19TH AVENUE CORRIDOR STUDY

CITY AND COUNTY OF SAN FRANCISCO

PUBLICATION DATE: FEBRUARY 12, 2010

PUBLIC MEETING DATE: FEBRUARY 24, 2010

PUBLIC COMMENT PERIOD: FEBRUARY 12-26, 2010

Written comments should be sent to:

Rick Cooper, Senior Environmental Planner
San Francisco Planning Department
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FROM: Rick Cooper, Senior Environmental Planner

SUBJECT: 19th Avenue Corridor Study

This is the 19th Avenue Corridor Study, which has been prepared by the San Francisco Planning Department pursuant to San Francisco Board of Supervisors Resolution Nos. 080014 and 080015, adopted on October 20, 2008. This legislation requires that a comprehensive cumulative impact study encompassing all reasonably foreseeable developments located along the 19th Avenue Corridor Study area be prepared and continually updated by the San Francisco Planning Department and Municipal Transportation Authority. (Please note that although the study includes the proposed Parkmerced Project among the projects considered in the analysis, it has been prepared only pursuant to the legislation noted above and is not intended to fulfill the requirements of the California Environmental Quality Act.)

A **public meeting** on the study has been scheduled for **February 24, 2010,** from **6:00 PM to 8:00 PM** in the Nob Hill Room, Seven Hills Conference Center, San Francisco State University, 800 Font Boulevard, San Francisco, California 94132

Public comments on the draft study will be accepted until 5:00 PM on February 26, 2010. Written comments should be addressed to Rick Cooper, Senior Environmental Planner, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103.

If you have any questions about the 19th Avenue Corridor Study, please call Rick Cooper at 415-575-9027.

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I. 19th AVENUE CORRIDOR STUDY DESCRIPTION

A. INTRODUCTION

The San Francisco Planning Department has prepared this *19th Avenue Corridor Study* (hereinafter "Corridor Study") pursuant to Board of Supervisors' Resolution Nos. 081004 and 081005. The intent of the Corridor Study is to identify the demand for, and any deficiencies in, traffic and transportation systems, public services and utilities, recreational resources, and schools as a result of reasonably foreseeable developments along and in the vicinity of the 19th Avenue Corridor (hereinafter "Corridor Study area"). It is not meant to circumvent any requirements of the California Environmental Quality Act (CEQA) related to individual projects. Instead, it is meant to separately analyze comprehensive cumulative impacts prior to, or in conjunction with, an individual project's environmental review.

B. CORRIDOR STUDY OVERVIEW

In October 2008, the San Francisco Board of Supervisors adopted two resolutions related to the 19th Avenue Corridor: Files No. 081004 and 081005. Resolution No. 081004 adopted interim controls requiring Conditional Use Authorization for any new large development project consisting of 20 residential units or more and/or 50,000 square feet or more of retail or commercial space that would be located along or near the southern portion of the 19th Avenue Corridor. These controls remain in effect for a period of 18 months (until April 2010). Prior to any Conditional Use Authorization, parking and traffic studies, as well as information determining the sufficiency of police, fire and emergency services, and adequacy of other factors, such as public services, affecting public safety and the quality of life for neighboring residents, must be submitted to the Board of Supervisors and Planning Commission.

Resolution No. 081005 requires that a comprehensive cumulative impact study, encompassing all reasonably foreseeable developments located in the Corridor Study area, be prepared and continually updated by the San Francisco Planning Department and Municipal Transportation Authority. The reasonably foreseeable developments identified in the resolution are the Parkmerced Project, San Francisco State University (SFSU) 2007-2020 expansion (Campus Master Plan), expansion at the Stonestown Galleria Shopping Center site, mixed-use development at 77-111 Cambon Drive, residential development at 800 Brotherhood Way, redevelopment of the San Francisco Unified School District (SFUSD) "School of the Arts" site (700 Font Boulevard), residential development on a portion of the Arden Wood site (445 Wawona Street); and mixed-use development at the Kragen Auto Center in the Balboa Park Better Neighborhoods Plan (1150 Ocean Avenue Project).

This 19th Avenue Corridor Study is the cumulative impact study required by Resolution No. 081005. It is a separate study to be performed prior to, or in conjunction with, any environmental review required for an individual foreseeable development project. It must consider impacts on traffic, public transit, transportation and circulation, public services and utilities, recreational resources, and schools. A draft of this study is to be circulated for a public comment and review period. The cumulative impact study is intended to be updated when new environmental review applications for projects are filed within the Corridor Study area.

