would not be separated from left- or right-turning vehicles through signal phasing.

1.4 Proposed Transportation Network Changes along Second Street

Table 1 presents a summary of proposed transportation improvements along Second Street and at each major intersection while **Table 2** presents the proposed network changes at segments along Second Street. Detailed descriptions of these proposed changes are provided further below.

[4] San Francisco Planning Department. 2012. *Transit Center District Plan and Transit Tower EIR*. This document is available for review at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA as part of Case File 2007.0558E 2008.0789E.

Table 1 – Proposed Second Street Transportation Intersection Movements

Intersection with Second Street (segment)	Left-Turn Allowed at Intersections	Right-Turn Allowed at Intersections
Market		
Northbound		❍
Mission[a]		
Northbound		❍
Southbound		❍
Howard[a]		
Northbound		
Southbound		❍
Folsom		
Northbound		❍
Southbound		
Harrison		
Northbound		❍
Southbound		❍
Bryant		
Northbound		❍
Southbound		
Brannan[b]		
Northbound		❍
Southbound		❍
Townsend		
Northbound	❍	❍
Southbound	❍	❍
King		
Southbound	❍	❍

Note:
a. Left turn lane would be retained along southbound Second Street at Minna Street (alleyway between Mission and Howard Streets)
b. Project Variant would allow southbound left-turning movements at Second and Brannan Streets.
Source: Project Design Plans.

Table 2 – Proposed Second Street Transportation Improvements

Second Street (segment)	Transit Boarding Island Installed	Commercial Loading Added/ Removed	Passenger Loading Added/ Removed	On-Street Passenger Vehicle Parking Removed	On-Street Bicycle Parking Provided[1]
Market – Mission St					❍
Northbound	❍	❑			
Southbound	❍			❑	
Mission – Howard St[a]					
Northbound	❍	❑	❑	❑	
Southbound			❑	❑	❍
Howard – Folsom St					❍
Northbound					
Southbound	❍		❑	❑	
Folsom – Harrison St					
Northbound	❍				❍
Southbound	❍	❑		❑	
Harrison – Bryant St					❍
Northbound					
Southbound				❑	
Bryant – Brannan St[b]					
Northbound	❍	❍			
Southbound	❍			❑	❍
Brannan – Townsend St[c]					❍
Northbound	❍			❑	
Southbound					

Note:
1. Up to 42 bike racks will be distributed along the corridor and bike parking will be provided on every block
❍ Facility added
❑ Facility removed
Source: Project Design Plans.

Roadway/Traffic

The proposed project would remove one travel lane in each direction (northbound and southbound) along Second Street in order to accommodate cycle tracks along both sides of the street, one in each direction. In addition, left turns would be prohibited at all intersections along the extent of Second Street, with the exception of Townsend and King Streets and alley intersections.[5] Under the proposed project, Second Street would include one travel lane in each direction and include right-turn pockets or dedicated right-

[5] Minna Street would include a southbound left-turn lane. As proposed in the *Transit Center District Plan*, Minna Street would be designated for loading use only and therefore, the southbound left-turn would be primarily used by freight/delivery trucks. In addition, to accommodate the southbound left-turn from Second Street to Minna Street, the alleyway would be converted from a westbound-only alleyway to an eastbound-only alleyway.

turn lanes at several intersections, with the exception of segments between Howard and Folsom Streets and between Harrison and South Park Streets (southbound only).

Transit
Under the proposed project Muni Bus Routes 10 Townsend and 12 Folsom[6] would continue to operate along Second Street. All transit stops along Second Street would be converted to transit boarding islands, located between the travel lane and the proposed cycle track. These boarding islands would be a minimum of eight feet wide and 80 feet long, and would require the bus to stop in the travel lane while loading and unloading passengers. These features would minimize bus delays that result from the bus having to pull out of and back into traffic at the bus stops. Preliminary design plans indicate that the total number of bus stops along Second Street would be reduced from the current 13 stops to 10 stops. The proposed project would eliminate the existing bus stops at northbound Folsom Street and southbound Harrison, Brannan and Townsend Streets. New bus stops would be located at the following locations:

- Two, one on each side of Second Street, south of Stevenson Street;
- One along northbound Second Street, south of Minna Street;
- One along southbound Second Street, south of Howard Street;
- Two, one on each side of Second Street, north of Harrison Street;
- Two, one on each side of Second Street, north of South Park Street; and
- One along northbound Second Street, north of Townsend Street.
- One along westbound Townsend, immediately to the west of Second Street; this bus stop would be a bus zone adjacent to the curb and not a transit boarding island like all the other new bus stops.

Bicycle
The proposed project would include installation of cycletracks in both directions between Market and Townsend Streets. These cycletracks are physically raised two inches from the roadway by a one- to four-foot wide ramped buffer strip between either parked vehicles or vehicle travel lanes. Bicyclists traveling along the cycletracks would be controlled by bicycle signals at intersections along Second Street. The cycletracks would vary in width between six and seven feet. City staff is currently coordinating with the Mayor's Office on Disability (MOD) to ensure the design meets Americans with Disabilities Act of 1990 (ADA) and accessibility needs.

Pedestrian
In response to the community's request (see Section 1.3, *Project Background*), the proposed project would widen the sidewalks between Harrison and Townsend Streets, from 10 feet to 15 feet. The project would also close the free right turn at the southeast corner of Second and Harrison Streets such that vehicles would turn right from the intersection to improve pedestrian crossing at this location. Raised crosswalks would be constructed across alleys from Market to Townsend Streets and new curb ramps would also be provided.

Parking
The proposed project would remove parking from one side of each block of Second Street between Market and Townsend Streets, with additional spaces on the opposite side removed for right-turn pockets and transit boarding islands. The majority of parking spaces retained in the project design would be designated for passenger and commercial loading activity during weekdays.

[6] Muni route 12 Folsom-Pacific would be discontinued as part of the Transit Effectiveness Project (TEP). Transit service on Second Street would be provided by the proposed 10 Sansome (the existing 10 Townsend) and a new Muni route, the 11 Downtown Connector.

The proposed project would remove approximately 137 standard parking spaces and 19 motorcycle spaces on Second Street between Market and King Streets. The proposed project would remove all of the existing parking on the east side of Second Street between Market and Howard Streets, on the west side of Second Street between Howard and Brannan Streets, and on the east side of Second Street between Brannan and Townsend Streets. Additional parking spaces would be removed where required for the installation of right-turn pockets, transit boarding islands, and improved sight lines at alley intersections.

Loading
Opportunities for loading would be reduced by the parking removal on one side of the street, as described above. The proposed project would remove the majority of the yellow commercial loading zones (approximately 23 out of 35 spaces) on the two blocks between Market and Howard Streets. The zones to be removed serve a variety of office, retail, restaurant and service business locations. Approximately two existing commercial loading zones serving large office buildings between Folsom and Harrison Streets would be removed. These zones could be relocated around the corner to a side street at the option of the owners.

Three yellow commercial loading zones on the east side of Second Street between Harrison and Bryant Streets, which currently serve an office building and a live/work space, would be removed. These three loading zones could be replaced further south along the frontage of the live/work space at the option of the owners. On the block between Bryant and Brannan Streets, up to two new yellow commercial loading zones would be established to serve restaurants and bars on this block. Two existing yellow commercial loading spaces on the east side of Hawthorne Street north of Folsom would either be removed or reduced in hours of operation to provide a left-turn pocket.

Existing white passenger loading zones located adjacent to the curbside cycletracks would be modified by the proposed project. A flat, cross-hatched loading area would be provided on the right side of the passenger loading zone, between the vehicle and the cycletrack. One or more curb ramps would be provided directly opposite one end of the loading zone for sidewalk access.

The proposed project would remove two passenger loading zones on the east side of Second Street between Stevenson and Mission Streets. These passenger loading zones currently serve two large office buildings, both of which have publicly accessible parking garages. All curbside passenger loading zones on this block would be expected to use the 40-foot-long passenger loading zone north of Stevenson Street. Additionally, the two existing 20-foot-long passenger loading zones on the west side of Second Street between Tehama and Folsom Streets would be removed with implementation of the proposed project. These two zones serve a large residential building without side-street or alley frontage.

The proposed project would maintain the full length of two of the three taxi loading zones on Second Street, one on the east side of the street (north of Folsom Street, at the Marriott Courtyard Hotel), the other on the west side of the street, between Brannan and Townsend Streets, which operates only during AT&T Park post-game hours - from 1pm to 6pm for afternoon games and 8pm to midnight for evening games The pre-game period taxi stand on the west side of Second Street between Townsend and King Streets would be shortened from 135 feet to 115 feet in length to accommodate a new blue (handicap accessible parking) zone.

1.4.1 Comparison to 2009 San Francisco Bicycle Plan - Project 2-1 Modified Option 1

As stated earlier, the proposed project builds upon the *2009 San Francisco Bicycle Plan* Project 2-1 Modified Option 1 (herein referred to as the "Bike Plan Project"), which was analyzed in that plan's Final EIR (FEIR). The following is a description of the Bike Plan Project design.

Second Street is Bicycle Route 11 in the City's Bicycle Route Network. In the Bike Plan Project, Class II bicycle lanes were proposed along Second Street northbound between King and Market Streets and southbound between Market and Townsend Streets. Sharrows[7] were planned along Second Street northbound between Stevenson and Market Streets (vehicles must turn right at Market Street pursuant to existing regulations, and bicycles may turn left or right at Market Street); northbound between Stillman and Harrison Streets in the shared through-right turn lane; and southbound between Townsend and King Streets for the existing Class III bicycle route. Other proposed roadway changes along Second Street as a result of the Bicycle Plan Proposal are summarized in **Table 3**.

Table 3 – Proposed Transportation Network Changes along Second Street as a result of Bike Plan Project (Project 2-1 Modified Option 1)

Roadway (Direction)	Proposed Roadway Changes
Second Street (Northbound)	Removal of northbound travel lane between: • Townsend Street and south of Brannan Street • Harrison Street and south of Folsom Street • Folsom Street and south of Mission Street Northbound right-turn pockets at Mission and Folsom Streets
Second Street (Southbound)	Removal of southbound travel lane between: • Mission Street and north of Howard Street • Howard Street and north of Harrison Street • Harrison Street and south of Brannan Street Southbound right-turn pockets at Mission, Howard, and Harrison Streets Southbound left-turn pockets at Brannan and Townsend Streets
Hawthorne Street	Southbound left-turn pocket along Hawthorne Street at Folsom Street

Source: *2009 San Francisco Bicycle Plan FEIR*, Project 2-1 Modified Option 1.

The Bicycle Plan Project included left-turn restrictions to permit better traffic flow through the single travel lane on Second Street. The locations of the left-turn restrictions were northbound at Mission, Minna, and Howard Streets, and southbound at Mission (except Muni), Natoma, Clementina, Folsom, Harrison and Bryant Streets. Finally, the Bicycle Plan Project planned to convert an existing through travel lane to a left-turn only lane on northbound Second Street at Harrison Street.

To accommodate passenger loading in front of a large downtown office building and a restaurant, the design included the conversion of three metered parking spaces in front of the 101 Second Street office building into a passenger loading zone, and the conversion of a metered parking space just north of the proposed right turn pocket at Howard Street into a part-time passenger loading zone to serve the nearby businesses.

Comparison of Designs

The following describes the differences between the proposed project design and the design for Second Street in the *Bike Plan*.

Both the Bike Plan Project and the conceptual design for the proposed project include one southbound travel lane from Market to Townsend Streets. The proposed project would introduce a traffic signal at Second and South Park Streets; installation of this signal was not included the Bike Plan Project.

[7] Sharrows are a traffic control device which consists of pavement markings within the travel lane. The markings are intended to alert drivers that bicyclists share the travel lane and also to reduce the chance of bicyclists impacting the open doors of parked vehicles.

If implemented, the Bike Plan Project would have include two full-time northbound lanes from Bryant to Harrison Streets, with the left-most lane becoming a left-turn only at Harrison Street. Under the Bicycle Plan Project, the other northbound lane would be a right-through lane at Harrison Street. Additionally, if the Bicycle Plan Project were implemented, there would be a PM peak hour northbound tow-away lane, which would turn right onto Harrison Street. This tow-away right-turn lane would result in a second right turn onto Harrison Street. In comparison, the proposed project would include two full-time northbound lanes from Bryant to Harrison Streets, one of which would be a right-turn lane onto Harrison Street, the other of which would be a through lane. To improve pedestrian safety at the intersection, the existing channelized free right turn onto Harrison Street would be squared off so that a right turn would be required at the intersection (i.e., channelization is removed). The northbound left-turn lane approaching Harrison Street, that was proposed in the Bike Plan Project, would not be included in the proposed project. Under both the Bike Plan Project and the proposed project, there would be a reduction in capacity for freeway-bound traffic attempting to access the Essex Street on-ramp from eastbound Bryant Street and northbound Second Street.

From Harrison to Market Streets, the Bike Plan Project and the proposed project both would include one northbound lane and would provide right-turn pockets at signalized intersections where right turns are allowed. The Bike Plan Project prohibited left turns in both directions at signalized intersections at all times between Mission and Bryant Streets, except at northbound Harrison Street where a left-turn pocket was provided. Under the proposed project, left turns would be prohibited at all intersection locations with the exception of southbound Second Street at Minna Street, King Street and both northbound and southbound Second Street to Townsend Street. Southbound left-turns to Townsend Street would be permitted from a shared lane under the proposed project while the Bike Plan Project analyzed an exclusive left-turn pocket at this location. Additionally, under the Project Variant scenario, left-turns would be allowed from southbound Second Street to Brannan Street.

Both the Bike Plan Project and the proposed project would affect the route of southbound Bay Bridge-bound freeway access, by prohibiting the existing southbound left turn movements from Second Street onto both Folsom and Harrison streets. A detour route was identified and analyzed under the Bike Plan Project, routing this traffic right onto Howard Street, left onto Hawthorne Street, and left onto Folsom Street. The proposed project would similarly establish this southbound Bay Bridge-bound detour route.

Similar to the Bike Plan Project, the proposed project would not affect the route of northbound Bay Bridge-bound freeway access, which would remain as northbound Second Street, right onto eastbound Harrison Street, and right onto the Essex Street on-ramp. However, unlike the Bike Plan Project, the proposed project would reduce the capacity of the northbound right turn from Second Street onto Harrison Street, from two lanes to one lane.

The Bike Plan Project did not propose changes to the traffic signal timing along Second Street. The proposed project would alter the traffic signal timing. Because the bicycles would be separated from the traffic by painted buffers (see **Figures 1A – 1F**), there is a potential conflict between right-turning vehicles and through bicycles. To remedy this conflict, separate bicycle signal phases would be added under the proposed project to all intersections along Second Street between Mission and Brannan Streets, inclusive. When the bicycles are proceeding north-south, no vehicular turns would be allowed. Only once the bicycle phase ends would north-south turning traffic be allowed to proceed. The vehicular signal cycle lengths would be increased from the existing 60 seconds to 90 seconds for these intersections along Second Street in order to accommodate these additional signal phases.

Figure 1A
Proposed Conceptual Plan:
Second Street from Market Street to Mission Street

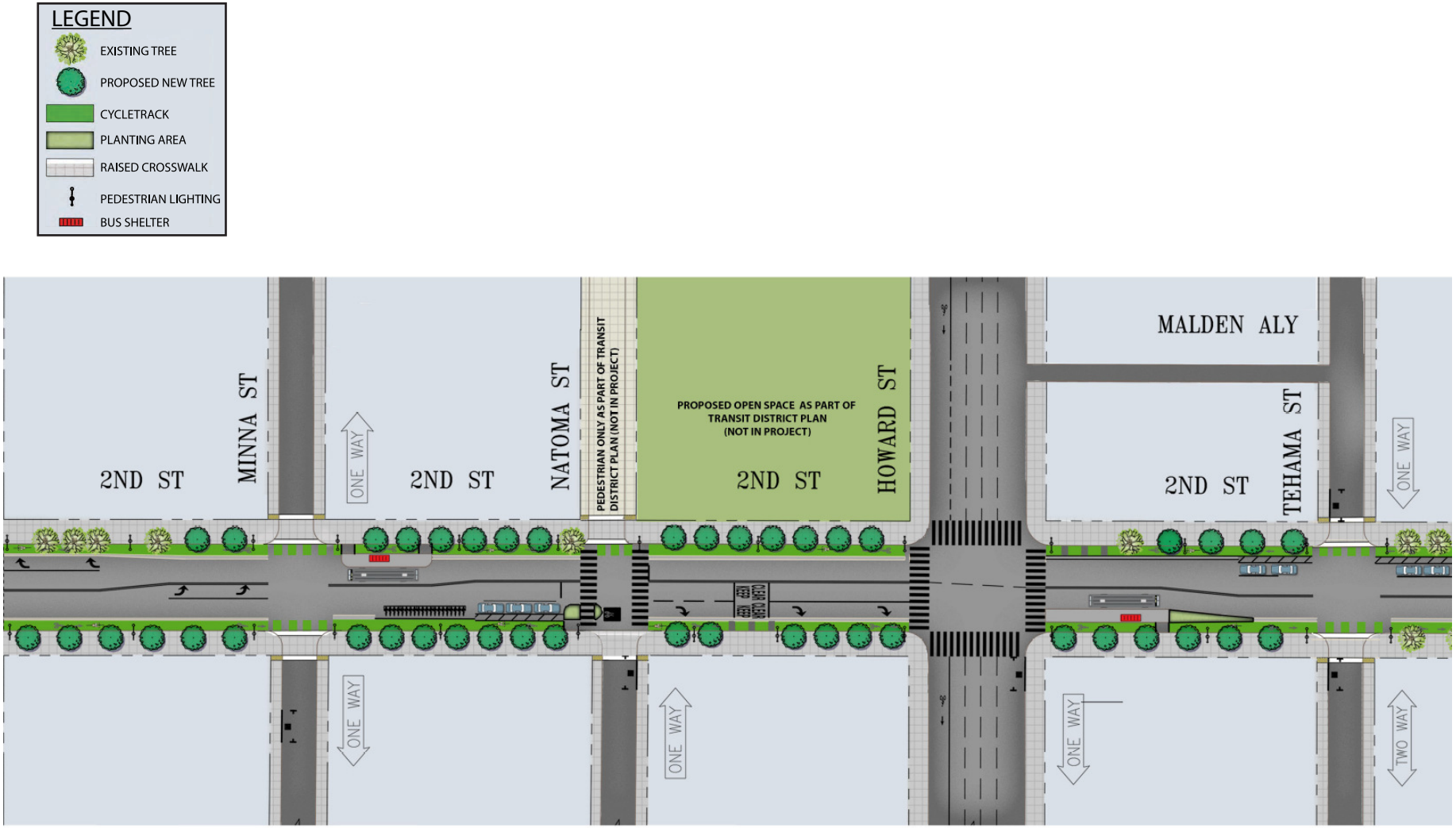


Figure 1B
Proposed Conceptual Plan:
Second Street from Mission Street to Tehama Street

Figure 1C
Proposed Conceptual Plan:
Second Street from Tehama Street to Dow Place

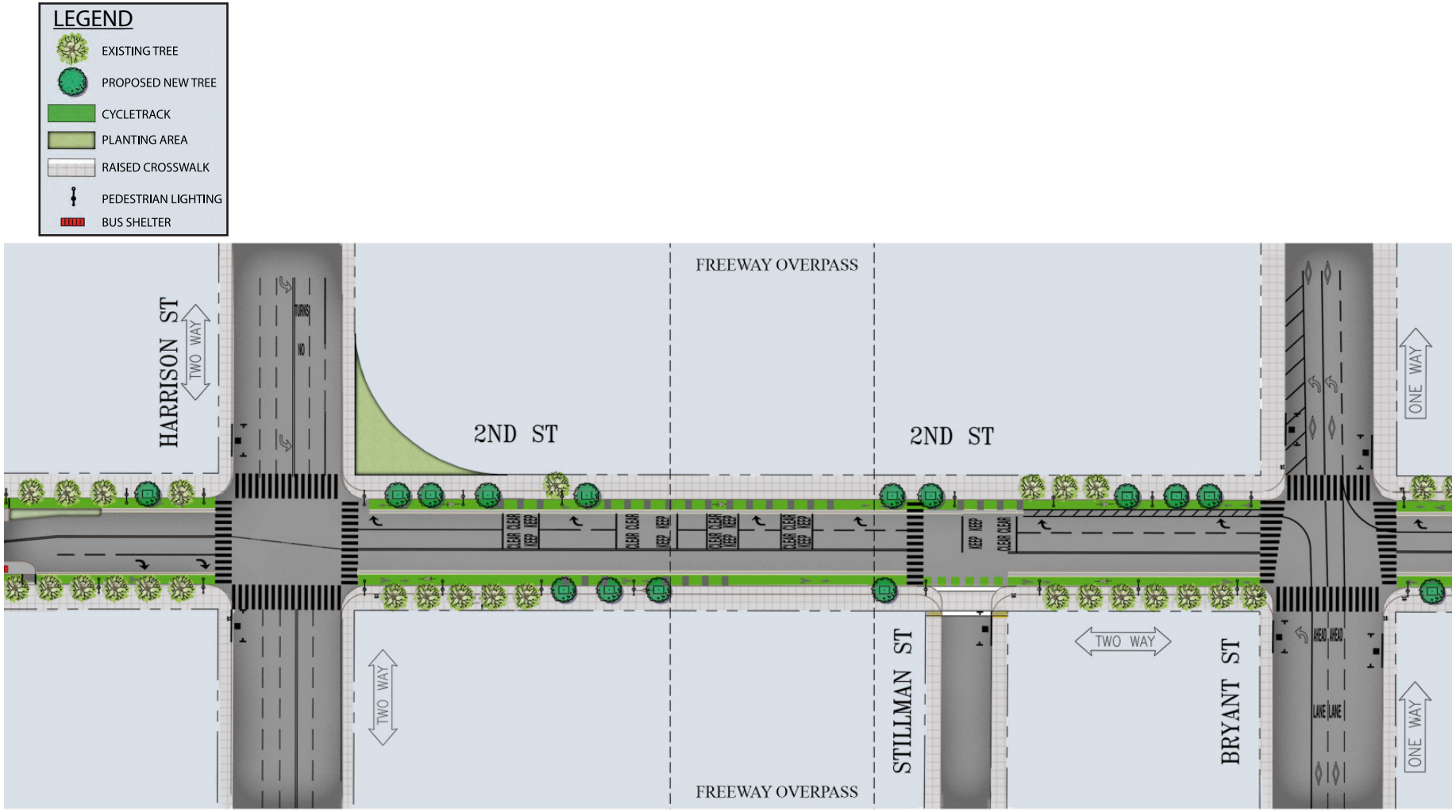


Figure 1D
Proposed Conceptual Plan:
Second Street from Dow Place to Bryant Street

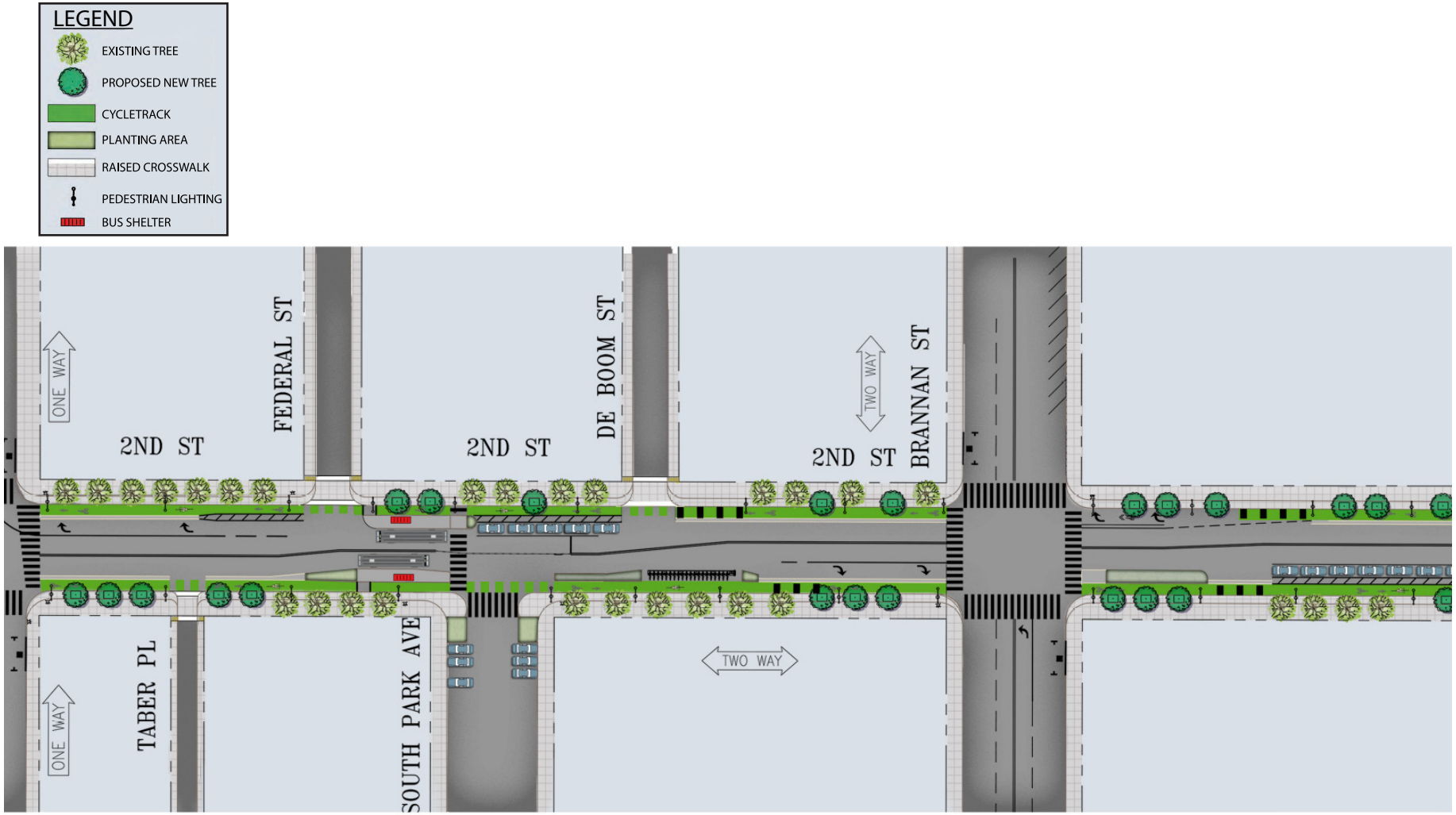


Figure 1E
Proposed Conceptual Plan:
Second Street from Bryant Street to Brannan Street

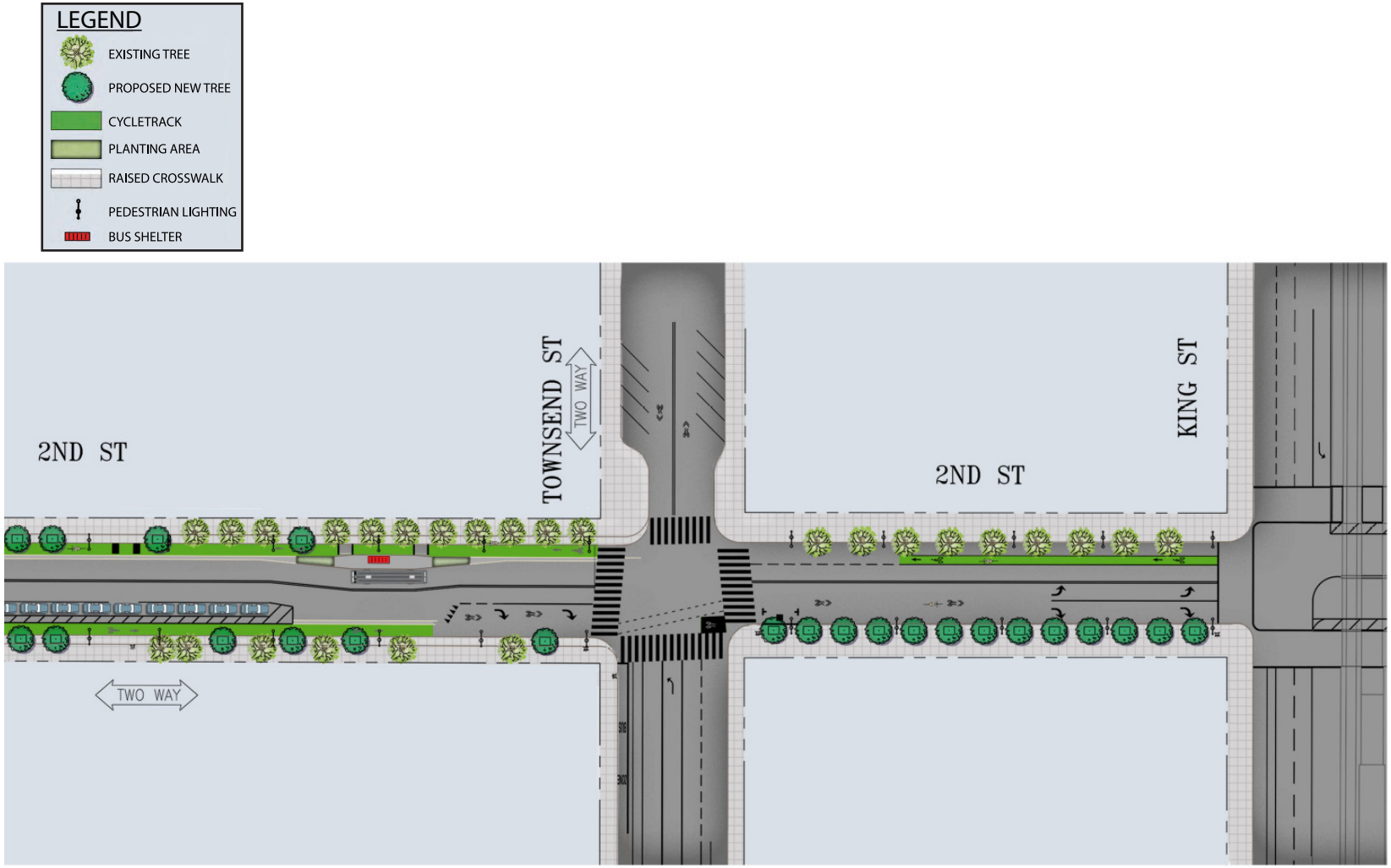


Figure 1F
Proposed Conceptual Plan:
Second Street from Brannan Street to King Street

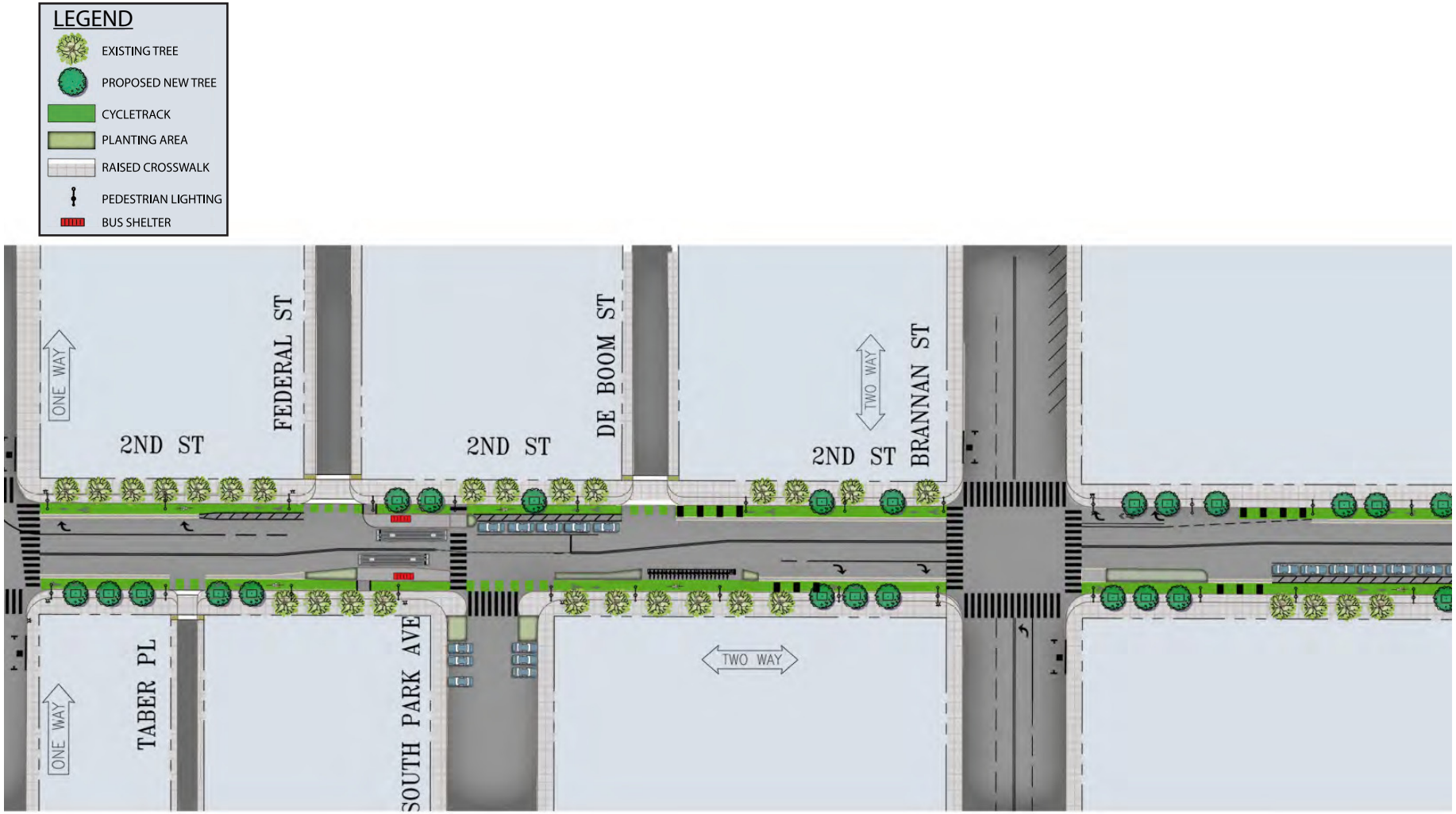


Figure 1G
Proposed Conceptual Plan (Project Variant):
Second Street from Bryant Street to Brannan Street

1.5 Study Scope and Approach

The scope of work for this transportation study was approved by the City and County of San Francisco Planning Department on August 16, 2013 (**Appendix B**). The scope of work includes analysis of transportation impacts for the following scenarios:

- Existing (Year 2013)
- Existing Plus Project Conditions
- Future Cumulative Baseline Conditions (Year 2040)[8]
- Future Cumulative Plus Project Conditions

A total of 29 intersections were analyzed for purposes of this study. Intersections were analyzed during the weekday evening (PM) peak hour, which is the peak 60 minutes during the peak period (4:00 p.m. to 6:00 p.m.). Existing weekday PM peak period intersection turning movement counts for 24 of the 29 study intersections were obtained from the *Central SoMa Plan Transportation Impact Study* and turning movement counts for the remaining five intersections were collected during the PM peak period on Tuesday, September 10, 2013, as indicated with an asterisk (*) in the list below.[9]

1. New Montgomery St and Market St
2. New Montgomery St and Mission St
3. New Montgomery St and Howard St
4. Hawthorne St and Howard St
5. Hawthorne St and Folsom St
6. Hawthorne St and Harrison St
7. Third St and Bryant St
8. Third St and Brannan St
9. Third St and Townsend St
10. Third St and King St
11. Second St and Market St
12. Second St and Mission St
13. Second St and Minna St*
14. Second St and Howard St
15. Second St and Folsom St
16. Second St and Harrison St
17. Second St and Bryant St
18. Second St and South Park St*
19. Second St and Brannan St
20. Second St and Townsend St
21. Second St and King St
22. Essex St and Folsom
23. Essex St and Harrison St
24. First St and Market St*
25. First St and Mission St*
26. First St and Howard St*
27. First St and Folsom St
28. First St and Harrison St
29. Fifth/ Bryant/ I-80 EB on-ramps

The proposed project would involve the construction and installation of two, one-way cycletracks along the east and west sides of Second Street, the rehabilitation or replacement of portions of the sewer infrastructure underneath Second Street and utility relocation underground along Second Street between the Interstate 80 (I-80) overpass south to Townsend Street (0.29 miles). As an infrastructure project, the proposed project would not generate any new vehicle trips throughout the transportation network. However, because the proposed project would result in the physical change to the roadway geometries

[8] The Existing Plus Project scenario assumes the completion of the Transbay Transit Center.

[9] Turning movement counts for intersections analyzed in the *Central SoMa Transportation Impact Study* were provided from counts conducted in August 2013 by Fehr & Peers Transportation Consultants and recent transportation studies for the Event Center and Mixed-Use Development at Piers 30-32 and Seawall Lot 330, 5M project (925-927 Mission Street), and Transit Center District Plan. Because the majority of study intersections for this analysis overlap with intersections in the Central SoMa study and counts at study intersections in the Central SoMa study were deemed relevant (and current), the intersection traffic data provided by the Central SoMa study was deemed adequate for purposes of this analysis and traffic information presented herein would continue to reflect existing traffic conditions within the project study area.

and intersection lane configurations along Second Street, some vehicles would divert to other nearby streets, primarily due to the prohibition of left-turn movements and the reduction in roadway capacity.[10]

Pedestrian and bicycle conditions within the project study area as well as impacts are described qualitatively. Transit conditions are described in terms of routes and stops in the study area, and impacts to existing and future transit service with implementation of the proposed project are discussed. On- and off-street parking inventory and occupancy data were collected for the study area to determine current parking conditions and future parking conditions are qualitatively discussed in this report. Emergency access and operations of current loading facilities, including garbage storage, are also analyzed.

[10] *Second Street Cycle Track Traffic Diversion Methodology Memorandum*, CHS Consulting Group. November 6, 2013. A copy of this memorandum is available in Appendix I of this TIS.

1.0 SETTING

This section describes the existing street network and traffic, transit, pedestrian, bicycle, loading, and parking conditions in project study area, which is generally bounded by Market Street to the north, First Street to the east, King Street to the south, and Third Street to the west. Portions of Fifth and Bryant Streets, near the Interstate 80 ramps are also included in the study area.

The majority of traffic, transit, pedestrian, bicycle, emergency vehicle access, loading, and parking data presented herein was provided by San Francisco Planning Department, San Francisco Municipal Transportation Authority (SFMTA) and from relevant past and concurrent projects within the project study area. Additional data collection for project analysis was conducted in September 2013 by CHS Consulting Group and included traffic counts at five study area intersections. CHS also conducted field observations of vehicular queuing patterns, and conflicts among automobiles, bikes, pedestrians, and Muni buses in the vicinity of the proposed project.

2.1 Roadway Network

This section presents a discussion of existing roadway systems in the vicinity of the proposed project, including roadway designation, number of lanes, and traffic flow directions. The functional designation of these roadways was obtained from the *San Francisco General Plan*.[11] Detailed definitions of the *San Francisco General Plan*'s roadway classification schemes are included in **Appendix C**. It should be noted that as described in Section 1.1, the existing street layout of Second Street would be reconfigured as part of the proposed project.

2.1.1 Regional Access

This study area is served by three freeways: Interstate 80 (I-80), Interstate 280 (I-280) and U.S. Highway 101. These facilities are described below.

Interstate 80 (I-80) provides the primary regional access to the project area. In the project vicinity this freeway is between Harrison and Bryant Streets. The San Francisco-Oakland Bay Bridge is part of I-80, connecting San Francisco to the East Bay. Between the East Bay and the project site, the primary access points are via the I-80 westbound off-ramp at Fremont and Harrison Streets and the eastbound on-ramp at Essex, Sterling and First Streets.

Interstate 280 (I-280) provides regional access to and from the South Bay. I-280 terminates at three blocks from the study area, at Fifth Street and the traffic merges with King Street traffic. I-280 also has nearby on- and off-ramps at Sixth Street, and Brannan Street intersection. I-280 connects to U.S. 101 approximately four miles south of the Study Area. I-280 and U.S. 101 continue as parallel freeways southbound along the Peninsula before reconnecting in San Jose.

U.S. Highway 101 (U.S. 101) provides regional access to both the north and south of San Francisco. I-80 joins U.S. 101 to the southwest of the project area and provides access to the South Bay and the Peninsula. U.S. 101 connects San Francisco to the North Bay via Van Ness Avenue, Lombard Street, and the Golden Gate Bridge. Access to and from U.S. 101 southbound includes the on- and off-ramps at Seventh/Harrison and Seventh/Bryant Streets, as well as at the intersections of Tenth/Bryant and Ninth/Bryant Street, respectively.

[11] *San Francisco General Plan*, Transportation Element, July 1995. Available online at http://www.sf-planning.org/ftp/General_Plan/I4_Transportation.htm. Accessed April 14, 2014.

2.1.2 Local Access

The Embarcadero runs between China Basin in the project vicinity and Taylor Street, near Fisherman's Wharf. The Embarcadero merges with King Street to the east of the project area. In general, The Embarcadero has two travel lanes in each direction with a 30-foot-wide center median for the Muni Metro light rail lines and the F Market & Wharves historic streetcar line. Parking is generally provided on both sides of the street. The *General Plan* identifies The Embarcadero as a Major Arterial in the Congestion Management Program (CMP) Network, a Metropolitan Transportation System (MTS) Street, a Transit Preferential Street, and a Neighborhood Commercial Street. In addition, The Embarcadero is part of Bicycle Route 5 (Class II), and a bicycle lane is provided on either side of the street. The Embarcadero is also part of the Bay, Ridge, and Coast Trail, which is a recreational pedestrian/bicycle path connecting several Bay Area cities.

Market Street is a major east-west roadway in downtown San Francisco that connects The Embarcadero with the Twin Peaks area, where it becomes Portola Drive. The roadway operates two-way with generally two travel lanes in each direction and left turns are not permitted, with exceptions at Drumm, Valencia, Church, and Castro Streets. Streetcars operate two-way on the center lanes between Steuart Street and 17th Street; transit stops are located both at the curb and at raised center islands along the corridor. On-street parking is prohibited downtown between Franklin Street and The Embarcadero, with recessed passenger loading and delivery zones on both sides of the street. Intersections with all major streets are controlled by traffic signals. The *San Francisco General Plan* identifies Market Street as a Transit Conflict Street in the CMP network, and as a Major Arterial elsewhere. Market Street is also classified as a MTS street, a Transit Preferential Street, a Citywide Pedestrian Street, and a Citywide Bicycle Route 50 (Class II).

Mission Street is a four-lane arterial that runs in an east-west direction between The Embarcadero and South Van Ness Avenue, and continues in a north-south direction west of South Van Ness Avenue. Mission Street connects the South of Market area to the Mission District and northern San Mateo County. Left turns from Mission Street are restricted between South Van Ness Avenue and Main Street in the eastbound direction and between Tenth and Beale Streets in the westbound direction. In the eastbound direction, Mission Street has a diamond lane (bus only lane) between Eleventh and Fifth Streets between 7:00 a.m. and 9:00 a.m. and between 4:00 p.m. and 6:00 p.m., and between Fifth and Beale Streets between 7:00 a.m. and 6:00 p.m. In the westbound direction, Mission Street has a diamond lane between Main and Fourth Streets between 7:00 a.m. and 6:00 p.m. and between Fourth and Eleventh Streets between 4:00 p.m. and 6:00 p.m. The *San Francisco General Plan* designates Mission Street as a Neighborhood Pedestrian Street, a Transit Preferential Street, a Transit Conflict Street in the CMP network, and as part of the Citywide Pedestrian Network. Sidewalks are 15 feet wide in the vicinity of the project site. On-street metered parking is provided along both sides of the street (between Fourth and Twelfth Streets), but is prohibited during the p.m. peak period (4:00 p.m. to 6:00 p.m.). The peak period parking prohibition allows for additional capacity for right turning vehicles. Intersections with all major streets are controlled by traffic signals.

Howard Street runs between The Embarcadero and South Van Ness Avenue. The roadway is a two-way arterial with two travel lanes in each direction between The Embarcadero and Fremont Street, and a one-way arterial west of Fremont Street with four travel lanes in the westbound direction. Intersections with all major streets are controlled by traffic signals. Howard Street is one of the primary routes from downtown to the I-80 westbound on-ramp at Fourth and Harrison Streets. The *San Francisco General Plan* identifies Howard Street as a Major Arterial in the CMP network, a MTS street, a Citywide Bicycle Route, and a Freight Traffic Route. A Class II bike lane for Bike Route 30 runs on the north side of Howard Street from Fremont to Eleventh Streets. The segment from The Embarcadero to Fremont Streets is a designated Class III bicycle route.

Folsom Street runs between The Embarcadero and Ripley Street in the Bernal Heights neighborhood. It is primarily a one-way, eastbound arterial with four travel lanes in South of Market (SoMa) area. However, between The Embarcadero and Main Street, Folsom Street is a two-way arterial with three eastbound lanes and one westbound transit-only lane. Intersections with all major streets are controlled by traffic signals. Folsom Street forms a couplet with Howard Street. The *San Francisco General Plan* identifies Folsom Street as a Major Arterial in the CMP network from Embarcadero to Fourteenth Street and a Citywide Bicycle Route from The Embarcadero to South Van Ness Avenue (Bicycle Route 30 [Class II]), and a designated MTS street.

Harrison Street runs between The Embarcadero and Norwich Street. It is a one-way arterial with five lanes in the westbound direction between Third Street and Tenth Street; however, between Third Street and First Street, Harrison Street contains three westbound and two eastbound travel lanes. Between First and Spear Streets, it has three westbound and one eastbound travel lanes. Between Spear Street and The Embarcadero, there are two lanes in each direction. Intersections with all major streets are controlled by traffic signals. Harrison Street serves as a primary route to the Fourth Street/I-80/U.S. 101 southbound on-ramp and to the I-80 on-ramp at First and Essex Streets. The *San Francisco General Plan* identifies Harrison Street as a Major Arterial in the CMP network between The Embarcadero and 13th Street, a MTS street, and a Transit Important Street between Fourth and 13th Streets. Harrison Street forms a couplet with Bryant Street. The sidewalks are approximately eight feet wide, and there is on-street parking on both sides of the street. The roadway is also a designated Neighborhood Commercial Street between Fourth and 16th Streets.

Bryant Street begins at The Embarcadero and ends at Precita Avenue, south of Cesar Chavez Street. East of Division Street, Bryant Street is a one-way, eastbound arterial with four travel lanes with parking on both sides. Intersections with all major streets are controlled by traffic signals. The street provides direct access to I-80 eastbound on-ramps at Fifth, Eighth, and Sterling Streets. It is also the primary exit route of I-80 eastbound off-ramps at Seventh and Fourth Streets. There are eight foot sidewalks and on-street parking on both sides of the street within the vicinity of the project. The *San Francisco General Plan* identifies Bryant Street as a Major Arterial in the CMP network between The Embarcadero and 11th Street, a MTS street, and a Transit Important Street between Third Street and 12th Street. The roadway is also a designated Neighborhood Commercial Street between Fourth and 16th Streets.

Brannan Street runs between The Embarcadero and Potrero/Division Streets. The roadway is a two-way, east-west roadway with two travel lanes in each direction; however, the roadway includes one travel lane in each direction east of Second Street (at the intersection of Colin Kelly Junior Street) to The Embarcadero. Parking is generally provided on both sides of the street. The *San Francisco General Plan* identifies Brannan Street between Fifth and Sixth Streets, and between Ninth and Division Streets as a Major Arterial in the CMP Network and a designated MTS street.

Townsend Street runs between The Embarcadero and Eighth/Division Streets. Townsend Street is a two-way street and generally has one travel lane in each direction. Parking is provided on both sides of the street. Bicycle Route 36 (Class II) runs the length of Townsend Street, and has a bicycle lane on either side of the street.

King Street runs between The Embarcadero and Division/De Haro Streets. West of Fourth Street, King Street connects with the Interstate 280 (I-280) freeway ramps. King Street has two travel lanes in each direction, and parking is generally permitted on the north side of the street. In the *General Plan*, King Street is identified as a Major Arterial in the CMP Network, an MTS street, a Transit Preferential (transit important) Street, and a Neighborhood Network Connection Street. The roadway is also a Freight Traffic Network Street.

First Street is a one-way southbound street between Market Street and I-80 eastbound on-ramp/Harrison Street. The roadway generally includes three travel lanes and includes a travel lane reserved for transit vehicles only. At its southerly terminus, First Street provides one travel lane for left-turning vehicles to eastbound Harrison Street, one travel for right-turning vehicles to westbound Harrison Street and two travel lanes to the eastbound I-80 on-ramp. On-street parking is provided on both sides of the street. The *San Francisco General Plan* identifies First Street as a Major Arterial in the CMP Network, a designated MTS street, a Transit Preferential (Secondary Transit) Street from Market to Mission Streets, a Neighborhood Pedestrian (Neighborhood Network) Street from Market to Folsom Streets, and a Freight Traffic Network Street between Market and Harrison Streets.

Second Street is a two-way street between Market and King Streets, generally with two travel lanes in the northbound and southbound directions; there is one northbound lane from Mission Street to Market Street, where traffic must turn right. In the project site vicinity, on-street parking is generally provided along both sides of the street. In the *San Francisco General Plan*, Second Street is identified as a Neighborhood Commercial Pedestrian Street.

Third Street runs between U.S. 101/Bayshore Boulevard and Market Street. It forms a one-way couplet with Fourth Street. Both Third and Fourth Streets serve as major links between north and south of Market areas with Third Street operating in the northbound direction. Third Street generally has four travel lanes and traffic signals located at all intersections with other major streets. Within the vicinity of the project, Third Street has five travel lanes south of Folsom Street and six lanes north of Folsom Street. There are 10-foot sidewalks and on-street parking on both sides of the street. However, no parking is allowed along this corridor from 7:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m. The *San Francisco General Plan* identifies Third Street as a Major Arterial in the CMP network, a MTS street, a Transit Important Street, a Neighborhood Commercial Pedestrian Street, and a Freight Truck Route from Market to King Streets.

Fourth Street runs between Market Street and Third Street in the Mission Bay area. Within the vicinity of the project, Fourth Street is a one-way, four-lane southbound roadway. The roadway forms a one-way couplet with Third Street. Sidewalks are ten-feet wide on both sides of the street. There are limited on-street metered parking spaces in the vicinity of the project. The *San Francisco General Plan* identifies Fourth Street as a Major Arterial in the CMP network, a MTS street, a Neighborhood Commercial Pedestrian Street, and a Transit Important Street. The roadway is also a Freight Traffic Network Street between Market and King Streets.

Fifth Street runs between Market and Townsend Streets. Fifth Street is a two-way roadway with two travel lanes in each direction. There are ten-foot-wide sidewalks and on-street parking on both sides of the street. Left turns are prohibited in the northbound direction from Fifth Street onto Mission, Market, Howard, and Folsom Streets. The *San Francisco General Plan* identifies Fifth Street as a Major Arterial in the CMP network between Market and Brannan Streets, a MTS street, and a Citywide Bicycle Route between Market and Townsend Streets (Bike Route 19). Fifth Street is designated as a Neighborhood Pedestrian Street between Market and Mission Streets and a Freight Traffic Network Street between Market and Brannan Streets.

Stevenson Street is an alleyway that exists intermittently between First and Eighth Streets. Between First and Second Streets, Stevenson Street is a one-way eastbound alleyway and becomes a two-way alleyway between Second and New Montgomery Streets. Stevenson Street has nine-foot-wide sidewalks on both sides of the street and on-street parking on the north side of the street.

Jessie Street is a one-way eastbound alleyway that exists intermittently between First and Tenth Streets. Between First and Seconds Streets, Jessie Street includes intermittent six-foot-wide sidewalks along both sides of the street and on-street parking is generally prohibited, with the exception of few designated

loading zones. Between Second and Third Streets, Jessie Street includes six- to nine-foot-wide sidewalks along both sides of the street and on-street parking is limited to select designated zones on both sides of the street.

Minna Street is a one-way alleyway that exists intermittently between First and 15th Streets. Between First and Third Streets, the street includes one travel lane in the westbound direction and provides on-street parking along the north side of the street. Between New Montgomery and Third Streets, the roadway includes one travel lane in the eastbound only direction and on-street parking is provided on the north side of the street. Between Third and Fifth Streets, Minna Street includes two travel lanes in the eastbound only direction and on-street parking is provided along the south side of the street. Minna Street continues to points further west and south, and intermittently between Fifth and Ninth Street, Tenth and Lafayette Streets, and 14th and 15th Streets.

Natoma Street is a one-way alleyway that exists intermittently between First and 15th Streets. Between Second and Third Streets, Natoma Street is a one-way eastbound alleyway. The street has seven-foot-wide sidewalks on both sides of the street and on-street parking on the south side of the street.

Tehama Street is a one-way westbound alleyway that exists intermittently between First and Ninth Streets. Between First and Second Streets, Tehama Street has seven-foot-wide sidewalks on both sides of the street and on-street parking on the north side of the street.

Clementina Street is a one-way, eastbound alleyway that exists intermittently between First and Ninth Streets. Between First and Second Streets, Clementina Street has six-foot-wide sidewalks on both sides of the street and on-street parking on the south side of the street.

Dow Place is a two-way east-west alleyway that extends from Second Street to its terminus about 300 feet to the west (at the 77 Hawthorne Street building). There are no sidewalks or on-street parking along the alleyway.

Stillman Street is a two-way east-west street, connecting Second and Fourth Streets. The roadway includes two travel lanes and on-street parking is provided along the south side of the street.

Taber Place is a one-way eastbound alleyway, connecting Second and Third Streets. The roadway includes one travel lane, four-foot-wide intermittent sidewalks along both sides of the alley and no on-street parking.

Federal Street is a two-way east-west street that exists intermittently between First and Second Streets. The roadway includes two travel lanes and eight-foot-wide sidewalks along both sides of the street; on-street parking is prohibited.

South Park Street is a one-way circuitous street that travels along the circumference of South Park. There is one travel lane and on-street parking along both sides of the street. There are eight-foot-wide sidewalks along the street.

De Boom Street is a two-way east-west alleyway that extends from Second Street to its terminus about 300 feet to the east. There are no sidewalks or on-street parking along the alleyway.

Hawthorne Street is a one-way southbound street, connecting Howard and Harrison Streets. The roadway includes two travel lanes and on-street parking is provided along both sides of the street.

Essex Street is a one-way southbound street, connecting Folsom Street and I-80 eastbound on-ramp/Harrison Street. There is a raised concrete median along the extents of the street, with two travel lanes along both sides of the median (one travel lane is dedicated for bus and taxi use only). At its southerly terminus, Essex Street provides one travel lane for left-turning vehicles to eastbound Harrison Street, one travel for right-turning vehicles to westbound Harrison Street and two travel lanes to the eastbound I-80 on-ramp. Sidewalks are located only on the east side of the street and on-street parking is prohibited along both sides of the street.

2.2 Intersection Levels of Service

Existing traffic conditions were evaluated for the peak hour within the weekday evening (PM) peak period (4:00 p.m. to 6:00 p.m.). Peak hours for each intersection differ from each other. Intersection level of service (LOS) for each intersection was analyzed for a 60-minute period when the highest traffic volume was recorded at each intersection during the PM peak period. For example, the highest traffic volume for a 60-minute period for the intersection of First Street and Mission Street was observed between 4:15 p.m. and 5:15 p.m., whereas the intersection LOS for Second Street and South Park Street was analyzed between 5:00 p.m. and 6:00 p.m. (the highest observed traffic volume recorded for that intersection). Traffic counts for 24 of the 29 study intersections were provided in the *Central SoMa Plan Transportation Impact Study* (conducted in August 2013) and turning movement counts for the remaining five intersections were collected by CHS Consulting Group on Tuesday, September 10th, 2013 and Wednesday, September 11th, 2013 during the PM peak period. The intersection turning movement counts are included in **Appendix D**. The locations of the study intersections are presented in **Figure 2** and **Figures 3** and **4** show the existing lane configuration and turning movements for the study intersections, respectively.[12]

Traffic operating characteristics of intersections are described by the concept of level of service (LOS). LOS is a qualitative description of an intersection's performance based on the average delay per vehicle. Intersection LOS ranges from A, which indicates free flow or excellent conditions with short delays, to F, which indicates congested or overloaded conditions with extremely long delays. LOS A, B, C, and D are considered excellent to satisfactory service levels, while LOS E is undesirable and LOS F is unacceptable. A project resulting in LOS E or F is considered to have a significant adverse impact. **Appendix E** presents the LOS descriptions for signalized and unsignalized intersections.

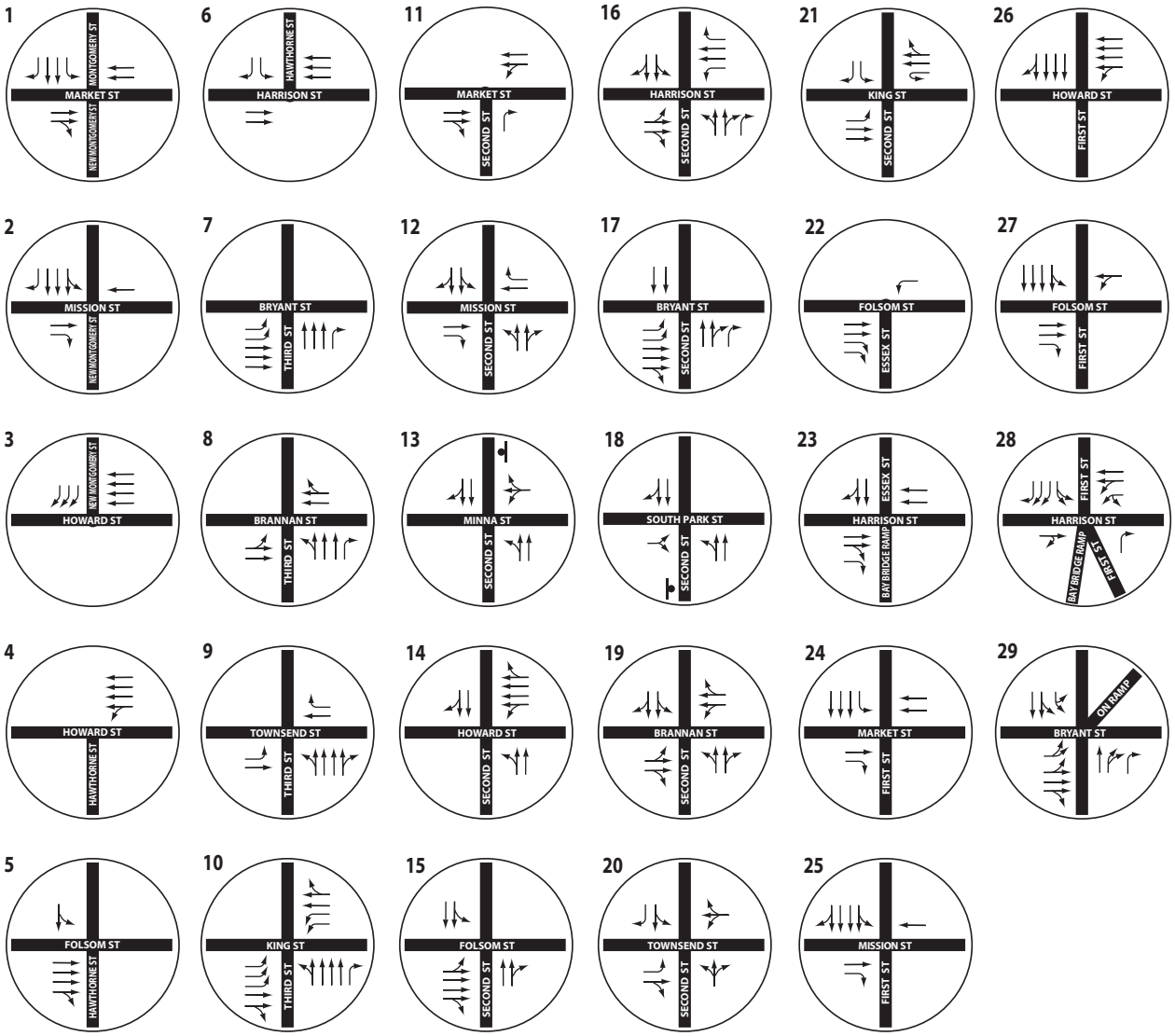
The intersections were evaluated using the *2000 Highway Capacity Manual* operations methodology. This method determines the capacity for each lane group approaching the intersection. LOS is then based on the average stopped delay per vehicle (seconds per vehicle) for the various movements within the intersection. **Table 4** presents the LOS and delay data for the study intersections under the existing conditions. It shows that the majority of study intersections currently operate satisfactorily at LOS D or better; however 10 study intersections currently operate at unacceptable LOS conditions (LOS E or F). Intersection LOS calculation output sheets are provided in **Appendix F**.

[12] Turning movement counts for intersections analyzed in the *Central SoMa Transportation Impact Study* were provided from counts conducted in August 2013 by Fehr & Peers Transportation Consultants and recent transportation studies for the Event Center and Mixed-Use Development at Piers 30-32 and Seawall Lot 330, 5M project (925-927 Mission Street), and Transit Center District Plan. Because the majority of study intersections for this analysis overlap with intersections in the Central SoMa study and counts at study intersections in the Central SoMa study were deemed relevant (and current), the intersection traffic data provided by the Central SoMa study was deemed adequate for purposes of this analysis and traffic information presented herein would continue to reflect existing traffic conditions within the project study area.

CHS Consulting Group

Second Street Cycle Track Transportation Impact Study

Figure 2
Study Intersections



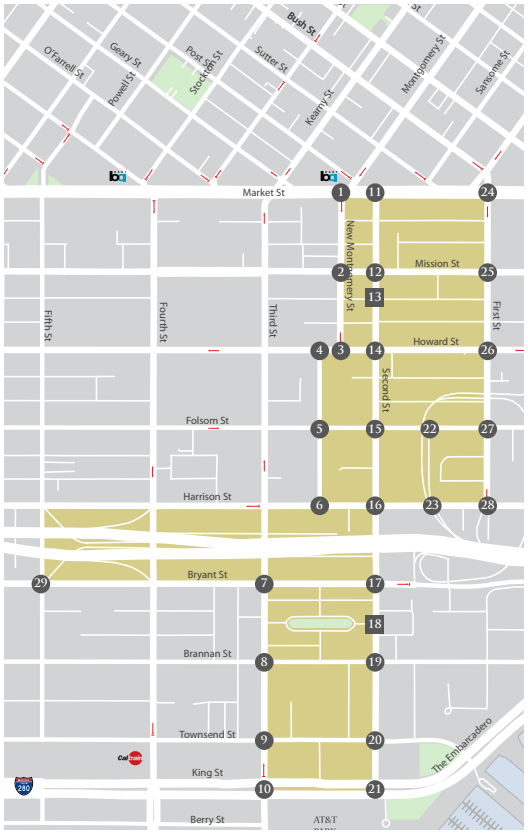


Figure 3
Study Intersections - Existing Lane Configurations

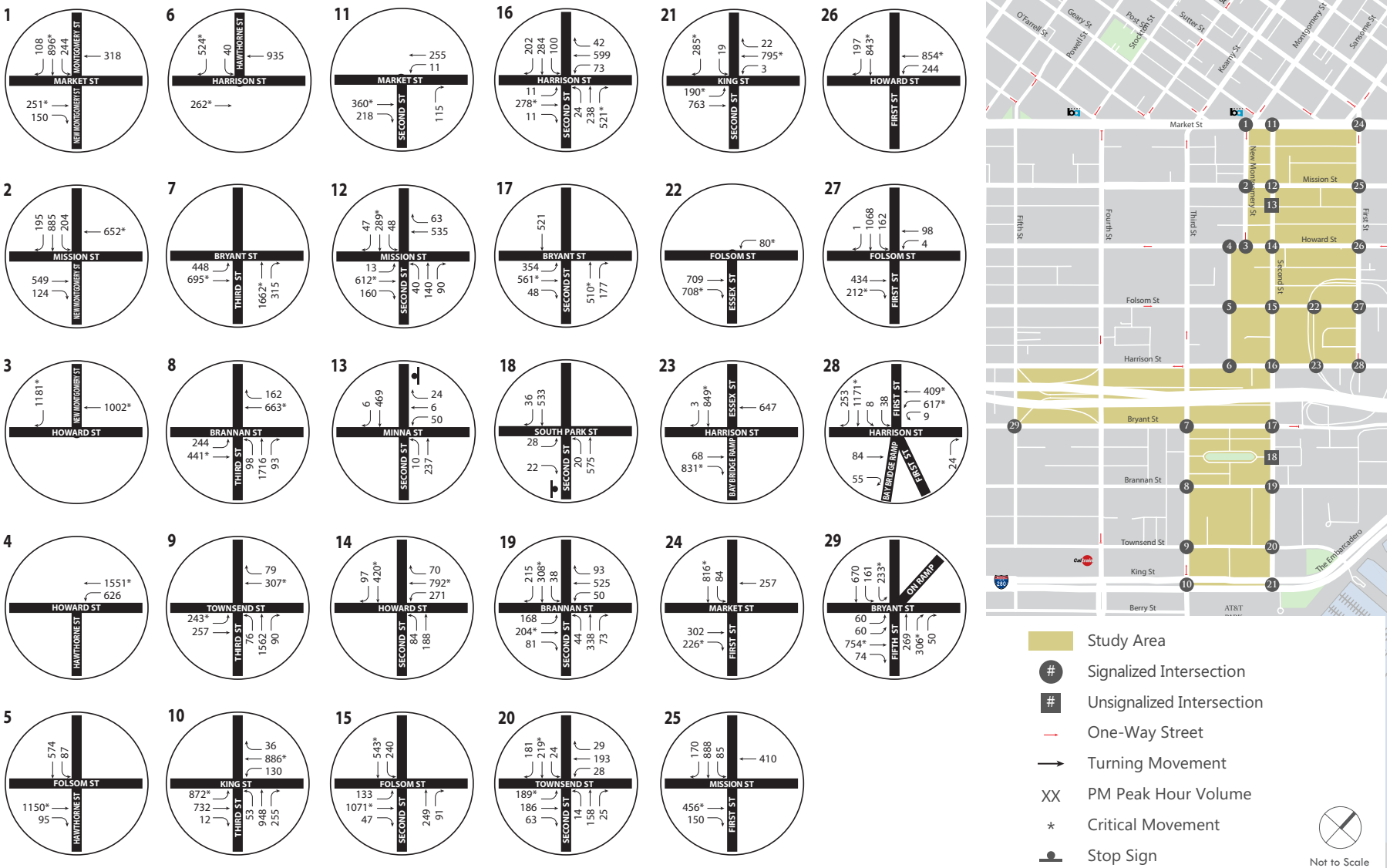


Figure 4
Study Intersections - Existing Turning Movements

Table 4 – Intersection Level of Service: Existing Weekday PM Peak Hour

	Intersection	Type[1]	Existing (2013)		
			Delay[2]	V/C[3]	LOS
1	New Montgomery St and Market St	Signal	51.0		D
2	New Montgomery St and Mission St	Signal	**61.3**	**1.04**	**E**
3	New Montgomery St and Howard St	Signal	39.5		D
4	Hawthorne St and Howard St	Signal	19.6		B
5	Hawthorne St and Folsom St	Signal	**74.5**	**1.08**	**E**
6	Hawthorne St and Harrison St	Signal	43.4		D
7	Third St and Bryant St	Signal	41.1		D
8	Third St and Brannan St	Signal	32.0		C
9	Third St and Townsend St	Signal	31.1		C
10	Third St and King St	Signal	**> 80**	**0.97**	**F**
11	Second St and Market St	Signal	10.8		B
12	Second St and Mission St	Signal	15.0		B
13	Second St and Minna St	TWSC	16.5		C (WB)
14	Second St and Howard St	Signal	16.8		B
15	Second St and Folsom St	Signal	**64.6**	**0.94**	**E**
16	Second St and Harrison St	Signal	42.3		D
17	Second St and Bryant St	Signal	**> 80**	**1.30**	**F**
18	Second St and South Park St	TWSC	**> 80**	**N/A**	**F (EB)**
19	Second St and Brannan St	Signal	14.4		B
20	Second St and Townsend St	Signal	14.5		B
21	Second St and King St	Signal	42.9		D
22	Essex St and Folsom	Signal	30.3		C
23	Essex St and Harrison St	Signal	**> 80**	**2.23**	**F**
24	First St and Market St	Signal	14.9		B
25	First St and Mission St	Signal	23.0		C
26	First St and Howard St	Signal	18.3		B
27	First St and Folsom St	Signal	**> 80**	**1.26**	**F**
28	First St and Harrison St	Signal	**> 80**	**1.44**	**F**
29	Fifth/Bryant/I-80 EB on-ramps	Signal	**> 80**	**1.34**	**F**

Source: CHS Consulting Group, 2014.