C. CORRIDOR STUDY LOCATION

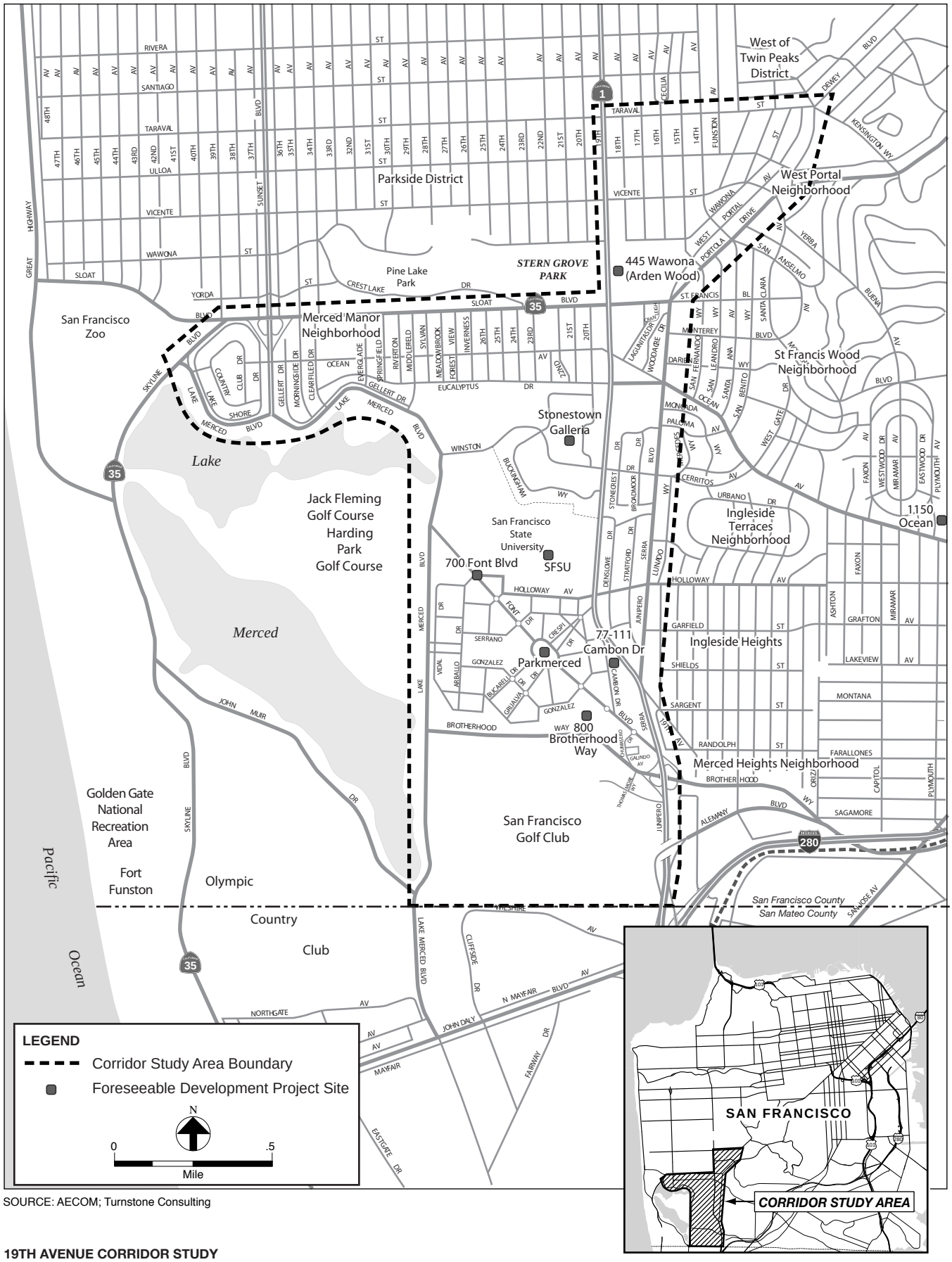
As defined in the legislation, the Corridor Study area consists of approximately 1,400 acres located in the southwest corner of the City and County of San Francisco (see Figure I.1: 19th Avenue Corridor Study Area). The area boundary commences at Lake Merced Boulevard at the San Francisco County line and then runs north along Lake Merced Boulevard to Sloat Boulevard, east along Sloat Boulevard to 19th Avenue, north along 19th Avenue to Taraval Street, east on Taraval Street to Claremont Boulevard, south on Claremont Boulevard to Portola Drive, southwest on Portola Drive to Junipero Serra Boulevard, and south on Junipero Serra Boulevard to the County line.[1] A larger, potentially affected area identified in Resolution No. 081004 extends the study area west to the Great Highway and Skyline Boulevard. This area is considered for the purposes of transportation and circulation analysis.

Existing Uses in the Vicinity of the Corridor Study Area

Land uses in the vicinity of the Corridor Study area include Lake Merced Park, the Olympic Country Club, Fort Funston (part of the Golden Gate National Recreation Area), and the San Francisco Zoo to the west; Stern Grove and the Parkside District to the north; the West of Twin Peaks District to the northeast; and low-density residential development east of Junipero Serra Boulevard.

Directly west and adjacent to the Corridor Study area is Lake Merced Park, a 614-acre park that offers active and passive recreation opportunities. There are trails for cycling, running, and walking, as well as three fishing piers, two picnic areas, and a boathouse. Lake Merced Park is

[1] The mixed-use development at the Kragen Auto Center within the Balboa Park Better Neighborhoods Plan (1150 Ocean Avenue Project) is not located within the defined Corridor Study area boundary; however, the legislation identifies this project as having cumulative impacts in the Corridor Study area. Therefore, analyses in this Corridor Study consider the potential cumulative effects from the 1150 Ocean Avenue Project.



SOURCE: AECOM; Turnstone Consulting

FIGURE I.1: 19TH AVENUE CORRIDOR STUDY AREA

also a popular destination for bird watching.[2] The nine-hole Jack Fleming Golf Course and the 18-hole Harding Park Golf Course occupy the eastern portion of the park.[3] Other uses along the western shore of the lake include the San Francisco Police Pistol Range and the Pacific Rod and Gun Club. The 721-unit Lakewood Apartments complex is west of the Pacific Rod and Gun Club.[4]

Farther west is Fort Funston (part of the Golden Gate National Recreation Area), which includes hiking trails, a pre-World War II gun emplacement called Battery Davis, and a launch and landing site for hang gliders.

The private Olympic Country Club is located to the south of Lake Merced and Fort Funston and also straddles the border between San Francisco County and San Mateo County. The country club consists of three separate golf courses: the 9-hole Cliffs Course, the 18-hole Lake Course, and the 18-hole Ocean Course.[5]

The San Francisco Zoo, which is northwest of Lake Merced, is a 100-acre facility bounded by Sloat Boulevard on the north, the Great Highway on the west and the south, and State Route 35/Skyline Boulevard on the east. It is managed by the nonprofit San Francisco Zoological Society in partnership with the City and County of San Francisco and attracts approximately 925,000 visitors a year.[6]

Immediately north of the Corridor Study area is the 33-acre Stern Grove Park. Stern Grove is located at the northeast corner of 19th Avenue and Sloat Boulevard and includes meadows, walkways, and an outdoor amphitheater used for admission-free dance, music, and theater performances during the summer.[7] Stern Grove abuts Larsen Park to the north and Pine Lake Park to the west. Parkside Square is adjacent to and north of Pine Lake Park. Together, these four parks form a contiguous area of parkland on the north side of Sloat Boulevard that stretches from 19th Avenue to 34th Avenue.

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[2] Lake Merced brochure, available on the San Francisco Recreation and Park Department website, http://www.parks.sfgov.org/wcm_recpark/Volunteer/Brochures/LakeMerced.pdf, accessed September 15, 2009.

[3] San Francisco Public Utilities Commission website, http://sfwater.org/msc_main.cfm/MC_ID/20/MSC_ID/179, accessed September 15, 2009.

[4] Lakewood Apartments website, http://www.lakewoodatlakemerced.com, accessed September 15, 2009.

[5] *Ibid.*

[6] San Francisco Zoo website, http://www.sfzoo.org/openrosters/ViewOrgPageLink.asp?LinkKey=14092&orgkey=1903, accessed September 15, 2009.

[7] Stern Grove Festival website, http://www.sterngrove.org/index.html, accessed September 15, 2009.

Farther north of the Corridor Study area is the Parkside District, which is generally the area bounded by 14th Avenue on the east, Wawona Street on the south, the Pacific Ocean on the west, and Rivera Street on the north. (The eastern portion of the Parkside District is located within the Corridor Study area boundary.) The Parkside District is characterized by detached single-family homes, mainly one or two stories above a garage. Neighborhood-serving retail uses are concentrated along Taraval Street from 14th Avenue to 36th Avenue. Other land uses in the Parkside District include Lincoln High School, McCoppin Square, South Sunset Playground, Larsen Park, and Parkside Square.