Notes:

Bold indicates an unacceptable intersection level of service condition (LOS E or F).

1. Signal indicates signalized intersection; TWSC indicates a Two-Way Stop-Controlled intersection.

2. LOS and delay for signalized intersections represent conditions for the overall intersection; LOS and delay for TWSC intersections represent conditions for the side-street stop-controlled approach, eastbound (EB); westbound (WB).

3. Volume-to-Capacity (V/C) ratios are only presented for intersections that operate at unacceptable LOS conditions (LOS E or F), per City standards.

2.2.1 Traffic Conditions along Second Street

Traffic conditions along Second Street during the weekday evening peak period are generally dictated by the conditions along the I-80 freeway and the freeway access ramps. For example, when the Bay Bridge (I-80) is congested, vehicles are backed up onto the First, Essex, and Sterling Street on-ramps because of the limited capacity to access the Bay Bridge, and these residual effects cause traffic queues along Folsom, Harrison, Bryant, and Second Streets. As such, traffic congestion and queuing conditions generally occur along Second Street, as far north as Howard Street or as far south as Brannan and Townsend Streets. The backup varies daily, but generally occurs during the PM peak period for two to three hours, depending on traffic congestion levels on the Bay Bridge.

In addition to the queue spill back from the Bay Bridge, traffic congestion along Second Street is also caused by the following two factors:

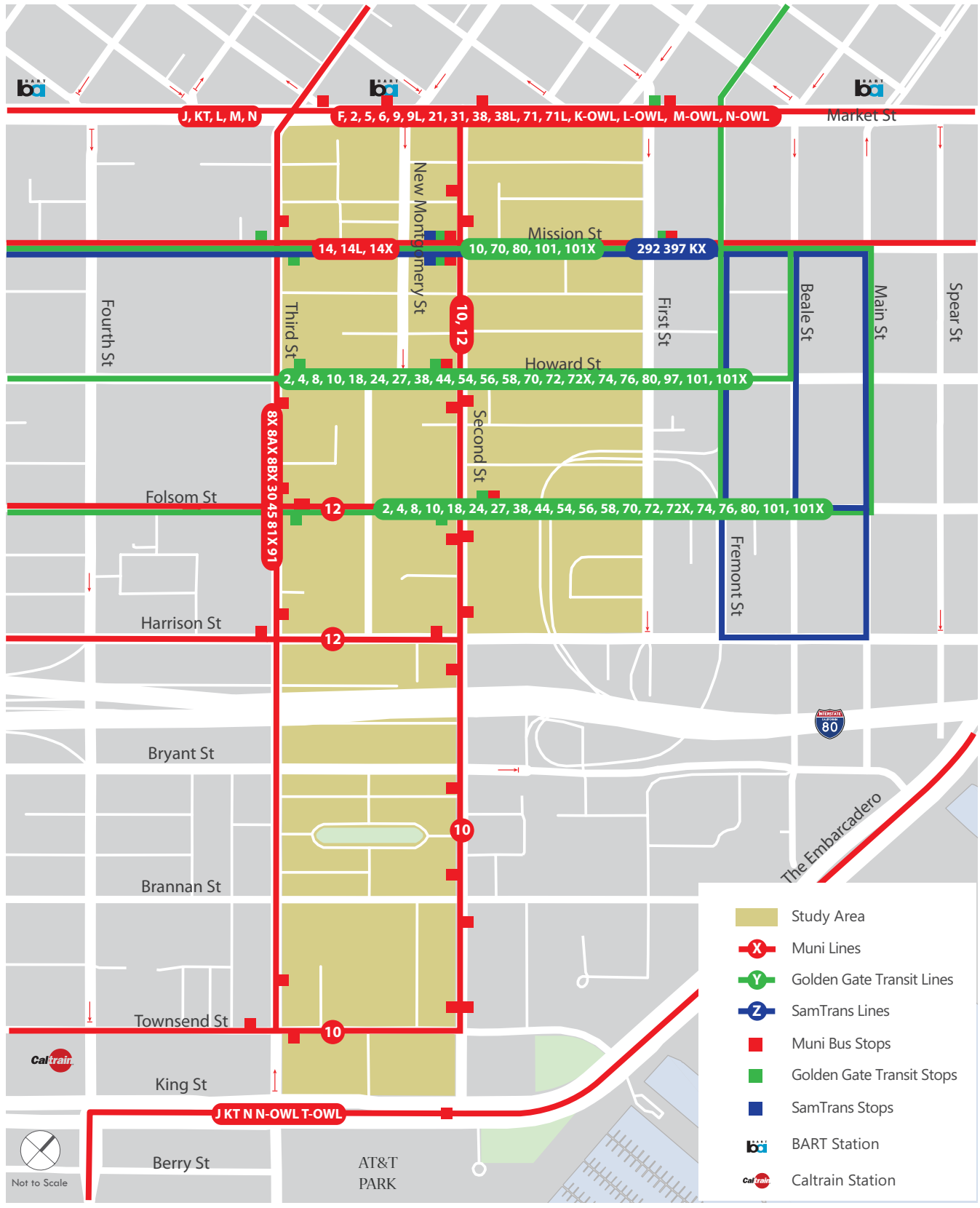
- Left-turn vehicles at Folsom and Harrison Street in the southbound direction - These left-turn vehicles have limited opportunities to get into the end of the queue at these two intersections, consequently, causing vehicle queuing along Second Street.
- Conflicts with pedestrians at intersections – Second Street has become a major pedestrian street along both east and west sidewalks. Consequently, right-turn and left-turn vehicles conflict with pedestrian movements and become the sources of backups.

2.3 Transit Network

The transit study area generally covers two blocks in each direction from the project site (The Embarcadero and Main Street to the east, Market Street to the north, Third Street to the west, and King Street to the south). The area is served by both regional and local transit. Regional transit service is provided by BART, AC Transit, Golden Gate Transit, SamTrans and Caltrain; and local transit service provided by the San Francisco Municipal Railway (Muni). There are 28 Muni transit routes that are in the immediate vicinity of the project area. **Figure 5** presents the transit lines in the study area and the stops within the study boundary.

2.3.1 San Francisco Municipal Railway

Muni operates buses, cable cars, and light rail services within the City and County of San Francisco as part of the San Francsico Municipal Transportation Agency (SFMTA). There are 20 Muni bus routes that traverse the project study area and eight light rail lines, located along Market Street and The Embarcadero. The two Muni bus routes that operate along Second Street are the 10 Townsend and 12 Folsom/Pacific. The 10 Townsend bus route currently operates at 12-minute headways (frequencies) during a typical weekday and the 12 Folsom/Pacific bus route currently operates at 20-minute headways during a typical weekday. Weekday headway information for all Muni bus routes that traverse and/or intersect with Second Street are listed in **Appendix G**.



CHS Consulting Group

Figure 5
Existing Transit Service

Capacity Utilization by Line

Load factor, defined as the number of passengers on board a transit vehicle relative to the total capacity, is used to determine capacity utilization of a transit line. Muni's *Short-Range Transit Plan* defines a maximum capacity as the total number of passengers allowed including the number of seats and a set number of standees for each vehicle type. Muni also has a policy that its vehicles should operate at 85 percent or less of the load factor at the maximum load point (MLP) during the peak period. The ridership data for this analysis was obtained from the Transit Data for Transportation Impact Studies Memorandum[13] and this data and capacity utilization by line is presented in **Appendix G**.

During the a.m. peak hour, 18 of the 20 Muni bus lines within the project study area operate at or below Muni's standard of 85 percent capacity utilization. The two Muni lines that exceed Muni's standard include the 10 Townsend bus route, which operates at 87 percent utilization in the outbound direction and the 21 Hayes bus route, which operates at 87 percent utilization in the inbound direction. Of the six Muni light rail lines within the project study area, three lines currently exceed Muni's standard during the a.m. peak hour. The K Ingleside line operates at 88 percent utilization in the inbound direction, the L Taraval line operates at 85 percent utilization in the inbound direction, and the N Judah line operates at 94 percent utilization in the inbound direction.

During the p.m. peak hour, 18 of the 20 Muni bus lines within the project study area operate at or below Muni's standard of 85 percent capacity utilization. The two Muni lines that exceed Muni's standard include the 10 Townsend bus route, which operates at 90 percent utilization in the outbound direction and 98 percent utilization in the inbound direction, and the 71/71L Haight-Noriega bus routes, which operate at 86 percent utilization in the outbound direction. Two of the six Muni light rail lines currently exceed Muni's standard during the p.m. peak hour. The F Market & Wharves streetcar operates at 103 percent capacity utilization in the outbound direction and the K Ingleside line operates at 90 percent utilization in the outbound direction.

Capacity Utilization by Direction

Transit riders typically have multiple transit options to reach the project site and will choose a route based on several factors including reliability, headways, travel time, type of transit, comfort and convenience. Based on this understanding, four screenlines (i.e., Northeast, Northwest, Southeast, and Southwest) have been established to evaluate Muni operations into and out of the greater downtown area, roughly corresponding to Superdistricts 1, 2, 3, and 4, respectively. The concept of screenlines is used to describe the magnitude of travel from or to the downtown area and its vicinity, and to compare estimated transit volumes to available capacities for each transit operator. These four established screenlines are hypothetical lines that would be crossed by persons traveling between downtown and its vicinity and other parts of San Francisco and the region. They have been established in San Francisco to analyze potential impacts of projects on Muni service along each screenline and sub-corridors within each screenline.

Appendix G presents the location of each downtown screenline. Among the four screenlines, Muni transit lines that operate within the project study area generally traverse the Southwest and Southeast screenlines. The existing capacity utilization for each screenline is summarized in **Table 5**. All screenlines currently operate below Muni's 85 percent standard during the weekday AM and PM peak hours, with the southwest screenline being the most crowded.

[13] San Francisco Planning Department. June 2013. Transit Data for Transportation Impact Studies Memorandum. A copy of this memorandum is available for review at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103.

Table 5 – Muni Screenline Capacity Utilization: Existing Weekday AM and PM Peak Hours

Screenline	PM Peak Hour (Outbound)		
	Ridership	Capacity	Utilization
Northeast			
Kearny/Stockton	2,158	3,291	66%
All Other Lines	570	1,078	53%
Screenline Total	*2,727*	*4,369*	*62%*
Northwest			
Geary	1,814	2,528	72%
California	1,366	1,686	81%
Sutter/Clement	470	630	75%
Fulton/Hayes	965	1,176	82%
Balboa	637	929	69%
Screenline Total	*5,252*	*6,949*	*76%*
Southeast			
Third Street	550	714	77%
Mission	1,529	2,789	55%
San Bruno/Bayshore	1,320	2,134	62%
All Other Lines	1,034	1,712	60%
Screenline Total	*4,433*	*7,349*	*60%*
Southwest			
Subway Lines	4,747	6,294	75%
Haight/Noriega	1,105	1,651	67%
All Other Lines	276	700	39%
Screenline Total	6,128	8,645	71%
Muni Screenlines Total	**18,540**	**27,312**	**68%**

Source: San Francisco Planning Department, Transit Data for Transportation Impact Studies Memorandum, June 2013.

2.3.2 Regional Transit System

While the local transit service to and from the project area is provided by Muni bus routes, these services can be used to access regional transit operators including the San Mateo County Transit District (SamTrans), Golden Gate Transit (GGT), Bay Area Rapid Transit (BART), and Caltrain. These regional transit providers are described below.

BART: BART operates regional rail transit service between the East Bay (from Pittsburg/Bay Point, Richmond, Dublin/Pleasanton, and Fremont) and between San Mateo County (Daly City, San Francisco International Airport, and Millbrae) and San Francisco. During the PM peak period, headways are generally five to 15 minutes for each line.

The nearest BART station to Second Street is the Montgomery Street BART Station along Market Street. The Montgomery Street BART Station is served by several Muni routes, including 5 Fulton, 6 Parnassus, 9/9L San Bruno/Limited, 21 Hayes, 31 Balboa, 38/38L Geary/Limited, and six light rail lines (F, J, L, M, N, and KT, including "Owl" services).

AC Transit: The Alameda-Contra Costa Transit District (AC Transit) provides Transbay bus service between the East Bay and San Francisco. Currently all Transbay routes terminate at the temporary Transbay Terminal, located on the block bounded by Folsom, Howard, Beale, and Main Streets. The new Transbay Center will be located on Mission Street between First and Fremont Streets, one block east of Second Street and will begin operation in Fall 2017. Muni lines 5 Fulton, 38 Geary, and 71 Haight-Noriega that run within the study area connect to the Transbay Temporary Terminal. Most AC Transit Transbay services are operated during the peak hour and in the peak direction (to San Francisco during the AM peak period and from San Francisco during the PM peak period), with headways of 15 to 30 minutes on each route.

Golden Gate Transit: Golden Gate Transit (GGT), operated by the Golden Gate Bridge, Highway, and Transportation District (GGBHTD), provides both bus and ferry services between cities in the North Bay (Marin and Sonoma Counties) and San Francisco. Golden Gate Transit operates 19 commuter bus routes and three basic routes, with service between the North Bay and San Francisco. Most routes serve either the Civic Center (via Van Ness Avenue and Mission Streets) or the Financial District (via Battery and Sansome Streets). Basic bus routes operate at 15- to 90-minute intervals, depending on the time and day of the week. Commuter and ferry feeder bus routes operate at more frequent intervals in the mornings and evenings. Golden Gate Transit does not provide local service within San Francisco. Buses running from the North Bay to San Francisco only allow alighting at stops within San Francisco beyond the Golden Gate Bridge toll booth and Richardson Transfer Center. Conversely, buses running from San Francisco to the North Bay only allow boarding at stops within San Francisco. Although there are no Golden Gate Transit bus stops located on Second Street, there are GGT bus stops located along Mission, Howard, and Folsom Streets, near the intersections with Second Street. These stops serve approximately 20 GGT bus routes.

GGBHTD ferries operate between Larkspur and Sausalito and San Francisco. The San Francisco terminal is located at the Ferry Building, on The Embarcadero at Market Street. The average weekday ridership is 6,033 riders to Larkspur and 2,644 riders to Sausalito in 2012.[14] The Ferry Building can generally be accessed from the project site via Muni route 14 Mission, at Mission and Steuart Streets, two blocks away from the Ferry Building.

WETA: The San Francisco Bay Area Water Emergency Transportation Authority (WETA) operates the San Francisco Bay Ferry and provides weekday and weekend ferry service between the cities of Alameda (Main Street terminal) and Oakland (Jack London Square terminal) in the East Bay to the Ferry Building and Pier 41 terminals in San Francisco.

Caltrain: The Peninsula Commute Service (Caltrain) provides passenger rail service on the Peninsula between Gilroy and San Francisco. The Peninsula Corridor Joint Powers Board (JPB), a joint powers agency consisting of San Francisco, San Mateo, and Santa Clara Counties, operates the service. The downtown Caltrain station (at Fourth and Townsend Streets) connects to project site via Muni line 10 Townsend on Second Street. Caltrain currently operates a total of 92 trains each weekday (46 trains northbound and 46 trains southbound) stopping at this station. The Baby Bullet Express trains operate approximately hourly in the AM and PM peak period. Headways during the weekday PM peak period are approximately 10 to 30 minutes. As recorded between February 2012 and February 2013, the average

[14] GGBHTD. 2012. Golden Gate Ferry Statistics. Available online at http://goldengateferry.org/researchlibrary/statistics.php; accessed August 30, 2013

daily ridership has increased approximately 11 percent, an increase of about 42,350 to 47,100 riders per day.[15]

SamTrans: The San Mateo County Transit District (SamTrans) provides bus service between San Mateo County and San Francisco. SamTrans operates four diesel bus lines that serve San Francisco, all into the downtown area. One of these routes operates as a peak-only commuter route, one operates as an all-day express route, one provides service throughout the day, and one provides night-owl service between approximately 1:00 a.m. and 5:00 a.m. The total average weekday ridership to and from downtown San Francisco is approximately 11,300 per day. Headways during the PM peak period are approximately 20 to 60 minutes per line. There are no SamTrans bus stops located along Second Street; however, there is a bus stop located along the north side of Mission Street, immediately west of its intersection with Second Street which services SamTrans bus routes 292, 397, and KX.

Regional Screenlines

Three screenlines (East Bay, North Bay, and South Bay) have been established to evaluate regional transit operations into and out of San Francisco. The East Bay screenline is operated by BART, AC Transit and ferries (i.e., Alameda/Oakland ferry, Harbor Bay ferry, Vallejo Baylink), the North Bay screenline is operated by Golden Gate Transit Bus and ferries (i.e., Golden Gate ferry, Tiburon ferry), and the South Bay screenline is operated by BART, Caltrain, and SamTrans. **Appendix G** shows the location of each regional screenline. The resulting regional peak hour screenline operations are summarized in **Table 6**.

Table 6 – Regional Screenline Capacity Utilization: Existing Weekday AM and PM Peak-hours

Screenline (Transit Operator)	PM Peak Hour (Outbound)		
	Ridership	Capacity	Utilization
East Bay			
BART	19,716	22,050	89%
AC Transit	2,256	3,926	57%
Ferries	805	1,615	50%
Screenline Total	*22,777*	*27,591*	*83%*
North Bay			
Golden Gate Transit Bus	1,384	2,817	49%
Ferries	968	1,959	49%
Screenline Total	*2,352*	*4,776*	*49%*
South Bay			
BART	10,682	14,910	72%
Caltrain	2,377	3,100	77%
SamTrans	141	320	44%
Ferries	--	--	--
Screenline Total	*13,200*	*18,330*	*72%*
Regional Screenlines Total	**38,329**	**50,697**	**76%**

Source: San Francisco Planning Department, Transit Data for Transportation Impact Studies Memorandum, June 2013.

2.3.3 Transit Conditions along Second Street

The existing Muni bus transit routes along Second Street include the 10 Townsend and 12 Folsom/Pacific. As described in Section 2.2.1, *Traffic Conditions along Second Street*, in most cases,

[15] Caltrain, 2012. February 2012 Caltrain Annual Passenger Counts Key Findings Report. Available online at: http://www.caltrain.com/about/statsandreports/Ridership.html; accessed August 30, 2013.

queuing locations are associated with vehicles driving towards the Bay Bridge. Therefore, these buses are affected by the slow moving traffic along several sections of Second Street. As a result, there is an increase in transit travel time and delay through these sections: southbound Second Street between Mission and Market Street, Folsom and Howard Streets, and Harrison Street and Dow Place; and along northbound Second Street, between Howard and Folsom Streets and Harrison and Brannan Streets. It is noted that although Second Street experiences heightened congestion levels during the evening peak commute period, the buses traveling in the northbound center-most lane and southbound curbside lane are generally unconstrained and experience near free-flow conditions.

SFMTA periodically monitors the route load (number of passengers) and capacity (number of seats and standing room for passengers) for all of its buses, light rail, and streetcar vehicles within the system. As previously stated, Muni's operating standard for all of its vehicles is 85 percent of capacity and crowded conditions are identified when the number of passengers exceeds Muni's capacity threshold.

Based on current transit capacity utilization data, the 10 Townsend bus route currently exceeds Muni's operating standard during the morning and evening peak commute periods. The maximum load points for the 10 Townsend during the morning peak period occurs at the inbound stop at the intersection of Second and Townsend Streets and at the outbound stop at the intersection of Pacific and Taylor Streets. The maximum load points for the 10 Townsend during the evening peak period occurs at the inbound stop at the intersection of Pacific and Powell Streets and at the outbound stop at the intersection of Second and Howard Streets.[16] Therefore, the data findings indicate that during the evening peak commute period, the 10 Townsend along Second Street is generally crowded with limited available capacity for additional passengers traveling in the outbound direction.

The 12 Folsom-Pacific bus route currently operates well below Muni's capacity threshold and has available capacity to accommodate additional passengers. During the morning peak period, the maximum load points for the 12 Folsom-Pacific route occur at the inbound stop at the intersection of Folsom and Seventh Streets and at the outbound stop at the intersection of Pacific and Mason Streets. In the evening peak period, the maximum load points for the 12 Folsom-Pacific route occur at the inbound stop at the intersection of Pacific and Powell Streets and at the outbound stop at the intersection of Sansome and California Streets.

2.4 Pedestrian Conditions

The pedestrian network along Second Street and adjacent (intersecting) roadways includes continuous sidewalks, striped crosswalks, curb ramps, and pedestrian signals and countdown timers at each intersection along the roadway. Crosswalks are provided at the signalized intersections but not at the unsignalized alleyway intersections. There is a mid-block pedestrian crossing located on Second Street at South Park Street. Other pedestrian amenities, including street trees and street furniture, primarily consisting of tables and chairs outside restaurants and cafés, are located within the sidewalk area (mostly along both sides of Second Street, between Howard and Market Streets). Sidewalks are approximately 15 feet wide along Second Street between Market and Harrison Streets, and approximately 10 feet wide between Harrison and Townsend Streets. From Townsend to King Streets, sidewalks are about 19 feet wide on both sides of the street.

Field observations of pedestrian activity were conducted on September 17th along Second Street during the evening peak hour (5:00 p.m. to 6:00 p.m.). Pedestrian traffic along Second Street was generally moderate to heavy along most portions of the roadway, with the majority of pedestrian traffic traveling in

[16] The MLP is the location where the route has its highest number of passengers relative to capacity.

the northbound direction. Other areas of Second Street, particularly between Brannan and King Streets, were relatively light; however, it is noted that field observations were not conducted during a scheduled baseball game at AT&T Park. Overall, pedestrian conditions were unimpeded, with generally normal walking speeds, and the freedom to bypass other pedestrians (although requiring interaction with other pedestrians). There were no instances of overcrowding along sidewalks, although temporary crowding occurred at bus stop locations (e.g., along the west side of Second Street, north of Jessie Street), and at intersections as pedestrians waited to cross the street. In general, sidewalks along Second Street are adequate in width to accommodate existing pedestrian circulation.

As stated in Section 2.2.1, *Traffic Conditions along Second Street*, during typical peak evening commute periods vehicle queues along Second Street are prevalent, mostly due to the heightened traffic volumes traveling to the Bay Bridge and subsequent blockages at several intersections due to southbound left-turning vehicles and northbound right-turning vehicles from Second Street. Field observations noted several instances of vehicles blocking crosswalks and impeding pedestrian flow along Second Street at Folsom, Harrison, and Bryant Streets, and often resulting in pedestrians interweaving between vehicles in order to cross the street and increasing the risk of conflicts between pedestrians and vehicles.

2.5 Bicycle Conditions

On-street bicycle facilities include city-designated routes that are part of the San Francisco Bicycle Network. These on-street bicycle facilities are grouped into three categories:

- Class I bikeways are bike paths with exclusive right-of-way for use by bicyclists and in many cases pedestrians;
- Class II bikeways are bike lanes striped within the paved areas of roadways and established for the preferential use of bicycles; and
- Class III bikeways are signed bike routes where bicyclists share travel lanes with vehicles**.**

Bicycle Route 11, a Class III facility, run along the entire length of Second Street and connects to other routes, including Class III Bicycle Route 50 at Market Street, Class II Bicycle Route 30 at Howard and Folsom Streets, Class III Bicycle Route 36 at Townsend Street, and Class II Bicycle Route 5 at King Street. These bicycle facilities are described below.

Route 5 connects Visitacion Valley and North Beach, primarily as a Class III facility along Bayshore Boulevard, Third Street, and Illinois Street, and as a Class II facility along The Embarcadero and San Bruno Avenue. The Class II facility connects to Second Street (Bicycle Route 11) and continues along The Embarcadero with bicycle lanes along both sides of the roadway.

Route 11 is a Class III facility that runs the extent of Second Street (from Market Street to the north and King Street to the south). The bicycle route allows for bicycle and vehicles to share the same general travel lane and Route 11 runs along both sides of Second Street to its northern and southern terminus.

Route 30 connects Downtown San Francisco with the Golden Gate Park. It runs the length of Golden Gate Park and the Panhandle, Hayes Valley, Duboce Triangle area, and Folsom Street and Howard Street couplet to The Embarcadero. There is a Class II bike lane on the north side of Howard Street between Fremont and Eleventh Streets. The peak period tow away zones were revoked along some sections of Howard to accommodate the bike lane. On Folsom Street, Route 30 has a dedicated bike lane on the south side of the street.

Route 36 connects South Beach with the Mission District. It runs the length of Townsend Street from The Embarcadero to Division Street and continues to points further west along Division Street to Folsom

Street. The bicycle facility is a Class III bicycle route from The Embarcadero to Second Street and then intermittently a Class II facility from Second Street to Eighth and Division Streets. The route becomes a Class III facility along Division Street and continues northwest along 11th Street and then runs south along Harrison Street and terminates at Harrison and 14th Streets (and connects to other routes, including routes 25 and 30).

Route 50 connects downtown San Francisco with the Castro neighborhood. It runs along Market Street from The Embarcadero to 17th Street. The route is a Class III facility from The Embarcadero to Eighth Street and then becomes a Class II facility, with bicycle lanes along both sides of Market Street to 17th Street.

Field observations of bicycle activity along Second Street were conducted by CHS Consulting Group during the evening peak hour (5:00 p.m. to 6:00 p.m.) during a weekday. Although bicycle volumes were observed to be generally low along Second Street, in areas of heavy traffic congestion and vehicle queuing (e.g., at Folsom and Bryant Streets), field observations indicated that bicyclists were required to slow down and/or stop to maneuver (or detour) around these queued vehicles in order to continue along Second Street. As a result, these congested areas result in an unsafe environment for bicyclists traveling along the roadway and create a greater potential for conflicts between vehicles and bicycles.

2.6 Emergency Vehicle Access

The proposed project would include improvements to the right-of-way along the entire extent of Second Street, from Market to King Streets. The current roadway configuration includes two travel lanes in both the northbound and southbound directions, parallel on-street parking on both sides of the street, and traffic/pedestrian signals at each intersection. The roadway is currently designed to accommodate all vehicle types, including emergency vehicles (e.g., fire engines/trucks, ambulances, police vehicles). In the event of an emergency, drivers are required to comply with standard driving laws and yield the right-of-way to any emergency vehicles that are using a siren and/or flashing red lights. Drivers are required to maneuver to the right edge of the road and stop until emergency vehicle(s) have passed. The current roadway capacity and lane configuration along Second Street allow for safe maneuvering of vehicles and the passage of emergency vehicles.

The San Francisco Fire Department Fire Station No. 35 is located at The Embarcadero and Harrison Street (Pier 22 ½), about 0.50 miles east of Second Street. Emergency vehicles from Fire Station No.35 are able to access Second Street directly via Harrison Street. Fire Department Fire Station No. 1 is also located in proximity to Second Street, located specifically at Folsom Street, east of Fifth Street, about 0.60 miles west of Second Street. Access to Second Street from Fire Station No. 1 is provided via Folsom Street.

2.7 Game Day Conditions

The following includes a discussion of circulation conditions (i.e., vehicle traffic, transit, pedestrian, and bicycle) along Second Street before, during, and after baseball games at AT&T Park, which is located along King Street, west of Second Street. As noted above, field observations of traffic, transit, bicycle, and pedestrians conditions (Sections 2.1 – 2.5, above) accounted for conditions during a typical weekday evening peak (commute) hour.

In general, the following includes a detailed description of circulation conditions along Second Street and nearby streets on dates when the San Francisco Giants are playing a home game at AT&T Park, and how such conditions differ from typical weekday conditions, as previously described.

The Giants play between 80 and 85 regular-season and exhibition games a year at home. About half of these are weekday evening games which begin at 7:15 pm, and about 15 percent are weekday afternoon games which begin at 12:45 pm or 1:35 pm. The rest are weekend games.

Eastbound King Street adjacent to the ballpark (between Third and Second Streets) and southbound Second Street between Townsend and King are closed to vehicular traffic beginning at the seventh inning until approximately one hour post-game. This is done in order to safely accommodate the surge in outbound pedestrian volume at the conclusion of the game.

Second Street also benefits from the Transportation Management Plan (TMP) that is regularly refined to manage circulation to and from the ballpark so that traffic flows have as little impact on the affected community as possible. A brief background of TMP follows. Pursuant to the EIR prepared for the San Francisco Giants Ballpark at China Basin (Ballpark EIR), mitigation measures to address the special nature of transportation conditions related to special events facilities such as the ballpark were identified and applied to the ballpark project.[17] In particular, a mitigation measure specified that the Giants and the City would be responsible for development of a Transportation Management Plan (TMP) to address the congestion and delay that occurs following a ballgame. The Ballpark EIR noted that the TMP should be based on accepted planning practices with an emphasis on incentives for transit, pedestrian, and bicycle modes and disincentives for auto modes. As required under the mitigation measure, the City established a committee to develop the TMP known as the Ballpark/Mission Bay Transportation Coordinating Committee (TCC). This TCC prepared a Transportation Management Plan (TMP) dated April 1999.[18] The TCC continues to meet and refine the TMP as appropriate based on changing conditions in the ballpark vicinity.

As part of the TMP implementation, SFMTA issues a press release at the beginning of the baseball season with information regarding how to access the ballpark via alternate modes such as by transit, special Muni ballpark shuttle, taxis, bicycle, or on foot. In addition, the notice directs baseball fans to maps available on the Giants Website at http://sanfrancisco.giants.mlb.com/sf/downloads/y2012/postgame_map.pdf providing information regarding routes to access and leave the ballpark area. The SFMTA also deploys Parking Control Officers (PCOs) to key locations around the ballpark to facilitate transportation in the vicinity including people walking, transit riders, and other traffic.

Automobile Traffic

Weekday afternoon games generally have the most intense effect on local circulation as the post-game traffic period overlaps with the early evening commute period. Hence, observations of transportation conditions were conducted during the evening peak period post-afternoon game at AT&T Park on September 11th 2013. The screenshots and video of these observations are presented in Appendix J. Evening games tend rather to extend the period of afternoon peak traffic volumes into the evening. On both afternoon and evening weekday game days, afternoon peak congestion along the Second Street corridor due to additional vehicle trips is compounded by higher pedestrian volumes which increase delay for turning vehicles.

On-ramps to I-80 East typically exceed capacity during the period following weekday home games, causing queues to extend onto local streets.. Drivers trying to access the Bay Bridge from the Ballpark Parking Lot A, the largest dedicated parking lot located to the east of Third Street adjacent to Pier 48, travel on northbound Third Street to either eastbound Harrison and Essex Street on-ramp or to eastbound Brannan and the Sterling Street high-occupancy vehicle on-ramp. However, as backups frequently occur on these routes during the post-game period due to freeway congestion, some drivers divert to northbound Second Street to access these ramps.

[17] San Francisco Planning Department and San Francisco Redevelopment Agency. 1997. *San Francisco Giants Ballpark at China Basin Final Environmental Impacts Report.* A copy of this document is available for review at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, California 94103 under Case number 96.176E [State Clearinghouse No. 96102056].

[18] San Francisco Ballpark/Mission Bay Transportation Coordinating Committee. 1999. *Transportation Management Plan.* This document is available for review at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103.

Transit
The 10 Muni line serves AT&T Park via Second Street, with the closest stop at Second and Townsend Streets. With approval of the SFMTA's Transit Effectiveness Project (TEP), the 12 Folsom-Pacific route will be eliminated and the service will be replaced with service on a new route, the 11 Downtown Connector.[19] Most ballpark-bound passengers board along Second Street at Stevenson Street and alight at Townsend Street. Pursuant to the analysis under the proposed project, the 10 and 12 Muni routes experience variable travel time along the Second Street corridor, and have not been shown to experience a consistent increase on game days. The same would be true for the new 11 Downtown Connector once the TEP changes are implemented. On Game Days, the SFMTA provides extra light rail service via the S-Shuttle trains, but there is no specialized transit service operated along Second Street.

Taxi
Three taxi stands are provided near the ballpark on game days to facilitate passenger loading. A stand on northbound Third Street operates before, during and after afternoon and evening games (10am to 6pm for afternoon games and 4pm to midnight for evening games). On southbound Second Street, a stand between Townsend and King operates until the start of the seventh inning, and a stand between Brannan and Townsend operates from 1pm to 6pm for afternoon games and 8pm to midnight for evening games. Under existing conditions these stands are not operating at capacity.

Pedestrians
Second Street is one of the primary streets used by pedestrians walking to and from the ballpark, many of whom walk to the ballpark from Montgomery Street BART Station or the Market Street Muni lines. During the post-game and to a lesser extent, pre-game period sidewalks on Second Street are congested.

Bicycling
Second Street along with The Embarcadero and King Street are the primary bicycle routes for access and egress to AT&T Park. In the vicinity of the ballpark, bicycle lanes exist along The Embarcadero, on King Street between The Embarcadero to midway between Second and Third Streets, on Townsend Street, and from the south on Terry A. Francois Boulevard.

2.8 Loading Conditions

There are several businesses located along Second Street, ranging from general commercial and office use to retail stores and sit-down restaurants, cafes, and related eateries. Commercial and passenger loading zones are designated along the entire extent of Second Street. Commercials loading spaces are typically designated with a yellow-painted curb and passenger loading spaces are designated with a white-painted curb. Long-term parking is prohibited within these zones and commercial loading zones may only be utilized by freight vehicles or similar commercial trucks.

As shown in **Table 7**, there are currently 41 metered commercial loading zones and about 39 designated passenger loading spaces along Second Street. A majority of the existing yellow commercial loading zones along Second Streets (31 spaces) are located on the two blocks between Market and Howard Streets. Commercial meters on these blocks are occupied for approximately 60 percent of the time during their hours of operation.[20] Commercial parking meters between Howard and Bryant Streets have an occupancy level of less than 45 percent. Additionally, Second Street has 39 white passenger loading

[19] San Francisco Municipal Transportation Agency. 2014. TEP- Transit Effectiveness Project. Online at http://www.sfmta.com/projects-planning/projects/tep-transit-effectiveness-project. Accessed June 19, 2014.
[20] 2nd Street Meter Occupancy Worksheets SF Park-SFMTA.pdf (On File at SF Planning Department)

zones between Market and King Streets. The passenger loading zones are adjacent to the curbside bikeways.

2.9 Parking Conditions

The following presents the on-street parking inventory (parking spaces by type and designated use), supply (number of parking spaces), and current weekday midday occupancy (demand and/or accumulation of parked vehicles) along Second Street.

2.9.1 Parking Inventory and Supply

There are a total of approximately 168 existing on-street vehicle parking spaces (including both general metered parking and blue accessible [i.e., handicap] parking zones) and 56 motorcycle parking spaces on both sides of Second Street between King and Market Streets. **Table 8** presents the current parking inventory and supply along Second Street.

2.9.2 Parking Occupancy – Weekday Midday Conditions

Parking occupancy is a ratio of parking demand to parking supply for a given time period. Occupancy during peak periods is the primary measure of parking usage and can identify the potential need for additional parking. A parking occupancy rate of 85 percent for on-street parking facilities is typically defined as "practical capacity" meaning that it has reached a balance point between supply and demand where there are sufficient empty spaces to assure parking availability. As occupancy rates climb towards 100 percent, drivers will resort to "cruising" for parking or may be tempted to park illegally, and such activities may result in adverse traffic and circulation effects.[21]

Parking occupancy surveys were conducted between May 2011 and April of 2012 during the weekday midday period (12:00 p.m. to 3:00 p.m.). Overall, the midday parking occupancy rate along Second Street is approximately 75 percent, as shown below in **Table 9**. Based on these findings parking demand along Second Street has remained consistent and remains below practical capacity. On average, there are approximately 40 parking spaces available during the midday period. As such, on-street parking along Second Street is generally available and unconstrained.

[21] Shoup, Donald. *The High Cost of Free Parking*; Chapter 11: Cruising, p. 290 (2005).

Table 7 – Loading Inventory and Supply along Second Street

Second Street (segment)	Loading Inventory and Supply by Type	
	Yellow (Loading)	White (Passenger Loading)[a]
Market – Mission St		
East side	4	9
West side	11	1
Mission – Howard St		
East side	10	2
West side	6	1
Howard – Folsom St		
East side	2	6
West side		2
Folsom – Harrison St		
East side	3	2
West side	2	0
Harrison – Bryant St		
East side	3	2
West side		0
Bryant – Brannan St		
East side		1
West side		0
Brannan – Townsend St		
East side		0
West side		8
Townsend – King St		
East side		0
West side		5
Total Supply	**41**	**39**

Table 8 – Parking Inventory and Supply along Second Street

Second Street (segment)	Parking Inventory and Supply by Type		
	General Metered	Blue (Handicap)	Motorcycle[b]
Market – Mission St			
East side		1	32
West side	3		
Mission – Howard St			
East side	7	1	
West side	11	1	
Howard – Folsom St			
East side	7		
West side	10		12
Folsom – Harrison St			
East side	13		
West side	13		4
Harrison – Bryant St			
East side	11		
West side	11	1	
Bryant – Brannan St			
East side	18		
West side	16		8
Brannan – Townsend St			
East side	20		
West side	10	1	
Townsend – King St			
East side	13		
West side			
Total Supply	**163**	**5**	**56**

Notes:

a. Total equivalent car parking stalls. White Zones converted at 20 feet per stall.

b. Total equivalent car parking stalls. Motorcycle spaces converted at 5 motorcycle spaces per equivalent car parking stall.

Source: SFTMA, SFPark, September 2012. Presented in Appendix K

Table 9 – Average Parking Occupancy along Second Street – Weekday Midday Period

Second Street (segment)	Parking Occupancies (%) by Survey Date[a]					
	May 2011	August 2011	November 2011	January 2012	April 2012	Average
Howard – Folsom St	91%	83%	78%	80%	82%	83%
Folsom – Harrison St	85%	81%	78%	75%	88%	81%
Harrison – Bryant St	50%	60%	61%	58%	74%	61%
Bryant – Brannan St	77%	68%	71%	61%	76%	71%
Brannan – Townsend St	73%	73%	73%	76%	70%	73%
Townsend – King St	79%	80%	67%	68%	80%	75%
Average	**76%**	**74%**	**71%**	**70%**	**78%**	**75%**

Notes:
a. Parking occupancies represent number of observed parked vehicles relative to existing supply.
Source: SFTMA, SFPark, September 2012.

3.0 PROJECT TRAFFIC DIVERSION ANALYSIS

The following section includes a traffic diversion methodology and summarizes where traffic would likely divert to as a result of the proposed project. The proposed project would not generate any new vehicle trips to the area; moreover, the project would result in physical roadway changes along the entire extent of Second Street. Specifically, the following diversion analysis describes, in detail, how specific changes to the street with respect to the reduction in roadway capacity, prohibition of left-turn movements at most intersections and reconfiguration of lane geometries would alter travel patterns in and around Second Street. Section 4.0, *Project Transportation Impact Analysis*, describes how these physical changes to Second Street and subsequent diversion of vehicles along Second Street would affect the surrounding circulation network and all modes of transportation therein. Detailed descriptions of the proposed traffic diversion along Second Street as a result of the proposed project and vehicle traffic diversion table are provided in **Appendix I**.

3.1 Methodology

3.1.1 Traffic Diversion Metrics and Assumptions

The reduction of travel lanes due to the proposed project would cause diversions of Bay Bridge-bound traffic to several streets adjacent to Second Street; these affected streets include First Street, New Montgomery Street, Hawthorne Street, Third Street, Harrison Street, and other east-west streets (e.g., Mission, Howard, Folsom, Bryant, Brannan, Townsend, and King Streets). The overall approach to developing the traffic diversion methodology was to understand existing travel patterns along Second Street and to determine what percentage (or proportion) of northbound left- and right-turning and southbound left-turning traffic along Second Street would be diverted to other nearby streets. The traffic diversion assumptions were based on:

- Existing vehicle turning movements at each intersection along Second Street;
- Observed queue lengths;
- Intersection and vehicle delays along the roadway; and,
- Proportion of upstream traffic volumes.

The total number of diverted vehicles off of Second Street would be approximately 950 vehicles during the p.m. peak hour. These vehicle trips would divert from their existing routes to parallel routes in close proximity (i.e., one to two blocks) based on the proportion of existing upstream traffic movements.

3.2 Second Street Traffic Diversion

In general, a portion of the traffic that currently uses Second Street would be diverted to New Montgomery, Hawthorne, and Folsom Streets or to Harrison Street to access the Bay Bridge or to First Street. The following discussion provides an overview of the approaches used to divert (redistribute and reassign) existing vehicle trips along Second Street throughout the roadway network in the vicinity of the proposed project.

<u>Northbound Second Street Diversion</u>

- *Mission Street at Second Street* – Northbound vehicles would be shifted (diverted) from Second Street to Third Street in order to access westbound Mission Street. Accordingly, vehicles traveling along westbound-only streets (e.g., Howard Street) would continue through the intersection at Second Street and make a right-turn (northbound) along Third Street and then turn left onto Mission Street. Vehicles along eastbound-only streets (e.g., Folsom and Bryant Streets) would turn left onto Third Street and travel northbound and then turn left onto Mission Street.

Vehicles traveling along two-way, east-west streets (e.g., Harrison, Brannan, and Townsend Streets) would access westbound Mission Street by using Third Street. Access to westbound Mission Street from eastbound-only alleys (e.g., Clementina Street) would travel to First Street, then turn right at First Street and then turn right onto a westbound street in order to access Third Street and then travel northbound to turn left at Mission Street. Access to eastbound Mission Street from Stevenson Street would be unchanged, as vehicles would travel eastbound along Stevenson Street, turn right to southbound First Street and then turn left onto Mission Street.

- *Howard Street at Second Street* – Vehicles accessing Howard Street would continue along northbound Second Street and then make three right turns: onto Mission Street, then onto First Street, and then a right turn onto Howard Street. Vehicles traveling along east-west roadways (e.g., Folsom, Harrison, Bryant, Brannan, Townsend Streets) would access Howard Street by traveling to Third Street and turning right and then turning right onto Howard Street. Vehicles from garages along Second Street between Howard and Harrison Streets would travel southbound on Second Street and turn right onto Harrison Street and then right onto Third Street and left onto Howard Street.

- *Minna Street at Second Street* – Vehicles that presently turn left onto westbound Minna Street would be prohibited by the project's roadway configuration. Those vehicles would be shifted to Mission Street at Third Street followed by an eastbound right turn at Second Street, accessing Minna Street as a southbound right turn. As a result of converting Minna Street from one-way westbound traffic along the east leg to one-way eastbound traffic, the westbound approach volumes would be redirected at Second Street along both First Street (approximately 60 percent) to access the southern portion of the study area and Howard/Third Streets (approximately 40 percent) to access the western and northern portions of the study area.

- *Harrison Street at Second Street* – Vehicles that would turn left onto westbound Harrison Street would divert to Third Street (northbound) and then turn left onto Harrison Street. For example, vehicles along Bryant, Brannan, and Townsend Streets would turn left onto northbound Third Street and then turn left onto Harrison Street.

  The proposed project would reduce the existing two-lane northbound Second Street channelized right-turn to one-lane right-turn movement (using the dedicated right-turn lane). This would reduce the right-turn capacity by over 50 percent, thus causing approximately 50 percent of traffic making that turn movement to divert onto Third Street northbound. This traffic would then turn right onto eastbound Harrison Street. A small proportion of vehicles would likely avoid Harrison Street and may be inclined to access the I-80 freeway at Fifth Street and Bryant Street.

- *South Park at Second Street* – Vehicles that would turn left on South Park Street would be prohibited from doing so as part of the project. Those vehicles would be rerouted along adjacent streets circulating back to Second and South Park Streets as a southbound right turn. The vehicles would be routed proportionally at the upstream intersections and diverted to Bryant, Brannan, Townsend, Kind, Second, and Third Streets.

- *Brannan Street at Second Street* – Vehicles traveling along east-west streets (e.g., Townsend Street and King Street) would access Brannan Street by accessing Third Street and then turning onto Brannan Street.

Southbound Second Street Diversion

- *Mission Street at Second Street* – Southbound vehicles accessing Mission Street from Market Street and points north would use New Montgomery Street (via Montgomery Street) and would turn left onto Mission Street.

- *Folsom Street at Second Street* – Vehicles currently traveling on westbound Howard Street that turn left on Second Street and left onto Folsom Street will divert onto southbound First Street to access the Bay Bridge. Vehicles traveling south and east would make a right turn onto Howard Street from either Second Street or New Montgomery Street; turn left to Hawthorne Street and then turn left onto Folsom Street. Other vehicles would continue south along Hawthorne Street and turn left onto Harrison Street (and essentially avoid Folsom Street). A small proportion of vehicles coming from north of Market Street would divert to First Street via Bush Street.

- *Harrison Street at Second Street* – Vehicles currently traveling on westbound Howard Street that turn left on Second Street and left onto Harrison Street will divert onto southbound First Street to access the Bay Bridge. Vehicles traveling south and east would divert to New Montgomery Street, make a right turn onto Howard Street, left to Hawthorne Street and then turn left onto Folsom Street. Other vehicles would continue south along Hawthorne Street and turn left onto Harrison Street.

- *Brannan Street at Second Street* – Vehicles traveling west along Howard and Harrison Streets and accessing Brannan Street via Second Street would continue southbound along Second Street and make a triple right - right onto eastbound Townsend Street, right onto northbound Third Street and then a right onto Brannan Street. Eastbound vehicles would turn right onto Fourth Street and then left onto Brannan Street. Vehicles from New Montgomery Street would continue along the street and then turn right onto Howard Street, and then left onto Fourth Street, and then left onto eastbound Brannan Street.

4.0 PROJECT TRANSPORTATION IMPACT ANALYSIS

This chapter presents the assessment of transportation impacts due to the proposed project's diversion of existing traffic along Second Street. The impacts are grouped into eight areas: traffic, transit, pedestrian, bicycle, loading, emergency vehicle access, construction, and parking.

4.1 Significance Criteria

The following are the significance criteria used by the San Francisco Planning Department for the determination of impacts associated with a proposed project:

4.1.1 The operational impact on signalized intersections is considered significant when project-related traffic would cause the intersection level of service to deteriorate from LOS D or better to LOS E or F, or from LOS E to LOS F. The operational impacts on unsignalized intersections are considered potentially significant if project-related traffic would cause the level of service at the worst approach to deteriorate from LOS D or better to LOS E or F, and Caltrans traffic signal warrants would be met, or would cause Caltrans signal warrants to be met when the worst approach is already at LOS E or F. The project may result in significant adverse impacts at intersections that operate at LOS E or F under existing conditions depending upon the magnitude of the project traffic contribution to the critical movement (5% or more project traffic).

For streetscape projects (as opposed to land use projects), if an intersection continues to perform at the same LOS E or F under both the Existing and Existing plus project scenarios and is within the area where the proposed project would reduce roadway capacity, then the impact is considered significant if Existing Plus Project volume to capacity ratio (v/c) for the overall intersection is 10% or more than the Existing v/c for the overall intersection. The same threshold of 10% increase holds for Cumulative plus project conditions. In addition, the project would have a significant adverse effect if it would cause major traffic hazards, or would contribute considerably to the cumulative traffic increases that would cause the deterioration in levels of service to unacceptable levels.

4.1.2 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 p.m. peak hour.

4.1.3 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.

4.1.4 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.

4.1.5 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 created potentially hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians.

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

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

4.1.8 The project would have a significant effect on the environment if it would result in a substantial parking shortfall 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.

4.2 Existing Plus Proposed Project Conditions

4.2.1 Traffic Impacts

This section presents the intersection LOS with the proposed changes to Second Street (as described in Chapter 1) and the anticipated diversion of existing vehicle trips along the corridor to neighboring roadways (as described in Chapter 3, above). **Figure 6** shows the Existing plus Project weekday p.m. peak hour turning movements for the study intersections.

Table 10 presents the LOS and delay data for the study intersections under the Existing and Existing plus Project conditions. Intersection LOS calculations are provided in **Appendix F.** Under Existing plus Project conditions, 16 of the 29 study intersections would continue to operate at acceptable LOS conditions (LOS D or better). In particular, the intersection of Folsom Street and Second Street would improve from unacceptable LOS conditions (LOS E) to acceptable LOS conditions (LOS C). Signalization of the intersection of South Park Street and Second Street with implementation of the proposed project would substantially improve the intersection operations from LOS F to LOS A. Therefore, under Existing plus Project conditions 16 of the 29 intersections would operate satisfactorily, and the impacts of the proposed project would be less than significant.

Under Existing plus Project conditions, 13 of the 29 study intersections would operate at unacceptable LOS conditions (LOS E or F). Eight of these intersections already perform at unacceptable level of service under existing conditions. These eight intersections were reviewed to determine if the proposed project's contribution to the poor operation of the intersection would result in a significant impact. The remaining five intersections would degrade to unacceptable levels as a result of the changes to traffic patterns due to the proposed project.

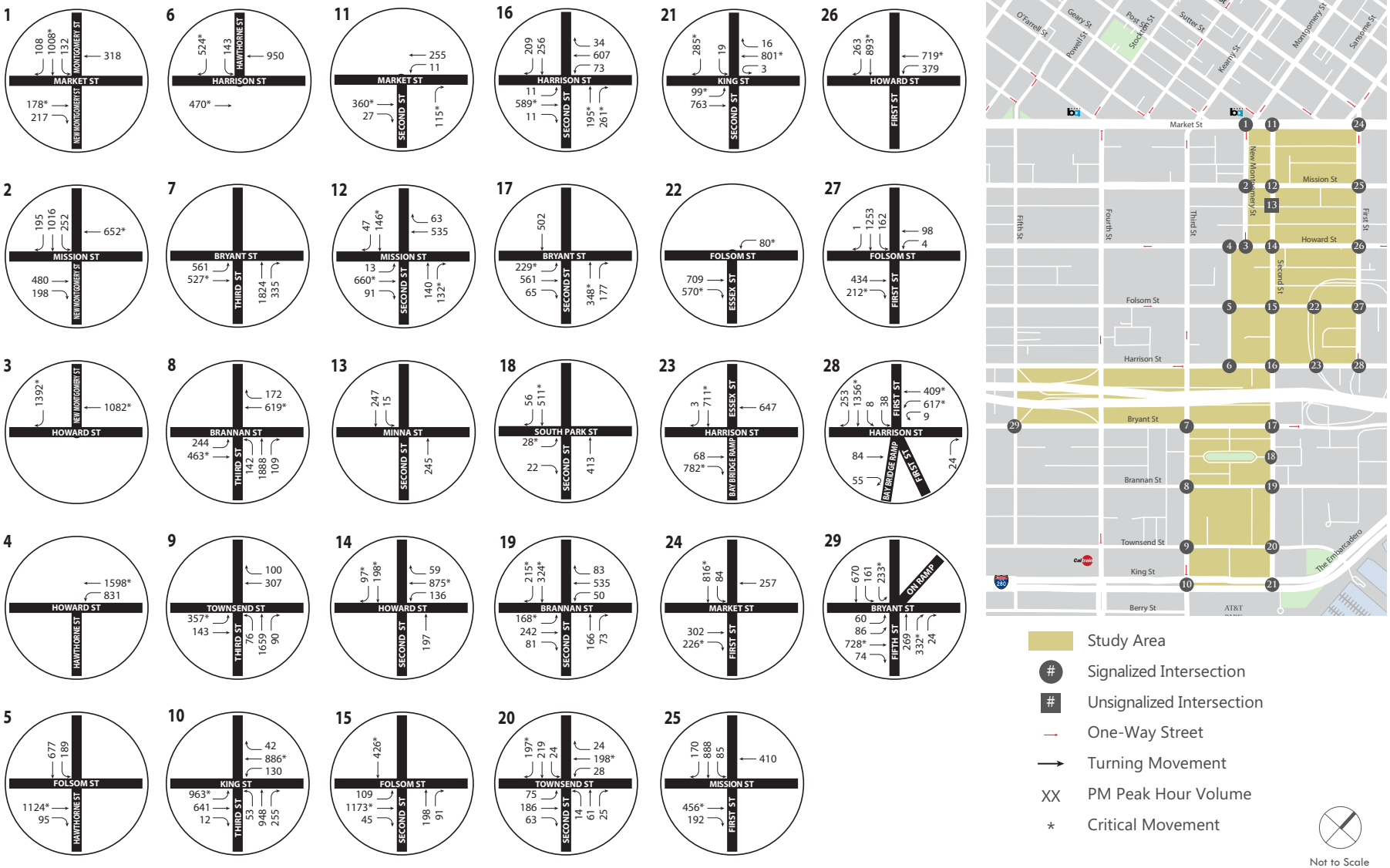


Figure 6
Existing Plus Project Intersection Turning Movements

Table 10 – Intersection Level of Service: Existing and Existing Plus Project – Weekday PM Peak Hour

#	Intersection	Overall Intersection Summary					
		Existing PM Delay[1] (seconds)	V/C[2]	LOS	Existing + Project PM Delay[1] (seconds)	V/C[2]	LOS
1	Market St/ Montgomery St	51.0		D	**77.8**	**1.01**	**E**
2	Mission St/ New Montgomery St	**61.3**	**1.04**	**E**	**>80**	**1.13**	**F**
3	Howard St/ New Montgomery St	39.5		D	**77.2**	**0.95**	**E**
4	Howard St/ Hawthorne St	19.6		B	**61.9**	**1.10**	**E**
5	Folsom St/ Hawthorne St	**74.5**	**1.08**	**E**	**>80**	**1.24**	**F**
6	Harrison St/ Hawthorne St	43.4		D	**71.0**	**1.24**	**E**
7	Bryant St/ Third St	41.1		D	26.9		C
8	Brannan St/ Third St	32.0		C	46.7		D
9	Townsend St/ Third St	31.1		C	48.0		D
10	King St/Third St	**> 80**	**0.97**	**F**	**>80**	**1.00**	**F**
11	Market St/ Second St	10.8		B	9.0		A
12	Mission St/ Second St	15.0		B	30.3		C
13	Minna St/ Second St	16.5		C (WB)	0.4		A (SB)
14	Howard St/ Second St	16.8		B	23.1		C
15	Folsom St/ Second St	**64.6**	**0.94**	**E**	30.7		C
16	Harrison St/ Second St	42.3		D	**>80**	**2.00**	**F**
17	Bryant St/ Second St	**> 80**	**1.30**	**F**	**>80**	**1.53**	**F**
18	South Park St/ Second St	**> 80**	**N/A**	**F (EB)**	4.6		A
19	Brannan St/ Second St	14.4		B	37.7		D
20	Townsend St/ Second St	14.5		B	16.7		B
21	King St/ Second St	42.9		D	39.0		D
22	Folsom St/ Essex St	30.3		C	13.5		B
23	Harrison St/ Essex St	**> 80**	**2.23**	**F**	**>80**	**1.92**	**F**
24	Market St/ First St	14.9		B	14.9		B
25	Mission St/ First St	23.0		C	25.2		C
26	Howard St/ First St	18.3		B	10.2		B
27	Folsom St/ First St	**> 80**	**1.26**	**F**	**>80**	**1.42**	**F**
28	Harrison St/ First St	**> 80**	**1.44**	**F**	**>80**	**1.60**	**F**
29	Fifth St/Bryant St/ I-80 EB On-Ramp	**> 80**	**1.34**	**F**	**>80**	**1.37**	**F**

Bold indicates an unacceptable intersection level of service condition (LOS E or F).
Shaded values indicate *a Significant Project-Specific Traffic Impact*.
1. LOS and delay for signalized intersections represent conditions for the overall intersection; LOS and delay for unsignalized (e.g., TWSC) intersections represent conditions for the side-street stop-controlled approach, eastbound (EB); westbound (WB).
2. Volume-to-Capacity (V/C) ratios are only presented for intersections that operate at unacceptable LOS conditions (LOS E or F), per City standards.
Source: CHS Consulting Group, 2014.

Less Than Significant Project-Specific Impacts

Based on the significance criteria and discussion below, the proposed project would not result in a project-specific traffic impact at 18 of the 29 study intersections and impacts to traffic conditions at these intersections would be *less than significant*. Sixteen of these intersections would operate at acceptable levels under Existing plus Project conditions. In particular, the proposed project would improve intersection operations at six of these sixteen intersections. At the other two intersections (of the 18) which would operate poorly under Existing plus Project conditions, the proposed project's contribution to the poorly operating intersection conditions would not be considerable. Therefore, as discussed below, the impact at these two intersections would be less than significant. The following describes the potential effects to traffic conditions at these intersections.

Traffic operations would continue to be acceptable at the following intersections:

Intersection #8: Brannan Street / Third Street. Intersection traffic conditions would degrade from LOS C to LOS D, due to the increase in northbound Third Street traffic volumes that would divert from northbound Second Street. However, the intersection would continue to operate at acceptable LOS conditions with implementation of the proposed project. Therefore, the impact to this intersection would be considered *less than significant*.

Intersection #9: Townsend Street / Third Street. Intersection traffic conditions would degrade from LOS C to LOS D, due to the increase in traffic volumes along the eastbound through movement on Townsend Street (due to volumes that would be divert from northbound Second Street) and these volumes would be added onto the critical eastbound left-turning movement, which would result in a marginal increase in the weighted-average delay of the overall intersection. However, the intersection would continue to operate at acceptable LOS conditions and the impact to this intersection would be considered *less than significant*.

Intersection #12: Mission Street / Second Street. Intersection traffic conditions would degrade from LOS B to LOS C, due to the proposed lane configuration changes along the northbound and southbound Second Street (both northbound and southbound configurations would be modified from a shared through-left/shared through-right lane groups under existing conditions, to a single through lane/exclusive right-turn pocket under existing plus project conditions) and the increase in volumes along the northbound right-turning movement on Second Street due to the prohibition of left-turns from northbound Second Street onto westbound Howard Street. However, the intersection would continue to operate at acceptable LOS conditions with implementation of the proposed project. Therefore, the impact to this intersection would be considered *less than significant*.

Intersection #14: Howard Street / Second Street. Intersection traffic conditions would degrade from LOS B to LOS C, due to the increase in westbound Howard Street traffic volumes that would be diverted from northbound Second Street and an increase in volumes along the northbound Second Street approach due to restricted left-turning movements as a part of the proposed project. However, the intersection would continue to operate at acceptable LOS conditions with implementation of the proposed project because the proposed project would result in changes in signal timing along with optimization thereby allowing for additional green time for both approaches. Therefore, the impact to this intersection would be considered *less than significant*.

Intersection #19: Brannan Street / Second Street. Intersection traffic conditions would degrade from LOS B to LOS D, due to the increase in eastbound and westbound Brannan Street traffic volumes that would divert off of northbound Second Street. However, the intersection would

continue to operate at acceptable LOS conditions with implementation of the proposed project. Therefore, the impact to this intersection would be considered *less than significant*.

Intersection #20: Townsend Street / Second Street. The intersection would operate at LOS B with and without implementation of the proposed project. At this intersection under project conditions, northbound and southbound left turns from Second Street to Townsend Street would be permitted, and in spite of some increases in volumes this intersection would continue to operate satisfactorily due to the increase in signal timing and optimization. Therefore, the impact to this intersection would be considered *less than significant*.

Intersection #21: King Street / Second Street. The intersection would operate at LOS D with and without implementation of the proposed project. The weighted-average delay of the overall intersection would be reduced because traffic volumes in the eastbound left-turning critical movement would be reduced due to diverted volumes attempting to turn left onto Second Street would make a left turn onto Third Street. Also, the proposed project would result in changes in signal timing along with optimization thereby allowing for additional green time along approaches. Therefore, the impact to this intersection would be considered *less than significant*.

Intersection #24: Market Street / First Street. The intersection would operate at LOS B with and without implementation of the proposed project and the proposed project would not result in any change to the volumes at this intersection due to diversions from Second Street. Therefore, the impact to this intersection would be considered *less than significant*.

Intersection #25: Mission Street / First Street. The intersection would operate at LOS C with and without implementation of the proposed project. The weighted-average delay of the overall intersection would increase due to an increase in traffic along the eastbound right-turning movement due to traffic volumes in the northbound direction diversions off Second Street. However this increase would not change the LOS at this location, hence the impact to this intersection would be considered *less than significant*.

Intersection #26: Howard Street / First Street. The intersection would operate at LOS B with and without implementation of the proposed project. The weighted-average delay of the overall intersection would be reduced because traffic volumes along the westbound through movement on Howard Street would decrease due to diverted traffic volumes off southbound Second Street and would be diverted to the westbound left-turning movement along Howard Street. Because of this reduction in traffic volumes the weighted-average delay of the overall intersection would marginally decrease and the impact to this intersection would be considered *less than significant*.

Traffic operations will improve as a result of the proposed project at the following intersections:

Intersection #7: Bryant Street / Third Street. Traffic operations would improve from LOS D to LOS C. Traffic volumes along the eastbound-through movement on Bryant Street would decrease due to diversions off of northbound Second Street, and the diverted volumes would be added to the less-congested eastbound left-turning movement; this would improve the weighted-average delay of the overall intersection.

Intersection #11: Market Street / Second Street. Intersection traffic conditions would improve from LOS B to LOS A with implementation of the proposed project. The weighted-average delay of the overall intersection would be reduced because traffic volumes along the critical eastbound right-turning movement on Market Street would decrease (due to volumes that have diverted

from southbound Second Street) and these diverted volumes would be added onto southbound New Montgomery Street.

Intersection #13: Minna Street / Second Street. Traffic operations would actually improve from LOS C to LOS A. The traffic volumes along Second Street, in the northbound and southbound directions would decrease due to diverted volumes from Second Street to adjacent roadways. In addition, the current roadway configuration along Minna Street would be converted from a westbound-only alleyway to an eastbound-only alleyway due to the planned Transit Center District Plan. Therefore, vehicles would no longer be stopped along Minna Street and attempting to turn onto Second Street, thereby decreasing the weighted-average delay of the overall intersection and improving LOS conditions at the study intersection.

Intersection #15: Folsom Street / Second Street. Traffic operations would actually improve from unacceptable LOS conditions (LOS E) to acceptable LOS conditions (LOS C). Traffic volumes would be reduced along northbound and southbound Second Street while through movements and traffic volumes on eastbound Folsom Street would increase (due to diverted traffic volumes off of Second Street). In addition, the proposed project would result in changes in signal timing along with optimization thereby allowing for additional green time in the eastbound Folsom Street approach. Because of this additional green time and the reduction in volumes along Second Street, the weighted-average delay of the overall intersection would decrease and the intersection would operate at acceptable LOS conditions.

Intersection #18: South Park Street / Second Street. Traffic operations would actually improve from unacceptable LOS conditions (LOS F) to acceptable LOS conditions (LOS A). The intersection is currently a Side-Street Stop-Controlled intersection, with the eastbound shared left-right turning lane group currently stop-controlled; whereas, movements along Second Street are uncontrolled (free flow). The number of lanes along Second Street would be reduced from four to two and the proposed project would include signalization of this intersection. Furthermore, traffic volumes along northbound and southbound Second Street would be reduced due to diversions off Second Street onto Third Street.