The West of Twin Peaks District, northeast of the Corridor Study area, is generally the area bounded by Junipero Serra Boulevard and 14th Avenue on the west; Ortega Street, Laguna Honda Boulevard, and Woodside Avenue on the north; O'Shaughnessy Boulevard, Melrose Avenue, and Phelan Avenue on the east; and Ocean Avenue on the south. This district includes the Balboa Terrace, Forest Hill, Miraloma Park, St. Francis Wood, Sunnyside, West Portal,[8] and Westwood Park neighborhoods. All of these neighborhoods are characterized by detached single-family homes. Neighborhood-serving retail uses are concentrated along Ocean Avenue between Phelan Avenue and Lakewood Avenue. Land uses in the West of Twin Peaks District include Aptos Playground, the Balboa Reservoir, Mt. Davidson Park, Miraloma Playground, and Sunnyside Playground.

The Ocean View District, which is adjacent to and east of the Corridor Study area, is generally the area bounded by Junipero Serra Boulevard on the west, Ocean Avenue on the north, and Interstate 280 on the east and the south. (The western portion of the Ocean View District is located within the Corridor Study area boundary.) The Ocean View District includes the Ingleside, Ingleside Terrace, Merced Heights, and Ocean View neighborhoods, all of which are characterized by detached single-family homes. Multi-story, multi-unit residential buildings and neighborhood-serving retail uses are concentrated along Ocean Avenue between Phelan Avenue and Lakewood Avenue. The Ocean View District includes a number of parks and recreation facilities: Brooks Park, Brotherhood/Chester Mini-Park, Brotherhood/Head Mini-Park, Junipero Serra Playground, Lakeview/Ashton Mini-Park, Merced Heights Playground, Minnie and Lovie Ward Recreation Center, and Randolph/Bright Mini-Park. The main campus of the City College of San Francisco is east of the Ocean View District. The Balboa Park Bay Area Rapid Transit (BART) station is south of City College.

Existing Uses in the Corridor Study Area

The Corridor Study area is located primarily within portions of the Lakeshore District and West Portal neighborhoods. (The northeast corner of the Corridor Study area is also comprised of a

[8] The West Portal neighborhood is located within the Corridor Study area.

portion of Parkside District.) The Lakeshore District is generally the area bounded by Junipero Serra Boulevard on the east, the San Francisco County line on the south, the Pacific Ocean on the west, and Wawona Street on the north. This district includes the Parkmerced, Stonestown, and Merced Manor neighborhoods, as well as Lake Merced, SFSU, the San Francisco Zoo, the Stonestown Galleria, Pine Lake Park, and Stern Grove. The West Portal neighborhood is generally the area bounded by Wawona Street, 15th Avenue, and Taraval Street on the north, Claremont Boulevard on the east, Portola Avenue and Junipero Serra Boulevard on the southeast, Eucalyptus Drive on the south, and 19th Avenue on the west.

The private 18-hole San Francisco Golf Club, which abuts the border between the San Francisco County and San Mateo County lines, is the southernmost land use within the Corridor Study area. North of the San Francisco Golf Course and south of Brotherhood Way are several institutional and religious facilities, including St. Thomas More Catholic Church, St. Thomas More School, the Alma Via assisted living community, Brandeis Hillel Day School, Congregation Beth Israel-Judea, the Calvary Armenian Congregational Church, the Lake Merced Church of Christ, Bridgemont High School and Junior High, Brotherhood Masonic Temple, the KZV Armenian School, San Francisco Lodge No. 120 of the Free and Accepted Masons, and Holy Trinity Greek Orthodox Church.

The land on the north side of Brotherhood Way, west of Chumasero Drive, is a level open space area under the jurisdiction of the San Francisco Department of Public Works (DPW). This open space is landscaped with grass and several clusters of trees, and it features a 20-foot-high statue by sculptor Benjamin Bufano. To the north of this open space, there is a vacant development site (800 Brotherhood Way).

The Parkmerced residential neighborhood was constructed between 1941 and 1951 and included a combination of two-story residential buildings and 13-story towers surrounded mainly by lawns. The original property totaled 192 acres, and was generally bounded by Vidal Drive, Font Boulevard, and Holloway Avenue to the north, 19th Avenue and Junipero Serra Boulevard to the east, Brotherhood Way to the south, and Lake Merced Boulevard to the west. Over many decades, various blocks along the northern, eastern, and southern perimeters of the original development complex have been subdivided and sold to third parties.