Intersection #22: Folsom Street / Essex Street. Traffic operations would actually improve from LOS C to LOS B. Traffic volumes in the eastbound right-turning critical movement on Folsom Street would decrease due to diverted traffic volumes off of Second Street to First and New Montgomery Streets.

The proposed project would not contribute considerably to existing poor operating conditions at the following intersections:

Intersection #23: Harrison Street / Essex Street. The study intersection would operate at unacceptable conditions (LOS F) with and without the proposed project. The proposed project would result in a reduction of 138 vehicles to the southbound through-right lane group movement along Essex Street. Also, the proposed project would result in a reduction of 49 vehicles to the eastbound right-turning critical movement along Harrison Street due to diversions off of Second Street. Therefore, the proposed project would not contribute considerably to the poor intersection operations, and the impact at this intersection would be *less than significant*.

Intersection #27: Folsom Street / First Street. The intersection would operate at unacceptable conditions (LOS F) with and without the proposed project. However, because the proposed project would not add any vehicles to the eastbound right-turning critical movement along Folsom Street, impacts to this intersection would be considered *less than significant*.

Significant Project-Specific Impacts

Based on the significance criteria and discussion below, the proposed project would result in a project-specific significant traffic impact at 11 of the 13 study intersections that operate at LOS E or LOS F under Existing plus Project conditions. As discussed above, **Intersection #23: Harrison Street / Essex Street** and **Intersection #27: Folsom Street / First Street** would operate at unacceptable levels under Existing plus Project conditions, but the proposed project would not contribute considerably to the poor operation of the intersection. Therefore, these two intersections are not discussed below. Because the project would result in a significant impact at eleven intersections, mitigation measures to reduce impacts to a less-than-significant level are required, if feasible.

Intersection #1: Market Street / Montgomery Street. The intersection currently operates satisfactorily at LOS D and implementation of the proposed project would degrade traffic conditions to LOS E (unacceptable conditions). Implementation of the proposed project would result in an increase in traffic volumes to the southbound through movement at Montgomery Street. Therefore, based on these findings, the traffic impact to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints as well as incompatibilities with the multi-modal character of the proposed project. Therefore, the impact would be considered *significant and unavoidable*.

Intersection #2: Mission Street / New Montgomery Street. The intersection currently operates unsatisfactorily at LOS E under Existing conditions. Implementation of the proposed project would result in an increase in traffic volumes to the southbound left-through lane group and eastbound right-turning movements at this study intersection and would further degrade intersection operating conditions to LOS F. Therefore, the impact to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints as well as incompatibilities with the multi-modal character of the proposed project. Therefore, the impact would be considered *significant and unavoidable*.

Intersection #3: Howard Street / New Montgomery Street. The intersection currently operates satisfactorily at LOS D under Existing conditions. Implementation of the proposed project would result in an increase in traffic volumes to the westbound through and southbound right movements at this study intersection and would degrade LOS conditions to LOS E (unacceptable conditions). Therefore, the impact to this intersection would be considered *significant*.

Mitigation Measure – M-TR-1: Increase Signal Cycle Length: The **Howard Street and New Montgomery Street** traffic signal operates on a 60-second cycle length under the Existing plus Project conditions. As a mitigation measure, increasing the signal cycle length to 90 seconds would improve the intersection operation from LOS E to LOS D, thus reducing the impact of the project to a less-than-significant level. The impact at this intersection would be *less than significant with mitigation*.

Intersection #4: Howard Street / Hawthorne Street. The intersection currently operates satisfactorily at LOS B under Existing conditions. Implementation of the proposed project would result in an increase in traffic volumes to the westbound left-through critical lane group at this study intersection and would degrade LOS conditions to LOS E (unacceptable conditions). Therefore, the impact to this intersection would be considered *significant*.

Mitigation Measure – M-TR-2: Increase Signal Cycle Length: The **Howard Street and Hawthorne Street** traffic signal operates on a 60-second cycle length under the Existing plus Project conditions. As a mitigation measure, increasing the signal cycle length to 90

seconds would improve the intersection operation from LOS E to LOS D, thus reducing the impact of the project to a less-than-significant level. The impact at this intersection would be *less than significant with mitigation*.

Intersection #5: Folsom Street / Hawthorne Street. The intersection currently operates unsatisfactorily at LOS E under Existing conditions. Implementation of the proposed project would result in an increase in traffic volumes to the southbound-through and southbound-left movements at this study intersection, and would further degrade LOS conditions to LOS F. Therefore, the impact to this intersection would be considered *significant*.
The following mitigation measure has been identified to address this significant impact.

> *Mitigation Measure – M-TR-3: Adding a left-turn lane:* At the **Folsom Street and Hawthorne Street** intersection, there currently is a single southbound lane, serving both the southbound-through and southbound-left movements. As a mitigation measure, the addition of a southbound left-turn lane during the p.m. peak demand period would improve the intersection operation back to the existing LOS E condition. This mitigation measure would result in the removal of two metered parking spaces on the east side of Hawthorne Street north of Folsom Street during the p.m. peak demand period; during the remainder of the day, the parking spaces would remain available.
>
> With implementation of the above mitigation measure, the intersection would remain at LOS E with the proposed project and the mitigation measure. In order to determine if the project would result in a considerable cumulative contribution to the unacceptable operation of the intersection, the critical eastbound-through movement was examined. The proposed project would result in the reduction of 26 vehicles (due to diversions off Second Street to Third Street) from the critical eastbound-through movement along Folsom Street. This would be a negative contribution to the critical movement, and would therefore not constitute a considerable contribution. The impact would be *less than significant with mitigation.*

As such, the traffic impact at the Folsom Street and Hawthorne Street intersection with mitigation would be *less than significant with mitigation.*

Intersection #6: Harrison Street / Hawthorne Street. The intersection currently operates satisfactorily at LOS D under Existing conditions. Implementation of the proposed project would result in an increase in traffic volumes to the southbound left-turning movement along Hawthorne Street and increase traffic volumes along eastbound and westbound Harrison Street at this study intersection and would degrade LOS conditions to LOS E (unacceptable conditions). Therefore, the impact to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints as well as incompatibilities with the multi-modal character of the proposed project. Therefore, the impact would be considered *significant and unavoidable*.

Intersection #10: King Street / Third Street. The study intersection would operate at unacceptable conditions (LOS F) with and without the proposed project. The proposed project would result in the addition of 91 vehicles to the eastbound left-turning critical movement along King Street, which represents 9 percent of the p.m. peak hour volume of 963 vehicles in the eastbound left-turning movement. Therefore, the impact to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints as well as incompatibilities with the multi-modal character of the proposed project. Therefore, the impact would be considered *significant and unavoidable*.

Intersection #16: Harrison Street / Second Street. The intersection currently operates satisfactorily at LOS D under Existing conditions. Implementation of the proposed project would result in an increase in volumes to the eastbound movement on Harrison Street at this study intersection and would degrade LOS conditions from LOS D to LOS F (unacceptable conditions). Therefore, the impact to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints as well as incompatibilities with the multi-modal character of the proposed project. Therefore, the impact would be considered *significant and unavoidable*.

Intersection #17: Bryant Street / Second Street. The study intersection would operate at unacceptable conditions (LOS F) with and without the proposed project. The proposed project would result in a reduction in lane capacity given the loss of one eastbound left turn lane and a through lane in the northbound and southbound directions. In spite of signal timing changes and optimization, the intersection volume to capacity (v/c) ratio would increase from 1.30 to 1.53. This would represent a growth in the overall intersection v/c of 18%, which would exceed the significance threshold of 10% as discussed under Significance Criteria Section 4.1. Therefore, the impact to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints as well as incompatibilities with the multi-modal character of the proposed project. Therefore, the impact would be considered *significant and unavoidable*.

Intersection #28: Harrison Street / First Street. The intersection would operate at unacceptable conditions (LOS F) with and without the proposed project. The proposed project would result in an addition of 185 vehicles to the southbound right-turning critical movement along First Street, which represents 14 percent of the p.m. peak hour volumes of 1,356 vehicles in the southbound right-turning movement. Therefore, the impact to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints as well as incompatibilities with the multi-modal character of the proposed project. Therefore, the impact would be considered *significant and unavoidable*.

Intersection #29: Fifth Street / Bryant Street / I-80 Eastbound On-Ramp. The intersection would continue to operate at LOS F with and without the proposed project. The proposed project would result in an addition of 26 vehicles to the northbound right-turning critical movement along Fifth Street, which would which represents 8 percent of the p.m. peak hour volume of 332 vehicles in the northbound right-turning movement. Therefore, the impact to this intersection would be considered *significant*. Therefore, the impact would be considered *significant and unavoidable*.

Summary of Project Traffic Impacts

Under Existing plus Project conditions, 16 of the 29 study intersections would continue to operate at acceptable LOS conditions (LOS D or better). In particular, the intersection of Folsom Street and Second Street would improve from unacceptable LOS conditions (LOS E) to acceptable LOS conditions (LOS C). Also, signalization of the intersection of South Park Street and Second Street with implementation of the proposed project would substantially improve the intersection operations from LOS F to LOS A.

Under Existing plus Project conditions, 13 of the 29 study intersections would operate poorly at unacceptable LOS conditions (LOS E or LOS F). At two of these 13 intersections (Intersection #27: Folsom Street / First Street and Intersection #23: Harrison Street / Essex Street), the proposed project would not contribute considerably to the poor intersection operation, and the

traffic impacts have been determined to be less than significant. Significant traffic impacts were identified at the remaining 11 intersections. However, mitigation measures that would reduce the impacts to less than significant have been identified for the following three of the 11 intersections:

Intersection #3: Howard Street / New Montgomery Street.
Intersection #4: Howard Street / Hawthorne Street.
Intersection #5: Folsom Street / Hawthorne Street.

Due to the constraints of the right of way and incompatibilities with the multi-modal character of the proposed project, at the remaining eight intersections, the traffic impacts would be significant and unavoidable.

Game Day Conditions - Traffic Impacts

In the existing condition, drivers mostly use northbound Third Street to access I-80 East on-ramps at Essex, First and Sterling Streets from Ballpark Parking Lot A. However, when congestion occurs after the game, some drivers divert to northbound Second Street in order to access these ramps. These drivers are currently allowed to turn right from two lanes on Second Street at the intersections of Harrison Street and Bryant Street during the evening commute period (4pm to 7pm). The proposed project would provide only one right-turn lane at each of these locations, effectively limiting the space on Second Street available for vehicle queues extending from the Essex and Sterling Street on-ramps. It is expected that with implementation of the proposed project, fewer drivers would be able to use Second Street to reach I-80 east after ballgames, and instead would use Harrison and Bryant Streets via Third Street, as described above, or would divert to the Fifth Street on-ramp. The increase in vehicles on these routes may lengthen queues on Bryant, Harrison and Third streets.

As described in the setting under the Game Day Conditions for weekday games, traffic conditions are much more congested than under existing conditions. The proposed project would reduce vehicle capacity along the Second Street corridor and result in traffic diversions to other surrounding streets. As described above, the proposed project would result in project-specific significant traffic impacts at the following intersections:

- Market Street / Montgomery Street (#1)
- Mission Street / New Montgomery Street (#2)
- Howard Street / New Montgomery Street (#3)
- Howard Street / Hawthorne Street (#4)
- Folsom Street / Hawthorne Street (#5)
- Harrison Street / Hawthorne Street (#6)
- King Street / Third Street (#10)
- Harrison Street / Second Street (#16)
- Bryant Street / Second Street (#17)
- Harrison Street / First Street (#28)
- Fifth St/Bryant St/ I-80 EB On-Ramp (#29)

As described in the traffic impact section above, mitigation measures have been identified for the project specific significant traffic impacts at Intersections #3, #4, and #5 that would mitigate these traffic impacts to a less than significant level. The conditions at these three intersections would also be improved with mitigation under the Game Day Scenario. However, for the eight other intersections that would operate at LOS E or LOS F with the proposed project, no feasible mitigation measures have been identified and therefore, the identified traffic impacts would remain significant and unavoidable. Therefore, the proposed project would exacerbate the congested conditions that result during weekday Game Day

Conditions (either after an afternoon game or preceding an evening game) during the weekday pm peak hour and the impact would be considered significant. No feasible mitigation measures have been identified for the significant and unavoidable project-specific traffic impacts due to the constraints of the right of way and incompatibilities with the multi-modal character of the proposed project.

As mentioned previously, the Ballpark EIR required development of a Transportation Management Plan (TMP) as a mitigation measure to address the congestion and delay that occurs in the vicinity of the ballpark, including on Second Street, following a ballgame. The implementation of the TMP is overseen by the TCC, which continues to meet and refine the TMP to manage circulation to and from the ballpark so that traffic flows have as little impact on the affected community as possible. As part of the TMP, the SFMTA deploys Parking Control Officers (PCOs) to key locations around the ballpark to facilitate transportation in the area including people walking, transit riders, and other traffic. The TMP is modified as appropriate based on changing conditions in the ballpark vicinity.

4.2.2 Transit Impacts

The proposed changes to Muni transit service and infrastructure as a result of the proposed project are presented above in Section 1.5 of this report and summarized here:

- Muni routes 10 and 12 would remain the same[22];
- There would be a reduction of bus stops from 13 to 10; and
- All curbside Muni bus stops would be replaced with 8-foot wide and approximately 80 feet long transit boarding islands located between the cycletracks and general travel lane except for the bus zone on Townsend Street.

This section presents the impacts related to transit as a result of the proposed project.

Methodology

Since the project is a bikeway infrastructure improvement project as opposed to a land use project, it would not generate transit trips; therefore, a transit capacity utilization analysis has not been prepared. However, the roadway reconfiguration associated with the project could result in added delay for transit travel time.

The transit delay methodology presented below was originally developed in the San Francisco Bicycle Plan EIR and the same methodology has been used to analyze transit impacts for the proposed project. The total transit vehicle delay is comprised of the following three elements:

- **Bus Travel Delay** – The transit travel delay represents the additional time experienced by a transit vehicle as it travels between stops across one or more intersections along the corridor. This is attributed to congestion caused by other vehicular traffic impeding bus movement.
- **Transit Reentry Delay** – The transit reentry delay represents the waiting time for a sufficient gap in traffic flow to allow a bus pulled over within a bus lay-by stop to pull back into the travel lane. The proposed project would reconfigure the roadway with transit boarding islands located between the roadway and the proposed cycletrack wherein buses would stop within the travel lane, which would eliminate transit reentry delay.
- **Boarding Delay** – The passenger boarding delay represents the time needed for additional passengers to board. Since the project is a street improvement project (as opposed to a land use project), it would not generate any additional transit ridership. Therefore, the project would not

[22] Changes to Muni routes 10 and 12 service are proposed under the Transit Effectiveness Project

result in any boarding delay. It is assumed that the proposed project would not cause changes in Muni ridership. Therefore boarding delay would remain constant within each scenario.

The three components of the total transit delay were quantified as described below.

Bus Travel Delay
The bus travel delay was quantified using traffic operations data obtained from the intersection level of service (LOS) calculations performed at study intersections along the corridor. The bus travel delay reflects the movement delay at the intersection for the direction of bus travel. Thus, the total bus travel delay along Second Street was calculated as the sum of all the related approach movement delays within the study area. The bus travel delay was calculated separately for each direction of transit travel (i.e. inbound and outbound).

At intersections operating at LOS F with a volume-to-capacity (v/c) ratio above 1.02 or above 80 seconds of delay, the Highway Capacity Manual (HCM) for LOS quantification methodology breaks down, and reported values of delay would be inaccurate. Thus, as described below, an adjusted methodology was used to calculate transit delays at those locations where the LOS degrades to LOS F for the approach along which transit vehicles operate.

The methodology for calculating transit travel delay consists of two components, one applied to each individual intersection on a transit corridor, and the other applied globally to each transit corridor.

Individual Intersection Level Delay Adjustments – Three possible cases occurred:

1) Movement operated at LOS F with a calculated delay of less than or equal to 100 seconds per vehicle. In this case the delay resulting from the application of the HCM methodology was applied.
2) Movement operated at LOS F with a calculated delay greater than 100 seconds per vehicle and the v/c ratio is less than or equal to 1.02 – In this case, the delay was adjusted to 200 seconds.
3) Movement operated at LOS F with a calculated delay greater than 100 seconds per vehicle and the v/c ratio is greater than 1.02 – In this case, we adjusted the delay to 240 seconds.

Corridor Level Delay Adjustments – Subsequently, additional adjustments were made to calculate the total delay along a transit corridor for those intersections that met any of the three cases noted above. In the instances where there were consecutive intersections operating at LOS F along the transit corridor, the intersection delay calculations were increased by a factor of 10 percent per intersection. For example, if there were three consecutive intersections in a transit corridor that operated at LOS F and met the criterion noted in case 3 described above, the total delay for these three intersections was increased by 30 percent. In this case, the total intersection delay for these three locations became 312 seconds per vehicle (240 x 1.3 = 312).

Transit Re-Entry Delay
The bus reentry delay at a given bus stop is estimated using empirical data presented in the 2000 Highway Capacity Manual (HCM). **Table 11** summarizes the HCM data. The total bus reentry delay along Second Street is calculated as the sum of the individual transit reentry delay at each bus stop within the study area. The bus reentry delay is calculated separately for each direction of transit travel (i.e., inbound and outbound).

The existing bus stops are located curb side; therefore, there would be a re-entry delay for buses under both Existing and Year 2040 (No Build) Conditions. With implementation of the proposed project, the bus stops would be converted to boarding islands, located between the travel lane and the proposed cycletrack. Therefore, there would be no re-entry delay under the Existing plus Project and Year 2040 Build Conditions.

Table 11 – Average Bus Re-Entry Delay into Adjacent Traffic Stream (Random Vehicle Arrivals)

Adjacent Lane Mixed Traffic Volume (vehicles)	Average Re-Entry Delay (seconds)
100	0
200	1
300	2
400	3
500	4
600	5
700	7
800	9
900	11
1000	14

Source: CHS Consulting Group, 2014.

Significance Criteria

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 operating costs or delays such that significant adverse impacts to transit service levels could result. The proposed project would not impact transit demand, thus, the focus of the transit impact analysis was on transit delay. The methodology for assessing transit delay is discussed in the next section.

The proposed project would have a significant impact on transit if one of the following is true: 1) For transit lines where the headway is greater than six minutes, the sum of the increase in delay in both directions is equal to or greater than six minutes. 2) For transit lines where the headway is equal to or less than six minutes, the impact is significant if the sum of the increase in delay in both directions is equal to or greater than the headway of the affected transit line.

Existing and Existing Plus Project-Related Transit Delay

Table 12 presents the existing and associated additional transit delay the project would cause for Routes traveling on Second Street during the PM peak hour. Detailed calculations are included in Appendix H.

Table 12 – Transit Delay: Existing and Existing Plus Project Conditions Weekday PM Peak-hour

Route	Headway (min)	Total Transit Delay (min: sec)		
		Existing	Existing Plus Project	Project Contribution
10 Townsend				
Inbound (Northbound)	20	7:20	6:18	-1:02
Outbound (Southbound)	20	3:25	4:28	1:03
12 Folsom-Pacific				
Inbound (Northbound)	20	6:38	2:31	-4:07
Outbound (Southbound)	20	1:22	4:39	3:17

Note: The total transit delay presented in the table does not include boarding delay.
Source: CHS Consulting Group, February 2014.

The proposed project would decrease Muni Route 10 delay by approximately one minute and two seconds in the inbound direction and increase by one minute and three seconds in the outbound direction. The

sum of the delay for Muni Route 10 in both directions would increase one second. The proposed project would reduce Muni Route 12 travel times by approximately four minutes and seven seconds in the inbound direction, while increasing the delay by approximately three minutes and seventeen seconds in the outbound direction. The sum of the delay for Muni Route 12 in both directions would thus amount to a reduction of fifty seconds.

As shown in Table 10, above, the increase in transit travel time in both directions due to the proposed project would be less than the threshold of six minutes for both Routes 10 and 12. Thus, the impact of the project on transit would be ***less than significant.***

Some observations as to the reasons for the considerable increase or decrease of travel time at some intersections between the existing versus existing plus project conditions are listed below:

- Muni Route 10 Inbound: There would be a decrease in bus travel delay at Market and Second Street intersection due to a reduction in traffic volume for the eastbound right movement from Market Street as a result of diversion due to the project. There would also be a decrease in bus travel delay at Howard and Second as well as Harrison and Second Street intersections due to lane geometry changes combined with cycle length increase from 60 seconds to 90 seconds along with signal optimization.

- Muni Route 10 Outbound: There would be an increase in bus travel delay at Folsom and Second Street intersection due to lane geometry changes (two shared through lanes in the southbound direction reduces to one through only lane). There would also be a decrease in bus travel delay at Harrison, Brannan and Townsend Street intersections with Second Street due to lane geometry changes combined with cycle length increase from 60 seconds to 90 seconds along with signal optimization. There would also be decreases in bus travel delay at Townsend and Second Street as well as Townsend and Third Street intersections due to signal optimization and volume reduction and optimization respectively.

- Muni Route 12 Inbound: There would be a decrease in bus travel delay at Market and Second Street intersection due to a reduction in traffic volume for the eastbound right movement from Market Street as a result of diversion due to the project. There would be a decrease in bus travel delay at Folsom and Second Street intersection due to the cycle length increase from 60 seconds to 90 seconds along with signal optimization and a reduction in delay at Howard and Second due to lane geometry changes along with the cycle length increase from 60 seconds to 90 seconds.

- Muni Route 12 Outbound: There would be an increase in bus travel delay at Folsom and Second Street intersection due to lane geometry changes (two shared through lanes SB reduces to one through only lane). There would be an increase in bus travel delay at Harrison and Second Street intersection due to lane geometry changes (two shared through lanes SB reduces to one through only lane and an exclusive right turn pocket).

Transit travel time for other transit routes along adjacent streets may also be affected due to autos diverting to these streets under the project condition. Specifically, this phenomenon could occur on First, Third, Mission, Howard, and Folsom Streets. Transit travel time effects on each of these streets as a result of the proposed project are described below.

- First Street: Currently there are no transit routes on First Street, except for Golden Gate Transit inbound commuter bus routes during the morning peak period. These buses travel for two blocks along southbound First Street in the right lane and turn right onto westbound Howard Street. The proposed project would divert some vehicles off of southbound Second Street and onto southbound

First Street, due to the left-turn restrictions and reduction in capacity that is proposed for southbound Second Street.

The delay to Golden Gate Transit vehicles on First Street due to the proposed project would be negligible for three reasons:

- The buses only operate during the morning period, when traffic volumes on First Street are substantially lower than during the afternoon period, and congestion has not been observed on First Street during the morning period;
- The buses only operate for two blocks along First Street, between Market and Howard streets; and
- The proposed project would only divert a negligible volume of vehicles onto the southbound right-turn movement at First/Howard (where they could conflict with the buses making the same maneuver) because the southbound right-turn movement at Second/Howard would be maintained.

With the future completion of the Transbay Transit Center, several Muni bus routes will relocated onto First Street between Market and Mission streets. However, these bus routes will operate within a fully dedicated transit-only lane and therefore be protected from congestion. Therefore, there would be a negligible added delay to Muni vehicles on First Street as a result of the proposed project.

- Third Street: Muni route 8X Bayshore Express operates along Third Street between Bryant and Market streets, and routes 30 Stockton, 45 Union/Stockton and 81X Caltrain Express operate along Third Street between Townsend and Market streets. The proposed project would divert some vehicles off of northbound Second Street and onto northbound Third Street, due to the left-turn restrictions and reduction in capacity that is proposed for northbound Second Street.

  All of these bus routes operate within the existing transit-only lane on the east side of Third Street (right side) between Townsend and Market streets, which protects transit vehicles from congestion. Private vehicles are permitted to weave across the transit-only lane on Third Street in order to execute right turn movements, which can cause delay to transit vehicles. However, the proposed project would only divert a negligible volume of vehicles onto the northbound right-turn movements along Third Street, because the northbound right-turn movements along Second Street would be maintained.

  Therefore, the proposed project would result in negligible added delay to transit vehicles along Third Street.

- Mission Street: Muni routes 14 Mission, 14L Mission Limited, 14X Mission Express, Golden Gate Transit routes 70/80, and Samtrans routes 292, 397 and KX operate along Mission Street in the vicinity of Second Street. The proposed project would result in a minor increase in traffic volumes traveled along Mission Street due to the northbound and southbound left-turn prohibitions proposed with the project at Second/Mission. Specifically, vehicles previously executing these left-turn movements would instead execute three right-turn movements around the block, resulting in one additional block of travel along eastbound or westbound Mission Street. During the PM peak hour, 40 vehicles currently execute the northbound-left movement, and 48 vehicles currently execute the southbound-left movement; these vehicles would be diverted around the block.

  All of these bus routes operate within existing transit-only lanes on Mission Street in the vicinity of Second Street, which protects transit vehicles from congestion. Private vehicles are permitted to weave across the transit-only lane on Mission Street in order to execute right-turn movements, which can cause delay to transit vehicles. However, the proposed project would not add any additional

right-turn movements off of Mission Street that could cause delay to transit. Furthermore, the project would result in these diverted vehicles only traveling one additional block along Mission Street, which (assuming that the existing transit lane was not in operation) would only cause a negligible increase in delay for transit vehicles along Mission Street.

Therefore, the proposed project would result in negligible added delay to transit vehicles along Mission Street.

- Howard Street: There are no transit routes on First Street, except for Golden Gate Transit inbound commuter bus routes during the morning peak period. These buses travel for three blocks along westbound Howard Street and turn left onto southbound Fourth Street. The proposed project would result in a minor increase in traffic volumes traveled along westbound Howard Street due to the northbound left-turn prohibition proposed with the project at Second/Howard. Specifically, vehicles previously executing this left-turn movement would instead execute three right-turn movements around the block, resulting in one additional block of travel along westbound Howard Street (between First and Second streets). During the PM peak hour, 84 vehicles currently execute this northbound left-turn maneuver.

  The delay to Golden Gate Transit vehicles on Howard Street due to the proposed project would be negligible for two reasons:

  - The buses only operate during the morning period, when traffic volumes on Howard Street are substantially lower than during the afternoon period, and congestion has not been observed on Howard Street during the morning period;
  - The project would result in these diverted vehicles only traveling one additional block along westbound Howard Street, which would only cause a negligible increase in delay for transit vehicles along Howard Street.

- Folsom Street: Muni route 12 Folsom operates along eastbound Folsom Street west of Second Street, and then executes an eastbound left-turn from Folsom Street onto northbound Second Street. Also, Golden Gate Transit outbound commuter bus routes operate along Folsom Street during the PM peak period between Third Street and Fremont Street. The proposed project would result in an increase in traffic volumes traveled along eastbound Folsom Street between Hawthorne and Second streets, due to the Bay Bridge-bound traffic detour (described above in Section 3.2) associated with the southbound left-turn prohibition proposed at Second/Folsom. During the PM peak hour, 240 vehicles currently execute this southbound left-turn maneuver, of which 145 vehicles would be rerouted onto Hawthorne Street with the remainder rerouted onto southbound First Street and the First Street on-ramp.

  These additional vehicles on Folsom Street between Hawthorne and Second streets could cause delay to both Muni and Golden Gate Transit routes. However, this segment of Folsom Street has four eastbound travel lanes. Bay Bridge-bound traffic is confined to the middle two lanes, because these lanes feed onto the Essex Street on-ramp; the left (northernmost) lane does not feed the on-ramp. While the middle two lanes routinely become congested during the PM peak period, the left lane does not experience similar congestion. Both the Muni vehicles (which turn left onto northbound Second Street) and the Golden Gate Transit vehicles (which access a boarding island east of Second Street) travel within this left lane and would avoid this congestion, similar to existing conditions.

  The Hawthorne Street detour is primarily intended for Bay Bridge-bound traffic, which means that these detoured vehicles would utilize the middle lanes of Folsom Street between Hawthorne and Second streets, and would not utilize the left lane which serves the transit routes. Therefore, the proposed project would result in negligible added delay to transit vehicles along Folsom Street.

- Harrison Street: Muni route 12 Folsom operates along westbound Harrison Street west of Second Street. Westbound Harrison Street would not experience any diverted traffic volumes as a result of the proposed project (the Hawthorne diversion would add traffic only onto eastbound Harrison Street), therefore added transit delay to transit vehicles along Harrison Street would be negligible.

- Brannan Street: Muni route 82X Levi Plaza Express operates along westbound Brannan Street in the vicinity of Second Street. Westbound Brannan Street would not experience any diverted traffic volumes as a result of the proposed project (although the northbound-left turn at Second/Brannan would be prohibited, there is no ability to execute three right turns around the block because Delancey Street does not connect with Bryant Street, therefore this traffic would utilize northbound Third Street).

- Townsend Street: Muni route 10 Townsend operates along Townsend Street west of Second Street. Townsend Street would not experience any diverted traffic volumes as a result of the proposed project because northbound and southbound left-turn movements would be maintained at Second/Townsend.

In summary, as described above, the proposed project would only result in negligible increases in transit travel time along transit routes in the vicinity of Second Street.

Game Day Conditions - Transit Impacts
Under the existing condition, the 10 Townsend Muni buses[23] serving AT&T Park via Second Street experience variable travel time along the Second Street corridor, but have not been shown to experience a consistent increase in transit travel time on game days. The transit demand on Game Days under existing plus project conditions is expected to be similar to that under existing Game Day conditions since this project would not increase transit demand. Additionally, some of the existing Game Day transit users could potentially change their mode of travel to bikes as a result of the improved bicycle infrastructure. The proposed project would result in the installation of transit boarding islands at most transit stops along Second Street, which would facilitate bus operations as described under the existing plus project transit impacts above. For these reasons, transit impacts due to the project under Game Day conditions would be less than significant.

4.2.3 Pedestrian Impacts

Pedestrian impacts can be identified as (1) capacity-related impacts, and (2) hazard-related impacts. Capacity-related impacts would occur if the number of pedestrian trips generated by a proposed project could not be accommodated by existing pedestrian facilities, sidewalks, cross-walks, etc. Hazard-related impacts could occur if project-generated pedestrians would be exposed to existing hazardous conditions (i.e. poor visibility, lack of crosswalks, long roadway crossing distances, etc.) or if the proposed project would create new potential conflict points between pedestrians and motorized vehicles (i.e. new driveways and/or loading areas, etc.)

The proposed project would include various pedestrian improvements along the Second Street corridor including sidewalk widening, signal phasing modifications, one new traffic signal, the elimination of an

[23] Under the SFMTA's Transit Effectiveness Project (TEP) Service Improvements, the 10 Townsend would be renamed the 10 Sansome and would continue to operate along Second Street. More information regarding the TEP may be found at online at http://www.sfmta.com/projects-planning/projects/tep-transit-effectiveness-project. Accessed May 16, 2014.

uncontrolled dual right-turn lane, raised crosswalks, new curb ramps, and bulb-outs. It would also include streetscape improvements such addition of trees, street furniture, and pedestrian-scale lighting to improve pedestrian experience and safety. These facilities would be placed in a manner than meets City Standards and American Disability Act requirements for maintaining unobstructed effective with of sidewalk for clear path of travel.

Between Harrison Street and Townsend Street the sidewalks on both sides of the street would be widened from 10 to 15 feet. This would provide additional circulation space on the sidewalk for pedestrians traveling along Second Street as well as provide consistent sidewalk widths between Market Street and Townsend Street. The sidewalk widening would also result in shorter crossing distances, and thus shorter required crossing times, for all east-west crossings of Second Street between Harrison and Townsend Streets. Between Townsend Street and King Street, sidewalk widths would remain 19 feet wide.

Left turns off of Second Street would be restricted at signalized intersections north of Townsend Street, and right-turns off of Second Street would be served during a new exclusive signal phase. The new right-turn phases would follow a phase for north-south pedestrian movements concurrent with through vehicle traffic along Second Street; in other words, conflicts between cars turning right off of Second Street and pedestrians walking in the crosswalk along Second Street would be removed by implementing separate signal phases. The control of turns from cross-streets onto Second Street would not be changed.

At the southeast corner of Harrison Street and Second Street, one of two existing northbound right-turn lanes and a "pork chop" pedestrian island would be eliminated as part of the proposed project. Replacing this dual free-right turn condition with a single, signal-controlled right-turn lane with a smaller curb radius at this location would improve pedestrian operations and circulation at this corner. As the existing uncontrolled crossing between the pork chop island and the southeast corner of the sidewalk would be eliminated, crossing the east and south legs of the intersection would be simplified and shortened, and pedestrian exposure to turning vehicles would be reduced.

The proposed project would include a new traffic signal with pedestrian countdown signals at Second Street and South Park Street, which is currently controlled with a stop sign on the eastbound South Park approach. The new signal would provide a pedestrian crossing signal phase for one or both of the currently uncontrolled crosswalks across Second Street. The sidewalks at the northwest and southwest corners of the intersection would be extended into South Park Street to shorten crossing distance and allow pedestrians to be more visible to approaching drivers.

Transit boarding islands at nine locations would provide dedicated space for pedestrians to access buses along Second Street. These eight-foot-wide islands would be separated from the sidewalk by the cycletrack and would provide dedicated space for pedestrians to queue, board and de-board buses. At least one marked, accessible path would be provided across the bikeway for pedestrians to cross between the sidewalk and each boarding island.

The proposed project would include installation of new, ADA-compliant curb ramps at all intersections along the project corridor, as well as raised crosswalks at crossings of alleys. All marked crosswalks where raised crosswalks would not be installed would be upgraded with high-visibility, continental-style markings.[24]

As discussed above, the proposed project would enhance the pedestrian realm along Second Street and would widen sidewalks on a large portion of the corridor and would create additional space for bus

[24] Continental-style markings are sets of white longitudinal lines separated by gaps of two-to-six feet, parallel to the intersecting travel lanes.

passenger queuing, separate pedestrian crossing phases from vehicle turning movements, install new curb ramps and crosswalks upgrades, and improve crosswalks along the corridor generally. Additional modifications to the intersections of Second Street with Harrison Street and South Park Street included in the proposed project would improve pedestrian crossing conditions at those locations. These improvements would result in more pedestrian space for circulation, improve the visibility of crossing pedestrians, and would reduce vehicle-pedestrian conflicts. Therefore, the proposed project would benefit pedestrian circulation and safety, and impacts to pedestrian facilities and to users therein would be ***less than significant.***

Game Day Conditions – Pedestrian Impacts
Second Street is one of the primary streets used by pedestrians walking to and from the ballpark, many of whom walk to and from Montgomery Street BART Station or to access the Muni lines on Market Street. During the post-game and, to a lesser extent, pre-game period, the sidewalks on Second Street are congested.

The proposed project would widen the sidewalks on Second Street between Townsend and Harrison Streets from ten to 15 feet. This improvement would reduce crowding on this segment, and may reduce instances of pedestrians walking in the street. The project would also provide right-turn signal phases time-separated from crossing phases for pedestrians walking along Second Street north of Townsend Street. This change would reduce pedestrian-vehicle conflicts in the east- and west-side crosswalks along Second Street during post-game periods of high pedestrian volumes by giving right-turning drivers an exclusive green phase after the pedestrian crossing time has ended. This benefit to pedestrian safety would be amplified at the Second Street east-side crossing of Harrison Street, where the project would eliminate existing dual right-turn lanes and replace them with a single, signal-controlled right-turn lane with a right-turn signal phase separated from the pedestrian crossing phase. The combination of high-visibility crosswalk markings, raised alley crossings and new sidewalk lighting included in the project would also improve conditions for pedestrians using Second Street on game days. Thus, for the reasons provided above, under Game Day Conditions the project impact to pedestrians would be less than significant.

4.2.4 Bicycle Impacts

Bicycle impacts can be identified as (1) capacity-related impacts, (2) hazard-related impacts, and (3) accessibility-related impacts. Capacity-related impacts would occur if the number of bicycle trips generated by a proposed project could not be accommodated by existing bicycle facilities, including bicycle lanes and bicycle parking. Hazard-related impacts could occur if project-generated bicyclists would be exposed to existing hazardous conditions (e.g., poor visibility, fast-moving vehicular traffic) or if the proposed project would create new potentially hazardous conditions for bicyclists such as conflict points between bicyclists and motorized vehicles (e.g., new driveways and/or loading areas, etc.); or if the proposed project site does not include a safe path for bicyclists from the public right-of-way to the bicycle parking facilities. Accessibility-related impacts could occur if project-related components would interfere with access to a regularly used bicycle route (e.g., construction of a building that would close an existing street, widening a roadway that would reduce or eliminate bicycle lanes).

Second Street from Market to Townsend streets is designated as San Francisco Bicycle Route 11, and the street is intersected by east-west bicycle routes 30 (on Howard and Folsom Streets), 36 (Townsend Street) and 5 (King Street). Currently, the block of Second Street between Mission and Howard Streets has

shared lane markings, also called "sharrows."[25] There are no other existing pavement markings or dedicated bicycle facilities on Second Street. Other existing improvements for bicyclists are guide signs and sidewalk bicycle racks.

Bicycle improvements in the proposed project include a combination of raised cycletracks, standard bicycle lanes and shared lane markings, as well as modifications to signal phasing and bus stop design described above in Section 4.2.3, *Pedestrian Impacts*.

With implementation of the proposed project, curbside bikeways, or cycletracks, would be provided in the northbound and southbound directions along Second Street between Stevenson Street and Townsend Street. The cycletracks would vary between six and seven feet in width and would be located between the curb and vehicle parking and/or loading, transit boarding islands, or the vehicle travel or turning lane. To provide visual and physical distinction from vehicular travel lanes and the sidewalk, the cycletracks would be colored green and would be constructed two inches above the roadway (four inches below the sidewalk level). A one- to two-foot wide buffer space between the raised cycletrack and the vehicle travel lane would incorporate a gradual vertical transition to allow bicyclists to merge in and out of the cycletrack midblock when needed.

Between Market Street and Stevenson Street, six- to seven-foot wide Class II bicycle lanes would be added between the vehicle travel lanes and curbside parking and loading spaces. Motorcycle and truck drivers would cross the bicycle lane to access the parking and loading spaces (and at night, the Muni Route 9 bus terminal).

Between Stevenson Street and Townsend Street, parking spaces, loading zones, taxi stands, and bus stops would be moved from curbside to the left of the cycletracks. This design would separate bicyclists from motorists, transit operations, and parking maneuvers, thereby reducing the number of midblock vehicle-cyclist conflicts along Second Street. Where vehicle parking and loading are provided, a four-foot wide crosshatched buffer space would be installed to accommodate loading activities between the parking/loading zones and the cycletrack. At bus stops, the cycletrack would pass between the new transit boarding islands and the curb, which would limit bicyclist conflicts with buses pulling into and out of bus stops and with passengers boarding and alighting from buses.

Between Mission and Brannan Streets, bicyclist movements along Second Street would be controlled by new bicycle signal heads, which would show green concurrently with north-south pedestrian and north-south through vehicle phases. Right-turning vehicles would be held by a red arrow during the bicycle and pedestrian crossing phase, after which they would receive a green arrow. This new phasing would limit conflicts between bicyclists traveling along Second Street and right-turning vehicles. Bicyclists turning right off of Second Street would be required to yield to pedestrians, as in the current condition. Where left-turns from Second Street are restricted, bicyclists wishing to turn left would be expected to make a two-stage or "box" turn, crossing with the bicycle signal to the far side of the intersection, then waiting for the cross-street green phase to proceed straight. Where possible, dedicated space for cyclists waiting to make the second stage of such turns would be provided using special markings. Signal phasing for all modes from cross-street approaches would remain unchanged.

On the segment of Second Street between Brannan and Townsend Streets, the cycletrack would be lowered to the roadway level in advance of the intersections and widen into "mixing zones," which

[25] Sharrows are a traffic control device which consists of pavement markings within the travel lane. The markings are intended to alert drivers that bicyclists share the travel lane and also to reduce the chance of bicyclists impacting the open doors of parking vehicles. For more information on sharrows, please see http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd/CAMUTCD-Part9.pdf

provide room for vehicles to merge fully into the bike lane before executing a right-turn. At Townsend Street, the southbound mixing zone treatment would coincide with permitted right-turns for vehicles, rather than the separated right-turn phases provided from Brannan Street north.

Alley intersections would remain uncontrolled or side-street stop controlled consistent with existing conditions. At alleys, bikeways would be colored with a dashed green pattern to indicate that vehicles may cross the bikeway to make turns. Parking would be restricted immediately in advance of alley intersections to improve visibility of bicyclists traveling in the cycletrack to turning drivers.

Between Townsend Street and King Street, a new northbound bicycle lane would be located between the parking lane and the vehicle travel lane while sharrows would be installed in the southbound direction. The northbound bicycle lane would allocate dedicated right-of-way for bicyclists. The southbound sharrows would increase drivers' awareness of the bicycle route, and would identify a preferred riding alignment for bicyclists outside of the 'door zone' where vehicle doors may be opened from adjacent parking and loading zones.

The project would include up to 42 new sidewalk bicycle racks distributed along the length of Second Street. Installation of these bicycle racks would comply with SFMTA's *Bicycle Rack Placement Criteria,* which ensure that rack placement maintain an appropriate effective width of the sidewalk and comply with ADA requirements.[26] Additional short-term bicycle parking may be added before, during or after project construction by public request through the existing SFMTA bicycle parking program.

With the addition of raised cycletracks and bicycle lanes included in the project, bicyclists would benefit from these dedicated bicycle facilities along the Second Street corridor. The proposed project would result in bicycle infrastructure which would reduce the number of conflicts between motor vehicles, including buses, and bicyclists. Therefore, impacts to bicycle facilities and users therein would be ***less than significant***.

Game Day Conditions – Bicycle Impacts
Second Street along with The Embarcadero and King Street are the primary bicycle routes for access to and egress from AT&T Park. The proposed project would provide a continuous dedicated bicycle facility from Market Street to King Street as well as increase the availability of bicycle parking facilities along Second Street. The new bikeways and bike-specific signal phases would increase the capacity and safety for bicyclists along Second Street, who currently share the travel lanes with automobiles. In addition, bike-specific signal phases would reduce bicycle-vehicle conflicts from right-turning vehicles. The project improvements would improve conditions for bicyclists along the Second Street corridor even under Game Day conditions. Therefore, for the reasons provide in the project-specific bicycle impacts discussion and in the above discussion, under Game Day conditions the proposed project would not result in significant impacts for bicycles.

4.2.5 Emergency Vehicle Impacts

Second Street and the adjacent street network serving the corridor can currently accommodate the movements of emergency response vehicles (e.g., fire engines, ambulances, police vehicles). In the event of an emergency, vehicles can access Second Street from various intersecting roadways and can access buildings along the east and west sides of the street.

[26] *San Francisco Bicycle Plan Update Transportation Impact Study*, Wilbur Smith Associates, October 28, 2008, Appendix F. This document is on file and available for public review by appointment at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, California, 94103, as part of Case File No. 2007.0347E.

The proposed project would result in physical changes to the roadway and lane configurations along Second Street. The new design features associated with the proposed project would include the construction of transit boarding islands at all bus stops except for the zone that would be maintained at Second and Townsend Streets, the installation of cycletracks in both directions between Market and Townsend Streets (which are physically raised two inches from the roadway by a one- to four-foot wide ramped buffer strip between either parked vehicles or vehicle travel la), and the widening of sidewalks between Harrison and Townsend Streets, from 10 feet to 15 feet. As a result, the dimension of existing roadway space (right-of-way) would be reduced to accommodate these proposed transit, bicycle, and pedestrian improvements.

Implementation of the proposed project would not result in a substantial increase in vehicles or implement physical design features along Second Street that would impede or hinder the movement of emergency vehicles or result in a substantial increase in response time by emergency vehicles, for example from the neighboring fire stations (Fire Department Fire Station No.1 and/or Fire Station No.35).

Pursuant to the California *Fire Code* (Sections 902.2.1 and 902.2.4), the minimum street width required for a fire apparatus access road such as Second Streeis 20 feet between curbs.[27] The proposed project would result in a reduction in travel lanes (from four to two lanes); however, the northbound and southbound travel lanes would maintain a varying width of 12 feet and 13 feet per travel lane, depending on the location, intersecting street, and proposed roadway treatment (e.g., bus bulb, cycletrack buffer, etc.), and would provide a minimum width of up to 24 feet and, therefore, would comply with the *Fire Code*.

The cycletracks along Second Street would be raised two inches from the roadway. This grade change would be achieved over a one- to four-foot wide ramped concrete painted buffer between the cycletrack and either parked vehicles or vehicle travel lanes. In the event of an emergency, vehicles traveling along Second Street would be able to pull over onto this buffer strip or the cycletrack itself in order to create additional space for passage of emergency vehicles.

It should be noted that there would be two "pinch point" locations along Second Street (one between Stevenson and Jessie Streets, and another between Federal and South Park Streets). At these two locations, there would be northbound and southbound transit boarding islands located adjacent to each other. This means that cars in both the northbound and southbound lane would not have the ability to pull right out of the travel lane. However, the curb-to-curb width between the two boarding islands would be 24 feet, which means that if the northbound and southbound vehicles were to pull right within the lane, a space of about ten feet would be created for the emergency vehicle to pass. Furthermore, both of these pinch points would be less than 80 feet in length, and vehicles would be able to drive forward of the island and then pull right, out of the travel lane, in order to create additional room for emergency vehicles to pass.

Therefore, the roadway treatments associated with the proposed project would continue to accommodate fire trucks and related emergency vehicles (e.g., ambulance, police) and allow for safe maneuvering of vehicles and the passage of emergency vehicles. In addition, the proposed project would not introduce any design features that would result in a reduction or elimination of existing vertical clearance and sight distances that would adversely affect vehicle access by emergency vehicles or other users of the roadway.

[27] California Fire Code, 2001. Available online at: http://www.ci.redding.ca.us/devserv/pdfs/fire/access-ca-firecode.pdf; accessed November 15, 2013.

Because the proposed project would continue to provide adequate widths, clearance, and capacity for emergency vehicle access, impacts would be considered ***less than significant***.

4.2.6 Loading Impacts

Commercial Loading

Currently, there are a total of 41 metered commercial loading zones along Second Street between Market and King Streets. The proposed project would remove approximately 25 of these zones, as well as two zones on Hawthorne Street. However, as described below, approximately four of these zones could be relocated nearby, and an additional two new zones could be created. Depending on whether the last two zones are created, there would be a net loss of 19 to 21 commercial loading zones.

The approximately 31 existing yellow commercial loading zones on the two blocks of Second Street between Market and Howard Streets constitute the majority of the commercial loading zones on the length of the street. With implementation of the proposed project, approximately 20 of the 31 zones on these two blocks would be removed, including all of the existing yellow zones on the east side of the street. The commercial loading zones to be removed serve a variety of office, retail, restaurant and service business locations. Commercial meters on this block are occupied approximately 60 percent of the time during their hours of operation.[28]

Two existing adjacent commercial loading zones on Second Street between Folsom and Harrison Streets would be removed. These loading zones could be relocated to Harrison Street within 200 feet of the original loading zones at the option of the owner of the 600 Harrison Street office building. Commercial meters on this block (all of which are designated for six-wheeled or larger vehicles) are occupied approximately 34 percent of the time during their hours of operation.[29]

Three yellow commercial loading zones on the east side of Second Street between Harrison and Bryant streets, which currently serve a commercial building and a live/work space, would be removed. Two of these three loading zones would be replaced further south along the frontage of the live/work space within 300 feet of the original loading zones. Commercial meters on this block are occupied approximately 27 percent of the time during their hours of operation.[30]

On the block between Bryant and Brannan Streets, up to two new yellow commercial loading zones would be established to serve restaurants and bars on this block. The two existing yellow commercial loading zones on the east side of Hawthorne Street north of Folsom would either be removed or reduced in hours of operation to provide a southbound left-turn pocket.

Due to the substantial reduction in the supply of on-street commercial loading zones along the Second Street corridor, particularly between Market and Howard Streets, and the existing high demand for on-street commercial loading activity, the project's impact on commercial loading would be considered significant.

As described above, in a few locations, several of the commercial loading spaces could be relocated at the request of affected businesses. In addition, SFMTA has sought to create new on-street commercial loading spaces in the vicinity of the project in order to mitigate the reduction in supply. However, all available curbside space in the project vicinity that could be repurposed for commercial loading zones

[28] From SF*Park* occupancy data from period January to September 2012.
[29] Ibid.
[30] Ibid.

have already been established; there is no opportunity to create additional commercial loading zones other than as discussed above.

Therefore, the project would result in a commercial loading demand during the peak hour of loading activities that could not be accommodated within on-street commercial loading zones, and could create potentially hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. The project's impact on commercial loading would be ***significant and unavoidable.***

Passenger Loading

Existing passenger loading zones which are preserved adjacent to the curbside bikeways would be modified by the proposed project. A flat, cross-hatched loading area would be provided on the right side of the loading zone, between the vehicle and the bicycle lane. One or more curb ramps would be provided directly opposite one end of the loading zone for sidewalk access.

The proposed project would remove two passenger loading zones on the east side of Second Street between Stevenson and Mission streets. These passenger loading zones serve two large office buildings, both of which have publicly accessible parking garages. All curbside passenger loading zones on this block would be expected to use the existing 40-foot long passenger loading zone north of Stevenson Street.

Additionally, the two existing 20-foot long passenger loading zones on the west side of Second Street between Tehama and Folsom Streets would be removed with implementation of the proposed project. These two passenger loading zones serve a large residential building without side-street or alley frontage. However, vehicular access to the building's two driveways on Second Street would be maintained, allowing access to the building's parking garage which could be utilized for passenger loading. Furthermore, the existing passenger loading zone at the Marriot Hotel, directly across Second Street from this residential building, would be maintained with the project; this passenger loading zone would be available for the residential building. Therefore, the removal of the passenger loading zones in front of the residential building would not substantially interfere with passenger loading at the site.

The proposed project would maintain the full length of two of the three taxi loading zones on Second Street, one on the east side north of Folsom Street, the other on the west side between Brannan and Townsend Streets and operational during AT&T Park post-game hours only. The pre-game period taxi stand on the west side of Second Street between Townsend and King Streets would be shortened from 135 feet to 115 feet in length to accommodate a new blue accessible parking zone. This minor reduction in width would not substantially affect the operation of the taxi stand, because the majority of the taxi stand would remain.

Overall, the project would not result in a substantial loss of passenger loading zones. The project would not result in a passenger loading demand during the peak hour of loading activities that could not be accommodated within on-street passenger loading zones, and would therefore not create potentially hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. The project's impact on passenger loading would be ***less than significant***

4.2.7 Parking Impacts

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 shortfall 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 shortfall 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 shortfall 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 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, Section 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.

There are a total of approximately 168 existing on-street automobile parking spaces (including both general metered parking and blue accessible parking zones) and 56 motorcycle parking spaces on both sides of Second Street between King and Market Streets.[31] The overall existing midday parking occupancy rate is approximately 75 percent.[32]

The proposed project would remove approximately 133 standard parking spaces and 19 motorcycle spaces on Second Street between Market and King Streets. The proposed project would remove all of the existing parking on the east side of Second Street between Market and Howard Streets, on the west side of Second Street between Howard and Brannan Streets, and on the east side of Second Street between Brannan and Townsend Streets. Additional spaces would be removed where required for the installation of right-turn pockets, transit boarding islands, and improved sight lines at alley intersections.

The majority of the spaces retained in the project design would be designated for passenger and commercial loading activity during weekdays and are previously discussed in Section 4.2.5, *Loading Impacts*.

Approximately six on-street general metered parking spaces would be added to Brannan Street between Second and Delancey Streets under the proposed project through the conversion of parallel parking spaces

[31] From SFMTA parking meter records, collected March 2012. Records are on file at SF Planning

[32] Based on total meter occupancy by block on Second Street between Howard and King Streets, noon to 3pm weekdays. From SFPark occupancy data collected April 2012 on file at SF Planning

to angled parking spaces. Additionally, the project would add approximately two parking spaces on the north side of Harrison Street immediately west of Second Street through the relocation of the existing bus stop at that location. In total, the proposed project would result in a net removal of approximately 125 standard on-street parking spaces and 19 motorcycle parking spaces within one block of Second Street.

The preponderance of parking supply within the project vicinity is located within off-street parking facilities, and the proposed project would not remove any of these spaces. Within one block on either side of Second Street (the area between First and Third Streets), there are currently approximately 6,950 spaces in parking garages. In addition, there are approximately 1,530 spaces in private surface parking lots, which may be removed with future development. See **Appendix J** for calculations.

The proposed project would not inhibit driveway access to any off-street parking facilities, although traffic circulation changes may require local residents to take alternate routes.

The proposed project is an infrastructure project that would not result in an increase in parking demand. As described above, the proposed project would result in the elimination of approximately 125 on-street parking spaces along the Second Street corridor. In some locations, the parking demand that would be displaced due to the loss of these 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 shortfall. However, as indicated above, the proposed project is located in SoMa and a portion of it is within the Transit Center District Plan. In addition, Second Street is a transit route and a designated portion of the bicycle route network. This area is well-served by transit, including access to local and regional transit options, as well as by other modes, presenting the opportunity for drivers to change travel patterns or switch to other travel modes. The loss of 128 parking spaces in the context of downtown San Francisco where a supply of off-street parking is readily available and where there are multiple options for alternative transportation would not be considered substantial. 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. Therefore, the proposed project's impact related to parking would be ***less than significant***.

4.2.8 Construction Impacts

Detailed plans for construction activities have not yet been finalized, but construction of the proposed project is anticipated to begin fall of 2015 and occur over a 10 to 12-month period. As a result, temporary and intermittent transportation impacts from truck movements and construction activities within Second Street are anticipated.

The San Francisco Department of Public Works (DPW) anticipates that construction activities would occur sequentially and therefore construction operations would be focused on one block at a time (i.e. Second Street between Mission and Howard Streets) for about six weeks per block. It is noted that this estimate would be reevaluated during the design phase of the project. Typical construction operations would include:

- Catch basin and culvert construction and relocation
- Sewer rehabilitation or replacement
- Curb ramp construction

- Parking strip and sidewalk bulbout construction
- Electrical wire and irrigation piping installation
- Undergrounding of existing above-ground utilities
- Curb construction and sidewalk widening
- Bus boarding island construction
- Traffic signal conduit and equipment installation
- Road base repair and/or replacement
- Road grinding and repaving
- Landscape installation

The duration of construction activities would vary, but could range from a week per block for travel lane base repair and road grinding and paving, to a week per block for sewer rehabilitation or replacement, to about two weeks for construction and installation of pedestrian bulbs, transit islands, and traffic signals.

Construction-related activities would typically occur Monday through Friday, between 7:00 a.m. and 4:00 p.m. Construction is not anticipated to occur on Saturdays, Sundays or major legal holidays, but could occur during those times on an as-needed basis. The hours of construction would be stipulated by DPW, and the contractor would need to comply with the San Francisco Noise Ordinance, including requirements to avoid peak hour construction activities on adjacent streets and to coordinate with major events at the Moscone Convention Center. No work would be allowed during the Holiday Moratorium (day after Thanksgiving to January 1, inclusive, 24 hours per day, and 7 days per week) in areas with 50 percent or more commercial frontage. All plates would be removed at least one day before the Holiday Moratorium in these areas. For more information, please refer to the "Regulations for Working in San Francisco Streets" handbook (*Blue Book*).[33] No plates would be allowed during the specified periods above. All openings in the street and sidewalk would be closed by backfilling and paving, providing safe and adequate passage for vehicles and pedestrians.

During the construction period, there would be a flow of construction-related trucks into and out of the site (the right of way along Second Street). There would be an average of about 10 construction truck trips (one-way trips) traveling to the site on a daily basis during the peak periods of construction considering all project components including the streetscape (transit, bicycle and pedestrian facilities), sewer rehabilitation and replacement, and utility relocation. The increase in construction truck traffic would result in the temporary lessening of the capacities of streets due to the slower movement and larger turning radii of trucks, which would affect traffic, transit, pedestrian and bicycle movement. It is anticipated that a majority of the construction-related truck traffic would use I-80/U.S. 101 to travel to and from the project site. To access the project site from I-80/U.S. 101, trucks would use the nearby off-ramps at Fremont Street and First Streets and Fourth and Bryant streets, and travel on Second Street and Howard Street to the area to access the work site(s). To return to I-80/U.S. 101, trucks would utilize Harrison Street to access the freeway on-ramps at Essex Street in the eastbound direction, or Fourth Street in the westbound direction. The project site could also be accessed from I-280 traveling from the south. Trucks would take the off-ramp at the King Street exit from I-280 and access the site via the left turn from eastbound King Street to Second Street. To return to I-280, trucks would head southbound on Second Street and turn right onto King Street to access the I-280 on-ramp.

There would be an average of about 10 construction workers per day at the project site, with up to 20 during peak periods of construction. The trip distribution and mode split of construction workers are not

[33] San Francisco Municipal Transportation Agency (SFMTA). *City of San Francisco's Regulations for Working in San Francisco Streets,* 2012. Available online at: http://www.sfmta.com/services/streets-sidewalks/construction-regulations. Accessed June 19, 2014.

known. In San Francisco, some construction workers use transit or carpool to the site, particularly when located downtown, to reduce traffic and parking problems during construction. However, it is anticipated that the addition of the worker-related vehicle- or transit-trips would not substantially affect transportation conditions, as any impacts on local intersections or the transit network would be similar to, or less than, those associated with the proposed project and would be temporary in nature. Construction workers who drive to the site would cause a temporary increase in parking demand. Because the nearby parking facilities currently have availability during the day, it is anticipated that construction worker parking demand could be accommodated without substantially affecting area-wide parking conditions.

Construction of the proposed project, inclusive of all project components such as streetscape, transit, bicycle, and pedestrian facilities, sewer rehabilitation or replacement, and utility relocation, would 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 Second Street. In some instances, construction may require temporary street closures and traffic and/or transit reroutes. During the project's construction period, temporary and intermittent traffic and transit delays could 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 Departments. The TASC review and approval process takes into consideration other construction projects in the vicinity of the proposed project construction.

The anticipated increase in vehicles traveling to and from the project site during construction could increase potential conflicts between construction vehicles (with slower speeds and wider turning radii than autos) and automobiles, bicyclists, and pedestrians. However, the construction contractor would be required to conduct construction activities in accordance with the City of San Francisco's *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). The contractor would also be required to meet with SFMTA staff to determine if any special traffic permits would be required. Prior to construction, the project contractor would coordinate with Muni's Street Operations and Special Events Office to coordinate construction activities and reduce any impacts to transit operations. In addition to the regulations in the *Blue Book*, the contractor would be responsible for complying with all city, State and federal codes, rules and regulations.

Along the project limits for the proposed project, which includes Second Street between Market and King streets, the contractor would be required to (1) conduct construction operations to cause the least possible obstruction and inconvenience to the local businesses, public and area residents, and prosecute properly with due regard to the rights of the local businesses, public and area residents; and (2) provide travel lanes and routing of vehicular and pedestrian traffic, in a manner that will be safe and would minimize traffic congestion and delays during construction. In addition, the contractor would be required to maintain a minimum width of five (5) feet of clear sidewalk for the pedestrians, at all times. The contractor would be required to separate the construction area and staging areas from the travel lanes and sidewalks by barricades, delineators, etc.

The City and County of San Francisco's specifications for a construction staging area would include, at minimum, the following requirements for locating the staging area:

- Proposed project work for all project components would be staged in the existing parking strip on Second Street and on the side streets;
- Construction equipment for all project components including equipment needed to construct the streetscape (transit, bicycle, and pedestrian facilities), sewer rehabilitation or replacement, and

utility relocation, would be parked in the existing parking strip on Second Street and on the adjacent side streets;
- Material storage would take place on Second Street and adjacent side streets; and
- The staging area would not affect vehicular or pedestrian ingress or egress between properties and the public right of way.

During curb ramp construction, the contractor would be required to provide a clear sidewalk of at least five (5) ft in width and no crosswalk would be allowed to be closed during curb ramp work. The contractor would be required to separate the construction area of the curb ramps and provide a safe path of travel for pedestrians and traffic area with Triton barriers (or approved equal). The contractor would not be allowed to simultaneously construct the curb ramps on two adjacent corners of the same street at the same time; however, the contractor could work on two curb ramps at diagonally located corners at the same time. Temporary curb ramps would be required during construction with clearly marked temporary crosswalks. The pedestrian path would be clear of any debris and meet all ADA requirements.

The contractor would be required to provide flag persons to control the traffic, as directed by the Engineer. The number of flag persons required would depend on the phase of work, traffic conditions, as appropriate. Furthermore, in keeping with the City's "Transit First" policy, the contractor would not be allowed to impede the operation of mass transit vehicles at any time.

The contractor would be required to perform the appropriate measures to ensure the safety of bicyclists on all streets on which there is construction. This is especially important due to the fact that Second Street is a designated route on the Bicycle Route Network (Bicycle Route 11). The contractor would be required to install "Bicyclists Allowed Use of Full Lane" signs, or other approved equal, on streets with bicycle routes during construction. The contractor would be required to submit a Traffic Control Plan to the City's Traffic Engineer for review and approval before any major work is allowed in the streets. The Traffic Control Plan shall be prepared, signed and stamped by a Civil Engineer or a Traffic Engineer (Registered in the State of California) with the assistance and input of the Traffic Supervisor and the Contractor's Superintendent. The contractor would not be allowed to commence site work prior to receiving the Engineer's approval of the construction schedule. No work would commence prior to the approval of applicable traffic control plan.

In addition the Contractor is required to comply with all applicable requirements of the latest editions of the following:

- California Vehicle Code;
- San Francisco Municipal Code, Chapter XI- Traffic Code;
- Other Applicable Government Regulations;
- Standard Specifications and Plans, Department of Public Works, City and County of San Francisco;
- Caltrans Standard Specifications and Plans, Department of Transportation, State of California, except as modified herein;
- California Manual of Uniform Traffic Control Devices (MUTCD), 2009 Edition with Revisions 1 & 2 (May 2012);
- Regulations for Working in San Francisco Streets ("Blue Book"), SFMTA, City and County of San Francisco;
- Regulations for Excavating and Restoring Streets in San Francisco, Department of Public Works, City and County of San Francisco; and
- Work Area Traffic Control Handbook, BNI Books

A single pair of Muni overhead wires, including support poles and feeder conduit, runs along northbound Second Street between Townsend and Harrison Streets; these wires would be retained as part of the project. A pair of overhead wires crosses Second Street at Mission Street, and a single eastbound wire crosses Second Street at Howard Street. Four pairs of overhead wires run along Market Street at the northern extent of Second Street. During the construction period, the poles supporting the overhead wire system would need to be maintained, and this effort would be coordinated with Muni's Overhead Lines Department. Construction activities would not affect the existing bus stops and bus shelters at these locations; however, if construction activities require bus stop relocation, the plans for relocation would need to be reviewed and approved by SFMTA. Any temporarily-closed bus stops would be posted with signage to inform transit passengers of the location of the temporary bus stop.

Construction of transit boarding islands, pedestrian bulbouts, sidewalk widening, and utility relocation would require work along the curb lane and within the street right-of-way. Such activities would result in closure of the parking lane where the sidewalk is being extended and would generally require temporary travel lane closures and street or intersection 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. As appropriate, detours with appropriate signage would be provided for pedestrians, bicyclists, and vehicles. Construction associated with the sewer rehabilitation or replacement would require work within the street right-of-way and possibly the sidewalk for side sewer work. Such activities would generally require temporary travel lane closures and street or intersection closures, depending on the construction activity. As with the other types of construction activities, detours with appropriate signage would be provided for pedestrians, bicyclists, and vehicles as appropriate. Because Second Street has two travel lanes in each direction, temporary lane closures would reduce the roadway capacity and require all vehicles to use the remaining lane. Temporary lane closures would result in additional vehicle delay, and some drivers might shift to other potentially less convenient routes to access their destinations.

It is anticipated that construction activities associated with the proposed projects could potentially overlap with construction activities associated with other developments in the area, including:

- The Transbay Transit Center bounded by Mission, Beale, Howard and Second Streets, currently under construction;
- The Transbay Transit Tower, bounded by Mission, Fremont, Minna, and First Streets;
- The San Francisco Museum of Modern Art (SFMOMA) expansion project, bounded by Minna, New Montgomery, Howard, and Third Streets, currently under construction;
- The proposed Moscone Convention Center expansion project on the block bounded by Mission, Third, Folsom, and Fourth Streets; and
- Planned commercial and residential developments along Second Street and in the vicinity of the project, including 222 Second Street, 270 and 333 Brannan Street, 706 Mission Street, and 41 Tehama Street.

The construction activities associated with these nearby projects, and particularly the construction of the Transbay Transit Center, would affect access, traffic operations and pedestrian movements. It is anticipated that the construction manager for each individual project would be required to work with the various departments of the City to develop a detailed and coordinated plan that would address construction vehicle routing, traffic control and pedestrian movement adjacent to the construction area for the duration of the overlap in construction activity for these projects.

It is noted that the assessment of construction-related impacts and procedures identified above are based on professional knowledge of typical construction practices citywide. Moreover, it is noted that prior to

construction, as part of the construction application phase, the construction contractor would be required to meet with DPW and SFMTA staff to develop and review truck routing plans for demolition, disposal of excavated materials, materials delivery and storage, as well as staging for construction vehicles.

Based on the findings presented above, and because construction activities would be temporary and limited in duration to approximately 10 to 12 months, and because these activities would be conducted in accordance with City, State and Federal requirements, would maintain pedestrian and vehicle access to all properties at all times, and would maintain ADA-compliant pedestrian access along and across Second Street during construction, the construction-related transportation impacts of the project would be ***less than significant***.