SFSU is adjacent to and north of Parkmerced. Founded in 1899, the school is part of the California State University system and offers undergraduate and graduate degrees in more than 200 areas of specialization. The campus covers 144 acres and includes classroom and administration buildings, athletic facilities, open space, and on-site housing for more than 2,300

students.[9] In late 2007, the California State University Board of Trustees approved the *2007-2020 San Francisco State University Campus Master Plan* (SFSUCMP), which is a long-range plan for guiding the growth and development of the campus through 2020.

Near the southwest corner of SFSU, there is a roughly triangular 2.5-acre property on the north side of Font Boulevard that is owned by the San Francisco Unified School District. The single-story, 51,000-square-foot building on the site was previously occupied by the School of the Arts and is now vacant.

The Stonestown Galleria, which is north of SFSU, is on the west side of 19th Avenue between Eucalyptus Drive and Buckingham Way. This regional shopping center includes approximately 130 stores, various restaurants, a Trader Joe's grocery store, a two-screen movie theater, and parking for approximately 3,700 vehicles.[10]

Lowell High School, located on the south side of Eucalyptus Drive at Forest View Drive, is located northeast of Lake Merced. The campus includes two- and three-story buildings and various athletic playing fields and facilities. Lowell High School abuts Lakeshore Elementary School to the west and Rolph Nicol Playground to the east. St. Stephen Catholic Parish and St. Stephen School are east of Rolph Nicol Playground.

The Merced Manor neighborhood, which is the area generally bounded by 19th Avenue on the east, Eucalyptus Drive on the south, State Route 35/Skyline Boulevard on the west, and Sloat Boulevard on the north, is characterized by detached single-family homes that consist of one or two stories above a garage. Merced Manor includes Lakeshore Plaza, a neighborhood-serving shopping center on the south side of Sloat Boulevard between Clearfield Drive and Everglade Drive.

The eastern boundary of the Parkside District and the West Portal neighborhood is the northeastern corner of the Corridor Study area. This area is characterized by detached single-family homes. The West Portal neighborhood includes neighborhood-serving retail uses concentrated along West Portal Avenue between the West Portal Muni station and 15th Avenue. The Arden Wood residential care facility and the California Scottish Rite temple are located in the vicinity of the 19th Avenue and Sloat Boulevard intersection.

[9] San Francisco State University: Facts 2008/2009 Brochure, available on the San Francisco State University website, http://www.sfsu.edu/~puboff/sfsufact/archive/0809/files/SFSU_Facts_0809.pdf, accessed September 15, 2009.

[10] General Growth Properties website, http://www.ggp.com/Properties/MallDirectory.aspx?smuid=725, accessed September 15, 2009.

Portions of the Ingleside Terraces and Ingleside Heights neighborhoods[11] are adjacent to and east of the Corridor Study area. These neighborhoods are characterized by detached single-family homes. The Junipero Serra Playground is located within this area, east of SFSU.

Transportation and Major Transit Corridors in and in the Vicinity of the Corridor Study Area

There are several major transportation corridors in and in the vicinity of the Corridor Study area. State Route 35/Skyline Boulevard is a two-lane highway that runs north-south along the west side of Lake Merced and connects San Francisco with the communities on the San Francisco Peninsula. State Route 1/19th Avenue is a six-lane roadway that runs north-south through the Corridor Study area. Interstate 280 runs north-south along the San Francisco Peninsula. After crossing the San Francisco County line at the southeast corner of the Corridor Study area, Interstate 280 heads northeast toward its terminus near China Basin in San Francisco's South of Market area.

Major transit routes are located within and in the vicinity of the Corridor Study area. Muni bus routes in the Corridor Study area are Route 28 19th Avenue and Route 28L 19th Avenue Limited along 19th Avenue; Route 17 Parkmerced, which runs from the Parkmerced site to the West Portal Station via Buckingham Way and Junipero Serra Boulevard; Route 18 46th Avenue, which runs from Stonestown Galleria to the Legion of Honor via Lake Merced, 46th Avenue, and Ocean Beach; Route 29 Sunset, which runs from Candlestick Park to the Presidio via McLaren Park, the Balboa Park BART station, SFSU, Sunset Boulevard, Lincoln Way, Golden Gate Park, and 25th Avenue; and the 88 Mission/BART Shuttle, which runs from Lake Merced to the Balboa Park BART station via Parkmerced and Mission Street. The L Taraval Muni light rail line exits the Twin Peaks Tunnel at the West Portal Station and continues along Ulloa Street to Taraval Street, where it terminates near the Great Highway. The M Oceanview Muni light rail line exits the Twin Peaks Tunnel at the West Portal Station, continues along West Portal Avenue to 19th Avenue, crosses 19th Avenue at Junipero Serra Boulevard, continues to Randolph Street, and terminates at the Balboa Park BART station. The K Ingleside also exits the Twin Peaks Tunnel at the West Portal Station, continues along West Portal Avenue to Junipero Serra Boulevard and to Ocean Avenue where it terminates at the Balboa Park BART station. The Daly City BART station is approximately 500 feet southeast of the Corridor Study area. The Balboa Park BART station is located about 1 mile east of the Corridor Study area.

[11] The Ingleside Terraces and Ingleside Heights neighborhoods are two of the four residential areas identified within the Ocean View District.

D. FORESEEABLE DEVELOPMENT PROJECTS IN THE CORRIDOR STUDY AREA

Several foreseeable development projects within the Corridor Study area are under consideration: the Parkmerced Project, 800 Brotherhood Way, 77-111 Cambon Drive, 700 Font Boulevard, 445 Wawona Street (the Arden Wood site), the 2007-2020 SFSUCMP, Stonestown, and the 1150 Ocean Avenue Project, which is within the *Balboa Park Station Area Plan*. (See Table I.1: 19th Avenue Corridor Study Foreseeable Development Projects.)

The proposed Parkmerced Project site is an existing residential neighborhood with 3,221 residential units on approximately 152 acres of land. The site is generally bounded by Vidal Drive, Font Boulevard, Pinto Avenue, and Serrano Drive to the north; 19th Avenue and Junipero Serra Boulevard to the east; Brotherhood Way to the south; and Lake Merced Boulevard to the west. The proposed Parkmerced Project is a long-term mixed-use development program to comprehensively replan and redesign the Parkmerced site. This project would increase residential density, provide a neighborhood core with new commercial and retail services, modify transit facilities, and improve utilities within the development site. A new Pre K-5 school and day care facility, a fitness center, and new open space uses, including athletic fields, walking and biking paths, an approximately 2-acre organic farm, and community gardens, would also be provided on the site. About 1,683 of the existing apartments would be retained on the site. Over a period of approximately 20 years, the remaining 1,538 existing apartments would be demolished in phases and fully replaced, and an additional 5,679 net new units would be added to the site. With implementation of the Parkmerced Project, there would be a total of 8,900 units on the site. A Notice of Preparation for the Parkmerced Project was published on May 20, 2009, and the project is currently undergoing environmental review.

The 7.7-acre site at 800 Brotherhood Way is between the southern edge of the Parkmerced site and the existing DPW open space on the north side of Brotherhood Way. The parcel is currently landlocked, but a new access road from the southeast corner of the parcel to Brotherhood Way is proposed. The project at 800 Brotherhood Way involves a subdivision of the lot and the construction of 60 single-family homes and 61 two-unit buildings.[12] This project was entitled on May 19, 2005, but construction has not yet begun.[13]

The 2.8-acre triangular site at 77-111 Cambon Drive is adjacent to and east of the Parkmerced site, on the west side of 19th Avenue. The proposed project at 77-111 Cambon Drive involves the

[12] San Francisco Planning Department, *800 Brotherhood Way Final Mitigated Negative Declaration*, May 19, 2005.

[13] Minutes from the May 19, 2005 meeting of the San Francisco Planning Commission, available on the San Francisco Planning Department website, http://www.sfgov.org/site/planning_page.asp?id=32658, accessed October 15, 2009.

demolition of two existing one-story commercial buildings and the construction of a mixed-use project with approximately 200 dwelling units, 15,000 square feet of retail space, a fitness center and a club room, and underground parking for 248 vehicles and 61 bicycles.[14] The buildings would range in height from two to four stories. An Initial Study and Notice of Preparation of an Environmental Impact Report have been prepared for this project.

The 2.5-acre site at 700 Font Boulevard, which is the former home of the School of the Arts, has been identified as a potential site for a development project that could provide as many as 340 dwelling units, but no formal applications have been filed.

The 12.2-acre site at 445 Wawona Street is partially developed with the 119,000-square-foot Arden Wood residential care facility. The property owner has offered to subdivide the site into two parcels of 4.6 and 7.6 acres and sell the latter parcel to a private developer. The Arden Wood residential care facility would remain on the 4.6-acre parcel. One potential development scenario proposed for the 7.6-acre parcel calls for the construction of up to 142 dwelling units. No formal applications have been filed.