4.3 Future Year (Year 2040) Cumulative Conditions

4.3.1 Methodology

Future year 2040 cumulative p.m. peak hour traffic volumes were developed using outputs from the San Francisco County Transportation Authority (SFCTA) countywide travel demand forecasting model and travel demand analysis.[34] The Year 2040 baseline scenario for travel demand forecasting includes such planned transportation network changes proposed in the following relevant plan documents; detailed descriptions of these plans and related projects, and applicability for purposes of this analysis are discussed further below.

- Central SoMa Plan[35]
- Central Subway Project[36]
- San Francisco Bicycle Plan
- Transit Effectiveness Project (TEP)
- Transit Center District Plan[37]

As a result of the above-mentioned plan documents and related projects, lane configuration changes would occur at the following 16 study intersections:

2. Mission Street / New Montgomery Street
3. Howard Street / New Montgomery Street
4. Howard Street / Hawthorne Street
5. Folsom Street / Hawthorne Street
6. Harrison Street / Hawthorne Street
7. Bryant Street / Third Street
8. Brannan Street / Third Street
9. Townsend Street / Third Street
13. Minna Street / Second Street
14. Howard Street / Second Street
15. Folsom Street / Second Street
16. Brannan Street / Second Street
19. Brannan Street / Second Street
22. Folsom Street / Essex Street
26. First Street / Howard Street
27. Folsom Street / First Street
29. Fifth Street / Bryant Street / I-80 Eastbound On-Ramp

Cumulative (Year 2040) background conditions for study intersections are based on a background growth rate calculated from the travel demand associated with the countywide travel demand forecasting model.

[34] SFCTA travel demand forecasting model received July 2013.
[35] San Francisco Planning Department. April 2013. Draft Central SoMa Plan. Available online at: http://www.sf-planning.org/index.aspx?page=2557. Accessed on January 12, 2014.
[36] San Francisco Municipal Transportation Agency (SFMTA). October 2012. Central Subway Project. Available online at: http://centralsubwaysf.com/. Accessed on January 12, 2014.
[37] Transit Center District Plan, November 2009. Available online at: http://www.sf-planning.org/ftp/CDG/CDG_transit_center.htm#draft_plan; accessed on January 28, 2014.

The Future Year 2040 model run was based on the Association of Bay Area Governments (ABAG) Sustainable Community Strategy (SCS) *2013 Jobs Housing Connection*.[38] The geographic context for the analysis of cumulative transportation impacts is the local roadway in the vicinity of the project site and surrounding environs. Specific transportation network changes within the project area are further discussed in the following sections, as appropriate.

Planned Transportation Network Changes

Relevant planned roadway network changes include roadway/traffic changes, transit improvement projects, bicycle network improvement projects, and pedestrian improvement projects, include the following:

Roadway/Traffic Improvements

Transit Center District Plan (TCDP) – The Transit Center District Plan (TCDP) was adopted by the San Francisco Board of Supervisors on July 31, 2012 and signed by Mayor Lee on August 8. 2012. The overall purpose of the TCDP is to develop a vision and establish strategies to redevelop and revitalize the area surrounding the Transbay Transit Center. In addition, the TCDP is aimed at implementing planning policies to enhance the land use, urban form, public, and circulation of the downtown area. Specific roadway and transportation-related improvements presented in the TCDP that are relative to the proposed project are listed below:

- Convert Folsom Street (east of Second Street) from one-way to two-way.
- Convert Howard Street (east of New Montgomery) from one-way to two-way.
- Minna Street would change from one-way westbound to one-way eastbound between First and Second Streets
- Natoma Street from Second Street east to midway between First and Second Streets would be converted to pedestrian access and emergency vehicles only.

Central SoMa Plan – This plan provides the vision and the strategies to support positive change along and around the Fourth Street transit spine. The Planning Department published a Notice of Preparation of an Environmental Impact Report in April, 2013, and an Initial Study on February 12, 2014. Environmental review is proceeding. Roadway improvements in proximity to Second Street include:

> *Folsom Street* (from Second Street to Eleventh Street) would be reconfigured to allow for two eastbound general travel lanes, an eastbound transit-only lane (during peak commute periods), wider sidewalks, mid-block crosswalks, on-street parking, and a two-way cycletrack along the north side of the roadway.
>
> *Howard Street* (from Second Street to Eleventh Street) would be reconfigured to allow for two general westbound travel lanes, an additional westbound travel lane (during peak commute periods and an on-street parking lane during off-peak hours), wider sidewalks, mid-block crosswalks, on-street parking, and a two-way cycletrack along the south side of the roadway.[39]

[38] One Bay Area, Jobs-Housing Connection Strategy, May 2012. Available online at: http://www.onebayarea.org/pdf/JHCS/May_2012_Jobs_Housing_Connection_Strategy_Main_Report.pdf; accessed on January 12, 2014.

[39] The Central SoMa Plan also proposes a second option for Folsom and Howard streets, which would convert both streets into two-way operation, and would also close Essex Street between Folsom and Harrison streets. However, because this "two-way option" would result in a greater number of overall general travel lanes than the "one-way option" for these streets (which is the

Harrison Street (from Second Street to Seventh or Eleventh Street) would be reconfigured to allow for three westbound general travel lanes and on-street parking, with a dedicated westbound transit lane and an additional westbound travel lane during peak periods, as well as widened sidewalks.

Bryant Street (from Second Street to Seventh Street) would reduce the number of general travel lanes from five to three lanes; provide an additional travel lane during peak commute periods (and become an on-street parking lane during off-peak periods), provide dedicated transit lane along the south side curb lane during the daytime hours (and become an on-street parking lane during nighttime hours), and include wider sidewalks.

Brannan Street (from Second Street to Sixth Street) would reduce the number of general travel lanes from four to two lanes (one in each direction), include wider sidewalks, and provide two, one-way cycle tracks along the north and south sides of the roadway.

Third Street (from King Street to Market Street) would reduce the number of general travel lanes from five to three lanes, include wider sidewalks, a cycletrack, an enhanced transit-only lane, and on-street loading bays.

Fourth Street (from Market Street to Harrison Street) would reduce the number of general travel lanes from four to three lanes, include wider sidewalks, a cycletrack, an enhanced transit-only lane, and on-street loading bays.

Transit Improvements

Central Subway Project – This project is currently under construction and will extend the Muni Metro T Third Line through SoMa, Union Square, and Chinatown in a subway. When the Central Subway is completed, the T Third Line trains would travel mostly underground from the Fourth Street Caltrain Station to Chinatown, bypassing traffic on Fourth and Stockton Streets. An underground transit station, Yerba Buena/Moscone Station, is planned at the intersection of Fourth Street and Folsom Street. The Central Subway is scheduled to open to the public in 2019.

Central SoMa Plan – The *Central SoMa Plan*, as described above, aims to implement existing City policies to improve transit conditions in the plan area. As such, the Central SoMa Plan recommends new dedicated transit lanes along Third, Fourth, Folsom, Howard, Harrison, and Bryant Streets be created to enhance transit operations.

The Transit Effectiveness Project (TEP) – The San Francisco Municipal Transportation Agency (SFMTA) has developed the Transit Effectiveness Project (TEP), proposals designed to make Muni service more reliable and reduce transit travel times, particularly for the Rapid Network. The TEP recently underwent environmental review. The Final TEP EIR was certified by the Planning Commission on March 27, 2014. The SFMTA approved many of the Service Improvements on March 28, 2014. The SFMTA anticipates that many of the service improvements would be implemented in Fiscal Year

option described above), this memorandum assumes the implementation of the "one-way option" in order to present the most conservative analysis (i.e., fewer number of travel lanes).

(FY) 2014 - 2015 , and that the remainder of the service improvements would occur in FY 2016.[40] The TEP proposes the following potential changes to transit lines within the study area:

10 Sansome (formerly 10 Townsend)

- This route would be renamed to the 10 Sansome.
- Service would continue to operate between Jackson and Steiner Streets and 24th Street and Potrero Avenue via Potrero Hill, but would be rerouted at Fourth Street south of the Caltrain Station through the Mission Bay neighborhood. From Fourth Street, the route would extend through Mission Bay to new proposed street segments 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. The southern terminal loop would be modified by extending service on Potrero Avenue, right on Cesar Chavez Street, right on Hampshire Street, right on 24th Street.
- The northern terminus would continue to be located on Jackson Street between Fillmore and Steiner Streets. On the weekends and evenings, all trips would continue to terminate at Van Ness Avenue, but would use a slightly different route. From Jackson Street the route would continue right on Franklin Street and right on Pacific Avenue.
- Proposed eliminated segments would be on Townsend Street between Fourth and Eighth Streets, Rhode Island Street between Eighth and 17th Streets, and 17th Street between Rhode Island and Connecticut Streets. The segment on Townsend Street between Fourth and Eighth Streets would be served by the rerouted 47 Van Ness route and the 83X Mid-Market Express between Fourth and Eighth Streets during limited hours.

11 Downtown Connector

- New 11 Downtown Connector would provide SoMa with two connections to Market Street, at the Van Ness and Montgomery Stations, and would provide North Beach with a direct connection to the Financial District and Montgomery Station.
- Southbound, the new route would run on Van Ness Avenue, Bay, Polk, North Point, and Powell streets, on Columbus Avenue, on Montgomery, Clay, Sansome, Market, Second, Harrison, 11th, and Mission streets, to a southern terminal on South Van Ness Avenue. Northbound (IB), the new route would run on South Van Ness Avenue, Market, 11th, Folsom, Second, Market, Sutter, Sansome, and Washington streets, on Columbus Avenue, Powell and North Point and Bay streets to the northern terminal on Van Ness Avenue.
- Proposed route in SoMa would operate on an east/west couplet on Folsom and Harrison Streets.
- The southern terminal would be located at the southeast corner of South Van Ness Avenue and Market Street. The 140-foot transit zone would require a reduction of up to eight parking spaces.
- The northern terminal will be located on Van Ness Avenue between Bay and North Point Streets requiring a 130-foot transit zone and the removal of up to six parking spaces.
- The 11 Downtown Connector Service Variant would evaluate two-way operation on Folsom Street consistent with the proposal in the Western SoMa Community Plan.

12 Folsom-Pacific

[40] Planning Department. 2014. *Transit Effectiveness Project Environmental Impact Report* is available online at http//tepeir.sfplanning.org; accessed April 15, 2014. SFMTA. 2014. Transit Effectiveness Project Web page. Online at http://www.sfmta.com/projects-planning/projects/tep-transit-effectiveness-project; accessed April 15, 2014.

- This route would be discontinued. Transit service on Second Street would be provided by the proposed 11 Downtown Connector between Market and Folsom/Harrison Streets. In addition, the new route would provide transit service on Folsom Street and Harrison Streets from Second to Eleventh Streets, the 27 Bryant (renamed the 27 Folsom) on Folsom Street from Second to Cesar Chavez Streets and the terminal loop to the 24th Street BART station, and the 10 Sansome along Pacific Avenue, and Second and Sansome Streets.

Under the TEP, the frequency of the 10 Sansome would be increased from a 20-minute headway to a 6-minute headway in the a.m. and p.m. peak periods. The 12 Folso-Pacific currently operates with a 20-minute headway at all times. The new 11 Downtown Connector would operate with 15-minute headway at all times.

In addition, the TEP proposes a transit travel time reduction proposal (TTRP.14) on Mission Street consisting of transit improvements for the 14 Mission and 14L Mission Limited routes along the length of the Mission Street corridor extending from the Ferry Building to Daly City. Three alternatives are proposed, TTRP.14 Moderate Alternative Variants 1 and 2 and TTRP.14 Expanded Alternative. The alternatives would include transit stop changes, parking and turn restrictions, lane modifications, and traffic signal and stop sign changes. In the vicinity of Second Street, under the Moderate Alternatives, the existing transit-only lane hours of 7 a.m. to 6 p.m. between Fourth and Main streets in the outbound direction and between Fourth and Beale streets in the inbound direction would be extended to full-time. The TTRP.14 Expanded Alternative would relocate the existing side-running transit-only lanes so that they become 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, then, establish a new outbound transit-only lane extending from 11th to Cesar Chavez Streets.

Transit Center District Plan (TCDP) – The TCDP includes several transit improvements within the downtown area. Specific improvements in the vicinity of the project include removing one travel lane along Fremont Street and extending the transit-only lane to Howard Street and removing on-street parking along one side of the street. Similarly, the Plan includes removing one travel lane along Beale Street and to add a transit-only lane between Market Street and the Transbay Transit Center and removing on-street parking along one side of the street. Additional transit-only lanes are also proposed along Folsom Street, from First Street to Essex Street; along Fremont Street, between Howard Street and Mission Street; and along Mission Street, from Steuart Street to Beale Street.

Bicycle Network Improvement Projects

San Francisco Bicycle Plan – The SFMTA Board of Directors adopted the *2009 San Francisco Bicycle Plan* (Bicycle Plan) on June 26, 2009. The Bicycle Plan proposed bicycle improvements within the project study area, specifically along Second Street. "Near-Term Improvement Project 2-1" proposed the installation of Class II and Class III bicycle facilities in both directions on Second Street between King and Market Streets. Two design options were presented and analyzed in the Bicycle Plan EIR; however, no preferred option was selected. Subsequently, DPW in conjunction with the SFMTA have worked with the community and other stakeholders to develop the current improvement project for Second Street.

Project 2-16 of the Bicycle Plan was the installation of Class II bike lanes on Townsend Street between Eighth Street and Second Street. Project 2-16 was implemented in 2010.

Central SoMa Plan – As part of the planning process for the Central SoMa Plan, SFMTA and the San Francisco Planning Department propose the following bicycle improvements in the vicinity of the proposed project:

- Upgraded bicycle facilities would be located along Folsom Street from The Embarcadero to Eleventh Street.
- Upgraded bicycle facilities would be located along Howard Street, from Third Street to Eleventh Street.
- A new one-way cycle track would be located along Third Street, on the west side of the roadway (left-hand curb lane).
- A new one-way cycle track would be located along Fourth Street, from Market to Harrison Streets, on the east side of the roadway (left-hand curb lane).
- New one-way cycle tracks would be located on Brannan Street from Sixth Street to Second Street.

Transit Center District Plan (TCDP) – In addition to the proposed bicycle improvements presented in the *San Francisco Bicycle Plan*, the TCPD proposed adding bicycle lanes along Fremont, Beale, and Main Streets between Market and Folsom Streets.

Pedestrian Improvement Projects

Better Streets Plan – In December 2010, the Board of Supervisors and the Mayor of San Francisco adopted the *Better Streets Plan*. The *Better Streets Plan* provides guidelines for the pedestrian environment and generally encourages development projects to impose pedestrian-level treatments, including but not limited to the widening of sidewalks, constructing crosswalks and ADA-accessible ramps, install curb extensions and mid-block crossings, and construct other attractive streetscape designs that would enhance the pedestrian experience.[41] The *Better Streets Plan* is a programmatic document to guide development of streetscape improvements throughout the City, and no specific projects were included in the plan.

4.3.2 Traffic Impacts

Table 13 presents the 2040 Cumulative intersection operating conditions for the weekday p.m. peak hour. Intersection LOS calculations are provided in **Appendix F**. As shown, 20 of the 29 study intersections would operate at unacceptable LOS conditions (LOS E or F) without the proposed project. With implementation of the proposed project, 19 study intersections that were operating poorly without the proposed project would continue to operate at unacceptable LOS conditions. The intersection of South Park Street and Second Street would improve from LOS F to LOS B, as the proposed project would include signalization of this intersection, with appropriate signal timing and optimization. In addition, the proposed project would degrade intersection LOS conditions from acceptable to unacceptable service levels due to volume increases due to traffic diversion at two study intersections; these are listed below:

1. Howard Street / New Montgomery Street (#3)
2. Harrison Street / Hawthorne Street (#6)

Figures 7 and 8 show the Cumulative (without the proposed project) and Cumulative plus Project (with the proposed project) weekday p.m. peak hour turning movements for the study intersections, respectively.

[41] Additional information about the *Better Streets Plan* is available online: http://www.sfbetterstreets.org/; accessed on January, 12, 2014.

The following discussion includes a description of project-related traffic effects to study intersections that were identified as resulting in a less-than-significant impact and *new* significant impacts under cumulative conditions. It should be noted that, pursuant to Planning Department impact criteria, if the project is found to create a significant impact under Existing plus Project conditions, then the proposed project would automatically also result in a *significant impact* under Cumulative plus Project conditions.

Less Than Significant Impacts under Cumulative Plus Project conditions

Eight of the 29 intersections would operate acceptably (LOS D or better) under Cumulative plus Project conditions. However, since Intersection #4: Howard Street / Hawthorne Street would result in a project-specific significant traffic impact, it would also be considered to have a significant cumulative traffic impact. Therefore, intersection #4 is discussed in the significant cumulative impacts section below. In addition, at seven intersections that would operate unacceptably under Cumulative plus Project conditions, the proposed project was determined not to contribute considerably to the poor intersection operation. At these seven intersections, the cumulative traffic impacts would also be less than significant as discussed below.

Traffic operations would remain acceptable under Cumulative plus Project conditions at the following intersections:

Intersection #11: Market Street / Second Street. The intersection would operate at LOS B with and without implementation of the proposed project. The traffic volumes along the eastbound right-turning movement on Market Street would decrease (due to diverted traffic volumes off southbound Second Street) and diverted volumes would be added onto southbound New Montgomery Street due to the project. However, with no changes to the LOS conditions, the cumulative traffic impact to this intersection would be considered *less than significant*.

Intersection #12: Mission Street / Second Street. The intersection would operate acceptably at LOS C under cumulative conditions. However, with implementation of the proposed project, the LOS conditions would degrade to LOS D, due to the proposed lane configuration changes along northbound and southbound Second Street (both northbound and southbound configurations would include a shared through-left/shared through-right lane groups under existing conditions; and be modified to a single through lane/exclusive right turn pocket under cumulative plus project conditions) as well as an increase in traffic volumes to the eastbound through movement along Mission Street and increase in traffic volumes to the northbound right-turning movement along Second Street. However, the intersection would continue to operate at acceptable LOS conditions with implementation of the proposed project. Therefore, the cumulative impact to this intersection would be considered *less than significant*.

Intersection #13: Minna Street / Second Street. The intersection would operate at LOS A with and without implementation of the proposed project. The current roadway configuration along Minna Street would be converted from a westbound-only alleyway to an eastbound-only alleyway as specified in the Transit Center District Plan. In spite of the project permitting a southbound left turn at this intersection, uses along this alleyway consist of parking garagesthat will not generate a significant number of trips in the PM period based on existing hours and usage observations. Therefore, impacts to this intersection would be considered *less than significant*.

Intersection #18: South Park Street / Second Street. Traffic operations would improve from unacceptable LOS conditions (LOS F) to acceptable LOS conditions (LOS B). The intersection is a Side-Street Stop-Controlled intersection, with the eastbound shared left-right turning lane group currently stop-controlled; whereas, movements along Second Street are uncontrolled (free flow). The proposed project would reduce the number of lanes along Second Street from four to two and

the proposed project would include signalization of the intersection. Furthermore, traffic volumes along northbound and southbound Second Street would decrease due to diversions off Second Street to Third Street. Therefore, the cumulative traffic impact at this intersection would be considered *less than significant*.

Intersection #19: Brannan Street / Second Street. The intersection would continue to operate at LOS C with and without the proposed project. The proposed project would result in a decrease of 69 vehicles to the southbound left turning movement. Therefore, the cumulative traffic impact at this intersection would be considered *less than significant*.

Intersection #24: Market Street / First Street. The intersection would operate at LOS B with and without implementation of the proposed project, and the proposed project would result in a marginal increase to the weighted-average delay of the overall intersection. Intersection conditions would continue to operate at acceptable LOS conditions and therefore, the cumulative traffic impact at this intersection would be considered *less than significant*.

Intersection #25: Mission Street / First Street. The intersection would operate at LOS C with and without implementation of the proposed project. The project would cause an increase in traffic along the eastbound right-turning movement in the northbound direction due to diversions off Second Street; however, the delay would improve from 33.7 seconds to 27 seconds due to signal optimization. Therefore, the cumulative traffic impact at this intersection would be considered *less than significant*.

Table 13 – Intersection Level of Service: Cumulative (2040) and Cumulative Plus Project – Weekday PM Peak Hour

Overall Intersection Summary							
		2040 Cumulative			Cumulative + Project		
#	Study Intersection	Delay[1] (seconds)	V/C[2]	LOS	Delay[1] (seconds)	V/C[2]	LOS
1	Market St/ Montgomery St	**> 80**	1.02	**F**	**> 80**	1.13	**F**
2	Mission St/ New Montgomery St	**> 80**	1.36	**F**	**> 80**	1.47	**F**
3	Howard St/ New Montgomery St	17.5		B	**55.9**	1.05	**E**
4	Howard St/ Hawthorne St	12.0		B	42.7		D[3]
5	Folsom St/ Hawthorne St	**> 80**	1.98	**F**	**> 80**	2.05	**F**
6	Harrison St/ Hawthorne St	30.5		C	**> 80**	1.38	**F**
7	Bryant St/ Third St	**> 80**	2.88	**F**	**> 80**	2.91	**F**
8	Brannan St/ Third St	**> 80**	1.30	**F**	**> 80**	1.51	**F**
9	Townsend St/ Third St	**> 80**	1.69	**F**	**> 80**	2.40	**F**
10	King St/Third St	**> 80**	1.34	**F**	**> 80**	1.39	**F**
11	Market St/ Second St	10.5		B	15.6		B
12	Mission St/ Second St	24.4		C	41.1		D
13	Minna St/ Second St	0.6		A (NB)	0.4		A (NB)
14	Howard St/ Second St	**> 80**	1.20	**F**	**> 80**	1.03	**F**
15	Folsom St/ Second St	**> 80**	1.62	**F**	**> 80**	1.72	**F**
16	Harrison St/ Second St	**> 80**	2.58	**F**	**> 80**	3.39	**F**
17	Bryant St/ Second St	**> 80**	2.26	**F**	**> 80**	2.56	**F**
18	South Park St/Second St	**61.0**	N/A	**F**	10.7		B
19	Brannan St/ Second St	31.8		C	31.6		C
20	Townsend St/ Second St	**73.3**	1.20	**E**	**> 80**	1.34	**F**
21	King St/ Second St	**> 80**	1.03	**F**	**> 80**	0.90	**F**
22	Folsom St/ Essex St	**> 80**	6.50	**F**	**> 80**	2.84	**F**
23	Harrison St/ Essex St	**> 80**	3.73	**F**	**> 80**	3.30	**F**
24	Market St/ First St	17.8		B	18.2		B
25	Mission St/ First St	33.7		C	27.0		C
26	Howard St/ First St	**> 80**	1.21	**F**	**> 80**	1.24	**F**
27	Folsom St/ First St	**> 80**	2.48	**F**	**> 80**	2.59	**F**
28	Harrison St/ First St	**> 80**	1.55	**F**	**> 80**	1.74	**F**
29	Fifth St/Bryant St/ I-80 EB On-Ramp	**> 80**	3.37	**F**	**> 80**	3.32	**F**

Notes:
Bold indicates an unacceptable intersection level of service condition (LOS E or F).
Shaded values indicate *a Significant Project-Specific Traffic Impact*.
1. LOS and delay for signalized intersections represent conditions for the overall intersection; LOS and delay for unsignalized (e.g., TWSC) intersections represent conditions for the side-street stop-controlled approach, northbound (NB).
2. Volume-to-Capacity (V/C) ratios are only presented for intersections that operate at unacceptable LOS conditions (LOS E or F), per City standards.
3. Intersection #4 Howard and Hawthorne Street was identified as resulting in a significant impact under Existing plus Project Conditions; therefore, it is identified as having a significant impact in the cumulative condition. Also, this intersection would operate at unacceptable LOS F under Cumulative plus Project conditions if the Central SoMa Plan, and its associated reduction in traffic volumes on Howard Street, was not adopted.
Source: CHS Consulting Group, 2014.

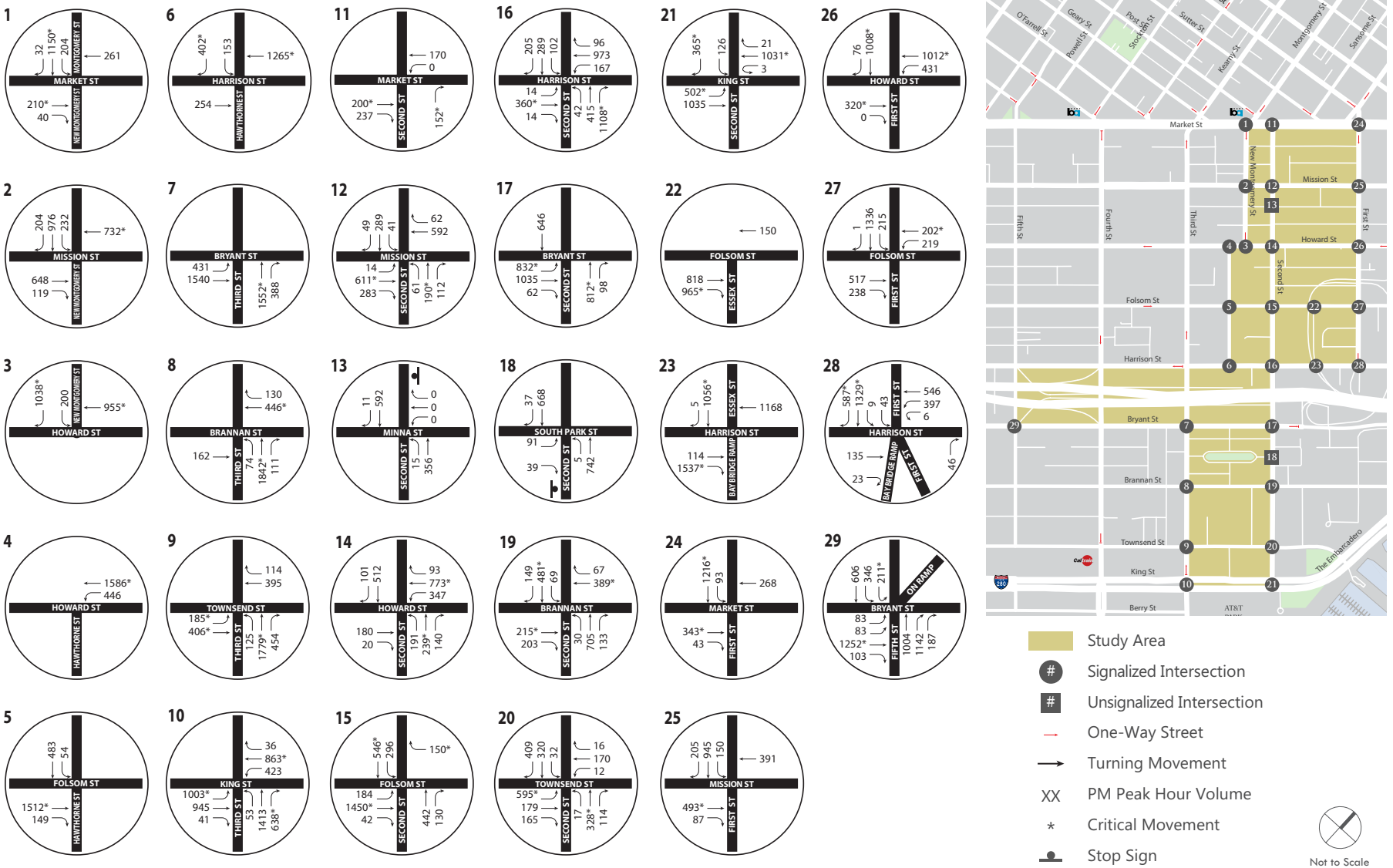


Figure 7
Cumulative (no project) Intersection Turning Movements

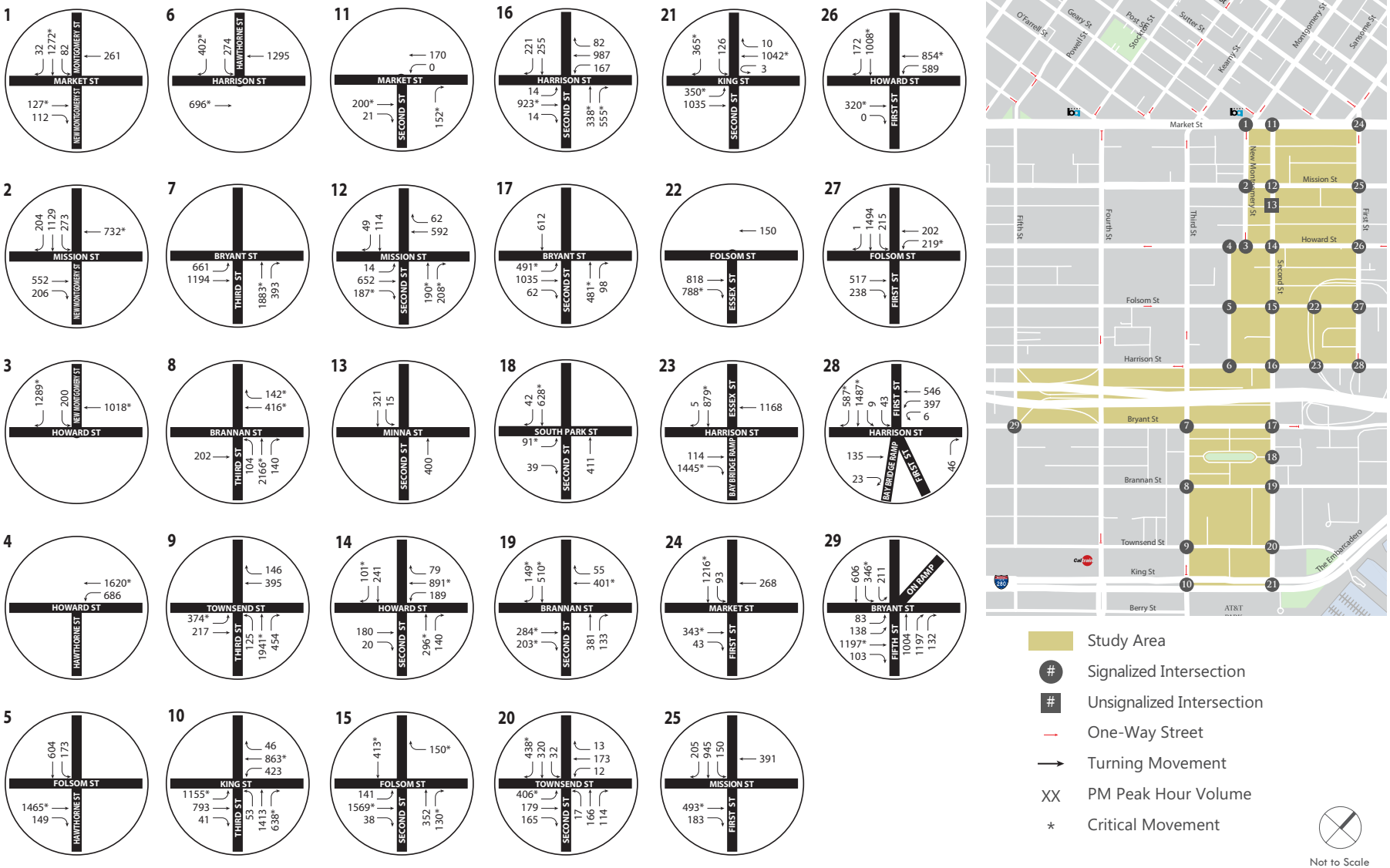


Figure 8
Cumulative (with project) Intersection Turning Movements

Traffic operations at the following four intersections will improve as a result of the proposed project and therefore, result in less than significant cumulative traffic impacts:

Intersection #14: Howard Street / Second Street. The intersection would continue to operate at LOS F with and without the proposed project. The proposed project would result in a decrease of 54 vehicles to the critical westbound shared left-through-right turning lane group along Howard Street due to diversions off Second Street to Third Street. The v/c ratio would improve from 1.20 under 2040 Cumulative to 1.04 under 2040 Cumulative plus project. The overall average delay and v/c ratio would be lower than under cumulative (no project) conditions. Therefore, the cumulative traffic impact at this intersection would be *less than significant*.

Intersection #21: King Street / Second Street. The intersection would continue to operate at LOS F with and without the proposed project. The proposed project would result in the reduction of one vehicle to the westbound through movement along King Street. In addition, the proposed project would result in a decrease of 152 vehicles to the eastbound left-turning movement along King Street (due to a diversion off Second Street to Third Street). The v/c ratio would improve from 1.03 under 2040 Cumulative to 0.90 under 2040 Cumulative plus project. The overall average delay and v/c ratio would be lower than under cumulative (no project) conditions. Therefore, the cumulative traffic impact at this intersection would be considered *less than significant*.

Intersection #22: Folsom Street / Essex Street. The intersection would continue to operate at LOS F with and without the proposed project. The proposed project would result in a decrease of 177 vehicles to the eastbound right-turning critical movement along Folsom Street (due to a diversion off Second Street to Third Street), which would not exceed the threshold of adding more than 5 percent to the critical movement. The overall average delay and v/c ratio as shown in Table 13 would be lower than under cumulative (no project) conditions. Therefore, the cumulative traffic impact at this intersection would be considered *less than significant*.

Intersection #23: Harrison Street / Essex Street. The study intersection would operate at unacceptable conditions (LOS F) with and without the proposed project. The proposed project would result in a reduction of 177 vehicles to the southbound through movement along Essex Street, and the proposed project would result in a reduction of 92 vehicles to the eastbound right-turning movement along Harrison Street. These decreases would not exceed the threshold of adding more than 5 percent to the critical movement. Also, due to these traffic volume diversions with implementation of the proposed project, the overall average delay and v/c ratio as shown in Table 13 would be lower than under cumulative (no project) conditions. Therefore, the cumulative traffic impact at this intersection would be considered *less than significant*.

Under Cumulative plus Project conditions, the proposed project would not contribute considerably to the poor operating conditions at the following four intersections. Therefore, the cumulative traffic impacts would be less than significant.

Intersection #5: Folsom Street / Hawthorne Street. The intersection would operate at LOS F with and without the proposed project. The proposed project would result in a decrease of 47 vehicles to the critical eastbound through movement along Folsom Street (due to diversions off Second Street to Third Street), which would not be a significant impact. However, a significant traffic impact was identified at this intersection under the Existing plus Project conditions. The project level impact would be mitigated to a less than significant level with the introduction of a southbound left–turn pocket. Specifically, mitigation measure M-TR-3 was identified at the project level to reduce the impact to LOS D, less than significant. The cumulative analysis

assumes the implementation of roadway changes proposed under the Central Soma Plan, which has not been adopted and is undergoing environmental review. The Folsom Street and Hawthorne Street intersection has one shared through-left lane group and one through lane in the southbound direction under the Cumulative conditions as part of the Central SoMa and TCDP plans. Therefore, consideration was given to 2040 Cumulative plus project conditions without Central SoMa changes. Even without the implementation of the Central SoMa Plan, the intersection Folsom and Hawthorne Streets overall would have the same LOS as 2040 No Project PM Peak (LOS F), including the implementation of the project level mitigation measure of a left turn lane. Therefore, the proposed project's contribution to the critical movement without the changes proposed under Central SoMa was assessed. In this case it is negative. The project would divert 47 vehicles from the southbound critical lane group volume, which would not exceed the 5% contribution to the critical movement. Therefore, the proposed project would not result in a cumulative impact at the intersection of Folsom and Hawthorne. No mitigation would be required.

Intersection #15: Folsom Street / Second Street. The intersection would operate at LOS F with and without the proposed project. The proposed project would result in an increase of 72 vehicles to the eastbound shared through-right lane groups along Folsom Street. The intersection v/c ratio would increase from 1.62 to 1.72. This would represent a growth in the intersection v/c of 6%, which would not exceed the significance threshold of 10% as discussed under Significance Criteria Section 4.1. Therefore, the cumulative traffic impact to this intersection would be considered *less than significant*.

Intersection #26: Howard Street / First Street. The intersection would continue to operate at LOS F with and without the proposed project. However, the proposed project would not add any vehicles to the eastbound or westbound critical movements. Therefore, the cumulative traffic impact to this intersection would be considered *less than significant*.

Intersection #27: Folsom Street / First Street. The intersection would continue to operate at LOS F with and without the proposed project. However, the proposed project would not add any vehicles to the critical movements. Therefore, the cumulative traffic impact to this intersection would be considered *less than significant*.

Significant Project-Specific Cumulative Impacts

Based on the significance criteria and discussion below, the proposed project would result in a significant cumulative traffic impact at 14 of the 29 intersections due to the project's cumulatively considerable contribution to intersection movements that operate unsatisfactorily.

Intersection #1: Market Street / Montgomery Street. The intersection would operate at LOS F with and without the proposed project. The proposed project would result in the addition of 122 vehicles to the southbound through critical movement along Montgomery Street, which represents 10 percent of the p.m. peak hour volume of 1,276 vehicles in the southbound through movement. Such an increase in volume to the southbound through critical movement would be considered significant. In addition, because the proposed project would result in an impact at this intersection under Existing plus Project conditions, cumulative traffic impacts to this study intersection would continue to be *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #2: Mission Street / New Montgomery Street. The intersection would operate at LOS F with and without the proposed project. The proposed project would result in the addition

of 153 vehicles to the southbound through movement along New Montgomery Street, which represents 14 percent of the p.m. peak hour volume of 1,133 vehicles in the southbound through movement and would be considered a significant impact. This would increase the overall average delay and v/c ratio relative to cumulative (no project) conditions. In addition, because the proposed project would result in an impact at this intersection under Existing plus Project conditions, cumulative traffic impacts to this study intersection would continue to be *significant.* At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #3: Howard Street / New Montgomery Street. The intersection would operate satisfactorily at LOS B under cumulative conditions; however, implementation of the proposed project would result in an increase in traffic volumes to the westbound through movement and southbound right-turning movement at this study intersection and would degrade LOS conditions to LOS E (unacceptable conditions). Therefore, the cumulative traffic impact to this intersection would be considered *significant*. In addition, because the proposed project would result in an impact at this intersection under Existing plus Project conditions, cumulative traffic impacts to this study intersection would continue to be *significant.* The project-level impact would be mitigated to a less than significant impact (LOS D) with a mitigation measure (M-TR-1) to increase the cycle length to 90 seconds. However, the cumulative traffic analysis accounts for this cycle length. Therefore, cumulative the impact would be significant. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #4: Howard Street / Hawthorne Street. Under the Cumulative plus Project scenario, this intersection would perform at LOS D due to a combination of a lengthened 90-second traffic signal cycle and a reduction in westbound traffic volumes. Westbound traffic volumes would be reduced due to the planned reduction in westbound travel lanes under the Transit Center District Plan (TCDP) (which will reduce westbound Howard Street from four lanes down to two lanes between Fremont and New Montgomery streets). Westbound traffic volumes would be further reduced due to the planned reduction in westbound travel lanes under the Central SoMa Plan (which would reduce westbound Howard Street from four lanes down to three between New Montgomery and Eleventh streets). However, since a significant traffic impact was identified at this intersection under the Existing plus Project conditions, the cumulative traffic impact at this study intersection would continue to be significant. Mitigation measure M-TR-2 to increase the cycle length to 90 seconds at this intersection was identified at the project level to reduce the impact to a less than significant level (LOS D). Analysis under the Cumulative plus Project Conditions accounts for the implementation of the 90-second cycle length and of roadway changes proposed as part of TCDP and the Central SoMa Plan including the proposed changes to Howard Street described above that would result in less traffic on Howard Street. However, the Central SoMa Plan has not yet been adopted and is currently undergoing environmental review.[42] In the event that proposed Central SoMa Plan roadway changes are not made, then the impact would remain significant because the reduction in traffic volumes would not materialize. Mitigation measure M-TR-2 from the Existing plus Project analysis to increase the cycle length to 90 seconds would still be applicable and was assumed for the cumulative analysis. However, since this intersection was identified as having a significant project-level impact, the cumulative traffic impact at this intersection would be considered

[42] San Francisco Planning Department. 2014. NOP and IS for Central SoMa Plan. Online at http://www.sf-planning.org/index.aspx?page=1828 under case no 2011.1356E. Accessed June 19, 2014. These document may be reviewed at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA as part of Case no.2011.1356E

conservatively significant and unavoidable. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #6: Harrison Street / Hawthorne Street. The intersection would operate satisfactorily at LOS C under Cumulative conditions; however, implementation of the proposed project would result in an increase in traffic volumes to the eastbound through movement by 442 vehicles at this study intersection and would degrade LOS conditions to LOS F (unacceptable conditions). Therefore, cumulative traffic impacts to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #7: Bryant Street / Third Street. The study intersection would operate at unacceptable conditions (LOS F) with and without the proposed project. The proposed project would result in the addition of 336 vehicles to the northbound critical movement along Third Street (due to diverted trips off Second Street to Third Street), which represent 15 percent of the p.m. peak hour volume of 2,276 vehicles in the shared northbound through-right turning movement. Therefore, the cumulative traffic impact to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #8: Brannan Street / Third Street. The intersection would continue to operate at LOS F with and without the proposed project. The proposed project would result in an increase of 383 vehicles to the northbound shared left-right-through lane groups along Third Street (due to diverted trips off Second Street to Third Street), which represent 16 percent of the p.m. peak hour volume of 2,410 vehicles in the northbound lane group movement.. Therefore, the cumulative traffic impact to this study intersection would continue to be *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #9: Townsend Street / Third Street. The intersection would continue to operate at LOS F with and without the proposed project. The proposed project would result in an increase of 189 vehicles to the eastbound left-turning movement along Townsend Street, which represents 51 percent of the p.m. peak hour volumes of 374 vehicles in the eastbound left-turning movement. In addition, the proposed project would result in an increase of 162 vehicles to the northbound shared left-through-right turning critical movement along Third Street, which represents 6 percent of the p.m. peak hour volume of 2,520 vehicles in the northbound shared left-through-right turning movement. These would exceed the City threshold by increasing the critical movement volume by more than 5 percent. Therefore, the cumulative traffic impact to this study intersection would continue to be *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #10: King Street / Third Street. The intersection would operate at LOS F with and without the proposed project. The proposed project would add 152 vehicles to the eastbound left turn critical movement which represents a 15 percent increase in volume over 2040 cumulative no project conditions. Therefore, the cumulative impact would remain significant. In addition, the proposed project would result in an impact at this intersection under Existing plus Project conditions, cumulative traffic impacts to this study intersection would continue to be

significant At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #16: Harrison Street / Second Street. The intersection would operate at LOS F with and without the proposed project. The proposed project would result in the addition of 563 vehicles to the eastbound shared left-through-right lane groups along Harrison Street, and proposed project would increase the intersection v/c ratio by 31%, which would exceed the City threshold of an increase of 10%. In addition, because the proposed project would result in an impact at this intersection under Existing plus Project conditions, cumulative traffic impacts to this study intersection would continue to be *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #17: Bryant Street / Second Street. The intersection would continue to operate at LOS F with and without the proposed project. The proposed project would result in a reduction in lane capacity given the loss of one eastbound left turning lane and a through lane in the northbound and southbound directions. In spite of signal timing changes and optimization, the v/c ratio would increase by 13%, which would exceed the City threshold of 10%. Therefore, the cumulative traffic impact to this study intersection would be *significant*. In addition, because the proposed project would result in an impact at this intersection under Existing plus Project conditions, cumulative traffic impacts to this study intersection would continue to be *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #20: Townsend Street / Second Street. The intersection would operate unacceptably at LOS E under cumulative conditions. With implementation of the proposed project, the LOS conditions would degrade further to LOS F. This is due to the fact that there would be a protected northbound right-turn phase at this intersection, which would take away time from other critical movements. Because the proposed project would further degrade LOS conditions from LOS E to LOS F, the cumulative traffic impact to this intersection would be considered *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #28: Harrison Street / First Street. The intersection would operate at LOS F with and without the proposed project. The proposed project would result in the addition of 158 vehicles to the southbound right-turning movement along First Street (due to diverted trips off of Second Street to First Street), which represents 11 percent of the p.m. peak hour volumes of 1,486 vehicles in the southbound right-turning critical movement and such an increase in volume to the southbound right-turning critical movement would be considered a significant impact. In addition, because the proposed project would result in an impact at this intersection under Existing plus Project conditions, cumulative traffic impacts to this study intersection would continue to be *significant*. At this intersection, no feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Intersection #29: Bryant Street / Fifth Street / I-80 Eastbound On-Ramp. The intersection would continue to operate at LOS F with and without the proposed project. The proposed project would result in an impact at this intersection under Existing plus Project conditions, cumulative traffic impacts to this study intersection would continue to be *significant.* At this intersection, no

feasible mitigation measure has been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Summary of Cumulative Traffic Impacts

Under Cumulative plus Project conditions, of the 11 intersections at which project level significant impacts were identified, 10 would continue to have significant impacts. Of the remaining 18 study intersection intersections, seven would continue to operate at acceptable LOS conditions (LOS D or better) in the Cumulative plus Project Condition, and the 11 other intersections would operate at unacceptable levels (LOS E or LOS F). These last eleven intersections were examined to determine the proposed project's contribution to poor intersection operation. The proposed project would result in a cumulatively considerable contribution to the unsatisfactory operation at four of these intersections. At the other seven intersections, the proposed project would not contribute to the poor intersection operation and the cumulative traffic impacts would be less than significant. Therefore, the proposed project would result in significant cumulative traffic impacts at fourteen intersections.

Under Existing plus Project conditions, mitigation measures that would reduce the impact to less than significant have been identified for the following three intersections:

Intersection #3: Howard Street / New Montgomery Street.
Intersection #4: Howard Street / Hawthorne Street.
Intersection #5: Folsom Street / Hawthorne Street.

The cumulative analysis assumed the continued implementation of the 90-second cycle length mitigation measures for Intersection #3: Howard Street / New Montgomery Street and Intersection #4: Howard Street / Hawthorne Street. No additional mitigation measures have been identified and the impacts would remain significant and unavoidable. At intersection 5, the proposed project would not contribute considerably to the cumulative impact. It would be less than significant for the reasons described above.

Due to the constraints of the right of way and incompatibilities with the multi-modal character of the proposed project, at 14 intersections the cumulative traffic impacts would be significant and unavoidable.

4.3.3 Transit Impacts

SFTMA's Transit Effectiveness Project (TEP)[43] assumes that Muni Route 10 Townsend would be replaced by Route 10 Sansome. The alignment would continue to be similar to existing conditions within the study area. The proposed headway for 10 Sansome would be approximately six minutes during PM peak period. Muni Route 12 Folsom-Pacific would be replaced by Route 11 Downtown Connector along Second Street within the study area. The proposed headway would be approximately twelve minutes during the PM peak period.

Table 14 presents the associated delay for the Year 2040 No Build and Year 2040 Build condition during the PM peak hour. Detailed calculations are included within the **Appendix H**.

[43] SF Planning Department. 2014.Transit Effectiveness Project (TEP) EIR. Online at http://www.sf-planning.org/ftp/files/MEA/02_TEP_DEIR_Volume_2_DEIR_Appendix_2_TEP_Initial_Study.pdf. Accessed June 19, 2014.

Table 14 – Transit Delay: 2040 No Build and 2040 Build Conditions Weekday PM Peak-Hour

Route	Proposed Headway (min)	Total Transit Delay (min: sec)		
		2040 No Build	2040 Build	Project Contribution
10 Townsend (Sansome)				
Inbound (Northbound)	6	22:04	11:26	-10:38
Outbound (Southbound)	6	11:07	7:39	-3:28
12 Folsom-Pacific/11 Downtown Connector				
Inbound (Northbound)	12	6:25	5:23	-1:02
Outbound (Southbound)	15	5:28	2:30	-2:58

Note: The total transit delay presented in the table does not include boarding delay.

Similar to the Existing and Existing plus Project conditions, future transit delay impacts were analyzed based on the level of traffic congestion and re-entry delay. In the future (Year 2040), the proposed project would reduce Muni Route 10 delay by approximately ten minutes and thirty eight seconds in the inbound direction, and three minutes and twenty eight seconds in the outbound direction. The sum of the delay in both directions for Muni Route 10 would decline fourteen minutes and six seconds. The proposed project would decrease Muni Route 12/11 travel time by approximately one minute and two seconds in the inbound direction, while decreasing the delay by approximately two minutes and fifty eight seconds in the outbound direction. The sum of the delay in both directions for Muni Route 12/11 would thus decline by four minutes.

As shown in Table 12, the transit travel time for both Routes 10 and 12/11 would decrease in both directions due to the proposed project, thus improving transit service and causing *less than significant* impact. Some observations as to the reasons for the considerable decrease of travel time at some intersections between the existing versus existing plus project conditions are listed below:

- Muni Route 10 Inbound: There would be a decrease in bus travel delay at the Harrison Street and Second Street intersection because of left turns being prevented along Second Street as well as with the cycle length increase from 60 seconds to 90 seconds and signal optimization with the proposed project. This would also apply to the Brannan Street and Second Street intersection.
- Muni Route 10 Outbound: There would be a decrease in bus travel delay at the Folsom Street and Second Street intersection because of left turns being prevented along Second Street as well as with the cycle length increase from 60 seconds to 90 seconds and signal optimization with the proposed project. This would also apply to the Brannan Street and Second Street intersection. There would be an increase in bus travel delay at the Townsend Street and Second Street intersection due an increase in southbound right turn traffic volume (critical movement).
- Muni Route 12/11 Inbound: There would be decreases in delay at the Market Street and Second Street intersection as well as at the Folsom Street and Second Street intersection because of signal optimization as well as volume reduction and cycle length increase (60 seconds to 90 seconds) and optimization respectively.
- Muni Route 12/11 Outbound: There would be a decrease in bus travel delay at the Folsom Street and Second Street intersection because of left turns being prevented along Second Street as well as with the cycle length increase from 60 seconds to 90 seconds and signal optimization with the proposed project. There would be an increase in bus travel delay at the Harrison Street and Second Street intersection due to lane geometry changes (two shared through lanes southbound reduced to one through only lane and an exclusive right turn pocket). There would be a reduction in bus travel delay at the intersection of Harrison and Hawthorne Streets due to signal optimization.

As described above and presented in Tables 10 and 12, there would be a ***less-than-significant*** impact to transit operations as a result of the proposed project.

4.3.4 Pedestrian Impacts

Pedestrian circulation impacts by their nature are site-specific and generally do not contribute to impacts from other development projects. The proposed project would not result in overcrowding of sidewalks or create new potentially hazardous conditions for pedestrians under cumulative conditions. Conversely, the proposed project would improve pedestrian circulation in and around the project site by implementing streetscape designs to create a more comfortable walking environment as well as widening sidewalks and including additional high-visibility crosswalks to increase pedestrian safety and connectivity along Second Street and the surrounding pedestrian network. The project would also provide right-turn signal phases time-separated from crossing phases for pedestrians walking along Second Street north of Townsend Street. This change would reduce pedestrian-vehicle conflicts in the east- and west-side crosswalks along Second Street during post-game periods of high pedestrian volumes by giving right-turning drivers an exclusive green phase after the pedestrian crossing time has ended. These treatments would improve pedestrian conditions by facilitating safe pedestrian circulation and crossings, by providing safe spaces for pedestrians and by increasing pedestrian visibility to drivers. Walk trips may increase between the completion of the proposed project and future conditions due to increasing effectiveness of planned pedestrian improvements. Because of pedestrian realm enhancements and the continued access to bus stops by transit users, the proposed pedestrian improvements along Second Street could over time increase the number of pedestrians along the street via transit modes, although not to the level which would induce overcrowding of sidewalks under the cumulative conditions.

There would be a projected increase in background vehicle traffic under future (2040) conditions. This could result in an increase in the potential for vehicle-pedestrian conflicts at intersections along Second Street. While there would be a general increase in vehicle traffic that is expected through the future (2040) cumulative conditions, the proposed project would not create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas. Therefore, the proposed project, in combination with past, present and reasonably foreseeable transportation and/or land-use developments in San Francisco, would result in ***less-than-significant*** cumulative pedestrian impacts.

4.3.5 Bicycle Impacts

The proposed project includes a combination of raised cycletracks, standard bicycle lanes and sharrows, as well as modifications to signal phasing to accommodate vehicular, bicycle, and pedestrian flow along Second Street. Although the proposed project could result in an increase in the amount of bicycling activities along the corridor, the proposed project would be designed to reduce potential conflicts with moving vehicles along Second Street and would continue to provide adequate access to adjacent land uses, bicycle parking, as well as other bicycle routes that connect to Second Street. Additionally, the proposed project in combination with adjacent bicycle facilities would be able to accommodate potential increases in bicycling trips over time, and such increases would not reach a level that would create potentially hazardous conditions for bicycles.

As described above, under cumulative conditions, there would be a projected increase in vehicles at intersections along Second Street, which may result in an increase in vehicle-bicycle conflicts at intersections in the study area. However, the project would also provide right-turn signal phases time-separated from crossing phases for bicyclists. This change would reduce bicycle-vehicle conflicts along Second Street by giving right-turning drivers an exclusive green phase separate from the bicycle phase. Although there would be a general increase in vehicle traffic that would be expected through the future 2040 cumulative conditions, the proposed project would not create potentially hazardous conditions for

bicycles or otherwise interfere with bicycle accessibility to land uses along Second Street and adjoining areas, or substantially affect existing or future bicycle facilities. Therefore, the proposed project would result in ***less-than-significant*** cumulative impacts on bicyclists.

4.3.6 Emergency Vehicle Access Impacts

The proposed roadway treatments associated with the proposed project would continue to accommodate fire trucks and related emergency vehicles (e.g., ambulance, police) and allow for safe maneuvering of vehicles and the passage of emergency vehicles along the Second Street corridor. Future streetscape proposals for other streets in the vicinity will also need to identify measures that address emergency vehicle response times for those streets, as part of the environmental review and approval for those projects. This will ensure that the existing network of downtown streets that accommodate emergency vehicles will be maintained. Therefore, the proposed project, in combination with future cumulative projects in the area would continue to support emergency response vehicles, and the proposed project would result in ***less-than-significant*** cumulative impacts to emergency vehicle access.

4.3.7 Loading Impacts

Commercial Loading

The proposed project would result in project-specific significant and unavoidable impact for commercial loading under Existing plus Project conditions along the Second Street corridor. These impacts would continue to remain ***significant and unavoidable*** along Second Street under the Cumulative Condition.

As described above, the SFMTA has sought to create new on-street commercial loading spaces in the vicinity of the project in order to mitigate the reduction in supply. However, all available curbside space in the project vicinity that could be repurposed for commercial loading zones has already been proposed for commercial loading; there are no additional opportunities to replace more of the commercial loading zones removed as part of the proposed project.

Passenger Loading

Passenger loading and 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 and unloading zones require an annual permit managed by the SFMTA. The loss of passenger loading and unloading zones anywhere in the City may be an inconvenience, and passengers may need to walk farther 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 project-specific impact. The demand for passenger loading zones may increase over time, due to the land use development and increased density anticipated within the City. However, as previously discussed, the proposed project would not result in substantial loss of passenger loading zones or a significant project specific impact. Additionally, some of these passengers may shift to using bicycles and thus reduce demand. Thus, the reduction in on-street passenger loading zones would not be considered substantial, and therefore, in combination with past, present, and reasonably foreseeable developments in San Francisco, the proposed project would result in a ***less-than-significant*** cumulative passenger loading impacts.

4.3.8 Parking Impacts

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. As previously discussed, the proposed project would result in a reduction of on-street parking along Second Street and could result in drivers parking further from the street. Due to the current and likely future difficulty in finding on-street parking along Second Street, some drivers may park along neighboring roadways, or forego their private vehicle and choose to use transit, a taxi, or walking or

bicycle to and from their destination along Second Street. As discussed, transit service to the project area would be enhanced as a part of SFMTA's TEP, and capacity would be available to accommodate passengers. Additionally, the proposed project would provide a safe option to shift mode to bicycles or walk to their destinations. Drivers could also park at the many of the off-street parking facilities in the project vicinity. The proposed project would not remove any of these spaces. The reduction in on-street parking would not be considered substantial within the context of Downtown San Francisco[44] where a supply of off-street parking would be potentially available and where there would be multiple options for alternative transportation, and therefore, in combination with past, present, and reasonably foreseeable developments in San Francisco, the proposed project would result in a ***less-than-significant*** cumulative parking impact.

4.3.9 Construction Impacts

The construction of the proposed project may overlap with the construction of other projects in the vicinity of Second Street. Construction activities associated with other projects would affect access, traffic, and pedestrians on streets used as access routes to and from these project sites. Overall, localized cumulative construction-related transportation impacts could occur as a result of cumulative projects that generate increased traffic at the same time and on the same roads as the proposed project. The construction manager for each individual project would work with the various departments of the City to develop a detailed and coordinated plan that would address construction vehicle routing, traffic control and pedestrian movement adjacent to the construction area for the duration of any overlap in construction activity.

The cumulative impacts of multiple nearby construction projects would not be cumulatively considerable, as the construction of the proposed project and other projects would be temporary. Further, the proposed project would coordinate with various City departments such as SFMTA and DPW through the TASC to develop coordinated plans that would address construction-related vehicle routing and pedestrian/bicycle movements adjacent to the construction area for the duration of construction overlap. Therefore, the proposed project, in combination with past, present, and reasonably foreseeable developments in San Francisco, would result in a ***less-than-significant*** cumulative construction-related transportation impact.

4.4 Project Variant Analysis

DPW has proposed a variant to the proposed project for the intersection of Second and Brannan Streets based upon input from local residents who utilize the existing southbound left turn at Second and Brannan Streets to access their building. The project variant would be the same as the proposed project except that it would include a permitted left-turn movement from the southbound shared through-left lane on Second Street to Brannan Street and the northbound right turn movement would be allowed to turn right on a permitted phase. Thus, the east-side crosswalk and cycletrack on the east side of the intersection would not be separated from left- or right-turning vehicles through signal phasing. This operational change would cause the same pedestrians, loading, emergency vehicles, parking and construction impacts as the project impacts discussed above. However, the impact on traffic, transit vehicles and bicyclist would differ from the project and are discussed below.

4.4.1 Traffic Impacts

The following presents the intersection traffic conditions at each of the 29 study intersections with implementation of the Project Variant under Existing plus Project and Cumulative plus Project conditions. The Project Variant would include the same physical changes to Second Street as the proposed project; however, the Project Variant would permit southbound left-turning movements along

[44] The GIS data the off-street parking information was based on is available at http://sfpark.org/resources/off-street-parking-census-gis-data/

Second Street at the intersection of Brannan Street. As a result, the traffic diversions were revised and this resulted in a change in volumes at 12 intersections (#8, #9, and #11 through #20) as a result of the variant when compared to the existing plus project without variant conditions. The analysis results are similar to those of the proposed project without the variant. This is because the left turn volume at this intersection was not very substantial and no other changes were made to the intersection in terms of lane geometry or signal phasing/timing. As a result, the southbound left turns at this intersection would be expected to yield to the northbound through and bike lane traffic. The results for this analysis are presented within this section.

Existing and Existing Plus Project Variant Conditions

As presented in **Table 15**, the Project Variant would result in significant traffic impacts to 11 of the 29 study intersections. The Project Variant would result in similar traffic impacts as the proposed project. At many locations the results would be the same. At other study intersections, the level of service would remain the same, but the delay may increase or decrease slightly. At Intersection #19, Brannan and Second Street, the Project Variant would result in LOS C while the proposed project would result in LOS D. Intersection LOS output sheets are provided in **Appendix F**.

Similar to the proposed project, the mitigation measures identified in the Existing plus Project analysis to reduce the significant impacts identified at Intersection numbers 3, 4 and 5 would also be applicable to the Project Variant. Implementation of mitigation measures M-TR-1, M-TR-2 and M-TR-3 would reduce the impacts under the Project Variant at Intersection numbers 3, 4, and 5 to less than significant levels. For the impacts at the remaining eight intersections, the impacts would be significant and unavoidable as under the Proposed Project.

Figure 9 presents the intersection turning movements under existing plus project variant conditions.

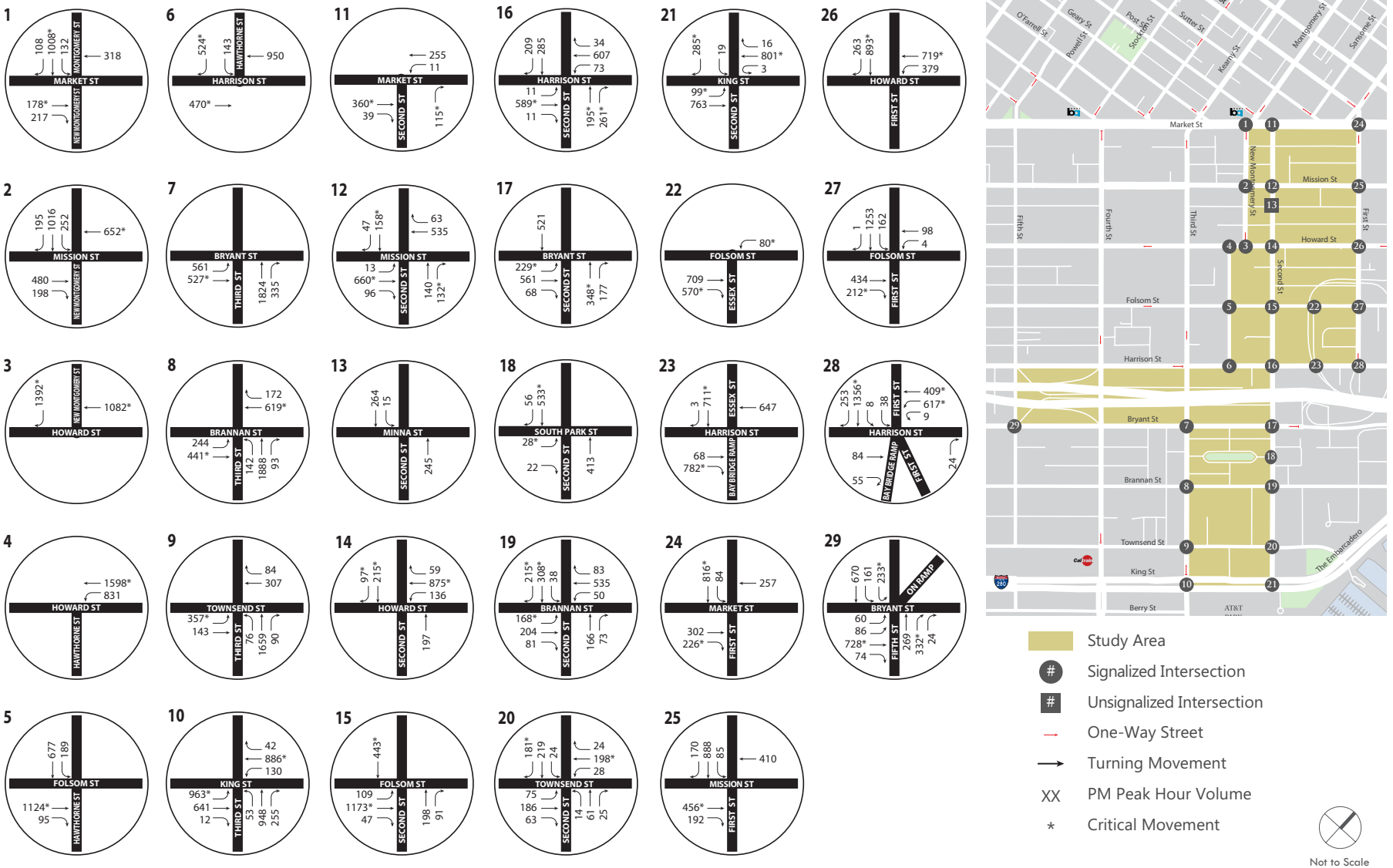


Figure 9
Existing Plus Project Variant Intersection Turning Movements

Table 15 – Intersection Level of Service: Existing and Existing Plus Project Variant – Weekday PM Peak Hour

#	Intersection	Overall Intersection Summary					
		Existing PM			Existing + Project Variant		
		Delay[1] (seconds)	V/C[2]	LOS	Delay[1] (seconds)	V/C[2]	LOS
1	Market St/ Montgomery St	51.0		D	**77.8**	1.01	**E**
2	Mission St/ New Montgomery St	**61.3**	**1.04**	**E**	**> 80**	1.13	**F**
3	Howard St/ New Montgomery St	39.5		D	**77.2**	0.95	**E**
4	Howard St/ Hawthorne St	19.6		B	**61.9**	1.10	**E**
5	Folsom St/ Hawthorne St	**74.5**	**1.08**	**E**	**> 80**	1.24	**F**
6	Harrison St/ Hawthorne St	43.4		D	**71.0**	1.24	**E**
7	Bryant St/ Third St	41.1		D	26.9		C
8	Brannan St/ Third St	32.0		C	46.2		D
9	Townsend St/ Third St	31.1		C	47.8		D
10	King St/Third St	**> 80**	**0.97**	**F**	**> 80**	1.00	**F**
11	Market St/ Second St	10.8		B	9.2		A
12	Mission St/ Second St	15.0		B	30.3		C
13	Minna St/ Second St	16.5*		C (WB)	0.4*		A (NB)
14	Howard St/ Second St	16.8		B	23.1		C
15	Folsom St/ Second St	**64.6**	**0.94**	**E**	34.9		C
16	Harrison St/ Second St	42.3		D	**> 80**	2.00	**F**
17	Bryant St/ Second St	**> 80**	**1.30**	**F**	**> 80**	1.53	**F**
18	South Park St/ Second St	**> 80**	**N/A**	**F (EB)**	4.8		A
19	Brannan St/ Second St	14.4		B	21.7		C
20	Townsend St/ Second St	14.5		B	16.5		B
21	King St/ Second St	42.9		D	39.0		D
22	Folsom St/ Essex St	30.3		C	13.5		B
23	Harrison St/ Essex St	**> 80**	**2.23**	**F**	**> 80**	1.92	**F**
24	Market St/ First St	14.9		B	14.9		B
25	Mission St/ First St	23.0		C	25.2		C
26	Howard St/ First St	18.3		B	10.2		B
27	Folsom St/ First St	**> 80**	**1.26**	**F**	**> 80**	1.42	**F**
28	Harrison St/ First St	**> 80**	**1.44**	**F**	**> 80**	1.60	**F**
29	Fifth St/Bryant St/ I-80 EB On-Ramp	**> 80**	**1.34**	**F**	**> 80**	1.37	**F**

Notes:
Bold indicates an unacceptable intersection level of service condition (LOS E or F).
Shaded values indicate *a Significant Project-Specific Traffic Impact*.
1. LOS and delay for signalized intersections represent conditions for the overall intersection; LOS and delay for unsignalized (e.g., TWSC) intersections represent conditions for the side-street stop-controlled approach, northbound (NB); westbound (WB); eastbound (EB).
2. Volume-to-Capacity (V/C) ratios are only presented for intersections that operate at unacceptable LOS conditions (LOS E or F), per City standards.
Source: CHS Consulting Group, 2014.