From 1989 through 2007, enrollment at SFSU was capped at 20,000 full-time equivalent students (FTE).[15] In late 2007, the California State University Board of Trustees approved a proposal to increase enrollment to 25,000 FTE by 2020. The projected increase in enrollment and related increases in faculty and staff required the *1989 Campus Master Plan* to be updated. The 2007-2020 SFSUCMP proposes physical changes and improvements to the campus to address the increased enrollment. Some existing buildings and facilities would be upgraded and expanded, while others would be demolished and replaced. Some new buildings and facilities would be constructed. In total, these proposed physical improvements would result in the net addition of approximately 972,400 square feet and approximately 660 dwelling units to the campus. On November 14, 2007, the California State University Board of Trustees certified the Final EIR and approved the 2007-2020 SFSUCMP. Implementation of the 2007-2020 SFSUCMP is currently under way. The renovation and expansion of the existing library began in March 2009.[16]

[14] San Francisco Planning Department, *77-111 Cambon Drive Initial Study and Notice of Preparation of an Environmental Impact Report*, October 13, 2007.

[15] One FTE is defined as one student taking 15 course units, which represents a full course load, during a semester.

[16] San Francisco State University Campus Master Plan website, http://www.sfsu.edu/~build/construct.htm, accessed November 11, 2009.

Table I.1: 19th Avenue Corridor Study Foreseeable Development Projects

19th Avenue Corridor Study	Individual Development Projects							
	Parkmerced	**San Francisco State University (SFSU)**	**800 Brotherhood Way**	**77-111 Cambon**	**700 Font (SFUSD)**	**Stonestown**	**445 Wawona (Arden Wood)**	**1150 Ocean**
Existing Acreage	152 acres	144 acres	7.7 acres	2.8acres	2.5 acres	40.7 acres	7.6 acres (development and "conservation" sites)	1.84 acres
Existing Development								
Residential	3,474,937 gsf	(see Institutional/ Educational gsf below)	0	0	0	0	0	0
Number of Dwelling Units	3,221 d.u.	541 d.u.	0	0	0	0	0	0
Retail/Office	10,755 gsf	0	0	30,790 gsf	0	864,400 gsf	0	14,900 gsf
Institutional/Educational	3,949 gsf	1,150,318 gsf	0	0	51,000 gsf	0	0	0
Maintenance	28,343 gsf	0	0	0	0	0	0	0
Structured Parking	959,400 gsf	0	0	0	0	0	0	0
Other (movie theater)	0	0	0	0	0	2-screen theater	0	0
Proposed Net New Development								
Residential	11,500,000 gsf	(gsf not available)	444,273 gsf	254,000 gsf	Not available	0	(gsf not available)	181,000 gsf
Number of Dwelling Units	5,677 net new du (8,900 du total)	657 net new d.u. (1,198 total du)	182 d.u (60 single family and 61 two-unit dwellings).	199 d.u.	340 d.u.	0	142 du	175 du
Retail/Office	310,000 gsf (230,000 retail and 80,000 office)	0	0	15,000 gsf	0	180,000 gsf	0	35,000 gsf
Institutional/Educational	25,000 gsf	808,977 gsf	0	0	0	0	0	0
Maintenance	100,000 gsf	13,439 gsf	0	0	0	0	0	0
Structured Parking	2,900,000 gsf	0	0	99,800 gsf	0	0	0	0
Other (fitness)	64,000 gsf	0	0	included in retail	0	0	0	0
Other (conference center)	0	150,000 gsf	0	0	0	0	0	0
Other (movie theater)	0	0	0	0	0	8-screen movie theater	0	0
Total net new proposed gsf	**10,421,596 gsf**	**972,415 gsf**	**444,273 gsf**	**373,300 gsf**	**(gsf not available)**	**180,000 gsf plus movie theater**	**(gsf not available)**	**216,000 gsf**
Total net new du	**5,677 net new du (8,900 du total)**	**657 net new d.u. (1,198 total du)**	**182 d.u.**	**199 d.u.**	**340 d.u.**	**0**	**142 d.u.**	**175 d.u**

Notes:
gsf = gross square feet
du = dwelling units

Source: Resolution Nos. 081004 and 081005, San Francisco Mayor's Office, Turnstone Consulting

The western portion of the Stonestown Galleria site has been identified as a potential location for a new eight-screen movie theater and approximately 180,000 square feet of office and retail space, but no formal applications have been filed.