Cumulative and Cumulative plus Project Variant Conditions

As presented in **Table 16**, the Project Variant would result in significant cumulative traffic impacts to 13 of the 29 study intersections. Intersection LOS output sheets are provided in **Appendix F**. **Figure 10** presents intersection turning movements under Cumulative plus Project Variant conditions.

Table 16 – Intersection Level of Service: Cumulative (2040) and Cumulative Plus Project Variant – Weekday PM Peak Hour

	Overall Intersection Summary						
		2040 Cumulative			**Cumulative + Project Variant**		
#	**Study Intersection**	**Delay[1] (seconds)**	**V/C[2]**	**LOS**	**Delay[1] (seconds)**	**V/C[2]**	**LOS**
1	Market St/ Montgomery St	**> 80**	1.02	**F**	**> 80**	1.13	**F**
2	Mission St/ New Montgomery St	**> 80**	1.36	**F**	**> 80**	1.47	**F**
3	Howard St/ New Montgomery St	17.5		B	**56.9**	1.05	**E**
4	Howard St/ Hawthorne St	12.0		B	42.8		D[3]
5	Folsom St/ Hawthorne St	**> 80**	1.98	**F**	**> 80**	2.05	**F**
6	Harrison St/ Hawthorne St	30.5		C	**> 80**	1.38	**F**
7	Bryant St/ Third St	**> 80**	2.88	**F**	**> 80**	2.91	**F**
8	Brannan St/ Third St	**> 80**	1.30	**F**	**> 80**	1.49	**F**
9	Townsend St/ Third St	**> 80**	1.69	**F**	**> 80**	2.40	**F**
10	King St/Third St	**> 80**	1.34	**F**	**> 80**	1.39	**F**
11	Market St/ Second St	10.5		B	15.8		B
12	Mission St/ Second St	24.4		C	44.9		D
13	Minna St/ Second St	0.6		A (NB)	0.3*		A (NB)
14	Howard St/ Second St	**> 80**	1.20	**F**	**> 80**	1.04	**F**
15	Folsom St/ Second St	**> 80**	1.62	**F**	**> 80**	1.74	**F**
16	Harrison St/ Second St	**> 80**	2.58	**F**	**> 80**	3.39	**F**
17	Bryant St/ Second St	**> 80**	2.26	**F**	**> 80**	2.56	**F**
18	South Park St/Second St	**61.0**	N/A	**F**	11.4		B
19	Brannan St/ Second St	31.8	0.72	C	47.0		D
20	Townsend St/ Second St	**73.3**	1.20	**E**	**64.0**	1.29	**E**
21	King St/ Second St	**> 80**	1.03	**F**	**> 80**	0.90	**F**
22	Folsom St/ Essex St	**> 80**	6.50	**F**	**> 80**	2.84	**F**
23	Harrison St/ Essex St	**> 80**	3.73	**F**	**> 80**	3.30	**F**
24	Market St/ First St	17.8		B	18.1		B
25	Mission St/ First St	33.7		C	27.1		C
26	Howard St/ First St	**> 80**	1.21	**F**	**> 80**	1.24	**F**
27	Folsom St/ First St	**> 80**	2.48	**F**	**> 80**	2.59	**F**
28	Harrison St/ First St	**> 80**	1.55	**F**	**> 80**	1.74	**F**
29	Fifth St/Bryant St/ I-80 EB On-Ramp	**> 80**	3.37	**F**	**> 80**	3.32	**F**

Notes:
Bold indicates an unacceptable intersection level of service condition (LOS E or F).
Shaded values indicate *a Significant Project-Specific Traffic Impact*.
1. LOS and delay for signalized intersections represent conditions for the overall intersection; LOS and delay for unsignalized (e.g., TWSC) intersections represent conditions for the side-street stop-controlled approach, northbound (NB); westbound (WB); eastbound (EB).
2. Volume-to-Capacity (V/C) ratios are only presented for intersections that operate at unacceptable LOS conditions (LOS E or F), per City standards.
3. Intersection #4 Howard and Hawthorne Street was identified as resulting in a significant impact under Existing plus Project Conditions; therefore, it is identified as having a significant impact in the cumulative condition. Also, this intersection would operate at unacceptable LOS F under Cumulative + Project conditions if the Central SoMa Plan, and its associated reduction in traffic volumes on Howard Street, was not adopted.
Source: CHS Consulting Group, 2014.

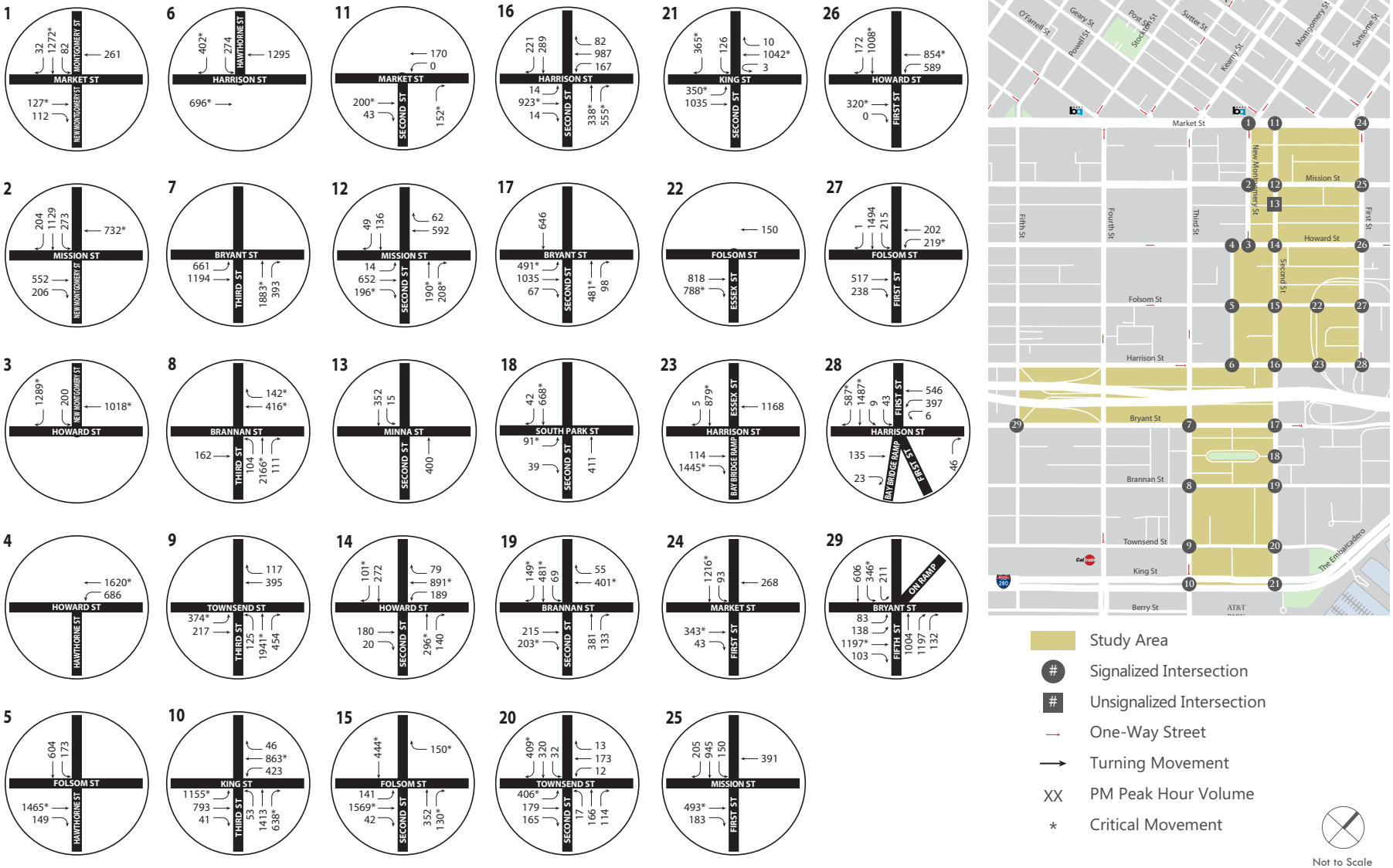


Figure 10
Cumulative Plus Project Variant Intersection Turning Movements

The Project Variant would result in similar cumulative traffic impacts as the proposed project at many of the study intersections. At many locations the results would be the same. At other study intersections, the level of service would remain the same, but the delay may increase or decrease slightly. At two intersections the level of service would change between the Project Variant and the Proposed Project. At intersection 5, the proposed project with variant would not contribute considerably to the cumulative impact due the same reasons as described within the Cumulative plus Project section. At Intersection #19 Brannan and Second Street, the Project Variant would result in LOS D while the Proposed Project would result in LOS C in the cumulative condition, but the intersection would operate acceptably and the impact would be less than significant under either scenario. In contrast, the Proposed Project would result in a significant cumulative impact at Intersection #20 Townsend and Second Streets, while the Project Variant would not result in a significant cumulative traffic impact at that intersection.

Intersection #20: Townsend Street / Second Street. The intersection would continue to operate at LOS E with and without the Project Variant. The Project Variant would result in a decrease of 162 vehicles to the northbound through movement along Second Street and 189 vehicles to the eastbound left movement along Townsend Street. However, when compared to 2040 Cumulative conditions, under Cumulative plus Project Variant conditions there would be a reduction in the southbound right volumes at this intersection due to the project prohibition of the southbound left at Brannan being taken away for the variant. Although these changes cause the v/c ratio to increase from 1.20 to 1.29 or by 8%, it would not exceed the City threshold. Therefore, the cumulative impact to this intersection would be considered *less than significant*.

Intersection LOS output sheets are provided in **Appendix F**.

Similar to the Proposed Project's cumulative traffic impacts at 14 intersections, there would be cumulative traffic impacts under the Project Variant at 13 intersections that would be significant and unavoidable as under the Proposed Project.

4.4.2 Transit Impacts

Existing and Existing Plus Project Conditions

The Project Variant would decrease Muni Route 10 delay approximately one minute and three seconds in the inbound direction and increase by one minute and five seconds in the outbound direction. The sum of the delay for Muni Route 10 in both directions would increase two seconds. The variant would reduce Muni Route 12 travel time by approximately three minutes and fifty eight seconds in the inbound direction, while increasing the delay by approximately three minutes and fifteen seconds in the outbound direction. The sum of the delay for Muni Route 12 in both directions would be thus amount to a reduction of forty three seconds.

The increase in transit travel time in both directions due to the variant would be less than the threshold of six minutes for both Routes 10 and 12 and thus the impacts would be considered ***less than significant***. Detailed calculations are included in **Appendix H**.

Cumulative and Cumulative Plus Project Conditions

In the future (Year 2040), the variant would reduce Muni Route 10 delay by approximately ten minutes and thirty seconds in inbound direction and increase by one minute and sixteen seconds in outbound direction. The sum of the delay in both directions for Muni Route 10 would reduce nine minutes and fourteen seconds. The variant would decrease Muni Route 12/11 travel time by approximately one minute and five seconds in inbound direction, while decreasing the delay by approximately two minutes

and thirty seven seconds in outbound direction. The sum of the delay in both directions for Muni Route 12/11 would thus amount to a reduction of three minutes and forty-two seconds.

The increase in transit travel time in both directions due to the variant would be less than the threshold of six minutes for both Routes 10 and 12/11 and thus the impacts would be considered ***less than significant***. Detailed calculations are included in **Appendix H**.

4.4.3 Bicycle Impacts

The Project Variant would result in the northbound bicycle facility across the Brannan intersection and would function like a typical Class II bicycle lane rather than a cycletrack. Northbound cyclists would not have the advantage of separate signal phases at this location; instead, northbound-right and southbound-left turning vehicles would be expected to yield to bicycles, like at a typical intersection. While this would increase conflicts between bicycles and vehicles (compared to a cycletrack), it would still be an improvement for cyclists compared to the existing condition. Therefore the impact would be ***less than significant***.

5.0 MITIGATION AND IMPROVEMENT MEASURES

This section presents the transportation mitigation measures that would be required to reduce the impacts of the project to less-than-significant levels.

5.1 Traffic

In San Francisco, the range of feasible traffic mitigation measures is typically limited due to physical constraints and competing priorities. Additional travel lanes cannot be created because that would require the narrowing/removal of sidewalks or the demolition of existing structures. While curbside parking and loading lanes can sometimes be converted to travel lanes during peak periods (also known as tow-away lanes), in downtown San Francisco the provision of on-street loading is critical, and the street network has already been optimized to balance the needs of loading versus traffic flow.

Left-turn movements off of two-way streets can sometimes be prohibited, but this is already proposed for the project (off of Second Street); therefore this tool is not applicable to as mitigation.

Therefore, the only feasible mitigation measure is optimization of signal timing at signalized intersections, specifically, increasing the signal cycle length and modification to green splits. Most signalized intersections within San Francisco operate at a 60-second cycle. This length could be increased, potentially up to 90 seconds. However, cycle lengths above 90 seconds create only marginal additional traffic capacity for congested movements, while resulting in substantial increased in delay for uncongested movements (as well as pedestrians and bicycles). Therefore, impacted signalized intersections with a cycle length at or above 90 seconds cannot be lengthened further.

At some intersections implementation of the project would result in significant and unavoidable impacts because no mitigation measures are feasible. However, some mitigation measures that would improve operating conditions at the affected intersections have been identified.

<u>Mitigation Measures - Existing Plus Project Conditions</u>

The proposed project would result in a project-specific traffic impact at 11 of the 29 study intersections under Existing plus Project conditions as shown in **Table 17**.

Mitigation measures that reduce impacts to a less-than-significant level were feasible only at the following three intersections:

Mitigation Measure – M-TR-1: Increase Signal Cycle Length: The **Howard Street and New Montgomery Street** traffic signal operates on a 60-second cycle length under the Existing plus Project conditions. As a mitigation measure, increasing the signal cycle length to 90 seconds would improve the intersection operation from LOS E to LOS D, thus reducing the impact of the project to a less-than-significant level. The impact at this intersection would be *less than significant with mitigation*.

Mitigation Measure – M-TR-2: Increase Signal Cycle Length: The **Howard Street and Hawthorne Street** traffic signal operates on a 60-second cycle length under the Existing plus Project conditions. As a mitigation measure, increasing the signal cycle length to 90 seconds would improve the intersection operation from LOS E to LOS D, thus reducing the impact of the project to a less-than-significant level. The impact at this intersection would be *less than significant with mitigation*.

Mitigation Measure – M-TR-3: Adding a left-turn lane: At the **Folsom Street and Hawthorne Street** intersection, there currently is a single southbound lane, serving both the southbound-through and southbound-left movements. As a mitigation measure, the addition of a southbound left-turn lane during the p.m. peak demand period would improve the intersection operation back to the existing LOS E condition. This mitigation measure would result in the removal of two metered parking spaces on the east side of Hawthorne Street north of Folsom Street during the p.m. peak demand period; during the remainder of the day, the parking spaces would remain available.

With implementation of the above mitigation measure, the intersection would remain at LOS E with the proposed project and the mitigation measure. In order to determine if the project would result in a considerable cumulative contribution to the unacceptable operation of the intersection, the critical eastbound-through movement was examined. The proposed project would result in the reduction of 26 vehicles (due to diversions off Second Street to Third Street) from the critical eastbound-through movement along Folsom Street. This would be a negative contribution to the critical movement, and would therefore not constitute a considerable contribution. The impact would be *less than significant with mitigation.*

Table 17 – Existing plus Project Conditions: Impacts and Mitigation Measures

#	Study Intersection	Overall Intersection Summary and Mitigation						
		Existing plus Project			Existing plus Project w/ Mitigation			
		Delay (s/veh)[a]	V/C[c]	LOS	Delay (s/veh)[a]	V/C[c]	LOS	Impact Determination[b]
1	Market St/ Montgomery St	**77.8**	**1.01**	**E**	**72.6**	**1.02**	**E**	SU
2	Mission St/ New Montgomery St	**> 80**	**1.13**	**F**	**> 80**	**1.14**	**F**	SU
3	Howard St/ New Montgomery St	**77.2**	**0.95**	**E**	**42.7**	**0.94**	D	LTS
4	Howard St/ Hawthorne St	**61.9**	**1.10**	**E**	**12.4**	**0.9**	B	LTS
5	Folsom St/ Hawthorne St	**> 80**	**1.24**	**F**	**72.3**	**1.07**	**E**	LTS
6	Harrison St/ Hawthorne St	**71.0**	**1.24**	**E**	**71.0**	**1.24**	**E**	SU
10	King St/Third St	**>80**	**1.00**	**F**	**>80**	**1.00**	**F**	SU
16	Harrison St/ Second St	**> 80**	**2.00**	**F**	**> 80**	**2.00**	**F**	SU
17	Bryant St/ Second St	**> 80**	**1.53**	**F**	**> 80**	**1.53**	**F**	SU
28	Harrison St/ First St	**> 80**	**1.60**	**F**	**> 80**	**1.55**	**F**	SU
29	Fifth St/Bryant St/ I-80 EB On-Ramp	**> 80**	**1.37**	**F**	**> 80**	**1.37**	**F**	SU

Notes:
Bold indicates an unacceptable intersection level of service condition (LOS E or F).
a. Exact values are not reported because the methodology breaks down above 80 seconds.
b. Impact Determination (after mitigation) = Less Than Significant (LTS) and Significant and Unavoidable (SU).
c. Volume-to-Capacity (V/C) ratios are only presented for intersections that operate at unacceptable LOS conditions (LOS E or F), per City standards.
Source: CHS Consulting Group, 2014.

The following list of intersections represents those locations where no feasible mitigation measures have been identified for the intersection under Existing plus Project conditions due to physical and operational limitations discussed in the beginning of this section. Therefore, project impacts to these eight intersections would be *significant and unavoidable*.

- Market Street / Montgomery Street (#1)
- Mission Street / New Montgomery Street (#2)
- Harrison Street / Hawthorne Street (#6)
- King Street/ Third St (#10)
- Harrison Street / Second Street (#16)
- Bryant Street / Second Street (#17)
- Harrison Street / First Street (#28)
- Bryant Street/ I-80 on-ramp (#29)

Mitigation Measures - Cumulative plus Project Conditions

The proposed project would result in a significant cumulative traffic impact at 14 of the 29 intersections, as shown in **Table 18**, due to the project's cumulatively considerable contribution to intersection movements that operate unsatisfactorily.

Mitigation measures at the project level were assumed for the cumulative analysis. No additional mitigation measures were identified under cumulative conditions. The impacts would remain significant and unavoidable for the 14 intersections and no additional mitigation measures have been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project.

Table 18 – Cumulative Conditions: Impacts and Mitigation Measures

#	Study Intersection	Overall Intersection Summary and Mitigation						
		Cumulative			Cumulative w/ Mitigation			
		Delay (s/veh)[a]	V/C[c]	LOS	Delay (s/veh)[a]	V/C[c]	LOS	Impact Determination[b]
1	Market St/ Montgomery St	**> 80**	**1.13**	**F**	**> 80**	**1.13**	**F**	SU
2	Mission St/ New Montgomery St	**> 80**	**1.47**	**F**	**> 80**	**1.47**	**F**	SU
3	Howard St/ New Montgomery St	**55.9**	**1.05**	**E**	**55.9**	**1.05**	**E**	SU
4	Howard St/ Hawthorne St	42.7		D	42.7		D	SU[d]
6	Harrison St/ Hawthorne St	**> 80**	**1.38**	**F**	**> 80**	**1.38**	**F**	SU
7	Third St/Bryant St	**>80**	**2.91**	**F**	**>80**	**2.91**	**F**	SU
8	Brannan St/ Third St	**> 80**	**1.51**	**F**	**> 80**	**1.41**	**F**	SU
9	Townsend St/ Third St	**> 80**	**2.40**	**F**	**> 80**	**2.40**	**F**	SU
10	King St/Third St	**>80**	**1.39**	**F**	**>80**	**1.39**	**F**	SU
16	Harrison St/ Second St	**> 80**	**3.39**	**F**	**> 80**	**3.39**	**F**	SU
17	Bryant St/ Second St	**> 80**	**2.56**	**F**	**> 80**	**2.56**	**F**	SU
20	Townsend St/ Second St	**> 80**	**1.34**	**F**	**> 80**	**1.34**	**F**	SU
28	Harrison St/ First St	**> 80**	**1.74**	**F**	**> 80**	**1.74**	**F**	SU
29	Fifth St/Bryant St/ I-80 EB On-Ramp	**> 80**	**3.32**	**F**	**> 80**	**3.32**	**F**	SU

Notes:
Bold indicates an unacceptable intersection level of service condition (LOS E or F).
a. Exact values are not reported because the methodology breaks down above 80 seconds.
b. Impact Determination (after mitigation) = Less Than Significant (LTS) and Significant and Unavoidable (SU).
c. Volume-to-Capacity (V/C) ratios are only presented for intersections that operate at unacceptable LOS conditions (LOS E or F), per City standards.
d. This intersection would operate at unacceptable LOS F under Cumulative + Project conditions if the Central SoMa Plan, and its associated reduction in traffic volumes on Howard Street, was not adopted. Due to the uncertainty of the adoption of the Central SoMa Plan, this impact at this intersection would remain *significant and unavoidable.*

Source: CHS Consulting Group, 2014.

The following list of intersections represents those locations where no feasible mitigation measures have been identified for the intersection under Cumulative plus Project conditions due to physical and operational limitations discussed before. Therefore, project impacts to these intersections would be *significant and unavoidable*.

- Market Street / Montgomery Street (#1)
- Mission Street / New Montgomery Street (#2)
- Howard Street / New Montgomery Street (#3)
- Howard Street / Hawthorne Street (#4)
- Harrison Street / Hawthorne Street (#6)
- Bryant Street / Third Street (#7)
- Brannan Street / Third Street t (#8)
- Townsend Street / Third Street (#9)
- King Street / Third Street (#10)
- Harrison Street / Second Street (#16)
- Bryant Street / Second Street (#17)
- Townsend Street / Second Street (#20)

- Harrison Street / First Street (#28)
- Fifth St/Bryant St/ I-80 EB On-Ramp (#29)

Project Variant Analysis

As described above, the proposed project would permit left-turns to Brannan Street from southbound Second Street under the Project Variant scenario. **Tables 19 and 20** below include a summary of adversely affected intersections with implementation of the proposed project variant and feasible mitigation measures to reduce impacts to a less-than-significant level. If mitigation measures are not feasible (or unmitigable), then the project would result in a significant and unavoidable impact.

Mitigation Measures - Existing Plus Project Variant Conditions

Similar to the Existing plus Project condition, the proposed project variant would result in a project-specific traffic impact at 11 of the 29 study intersections as shown in Table 19.

Table 19 – Existing plus Project Variant Conditions: Traffic Impacts and Mitigation Measures

		Overall Intersection Summary and Mitigation						
		Existing plus Project Variant			Existing plus Project Variant w/ Mitigation			
#	Study Intersection	Delay (s/veh)[a]	V/C[c]	LOS	Delay (s/veh)[a]	V/C[c]	LOS	Impact Determination[b]
1	Market St/ Montgomery St	**77.8**	**1.01**	**E**	**69.2**	**1.02**	**E**	SU
2	Mission St/ New Montgomery St	**> 80**	**1.13**	**F**	**> 80**	**1.14**	**F**	SU
3	Howard St/ New Montgomery St	**77.2**	**0.95**	**E**	**43.4**	**0.94**	D	LTS
4	Howard St/ Hawthorne St	**61.9**	**1.10**	**E**	**12.4**	**0.9**	B	LTS
5	Folsom St/ Hawthorne St	**> 80**	**1.24**	**F**	**69.5**	**1.07**	**E**	LTS
6	Harrison St/ Hawthorne St	**71.0**	**1.24**	**E**	**71.0**	**1.24**	**E**	SU
10	Third St/Bryant St	**>80**	**1.00**	**F**	**>80**	**1.00**	**F**	SU
16	Harrison St/ Second St	**> 80**	**2.00**	**F**	**> 80**	**2.00**	**F**	SU
17	Bryant St/ Second St	**> 80**	**1.53**	**F**	**> 80**	**1.53**	**F**	SU
28	Harrison St/ First St	**> 80**	**1.60**	**F**	**> 80**	**1.55**	**F**	SU
29	Fifth St/Bryant St/ I-80 EB On-Ramp	**> 80**	**1.60**	**F**	**> 80**	**1.60**	**F**	SU

Notes:
Bold indicates an unacceptable intersection level of service condition (LOS E or F).
a. Exact values are not reported because the methodology breaks down above 80 seconds.
b. Impact Determination (after mitigation) = Less Than Significant (LTS) and Significant and Unavoidable (SU).
c. Volume-to-Capacity (V/C) ratios are only presented for intersections that operate at unacceptable LOS conditions (LOS E or F), per City standards.
Source: CHS Consulting Group, 2014.

The mitigation measures proposed for the Existing plus Project Variant were the same as those proposed for Existing plus Project condition. Under the Existing plus Project Variant scenario, mitigation measures that reduce the impacts to a less-than-significant level were feasible at the following three intersections:

Mitigation Measure – M-TR-1: Increase Signal Cycle Length: The **Howard Street and New Montgomery Street** traffic signal operates on a 60-second cycle length under the Existing plus Project conditions. As a mitigation measure, increasing the signal cycle length to 90 seconds would improve the intersection operation from LOS E to LOS D,

thus reducing the impact of the project to a less-than-significant level. The impact at this intersection would be *less than significant with mitigation*.

Mitigation Measure – M-TR-2: Increase Signal Cycle Length: The **Howard Street and Hawthorne Street** traffic signal operates on a 60-second cycle length under the Existing plus Project conditions. As a mitigation measure, increasing the signal cycle length to 90 seconds would improve the intersection operation from LOS E to LOS D, thus reducing the impact of the project to a less-than-significant level. The impact at this intersection would be *less than significant with mitigation*.

Mitigation Measure – M-TR-3: Adding a left-turn lane: At the **Folsom Street and Hawthorne Street** intersection, there currently is a single southbound lane, serving both the southbound-through and southbound-left movements. As a mitigation measure, the addition of a southbound left-turn lane during the p.m. peak demand period would improve the intersection operation back to the existing LOS E condition. This mitigation measure would result in the removal of two metered parking spaces on the east side of Hawthorne Street north of Folsom Street during the p.m. peak demand period; during the remainder of the day, the parking spaces would remain available.

With implementation of the above mitigation measure, the intersection would remain at LOS E with the proposed project and the mitigation measure. In order to determine if the project would result in a considerable cumulative contribution to the unacceptable operation of the intersection, the critical eastbound-through movement was examined. The proposed project would result in the reduction of 26 vehicles (due to diversions off Second Street to Third Street) from the critical eastbound-through movement along Folsom Street. This would be a negative contribution to the critical movement, and would therefore not constitute a considerable contribution. The impact would be *less than significant with mitigation.*

The following list of intersections represents those locations where no feasible mitigation measures to reduce impacts to less-than-significant have been identified for the intersection under Existing plus Project Variant conditions due to physical and operational limitations discussed in the beginning of this section. Therefore, project impacts to these eight intersections would be *significant and unavoidable*.

- Market Street / Montgomery Street (#1)
- Mission Street / New Montgomery Street (#2)
- Harrison Street / Hawthorne Street (#6)
- King Street/ Third St (#10)
- Harrison Street / Second Street (#16)
- Bryant Street / Second Street (#17)
- Harrison Street / First Street (#28)
- Bryant Street/ I-80 on-ramp (#29)

Mitigation Measures - Cumulative plus Project Variant Conditions

The Project Variant would result in a significant cumulative traffic impact at 13 of the 29 intersections, as shown in Table 20, due to the Project Variant's cumulatively considerable contribution to intersection movements that operate unsatisfactorily. No feasible mitigation measures have been identified due to right-of-way constraints, as well as incompatibilities with the multi-modal character of the proposed project variant.

Table 20 – Cumulative and Cumulative plus Project Variant Conditions: Traffic Impacts and Mitigation Measures

#	Study Intersection	Overall Intersection Summary and Mitigation						
		Cumulative			Cumulative w/ Mitigation			
		Delay (s/veh)[a]	V/C[c]	LOS	Delay (s/veh)[a]	V/C[c]	LOS	Impact Determination[b]
1	Market St/ Montgomery St	**> 80**	**1.13**	**F**	**> 80**	**1.13**	**F**	SU
2	Mission St/ New Montgomery St	**> 80**	**1.47**	**F**	**> 80**	**1.47**	**F**	SU
3	Howard St/ New Montgomery St	**55.9**	**1.05**	**E**	**55.9**	**1.05**	**E**	SU
4	Howard St/ Hawthorne St	42.7		D	42.7		D	SU[d]
6	Harrison St/ Hawthorne St	**> 80**	**1.38**	**F**	**> 80**	**1.38**	**F**	SU
7	Third St/Bryant St	**>80**	**2.91**	**F**	**>80**	**2.91**	**F**	SU
8	Brannan St/ Third St	**> 80**	**1.51**	**F**	**> 80**	**1.41**	**F**	SU
9	Townsend St/ Third St	**> 80**	**2.40**	**F**	**> 80**	**2.40**	**F**	SU
10	King St/Third St	**>80**	**1.39**	**F**	**>80**	**1.39**	**F**	SU
16	Harrison St/ Second St	**> 80**	**3.39**	**F**	**> 80**	**3.39**	**F**	SU
17	Bryant St/ Second St	**> 80**	**2.56**	**F**	**> 80**	**2.56**	**F**	SU
28	Harrison St/ First St	**> 80**	**1.74**	**F**	**> 80**	**1.74**	**F**	SU
29	Fifth St/Bryant St/ I-80 EB On-Ramp	**> 80**	**3.32**	**F**	**> 80**	**3.32**	**F**	SU

Notes:
Bold indicates an unacceptable intersection level of service condition (LOS E or F).
a. Exact values are not reported because the methodology breaks down above 80 seconds.
b. Impact Determination (after mitigation) = Less Than Significant (LTS) and Significant and Unavoidable (SU).
c. Volume-to-Capacity (V/C) ratios are only presented for intersections that operate at unacceptable LOS conditions (LOS E or F), per City standards.
d. This intersection would operate at unacceptable LOS F under Cumulative + Project conditions if the Central SoMa Plan, and its associated reduction in traffic volumes on Howard Street, was not adopted. Due to the uncertainty of the adoption of the Central SoMa Plan, this impact at this intersection would remain *significant and unavoidable.*

Source: CHS Consulting Group, 2014.

The following list of intersections represents those locations where no feasible mitigation measures have been identified for the intersection under Cumulative plus Project Variant conditions due to physical and operational limitations discussed before. Therefore, Project Variant impacts to these intersections would be *significant and unavoidable*.

- Market Street / Montgomery Street (#1)
- Mission Street / New Montgomery Street (#2)
- Howard Street / New Montgomery Street (#3)
- Howard Street / Hawthorne Street (#4)
- Harrison Street / Hawthorne Street (#6)
- Bryant Street / Third Street (#7)
- Brannan Street / Third Street t (#8)
- Townsend Street / Third Street (#9)
- King Street / Third Street (#10)
- Harrison Street / Second Street (#16)
- Bryant Street / Second Street (#17)
- Harrison Street / First Street (#28)
- Fifth St/Bryant St/ I-80 EB On-Ramp (#29)

5.2 Transit

No mitigation measures would be required because the proposed project would not generate substantial numbers of additional transit riders on bus routes serving the area. In addition, the proposed project would not result in any substantial conflicts with transit operations, cause substantial delay to transit operations, or impede access to transit users.

The proposed project results in improved conditions for transit operations due to three reasons:

- Removal of transit re-entry delay given that the project would introduce transit boarding islands located between the travel lane and the cycletrack. With the introduction of transit boarding islands, other vehicles would have to wait for buses to load.
- Reduction in volume of traffic from some movements along Second Street due to diversions (as described in Chapter 3).
- Increase in cycle lengths and signal optimization as a result of the proposed project results in more green time for movements along Second Street thus reducing delay for these movements.

5.3 Pedestrians

No mitigation measures would be required because the proposed project would not adversely affect pedestrian conditions in the study area. Overall, the proposed project would introduce features that would improve pedestrian conditions such as widening the sidewalk.

5.4 Bicycle

No mitigation measures would be required because the proposed project would not adversely affect bicycle conditions in the study area. With the introduction of cycletracks, bicycle conditions would be improved.

5.5 Emergency Vehicle Access

No mitigation measures would be required, because the proposed project would not adversely affect emergency vehicle access to the project site.

5.6 Loading

Under the project condition, there would be a substantial reduction in the supply of on-street commercial loading zones (net loss of 21 loading zones) along Second Street. There is high demand for these commercial loading zones from the office, restaurant and retail establishments along Second Street.

SFMTA has sought to create new on-street commercial loading spaces in the vicinity of the project in order to mitigate the reduction in supply. However, all available curbside space in the project vicinity that could be repurposed for commercial loading zones have already been established; there is no opportunity to create additional commercial loading zones.

Therefore, the project would result in a commercial loading demand during the peak hour of loading activities that could not be accommodated within on-street commercial loading zones, and would create potentially hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians. The project's impact on commercial loading would be ***significant and unavoidable.***

5.7 Parking

No mitigation measures would be required because the proposed project would not adversely affect parking conditions.

5.8 Construction

The proposed project would not result in significant transportation-related construction impacts.

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APPENDIX C

Air Quality Technical Report (without Appendices)

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SECOND STREET IMPROVEMENT PROJECT FINAL AIR QUALITY TECHNICAL REPORT

Case No. 2007.0347E

Prepared for:

City and County of San Francisco
San Francisco Planning Department

July 2014

Prepared by:

URS Corporation Americas
Post Montgomery Center
One Montgomery Street, Suite 900
San Francisco, CA 94104

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Table of Contents

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EXECUTIVE SUMMARY

This Air Quality Technical Report (AQTR) identifies potential criteria air pollutant emission increases and potential health risks to sensitive receptors from the construction of the Second Street Improvement Project. The project expands on the bicycle improvements[1] analyzed in the 2009 San Francisco Bicycle Plan Final Environmental Impact Report (EIR).[2] It includes the following components along Second Street, generally between Market and King streets: widening sidewalks; installing one-way cycle track bicycle facilities in each direction, street trees, transit boarding islands at most transit stops, planted medians, and site furnishings (trash receptacles, bike racks, benches, and pedestrian lighting); reducing lanes from four to two; restricting left turns at most intersections; grinding and repaving the asphalt curb-to curb; installing Americans with Disabilities Act (ADA)-compliant curb ramps; undergrounding utilities; and rehabilitating and replacing sewers.

This analysis uses tools and methods established by the Bay Area Air Quality Management District (BAAQMD), as part of its California Environmental Quality Act (CEQA) air quality guidelines,[3] as well as the guidelines and methods established by the City of San Francisco Planning Department.

The analysis is divided into two discussions: criteria air pollutants (Chapter 3) and community risk and hazards (Chapter 4). Because operations-related emissions are not anticipated to change substantially as a result of the proposed project, operations-related emissions are not quantified in this report.

SUMMARY OF FINDINGS

- Construction emissions of the criteria pollutants were analyzed using the CalEEMod model. The model results are summarized in Table 3-3.
- Construction equipment would emit certain pollutants that could affect the health of those in the area. Measure AQ-1 (Construction Emissions Minimization) recommends using cleaner or controlled emission construction equipment to reduce community risks and hazards.

[1] The current proposal builds on Project 2-1 Modified Option 1 in the 2009 San Francisco Bicycle Plan.

[2] San Francisco Planning Department, 2009. *San Francisco Bicycle Plan Project EIR.* A copy of this document and supporting documentation may be reviewed at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103.

[3] BAAQMD, 2010a. Updated May 2010. CEQA: Air Quality Guidelines. Available online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx?la=en.

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Chapter 1
PROJECT UNDERSTANDING

This AQTR evaluates the potential air quality impacts of the San Francisco Department of Public Works' (DPW's) Second Street Improvement Project. Potential air quality impacts from implementing the proposed project are analyzed using the tools and methods established by the BAAQMD,[4] as well as the guidelines and methods established by the City of San Francisco Planning Department.

The overall purpose of the Second Street Improvement Project is to implement a pedestrian- and bicycle-friendly street along Second Street, from Market to King streets. The current proposal builds on Project 2-1 Modified Option 1 in the 2009 San Francisco Bicycle Plan. Modified Option 1 was analyzed in the Bicycle Plan Update's final EIR.[5] In addition, a proposed sewer project on Second Street will be combined with the streetscape scope. The San Francisco Department of Public Works Hydraulics Division has determined the extent of sewer rehabilitation or replacement. It provided plans, dated October 2013, showing main sewer repair and replacement locations. Also, the project may underground utilities along the east side of Second Street, between Stillman and Townsend streets (approximately 0.27 mile).

Project improvements would be confined within the right-of-way along Second Street, as shown in Figure 1-1. The proposed project consists of the following components along Second Street, between Market and King streets: widening sidewalks; installing one-way cycle track bicycle facilities in each direction, street trees, transit boarding islands at most transit stops, planted medians, and site furnishings (trash receptacles, bike racks, benches, and pedestrian lighting); reducing the roadway from four travel lanes to two; restricting left turns at most intersections; grinding and repaving the asphalt curb-to-curb; installing ADA-compliant curb ramps; undergrounding utilities; and rehabilitating and replacing sewer infrastructure, as determined necessary. Figures 1-2A and 1-2B show the proposed streetscape improvements.

A variant to the project is proposed at the Second Street/Brannan Street intersection. Southbound left-turning movements from Second Street would be permitted, unlike the proposed project. Additionally, signal phasing would not be used at the crosswalk and cycle track on the east side of the intersection to separate left- or right-turning vehicles.

Because the overall construction duration and equipment would be the same for the project variant as for the proposed project, construction of the project variant would result in the same emissions as the proposed project. Therefore, the analysis provided below is applicable to both the proposed project and the project variant.

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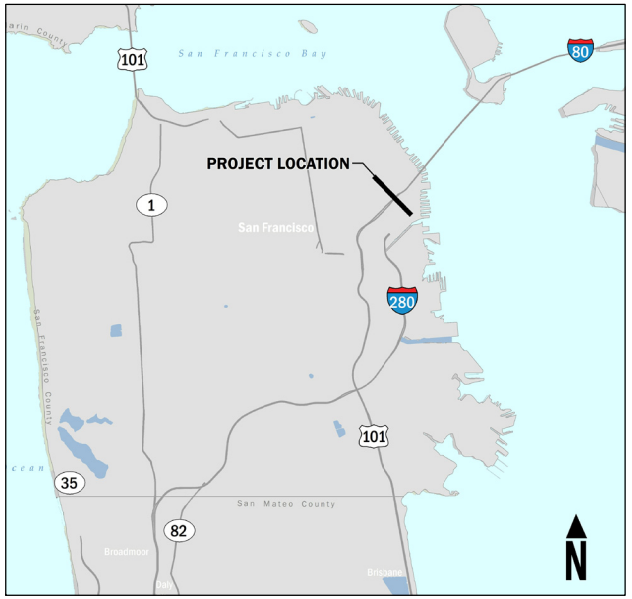
[4] BAAQMD, 2010a. Updated May 2010. *CEQA: Air Quality Guidelines.* Available online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx?la=en. Accessed April 30, 2014

[5] San Francisco Planning Department, 2009. *San Francisco Bicycle Plan Project EIR.* A copy of this document and supporting documentation may be reviewed at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103.



PROJECT LOCATION

Air Quality Technical Report
Second Street Improvement Project
San Francisco, California

FIGURE 1-1

agnes_katanics Jun 02, 2014 – 4:48pm T:\SFDPW 2nd Street Improvement\Figures_Air\FIGURE 1-1.dwg

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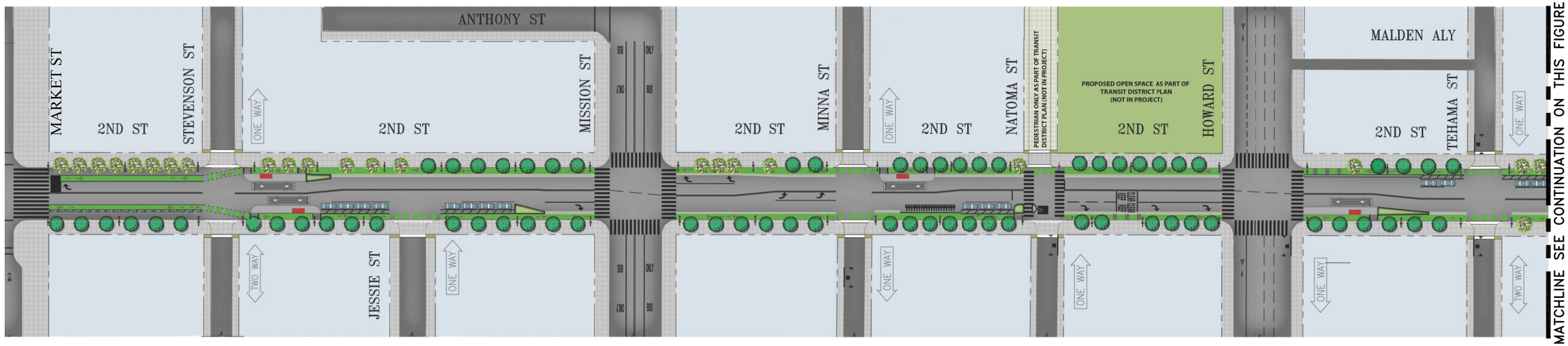
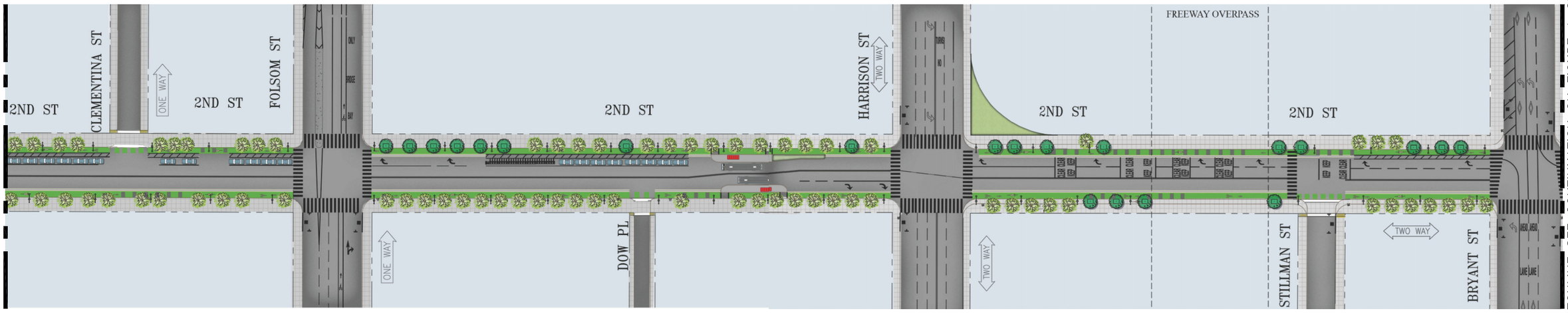




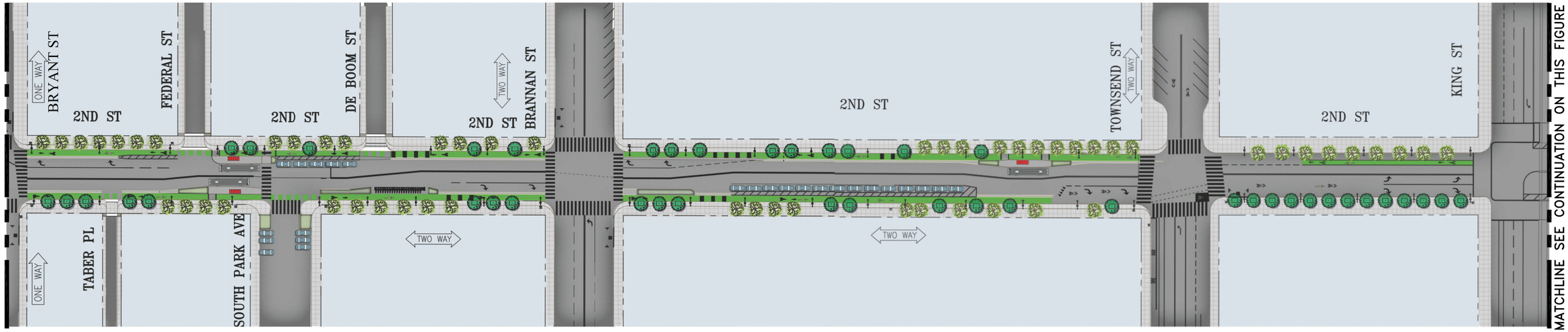
Legend

- Existing Tree
- Proposed New Tree
- Cycletrack
- Planting Area
- Raised Crosswalk
- Pedestrian Lighting
- Bus Shelter

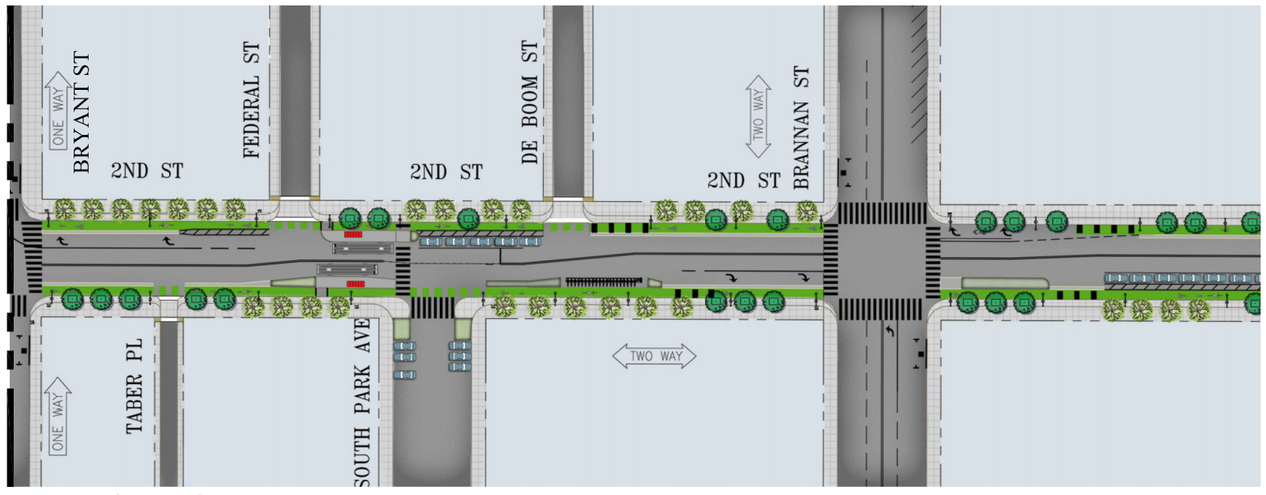
PROPOSED PROJECT

Air Quality Technical Report
Second Street Improvement Project
San Francisco, California

FIGURE 1-2A



VARIANT



Legend

- Existing Tree
- Proposed New Tree
- Cycletrack
- Planting Area
- Raised Crosswalk
- Pedestrian Lighting
- Bus Shelter

PROPOSED PROJECT

Air Quality Technical Report
Second Street Improvement Project
San Francisco, California

FIGURE 1-2B

1.1 PROPOSED PROJECT IMPROVEMENTS

The travel lanes along the Second Street corridor would generally be reduced from two lanes in each direction to one lane in each direction in order to install bicycle facilities, consistent with the Bicycle Plan. The one exception occurs along Second Street, between Harrison and Bryant streets. At the intersection of Second and Harrison Streets, the lane configuration on Second Street would be changed in the northbound direction from three travel lanes—one through-lane, one right-turn through-lane, and one right-turn-only lane—to two northbound travel lanes, consisting of one right-turn-only lane and a through-lane. The lane configuration on Second Street between Harrison and Bryant streets would be changed in the southbound direction from two lanes to one.

The proposed project involves the installation of a one-way cycle track in each direction along Second Street, between Stevenson and Townsend streets, along with right-turn pockets at a number of Second Street intersections. The proposed cycle tracks are a type of Class I bicycle facility,[6] which consists of asphalt paving raised 2 inches from the level of either the parking lane or vehicle travel lane. The elevation changes within a painted buffer strip, which separates the cycle track from the parking or vehicle lane. The painted buffer strip is 4 feet wide where the cycle track is next to parking lanes, and it is 2 feet wide where the cycle track is next to travel lanes. The raised separation is continuous, with the cycle track ramping down to be level with the travel lane at major intersections. The width of the cycle tracks would vary along the corridor between 6 and 7 feet.

Between Market and Stevenson streets, a Class II bicycle lane would be added in both the northbound and southbound directions. Additionally, between Townsend and King streets, a Class II bicycle lane would be added in the northbound direction, and a Class III bicycle lane would be added in the southbound direction.

Signal timing would be modified to include combined bicycle, pedestrian, and through-traffic phases at all intersections along Second Street, with a separate right-turn phase at right-turn pockets. A new signal would be installed at the intersection of Second and South Park streets to facilitate pedestrian crossing and traffic movements from eastbound South Park Street.

The Muni bus lines 10 Townsend and 12 Folsom-Pacific[7] operate along Second Street. The proposed project would reduce the number of transit stops along the Second Street corridor from 13 to 10. In addition, bus-boarding islands, which would be 8 feet wide and would range from 50 to 75 feet long, would replace curbside bus zones and allow bus operators to stop in the travel lane. The bus-boarding islands would be installed at all transit stops along Second Street, except the far-side outbound stop on the southwest corner of Townsend Street at Second Street; this would have a curbside bus zone.

Pedestrian improvements would be implemented along the Second Street corridor. These improvements consist of widening the sidewalks between Harrison and Townsend streets from 10 feet to 15 feet and

[6] The California Streets and Highway Code Section 890.4 defines a bikeway as a facility that is provided primarily for bicycle travel. Bikeways are classified as follows: Class I provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians, with cross-flow by motorists minimized; Class II provides a striped lane for one-way bike travel on a street or highway; and Class III provides for shared use with pedestrian or motor vehicle traffic.

[7] With approval and implementation of the SFMTA's Transit Effectiveness Project (TEP) in March 2014, the 10 Townsend is renamed the 10 Sansome and the 12 Folsom-Pacific is eliminated. The route 12 service is replaced with service from a new route called the 11 Downtown Connector. For more information regarding the SFMTA's TEP, please see the SFMTA website at http://www.sfmta.com/projects-planning/projects/tep-transit-effectiveness-project. Accessed June 5, 2014.

installing pedestrian bulbs at Second and South Park streets, raised crosswalks at all alleys, and pedestrian-scale lighting.

Streetscape improvements are also part of the proposed project and consist of planted medians (typically aligned at the ends of bus-boarding islands) and new trash receptacles, benches, and bicycle racks installed in the sidewalk.

The proposed project includes the inspection of the aging sewer infrastructure and replacement and/or upsizing as needed to meet current standards. The sewer runs below Second Street, typically in the center of the right-of-way. The oldest sewer was constructed in 1880, and the most recent was constructed in 1972. The excavation for the rehabilitation or replacement of the sewer pipes would be through open trenching, up to 21 feet below street level. In addition to the main sewer rehabilitation or replacement, all side sewers within the limits of main sewer work would be inspected and replaced, as needed. The side sewers would most likely be replaced at their existing locations and depth. Sewer manholes would also be replaced as part of sewer replacement work. The typical manhole excavation footprint is 8 feet long by 8 feet wide by the depth of the existing sewer. Most of the main sewer excavation work would occur at the location of existing sewer infrastructure and would be within previously disturbed soil. The extent of sewer improvements is approximately 1,050 lineal feet of main sewer work, with an estimate of 1,000 lineal feet of side sewer and culvert work.

Utilities are generally underground on Second Street from Market Street to Stillman Street and from Townsend Street to King Street. However, between Stillman and Townsend streets, electrical and telecommunications utilities are overhead. Utility poles are in the east sidewalk along Second Street, and overhead wires extend from these poles to service the west side properties. The proposed project would place these utilities underground.

The proposed project includes grinding and repaving the entire roadway surface of Second Street, from Market to King streets, with asphalt, followed by roadway restriping.

1.2 CONSTRUCTION ACTIVITIES AND SCHEDULE

Construction is projected to start in early to mid-2016 and to continue for approximately 1 year (240 working days). Table 1-1 is a summary of construction activities and the anticipated duration of each activity. The sewer rehabilitation is anticipated to take a total of approximately 7 months, utility undergrounding is anticipated to take a total of approximately 2 months, and streetscape improvements are anticipated to take a total of approximately 1 year (i.e., 240 working days). The sewer, utility, and streetscape improvements would be constructed in overlapping phases. The sewer and utility construction on each block would be completed prior to the street improvements along the same block. DPW anticipates that construction activities would occur sequentially and would be focused on one block at a time along Second Street, with up to 6 weeks of construction activity per block.[8]

[8] The project would comply with Regulations for Excavating and Restoring Streets in San Francisco, Department of Public Works, City and County of San Francisco, Order No. 176,707. Section 9.1, Part B: An excavation site may not exceed 1,200 linear feet at any time. The intent of this requirement is to limit construction to no more than two adjacent blocks at a time. This footage does not include service trenches. The 1,200-foot limit does include: (1) partially or completely backfilled but unpaved trench; (2) partially or completely excavated trench; (3) areas where pavement has been removed.

Table 1-1
Project Construction Activities

Construction Activity	Expected Duration	
	Working Days	Months
Sewer rehabilitation and replacement	150	7
Utilities relocation		
Underground conduit installation	30	1.5
Wire pulling and setting gear	12	0.5
Streetscape improvements	240	12

Source: DPW, 2014.

Construction of the proposed project would be required to comply with the San Francisco Clean Construction Ordinance. It requires construction performed under a public works contract (1) to use only off-road equipment and engines fueled by biodiesel fuel grade B20 or higher; and (2) to use only high use equipment that either meets or exceeds Tier 2 or higher standard engines or that are equipped with the most effective, verified diesel engine control strategy.[9]

1.3 ANTICIPATED CONSTRUCTION-RELATED SOURCES

The project will emit criteria air pollutants and air toxics (including diesel particulate matter [DPM]) from the use of off-road construction equipment. Fugitive dust emissions result from excavation and trenching. On-road activity from worker vehicle and hauling truck trips would also generate criteria pollutant emissions. Attachment A1 contains a detailed list of construction equipment, horsepower, and operating hours for each piece of equipment provided by DPW.

A quantitative analysis of the construction-related emissions is provided in Chapter 3, below.

1.4 ANTICIPATED OPERATIONS-RELATED SOURCES

1.4.1 Criteria Air Pollutants

The proposed project would not generate any new vehicle trips in the project area. However, the it would result in physical roadway changes along the entire extent of Second Street, where the reduction in roadway capacity, prohibition of left-turn movements at most intersections, and reconfiguration of lane geometries would alter travel patterns in and around Second Street. CHS Consulting Group prepared the Transportation Impact Study (TIS)[10] to evaluate the transportation impacts that may result from these roadway changes. CHS estimated that approximately 950 trips would be diverted to alternate corridors, such as First and Third streets, during the PM peak period. The study included a level of service (LOS) analysis of 29 study intersections along the corridor and neighboring roadways. These represent intersections most likely to be adversely affected by the proposed project. The results of the intersection LOS evaluation indicate that implementing the proposed project would increase PM peak-hour vehicle

[9] San Francisco Administrative Code, Section 6.25. Biodiesel is defined as a fuel comprised or mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100 or "neat biodiesel," and meeting the requirements of ASTM D 6751. B20 is a mixture of 20 percent biodiesel and 80 percent petroleum.

[10] CHS Consulting Group, 2014. *Second Street Improvement Project – Final Transportation Impact Study*. July.

delay at some intersections and would decrease PM peak-hour vehicle delay at others. The project variant would result in similar increases and decreases in PM peak-hour vehicle delay.

As stated, the proposed project or its variant would not generate additional vehicles trips, but reducing roadway capacity may increase delay at some locations; therefore, emissions of criteria pollutants or ozone precursors would increase in particular locations. These localized, isolated increases are likely to be minor because drivers would be expected to modify their travel routes or in some cases change their travel modes. Any changes in travel mode to buses, bicycles, or walking would reduce vehicle-generated emissions that would otherwise occur.

Furthermore, changes in criteria air pollutant and ozone precursor emissions are evaluated on an average daily and maximum annual basis. The proposed project or its variant would not generate new vehicle trips, would divert trips to alternate corridors, and would increase the delay at some intersections while decreasing delay at others. Because of this, the air quality impact from vehicle delay at intersections would be relatively minor.

1.4.2 Health Risk

As discussed above, the proposed project would not generate new vehicle trips but would likely divert vehicles from Second Street to alternate corridors. As indicated in the TIS, the proposed project would increase vehicle delay at some intersections and would decrease it at others. However, the air quality impact from private vehicles would be relatively minor for the reasons discussed previously.

Therefore, the project would not substantially change the operational emissions in the vicinity of the proposed project and operational impacts are not further assessed in this AQTR.

Chapter 2
AIR QUALITY SETTING

2.1 REGIONAL SETTING AND CLIMATE AND METEOROLOGY

The project site is in the City and County of San Francisco within the San Francisco Bay Area Air Basin (SFBAAB). The basin is approximately 5,600 square miles in area and consists of nine counties: all of the counties of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa and the southwestern portion of Solano County and the southern portion of Sonoma County.

The project area is under the jurisdiction of the BAAQMD. This agency oversees the region's efforts to achieve and maintain state and federal ambient air quality standards through development and implementation of air quality plans. The BAAQMD maintains the regional emission inventory of air pollution sources, including stationary, mobile, and area-wide sources. It is also responsible for implementing programs and issuing permits to construct and operate stationary sources of pollutants.

The air basin is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, all of which distort normal wind flow patterns. The Coast Range splits wind flows, resulting in a western coast gap (Golden Gate) and an eastern coast gap (Carquinez Strait). This split allows air to flow in and out of the SFBAAB and the Central Valley.

The San Francisco Bay Area has a Mediterranean climate, characterized by mild, dry summers and mild, moderately wet winters. Approximately 90 percent of the annual total rainfall occurs from November to April. The climate is also characterized by moderate daytime onshore breezes and moderate humidity. The area's climate is dominated by a strong, semipermanent, 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 the City, carrying emissions east over San Francisco Bay.

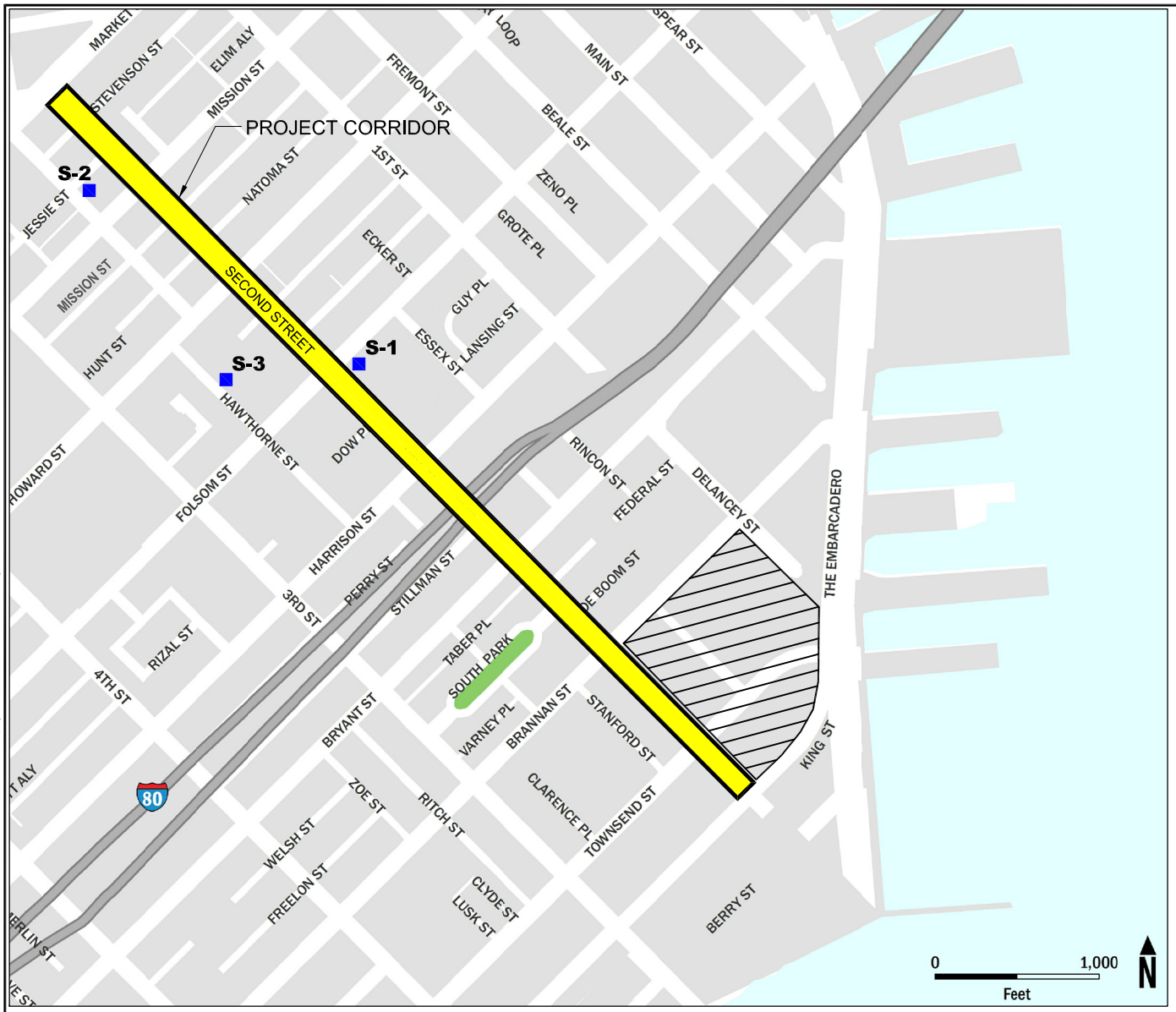
2.2 EXISTING SENSITIVE RECEPTORS

Sensitive receptors are defined as children, adults, and seniors occupying or residing in the following:

- Residences, including apartments, houses, and condominiums
- Schools, colleges, and universities
- Day care facilities
- Hospitals
- Senior-care facilities[11]

[11] BAAQMD, 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. Version 3.0. May 2012. Available online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en

Figure 2-1 shows the nearest sensitive receptors to the Second Street corridor. Bright Horizon Day Care, at 303 Second Street, approximately 140 feet east of the project site, is the closest sensitive receptor. Two other day care facilities near the project site, California Child Care Resources and Referral Network at 111 New Montgomery Street and Healthy Environmental Child Development Center at 75 New Hawthorne Street, are approximately 250 feet west and 400 feet west of the project site. The closest residential receptors are located in the multifamily residences along Second Street, between King and Brannan streets.



S-1 Bright Horizon Day Care

S-2 California Child Care Resources & Referral Network

S-3 Healthy Environment Child Development Center

Residences

SENSITIVE RECEPTORS CLOSEST TO THE PROJECT SITE

Air Quality Technical Report
Second Street Improvement Project
San Francisco, California

FIGURE 2-1

agnes_katanics Jun 02, 2014 – 4:54pm T:\SFDPW 2nd Street Improvement\Figures_Air\FIGURE 2-1.dwg

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Chapter 3
CRITERIA AIR POLLUTANTS

3.1 EXISTING AMBIENT AIR QUALITY

As required by the 1970 federal Clean Air Act (CAA), the US EPA established primary and secondary National Ambient Air Quality Standards (NAAQS). The CAA also required each state to prepare an air quality control plan, referred to as a State Implementation Plan (SIP). The CAA Amendments of 1990 require states with non-attainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIPs are periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins, as reported by their jurisdictional agencies. The US EPA has responsibility to review all state SIPs for conformity with the mandates of the CAA and to determine whether implementation will achieve air quality goals.

Table 3-1 lists the state and federal ambient air quality standards and the current attainment status for each criteria air pollutant.

The BAAQMD operates 28 air quality monitoring stations throughout the SFBAAB. These stations provide information on ambient concentrations of criteria air pollutants within the basin. The most representative air monitoring station nearest to the project site is the Arkansas Street station. Its address is 10 Arkansas Street, which is approximately 1.2 miles southwest of the project's southern limit. The criteria pollutants monitored at this station are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and toxics.

Table 3-2 presents ambient air quality data, which was recorded at the Arkansas Street station for the past 5 years. As the table shows, the recorded data show exceedances of the national standards for 24-hour $PM_{2.5}$ and 1-hour NO_2 on one or more occasions from 2009 through 2013. No exceedances of either the state or national standards were recorded for other criteria pollutants.

Table 3-1
State and National Ambient Air Quality Standards and Attainment Status for the Bay Area Air Basin

Pollutant	Averaging Period	California		Federal	
		Standards	Attainment Status	Standards	Attainment Status
O_3	1-hour	0.09 ppm (180 µg/m^3)	Non-attainment	—	—
	8-hour	0.070 ppm (137 µg/m^3)	Non-attainment	0.075 ppm (147 µg/m^3)	Non-attainment
PM_{10} (particulate matter less than or equal to 10 microns in diameter)	24-hour	50 µg/m^3	Non-attainment	150 µg/m^3	Attainment/ Maintenance
	AAM	20 µg/m^3	Non-attainment	—	Unclassified

Table 3-1
State and National Ambient Air Quality Standards and Attainment Status for the Bay Area Air Basin

Pollutant	Averaging Period	California		Federal	
		Standards	Attainment Status	Standards	Attainment Status
$PM_{2.5}$ (particulate matter less than 2.5 microns in diameter)	24-hour	—	—	35 µg/m^3	Non-attainment
	AAM	12 µg/m^3	Non-attainment	12.0 µg/m^3	Attainment
CO	8-hour	9.0 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Unclassifiable/ Attainment
	1-hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Attainment/ Maintenance
NO_2	AAM	0.030 ppm (57 µg/m^3)	Attainment	53 ppb (100 µg/m^3)	Attainment
	1-hour	0.18 ppm (338 µg/m^3)	Attainment	100 ppb (188 µg/m^3)	Unclassified
Sulfur dioxide (SO_2)	24-hour	0.04 ppm (105 µg/m^3)	Attainment		—
	3-hour*	—	—	—	—
	1-hour	0.25 ppm (655 µg/m^3)	Attainment	75 ppb (196 µg/m^3)	Attainment
Lead (Pb)	30-day average	1.5 µg/m^3	Attainment	—	—
	Calendar quarter	—	—	1.5 µg/m^3	Attainment
	Rolling 3-month average	—	—	0.15 µg/m^3	—
Visibility reducing particles	8-hour	Extinction coefficient of 0.23 per kilometer	Attainment	No federal standards	
Sulfates	24-hour	25 µg/m^3	Attainment		
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m^3)	Unclassified		
Vinyl chloride	24-hour	0.01 ppm (26 µg/m^3)	Unclassified		

Notes:

— = not applicable

AAM—annual arithmetic mean

µg/m^3—micrograms per cubic meter

ppm—parts per million

ppb—parts per billion (= 1,000 ppm)

*The 3-hour SO_2 standard is a secondary NAAQS of 0.5 ppm (not listed in this table). Secondary standards are established to protect the environment and are not health based.

Sources:

California Air Resources Board (CARB), 2014. Ambient Air Quality Standards: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf

CARB, 2013. Area designation maps: http://www.arb.ca.gov/desig/adm/adm.htm

Table 3-2
Criteria Air Pollutants Data Summary
(Arkansas Street Air Monitoring Station)

Pollutant	Standard	2009	2010	2011	2012	2013
O_3	(1-hour)					
	Maximum concentration (ppm)	0.072	0.079	0.070	0.069	0.069
	days > CAAQS (0.09 ppm)	0	0	0	0	0
	(8-hour)					
	4th maximum concentration (ppm)	0.056	0.051	0.054	0.048	0.059
	Days > NAAQS (0.075 ppm)	0	0	0	0	0
	Days > CAAQS (0.07 ppm)	0	0	0	0	0
PM_{10}	(24-Hour)					
	Maximum Concentration ($\mu g/m^3$)	36	40	46	51	44
	Days > CAAQS (50 $\mu g/m^3$)	0	0	0	6	0
	Days > NAAQS (150 $\mu g/m^3$)	0	0	0	0	0
	(Annual Average)					
	National annual average (50 $\mu g/m^3$)[a]	18	19	19	17	n/a
	State annual average (20 $\mu g/m^3$)[a]	19	n/a	19.5	17.5	n/a
$PM_{2.5}$	(24-Hour)					
	Maximum concentration ($\mu g/m^3$)	**35.5**	**45.3**	**47.5**	**38.7**	**48.5**
	Days > NAAQS (35 $\mu g/m^3$)	**1**	**3**	**2**	**1**	**2**
	National average 98th percentile ($\mu g/m^3$)[b]	28.7	24.4	26.4	21.5	27.8
	(Annual)					
	AAM (12.0 $\mu g/m^3$)	9.6	10.5	9.5	8.2	10.1
NO_2	(1-hour)					
	Maximum concentration (ppm)	0.059	0.093	0.093	**0.124**	0.073
	Days > NAAQS (0.10 ppm)	0	0	0	**1**[c]	0
	Days > CAAQS (0.18 ppm)	0	0	0	0	0
	(Annual)					
	CAAS (0.030 ppm)	0.015	0.013	0.014	0.012	0.013

Notes:

CAAQS—California ambient air quality standard
NAAQS—National ambient air quality standards

Ambient data for CO, SO_2, and airborne lead are not included in this table since the basin is currently in compliance with state and federal standards for these pollutants.

[a] State statistics are based on California-approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. Therefore, state and national statistics may be based on different samplers.

[b] Attainment condition for $PM_{2.5}$ is that the standard (35 $\mu g/m^3$) must not be exceeded by the three-year average of the 98th percentile of 24-hour concentrations at each monitoring station.

[c] Attainment condition for national 1-hour NO_2 standard is that the 98th percentile, averaged over 3 years, is not to be exceeded.

Source:

CARB, 2014. Air Quality Statistics. Available online at: http://www.arb.ca.gov/adam/topfour/topfourdisplay.php.

3.2 ANALYSIS METHODOLOGY FOR CRITERIA AIR POLLUTANTS

Emissions from project construction were estimated using California Emissions Estimator Model (CalEEMod), 2013, version 2013.2.2, which is the BAAQMD and City approved model. CalEEMod is a model that quantifies criteria pollutant and GHG emissions from construction from a variety of land use projects.

The construction module of CalEEMod was used to estimate the emissions from project construction. The model quantifies direct emissions from construction (including vehicle and off-road equipment use).

DPW provided project-specific construction equipment lists, phase durations, and hauling activities. For input data that was not provided, such as equipment load factor and worker trip activity, CalEEMod default values were used. This analysis does not account for project compliance with the Clean Construction Ordinance and therefore provides a very conservative estimate of emissions. Compliance with the Clean Construction Ordinance, described under Construction Activities and Schedule above, would further reduce the estimated emissions, described below.

3.3 RESULTS OF CRITERIA AIR POLLUTANTS ANALYSIS

Construction of the proposed project would start in early-to-mid 2016 and is scheduled to be completed in 240 working days (one calendar year). Project construction consists of three main activities, as shown in Table 1-1.

The model results for construction emissions are summarized in Table 3-3. The daily emissions were calculated by dividing the overall construction emissions by 240 days. Details of the assumptions and model data used in the analysis can be found in Attachment A2.

Table 3-3
Project Construction Emissions of Criteria Pollutants

Construction Emission	ROG	NO_x	PM_{10} (exhaust)	$PM_{2.5}$ (exhaust)
Total emissions (tons/ construction duration)	0.44	2.76	0.13	0.12
Average daily emissions (pounds/day)	3.69	22.47	1.10	1.01

Table 3-3 shows project construction emissions of criteria pollutants. Compliance with the Clean Construction Ordinance, described under Construction Activities and Schedule above, would further reduce the estimated emissions, below those shown in the Table 3-3. Additionally, the proposed project would be required to comply with the City's Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008). This ordinance requires a number of fugitive dust control measures to ensure that construction projects do not result in visible dust. Implementation of these measures is an effective strategy for controlling construction-related fugitive dust.

Chapter 4
AIR TOXICS AND COMMUNITY RISK

4.1 TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs) are air pollutants that may lead to serious illness or an increase in deaths, even when present in relatively low concentrations. The potential human health effects of TACs are 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.

There are no ambient air quality standards for TACs; the BAAQMD regulates them 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. This exposure is considered, together with information on the toxic potency of the substances, to provide quantitative estimates of health risks.

In addition to monitoring criteria air pollutants, both the BAAQMD and the CARB 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 a community's health risk. The BAAQMD operates an ambient TAC monitoring station at its Arkansas Street station, which is the only monitoring site for air toxics in the City.

Table 4-1 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. Therefore, the estimated average lifetime cancer risk from exposure to TAC concentrations measured at the Arkansas Street station do not appear to be any greater than for the Bay Area.

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 near freeways or busy roadways have poorer health, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children. Air pollution monitoring done in conjunction with epidemiological studies suggests that roadway-related health effects

Table 4-1
Carcinogenic Toxic Air Contaminants—Annual Average Ambient Concentration and Estimated Cancer Risk—from Arkansas Street Station

Substance	Concentration	Cancer Risk per Million [a]
Gaseous TAC	(ppb)	
Acetaldehyde	0.5	2
Benzene	0.21	19
1,3-butadiene	0.034	13
Para-dichlorobenzene	0.15	10
Carbon tetrachloride	0.082	22
Ethylene dibromide	0.006	3
Formaldehyde	1.01	7
Perchloroethylene	0.01	0.4
Methlylene chloride	0.087	0.3
Methyl tertiary-butyl ether (MTBE)	0.26	0.3
Chloroform	0.018	0.5
Trichloroethylene	0.011	0.1
Particulate TAC	(ng/m^3)	
Chromium (hexavalent)	0.065	10

Notes:

All values are from the BAAQMD Arkansas Street station reported for 2012, except for para-dichlorobenzene (2006), ethylene dibromide (1992), and MTBE (2003).

ng/m^3 = nanograms per cubic meter

[a] CARB estimated the cancer risks by applying published unit risk factors to the measured concentrations.

Source

CARB Ambient Air Toxics Summary, 2011. Available online at: http://www.arb.ca.gov/adam/toxics/sitesubstance.html. Accessed May 20, 2014.

vary with modeled exposure to particulate matter and NO_2.[12] In traffic-related studies, the additional non-cancer health risk attributable to roadway proximity is highest within 1,000 feet of high-traffic roadways and is even higher within 300 feet.[13]

Diesel Particulate Matter

The CARB identified DPM as a toxic air contaminant in 1998, primarily based on evidence demonstrating cancer effects in humans.[14] The exhaust from diesel engines contains hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources, such as trucks, buses, and

[12] San Francisco Department of Public Health, 2007. *Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review*, November 2007, pp. 6 and 8. Available online at: http://www.sfdph.org/dph/EH/Air/MitRoadway111907.pdf.

[13] CARB, 2005. *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.

[14] CARB, 1998. 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.

to a much lesser extent automobiles, are some of the primary sources of diesel emissions. Moreover, concentrations of DPM are higher near heavily traveled highways. In studies, the US EPA concluded that diesel exhaust ranks with other substances that pose the greatest relative risk.[15]

In 2000, the CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Subsequent CARB regulations apply to new trucks and to diesel fuel. The CARB 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. This represented a 36 percent drop between 1990 and 2000.[16] While the CARB has not provided more recent health risk estimates for the SFBAAB, the average statewide cancer risk from DPM was estimated to have declined from 540 in one million in 2000 to 450 in one million in 2010. This is an indication that the health risk from DPM continues to decline.

4.2 ANALYSIS METHODOLOGY FOR AIR TOXICS AND COMMUNITY RISK

Unlike criteria air pollutants, TACs do not have ambient air quality standards but are regulated by the BAAQMD using a risk-based approach. This is to determine which sources and pollutants to control as well as the degree of control. A health risk assessment estimates human health exposure to toxic substances. It is considered, together with information regarding the toxic potency of the substances, to provide quantitative estimates of health risks.[17]

To identify areas most adversely affected by sources of TACs, the City partnered with the BAAQMD to inventory and assess air pollution and exposures from mobile, stationary, and sources within the City. Areas with poor air quality, termed air pollutant exposure zones, were identified based on two health-protective criteria: excess cancer risk from the contribution of emissions from all modeled sources greater than 100 per one million population and/or cumulative $PM_{2.5}$ concentrations greater than 10 $\mu g/m^3$.

4.3 RESULTS FOR AIR TOXICS AND COMMUNITY RISK

Project construction would take approximately 1 year, during which activities would result in temporary and intermittent emissions of DPM and other TACs. As discussed above, the City and the BAAQMD have modeled and assessed air pollutant impacts from mobile, stationary, and area sources within the City. This assessment has identified air pollutant exposure zones. The project site is within an air pollutant exposure zone, meaning that existing cancer risk exceeds 100 per one million or ambient $PM_{2.5}$ concentrations exceed 10 $\mu g/m^3$ or both. As shown in Figure 2-1, sensitive receptors are located along the project alignment. The project site is in an area that already experiences poor air quality and construction would generate additional short-term air pollution affecting nearby sensitive receptors. Implementation of Measure ***AQ-1, Construction Emissions Minimization***, discussed below, would reduce the project impacts.

[15] EPA Technology Transfer Network at: http://www.epa.gov/ttn/atw/nata/perspect.html (last updated April 2010).

[16] CARB, 2009. *California Almanac of Emissions and Air Quality – 2009 Edition*, Figure 5-14 (p. 5-59) and Table 5-44 (p. 5-61). Available online at: http://www.arb.ca.gov/aqd/almanac/almanac09/chap509.htm.

[17] 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 source suggest a potential public health risk. The applicant is then subject to a health risk assessment for the source in question. Such an assessment generally evaluates chronic long-term effects, estimating the increased risk of cancer from exposure to one or more TACs.

While emission reductions from limiting idling, educating workers and the public and properly maintaining equipment are difficult to quantify, other measures, specifically the requirement for equipment with Tier 2 engines (San Francisco's Clean Construction Ordinance), and Level 3 Verified Diesel Emission Control Strategy (VDECS) can reduce construction emissions by 89 to 94 percent compared to equipment with engines meeting no emission standards and without a VDECS. Reducing emissions by combining Tier 2 equipment with Level 3 VDECS is almost equivalent to requiring only equipment with Tier 4 Final engines with higher emission reduction efficiency. These engines are not yet widely available.

Measure AQ-1: Construction Emissions Minimization

A. *Construction Emissions Minimization Plan*. Before a construction permit is issued, the project sponsor shall submit a construction emissions minimization plan (plan) to the environmental review officer (ERO) for review and approval by an environmental planning air quality specialist. The plan shall detail project compliance with the following requirements:

1. All off-road equipment greater than 25 horsepower and operating for more than 20 total hours over the duration of construction shall meet the following requirements:

   a) Where access to alternative sources of power are available, portable diesel engines shall be prohibited;

   b) All off-road equipment shall have:

      i. Engines that meet or exceed either the US EPA or CARB Tier 2 off-road emission standards; and

      ii. Engines that are retrofitted with a CARB Level 3 VDECS.[18]

   c) Exceptions

      i. Exceptions to A(1)(a) may be granted if the project sponsor has submitted evidence to the satisfaction of the ERO that an alternative source of power is limited or infeasible at the project site and that the requirements of this exception provision apply. Under this circumstance, the sponsor shall submit documentation of compliance with A(1)(b) for onsite power generation.

      ii. Exceptions to A(1)(b)(ii) may be granted if the project sponsor has submitted evidence to the satisfaction of the ERO that a particular piece of off-road equipment with a CARB Level 3 VDECS is (1) technically not feasible; (2) would not produce desired emissions reductions due to expected operating modes; (3) would create a safety hazard or impaired visibility for the operator; or (4) would interfere with a compelling emergency need to use off-road equipment that is not retrofitted with a CARB Level 3 VDECS and the sponsor has submitted documentation to the ERO that the requirements of this exception

[18] Equipment with engines meeting Tier 4 Interim or Tier 4 final emission standards automatically meet this requirement; therefore, a VDECS would not be required.

apply. If granted an exception to A(1)(b)(ii), the project sponsor must comply with the requirements of A(1)(c)(iii).

iii. If an exception is granted, in accordance with A(1)(c)(ii), the project sponsor shall provide the next cleanest piece of off-road equipment (see Table 4-2).

Table 4-2
Off-Road Equipment Compliance Step-Down Schedule

Compliance Alternative	Engine Emission Standard	Emissions Control
1	Tier 2	CARB Level 2 VDECS
2	Tier 2	CARB Level 1 VDECS
3	Tier 2	Alternative fuel*

Notes:

How to use the table: If the requirements of (A)(1)(b) cannot be met, then the project sponsor would need to meet Compliance Alternative 1. Should the project sponsor not be able to supply off-road equipment meeting Compliance Alternative 1, then Compliance Alternative 2 would need to be met. Should the project sponsor not be able to supply off-road equipment meeting Compliance Alternative 2, then Compliance Alternative 3 would need to be met.

*Alternative fuel is not a VDECS.

2. The project sponsor shall require the idling time for off-road and on-road equipment be limited to no more than 2 minutes, except as provided in the applicable state regulations for idling off-road and on-road equipment. Legible and visible signs shall be posted in English, Spanish, and Chinese in designated queuing areas and at the construction site to remind operators of the two-minute idling limit.

3. The project sponsor shall require that construction operators properly maintain and tune equipment in accordance with manufacturer specifications.

4. The plan shall include estimates of the construction timeline by phase, with a description of each piece of off-road equipment required for every construction phase. Off-road equipment descriptions and information may include equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (tier rating), horsepower, engine serial number, and expected fuel use and hours of operation. For VDECS installed, the information may include technology type, serial number, make, model, manufacturer, CARB verification number level, and installation date and hour meter reading on installation date. For off-road equipment using alternative fuels, reporting shall indicate the type of alternative fuel being used.

5. The plan shall be kept on-site and available for review by any persons requesting it, and a legible sign shall be posted at the perimeter of the construction site indicating to the public the basic requirements of the plan and a way to request a copy. The project sponsor shall provide copies of the plan to members of the public as requested.

B. *Reporting*. Quarterly reports shall be submitted to the ERO indicating the construction phase and off-road equipment information used during each phase including the information required in A(4). In addition, for off-road equipment using alternative fuels, reporting shall include the actual amount of alternative fuel used.

   Within 6 months of construction completion, the project sponsor shall submit to the ERO a final report summarizing activities. The final report shall indicate the start and end dates and duration of each construction phase. For each phase, the report shall include the detailed information required in A(4). In addition, for off-road equipment using alternative fuels, reporting shall include the actual amount of alternative fuel used.

C. *Certification Statement and On-site Requirements*. Before construction begins, the project sponsor must certify compliance with the plan and that all applicable requirements of the plan have been incorporated into contract specifications.

Chapter 5
CONCLUSIONS

The analysis presented above describes criteria air pollutants and community risk and hazards for the construction of the proposed Second Street Improvement Project. As described under Section 1.4 above, the proposed project would not result in substantial operations-related changes to emissions along the Second Street corridor and therefore operations were not analyzed in this report.

The findings of the report are summarized below.

- Construction emissions of the criteria pollutants were analyzed using the CalEEMod model. The modeling results are presented in Table 3-3.
- Construction equipment would emit certain pollutants that could affect the health of those in the area. Measure AQ-1 (Construction Emissions Minimization) recommends using cleaner or controlled emission construction equipment to reduce community risks and hazards.

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Attachment A

A1 Construction Schedule and Equipment List

A2 Construction Emissions

- **CalEEMod Output**
- **Construction Emissions Summary**

A1 Construction Schedule and Equipment List

Second Street Improvement Project - Equipment List and Haul Truck Trips from DPW (May 9, 2014)

	Start Date	Duration
Sewer Construction	*1/1/2016*	*150 Days*

Sewer Construction (one phase)	TYPICAL RATED HORSEPOWER	NO. OF HOURS IN USE PER DAY	TOTAL NO. OF DAYS	NO. OF UNITS
Sawcutting Machine	13	8	13	1
Excavator	157	4	39	1
Loader/Backhoe	75	4	39	1
Paving Equipment (Grinder)	82	6	7	1
Other Material Handling Equipment (AC Supply Truck)	196	4	7	1 Avg.
Paver	89	6	5	1
Roller	84	6	5	1
Other Material Handling Equipment (Concrete Mixer)	196	0.25	17	1
Off-Highway Trucks (Sewer Dump Truck)	381	2	33	1
Off-Highway Trucks (Sewer Delivery Truck for Crushed Rock)	381	0.5	18	1
Off-Highway Trucks (Sewer Delivery Truck for Piping and Manholes)	381	2	12	3
Off-Highway Trucks (Paving Dump Truck)	381	3	8	1 Avg.

Utilities Replacement/ Installation	*1/1/2016*	*30 Days*		
Phase 1. Underground Conduit Installation Start date and duration (30 days)	**TYPICAL RATED HORSEPOWER**	**NO. OF HOURS IN USE PER DAY**	**TOTAL NO. OF DAYS**	**NO. OF UNITS**
Utility Truck (for **Electrician)** (1 ton) F-350	400	8	30	1
Truck (for **Laborers)** 1-1/2 ton F-550	362	1	30	1
Backhoe John Deer 310J	72	8	30	1
S-185 Bobcat with breaker	61	8	30	1
Ditch Witch FX – 30 Vacuum	28.4	8	30	1
10 yard Dump Truck F-800	190	4	30	1
Compressor Diesel 185 CFM	12	8	30	1
Diesel Turtle walk behind compactor (25 HP)	25	8	30	1
Concrete saw 45 HP Diesel	45	8	30	1
Roller Bomag 36" Diesel	84	4	30	1
Solar Powered Arrow Boards (no engine)	0	8	30	2
Phase 2. Wire Pulling and Setting Gear Start date and duration (12 days)	*2/12/2016*	*12 Days*		
Utility trucks F-350	400	8	12	2
Boom Truck F-800	300	8	12	1
Flatbed truck and wire trailer F-700		8	12	1
Power puller (20 HP)	20	8	12	1
Solar Powered Arrow Boards (no engine)	0	8	12	2

Street Improvements construction activities	*1/1/2016*	*240 Days*		
Streetscape Construction (One Phase)	**TYPICAL RATED HORSEPOWER**	**NO. OF HOURS IN USE PER DAY**	**TOTAL NO. OF DAYS**	**NO. OF UNITS**
CAT 308 Excavator	117	8	80	1
CAT 930 Loader	100	8	80	1
CAT 426 Backhoe	88	8	80	1
Skid Steer	58	8	80	1
Roller	84	8	30	1
Sawcutting Machine	13	4	30	1
Paving Equipment (Grinder)	82	8	8	1
Paver	89	8	8	1
AC Supply Truck	196	8	8	1
Concrete Mixer Truck	196	8	15	1
Demolition Dump Truck	381	8	20	4
Materials Delivery Truck	381	2	120	4
Roadway Striping Vehicle	12	6	4	1

Offsite Haul Trucks (Roundtrips)	**No. Trucks/day**	**Miles/trip**	**Haul Truck Capacity**
Average daily for Sewer Construction	6	10	10 CY (typical)
Average daily for Utilities relocation/installation	4	10	10 CY (typical)
Average daily for Steet Improvement (if any)	0	0	N/A

Additional Assumptions:

Material from sewer conduit excavation: length of project (0.9 mile)*5 ft*20 ft*0.5 ton/CY	8,800 tons
Architectural coating surface (bicycle track painting): length of project (0.9 mile)*5 ft	23,760 sqft

A2 Construction Emissions

- **CalEEMod Output** – Annual Construction Emissions
- **Construction Emissions Summary**

- **CalEEMod Output –** Annual Construction Emissions

2nd Street Bicycle Path

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	6.07	Acre	6.07	264,409.20	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Project-specific phase duration provided by DPW
Off-road Equipment - Project-specific equipment list - provided by DPW
hrs/day adjusted for the duration of the construction phase

Off-road Equipment - Project-specific equipment list - provided by DPW

Off-road Equipment - Project-specific equipment list - provided by DPW

Off-road Equipment - Project-specific equipment list - provided by DPW

Demolition - Based on Sewer conduit excavation at 20 ft depth and 0.5 tons/CY

Trips and VMT - Project-specific hauling trips - provided by DPW

Architectural Coating - Assuming painting the bicycle path along the entire length of the corridor at a width of 5 feet.

Area Coating - operational emissions not to be calculated

2nd Street Bicycle Path

San Francisco County, Annual

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	132,205.00	23,760.00
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tblArchitecturalCoating	EF_Residential_Exterior	150.00	250.00
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tblAreaCoating	Area_Nonresidential_Interior	396614	0
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tblConstructionPhase	NumDays	20.00	150.00
tblConstructionPhase	NumDays	20.00	12.00
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tblConstructionPhase	NumDays	10.00	30.00
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tblConstructionPhase	PhaseEndDate	12/19/2016	2/29/2016
tblConstructionPhase	PhaseEndDate	1/12/2017	12/1/2016
tblConstructionPhase	PhaseEndDate	9/8/2016	2/11/2016
tblConstructionPhase	PhaseStartDate	3/1/2016	11/14/2016
tblConstructionPhase	PhaseStartDate	12/2/2016	2/12/2016
tblConstructionPhase	PhaseStartDate	2/12/2016	1/1/2016
tblConstructionPhase	PhaseStartDate	7/29/2016	1/1/2016
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tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
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2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4431	2.7568	2.0918	4.2800e-003	0.1973	0.1318	0.3290	0.0400	0.1216	0.1616	0.0000	381.5474	381.5474	0.0844	0.0000	383.3193
Total	**0.4431**	**2.7568**	**2.0918**	**4.2800e-003**	**0.1973**	**0.1318**	**0.3290**	**0.0400**	**0.1216**	**0.1616**	**0.0000**	**381.5474**	**381.5474**	**0.0844**	**0.0000**	**383.3193**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4431	2.7568	2.0918	4.2800e-003	0.1973	0.1318	0.3290	0.0400	0.1216	0.1616	0.0000	381.5471	381.5471	0.0844	0.0000	383.3190
Total	**0.4431**	**2.7568**	**2.0918**	**4.2800e-003**	**0.1973**	**0.1318**	**0.3290**	**0.0400**	**0.1216**	**0.1616**	**0.0000**	**381.5471**	**381.5471**	**0.0844**	**0.0000**	**383.3190**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Sewer Construction	Demolition	1/1/2016	7/28/2016	5	150	
2	Utilities - Underground Conduit Installation	Site Preparation	1/1/2016	2/11/2016	5	30	
3	Street Improvements	Paving	1/1/2016	12/1/2016	5	240	
4	Utilities - Wire Pulling	Grading	2/12/2016	2/29/2016	5	12	
5	Architectural Coating	Architectural Coating	11/14/2016	12/1/2016	5	14	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0 **(This result appears to be a bug in the "output" function of CalEEMod, where the incorrect value of 0 is printed in the output file. The actual paving surface used in modeling the emissions is 6.07 acres, the site area.)**

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 23,760 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Sewer Construction	Excavators	1	1.04	157	0.38
Sewer Construction	Concrete/Industrial Saws	1	0.69	13	0.73
Utilities - Wire Pulling	Excavators	0	8.00	162	0.38
Sewer Construction	Tractors/Loaders/Backhoes	1	1.04	75	0.37
Sewer Construction	Paving Equipment	1	0.28	82	0.36

Sewer Construction	Other Material Handling Equipment	1	0.19	196	0.40
Street Improvements	Pavers	1	0.27	89	0.42
Street Improvements	Rollers	1	1.00	84	0.38
Sewer Construction	Rubber Tired Dozers	0	8.00	255	0.40
Utilities - Wire Pulling	Rubber Tired Dozers	0	8.00	255	0.40
Sewer Construction	Pavers	1	0.20	89	0.42
Utilities - Wire Pulling	Graders	0	8.00	174	0.41
Utilities - Wire Pulling	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Street Improvements	Paving Equipment	1	0.27	82	0.36
Utilities - Underground Conduit Installation	Tractors/Loaders/Backhoes	1	8.00	72	0.37
Utilities - Underground Conduit Installation	Rubber Tired Dozers	0	8.00	255	0.40
Sewer Construction	Rollers	1	0.20	84	0.38
Sewer Construction	Other Material Handling Equipment	1	0.03	196	0.40
Sewer Construction	Off-Highway Trucks	1	0.44	381	0.38
Sewer Construction	Off-Highway Trucks	1	0.06	381	0.38
Sewer Construction	Off-Highway Trucks	3	0.16	381	0.38
Sewer Construction	Off-Highway Trucks	1	0.16	381	0.38
Utilities - Underground Conduit Installation	Off-Highway Trucks	1	8.00	400	0.38
Utilities - Underground Conduit Installation	Off-Highway Trucks	1	1.00	362	0.38
Utilities - Underground Conduit Installation	Other Construction Equipment	1	8.00	61	0.42
Utilities - Underground Conduit Installation	Trenchers	1	8.00	28	0.50
Utilities - Underground Conduit Installation	Off-Highway Trucks	1	4.00	190	0.38
Utilities - Underground Conduit Installation	Air Compressors	1	8.00	12	0.48
Utilities - Underground Conduit Installation	Plate Compactors	1	8.00	25	0.43
Utilities - Underground Conduit Installation	Concrete/Industrial Saws	1	8.00	45	0.73
Utilities - Underground Conduit Installation	Rollers	1	4.00	84	0.38
Utilities - Wire Pulling	Off-Highway Trucks	2	8.00	400	0.38
Utilities - Wire Pulling	Cranes	1	8.00	300	0.29

Utilities - Wire Pulling	Off-Highway Trucks	1	8.00	400	0.38
Utilities - Wire Pulling	Other Construction Equipment	1	8.00	20	0.42
Street Improvements	Excavators	1	2.67	117	0.38
Street Improvements	Rubber Tired Loaders	1	2.67	100	0.36
Street Improvements	Tractors/Loaders/Backhoes	1	2.67	88	0.37
Street Improvements	Skid Steer Loaders	1	2.67	58	0.37
Street Improvements	Concrete/Industrial Saws	1	0.50	13	0.73
Street Improvements	Off-Highway Trucks	1	0.27	196	0.38
Street Improvements	Off-Highway Trucks	1	0.50	196	0.38
Street Improvements	Off-Highway Trucks	4	0.67	381	0.38
Street Improvements	Off-Highway Trucks	4	1.00	381	0.38
Street Improvements	Other Construction Equipment	1	0.10	12	0.42

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sewer Construction	14	35.00	0.00	900.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Utilities - Underground Conduit Installation	10	25.00	0.00	120.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Utilities - Wire Pulling	5	13.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Street Improvements	19	48.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	22.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Sewer Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1019	0.0000	0.1019	0.0154	0.0000	0.0154	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0193	0.2130	0.1205	2.4000e-004		0.0103	0.0103		9.4400e-003	9.4400e-003	0.0000	22.5575	22.5575	6.8000e-003	0.0000	22.7003
Total	**0.0193**	**0.2130**	**0.1205**	**2.4000e-004**	**0.1019**	**0.0103**	**0.1122**	**0.0154**	**9.4400e-003**	**0.0249**	**0.0000**	**22.5575**	**22.5575**	**6.8000e-003**	**0.0000**	**22.7003**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0132	0.1319	0.1914	3.2000e-004	7.4800e-003	1.5800e-003	9.0600e-003	2.0500e-003	1.4500e-003	3.5000e-003	0.0000	28.8318	28.8318	2.1000e-004	0.0000	28.8361
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.4600e-003	0.0130	0.1302	3.1000e-004	0.0238	2.2000e-004	0.0240	6.3300e-003	2.0000e-004	6.5300e-003	0.0000	23.7318	23.7318	1.2600e-003	0.0000	23.7582
Total	**0.0226**	**0.1448**	**0.3216**	**6.3000e-004**	**0.0313**	**1.8000e-003**	**0.0331**	**8.3800e-003**	**1.6500e-003**	**0.0100**	**0.0000**	**52.5635**	**52.5635**	**1.4700e-003**	**0.0000**	**52.5943**

3.2 Sewer Construction - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1019	0.0000	0.1019	0.0154	0.0000	0.0154	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0193	0.2130	0.1205	2.4000e-004		0.0103	0.0103		9.4400e-003	9.4400e-003	0.0000	22.5574	22.5574	6.8000e-003	0.0000	22.7003
Total	**0.0193**	**0.2130**	**0.1205**	**2.4000e-004**	**0.1019**	**0.0103**	**0.1122**	**0.0154**	**9.4400e-003**	**0.0249**	**0.0000**	**22.5574**	**22.5574**	**6.8000e-003**	**0.0000**	**22.7003**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0132	0.1319	0.1914	3.2000e-004	7.4800e-003	1.5800e-003	9.0600e-003	2.0500e-003	1.4500e-003	3.5000e-003	0.0000	28.8318	28.8318	2.1000e-004	0.0000	28.8361
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.4600e-003	0.0130	0.1302	3.1000e-004	0.0238	2.2000e-004	0.0240	6.3300e-003	2.0000e-004	6.5300e-003	0.0000	23.7318	23.7318	1.2600e-003	0.0000	23.7582
Total	**0.0226**	**0.1448**	**0.3216**	**6.3000e-004**	**0.0313**	**1.8000e-003**	**0.0331**	**8.3800e-003**	**1.6500e-003**	**0.0100**	**0.0000**	**52.5635**	**52.5635**	**1.4700e-003**	**0.0000**	**52.5943**

3.3 Utilities - Underground Conduit Installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0485	0.4005	0.2399	4.5000e-004		0.0220	0.0220		0.0205	0.0205	0.0000	40.6245	40.6245	0.0117	0.0000	40.8703
Total	**0.0485**	**0.4005**	**0.2399**	**4.5000e-004**	**0.0000**	**0.0220**	**0.0220**	**0.0000**	**0.0205**	**0.0205**	**0.0000**	**40.6245**	**40.6245**	**0.0117**	**0.0000**	**40.8703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.7600e-003	0.0176	0.0255	4.0000e-005	1.0000e-003	2.1000e-004	1.2100e-003	2.7000e-004	1.9000e-004	4.7000e-004	0.0000	3.8442	3.8442	3.0000e-005	0.0000	3.8448
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3500e-003	1.8500e-003	0.0186	4.0000e-005	3.4000e-003	3.0000e-005	3.4300e-003	9.0000e-004	3.0000e-005	9.3000e-004	0.0000	3.3903	3.3903	1.8000e-004	0.0000	3.3940
Total	**3.1100e-003**	**0.0194**	**0.0441**	**8.0000e-005**	**4.4000e-003**	**2.4000e-004**	**4.6400e-003**	**1.1700e-003**	**2.2000e-004**	**1.4000e-003**	**0.0000**	**7.2345**	**7.2345**	**2.1000e-004**	**0.0000**	**7.2388**

3.3 Utilities - Underground Conduit Installation - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0485	0.4005	0.2399	4.5000e-004		0.0220	0.0220		0.0205	0.0205	0.0000	40.6244	40.6244	0.0117	0.0000	40.8702
Total	**0.0485**	**0.4005**	**0.2399**	**4.5000e-004**	**0.0000**	**0.0220**	**0.0220**	**0.0000**	**0.0205**	**0.0205**	**0.0000**	**40.6244**	**40.6244**	**0.0117**	**0.0000**	**40.8702**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.7600e-003	0.0176	0.0255	4.0000e-005	1.0000e-003	2.1000e-004	1.2100e-003	2.7000e-004	1.9000e-004	4.7000e-004	0.0000	3.8442	3.8442	3.0000e-005	0.0000	3.8448
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3500e-003	1.8500e-003	0.0186	4.0000e-005	3.4000e-003	3.0000e-005	3.4300e-003	9.0000e-004	3.0000e-005	9.3000e-004	0.0000	3.3903	3.3903	1.8000e-004	0.0000	3.3940
Total	**3.1100e-003**	**0.0194**	**0.0441**	**8.0000e-005**	**4.4000e-003**	**2.4000e-004**	**4.6400e-003**	**1.1700e-003**	**2.2000e-004**	**1.4000e-003**	**0.0000**	**7.2345**	**7.2345**	**2.1000e-004**	**0.0000**	**7.2388**

3.4 Street Improvements - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1576	1.6800	0.9238	1.8600e-003		0.0856	0.0856		0.0788	0.0788	0.0000	175.5259	175.5259	0.0529	0.0000	176.6377
Paving	7.9500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1656**	**1.6800**	**0.9238**	**1.8600e-003**		**0.0856**	**0.0856**		**0.0788**	**0.0788**	**0.0000**	**175.5259**	**175.5259**	**0.0529**	**0.0000**	**176.6377**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0208	0.0285	0.2857	6.8000e-004	0.0523	4.8000e-004	0.0527	0.0139	4.4000e-004	0.0143	0.0000	52.0743	52.0743	2.7600e-003	0.0000	52.1322
Total	**0.0208**	**0.0285**	**0.2857**	**6.8000e-004**	**0.0523**	**4.8000e-004**	**0.0527**	**0.0139**	**4.4000e-004**	**0.0143**	**0.0000**	**52.0743**	**52.0743**	**2.7600e-003**	**0.0000**	**52.1322**

3.4 Street Improvements - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1576	1.6800	0.9238	1.8600e-003		0.0856	0.0856		0.0788	0.0788	0.0000	175.5257	175.5257	0.0529	0.0000	176.6375
Paving	7.9500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1656**	**1.6800**	**0.9238**	**1.8600e-003**		**0.0856**	**0.0856**		**0.0788**	**0.0788**	**0.0000**	**175.5257**	**175.5257**	**0.0529**	**0.0000**	**176.6375**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0208	0.0285	0.2857	6.8000e-004	0.0523	4.8000e-004	0.0527	0.0139	4.4000e-004	0.0143	0.0000	52.0743	52.0743	2.7600e-003	0.0000	52.1322
Total	**0.0208**	**0.0285**	**0.2857**	**6.8000e-004**	**0.0523**	**4.8000e-004**	**0.0527**	**0.0139**	**4.4000e-004**	**0.0143**	**0.0000**	**52.0743**	**52.0743**	**2.7600e-003**	**0.0000**	**52.1322**

3.5 Utilities - Wire Pulling - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3000e-003	0.0000	5.3000e-003	5.7000e-004	0.0000	5.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0222	0.2528	0.1315	2.9000e-004		9.9700e-003	9.9700e-003		9.1700e-003	9.1700e-003	0.0000	27.0826	27.0826	8.1700e-003	0.0000	27.2542
Total	**0.0222**	**0.2528**	**0.1315**	**2.9000e-004**	**5.3000e-003**	**9.9700e-003**	**0.0153**	**5.7000e-004**	**9.1700e-003**	**9.7400e-003**	**0.0000**	**27.0826**	**27.0826**	**8.1700e-003**	**0.0000**	**27.2542**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	3.9000e-004	3.8700e-003	1.0000e-005	7.1000e-004	1.0000e-005	7.1000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.7052	0.7052	4.0000e-005	0.0000	0.7060
Total	**2.8000e-004**	**3.9000e-004**	**3.8700e-003**	**1.0000e-005**	**7.1000e-004**	**1.0000e-005**	**7.1000e-004**	**1.9000e-004**	**1.0000e-005**	**1.9000e-004**	**0.0000**	**0.7052**	**0.7052**	**4.0000e-005**	**0.0000**	**0.7060**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3000e-003	0.0000	5.3000e-003	5.7000e-004	0.0000	5.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0222	0.2528	0.1315	2.9000e-004		9.9700e-003	9.9700e-003		9.1700e-003	9.1700e-003	0.0000	27.0826	27.0826	8.1700e-003	0.0000	27.2541
Total	**0.0222**	**0.2528**	**0.1315**	**2.9000e-004**	**5.3000e-003**	**9.9700e-003**	**0.0153**	**5.7000e-004**	**9.1700e-003**	**9.7400e-003**	**0.0000**	**27.0826**	**27.0826**	**8.1700e-003**	**0.0000**	**27.2541**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	3.9000e-004	3.8700e-003	1.0000e-005	7.1000e-004	1.0000e-005	7.1000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.7052	0.7052	4.0000e-005	0.0000	0.7060
Total	**2.8000e-004**	**3.9000e-004**	**3.8700e-003**	**1.0000e-005**	**7.1000e-004**	**1.0000e-005**	**7.1000e-004**	**1.9000e-004**	**1.0000e-005**	**1.9000e-004**	**0.0000**	**0.7052**	**0.7052**	**4.0000e-005**	**0.0000**	**0.7060**

3.6 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1377					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5800e-003	0.0166	0.0132	2.0000e-005		1.3800e-003	1.3800e-003		1.3800e-003	1.3800e-003	0.0000	1.7873	1.7873	2.1000e-004	0.0000	1.7917
Total	**0.1402**	**0.0166**	**0.0132**	**2.0000e-005**		**1.3800e-003**	**1.3800e-003**		**1.3800e-003**	**1.3800e-003**	**0.0000**	**1.7873**	**1.7873**	**2.1000e-004**	**0.0000**	**1.7917**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5000e-004	7.6000e-004	7.6400e-003	2.0000e-005	1.4000e-003	1.0000e-005	1.4100e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.3923	1.3923	7.0000e-005	0.0000	1.3938
Total	**5.5000e-004**	**7.6000e-004**	**7.6400e-003**	**2.0000e-005**	**1.4000e-003**	**1.0000e-005**	**1.4100e-003**	**3.7000e-004**	**1.0000e-005**	**3.8000e-004**	**0.0000**	**1.3923**	**1.3923**	**7.0000e-005**	**0.0000**	**1.3938**

2nd Street Bicycle Path

San Francisco County, Annual

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1377					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5800e-003	0.0166	0.0132	2.0000e-005		1.3800e-003	1.3800e-003		1.3800e-003	1.3800e-003	0.0000	1.7873	1.7873	2.1000e-004	0.0000	1.7917
Total	**0.1402**	**0.0166**	**0.0132**	**2.0000e-005**		**1.3800e-003**	**1.3800e-003**		**1.3800e-003**	**1.3800e-003**	**0.0000**	**1.7873**	**1.7873**	**2.1000e-004**	**0.0000**	**1.7917**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5000e-004	7.6000e-004	7.6400e-003	2.0000e-005	1.4000e-003	1.0000e-005	1.4100e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.3923	1.3923	7.0000e-005	0.0000	1.3938
Total	**5.5000e-004**	**7.6000e-004**	**7.6400e-003**	**2.0000e-005**	**1.4000e-003**	**1.0000e-005**	**1.4100e-003**	**3.7000e-004**	**1.0000e-005**	**3.8000e-004**	**0.0000**	**1.3923**	**1.3923**	**7.0000e-005**	**0.0000**	**1.3938**

- **Construction Emissions Summary**

2nd Street Bicycle Path
San Francisco County, Annual Summary

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Year	tons/yr										
2016		0.4431	2.7568	2.0918	4.28E-03	0.1973	0.1318	0.329	0.04	0.1216	0.1616
Total		**0.4431**	**2.7568**	**2.0918**	**4.28E-03**	**0.1973**	**0.1318**	**0.329**	**0.04**	**0.1216**	**0.1616**

Avg Construction (lbs/day)		**3.69**	**22.97**	**17.43**	**0.04**	**1.64**	**1.10**	**2.74**	**0.33**	**1.01**	**1.35**

3.2 Sewer Construction - 2016

Unmitigated Construction On-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Fugitive Dust						0.1019	0	0.1019	0.0154	0	0.0154
Off-Road		0.0193	0.213	0.1205	2.40E-04		0.0103	0.0103		9.44E-03	9.44E-03
Total		**0.0193**	**0.213**	**0.1205**	**2.40E-04**	**0.1019**	**0.0103**	**0.1122**	**0.0154**	**9.44E-03**	**0.0249**

Unmitigated Construction Off-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Hauling		0.0132	0.1319	0.1914	3.20E-04	7.48E-03	1.58E-03	9.06E-03	2.05E-03	1.45E-03	3.50E-03
Vendor		0	0	0	0	0	0	0	0	0	0
Worker		9.46E-03	0.013	0.1302	3.10E-04	0.0238	2.20E-04	0.024	6.33E-03	2.00E-04	6.53E-03
Total		**0.0226**	**0.1448**	**0.3216**	**6.30E-04**	**0.0313**	**1.80E-03**	**0.0331**	**8.38E-03**	**1.65E-03**	**0.01**

3.3 Utilities - Underground Conduit Installation - 2016

Unmitigated Construction On-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Fugitive Dust						0	0	0	0	0	0
Off-Road		0.0485	0.4005	0.2399	4.50E-04		0.022	0.022		0.0205	0.0205
Total		**0.0485**	**0.4005**	**0.2399**	**4.50E-04**	**0**	**0.022**	**0.022**	**0**	**0.0205**	**0.0205**

Unmitigated Construction Off-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Hauling		1.76E-03	0.0176	0.0255	4.00E-05	1.00E-03	2.10E-04	1.21E-03	2.70E-04	1.90E-04	4.70E-04
Vendor		0	0	0	0	0	0	0	0	0	0
Worker		1.35E-03	1.85E-03	0.0186	4.00E-05	3.40E-03	3.00E-05	3.43E-03	9.00E-04	3.00E-05	9.30E-04
Total		**3.11E-03**	**0.0194**	**0.0441**	**8.00E-05**	**4.40E-03**	**2.40E-04**	**4.64E-03**	**1.17E-03**	**2.20E-04**	**1.40E-03**

3.5 Utilities - Wire Pulling - 2016

Unmitigated Construction On-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Fugitive Dust						5.30E-03	0	5.30E-03	5.70E-04	0	5.70E-04
Off-Road		0.0222	0.2528	0.1315	2.90E-04		9.97E-03	9.97E-03		9.17E-03	9.17E-03
Total		**0.0222**	**0.2528**	**0.1315**	**2.90E-04**	**5.30E-03**	**9.97E-03**	**0.0153**	**5.70E-04**	**9.17E-03**	**9.74E-03**

Unmitigated Construction Off-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Hauling		0	0	0	0	0	0	0	0	0	0
Vendor		0	0	0	0	0	0	0	0	0	0
Worker		2.80E-04	3.90E-04	3.87E-03	1.00E-05	7.10E-04	1.00E-05	7.10E-04	1.90E-04	1.00E-05	1.90E-04
Total		**2.80E-04**	**3.90E-04**	**3.87E-03**	**1.00E-05**	**7.10E-04**	**1.00E-05**	**7.10E-04**	**1.90E-04**	**1.00E-05**	**1.90E-04**

3.4 Street Improvements - 2016

Unmitigated Construction On-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Off-Road		0.1576	1.68	0.9238	1.86E-03		0.0856	0.0856		0.0788	0.0788
Paving		7.95E-03					0	0		0	0
Total		**0.1656**	**1.68**	**0.9238**	**1.86E-03**		**0.0856**	**0.0856**		**0.0788**	**0.0788**

Unmitigated Construction Off-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Hauling		0	0	0	0	0	0	0	0	0	0
Vendor		0	0	0	0	0	0	0	0	0	0
Worker		0.0208	0.0285	0.2857	6.80E-04	0.0523	4.80E-04	0.0527	0.0139	4.40E-04	0.0143
Total		**0.0208**	**0.0285**	**0.2857**	**6.80E-04**	**0.0523**	**4.80E-04**	**0.0527**	**0.0139**	**4.40E-04**	**0.0143**

3.6 Architectural Coating - 2016

Unmitigated Construction On-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Archit. Coating		0.1377					0	0		0	0
Off-Road		2.58E-03	0.0166	0.0132	2.00E-05		1.38E-03	1.38E-03		1.38E-03	1.38E-03
Total		**0.1402**	**0.0166**	**0.0132**	**2.00E-05**		**1.38E-03**	**1.38E-03**		**1.38E-03**	**1.38E-03**

Unmitigated Construction Off-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Hauling		0	0	0	0	0	0	0	0	0	0
Vendor		0	0	0	0	0	0	0	0	0	0
Worker		5.50E-04	7.60E-04	7.64E-03	2.00E-05	1.40E-03	1.00E-05	1.41E-03	3.70E-04	1.00E-05	3.80E-04
Total		**5.50E-04**	**7.60E-04**	**7.64E-03**	**2.00E-05**	**1.40E-03**	**1.00E-05**	**1.41E-03**	**3.70E-04**	**1.00E-05**	**3.80E-04**

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APPENDIX D

Supplemental Transportation Technical Memorandum for Project Alternatives

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CHS Consulting Group

MEMORANDUM

DATE: December 16, 2014

TO: Greg Riessen, Environmental Planning
Debra Dwyer, Environmental Planning

FROM: Preethi Narayanan, CHS Consulting Group

RE: Second Street Improvement Project
Final Supplemental Transportation Technical Memorandum
For Transportation Impact Assessment for Project Alternatives

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The purpose of this supplemental technical memorandum is to compare and evaluate the transportation impacts of the alternatives to the proposed Second Street Improvement project (proposed project). The proposed project's transportation impacts were analyzed and documented in the Second Street Improvement Project Transportation Impact Study (TIS) prepared by CHS Consulting Group in July 2014.[1] The TIS shows that the proposed project has the potential to cause significant adverse traffic impacts on vehicular traffic at some intersections in the project vicinity and commercial loading conditions at some locations along Second Street. Even with the mitigation measures listed in the TIS, these impacts would be significant and unavoidable. The findings of the TIS and this Supplemental Transportation Technical Memorandum will be incorporated into the Second Street Improvement Project Supplemental Environmental Impact Report (SEIR).

California Environmental Quality Act (CEQA) guidelines require the analysis of project alternatives that could feasibly avoid or lessen the significant impacts of the proposed project, while attaining most of the project sponsor's basic objectives for the Second Street Improvement project. This memorandum compares and evaluates two alternatives to the proposed project. A third, the No Project Alternative, was analyzed in the TIS as Existing Conditions and Cumulative (No Project) Conditions and is summarized below.

This document includes a brief discussion of the three alternatives, followed by the approach to analysis and an impact discussion of project-level and cumulative impacts for each alternative. This includes feasible mitigation measures for significant impacts.

[1] CHS Consulting Group, 2014, Second Street Improvement Project Transportation Impact Study. (This document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E.)

Table of Contents

List of Tables

1. SUMMARY OF IMPACTS

Tables 1 and **2** below provide a comparison of significant traffic and transit impacts for the proposed project[2] and the three alternatives, as compared to existing conditions and to cumulative no project conditions. The three alternatives, described below, focus on traffic and transit impacts before and after mitigation.

Key findings based on **Tables 1** and **2** are as follows:

- Alternative 1, the No Project Alternative, would not include a separate bicycle facility or lane closures along Second Street; therefore, this alternative would not result in any significant traffic or transit impacts.
- Alternative 2, the Bicycle Lanes Alternative, would result in fewer traffic impacts than the proposed project; similar to the proposed project, it would not result in any significant transit impacts.
- Alternative 3, the Center-Turn Lane Alternative, would have fewer traffic impacts than the proposed project. However, this alternative would result in significant transit impacts; neither the proposed project nor the other alternatives would result in any transit impacts.

2. PROJECT ALTERNATIVES

In addition to the No Project Alternative, the San Francisco Planning Department has identified two feasible alternatives to the proposed project. They are representative of roadway configurations that the San Francisco Municipal Transportation Agency (SFMTA) and San Francisco Public Works (SFPW) have considered or that were suggested by members of the community during the Second Street Improvement Project planning and public outreach process. They provide a reasonable range of alternatives that could feasibly attain most of the basic objectives of the proposed project and that may avoid or substantially lessen the significant impacts of the proposed project.

The alternatives are as follows:

- Alternative 1—No Project Alternative
- Alternative 2—Bicycle Lanes Alternative
- Alternative 3—Center-Turn Lane Alternative (bicycle lanes with a two-way, left-turn, center-turn lane)

[2] The analysis in this document compares the transportation impacts of the alternatives to the proposed project and the project variant. Both the proposed project and its variant were analyzed in the TIS. The project variant differs from the proposed project only in the proposed roadway configuration at one intersection, the intersection of Second and Brannan streets. The impacts of the alternatives, when compared to both the proposed project and its variant, are the same in most locations. Therefore, this document refers only to comparisons of the proposed project and alternatives in most places. It should be assumed to apply to both the proposed project and its variant except where specifically noted that the discussion relates to the project variant.

Table 1: Summary of Vehicular Traffic Impacts

Intersection	Project/Alternative-Specific Impacts				Cumulative Impacts			
	Existing Conditions (No Project — Alternative 1)	Existing Plus Proposed Project	Existing Plus Alternative 2	Existing Plus Alternative 3	Cumulative (No Project — Alternative 1)	Cumulative Plus Proposed Project	Cumulative Plus Alternative 2	Cumulative Plus Alternative 3
1. Market and Montgomery streets	–	SU	SU	–	NI	SU	SU	LTS
2. Mission and New Montgomery streets	NI	SU	SU	LTS	NI	SU	SU	LTS
3. Howard and New Montgomery streets	–	SM	SM	–	–	SU	SU	–
4. Howard and Hawthorne streets	–	SM	SM	–	–	SU	SU	–
5. Folsom and Hawthorne streets	NI	SM	LTS	LTS	NI	LTS	LTS	LTS
6. Harrison and Hawthorne streets	–	SU	SU	SU	–	SU	SU	SU
7. Bryant and Third streets	–	–	–	–	NI	SU	SU	SU
8. Brannan and Third streets	–	–	–	–	NI	SU	SU	SU
9. Townsend and Third streets	–	–	–	–	NI	SU	SU	SU
10. King and Third streets	NI	SU	SU	SU	NI	SU	SU	SU
14. Howard and Second streets	–	–	–	–	NI	LTS	LTS	SU
15. Folsom and Second streets	NI	LTS	LTS	LTS	NI	LTS	LTS	SU
16. Harrison and Second streets	–	SU	SU	SU	NI	SU	SU	SU
17. Bryant and Second streets	NI	SU	LTS	SU	NI	SU	LTS	SU
18. South Park and Second streets	NI	LTS	LTS	LTS	NI	LTS	LTS	LTS
20. Townsend and Second streets	–	–	–	–	NI	SU[1]	SM	SM
21. King and Second streets	–	–	–	–	NI	LTS	LTS	LTS
22. Folsom and Essex streets	–	–	–	–	NI	LTS	LTS	LTS
23. Harrison and Essex streets	NI	LTS	LTS	LTS	NI	LTS	LTS	LTS
26. Howard and First streets	–	–	–	–	NI	LTS	LTS	LTS
27. Folsom and First streets	NI	LTS	LTS	LTS	NI	LTS	LTS	LTS
28. Harrison and First streets	NI	SU	SU	LTS	NI	SU	SU	LTS
29. Fifth and Bryant streets and the I-80 on-ramp	NI	SU	SU	SU	NI	SU	SU	SU

Notes:

[1]Townsend Street/Second Street would have less-than-significant impacts under the Bicycle Lanes Alternative.

– = 29 intersections were analyzed for every scenario listed in the Table. The Dash shows intersections that performed acceptably (LOS D or better) under the respective scenario.

NI = No Project Impact. The intersection performs at level of service (LOS) E or LOS F under existing or cumulative (No project) conditions.

LTS = Less than Significant Project/Alternative-Specific Impact or Cumulative Impact. Project/Alternative traffic would not contribute significantly to intersections operating at the same LOS E or LOS F under (i) existing conditions or (ii) cumulative (no project) conditions.

SU = Significant and Unavoidable Project-Specific or Cumulative Impact. Project/Alternative traffic would contribute significantly to the decline of intersection operations. No mitigation measures are feasible.

SM = Significant Project/Alternative-Specific or Cumulative Impact. Project/Alternative traffic would contribute significantly to the decline of intersection operations. Feasible mitigation measures would reduce the impact to less than significant.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

Table 2: Summary of Transit Impacts

Intersection	Project-Specific Impacts				Cumulative Impacts			
	Existing Conditions (No Project – Alternative 1)	Existing Plus Proposed Project	Existing Plus Alternative 2	Existing Plus Alternative 3	Cumulative (No Project – Alternative 1)	Cumulative Plus Proposed Project	Cumulative Plus Alternative 2	Cumulative Plus Alternative 3
Route 10 Townsend (Sansome)	–	–	–	SU	–	–	–	SU
Route 12 Folsom-Pacific/11 Downtown Connector	–	–	–	–	–	–	–	–

Note:
SU: Significant and Unavoidable Project/Alternative-Specific or Cumulative Impact. Project/Alternative traffic would contribute significantly to the decline of transit travel time. No mitigation measures are feasible.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

2.1 ALTERNATIVE 1, NO PROJECT ALTERNATIVE

Under Alternative 1, the No Project Alternative, the proposed improvements along Second Street would not be implemented; thus this alternative would not result in any impacts as there would be no change from existing conditions. Alternative 1 was evaluated in the TIS as the existing conditions and 2040 cumulative conditions (without the proposed project). As such, it is not discussed further in this memorandum. Please refer to the TIS for further information.

2.2 ALTERNATIVE 2, BICYCLE LANES ALTERNATIVE

Alternative 2 was developed by modifying Project 2-1, Modified Option 1, from the San Francisco Bicycle Plan Environmental Impact Report (EIR).[3] (This alternative is referred to throughout this document and in the Supplement to the Bicycle Plan EIR as Alternative 2 or the Bicycle Lanes Alternative.) Alternative 2 would include one travel lane and one bicycle lane in each direction, right-turn pockets, and the prohibition of left turns at most locations. Compared to the proposed project, which allows left turns at northbound and southbound lanes at Townsend Street, Alternative 2 would allow left turns at two additional locations along Second Street: northbound at Harrison Street and at Brannan Street. Additionally, Alternative 2 would retain the existing 60-second signal cycle lengths at all locations under existing plus Alternative 2 conditions. It would not include a separate bicycle/pedestrian phase at the signalized intersections along Second Street. Also, the intersection at Second and Harrison streets would include only one signalized right-turn lane along northbound Second Street at Harrison Street.

2.2.1 Development of Alternative 2

Alternative 2 was developed from the Bicycle Plan Project 2-1 Modified Option 1 design (herein referred to as the Bicycle Plan Project) and was refined as described below:

- Alternative 2 would include a northbound and southbound Class II bicycle lane along Second Street, except along two blocks: northbound between Stevenson and Market streets and southbound between Townsend and King streets. Bicycle sharrows would be added to the travel lane at these two locations.

Under Alternative 2, the proposed bicycle lane would be accommodated by removing one travel lane in each direction along most of Second Street. As shown in **Table 3**, left turns would be prohibited at most streets, except northbound at Townsend, Brannan, and Harrison streets and southbound at Townsend and King streets. Left turns would be permitted at alleys. Right-turn pockets would be provided northbound at Mission and Folsom streets and southbound at Mission, Howard, and Harrison streets. Two eastbound left-turn lanes would be retained along Bryant Street to Second Street, and an exclusive southbound left-turn lane would be added to Hawthorne Street at Folsom Street. This would be accomplished by eliminating a commercial loading zone along the east side of Hawthorne Street.

The Bicycle Plan Project would have maintained the existing configuration of the uncontrolled channelized double right-turn lanes along northbound Second Street onto Harrison Street. However, unlike under the Bicycle Plan Project, Alternative 2 would allow the right-turn onto Harrison Street only

[3] San Francisco Planning Department. 2009. *San Francisco Bicycle Plan Project EIR*. This document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, San Francisco as part of Case No. 2007.0347E.

Table 3: Comparison of Left-Turn Opportunities Among the Proposed Project, Alternative 1, Alternative 2, and Alternative 3

Intersection with Second Street (segment)	Proposed Project	Alternative 1: No Project Alternative (Same as Existing Conditions)	Alternative 2: Project 2-1 Variation Alternative	Alternative 3: Center Turn-Lane Alternative
Market Street				
Northbound				
Mission Street[1]				
Northbound		❍		❍
Southbound		❍		❍
Howard Street[1]				
Northbound		❍		❍
Southbound				
Folsom Street				
Northbound				
Southbound		❍		❍
Harrison Street				
Northbound		❍	❍	❍
Southbound		❍		❍
Bryant Street				
Northbound				
Southbound				
Brannan Street[1]				
Northbound		❍	❍	❍
Southbound		❍		❍
Townsend Street				
Northbound	❍	❍	❍	❍
Southbound	❍	❍	❍	❍
King Street				
Southbound	❍	❍	❍	❍

[1]The variant to the proposed project analyzed in the TIS would allow southbound left turns at Second and Brannan streets.

Source: Project Design Plans (these documents are available for public review at the Planning Department, 1650 Mission Street, Suite 400, San Francisco, as part of Case No. 2007.0347E).

from a single curbside lane. It would do this by converting the p.m. tow-away lane along Second Street into a permanent exclusive right-turn lane. The shared through-right lane under the Bicycle Plan Project would be converted to a through-only lane, and the northbound left-turn lane would be retained. Additionally, the southeast corner at the Harrison and Second streets intersection would be reconfigured to eliminate uncontrolled (channelized) northbound right turns, and vehicles would be required to make a turn at the signalized intersection. The impetus for the modified configuration at the Second and Harrison streets intersection between the Bicycle Plan Project and Alternative 2 is to benefit pedestrian safety in the east crosswalk.

Under Alternative 2, on-street parking would generally be preserved on both sides of Second Street, except for the east side of the street between Bryant and Harrison streets, where the existing p.m. tow-away lane would be converted into a full-time right-turn lane. Additionally, parking spaces would be removed along Second Street northbound at Mission and Folsom streets and southbound at Mission, Howard, and Harrison streets to accommodate exclusive right-turn pockets under Alternative 2. The Bicycle Plan Project calls for retaining the existing combination of bus zones and flag stops along Second Street. It would only modify the placement of the nearside inbound Route 10 bus zone at Folsom Street to accommodate a right-turn pocket. In contrast, Alternative 2 would optimize stop placement, providing new bus bulbs at the same general locations where the bus boarding islands are proposed under the current project.

2.2.2 Traffic Signals under Alternative 2

Alternative 2 would include a new traffic signal at the intersection of Second Street and South Park Street. Separate bicycle/pedestrian signals in both directions at all intersections along Second Street, included under the proposed project, would not be provided under this alternative. Bicyclists would cross intersections with vehicular traffic, while weaving around right-turning vehicles, which is the typical bicycle lane design. Traffic signal timing along Second Street intersections would be modified to minimize traffic delay at intersections and facilitate smooth and coordinated flow of traffic along Second Street. However, cycle lengths would remain the same as the existing conditions at all intersections (60 seconds).

2.2.3 Comparison of Alternative 2 with the Proposed Project

The key differences between Alternative 2 and the proposed project are as follows:

- Alternative 2 would include Class II bicycle lanes, while the proposed project would include a grade separated cycle track (Class IV) on both sides of Second Street. Under both the proposed project and Alternative 2, these bicycle facilities would be accommodated by removing one travel lane in each direction.
- The northbound Second Street approach at Harrison Street would differ between Alternative 2 and the proposed project as follows: The northbound right-turn capacity would be reduced from two to one lane and the movement would be signalized under both conditions. However, Alternative 2 would include an exclusive left-turn lane, which would be eliminated under the proposed project.
- Alternative 2 would retain two exclusive eastbound left-turn lanes from Bryant Street to Second Street, while the proposed project would include only one such lane.
- Alternative 2 and the proposed project would eliminate most left turns, as seen in Table 3. However, Alternative 2 would allow left turns at two additional locations: northbound at Harrison Street, as discussed above, and from a shared northbound through-left lane at Brannan Street.
- Under Alternative 2, the southbound Second Street approach at Townsend Street would include a left-turn bay and a shared through-right lane. Under the proposed project, the southbound approach would include a right-turn bay and a shared through-left lane.
- Alternative 2 would include a p.m. peak tow-away, southbound left-turn lane along Hawthorne Street at Folsom Street. This lane is proposed as a mitigation measure for the proposed project at the significantly impacted Hawthorne and Folsom streets intersection.

- Alternative 2 would preserve curbside on-street parking and loading on both sides of the street along most of Second Street, except where right-turn lanes or pockets and bus bulbs are provided. In total, Alternative 2 would remove 28 parking spaces and 13 commercial loading zones, 5 of which would be relocated along Second Street and adjacent streets. It would also remove two passenger loading zones, one of which could be relocated within the same block. Under the proposed project, on-street parking would be provided on only one side of the street along most of Second Street, between the curbside bikeway and the travel lane. The proposed project would remove 125 on-street parking spaces and 19 motorcycle parking spaces. It would also remove 4 passenger loading zones and 27 commercial loading zones, 6 of which would be relocated.
- Alternative 2 would consolidate bus stop locations from 13 under existing conditions to 10. It would optimize or adjust the placement of the remaining bus stops, pursuant to the San Francisco Municipal Transportation Agency's (SFMTA's) Stop Spacing Guidelines, which is similar to the bus stop placement for the proposed project. Alternative 2 would provide bus bulbs at all stops except the Townsend outbound stop; the proposed project would provide bus boarding islands between the bikeway and travel lane at approximately the same locations.
- Alternative 2 would retain the existing signal cycle lengths at all locations and would not include a separate bicycle phase along Second Street. Under the proposed project, the traffic signals cycle length along Second Street would be increased to 90 seconds to accommodate the separate bicycle/pedestrian signal phases. To increase pedestrian and bicycle safety, no turns would be permitted during the pedestrian/bicycle phase under the proposed project.

2.3 ALTERNATIVE 3, CENTER-TURN LANE ALTERNATIVE

In early 2012, the SFPW, SFMTA, and the San Francisco Planning Department began reviewing prior proposals for the Second Street corridor and developing a refined design for the Second Street corridor. Four design themes emerged through public participation at community meetings in 2012: 1) bicycle lanes, 2) bicycle lanes with a center turn lane, 3) one-way cycle tracks, 4) and a two-way cycle track.[4] When surveyed at the September 2012 meeting, most participants preferred the concept with one-way cycle tracks. This concept was further refined and presented to the public in November 2012 and has been carried forward as the proposed project. The transportation impacts of the proposed project were analyzed in the Second Street Cycle Track TIS prepared by the CHS Consulting Group.

Participants at the September 2012 meeting also identified the bicycle lanes with a center-turn lane option as the second-most popular design (after the one-way cycle tracks design); this design concept was chosen for analysis as Alternative 3.

Alternative 3 would include a northbound and southbound Class II bicycle lane along Second Street, from Market to Townsend streets. Between Townsend and King streets, a northbound bicycle lane would be provided, and bicycle sharrows would be added to the southbound travel lane. The proposed bicycle lane would be accommodated by removing one travel lane in each direction along most of Second Street. To allow left turns at intersections and into the few existing driveways along Second Street, a two-way left-turn center lane would be provided along two sections of Second Street: between Market and Harrison streets and between South Park and Townsend streets. The two-way left-turn lanes would transition to

[4] Second Street Improvement Project Community Presentation by SFDPW (now SFPW) - Meeting Two, October 20, 2012 Available online at http://www.sfdpw.org/SecondStreet. Accessed October 14, 2014.

exclusive left-turn lanes northbound at Mission, Howard, and Brannan streets and southbound at Mission, Folsom, Harrison, Brannan, Townsend, and King streets, as seen in **Table 3**.

Additionally, northbound left turns would be permitted from shared lanes at Minna, Harrison, and Townsend streets and at South Park Street. No exclusive right-turn lanes and pockets would be provided along Second Street, except for a single northbound right-turn lane at Harrison Street. However, right turns would be permitted from the shared lane at all intersections where right turns are currently allowed.

Between Harrison and South Park streets, Alternative 3 would include two northbound lanes and one southbound lane. Between Harrison and Bryant streets, the northbound configuration would include a shared through-left lane, an exclusive right-turn lane, and a bicycle lane between these two lanes. To improve pedestrian safety at Second and Harrison streets, the southeast corner would be reconfigured to eliminate the two existing uncontrolled (channelized) northbound right-turn lanes; drivers would be required to make turns from the single right-turn lane at the intersection. Also, the eastbound left-turn lanes from Bryant to Second streets would be reduced from two lanes to one.

Alternative 3 would remove 24 commercial loading zones on Second Street. The majority of the commercial loading zones removed would be on the northern portion of Second Street. In addition, nine passenger loading zones would be removed, including the existing taxi and tour bus loading zones in front of the Marriott Hotel at the northeast corner of Second and Folsom streets. All parking and loading on the east side of Second Street would be removed. On-street curbside parking and loading would be provided on the west side of Second Street only between Market and Townsend streets. It would remain on both sides of the street between Townsend and King streets. Alternative 3 would provide bus stops in similar locations to the stop locations provided under the proposed project. Bus bulbs would be constructed at bus stops on the west side of Second Street, while stops on the east side of the street would be curbside bus zones.

2.3.1 Traffic Signals under Alternative 3

Alternative 3 would include a new traffic signal at the intersection of Second and South Park streets. Separate bicycle signals, included under the proposed project, would not be provided under this alternative. Bicyclists would cross intersections with vehicular traffic, which is typical for a traditional bicycle lane design. To improve traffic flow, traffic signal splits would be optimized along Second Street. However, under Alternative 3, cycle lengths would remain the same as under the existing conditions (60 seconds) at all intersections under existing plus Alternative 3 conditions, except at Second Street intersections with Howard, Folsom, and Harrison streets. To improve traffic capacity at these three intersections, the cycle length would be increased from 60 to 90 seconds under Alternative 3 conditions.

2.3.2 Comparison of Alternative 3 with the Proposed Project

The key differences between Alternative 3 and the proposed project are as follows:

- Alternative 3 would include Class II bicycle lanes and two-way left-turn center lanes that would transition to exclusive left-turn bays at intersections along Second Street. The proposed project would include a grade-separated cycle track on both sides of Second Street. Under both the proposed project and Alternative 3, these bicycle facilities would be accommodated by removing one travel lane in each direction.
- The northbound Second Street approach at Harrison Street under Alternative 3 would differ from the proposed project as follows:

  - Alternative 3 would include a shared through-left lane and an exclusive right-turn lane; a bicycle lane would be provided between these lanes. The proposed project would include a through lane and an exclusive right-turn lane, with a curbside grade-separated cycle track.
  - Similar to the proposed project, the northbound right-turn capacity would be reduced from two lanes to one lane and the movement would be signalized.
- Similar to the proposed project, Alternative 3 would include only one eastbound left-turn lane on Bryant Street at the Second Street intersection.
- Alternative 3 would retain all the existing left-turn opportunities along Second Street, as seen in **Table 3**, while the proposed project would eliminate most of these left turns.
- Alternative 3 would not provide right-turn pockets at locations other than northbound approach to Harrison Street, while the proposed project would provide right-turn pockets at nearly all locations where right-turns are allowed. Under Alternative 3, motorists merging into and turning from within the bicycle lane would make right turns.
- The southbound Second Street approach at Townsend Street would include a left-turn bay and a shared through-right lane under Alternative 3. Under the proposed project, the southbound approach would include a right-turn bay and a shared through-left lane.
- Alternative 3 would consolidate bus stop locations from 13 under existing conditions to 10. It would optimize or adjust the placement of the remaining bus stops, pursuant to the SFMTA's Stop Spacing Guidelines, which is similar to the proposed project. Alternative 3 would provide a combination of bus bulbs and bus zones at all stops except the Townsend outbound stop; the proposed project would provide bus boarding islands between the bikeway and travel lane at approximately the same locations.
- Alternative 3 would remove 91 parking spaces and 32 motorcycle spaces. Further, it would remove 24 commercial loading zones and 9 passenger loading zones. The proposed project would remove 125 on-street parking spaces and 19 motorcycle parking spaces. It would also remove 4 passenger loading zones and 28 commercial loading zones, 9 of which would be relocated.
- Alternative 3 would retain the signal cycle lengths at all locations, except along Second Street at the intersections with Howard, Folsom, and Harrison streets, where the cycle length would be increased to 90 seconds. The Second Street intersections would not include a separate bicycle phase under Alternative 3. Under the proposed project, the traffic signal cycle lengths along Second Street would be increased to 90 seconds to accommodate a separate bicycle signal phase; to increase pedestrian and bicycle safety, no turns would be permitted during the pedestrian/bicycle phase under the proposed project.

3. APPROACH TO ANALYSIS

The following section describes the method used to estimate traffic volumes. Also described are the roadway geometry and traffic signal timing characteristics used to analyze the traffic and transit impacts of the project alternatives during the p.m. peak hour. Similar to the proposed project, the project alternatives would not generate any new vehicles trips. However, changes to the street, such as reducing roadway capacity and turning opportunities and reconfiguring lane geometries, would alter travel patterns

in and around Second Street. This would impact the intersection operations, measured in terms of level of service (LOS), vehicle to capacity (v/c) ratio, as described below.

- **Intersection level of service.** LOS is used to describe how efficiently an intersection operates for automobile and truck traffic. The method used for signalized intersections generally defines LOS in terms of "control delay per vehicle," which refers to the average time drivers spend decelerating, stopping, and accelerating at traffic signals.

  Signalized intersection LOS is affected by traffic volumes, pedestrian volumes, intersection lane configuration, and signal timing and coordination in a corridor. LOS at unsignalized intersections is defined in terms of average delay experienced per driver along the stop controlled approaches at the intersection. According to the Highway Capacity Manual 2000, intersection LOS designations range from A, which indicates negligible delays with free flow speed (less than 10 seconds per vehicle for both signalized and unsignalized intersections) to F, which indicates delays with queuing that may block upstream intersections (greater than 80 seconds per vehicle for signalized intersections and greater than 50 seconds for unsignalized intersections).

- **Volume to capacity ratio.** The v/c ratio compares the roadway demand (the number of vehicles) to its traffic carrying capacity. A v/c ratio of less than 0.85 generally indicates that adequate capacity is available and motorists are not expected to experience significant queues and delays. As the v/c ratio approaches 1.0, traffic flow may become unstable, and delay and queuing conditions may occur. Once the demand exceeds the capacity (a v/c ratio greater than 1.0), traffic flow becomes unstable and excessive delay and queuing is expected. Under these conditions, more than one signal cycle may be required for motorists to pass through the intersection.

Transit delay analysis is based on transit travel-time delay (in seconds). The proposed project and Alternatives 2 or 3 would not generate any new transit trips. For comparison to the proposed project, the transit travel time impacts of the two alternatives were evaluated in this memorandum using the same method as was used to evaluate those of the proposed project.

3.1 Existing Plus Alternatives 2 and 3 Traffic Analysis

This section provides a brief discussion of the approach to develop traffic volumes and the traffic signal timing characteristics used for Alternatives 2 and 3. The roadway design for the proposed project and the alternatives would in general reduce roadway capacity for Second Street through movements, and at the northbound right turn to Harrison Street.

From a traffic perspective, the key difference between Alternative 2 and Alternative 3 is that Alternative 2 includes various left-turn prohibitions (similar to the proposed project), whereas Alternative 3 does not include left-turn prohibitions; the turn prohibitions are shown in Table 3.

3.1.1 Alternative 2, Bicycle Lanes Alternative

Similar to the proposed project, Alternative 2 prohibits many left-turn movements off of Second Street. The same diversion traffic pattern developed as a result of these left-turn prohibitions under the proposed project (discussed in Section 3 of the TIS) was used to develop the Alternative 2 traffic volumes by diverting existing traffic to parallel streets.

However, Alternative 2 would allow left turns at two additional locations along Second Street (compared to the proposed project), with an exclusive northbound left-turn lane at Harrison Street and a shared

northbound left-turn through lane at Brannan Street. Therefore, drivers making left turns, who would have diverted under the proposed project, would continue to travel on Second Street under Alternative 2 and to make those left turns. This would cause traffic volumes along Second Street to be relatively higher under Alternative 2, compared to the proposed project.

Under Alternative 2, the signal cycle length at all Second Street intersections would remain the same as under existing conditions (60 seconds). However, traffic signal timings along Second Street intersections would be modified to minimize traffic delay at intersections and to facilitate smooth and coordinated flow of traffic along Second Street. At intersections off of Second Street, signal cycle length and timings would remain the same as existing conditions under Alternative 2.

3.1.2 Alternative 3, Center-Turn Lane Alternative

Alternative 3 would retain left turns at all existing locations along Second Street. Therefore, left-turn drivers would continue to travel on Second Street and would not be diverted to parallel streets under Alternative 3, as compared to the proposed project. The only drivers expected to be diverted under Alternative 3 would be those who currently use the two northbound right-turn lanes from Second Street to Harrison Street to reach the Bay Bridge during the p.m. peak hour. This diversion would be from the reduction in Second Street northbound right-turn capacity from two to one lane at Harrison Street. The same diversion traffic pattern developed for this location under the proposed project scenario (discussed in Section 3 of the TIS) was used to develop the Alternative 3 scenario traffic volumes by diverting existing traffic to parallel streets.

Under Alternative 3, traffic signal timings along Second Street intersections would be modified to minimize traffic delay at intersections and to facilitate smooth and coordinated flow of traffic along Second Street. However, traffic cycle length under Alternative 3 would remain the same as existing conditions at nearly all intersections along Second Street (60 seconds). The exceptions are at Howard, Folsom, and Harrison streets, where signal cycle lengths would be increased to 90 seconds to improve traffic capacity.

3.2 Cumulative Conditions

The same method used to estimate the traffic diversion pattern for the two alternatives discussed in Section 3.1 above was used to develop the cumulative plus project alternative traffic estimates. Under the cumulative conditions, the 2040 cumulative (No Project Alternative) p.m. peak-hour traffic volumes were diverted to parallel streets to develop the traffic volumes for the two alternatives. Section 4.3.1 of the TIS has a detailed discussion about the planned transportation network changes and the methodology used to estimate traffic under 2040 cumulative conditions.

To improve traffic capacity along Second Street under the cumulative plus alternative conditions (applicable to both Alternatives 2 and 3), the traffic signal cycle lengths would be increased from 60 to 90 seconds under the cumulative conditions for both alternatives at all intersections along Second Street. Additionally, to improve traffic flow, traffic signal splits and offsets would be optimized along Second Street.

3.3 Transit Delay Analysis

Similar to the proposed project, neither of the alternatives would generate transit trips; therefore, a transit capacity utilization analysis has not been prepared for either alternative. However, the roadway

reconfiguration associated with both alternatives could result in added delay in transit travel time. Therefore, this memorandum includes the transit delay analysis for these alternatives.

The transit delay analysis used to estimate the impact of the alternatives on transit delay was originally developed in the San Francisco Bicycle Plan EIR and was used to analyze transit impacts for the proposed project. Details of the transit delay analysis method can be found in the TIS, Section 4.4.2, Transit Impacts.

4. IMPACT ANALYSIS

This section presents the significance criteria, the potential traffic and transit impacts of Alternatives 2 and 3 and feasible mitigation measures. It also compares the impacts of the alternatives with existing conditions and the impacts identified for the proposed project in the TIS.

4.1 SIGNIFICANCE CRITERIA

The analysis below of traffic impacts associated with Alternatives 2 and 3 is based on the same significance criteria used for the proposed project in the TIS. These criteria are as follows:

4.1.1 Traffic

The operational impact on signalized intersections is considered significant when alternative-related traffic would cause the intersection LOS to deteriorate from LOS D or better to LOS E or LOS F or from LOS E to LOS F.

Some intersections operate at LOS E or LOS F under existing conditions and would continue to operate at the same LOS under existing plus alternative conditions. For these intersections this analysis examines if the alternative has a substantial contribution to the poor operation, as described below:

- If the intersection is along Second Street, the level of contribution to the traffic impact is based on the v/c estimates. The alternative is considered to have a substantial contribution to the intersection's poor operation if its overall v/c is 10 percent higher under the existing plus alternative conditions than under the existing conditions. The same threshold of 10 percent increase applies for cumulative plus alternative conditions.
- If the intersection is located in the surrounding area (not along Second Street), the traffic impact would be considered significant if the level of contribution of the alternative to the intersection critical movement traffic volumes is more than 5 percent.

The operational impacts on unsignalized intersections are considered potentially significant under the following circumstances:

- Alternative-related traffic would cause the level of service at the worst approach to deteriorate from LOS D or better to LOS E or LOS F
- Caltrans traffic signal warrants would be met or would cause Caltrans signal warrants to be met when the worst approach is already at LOS E or LOS F

For signalized and unsignalized intersections that would have significant impacts under the existing plus alternative conditions, the analysis considers that significant impacts would continue under the cumulative conditions.

4.1.2 Transit

The alternative 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 alternative would have a significant effect on the transit provider if alternative-related transit trips would cause the capacity utilization standard to be exceeded during the p.m. peak hour. In addition, the alternative would have a significant effect on the environment if it were to result in substantial conflicts with transit operations, cause substantial delay to transit operations, or impede access to transit users.

4.1.3 Loading

An alternative would have a significant effect on the environment if it would result in a loading demand from adjacent land uses during the peak hour of loading activities that could not be accommodated within on-site loading facilities or within the supply of convenient on-street loading zones. This would also be significant if it would create potentially hazardous conditions or significant delays affecting traffic, transit, bicyclists, or pedestrians.

4.1.4 Parking

The alternative would have a significant effect on the environment if it would result in a substantial parking shortfall that could create hazardous conditions or significant delays, affecting traffic, transit, bicyclists, or pedestrians. Effects also would be significant where particular characteristics of the alternative or its site demonstrably render use of other modes infeasible.

4.2 ALTERNATIVE 2

This section evaluates the traffic and transit impacts associated with Alternative 2 relative to existing conditions. It also identifies feasible mitigation measures and compares Alternative 2 impacts to those of the proposed project.

4.2.1 Traffic Impacts under Alternative 2

Table 4 shows the LOS and delay data for the study intersections under the existing, existing plus project, and existing plus Alternative 2 conditions. Intersection volumes and LOS calculations are provided in **Appendix A**.

Significant Impacts under Alternative 2

Under existing plus Alternative 2 conditions, 12 of the 29 study intersections would operate at unacceptable LOS E or F. The traffic operations at 5 of the 12 study intersections would degrade from acceptable LOS D or better to unacceptable LOS E or LOS F as a result of the changes in traffic patterns under Alternative 2. At one of the nine intersections, traffic operations would degrade form LOS E to LOS F due to the changes in traffic patterns under Alternative 2. In addition, at three of the 12 unacceptably operating intersections, Alternative 2 was determined to contribute substantially to the poor operation. Therefore, the Alternative 2 traffic impacts would be significant at nine of these 12 unacceptably operating intersections. At the remaining three unacceptably operating intersections, Alternative 2 would result in less-than-significant impact findings, as discussed in the next section.

Table 4: Intersection Level of Service: Existing, Existing Plus Alternative 2, and Existing Plus Project – Weekday P.M. Peak Hour

#	Intersection	Overall Intersection Summary								
		Existing			Existing Plus Alternative 2			Existing Plus Project		
		Delay[1] (Seconds)	V/C[2]	LOS	Delay[1] (Seconds)	V/C[2]	LOS	Delay[1] (Seconds)	V/C[2]	LOS
1	Market and Montgomery streets	51.0		D	77.8	**1.01**	**E**	**77.8**	**1.01**	**E**
2	Mission and New Montgomery streets	**61.3**	**1.04**	**E**	> 80	**1.13**	**F**	**>80**	**1.13**	**F**
3	Howard and New Montgomery streets	39.5		D	73.4	**0.95**	**E**	**77.2**	**0.95**	**E**
4	Howard and Hawthorne streets	19.6		B	60.4	**1.10**	**E**	**61.9**	**1.10**	**E**
5	Folsom and Hawthorne streets	**74.5**	**1.08**	**E**	48.3		D	**>80**	**1.24**	**F**
6	Harrison and Hawthorne streets	43.4		D	77.1	**1.24**	**E**	**71.0**	**1.24**	**E**
7	Bryant and Third streets	41.1		D	25.6		C	26.9		C
8	Brannan and Third streets	32.0		C	41.7		D	46.7		D
9	Townsend and Third streets	31.1		C	42.0		D	48.0		D
10	King and Third streets	**> 80**	**0.97**	**F**	**> 80**	**0.99**	**F**	**>80**	**1.00**	**F**
11	Market and Second streets	10.8		B	10.9		B	9.0		A
12	Mission and Second streets	15.0		B	14.2		B	30.3		C
13	Minna and Second streets	16.5		C (WB)	0.4		A (SB)	0.4		A (SB)
14	Howard and Second streets	16.8		B	12.5		B	23.1		C
15	Folsom and Second streets	**64.6**	**0.94**	**E**	23.4		C	30.7		C
16	Harrison and Second streets	42.3		D	> 80	**1.86**	**F**	**>80**	**2.00**	**F**
17	Bryant and Second streets	**> 80**	**1.30**	**F**	67.1	**1.10**	**E**	**>80**	**1.53**	**F**
18	South Park and Second streets	**> 80**	**NA**	**F (EB)**	4.0		A	4.6		A
19	Brannan and Second streets	14.4		B	23.8		C	37.7		D
20	Townsend and Second streets	14.5		B	11.4		B	16.7		B
21	King and Second streets	42.9		D	40.2		D	39.0		D
22	Folsom and Essex streets	30.3		C	17.6		B	13.5		B
23	Harrison and Essex streets	**> 80**	**2.23**	**F**	> 80	**1.83**	**F**	**>80**	**1.92**	**F**
24	Market and First streets	14.9		B	14.9		B	14.9		B
25	Mission and First streets	23.0		C	20.9		C	25.2		C
26	Howard and First streets	18.3		B	10.2		B	10.2		B
27	Folsom and First streets	**> 80**	**1.26**	**F**	> 80	**1.42**	**F**	**>80**	**1.42**	**F**
28	Harrison and First streets	**> 80**	**1.44**	**F**	> 80	**1.60**	**F**	**>80**	**1.60**	**F**
29	Fifth and Bryant streets and the I-80 eastbound on-ramp	**> 80**	**1.34**	**F**	> 80	**1.37**	**F**	**>80**	**1.37**	**F**

Notes:
Bold indicates an intersection with unacceptable LOS E or F.
Shaded values indicate a significant project-level traffic impact.

[1]LOS and delay for signalized intersections represent conditions for the overall intersection; LOS and delay for unsignalized (e.g., two-way stop control [TWSC]) intersections represent conditions for the side-street stop-controlled approach, eastbound (EB); westbound (WB).
[2]V/c ratios are presented only for intersections that operate at unacceptable LOS E or F, pursuant to the City's Transportation Impact Assessment Guidelines. V/c provides additional information on delay and congestion, which is useful when an intersection is operating at a poor level of service.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

Intersections Deteriorating from Acceptable Performance (LOS D or Better) under Existing Conditions to Unacceptable LOS E or LOS F under Existing Plus Alternative 2 Conditions and Resulting in Significant Impacts

The traffic operations at the following five intersections would degrade from acceptable LOS D or better under existing conditions to unacceptable LOS E or F as a result of the changes in traffic patterns under Alternative 2:

- #1 Market and Montgomery streets
- #3 Howard and New Montgomery streets
- #4 Howard and Hawthorne streets
- #6 Harrison and Hawthorne streets
- #16 Harrison and Second streets

Since Alternative 2 would cause the levels of service at these five intersections to deteriorate from acceptable levels to LOS E or F, the traffic impact of Alternative 2 would be significant.

Intersections Operating at Unacceptable LOS E or F under Existing and Existing Plus Alternative 2 Conditions and Resulting in Significant Impacts

The four intersections listed below would perform at unacceptable LOS E or F under both existing and existing plus Alternative 2 conditions.

- #2 Mission and New Montgomery streets
- #10 King and Third streets
- #28 Harrison and First streets
- #29 Fifth and Bryant streets and the I-80 eastbound on-ramp

At the #2 Mission and New Montgomery streets intersection, traffic diversions would increase traffic along southbound New Montgomery Street and eastbound Mission Street. This would cause the intersection operations to deteriorate from LOS E under existing conditions to LOS F under existing plus Alternative 2 conditions. Therefore, Alternative 2 would have a significant traffic impact at this intersection.

The remaining three intersections would perform at the same LOS E or LOS F under existing and existing plus Alternative 2 conditions. Based on the significance criteria described above, these interactions were reviewed to determine if Alternative 2 would contribute substantially to the poor operation of the intersections. The traffic contribution estimates show that Alternative 2 traffic would exceed the significance threshold by contributing more than 5 percent traffic volume to the critical movements at these intersections. Therefore, the traffic impact on these intersections under Alternative 2 would be significant. (Detailed contribution calculations are provided in **Appendix B**.)

Mitigation Measures

Alternative 2 would result in a significant traffic impact at 9 of the 29 study intersections. The mitigation measures proposed in the TIS to reduce the proposed project's impacts at two of the intersections, #3 Howard and New Montgomery streets and #4 Howard and Hawthorne streets, are also proposed at these same intersections to mitigate Alternative 2 impacts to less-than-significant levels.

Mitigation Measure M-TR-1: Increase Signal Cycle Length. The #3 Howard and New Montgomery streets intersection traffic signal would operate at LOS E on a 60-second cycle under the existing plus Alternative 2 conditions. Increasing the signal cycle length to 90 seconds under Alternative 2 would improve the intersection operation from LOS E to D. This would reduce the impact of Alternative 2 to a less-than-significant level. Therefore, traffic impacts at this intersection under Alternative 2 would be less than significant with mitigation.

Mitigation Measure M-TR-2: Increase Signal Cycle Length. The #4 Howard and Hawthorne streets intersection traffic signal operates at LOS E on a 60-second cycle under existing plus Alternative 2 conditions. Increasing the signal cycle length to 90 seconds under Alternative 2 conditions would improve the intersection operation from LOS E to LOS B; this would reduce the impact of Alternative 2 conditions at this intersection to a less-than-significant level. Therefore, traffic impacts at this intersection under Alternative 2 would be less than significant with mitigation.

No feasible mitigation measures have been identified for Alternative 2 at the remaining seven significantly impacted intersections. This is due to right-of-way constraints as well as incompatibilities with the multimodal character of this alternative. In San Francisco, the range of feasible traffic mitigation measures is typically limited due to physical constraints and competing priorities for the use of the available right-of-way. Additional travel lanes cannot be created because that would require narrowing or removing sidewalks or demolishing structures. While curbside parking and loading lanes can sometimes be converted to travel lanes during peak periods (also known as tow-away lanes), in downtown San Francisco providing on-street loading is critical, and the street network has already been optimized to balance the needs of loading versus traffic flow.

In addition, left turns off of two-way streets can sometimes be prohibited to mitigate traffic impacts (as left-turning vehicles block intersections while waiting for a safe time to turn). However, this is already proposed for some intersections under Alternative 2 (off of Second Street). Therefore, this tool is not applicable as a mitigation for this alternative. The only feasible mitigation measure is optimization of timing at signalized intersections, specifically, increasing the signal cycle length to 90 seconds and modifying green splits, as proposed for two intersections discussed above. Increasing signal cycle length and signal timing modifications would not improve intersection performance at the remaining seven significantly impacted intersections to less than significant levels. Because of this, these measures were not proposed for implementation at these seven intersections. Further, cycle lengths above 90 seconds create only marginal additional traffic capacity for congested movements, while substantially increasing delay for uncongested movements (as well as pedestrians and bicycles). Therefore, impacted signalized intersections with a cycle length at or above 90 seconds cannot be lengthened further.

For the above reasons, the traffic impacts under Alternative 2 would be significant and unavoidable at the following seven intersections:

- #1 Market and Montgomery streets
- #2 Mission and New Montgomery streets
- #6 Harrison and Hawthorne streets
- #10 King and Third streets
- #16 Harrison and Second streets

- #28 Harrison and First streets
- #29 Fifth Street, Bryant Street, and the I-80 eastbound on-ramp

Less-than-Significant Impacts under Alternative 2

Under existing plus Alternative 2 conditions, 17 of 29 study intersections would continue to operate at acceptable LOS D or better, as shown in Table 4. At 3 of the 12 remaining intersections with unacceptable LOS E or F, Alternative 2 was determined not to contribute substantially to the poor intersection operation. Thus, the Alternative 2 traffic impacts would be less than significant at 20 of the 29 intersections studied.

Intersections Operating Acceptably (LOS D or Better) under Existing Plus Alternative 2 and Resulting in Less-than-Significant impacts

Seventeen intersections listed below would operate at acceptable LOS D or better under existing plus Alternative 2 conditions:

- #5 Folsom and Hawthorne streets
- #7 Bryant and Third streets
- #8 Brannan and Third streets
- #9 Townsend and Third streets
- #11 Second and Market streets
- #12 Second and Mission streets
- #13 Second and Minna streets
- #14 Second and Howard streets
- #15 Second and Folsom streets
- #18 Second and South Park streets
- #19 Second and Brannan streets
- #20 Second Street and Townsend streets
- #21 Second and King streets
- #22 Essex and Folsom streets
- #24 First and Market streets
- #25 First and Mission streets
- #26 First and Howard streets

At three of these intersections, operations would improve from unacceptable LOS E or F under existing conditions to acceptable LOS D or better under Alternative 2. These intersections are #5 Folsom and Hawthorne streets, #15 Second and Folsom streets, and #18 South Park and Second streets. These are described in more detail below.

- **#5 Folsom and Hawthorne streets—**The addition of p.m. peak, southbound, left-turn storage at Hawthorne and Folsom streets under Alternative 2 would cause the #5 Folsom and Hawthorne streets intersection operations to improve from unacceptable LOS E to acceptable LOS D.

- **#15 Second and Folsom streets—**Under Alternative 2, traffic volumes would be reduced along northbound and southbound Second Street, while through movements and traffic volumes on eastbound Folsom Street would increase (due to diverted traffic volumes off of Second Street). In addition, Alternative 2 would result in changes in signal timing at this intersection, along with optimization, thereby allowing for additional green-signal time in the eastbound Folsom Street approach. Because of this additional green time and the reduction in volumes along Second Street, the weighted-average delay of the overall intersection would decrease and the intersection would improve from unacceptable LOS E to acceptable LOS C.
- **#18 South Park and Second streets—**Under Alternative 2, adding a signal at this intersection would substantially improve operations from LOS F under existing conditions to LOS A under Alternative 2 conditions.

Since Alternative 2 would improve the traffic operations at these three intersections to acceptable LOS D or better, the traffic impacts on these intersections under this alternative would be less than significant.

The remaining 14 of 17 study intersections would perform acceptably under the existing conditions and existing plus Alternative 2 conditions. Since Alternative 2 would not cause the levels of service at these intersections to deteriorate to E or F, the traffic impacts under this alternative would be less than significant.

Intersections Operating Unacceptably (LOS E or F) under Existing Plus Alternative 2 Conditions and Resulting in Less-than-Significant Impacts

Alternative 2 would not contribute substantially to the unsatisfactory operation at the following three intersections, even though these intersections would continue to perform at LOS E or F during the p.m. peak hour:

- #23 Harrison and Essex streets
- #27 Folsom and First streets
- #17 Bryant and Second streets

Alternative 2 would not add any traffic to the critical movements at the #23 Harrison and Essex streets and #27 Folsom and First streets intersections. Therefore, the traffic impact on these intersections would be less than significant under Alternative 2.

At the #17 Bryant and Second streets intersection, the reduction in traffic due to diversion would cause this intersection's level of service to improve from F under existing conditions to E under Alternative 2 conditions. Additionally, with signal timing changes and optimization, the intersection v/c would be reduced from 1.30 to 1.10. Therefore, the traffic impact at this intersection would be less than significant under Alternative 2. (Detailed contribution calculations are provided in **Appendix B**.)

Comparison of Traffic Impacts of Alternative 2 and the Proposed Project

Under the proposed project, the traffic signal timing along the length of Second Street would be 90 seconds. This would accommodate a separate bicycle signal phase at all Second Street intersections such that bicycles and pedestrians would proceed through the intersection without conflicting with turning traffic; therefore, it would improve bicycle and pedestrian safety. However, under Alternative 2, signal cycle length at all intersections would remain the same as under existing conditions, with a 60-second cycle and without a separate bicycle/pedestrian phase. The lack of a separate bicycle/pedestrian phase

under Alternative 2, compared to the proposed project, would increase intersection capacity for vehicular traffic and result in less-congested intersections during the peak hour. Therefore, under Alternative 2 the levels of service and delays at acceptably performing intersections along Second Street would be better when compared to the proposed project. However, by not including the separate bicycle/pedestrian phase, Alternative 2 would result in additional conflicts between turning motorists and bicyclists and between turning motorists and pedestrians; therefore, reducing bicyclist and pedestrian safety, compared to the proposed project.

Under Alternative 2, nine intersections would result in a significant impact, compared to 11 intersections with significant impacts under the proposed project (see Table 4). The proposed project would cause significant traffic impacts at the same nine intersections and at two additional intersections—#5 Folsom and Hawthorne streets and #17 Bryant and Second streets. Under Alternative 2, mitigations to reduce the traffic impacts to less-than-significant level are proposed at #3 Howard and New Montgomery streets and #4 Howard and Hawthorne streets. Based on the TIS, project impacts would be mitigated to less than significant at the same two intersections as Alternative 2, and additionally at intersection #5 Folsom and Hawthorne streets. Therefore, Alternative 2 would cause significant and unavoidable traffic impacts at seven intersections compared to eight intersections under the proposed project. Intersection #17 Bryant and Second streets would have less-than-significant impacts under Alternative 2 and significant and unavoidable impacts under the proposed project.

Of the intersections with significant impacts under both Alternative 2 and the proposed project, Table 4 shows that the level of service, delay, and v/c ratio are similar at most intersections. However, compared to the proposed project conditions, Alternative 2 would relatively improve traffic operations at three intersections, as discussed below.

- **#5 Folsom and Hawthorne streets—**This intersection's level of service would improve under Alternative 2 compared to the proposed project. The proposed project would not include a southbound left-turn pocket at this intersection; the increase in southbound traffic would further deteriorate operations from LOS E under existing conditions to LOS F under the proposed project. Thus the proposed project would cause a significant impact at this intersection. However, a southbound left-turn pocket along Hawthorne Street is proposed as a feasible mitigation measure for this intersection under the existing plus proposed project scenario in the TIS. Its purpose is to reduce the impact at this intersection to less than significant. Under Alternative 2, the addition of p.m. peak, southbound, left-turn storage at the Hawthorne and Folsom streets intersection would cause its operations to improve from unacceptable LOS E to acceptable LOS D; thus Alternative 2 would cause less-than-significant impacts at this intersection.
- **#16 Harrison and Second streets—**Although this intersection performs at LOS F under the proposed project and Alternative 2, the v/c ratio under Alternative 2 would improve, compared to the proposed project's v/c ratio. Under the proposed project, a grade-separated cycle track would be provided along northbound and southbound Second Street, along with a separate bicycle signal phase without any turning movement conflicts. These features would enhance bicycle safety. However, they would increase average vehicular traffic delay and v/c ratio for drivers using this intersection. Compared to the proposed project, the signal cycle length under Alternative 2 would be shorter and would not include a separate bicycle phase. With the traffic signal condition, the v/c ratio under Alternative 2 would be better than under the proposed project, with ratios of 1.86

and 2.0, respectively. Although traffic at this intersection would experience extensive congestion under both scenarios because the v/c ratio is greater than 1 (as described in Section 3 above), traffic would clear through this intersection faster under Alternative 2 relative to the proposed project. However, the lack of a separate bicycle signal phase under Alternative 2 would reduce bicycle safety compared to the proposed project (although Alternative 2 would provide more bicycle safety than existing conditions).

- **#17 Bryant and Second streets—**This intersection's level of service would improve under Alternative 2 compared to the proposed project. It operates at unacceptable LOS F under existing conditions and would continue to operate at LOS F under the proposed project. This would be due to the reduction in eastbound left-turn capacity from two lanes to one. The v/c ratio would increase from 1.3 to 1.53 under the proposed project. This would represent a growth in the overall intersection v/c ratio of 18 percent, which would exceed the significance threshold of 10 percent (as described under Section 4.1 above). Therefore, it would result in a significant traffic impact under the existing plus proposed project conditions. Under Alternative 2, the availability of two eastbound left-turn lanes and the reduction in intersection traffic due to diversion would cause this intersection's level of service to improve from F to E. Additionally, with signal timing changes and optimization, the intersection v/c ratio would be reduced from 1.30 to 1.10. Therefore, the traffic impact at this intersection would be less than significant under Alternative 2.

4.2.2 Cumulative Traffic Impacts under Alternative 2

Table 5 presents the level of service and delay data for the 29 study intersections under the cumulative, cumulative plus project, and cumulative plus Alternative 2 conditions. (Intersection volumes and LOS calculations are provided in **Appendix A**.)

Significant Cumulative Impacts

Under cumulative plus Alternative 2 conditions, 20 of the 29 study intersections would operate at unacceptable LOS E or F. The traffic operations at two of these 20 study intersections would degrade from acceptable LOS D or better under cumulative conditions to unacceptable LOS E or F under cumulative plus Alternative 2 conditions.

The traffic operations at one additional intersection would degrade from LOS E under cumulative conditions to LOS F under cumulative plus Alternative 2 conditions. This would result from the change in traffic pattern under Alternative 2. At another nine of the 20 unacceptably operating intersections, Alternative 2 was determined to contribute considerably to the poor operations. At the remaining eight unacceptably operating intersections, Alternative 2 would not contribute considerably to the significant cumulative traffic impact and would have less-than-significant cumulative traffic impacts, as discussed below.

In addition, intersection #4 Howard and Hawthorne streets would operate at acceptable LOS D under cumulative plus Alternative 2 conditions. However, because a significant traffic impact was identified at this intersection under the existing plus Alternative 2 conditions, the cumulative traffic impact would continue to be significant under cumulative conditions. Thus, Alternative 2 would contribute considerably to cumulative traffic impacts at 13 of the 29 study intersections.

Table 5: Intersection Level of Service: Cumulative, Cumulative Plus Alternative 2, and Cumulative Plus Project – Weekday P.M. Peak Hour

		Overall Intersection Summary								
		Cumulative			Cumulative Plus Alternative 2			Cumulative Plus Project		
#	Intersection	Delay[1] (Seconds)	V/C[2]	LOS	Delay[1] (Seconds)	V/C[2]	LOS	Delay[1] (Seconds)	V/C[2]	LOS
1	Market and Montgomery streets	**> 80**	1.02	**F**	**> 80**	**1.13**	**F**	**> 80**	1.13	**F**
2	Mission and New Montgomery streets	**> 80**	1.36	**F**	**> 80**	**1.47**	**F**	**> 80**	1.47	**F**
3	Howard and New Montgomery streets	17.5		B	**57.5**	**1.05**	**E**	**55.9**	1.05	**E**
4	Howard and Hawthorne streets	12.0		B	42.7		D[3]	42.7		D[3]
5	Folsom and Hawthorne streets	**> 80**	1.98	**F**	**> 80**	**2.05**	**F**	**> 80**	2.05	**F**
6	Harrison and Hawthorne streets	30.5		C	**> 80**	**1.38**	**F**	**> 80**	1.38	**F**
7	Bryant and Third streets	**> 80**	2.88	**F**	**> 80**	**2.90**	**F**	**> 80**	2.91	**F**
8	Brannan and Third streets	**> 80**	1.30	**F**	**> 80**	**1.43**	**F**	**> 80**	1.51	**F**
9	Townsend and Third streets	**> 80**	1.69	**F**	**> 80**	**2.93**	**F**	**> 80**	2.40	**F**
10	King and Third streets	**> 80**	1.34	**F**	**> 80**	**1.38**	**F**	**> 80**	1.39	**F**
11	Market and Second streets	10.5		B	15.3		B	15.6		B
12	Mission and Second streets	24.4		C	29.3		C	41.1		D
13	Minna and Second streets	0.6		A	0.4		A	0.4		A
14	Howard and Second streets	**> 80**	1.20	**F**	31.7		C	**> 80**	1.03	**F**
15	Folsom and Second streets	**> 80**	1.62	**F**	**> 80**	**1.52**	**F**	**> 80**	1.72	**F**
16	Harrison and Second streets	**> 80**	2.58	**F**	**> 80**	**3.87**	**F**	**> 80**	3.39	**F**
17	Bryant and Second streets	**> 80**	2.26	**F**	**> 80**	**1.63**	**F**	**> 80**	2.56	**F**
18	South Park and Second streets	**61.0**		**F**	11.6		B	10.7		B
19	Brannan and Second streets	31.8		C	26.0		C	31.6		C
20	Townsend and Second streets	**73.3**	1.20	**E**	**> 80**	**1.54**	**F**	**> 80**	1.34	**F**
21	King and Second streets	**> 80**	1.03	**F**	**> 80**	**0.92**	**F**	**> 80**	0.90	**F**
22	Folsom and Essex streets	**> 80**	6.50	**F**	**> 80**	**3.48**	**F**	**> 80**	2.84	**F**
23	Harrison and Essex streets	**> 80**	3.73	**F**	**> 80**	**3.30**	**F**	**> 80**	3.30	**F**
24	Market and First streets	17.8		B	19.8		B	18.2		B
25	Mission and First streets	33.7		C	29.2		C	27.0		C
26	Howard and First streets	**> 80**	1.21	**F**	**> 80**	**1.24**	**F**	**> 80**	1.24	**F**
27	Folsom and First streets	**> 80**	2.48	**F**	**> 80**	**2.59**	**F**	**> 80**	2.59	**F**
28	Harrison and First streets	**> 80**	1.55	**F**	**> 80**	**1.74**	**F**	**> 80**	1.74	**F**
29	Fifth Street and Bryant Street and the I-80 eastbound on-ramp	**> 80**	3.37	**F**	**> 80**	**3.32**	**F**	**> 80**	3.32	**F**

Notes:
Bold indicates an unacceptable intersection LOS E or F.
Shaded values indicate a significant project-level traffic impact.

[1]LOS and delay for signalized intersections represent conditions for the overall intersection; LOS and delay for unsignalized (e.g., TWSC) intersections represent conditions for the side-street stop-controlled approach, eastbound and westbound.
[2]V/c ratios are presented only for intersections that operate at unacceptable LOS E or F, per City standards.
[3]Intersection #4 Howard and Hawthorne streets was identified as contributing a significant impact under existing plus the proposed project; therefore, it is identified as having a significant impact under the cumulative conditions. Also, this intersection would operate at unacceptable LOS F under cumulative plus the proposed project if the Central SoMa Plan and its associated reduction in traffic volumes on Howard Street were not adopted.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

Intersections Deteriorating from Acceptable Performance (LOS D or Better) under Cumulative Condition to Unacceptable LOS E or F under Cumulative Plus Alternative 2 Conditions and Resulting in Significant Impacts

Under cumulative plus Alternative 2 conditions, traffic operations at 2 of 29 study intersections would degrade from acceptable LOS D or better under cumulative conditions to unacceptable LOS E or F. These intersections are #3 Howard and New Montgomery streets and #6 Harrison and Hawthorne streets.

Changes to traffic patterns or traffic diversions under Alternative 2 would cause the level of service at the #3 Howard and New Montgomery streets intersection to deteriorate from LOS B to LOS E. Further, the level of service at the #6 Harrison and Hawthorne streets intersection would deteriorate from LOS C to LOS F. Therefore, Alternative 2 would result in significant cumulative traffic impacts at these two intersections.

Intersections Operating at Unacceptable LOS E or F under Cumulative and Cumulative Plus Alternative 2 Conditions and Resulting in Significant Impacts

Traffic operations at the ten intersections listed below would perform at unacceptable LOS E or F under both the cumulative and cumulative plus Alternative 2 conditions.

- #1 Market and Montgomery streets
- #2 Mission and New Montgomery streets
- #7 Bryant and Third streets
- #8 Brannan and Third streets
- #9 Townsend and Third streets
- #10 King and Third streets
- #16 Harrison and Second streets
- #20 Townsend and Second streets
- #28 Harrison and First streets
- #29 Fifth Street, Bryant Street, and the I-80 eastbound on-ramp

At the #20 Townsend and Second streets intersection, diversions would increase traffic along the Townsend Street eastbound left turn and Second Street southbound right turn. This would cause the intersection operations to deteriorate from LOS E under cumulative conditions to LOS F under cumulative plus Alternative 2 conditions. Therefore, Alternative 2 would result in significant cumulative traffic impacts at this intersection.

The remaining nine intersections would perform at the same LOS E or LOS F under cumulative and cumulative plus Alternative 2 conditions. Based on the significance criteria described above, these intersections were analyzed to determine if Alternative 2 would contribute considerably to their poor traffic operation. For intersections along Second Street operating with reduced capacity, an increase in v/c ratio of over 10 percent was used as the significance criteria; for intersections not on Second Street, a 5 percent increase in traffic volumes to the critical movement traffic volume was used as the significance criteria.

The analysis results show that the traffic contribution of Alternative 2 to the unsatisfactory operations at these nine intersections under cumulative conditions would exceed the significance thresholds, as

discussed below; therefore, contribution of Alternative 2 to the poor operations at each of the nine intersections would be cumulatively considerable and would result in significant cumulative traffic impacts at these intersections.

At the #16 Harrison and Second streets intersection, traffic diverting to the congested eastbound Harrison Street movement would cause intersection v/c ratio to increase from 2.58 under cumulative conditions to 3.87 under cumulative plus Alternative 2 conditions. This would result in a growth in the overall intersection v/c ratio of 50 percent, which would exceed the significance threshold of 10 percent, as discussed under Section 4.1, Significance Criteria. Therefore, Alternative 2 would contribute considerably to significant cumulative traffic impacts and would result in significant cumulative impacts at this intersection.

At the remaining eight intersections listed above, due to traffic diversions, Alternative 2 would contribute more than 5 percent of the traffic volume to the critical movement. Therefore, traffic impacts under cumulative plus Alternative 2 conditions would exceed the significance threshold, as discussed in the Significance Criteria Section 4.1. As such, Alternative 2 would contribute considerably to the cumulative traffic impacts at these intersections and would result in significant cumulative traffic impacts (Detailed contribution calculations are provided in **Appendix B**).

Mitigation Measures

As shown in **Table 5**, before mitigation, Alternative 2 would result in significant cumulative traffic impacts at 13 of the 29 study intersections. This is because it would result in a significant cumulative traffic impact at four intersections and would contribute considerably to the significant cumulative traffic impacts at nine intersections, as discussed above in the Significant Cumulative Impacts section Feasible mitigation to reduce cumulative traffic impacts to a less-than-significant level was identified for only the following intersection:

Mitigation Measure M-TR-4, Reconfiguring the southbound movements: At the #20 Townsend and Second streets intersection, there is a southbound exclusive left-turn pocket and a southbound shared lane, serving both the southbound-through and southbound-right movements. As a mitigation measure, restriping the southbound left-turn pocket to a shared through-left movement and the adjacent shared southbound through-right lane to an exclusive right-turn lane would improve the intersection operation from LOS F to D. With the implementation of Mitigation Measure M-TR-4, the intersection of Townsend and Second streets would operate at an acceptable LOS, and the cumulative impact at this intersection would be less than significant with mitigation.

No feasible mitigation measures have been identified for the intersections listed below due to right-of-way constraints. In general, the existing right-of-way within San Francisco cannot be expanded. Trade-offs need to be made when the goal of a project is to improve facilities to accommodate alternate modes of travel, such as pedestrians, bicycles, and transit, within the existing right-of-way, as proposed under Alternative 2 or the proposed project. In a constrained environment such as the right-of-way in San Francisco, mitigation measures that would preclude implementing facilities for other modes may not be possible. Therefore, cumulative traffic impacts would remain significant and unavoidable for these 12 intersections below.

- #1 Market and Montgomery streets
- #2 Mission and New Montgomery streets

- #3 Howard and New Montgomery streets
- #4 Howard and Hawthorne streets[5]
- #6 Harrison and Hawthorne streets
- #7 Bryant and Third streets
- #8 Brannan and Third streets
- #9 Townsend and Third streets
- #10 King and Third streets
- #16 Harrison and Second streets
- #28 Harrison and First streets
- #29 Fifth Street/Bryant Street/I-80 eastbound on-ramp

Less-than-Significant Cumulative Impacts under Alternative 2

Under cumulative plus Alternative 2 conditions, 9 of the 29 study intersections would continue to operate at acceptable LOS D or better, as seen in **Table 5**. The Intersection at #4 Howard and Hawthorne streets would operate at acceptable LOS D under cumulative plus Alternative 2 conditions. However, since a significant traffic impact was identified at this intersection under the existing plus Alternative 2 conditions, the cumulative traffic impacts would continue to be significant. Therefore, intersection #4 is discussed in the significant cumulative impacts section above. In addition, at 8 of the remaining 20 study intersections that would operate at unacceptable LOS E or F under cumulative plus Alternative 2 conditions, Alternative 2 was determined not to contribute considerably to the poor operation. Thus, Alternative 2 cumulative traffic impacts would be less than significant at 16 of the 29 study intersections.

Intersections Operating Acceptably (LOS D or Better) under Cumulative Plus Alternative 2 and Resulting in Less-than-Significant Impacts

Eight intersections, excluding #4 Howard and Hawthorne streets (discussed above), would operate at acceptable LOS D or better under cumulative plus Alternative 2 conditions. These eight intersections are as follows:

- #11 Second and Market streets
- #12 Second and Mission streets
- #13 Second and Minna streets
- #14 Second and Howard streets
- #18 Second and South Park streets
- #19 Second and Brannan streets
- #24 First and Market streets
- #25 First and Mission streets

[5] This intersection would operate at unacceptable LOS F under cumulative plus Alternative 2 conditions if the Central SoMa Plan, and its associated reduction in traffic volumes on Howard Street, was not adopted. Due to the uncertainty of the adoption of the Central SoMa Plan, this impact at this intersection would remain *significant and unavoidable.*

At #14 Second and Howard streets and #18 Second and South Park streets, traffic operations would improve from unacceptable LOS E or F under cumulative conditions to acceptable LOS D or better under cumulative plus Alternative 2 conditions.

- **#14 Howard and Second streets—**Under Alternative 2, reducing traffic by diverting it, changing the geometry, and increasing the signal green time for the heavy westbound movement would improve the intersection operations from unacceptable LOS F under cumulative conditions to acceptable LOS C under cumulative plus Alternative 2 conditions.
- **#18 Second and South Park streets—**Adding a signal at the intersection of South Park and Second streets under cumulative plus Alternative 2 conditions would substantially improve operations from LOS F under cumulative conditions to LOS B under cumulative plus Alternative 2 conditions.

Since Alternative 2 would improve the traffic operations at these two intersections to acceptable LOS D or better, the cumulative traffic impact of Alternative 2 would be less than significant.

The remaining six intersections listed above would perform acceptably under the cumulative condition and cumulative plus Alternative 2 conditions. Since Alternative 2 would not cause the level of service at these six intersections to deteriorate to E or F, traffic impacts would be less than significant under Cumulative plus Alternative 2 conditions.

Intersections Operating at Unacceptable LOS E or F under Cumulative and Cumulative Plus Alternative 2 Conditions but Resulting in Less-than-Significant Impacts

Alternative 2 would not contribute considerably to the unsatisfactory operation at the following eight intersections under cumulative conditions, even though these intersections would continue to perform at LOS E or F under Cumulative plus Alternative 2 conditions during the p.m. peak hour:

- #5 Folsom and Hawthorne streets
- #15 Folsom and Second streets
- #17 Bryant and Second streets
- #21 King and Second streets
- #22 Folsom and Essex streets
- #23 Harrison and Essex streets
- #26 Howard and First streets
- #27 Folsom and First streets

Alternative 2 would not add any traffic to the critical movements at five of the eight intersections above: #5 Folsom and Hawthorne streets, #22 Folsom and Essex streets, #23 Harrison and Essex streets, #26 Howard and First streets, and #27 Folsom and First streets. Therefore, traffic impacts at these intersections would be less than significant under cumulative plus Alternative 2 conditions.

At the remaining three intersections, #15 Folsom and Second streets, #17 Bryant and Second streets, and #21 King and Second streets, the v/c ratio would decrease under cumulative plus Alternative 2 as compared to the cumulative condition. The reduction of the v/c ratio and traffic improvement at these three intersections would result from the reduction in traffic along congested north-southbound movements and eastbound left turns due to traffic diversions. The cycle length would increase from 60

seconds under cumulative conditions to 90 seconds under cumulative plus Alternative 2 conditions. Therefore, traffic impacts under cumulative plus Alternative 2 conditions at these three intersections would be less than significant. Detailed contribution calculations are provided in **Appendix B**.

Comparison of Cumulative Traffic Impacts of Alternative 2 and the Proposed Project

As shown in **Table 5**, the level of service and delays at most acceptably performing intersections along Second Street would be better under cumulative plus Alternative 2 conditions than under the cumulative plus proposed project conditions. This would be mainly due to the difference in traffic signal timing at intersections along Second Street. Under cumulative plus proposed project conditions, the traffic signals at all Second Street intersections would operate at a 90-second cycle. This is required in order to enable a separate bicycle/pedestrian signal phase that would remove bicycle/pedestrian conflicts with turning traffic, thus improving bicycle/pedestrian safety.

Alternative 2 would also include 90-second cycle length signals along Second Street under cumulative conditions. However, it would not include a separate bicycle/pedestrian phase at these intersections. This would increase the availability of green time for other high demand movements when compared to the proposed project. It also would provide greater signal capacity to clear traffic through uncongested intersections during the peak hour, thus improving intersection operations. However, this may cause conflicts between turning motorists and bicyclists and between turning motorists and pedestrians, thus reducing bicyclist and pedestrian safety.

Among intersections performing poorly under cumulative plus Alternative 2 conditions, 13 of the 29 intersections would have significant cumulative impacts. Based on the TIS, the proposed project would have significant cumulative traffic impacts at 14 intersections. These are the same 13 intersections as those identified under the cumulative plus Alternative 2 conditions and at one additional intersection—#17 Bryant and Second streets.

The project variant traffic impacts would differ from the proposed project under cumulative conditions. The project variant would have significant cumulative traffic impacts at 13 intersections. These would be the same 12 intersections as those identified under the cumulative plus Alternative 2 conditions (not including the #20 Townsend and Second streets intersection) and at one additional intersection—#17 Bryant and Second streets. The project variant would have less-than-significant impact findings at the #20 Townsend and Second streets intersection.

Alternative 2 impacts at the #20 Townsend and Second streets intersection would be mitigated to less-than-significant levels; thus, the cumulative impacts at 12 intersections would be significant and unavoidable under cumulative plus Alternative 2 conditions. No mitigation measures would be feasible under cumulative plus proposed project and the cumulative plus project variant alternative. Therefore, the cumulative impacts at all 14 intersections under cumulative plus proposed project conditions and all 13 intersections under cumulative plus project variant conditions would be significant and unavoidable. Thus, Alternative 2 would result in significant and unavoidable cumulative traffic impacts at two fewer intersections than the proposed project and one fewer intersection than the project variant.

A comparison of the traffic operations at the 13 significantly impacted intersections under cumulative plus Alternative 2 and 14 significantly impacted intersections under cumulative plus proposed project, as seen in Table 5, shows that the LOS, delay, and v/c ratio are similar at intersections along Hawthorne, New Montgomery, and First streets. However, traffic operations would differ along Third Street and Second Street intersections, as discussed below:

- **#9 Townsend and Third streets—**This intersection would perform unacceptably at LOS F under the cumulative plus project and cumulative plus Alternative 2 conditions. The v/c ratio would deteriorate from 1.69 to 2.4 under cumulative plus project conditions and to 2.93 under cumulative plus Alternative 2 conditions. The slight increase in traffic diversion at this intersection under Alternative 2 would cause its v/c ratio to deteriorate more.

- **#16 Harrison and Second streets—**This intersection would perform unacceptably at LOS F under the cumulative plus project and cumulative plus Alternative 2 conditions. The v/c ratio would deteriorate from 2.58 to 3.39 under cumulative plus project conditions and to 3.87 under cumulative plus Alternative 2 conditions. Both the proposed project and Alternative 2 would have similar lane geometry and traffic volumes at this intersection. However, unlike the proposed project, Alternative 2 would allow northbound left turns at this intersection. This would alter the signal timing and traffic progression through the intersection and would cause its v/c ratio to deteriorate more.

- **#17 Bryant and Second streets—**This intersection would operate at unacceptable LOS F under cumulative conditions and would continue to perform at LOS F under the cumulative plus project and cumulative plus Alternative 2 conditions. The v/c ratio would deteriorate under cumulative plus proposed project conditions, from 2.26 to 2.56, and would improve under cumulative plus Alternative 2 conditions to 1.63. Deterioration of the intersection performance under cumulative plus project conditions is due to the reduction in eastbound left-turn capacity from two lanes to one. This would represent a growth in the overall intersection v/c ratio of 13 percent, which would exceed the 10 percent significance threshold, discussed under Section 4.1, Significance Criteria. It would result in significant cumulative impacts at this intersection under cumulative plus project conditions. Under cumulative plus Alternative 2 conditions, the availability of two eastbound left-turn lanes and the reduction in diverting traffic would improve this intersection's v/c ratio. Therefore, the cumulative traffic impact under cumulative plus Alternative 2 conditions would be less than significant.

- **#20 Townsend and Second streets—**This intersection would perform at LOS E under cumulative conditions. The intersection performance would further deteriorate to LOS F under the cumulative plus project conditions and cumulative plus Alternative 2 conditions. The v/c ratio would deteriorate from 1.20 to 1.34 under cumulative plus project conditions and to 1.54 under cumulative plus Alternative 2 conditions. The proposed project would include an exclusive southbound right-turn lane serving 438 vehicles. Alternative 2 would serve the same traffic volume from a shared southbound through-right lane. This would cause the intersection's v/c ratio to deteriorate more.

  This intersection is the only intersection with a different significance finding under the cumulative plus project variant conditions when compared to the cumulative plus proposed project conditions. Permitting southbound left turns at Brannan Street under the project variant (and not under the proposed project) would slightly reduce the traffic (by 20 vehicles) diverting to the congested southbound right-turn movement at the Townsend intersection. This would reduce the average vehicular delay and would improve intersection performance under the project variant, compared to the proposed project.

  This intersection would continue to perform at LOS E under the cumulative and cumulative plus project variant conditions. Although changes in traffic patterns and intersection capacity would cause the v/c ratio to increase from 1.20 to 1.29 or by 8 percent, it would not exceed the City

threshold, described in Section 4.1.1 above. Therefore, the cumulative impact on this intersection would be considered less than significant under the cumulative plus project variant condition. As discussed above, this intersection would deteriorate from LOS E under cumulative conditions to LOS F under cumulative plus Alternative 2 conditions. This would be due to higher traffic diversions to the shared southbound through-right lane; thus, cumulative plus Alternative 2 would cause significant traffic impacts at this intersection and would be more than the cumulative traffic impact resulting from cumulative plus project variant conditions.

Also, the **#14 Howard and Second streets** intersection would have less-than-significant cumulative traffic impacts under the proposed project and Alternative 2. However, the intersection would perform significantly better at LOS C under cumulative plus Alternative 2 conditions, compared to LOS F under the cumulative plus project conditions. Under the cumulative plus project conditions, this intersection would continue to perform at LOS F, although the project contribution to this impact is not considerable. The intersection's poor performance under cumulative plus project conditions would be mainly due to the turning restriction during the bicycle signal phase. Under Alternative 2, reducing traffic by diverting it, changing the geometry, and increasing the signal green time for the heavy westbound movement would improve the intersection performance from unacceptable LOS F under cumulative conditions to acceptable LOS C under cumulative plus Alternative 2 conditions.

4.2.3 Transit Impacts under Alternative 2

This section presents the Alternative 2 impacts on Muni transit service along Second Street under the existing plus Alternative 2 and cumulative plus Alternative 2 conditions. (Transit delay calculations are provided in **Appendix C**.)

Transit Impacts for Alternative 2 on Second Street

Since Alternative 2 is a bikeway infrastructure improvement project as opposed to a land use project, it would not generate transit trips. Also, Alternative 2 would maintain Muni routes 10 and 12 service along Second Street. Compared to the existing conditions, implementing Alternative 2 would decrease Muni Route 10 delays by three minutes and thirty-nine seconds in the inbound direction and would increase delays by three minutes and ten seconds in the outbound direction (**Table 6**). Therefore, the sum of the delays for Muni Route 10 in both directions would decrease by 29 seconds. As such, Alternative 2 would improve Muni Route 10 transit travel time. Therefore, the impact of Alternative 2 on Muni Route 10 would be less than significant.

Compared to existing conditions, Alternative 2 would decrease Muni Route 12 delays by four minutes in the inbound direction and would increase delays by seven seconds in the outbound direction. Therefore, the sum of the delays for Muni Route 12 in both directions would decrease by three minutes and fifty-three seconds. As such, Alternative 2 would improve Muni Route 12 transit travel time, so the impact of Alternative 2 on Muni Route 12 would be less than significant.

Mitigation Measures

No mitigation measures would be required because Alternative 2 would not generate substantial numbers of additional transit riders on bus routes serving the area. In addition, Alternative 2 would not result in any substantial conflicts with transit operations, would not cause substantial delay to transit operations, and would not impede access to transit.

Table 6: Transit Delay: Existing, Existing Plus Alternative 2, and Existing Plus Project Conditions – Weekday P.M. Peak-Hour

Route	Headway (Minutes)	Total Transit Delay (Minutes:Seconds)			
		Existing	Existing Plus Alternative 2	Alternative 2 Contributions	Project Contributions (from TIS)
10 Townsend (Sansome)					
Inbound (northbound)	6	7:20	3:41	-3:39	-1:02
Outbound (southbound)	6	3:25	6:36	3:10	2:29
12 Folsom-Pacific/11 Downtown Connector					
Inbound (northbound)	12	6:38	2:37	-4:00	-4:07
Outbound (southbound)	15	1:22	1:29	0:07	3:57

Note: The total transit delays presented in the table do not include boarding delays.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

Impacts of Alternative 2 on Transit Routes along Parallel and Cross Streets

Transit travel time for transit routes along streets in the vicinity of the Second Street corridor may also be affected due to traffic diverting to these roadways under Alternative 2. Specifically, this phenomenon could occur on First, Third, Mission, Howard, and Folsom streets. Transit travel time effects on each of these streets as a result of Alternative 2 are described below.

- **First Street**—Currently there are no transit routes on First Street, except for Golden Gate Transit inbound commuter bus routes during the morning peak period. These buses travel for two blocks along southbound First Street in the right lane and turn right onto westbound Howard Street. Because of left-turn restrictions and reduction in capacity under Alternative 2, some vehicles from southbound Second Street would be diverted onto southbound First Street.

  The delay to Golden Gate Transit vehicles on First Street that would result under Alternative 2 would be negligible for three reasons:

  - The buses operate only during the morning period, when traffic volumes on First Street are substantially lower and the intersections are not as congested as during the afternoon period.
  - The buses operate only for two blocks along First Street, between Market and Howard streets.
  - Alternative 2 would divert only a negligible volume of vehicles onto the southbound right turn at First and Howard streets (where they could conflict with the buses making the same maneuver) because the southbound right turn movement at Second and Howard streets would be maintained under Alternative 2.

  With the future completion of the Transbay Transit Center, several Muni bus routes will be relocated onto First Street between Market and Mission streets. However, these bus routes will operate within a fully dedicated transit-only lane and will be protected from congestion. Therefore, there would be a negligible added delay to Muni vehicles on First Street under Alternative 2 conditions.

- **Third Street—**Muni Route 8X Bayshore Express operates along Third Street between Bryant and Market streets; routes 30 Stockton, 45 Union/Stockton, and 81X Caltrain Express operate along Third Street between Townsend and Market streets. The left-turn restrictions and reduction in capacity under Alternative 2 would divert some vehicles from northbound Second Street onto northbound Third Street.

  All of these bus routes operate within the existing transit-only lane on Third Street between Townsend and Market streets; transit travel in this lane protects transit vehicles from congestion. However, private vehicles are permitted to weave across the transit-only lane on Third Street in order to execute right turns, which can delay transit vehicles. Because the northbound right turns along Second Street would be maintained under Alternative 2, it would divert only a negligible volume of vehicles onto the northbound right turns along Third Street. Therefore, Alternative 2 would result in negligible added delay to transit vehicles along Third Street.

- **Mission Street—**Muni routes 14 Mission, 14L Mission Limited, and 14X Mission Express, Golden Gate Transit routes 70/80, and SamTrans routes 292, 397 and KX operate along Mission Street in the vicinity of Second Street. All of these bus routes operate within transit-only lanes on Mission Street in the vicinity of Second Street, which protects transit vehicles from congestion. Private vehicles are permitted to weave across the transit-only lane on Mission Street in order to execute right turns, which can delay transit vehicles. However, Alternative 2 would not add any additional right turns off Mission Street that could delay transit.

  Alternative 2 would result in a minor increase in traffic volumes along Mission Street due to the northbound and southbound left-turn prohibitions associated with this alternative at Second and Mission streets. Specifically, motorists previously executing these left turns would instead execute three right turns around the block, resulting in one additional block of travel along eastbound or westbound Mission Street. During the p.m. peak hour, 40 motorists currently execute the northbound left turn, and 48 motorists currently execute the southbound left turn on Mission Street. These vehicles would be diverted one additional block along westbound Mission Street between First and Second streets or eastbound Mission Street between Second and New Montgomery streets. Assuming that the existing transit-only lanes were not in operation, this would cause only a negligible increase in delay for transit vehicles along Mission Street. Therefore, Alternative 2 would result in negligible added delay to transit vehicles along Mission Street.

- **Howard Street—**Golden Gate Transit inbound commuter buses run on Mission Street during the morning peak period for three blocks along westbound Howard Street then turn left onto southbound Fourth Street. Alternative 2 would result in a minor increase in traffic volumes along westbound Howard Street due to the northbound left-turn prohibition under this alternative at Second and Howard streets. Specifically, vehicles previously executing this left turn would instead execute three right turns around the block, resulting in one additional block of travel along westbound Howard Street between First and Second streets. During the p.m. peak hour, 84 motorists currently make this northbound left turn.

  The delay to Golden Gate Transit vehicles on Howard Street under Alternative 2 would be negligible for two reasons:

- The buses operate only during the morning period, when traffic volumes on Howard Street are substantially lower and the intersections are less congested than during the afternoon period.
- Vehicles that would travel one additional block along westbound Howard Street, between First and Second streets, under Alternative 2 would cause only a negligible increase in delay for transit vehicles along Howard Street.

- **Folsom Street—**Muni Route 12 Folsom operates along eastbound Folsom Street west of Second Street and then executes an eastbound left turn from Folsom Street onto northbound Second Street. Also, Golden Gate Transit outbound commuter bus routes operate along Folsom Street during the p.m. peak period between Third and Fremont streets. Alternative 2 would increase traffic volumes along eastbound Folsom Street between Hawthorne and Second streets. This would be due to the Bay Bridge-bound traffic detour associated with the southbound left-turn prohibition proposed at Second and Folsom streets. The additional vehicles on Folsom Street between Hawthorne and Second streets could delay both Muni and Golden Gate Transit routes. However, this segment of Folsom Street has four eastbound travel lanes.

  Bay Bridge-bound traffic is confined to the middle two lanes. This is because these lanes feed onto the Essex Street on-ramp, and the left (northernmost) lane does not feed the on-ramp. While the middle two lanes routinely become congested during the existing p.m. peak period, the left lane does not. The Hawthorne Street detour is primarily intended for Bay Bridge-bound traffic. Therefore, the detoured vehicles under Alternative 2 would use the middle lanes of Folsom Street between Hawthorne and Second streets, and would not use the left lane, which serves the transit routes. Both Muni vehicles (which turn left onto northbound Second Street) and Golden Gate Transit vehicles (which access a boarding island east of Second Street) would travel within this left lane and would avoid the congestion. Therefore, Alternative 2 would result in negligible added delay to transit vehicles along Folsom Street.

- **Harrison Street—**Muni Route 12 Folsom operates along westbound Harrison Street west of Second Street. Westbound Harrison Street would not experience any diverted traffic as a result of Alternative 2 (the Hawthorne diversion would add traffic only onto eastbound Harrison Street). Therefore, added delays to transit vehicles along Harrison Street would be negligible.

- **Brannan Street—**Muni Route 82X Levi Plaza Express operates along westbound Brannan Street in the vicinity of Second Street. Westbound Brannan Street would not experience any diverted traffic volumes as a result of Alternative 2. Diverted traffic would be on east and west streets north of the freeway, such as Howard and Harrison streets. Therefore, added delays to transit vehicles along Brannan Street would be negligible.

- **Townsend Street—**Muni Route 10 Townsend operates along Townsend Street west of Second Street. Townsend Street would not experience any diverted traffic as a result of Alternative 2. This is because northbound and southbound left turns would be maintained at Second and Townsend streets. Therefore, added delays to transit vehicles along Townsend Street would be negligible.

In summary, Alternative 2 would result in only negligible increases in travel time along transit routes in the vicinity of Second Street.

Comparison of Transit Impacts of Alternative 2 and the Proposed Project

Both the proposed project and Alternative 2 would have less-than-significant impacts on Muni Routes 10 and 12. However, compared to the proposed project, Alternative 2 would improve transit travel time along both routes. Transit travel time would be reduced by approximately two minutes for Muni Route 10 and by approximately three and a half minutes for Muni Route 12, when compared to the proposed project. Improvement in transit travel time under Alternative 2 compared to the proposed project can be attributed to the improved performance of intersections along Second Street. This is especially true for the northbound through movement at the #17 Bryant and Second streets intersection and southbound right turn at the #16 Harrison and Second streets intersection.

Under existing plus Alternative 2 conditions, the traffic signals along Second Street would have shorter cycle lengths (60 seconds) compared to the proposed project, and there would be no bicycle signal. The shorter cycle lengths under Alternative 2 would mean greater signal capacity to clear traffic through the uncongested intersections during the peak hour, thus improving intersection operation and transit travel time. However, the lack of a separate bicycle and pedestrian signal phase would result in additional conflicts between turning motorists and bicyclists and between turning motorists and pedestrians, thus reducing bicyclist and pedestrian safety, compared to the proposed project.

The proposed project and Alternative 2 would have similar impacts on transit routes along parallel and cross streets.

4.2.4 Cumulative Transit Impacts under Alternative 2

As shown in **Table 7**, under cumulative plus Alternative 2 conditions, Muni Route 10 delays would decrease by thirty-six seconds in the inbound direction and would increase by four seconds in the outbound direction. Therefore, the sum of the delays for Muni Route 10 in both directions would decrease by thirty-two seconds. As such, Alternative 2 would contribute beneficially to the Muni Route 10 travel time. For this reason, the impact of Alternative 2 on Muni Route 10 would be less than significant under cumulative conditions.

Table 7: Transit Delay: Cumulative, Cumulative Plus Alternative 2, and Cumulative Plus Conditions – Weekday P.M. Peak-Hour

Route	Headway (Minutes)	Total Transit Delay (Minutes:Seconds)			
		Cumulative	Cumulative Plus Alternative 2	Alternative 2 Contributions	Project Contributions (from TIS)
10 Townsend (Sansome)					
Inbound (northbound)	6	17:01	16:25	-0.36	-5:38
Outbound (southbound)	6	7:55	7:59	0:04	-0:44
12 Folsom-Pacific/11 Downtown Connector					
Inbound (northbound)	12	6:24	6:12	-0:12	-1:01
Outbound (southbound)	15	5:28	2:10	-3:18	-2:58

Note: The total transit delays presented in the table do not include boarding delays.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

Delays of Muni Route 12 under cumulative plus Alternative 2 conditions would decrease by twelve seconds in the inbound direction and by three minutes and eighteen seconds in the outbound direction. Therefore, the sum of the delays for Muni Route 12 in both directions would decrease by three minutes and thirty seconds. As such, Alternative 2 would benefit the Muni Route 12 transit travel time. Therefore, the impact of Alternative 2 on Muni Route 12 would be less than significant under cumulative conditions.

Mitigation Measures

No mitigation measures would be required because Alternative 2 would not generate substantial numbers of additional transit riders on bus routes serving the area. In addition, Alternative 2 would not substantially conflict with transit operations, would not substantially delay transit operations, and would not impede access to transit users.

Comparison of Cumulative Transit Impacts of Alternative 2 and the Proposed Project

Both the proposed project and Alternative 2 would have less-than-significant impacts on Muni routes 10 and 12. However, Alternative 2 under cumulative conditions would result in less transit travel time reduction (particularly for Inbound Muni Route 10) than the proposed project under cumulative conditions. The longer inbound Muni Route 10 travel time under cumulative plus Alternative 2 conditions compared to the proposed project can be attributed to the traffic signal operations at Second and Harrison streets. More green time would be provided to the congested eastbound movement under Alternative 2. This would cause the overall intersection performance to improve compared to the proposed project. However, this would mean less green time for the northbound approach, which would increase the northbound delay under Alternative 2.

4.2.5 Loading Impacts under Alternative 2

Loading Impacts for Alternative 2

There are 41 existing commercial loading zones on Second Street. Implementation of Alternative 2 would result in the removal of 11 of these commercial loading zones. Alternative 2 would also remove or restrict the hours of operation of two commercial loading zones on Hawthorne Street. However, five of those loading zones could be relocated along Second Street or adjacent streets. In addition to the commercial loading zones, two passenger loading zones would be removed or relocated under Alternative 2. However, one of these two passenger loading zones could be relocated within the same block.

The commercial loading zones on Second Street between Market and Mission Street are typically occupied about approximately 67 percent of the time. The commercial loading zones on Second Street between Mission and Howard Streets are typically occupied approximately 56 percent of the time. In general, the loading zones further away from Market Street are occupied less than half of the time. Overall, Alternative 2 would not result in a substantial loss of commercial or passenger loading zones. The loss of commercial and passenger loading zones is not expected to create hazardous conditions or significant delays affecting traffic, transit, bicyclists, or pedestrians. Alternative 2 would not result in a commercial or passenger loading demand during the peak hour of loading activities that could not be accommodated within on-street loading zones, and would therefore not create potentially hazardous conditions or significant delays affecting traffic, transit, bicycles, or pedestrians. Therefore, impacts of Alternative 2 associated with commercial and passenger loading would be less than significant.

Comparison of Loading Impacts of Alternative 2 and the Proposed Project

Alternative 2 would remove 13 commercial loading zones, five of which could be relocated. Alternative 2 would result in the loss of eight commercial loading zones, along Second Street and in the vicinity on Hawthorne Street. As discussed above, these commercial loading zones are not fully occupied such that the loss of several would not result in a significant commercial loading impact. The proposed project in contrast, would remove approximately 27 commercial loading zones on Second Street with opportunity to relocate only six (for a net loss of up to 21), and would result in a significant and unavoidable commercial loading impact. Both Alternative 2 and the proposed project would additionally remove or restrict the hours of operation of two commercial loading zones on Hawthorne Street. Therefore, commercial and passenger loading impacts of Alternative 2 would be less than those of the proposed project.

Both Alternative 2 and the proposed project would have less-than-significant impacts on passenger loading. However, Alternative 2 would result in fewer passenger loading zone impacts compared to the proposed project. This is because the supply of remaining passenger loading zones would be higher under Alternative 2 than under the proposed project: two passenger loading zones would be removed or relocated under Alternative 2, compared to four under the proposed project.

4.2.6 Parking Impact under Alternative 2

Parking Impacts for Alternative 2

Alternative 2 would remove approximately 28 parking spaces out of 168 existing spaces along Second Street. Approximately 26 would be removed to accommodate right-turn pockets, and there would be an additional net loss of about two spaces due to bus stop optimization. One of the 28 spaces removed that is located on Second Street just north of Harrison Street is currently designated as a blue accessible parking zone. This blue zone would be relocated around the corner to Harrison Street (on the north side). The loss of 28 parking spaces along Second Street in the context of downtown San Francisco where a supply of off-street parking is readily available and where there are multiple options for alternative transportation would not be considered substantial and the parking impact of Alternative 2 would be less than significant.

Comparison of Parking Impacts of Alternative 2 and the Proposed Project

Both Alternative 2 and the proposed project would have less-than-significant impacts on parking. Alternative 2 would remove approximately 28 standard on-street parking spaces along Second Street, compared to the net removal of approximately 125 standard on-street parking spaces and 19 motorcycle parking spaces under the proposed project. Therefore, Alternative 2 would result in less parking impacts than the proposed project.

4.2.7 Summary of Comparison of Alternative 2 and Proposed Projects Impacts

Compared to the proposed project and the project variant, Alternative 2 would result in fewer significant and unavoidable traffic impacts under the individual and cumulative conditions. It would result in significant impacts at 9 intersections, compared to 11 intersections significantly impacted under the proposed project. After implementing feasible mitigation measures, Alternative 2 would result in significant and unavoidable impacts at seven intersections, compared to eight intersections under the proposed project.

Similarly, under the cumulative conditions, Alternative 2 would result in significant cumulative traffic impacts at 13 intersections, compared to 14 intersections under the proposed project (13 intersections under the project variant). No mitigation measures are feasible for the proposed project. After

implementing feasible mitigation measures under cumulative plus Alternative 2 conditions, Alternative 2 would result in significant and unavoidable cumulative impacts at 12 intersections. This is compared to 14 intersections under the proposed project (13 intersections under the variant to the proposed project analyzed in the TIS).

Similar to the proposed project, Alternative 2 would not cause significant transit impacts on Muni routes 10 and 12 under either the individual or cumulative conditions.

Commercial and passenger loading impacts of Alternative 2 would be less significant than those of the proposed project. Alternative 2 would result in fewer passenger loading zone impacts and less parking impacts than the proposed project.

4.3 ALTERNATIVE 3

This section evaluates the traffic and transit impacts associated with Alternative 3, relative to existing conditions, it identifies feasible mitigation measures, and it compares Alternative 3 impacts to those of the proposed project.

4.3.1 Traffic Impacts under Alternative 3

Table 8 shows the level of service and delay data for the study intersections under the existing, existing plus project, and existing plus Alternative 3 conditions. (Intersection volumes and LOS calculations are provided in **Appendix A**.)

Significant Traffic Impacts under Alternative 3

Under existing plus Alternative 3 conditions, 11 of the 29 study intersections would operate at unacceptable LOS E or F. The traffic operations at 2 of these 11 study intersections would degrade to unacceptable LOS E or F as a result of the changes to traffic patterns under Alternative 3. In addition, at 3 of the 11 unacceptably operating intersections, Alternative 3 was determined to contribute substantially to the poor operation. Thus, traffic impacts under Alternative 3 would be significant at 5 of these 11 unacceptably operating intersections. At the remaining six unacceptably operating intersections, Alternative 3 would result in less-than-significant impact findings, as discussed in the next section.

Intersections Deteriorating from Acceptable Performance (LOS D or Better) under Existing Conditions to Unacceptable LOS E or F under Existing Plus Alternative 3 Conditions and Resulting in Significant Impacts

Traffic operations at intersection #6 Harrison and Hawthorne streets and #16 Harrison Street and Second streets would degrade from acceptable LOS D or better under the existing conditions to unacceptable LOS E or F as a result of the changes to traffic patterns under Alternative 3. Since Alternative 3 would cause the levels of service at these two intersections to deteriorate to an unacceptable level, the traffic impact would be significant.

Intersections Operating at Unacceptable LOS E or F under Existing and Existing Plus Alternative 3 Conditions and Resulting in Significant Impacts

The three intersections listed below would perform at the same unacceptable LOS E or LOS F under both existing and existing plus Alternative 3 conditions. Based on the significance criteria described in Section 4.1.1 above, these intersections were analyzed to determine if Alternative 3 would contribute substantially to their poor traffic operation. For intersections along Second Street, an increase in v/c ratio of over 10

Table 8: Intersection Level of Service: Existing, Existing Plus Alternative 3, and Existing Plus Project – Weekday P.M. Peak Hour

		Overall Intersection Summary								
		Existing			Existing Plus Alternative 3			Existing Plus Project		
#	Intersection	Delay[1] (Seconds)	V/C[2]	LOS	Delay[1] (Seconds)	V/C[2]	LOS	Delay[1] (Seconds)	V/C[2]	LOS
1	Market and Montgomery streets	51.0		D	51.0		D	**77.8**	**1.01**	**E**
2	Mission and New Montgomery streets	**61.3**	**1.04**	**E**	**58.9**	**1.04**	**E**	**>80**	**1.13**	**F**
3	Howard and New Montgomery streets	39.5		D	37.9		D	**77.2**	**0.95**	**E**
4	Howard and Hawthorne streets	19.6		B	20.7		C	**61.9**	**1.10**	**E**
5	Folsom and Hawthorne streets	**74.5**	**1.08**	**E**	**74.5**	**1.08**	**E**	**>80**	**1.24**	**F**
6	Harrison and Hawthorne streets	43.4		D	**74.5**	**1.24**	**E**	**71.0**	**1.24**	**E**
7	Bryant and Third streets	41.1		D	29.3		C	26.9		C
8	Brannan and Third streets	32.0		C	37.0		D	46.7		D
9	Townsend and Third streets	31.1		C	34.8		C	48.0		D
10	King and Third streets	**> 80**	**0.97**	**F**	**> 80**	**0.98**	**F**	**>80**	**1.00**	**F**
11	Market and Second streets	10.8		B	11.8		B	9.0		A
12	Mission and Second streets	15.0		B	17.4		B	30.3		C
13	Minna and Second streets	16.5		C (WB)	0.6		A (NB)	0.4		A (SB)
14	Howard and Second streets	16.8		B	31.1		C	23.1		C
15	Folsom and Second streets	**64.6**	**0.94**	**E**	**57.5**	**0.99**	**E**	30.7		C
16	Harrison and Second streets	42.3		D	**> 80**	**1.53**	**F**	**>80**	**2.00**	**F**
17	Bryant and Second streets	**> 80**	**1.30**	**F**	**> 80**	**1.74**	**F**	**>80**	**1.53**	**F**
18	South Park and Second streets	**> 80**	**NA**	**F (EB)**	4.3		A	4.6		A
19	Brannan and Second streets	14.4		B	26.5		C	37.7		D
20	Townsend and Second streets	14.5		B	11.7		B	16.7		B
21	King and Second streets	42.9		D	32.1		C	39.0		D
22	Folsom and Essex streets	30.3		C	40.8		D	13.5		B
23	Harrison and Essex streets	**> 80**	**2.23**	**F**	**> 80**	**2.15**	**F**	**>80**	**1.92**	**F**
24	Market and First streets	14.9		B	14.9		B	14.9		B
25	Mission and First streets	23.0		C	21.0		C	25.2		C
26	Howard and First streets	18.3		B	18.2		B	10.2		B
27	Folsom and First streets	**> 80**	**1.26**	**F**	**> 80**	**1.26**	**F**	**>80**	**1.42**	**F**
28	Harrison and First streets	**> 80**	**1.44**	**F**	**> 80**	**1.44**	**F**	**>80**	**1.60**	**F**
29	Fifth Street and Bryant Street and the I-80 eastbound on-ramp	**> 80**	**1.34**	**F**	**> 80**	**1.37**	**F**	**>80**	**1.37**	**F**

Notes:
Bold indicates an unacceptable LOS E or F.
Shaded values indicate a significant project-level traffic impact.

[1]Levels of service and delays for signalized intersections represent conditions for the overall intersection; levels of service and delays for unsignalized (e.g., TWSC) intersections represent conditions for the side street stop-controlled approach, eastbound and westbound.
[2]V/c ratios are presented only for intersections that operate at unacceptable LOS E or F, per San Francisco Transportation Impact Assessment Guidelines.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

percent was used as the significance criteria; for intersections not on Second Street, a 5 percent increase in traffic volumes to the critical movement criteria was used to make the impact determination:

- #10 King and Third streets
- #17 Bryant and Second streets
- #29 Fifth Street, Bryant Street, and the I-80 eastbound on-ramp

The traffic contribution of Alternative 3 to the unsatisfactory operations at these three intersections would exceed the significance threshold, as discussed below.

The reduction in eastbound Bryant Street left-turn capacity from two lanes to one would cause the v/c ratio at the #17 Bryant and Second streets intersection to increase from 1.3 under existing conditions to 1.74 under existing plus Alternative 3 conditions. This would represent a growth in the overall intersection's v/c ratio of 34 percent. This would exceed the significance threshold of an increase of 10 percent or more in the v/c ratio, as discussed under Significance Criteria Section 4.1.1. This would result in a significant traffic impact at this intersection.

At the remaining two intersections, #10 King and Third streets and #29 Fifth Street, Bryant Street, and the I-80 eastbound on-ramp, Alternative 3 would contribute more than 5 percent traffic volume to the critical movements due to traffic diversions. Therefore, traffic impacts under existing plus Alternative 3 conditions would exceed the significance threshold, as discussed in the Significance Criteria Section 4.1.1. Thus, Alternative 3 would result in significant traffic impacts at these two intersections. (Detailed contribution calculations are provided in **Appendix B**.)

Mitigation Measures

Alternative 3 would result in a significant traffic impact at 5 of the 29 study intersections (see below). No feasible mitigation measures have been identified due to right-of-way constraints and incompatibilities with the multimodal character of this alternative. Therefore, Alternative 3 impacts at these five intersections would be significant and unavoidable.

- #6 Harrison and Hawthorne streets
- #10 King and Third streets
- #16 Harrison Street and Second streets
- #17 Bryant and Second streets
- #29 Fifth Street, Bryant Street, and the I-80 eastbound on-ramp

Less-than-Significant Impacts under Alternative 3

Under existing plus Alternative 3 conditions, 18 out of the 29 study intersections would operate at acceptable LOS D or better. At six of the 11 remaining intersections where the level of service is unacceptable LOS E or F under existing plus Alternative 3 conditions, Alternative 3 was determined not to contribute substantially to the poor operations. Therefore, the Alternative 3 traffic impacts would be less than significant at 24 out of 29 intersections.

Intersections Operating at Acceptable LOS D or Better under Existing Plus Alternative 3 and Resulting in Less-than-Significant Impacts

Eighteen intersections would operate at acceptable LOS D or better under existing plus Alternative 3 conditions:

- #1 Market and Montgomery streets
- #3 Howard and New Montgomery streets
- #4 Howard and Hawthorne streets
- #7 Bryant and Third streets
- #8 Brannan and Third streets
- #9 Townsend and Third streets
- #11 Second and Market streets
- #12 Second and Mission streets
- #13 Second and Minna streets
- #14 Second and Howard streets
- #18 Second and South Park streets
- #19 Second and Brannan streets
- #20 Second and Townsend streets
- #21 Second and King streets
- #22 Essex and Folsom streets
- #24 First and Market streets
- #25 First and Mission streets
- #26 First and Howard streets

Under Alternative 3, the signal added at the #18 Second and South Park streets intersection would improve traffic operations from unacceptable LOS F to LOS A; therefore, under Alternative 3 conditions, the traffic impact would be less than significant at this intersection.

The remaining 17 of the 18 study intersections listed above would perform acceptably under the existing conditions and existing plus Alternative 3 conditions. Therefore, Alternative 3 would result in less-than-significant traffic impacts at these intersections.

Intersections Operating at Unacceptable LOS E or F under Existing and Existing Plus Alternative 3 and Resulting in Less-than-Significant Impacts

Alternative 3 would not contribute substantially to the unsatisfactory operation at the following six intersections, even though these intersections would continue to perform at LOS E or F during the p.m. peak hour:

- #2 Mission and New Montgomery streets
- #5 Folsom and Hawthorne streets
- #15 Second and Folsom streets
- #23 Harrison and Essex streets

- #27 Folsom and First streets
- #28 Harrison and First streets

The #15 Second and Folsom streets intersection would operate at LOS E under both existing conditions and existing plus Alternative 3 conditions. Alternative 3 would not add any traffic, but the northbound and southbound through capacity along Second Street would be reduced from two lanes to one in each direction. To increase the capacity for these movements, the intersection cycle length would be increased from 60 seconds under existing conditions to 90 seconds under Alternative 3.

This combination of no additional traffic, reduced lane capacity, and signal timing increase would only slightly increase the intersection's v/c ratio, from 0.94 under existing conditions to 0.99 under existing plus Alternative 3 conditions. This increase in v/c ratio of 5 percent would be less than the significance threshold of a 10 percent increase, as discussed in Section 4.1, Significance Criteria. Therefore, the impact of Alternative 3 at this intersection would be less than significant.

At the remaining five study intersections listed above, Alternative 3 would not add any traffic to the critical movements. Therefore, based on the significance criteria discussed in Section 4.1, the traffic impact would be less than significant under Alternative 3. (Detailed contribution calculations are provided in **Appendix B**.)

Comparison of Traffic Impacts of Alternative 3 and the Proposed Project

Under Alternative 3, there would be significant traffic impacts at five of the 29 intersections. Based on the TIS, the proposed project would cause significant traffic impacts at the same five intersections as Alternative 3 and at six additional intersections: #1 Market and Montgomery streets, #2 Mission and New Montgomery streets, #3 Howard and New Montgomery streets, #4 Howard and Hawthorne streets, #5 Folsom and Hawthorne streets, and #28 Harrison and First streets.

No mitigation measures are feasible under Alternative 3; thus, the traffic impacts at all five intersections would be significant and unavoidable under existing plus Alternative 3 conditions. The proposed project impacts would be mitigated to less than significant at three intersections: #3 Howard and New Montgomery streets, #4 Howard and Hawthorne streets, and #5 Folsom and Hawthorne streets; thus, the traffic impacts at eight intersections would be significant and unavoidable under existing plus project conditions. Therefore, Alternative 3 would cause significant and unavoidable traffic impacts at three fewer intersections than the proposed project.

The reason for fewer significantly impacted intersections under Alternative 3, compared to the proposed project, is that Alternative 3 would retain all the existing left-turn opportunities along Second Street. Therefore, traffic diversions would be limited to 50 percent of motorists currently making a right turn from Second Street at Harrison Street. This would be due to reducing right-turn capacity from two lanes in the existing condition to one lane under existing plus Alternative 3 conditions. This limited traffic diversion from Second Street to adjacent streets in the study area under Alternative 3 would cause intersection levels of service, delays, and v/c ratios at the intersections with the Second Street corridor to improve, when compared to the proposed project; in fact, they would closely match the existing conditions. However, allowing left turns along Second Street under Alternative 3 would cause conflicts between turning motorists and bicyclists and between turning motorists and pedestrians, thereby reducing bicyclist and pedestrian safety compared to the proposed project.

As shown in **Table 8**, the intersection operations at several acceptably operating Second Street intersections under Alternative 3 would also improve when compared to the proposed project. This is mainly due to the difference in traffic signal timings along Second Street. Under the proposed project, the traffic signals along Second Street would have 90-second cycles to accommodate a separate pedestrian/bicyclist signal phase to address turning movement conflicts between right-turning motorists and bicyclists and pedestrians. The longer signal cycle lengths would increase delays at uncongested Second Street intersections. However, this would improve bicyclist and pedestrian safety.

Under Alternative 3, signal cycle lengths would remain the same at uncongested intersections, with a 60-second cycle and without a separate bicycle/pedestrian phase. The shorter cycle length under Alternative 3 would mean greater signal capacity to clear traffic through acceptably operating intersections within the peak hour, thus improving intersections operation. However, the lack of a bicycle/pedestrian signal phase under Alternative 3 would likely cause conflicts between turning motorists and bicyclists and between turning motorists and pedestrians, thereby reducing bicyclist and pedestrian safety.

The traffic operations at the two significantly impacted intersections along Second Street that would deteriorate from acceptable LOS E or LOS F under Alternative 3 would differ when compared to the proposed project. They are as follows:

- **#16 Harrison and Second streets—**This intersection performs at LOS D under the existing conditions. Although this intersection would perform at LOS F under both the proposed project and Alternative 3 scenarios, the v/c ratio under Alternative 3 would improve, compared to that under the proposed project. Under the proposed project, this intersection would include a grade-separated cycle track along northbound and southbound Second Street. The signal timing would operate at a 90-second cycle and would include a separate bicycle/pedestrian signal phase to eliminate turning movement conflicts. These features would enhance bicyclist safety but would increase average vehicular traffic delay and v/c ratio for drivers using this intersection. Under Alternative 3, this intersection would operate at a 90-second cycle but would not include a separate bicycle/pedestrian phase. The lack of a bicycle/pedestrian phase would increase the availability of green time for congested traffic at this intersection. Therefore, traffic signal operations would improve the v/c ratio from 2.0 under the proposed project to 1.53 under Alternative 3. However, the lack of a separate bicycle/pedestrian signal phase would reduce bicycle and pedestrian safety under Alternative 3 compared, to the proposed project. (Although bicycle lanes under Alternative 3 would improve bicycle safety, compared to the existing condition, where bicyclists share travel lanes with motorists.)
- **#17 Bryant and Second streets—**This intersection performs at LOS F under the existing conditions. Although this intersection would continue to perform at LOS F under both the proposed project and Alternative 3, the v/c ratio under Alternative 3 would deteriorate, compared to the proposed project. At this intersection, both the proposed project and Alternative 3 would have reduced eastbound left-turn capacity (from two lanes to one) compared to the existing condition. This reduction in capacity would cause the v/c ratio at this intersection to increase compared to the existing condition for both scenarios. However, availability of left-turn opportunities along Second Street under Alternative 3 would cause less traffic to divert from Second Street compared to the proposed project. Therefore, the #17 Bryant and Second streets intersection would serve more traffic under Alternative 3; the v/c ratio would increase from 1.53 under the proposed project to 1.74 under Alternative 3.

The #15 Folsom and Second streets intersection would have less-than-significant impacts under both the proposed project and Alternative 3; nevertheless, the intersection would perform significantly worse at LOS E under Alternative 3 compared to LOS C under the proposed project. Under the proposed project, the high-volume (240 vehicles), southbound left-turn opportunity would be eliminated, and the northbound and southbound through traffic would be reduced due to diversion. This, along with signal timing improvements, would cause the intersection performance to improve from LOS E under existing condition to LOS C under the proposed project. Under Alternative 3, this intersection would include the southbound left-turn opportunity, and it would experience very limited traffic diversions. Therefore, the intersection performance under Alternative 3 would remain unchanged from the existing condition (LOS E).

4.3.2 Cumulative Traffic Impacts under Alternative 3

Table 9 presents the level of service and delay data for the 29 study intersections under the cumulative, cumulative plus project, and cumulative plus Alternative 3 conditions. (Intersection volumes and level of service calculations are provided in **Appendix A**.)

Significant Cumulative Impacts

Under cumulative plus Alternative 3 conditions, 20 of the 29 study intersections would operate at unacceptable LOS E or F. The traffic operations at intersection #6 Harrison and Hawthorne streets would degrade from acceptable LOS C under cumulative conditions to unacceptable LOS F under cumulative plus Alternative 3 conditions. The traffic operations at intersection #20 Townsend and Second streets would degrade from LOS E under cumulative conditions to unacceptable LOS F under cumulative plus Alternative 3 conditions. This deterioration in level of service would be a result of traffic diversions under Alternative 3. In addition, at nine of the 20 unacceptably operating intersections, Alternative 3 was determined to contribute considerably to the poor intersection operation under cumulative conditions. Thus, Alternative 3 cumulative traffic impacts would be significant at 11 of the 29 study intersections before mitigation. At the remaining nine unacceptably operating intersections, Alternative 3 would result in less-than-significant impact findings as discussed below.

Intersections Deteriorating from Acceptable Performance (LOS D or Better) under Cumulative (No Alternative) Conditions to Unacceptable LOS E or LOS F under Cumulative Plus Alternative 3 Conditions and Resulting in Significant Impacts

The traffic operations at intersection #6 Harrison and Hawthorne streets would degrade from acceptable LOS C under cumulative conditions to unacceptable LOS F under cumulative plus Alternative 3 conditions. This would result from the traffic diverting to eastbound Harrison Street due to a reduction in northbound Second Street right-turn capacity at Harrison Street (from two lanes to one) for vehicles accessing the freeway. Alternative 3 would cause this intersection to deteriorate from acceptable operation to LOS F and therefore would result in significant cumulative traffic impacts.

Intersections Operating at Unacceptable LOS E or LOS F under Cumulative and Cumulative Plus Alternative 3 Conditions and Resulting in Significant Impacts

Traffic operations at the ten intersections listed below would perform at unacceptable LOS E or F under both the cumulative and cumulative plus Alternative 3 conditions.

Table 9: Intersection Level of Service: Cumulative, Cumulative Plus Alternative 3, and Cumulative Plus Project – Weekday P.M. Peak Hour

#	Intersection	Overall Intersection Summary								
		Cumulative			Cumulative Plus Alternative 3			Cumulative Plus Project		
		Delay[1] (Seconds)	V/C[2]	LOS	Delay[1] (Seconds)	V/C[2]	LOS	Delay[1] (Seconds)	V/C[2]	LOS
1	Market and Montgomery streets	**> 80**	1.02	**F**	**> 80**	**1.02**	**F**	**> 80**	1.13	**F**
2	Mission and New Montgomery streets	**> 80**	1.36	**F**	**> 80**	**1.36**	**F**	**> 80**	1.47	**F**
3	Howard and New Montgomery streets	17.5		B	20.6		C	**55.9**	1.05	**E**
4	Howard and Hawthorne streets	12.0		B	12.8		B	42.7		D[3]
5	Folsom and Hawthorne streets	**> 80**	1.98	**F**	**> 80**	**1.98**	**F**	**> 80**	2.05	**F**
6	Harrison and Hawthorne streets	30.5		C	**> 80**	**1.38**	**F**	**> 80**	1.38	**F**
7	Bryant and Third streets	**> 80**	2.88	**F**	**> 80**	**2.88**	**F**	**> 80**	2.91	**F**
8	Brannan and Third streets	**> 80**	1.30	**F**	**> 80**	**1.40**	**F**	**> 80**	1.51	**F**
9	Townsend and Third streets	**> 80**	1.69	**F**	**> 80**	**2.23**	**F**	**> 80**	2.40	**F**
10	King and Third streets	**> 80**	1.34	**F**	**> 80**	**1.38**	**F**	**> 80**	1.39	**F**
11	Market and Second streets	10.5		B	15.4		B	15.6		B
12	Mission and Second streets	24.4		C	27.4		C	41.1		D
13	Minna and Second streets	0.6		A	0.0		SB:A	0.4		A
14	Howard and Second streets	**> 80**	1.20	**F**	**> 80**	**1.76**	**F**	**> 80**	1.03	**F**
15	Folsom and Second streets	**> 80**	1.62	**F**	**> 80**	**1.94**	**F**	**> 80**	1.72	**F**
16	Harrison and Second streets	**> 80**	2.58	**F**	**> 80**	**3.63**	**F**	**> 80**	3.39	**F**
17	Bryant and Second streets	**> 80**	2.26	**F**	**> 80**	**2.92**	**F**	**> 80**	2.56	**F**
18	South Park and Second streets	**61.0**		**F**	15.3		B	10.7		B
19	Brannan and Second streets	31.8		C	27.0		C	31.6		C
20	Townsend and Second streets	**73.3**	1.20	**E**	**> 80**	**1.49**	**F**	**> 80**	1.34	**F**
21	King and Second streets	**> 80**	1.03	**F**	**> 80**	**0.94**	**F**	**> 80**	0.90	**F**
22	Folsom and Essex streets	**> 80**	6.50	**F**	**> 80**	**3.83**	**F**	**> 80**	3.84	**F**
23	Harrison and Essex streets	**> 80**	3.73	**F**	**> 80**	**3.56**	**F**	**> 80**	3.30	**F**
24	Market and First streets	17.8		B	18.3		B	18.2		B
25	Mission and First streets	33.7		C	29.3		C	27.0		C
26	Howard and First streets	**> 80**	1.21	**F**	**> 80**	**1.21**	**F**	**> 80**	1.24	**F**
27	Folsom and First streets	**> 80**	2.48	**F**	**> 80**	**2.48**	**F**	**> 80**	2.59	**F**
28	Harrison and First streets	**> 80**	1.55	**F**	**> 80**	**1.55**	**F**	**> 80**	1.74	**F**
29	Fifth Street and Bryant Street and the I-80 eastbound on-ramp	**> 80**	3.37	**F**	**> 80**	**3.32**	**F**	**> 80**	3.32	**F**

Notes:
Bold indicates an unacceptable LOS E or F.
Shaded values indicate a significant project-level traffic Impact.

[1]Level of service and delays for signalized intersections represent conditions for the overall intersection; level of service and delays for unsignalized (e.g., TWSC) intersections represent conditions for the side street stop-controlled approach, eastbound and westbound.
[2]V/c ratios are presented only for intersections that operate at unacceptable LOS E or F, per City standards.
[3]Intersection #4 Howard and Hawthorne streets was identified as resulting in a significant impact under existing plus proposed project conditions; therefore, it is identified as having a significant impact under cumulative conditions. Also, this intersection would operate at unacceptable LOS F under cumulative plus proposed project conditions if the Central SoMa Plan, and its associated reduction in traffic volumes on Howard Street, were not adopted.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

- #7 Bryant and Third streets
- #8 Brannan and Third streets
- #9 Townsend and Third streets
- #10 King and Third streets
- #14 Second and Howard streets
- #15 Folsom and Second streets
- #16 Harrison and Second streets
- #17 Bryant and Second streets
- #20 Townsend and Second streets
- #29 Fifth Street, Bryant Street, and the I-80 eastbound on-ramp

At the #20 Townsend and Second streets intersection, traffic diversions would increase traffic along the Townsend Street eastbound left turn and Second Street southbound right turn. This would cause the intersection operations to deteriorate from LOS E under cumulative conditions to LOS F under cumulative plus Alternative 3 conditions. Therefore, Alternative 3 would result in a significant cumulative traffic impact at this intersection.

The remaining nine intersections would perform at the same LOS E or LOS F under cumulative and cumulative plus Alternative 3 conditions. Based on the significance criteria described in Section 4.1.1 above, these intersections were analyzed to determine if Alternative 3 would contribute considerably to their poor traffic operation. For intersections along Second Street, an increase in v/c ratio of over 10 percent was used as the significance criterion; for intersections not on Second Street, a 5 percent increase in traffic volumes to the critical movement criteria was used as the significance criterion.

The analysis results show that the traffic contribution of Alternative 3 to the unsatisfactory operations at these nine intersections under cumulative conditions would exceed the significance thresholds, as discussed below; therefore, the contribution of Alternative 3 to the poor operation at these intersections would be cumulatively considerable and would result in significant cumulative traffic impacts.

Under cumulative plus Alternative 3 conditions, reducing roadway capacity along Second Street, eastbound Bryant street, and the heavy northbound right turn from Second Street to Harrison Street, combined with minimal traffic diversion from Second Street, would cause the v/c ratio at the following intersections to exceed the significance threshold of 10 percent: #14 Second and Howard streets, #15 Folsom and Second streets, #16 Harrison and Second street, and # 17 Bryant and Second Street (see Section 4.1.1, Significance Criteria). Therefore, traffic impacts under Alternative 3 would contribute considerably to the cumulative traffic impacts at this intersection. As such, Alternative 3 would result in significant cumulative traffic impacts at these intersections.

At the remaining five of the 10 intersections listed above, Alternative 3 would contribute more than 5 percent traffic volume to the critical movements due to traffic diversions. Therefore, cumulative traffic impacts under cumulative plus Alternative 3 conditions would exceed the significance threshold. As such, traffic impacts under Alternative 3 would contribute considerably to the cumulative traffic impacts at these five intersections, as discussed in Section 4.1.1, Significance Criteria. This would result in significant cumulative traffic impacts (detailed contribution calculations are provided in **Appendix B**).

Mitigation Measures

Alternative 3 would result in a significant cumulative traffic impact at 11 of the 29 intersections, as shown in **Table 9**, due to the alternative's cumulatively considerable contribution to intersection movements that operate unsatisfactorily under the cumulative conditions.

A mitigation measure that reduces impacts to a less-than-significant level was feasible at only one intersection, as follows:

Mitigation Measure, M-TR-4—Reconfiguring the southbound movements: At the #20 Townsend and Second streets intersection, the southbound Second Street approach under Alternative 3 would include a southbound exclusive left-turn pocket and a southbound shared lane, serving both the southbound-through and southbound-right movements. As a mitigation measure, the restriping of the southbound left-turn pocket to a shared through-left movement and the adjacent shared southbound through-right lane to an exclusive right-turn lane would improve the intersection's LOS F to the cumulative LOS E.

With implementation of the above mitigation measure, the intersection would perform at LOS E under cumulative plus Alternative 3 conditions. The v/c ratio would improve from 1.2 under cumulative conditions to 1.17 under cumulative plus Alternative 3 conditions with implementation of the mitigation measure. Since the v/c ratio would be lower than under cumulative (no project) conditions, the Alternative 3 contribution would not be considerable, and the cumulative traffic impact at this intersection would be less than significant with mitigation under Alternative 3.

No feasible mitigation measures have been identified under cumulative plus Alternative 3 conditions due to right-of-way constraints. In general, the existing right-of-way within San Francisco cannot be expanded. Trade-offs need to be made when the goal of a project is to improve facilities to accommodate alternate modes of travel, such as pedestrians, bicycles, and transit, within the existing right-of-way, as proposed under Alternative 3 or the proposed project. In a constrained environment, such as the right-of-way in San Francisco, mitigation measures that would preclude implementation of facilities for other modes may not be possible. Therefore, cumulative traffic impacts would remain significant and unavoidable for the following 10 intersections:

- #6 Harrison and Hawthorne streets
- #7 Bryant and Third streets
- #8 Brannan and Third streets
- #9 Townsend and Third streets
- #10 King and Third streets
- #14 Second and Howard streets
- #15 Folsom and Second streets
- #16 Harrison and Second streets
- #17 Bryant and Second streets
- #29 Fifth Street, Bryant Street, and the I-80 eastbound on-ramp

Less-than-Significant Cumulative Impacts under Alternative 3

Under cumulative plus Alternative 3 conditions, 9 of the 29 study intersections would continue to operate at acceptable LOS D or better, as seen in Table 9. In addition, at 9 of the 20 study intersections that

would operate at unacceptable LOS E or F under cumulative plus Alternative 3 conditions, Alternative 3 was determined not to contribute considerably to the poor intersection operations. Therefore, Alternative 3 cumulative traffic impacts would be less than significant at 18 of the 29 study intersections.

Intersections Operating Acceptably (LOS D or Better) under Cumulative Plus Alternative 3 Conditions and Resulting in Less-than-Significant Impacts

Under cumulative plus Alternative 3 conditions, the following nine intersections would operate at acceptable LOS D or better:

- #3 Howard and New Montgomery streets
- #4 Howard and Hawthorne streets
- #11 Second and Market streets
- #12 Second and Mission streets
- #13 Second and Minna streets
- #18 Second and South Park streets
- #19 Second and Brannan streets
- #24 First and Market streets
- #25 First and Mission streets

Adding a signal at the #18 Second and South Park streets intersection under cumulative plus Alternative 3 conditions would improve traffic operations from unacceptable LOS F under cumulative conditions to LOS B under cumulative plus Alternative 3 conditions. Therefore, cumulative traffic impacts would be less than significant under Alternative 3.

The remaining eight of the nine study intersections listed above would perform acceptably under the cumulative condition and cumulative plus Alternative 3conditions. Since Alternative 3 would not cause the levels of service at these eight study intersections to deteriorate to LOS E or LOS F, the cumulative traffic impact would be less than significant.

Intersections Operating under Unacceptable LOS E or F under Cumulative and Cumulative Plus Alternative 3 Conditions and Resulting in Less-than-Significant Impacts

Alternative 3 would not contribute considerably to the unsatisfactory operation at the following nine intersections under cumulative conditions. These intersections would continue to perform at LOS E or F under cumulative plus Alternative 3 conditions during the p.m. peak hour:

- #1 Market and Montgomery streets
- #2 Mission and New Montgomery streets
- #5 Folsom and Hawthorne streets
- #21 King and Second streets
- #22 Folsom and Essex streets
- #23 Harrison and Essex streets
- #26 Howard and First streets

- #27 Folsom and First streets
- #28 Harrison and First streets

Alternative 3 would not add any traffic to the critical movements at the intersections listed; therefore, cumulative traffic impacts on these intersections would be less than significant under Alternative 3.

Comparison of Cumulative Traffic Impacts of Alternative 3 and the Proposed Project

Among intersections performing poorly under cumulative plus Alternative 3 conditions, 11 of the 29 intersections would have significant cumulative traffic impacts. Based on the TIS, the proposed project would result in significant cumulative traffic impacts at 14 intersections, nine of which would be the same as those identified under the cumulative plus Alternative 3 conditions.

The project variant would result in significant cumulative traffic impacts at 13 intersections, eight of which would be the same as those identified under the cumulative plus Alternative 3 conditions. Unlike the proposed project and Alternative 3 cumulative conditions, the project variant would have less-than-significant traffic impacts at the #20 Townsend and Second streets intersection.

Alternative 3 impacts at the #20 Townsend and Second streets intersection would be mitigated to less-than-significant levels; thus, the traffic impacts at 10 intersections would be significant and unavoidable under cumulative plus Alternative 3 conditions. For the proposed project and the project variant under cumulative conditions, no feasible mitigation measures were identified; thus, the cumulative impacts at all 14 intersections under cumulative plus proposed project condition and all 13 intersections under cumulative plus project variant conditions would be significant and unavoidable. Therefore, Alternative 3 would result in significant and unavoidable cumulative traffic impacts at four fewer intersections compared to the proposed project and at three fewer intersections compared to the project variant.

The reason for fewer significantly impacted intersections under cumulative plus Alternative 3 (compared to the proposed project) is because this alternative would retain all the left-turn opportunities along Second Street, similar to the cumulative (no project) conditions. Therefore, traffic diversions would be limited to 50 percent of vehicles currently making a right turn from Second Street at Harrison Street due to reduction in right-turn capacity from two lanes in cumulative (no project) condition to one lane under cumulative plus Alternative 3 conditions. This limited traffic diversion from Second Street to adjacent streets in the study area under cumulative plus Alternative 3 conditions would cause the intersection level of service, delay, and v/c ratio at the Second Street intersections to improve when compared to the cumulative plus project conditions; they would be similar to the cumulative (no project) condition results at many locations. However, allowing left turns along Second Street may cause conflicts between turning motorists and bicyclists and between turning motorists and pedestrians, thereby reducing bicycle and pedestrian safety.

Table 9 is a comparison of the traffic operations at the 11 significantly impacted intersections under cumulative plus Alternative 3 conditions and 14 significantly impacted intersections under cumulative plus project conditions. It shows that Alternative 3 would improve traffic operations at intersections along Hawthorne, New Montgomery, Third, and First streets when compared to the proposed project. However, under cumulative conditions, traffic operations between Alternative 3 and the proposed project would differ at the five significantly impacted intersections along Second Street, as discussed below.

- **#14 Second and Howard streets—**This intersection would perform unacceptably at LOS F under the proposed project and Alternative 3 cumulative conditions. However, the v/c ratio under

cumulative plus Alternative 3 conditions would deteriorate to 1.76 from 1.20 under cumulative no project conditions, while under the cumulative plus project conditions it would improve to 1.03. This is because under Alternative 3 the northbound and southbound through capacity along Second Street would be reduced from two lanes to one in each direction. This increase in v/c ratio of 47 percent would be more than the significance threshold of a 10 percent increase. Therefore, the cumulative traffic impact of Alternative 3 at this intersection would be significant. Under the cumulative plus project conditions, this intersection would continue to perform at LOS F. While through capacity on Second Street would be reduced in a way similar to cumulative plus Alternative 3 conditions, traffic also would be reduced at this intersection due to traffic diversions. This would cause the v/c ratio to improve from 1.20 to 1.03. Therefore, the proposed project would cause less-than-significant cumulative traffic impacts at this intersection.

- **#15 Second and Folsom streets—**This intersection would perform unacceptably at LOS F under the proposed project and Alternative 3 cumulative conditions, and the v/c ratio under Alternative 3 would deteriorate, compared to the proposed project's v/c ratio. Alternative 3 would not add any traffic to this intersection. However, the northbound and southbound through capacity along Second Street would be reduced from two lanes to one lane in each direction. This reduction in capacity would cause the intersection v/c ratio to increase from 1.62 under cumulative conditions to 1.94 under the cumulative plus Alternative 3 conditions. This increase in v/c of 20 percent would be more than the significance threshold of a 10 percent increase. Therefore, the cumulative traffic impact of Alternative 3 at this intersection would be significant. Under the proposed project, this intersection would continue to perform at LOS F, and the through capacity on Second Street would be reduced in a way similar to Alternative 3. Even though traffic would be reduced at this intersection due to traffic diversions, the reduction in through capacity would cause the v/c ratio to increase from 1.62 to 1.72 under the cumulative plus project condition. This increase in v/c ratio of 6 percent would be lower than the significance threshold of a 10 percent increase in the v/c ratio. Therefore, traffic conditions at this intersection would deteriorate more under cumulative plus Alternative 3 than under cumulative plus project conditions.

- **#16 Harrison and Second streets**—This intersection would perform at LOS F under cumulative conditions. It would continue to perform unacceptably at LOS F under the proposed project and Alternative 3 cumulative conditions, and the v/c ratio under Alternative 3 would deteriorate, compared to the proposed project's v/c ratio. This intersection would operate at a 90-second cycle under both the proposed project and Alternative 3. Traffic would increase along eastbound Harrison Street due to diversions under the proposed project and Alternative 3 cumulative conditions. This would be due to the reduction in Second Street northbound right-turn capacity at Harrison Street. However, unlike the cumulative plus project conditions, left turns would be allowed from Second Street in both directions under cumulative plus Alternative 3 conditions. In addition, higher traffic along Second Street due to lower diversions, compared to cumulative plus project conditions, would increase the v/c ratio from 3.39 under cumulative plus project conditions to 3.63 under cumulative plus Alternative 3 conditions. Therefore, traffic conditions at this intersection would deteriorate more under cumulative plus Alternative 3 than under cumulative plus project conditions.

- **#17 Bryant and Second streets—**This intersection would perform at LOS F under cumulative conditions. Although this intersection would perform at LOS F under the proposed project and Alternative 3 cumulative conditions, the v/c ratio under cumulative plus Alternative 3 conditions would deteriorate, compared to the cumulative plus project's v/c ratio. At this intersection, both

the proposed project and Alternative 3 would have reduced eastbound left-turn capacity (from two lanes to one) compared to the cumulative condition (no project). This reduction in capacity would cause the intersection v/c ratio to increase compared to the condition under both scenarios. However, availability of left-turn opportunities along Second Street under Alternative 3 would cause less traffic to divert from Second Street compared to the proposed project cumulative conditions. Therefore, the #17 Bryant and Second streets intersection would experience greater traffic volumes under cumulative plus Alternative 3 conditions than under the cumulative plus proposed project conditions. The v/c ratio would be 2.56 under cumulative plus project conditions, compared to 2.92 under cumulative plus Alternative 3 conditions. Therefore, traffic conditions at this intersection would deteriorate more under cumulative plus Alternative 3 conditions than under cumulative plus project conditions.

- **#20 Townsend and Second streets—**This intersection would perform at LOS E under cumulative conditions. The intersection performance would further deteriorate to LOS F under the cumulative plus project conditions and cumulative plus Alternative 3 conditions. The v/c ratio would deteriorate from 1.20 to 1.34 under cumulative plus project conditions and to 1.49 under cumulative plus Alternative 3 conditions. The proposed project would include an exclusive southbound right-turn lane serving 438 vehicles. Alternative 3 would serve the same traffic volume from a shared southbound through-right lane, which would cause the intersection's v/c ratio to deteriorate more.

  This is the only intersection with a different significance cumulative traffic impact under the cumulative plus project variant conditions, when compared to the proposed project conditions. Permitting southbound left turns at Brannan Street under the project variant and not under the proposed project would reduce the traffic by 20 vehicles diverting to the congested southbound right-turn movement at the Townsend intersection. This would reduce the average vehicular delay and would improve intersection performance under the cumulative plus project variant, compared to the cumulative plus proposed project conditions.

  This Townsend Street intersection would continue to perform at LOS E under the cumulative and cumulative plus project variant conditions. Although changes in traffic patterns and intersection capacity would cause the v/c ratio to increase from 1.20 to 1.29, or by 8 percent, it would not exceed the City threshold. Therefore, the cumulative traffic impact at this intersection would be considered less than significant under the cumulative plus project variant condition. As discussed above, this intersection would deteriorate from LOS E under cumulative conditions to LOS F under cumulative plus Alternative 3. This would be due to higher traffic diversions to the shared southbound through-right lane; thus, cumulative plus Alternative 3 would cause significant impacts at this intersection and more than cumulative traffic impact under cumulative plus project variant conditions.

4.3.3 Transit Impacts under Alternative 3

This section presents the Alternative 3 impacts on Muni transit service along Second Street under existing plus Alternative 3 and cumulative plus Alternative 3 conditions. (Transit delay calculations are provided in **Appendix C**.)

Transit Impacts of Alternative 3 on Second Street

Since Alternative 3 is an infrastructure improvement project as opposed to a land use project, it would not generate transit trips. Alternative 3 would also maintain Muni routes 10 and 12 along Second Street. **Table 10** shows that by implementing Alternative 3, the Muni Route 10 delays would increase by five minutes and seven seconds in the inbound direction and would increase by one minute and forty-one seconds in the outbound direction. Therefore, the sum of the delay increases for Muni Route 10 in both directions would be six minutes and forty-nine seconds. Most of the increase in inbound Muni Route 10 delays can be attributed to the increase in northbound movement delays at Second and Harrison streets. Since the increase in Muni Route 10 transit travel time under Alternative 3 would be higher than the six-minute threshold, the impact of Alternative 3 on Muni Route 10 would be significant.

Table 10: Transit Delay: Existing, Existing Plus Alternative 3, and Existing Plus Project Conditions – Weekday P.M. Peak-Hour

Route	Headway (Minutes)	Total Transit Delay (Minutes:Seconds)			
		Existing	Existing Plus Alternative 3	Alternative 3 Contribution	Project Contributions (from TIS)
10 Townsend (Sansome)					
Inbound (northbound)	6	7:20	12:27	5:07	-1:02
Outbound (southbound)	6	3:25	5:07	1:41	2:29
12 Folsom-Pacific/11 Downtown Connector					
Inbound (northbound)	12	6:38	3:35	-3:03	-4:07
Outbound (southbound)	15	1:22	2:31	1:09	3:57

Note: The total transit delays presented in the table do not include boarding delays.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

The transit delay analysis method (described in detail in Section 4.2.2 of the TIS) uses traffic movement delay estimations for the intersection level of service calculations as one of three inputs, in addition to transit boarding time and transit reentry time. (This method is intended to quantify delays at an intersection when the intersection is operating below its maximum capacity.) The method is not intended to quantify delays when an intersection is oversaturated. This is because when an intersection serves more vehicles than its capacity, queuing results, which is challenging to quantify because queue conditions can change day to day and based on localized and sporadic conditions.

Oversaturated conditions and queuing exists on Second Street due to Bay Bridge-bound traffic. Because one of the three inputs in the transit delay analysis is the level of service calculations, the ability to predict transit delay accurately diminishes as the network becomes more congested.

Based on the transit delay method calculations presented in **Table 10**, Alternative 3 is likely to result in significant impacts on transit operations. However, the exact severity of the impact is difficult to quantify with accuracy given the highly congested conditions on Second Street.

Compared to existing conditions, Alternative 3 would decrease the Muni Route 12 delays by three minutes and three seconds in the inbound direction and would increase delays in the outbound direction by one minute and nine seconds. The sum of the delays for Muni Route 12 in both directions would

decrease by one minute and fifty-four seconds. Therefore, Alternative 3 would improve Muni Route 12 transit travel time, and the impact of Alternative 3 on Muni Route 12 would be less than significant.

Mitigation Measures

As discussed above, Alternative 3 would have a significant impact on Muni Route 10 operations. An array of possible mitigation measures was examined to reduce the transit impacts of Alternative 3. These are discussed below.

Based on the transit delay method, the Muni Route 10 transit delay impact could be mitigated to less-than-significant levels by the following: eliminating the southbound left turns at Second at Folsom streets and Second and Harrison streets and retiming signals to provide more green time per hour to the heavy demand north-south movements. However, eliminating the left turns would conflict with the intent of Alternative 3 to retain all the left-turn opportunities along Second Street. Additionally, the proposed signal retiming would require a substantial reallocation of green time away from traffic on eastbound Folsom and Harrison streets in order to provide more green time to Second Street. The effect of this retiming on Folsom and Harrison streets could result in Second Street becoming a new bottleneck for east-west traffic, especially for eastbound Bay Bridge traffic. The result of this new bottleneck would have implications for the downtown roadway network and may render this mitigation measure infeasible.

Providing transit-only lanes or similar treatments along Second Street was examined as a possible mitigation measure. The transit delay impact could be mitigated with such lanes on Second Street. However, these transit-only lanes could be added only by removing the proposed bicycle facility, which conflicts with the project objective, or by reducing sidewalk widths, which is not feasible. Therefore, no feasible mitigation measure has been identified to reduce the transit delay impact under Alternative 3, and the transit impact would be significant and unavoidable.

Impacts of Alternative 3 on Transit Routes along Parallel and Cross Streets

Unlike the proposed project and Alternative 2, Alternative 3 is not expected to divert traffic along Second Street intersections because left-turn access would be maintained. Therefore, Alternative 3 would not significantly increase transit travel time along transit routes in the vicinity of Second Street.

Comparison of Transit Impacts of Alternative 3 and the Proposed Project

As described in the TIS, the proposed project would cause traffic to divert from Second Street. This would reduce the through movement delay along Second Street, especially at the northbound Harrison Street intersection, which would result in less-than-significant impacts on the Muni Route 10 and Route 12. Alternative 3, on the other hand, would cause significant and unavoidable transit impacts on Muni Route 10. However, similar to the proposed project, the impact of Alternative 3 on Muni Route 12 would be less than significant.

Under Alternative 3, Muni Route 10 travel time would increase by approximately five and a half minutes compared to the proposed project. The increase in Muni Route 10 travel time under Alternative 3 compared to the proposed project can be attributed to deteriorating performance of intersections along Second Street under this alternative. This is especially true for the northbound through movement at the Folsom and Harrison streets intersections. Unlike the proposed project, Alternative 3 would include left-turn opportunities at these intersections and would serve more through traffic due to limited diversions. Therefore, increased traffic demand along the north-south movements under Alternative 3 would increase traffic delays and thus increase Muni 10 travel time.

On the other hand, Alternative 3 would improve transit travel time along Muni Route 12 compared to the proposed project. Under Alternative 3, transit travel time would be reduced by approximately one and a half minutes for Muni Route 12 compared to the proposed project. This relative improvement in travel time can be attributed to improved performance of turn movements from Second Street due to the lack of a separate bicycle/pedestrian phase, especially at the southbound right-turn at Second and Harrison streets. However, the lack of a separate bicycle and pedestrian signal phase may cause conflicts between turning motorists and bicyclists and between turning motorists and pedestrians, thus reducing bicyclist and pedestrian safety.

Transit impacts of Alternative 3 on parallel and cross streets would be negligible. Alternative 3 would have less transit impacts along parallel and cross streets than the proposed project because traffic diverting to these streets from Second Street would be substantially lower under Alternative 3 mainly due to the continued availability of left-turn opportunities along Second Street.

4.3.4 Cumulative Transit Impacts under Alternative 3

As shown in **Table 11**, under cumulative plus Alternative 3 conditions, the Muni Route 10 delays would increase by four minutes and forty-six seconds in the inbound direction and would increase by two minutes and nine seconds in the outbound direction. Therefore, the sum of the delays for Muni Route 10 in both directions would increase by six minutes and fifty-six seconds. Most of the increase in inbound Muni 10 delays can be attributed to the increase in northbound movement delays along Second Street at Folsom and Harrison streets, resulting from the reduction in through-lane capacity along Second Street from two lanes to one lane. The availability of left turns from southbound Folsom Street and northbound Harrison Street would cause long delays to the through movements, especially when left-turn volumes would spill out of the left-turn pockets and block through traffic. Since the increase in Muni Route 10 transit travel time under Alternative 3 would be higher than the six-minute threshold, the cumulative transit impact of Alternative 3 on Muni Route 10 would be significant.

Table 11: Transit Delay: Cumulative, Cumulative Plus Alternative 3, and Cumulative Plus Project Conditions – Weekday P.M. Peak-Hour

Route	Headway (Minutes)	Total Transit Delay (Minutes:Seconds)			
		Cumulative	Cumulative Plus Alternative 3	Alternative 3 Contribution	Project Contribution (from TIS)
10 Townsend (Sansome)					
Inbound (northbound)	6	17:01	21:47	4:46	-5:38
Outbound (southbound)	6	7:55	10:04	2:09	-0:44
12 Folsom-Pacific/11 Downtown Connector					
Inbound (northbound)	12	6:24	5:36	-0:49	-1:01
Outbound (southbound)	15	5:28	4:27	-1:01	-2:58

Note: The total transit delays presented in the table do not include boarding delays.

Source: CHS Consulting Group 2014 (this document is available for public review at the Planning Department, 1650 Mission Street, Suite 400, Case No. 2007.0347E)

Under cumulative conditions, Alternative 3 would decrease the Muni Route 12 delay by forty-nine seconds in the inbound direction and by one minute and one second in the outbound direction, compared

to the cumulative (no project) conditions. Therefore, the sum of the delay for Muni Route 12 in both directions would decrease by one minute and forty-nine seconds under cumulative plus Alternative 3 conditions. Alternative 3 would improve Muni Route 12 transit travel time under cumulative conditions. Therefore, the impact of Cumulative plus Alternative 3 on Muni Route 12 would be less than significant.

Mitigation Measures

As discussed above, Alternative 3 would have a significant impact on Muni Route 10 operations. An array of possible mitigation measures was examined to reduce the transit impacts of Alternative 3. These are discussed below.

Based on the transit delay method, the Muni Route 10 transit delay impact could be mitigated to less-than-significant levels by the following: eliminating the southbound left turns at Second at Folsom streets and Second and Harrison streets and retiming signals to provide more green time per hour to the heavy demand north-south movements. However, eliminating the left turns at those intersections would conflict with the intent of Alternative 3 as developed with public input to retain all the left-turn opportunities along Second Street. Additionally, the proposed signal retiming would require a substantial reallocation of green time away from traffic on eastbound Folsom and Harrison streets in order to provide more green time to Second Street. The effect of this retiming on Folsom and Harrison streets could result in Second Street becoming a new bottleneck for east-west traffic, especially for eastbound Bay Bridge traffic. The result of this new bottleneck would have implications for the downtown roadway network.

A number of mitigation measures such as the provision of transit-only lanes or similar treatments along Second Street were examined as a possible mitigation measures. The transit delay impact could be mitigated with such lanes on Second Street. However, due to the limited right of way and the interconnectedness of the transportation system, these transit-only lanes could be added only by removing the proposed bicycle facility, which conflicts with a key project objective, or by reducing sidewalk widths, which is not feasible. These mitigation measures would have secondary impacts to bicyclists and pedestrians. Therefore, no feasible mitigation measure has been identified to reduce the transit delay impact under Alternative 3, and the transit impact would be significant and unavoidable.

Comparison of Cumulative Transit Impacts of Alternative 3 and the Proposed Project

As described in the TIS, the proposed project would cause traffic to divert from Second Street under cumulative conditions, thereby reducing the through movement delay along Second Street, especially at the northbound Harrison Street intersection. This would result in less-than-significant cumulative impacts on the Muni Route 10 and Route 12. Alternative 3, on the other hand, would cause significant and unavoidable cumulative transit impacts on Muni Route 10. However, similar to the cumulative plus project conditions, the impact of cumulative plus Alternative 3 conditions on Muni Route 12 would be less than significant.

While the proposed project would reduce Muni Route 10 travel time under cumulative conditions, Muni 10 travel time would increase under cumulative plus Alternative 3 conditions. Compared to the proposed project, Muni Route 10 travel time would increase by approximately thirteen minutes and fifteen seconds. This relative increase in travel time can be attributed to deteriorating performance of intersections along Second Street under this alternative, especially the northbound through movement at Folsom and Harrison streets. Unlike the project, Alternative 3 would include left-turn opportunities at these intersections and would serve more through traffic due to limited diversions. Increasing traffic demand

along the north-south movements would increase traffic delays and thus increase Muni 10 travel time under cumulative plus Alternative 3 conditions.

Similar to cumulative plus project conditions, Muni Route 12 transit travel time would decrease under cumulative plus Alternative 3 conditions. However, Alternative 3 under cumulative conditions would result in less travel reduction than cumulative plus proposed project conditions. The longer Muni Route 12 travel time under cumulative plus Alternative 3 conditions can be attributed to less diversion from Second Street and more traffic using Second Street. This would increase vehicular delay and Muni travel time along the north-south movements when compared to the proposed project under cumulative conditions.

4.3.5 Loading Impacts under Alternative 3

Loading Impacts for Alternative 3

Alternative 3 would remove 24 commercial loading zones on Second Street. The majority of the commercial loading zones removed would be on the northern portion of Second Street where commercial loading demand is highest. Therefore, Alternative 3 would result in a commercial loading demand during the peak hour of loading activities that could not be accommodated within on-street commercial loading zones. This would create potentially hazardous conditions or significant delays, affecting traffic, transit, bicyclists, and pedestrians. Therefore, commercial loading impact under Alternative 3 would be significant and unavoidable.

Due the design of Alternative 3 requiring the removal of all parking and loading on the east side of Second Street, nine passenger loading zones would be removed, including the existing taxi and tour bus loading zones in front of the Marriott Hotel at the northeast corner of Second and Folsom Streets. As a mitigation measure, the impact of the removal of these passenger loading zones could be reduced through the creation of a limited number of new passenger loading zones on the west side of the street, but the deficit of passenger loading space may still create potentially hazardous conditions or significant delays, affecting traffic, transit, bicyclists, and pedestrians. Therefore, no feasible mitigation was identified to reduce this impact, and passenger loading under Alternative 3 would be significant and unavoidable.

Comparison of Loading Impacts of Alternative 3 and the Proposed Project

Alternative 3 would remove 24 commercial loading zones on Second Street. The impact of this removal is comparable to the net loss of up to 21 commercial loading zones on Second Street under the proposed project. Alternative 3, like the proposed project, would have a significant and unavoidable impact on commercial loading. However, unlike the proposed project (which would result in less-than-significant impacts on passenger loading zones), Alternative 3 would result in a significant impact on passenger loading zones.

4.3.6 Parking Impacts under Alternative 3

Parking Impacts for Alternative 3

Alternative 3 would remove approximately 91 out of 168 existing standard parking spaces along Second Street, as well as 32 out of 56 existing motorcycle spaces. These include all parking spaces on the east side of Second Street between Market and Townsend streets, and an additional 5 parking spaces on the west side of the street due to bus stop optimization. The loss of these standard and motorcycle parking spaces in the context of downtown San Francisco where a supply of off-street parking is readily available and where there are multiple options for alternative transportation would not be considered substantial

and the parking impact under Alternative 3 would be less than significant under existing plus Alternative 3 conditions. Similar parking impacts would result under cumulative plus Alternative 3 conditions.

Comparison of Parking Impacts of Alternative 3 and the Proposed Project

Both Alternative 3 and the proposed project would have less-than-significant parking impacts. Alternative 3 would remove approximately 91 standard on-street parking spaces and 32 motorcycle parking spaces in the project area, compared to the net removal of approximately 125 standard on-street parking spaces and 19 motorcycle parking spaces under the proposed project.

4.3.7 Summary of Comparison of Proposed Project and Alternative 3 Impacts

Compared to the proposed project, Alternative 3 would result in fewer significant and unavoidable traffic impacts under alternative-specific and cumulative conditions. Alternative 3 would result in significant traffic impacts at 5 intersections, compared to 11 intersections under the proposed project. No mitigation measures are feasible under Alternative 3, while 3 of the 11 intersections significantly impacted under the proposed project could be mitigated. Therefore, Alternative 3 would result in significant and unavoidable traffic impacts at five intersections and the proposed project would result in significant unavoidable traffic impacts at eight intersections.

Under the cumulative conditions, Alternative 3 would result in significant cumulative traffic impacts at 11 intersections, compared to 14 intersections under the proposed project (13 intersections under the project variant). No mitigation measures are feasible for the proposed project. After implementing feasible mitigation measures under cumulative plus Alternative 3 conditions, Alternative 3 would result in significant and unavoidable cumulative impacts at 10 intersections, compared to 14 intersections under the proposed project (13 intersections under the variant to the proposed project analyzed in the TIS).

Unlike the proposed project, which would not result in transit impacts, Alternative 3 would cause a significant transit impact along Muni Route 10 under both the existing and cumulative conditions. Similar to the proposed project, Alternative 3 would not result in significant transit impacts on Muni Route 12.

Unlike the proposed project, Alternative 3 is not expected to divert traffic from Second Street intersections because left-turn access would be maintained. Therefore, Alternative 3 would not significantly increase transit travel time along transit routes in the vicinity of Second Street.

Alternative 3, like the proposed project, would have a significant and unavoidable impact on commercial loading due to the removal of 24 commercial loading spaces along Second Street. However, unlike the proposed project (which would result in less-than-significant impacts on passenger loading zones), Alternative 3 would result in a significant impact on passenger loading zones. Alternative 3 would result in the removal of fewer parking spaces than the proposed project.

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