The *Balboa Park Station Area Plan*, adopted by the San Francisco Board of Supervisors on April 7, 2009,[17] is a long-range plan that covers a 210-acre area around the Balboa Park BART station in south-central San Francisco.[18] Its purpose is to provide a regulatory framework to make improvements to the public realm (open space, streets and sidewalks, transit infrastructure), modify existing zoning controls to enhance the existing neighborhoods, and set objectives for future development in the area. The 1150 Ocean Avenue Project, which is within the *Balboa Park Station Area Plan* boundary, would include demolition of the existing 14,900 gsf retail/office space and construction of approximately 175 dwelling units, 35,000 square feet of ground-floor retail uses, 4,300 square feet of open space, and 281 parking spaces (175 residential spaces and 106 non-residential spaces).[19] This project was entitled on May 21, 2009, but construction has not yet begun.[20]

[17] Minutes from the April 7, 2009 meeting of the San Francisco Board of Supervisors, available on the San Francisco Board of Supervisors website, http://www.sfgov.org/site/bdsupvrs_page.asp?id=104612, accessed September 15, 2009.

[18] San Francisco Planning Department, *Balboa Park Station Area Plan*, April 2009.

[19] San Francisco Planning Department, *Balboa Park Station Area Plan Final Environmental Impact Report*, December 4, 2008.

[20] Minutes from the May 21, 2009 meeting of the San Francisco Planning Commission, available on the San Francisco Planning Department website, http://www.sfgov.org/site/planning_page.asp?id=105826, accessed October 15, 2009.

II. UTILITIES AND PUBLIC SERVICES

A. WATER DELIVERY FACILITIES

EXISTING WATER DELIVERY AND FACILITIES CONDITIONS

Regional Water System

Potable (drinking-quality) water for the Corridor Study area is provided by the San Francisco Public Utilities Commission (SFPUC), which manages a complex Regional Water System (RWS) that provides water to approximately 2.5 million people in San Francisco, Santa Clara, San Mateo, Alameda, and Tuolumne counties. The RWS consists of three integrated water supply and conveyance systems: the Hetch Hetchy, Alameda, and Peninsula systems. The SFPUC is currently implementing the Water System Improvement Program (WSIP) to provide improvements to its water infrastructure.

Water Supply

Effective January 1, 2002, the State of California adopted Senate Bill 610 (SB 610). SB 610 requires land use planning entities, such as the City and County of San Francisco, when evaluating large development and redevelopment projects,[1] to request an assessment of the availability of water supplies from the water supply entity that will provide water to a project. The Water Supply Assessment (WSA) is performed in conjunction with the land use approval process associated with a project and must include an evaluation of the sufficiency of the water supplies available to the water supplier to meet existing and future demands, including the demand for a project over a 20-year time period that includes normal, single-dry, and multiple-dry years.

The SFPUC prepared an *Urban Water Management Plan* in 2005 (2005 UWMP) as required by Section10610.4 of the California Water Code. When a new development project is accounted for in the demand projections of an UWMP, the WSA can refer to the UWMP and no further analysis is necessary. In an effort to streamline the water supply planning process within San Francisco, the SFPUC adopted a resolution in 2006 to allow all development projects requiring a WSA under SB 610 to rely solely on the SFPUC's 2005 UWMP without having to prepare individual WSAs. Because the San Francisco Planning Department and SFPUC are currently engaged in

[1] Under SB 610, large projects are defined as 1) a project creating the equivalent demand of 500 residential units, 2) a proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space, or 3) a commercial building employing more than 1,000 persons or having more than 250,000 square feet of floor space.

planning for various large land development proposals[2] that go beyond the future developments considered in the 2005 UWMP, the SFPUC concluded that its 2005 UWMP no longer accounted for every qualifying project in San Francisco. Therefore, until the 2010 UWMP is prepared, a WSA must be prepared for any qualifying project not accounted for in the 2005 UWMP. The WSA must consider the SFPUC's current and projected supplies in light of projected demands associated with new growth not covered in the 2005 UWMP.

Sources of Water Supply

The SFPUC delivers an annual average of approximately 265 million gallons of water per day (mgd),[3] with approximately 85 percent of that water supply provided by the Hetch Hetchy system, which diverts water from the Tuolumne River. The balance (approximately 15 percent) comes from runoff in the Alameda Creek watershed, which is stored in the Calaveras and San Antonio reservoirs, and runoff from the San Francisco Peninsula, which is stored in the Crystal Springs, San Andreas, and Pilarcitos Reservoirs. A small portion of retail[4] water demand is met through locally produced groundwater, used primarily for irrigation at local parks and on highway medians, and recycled water, which is used for wastewater treatment process water, sewer box flushing, and similar wash-down operations.

Groundwater

San Francisco overlies all or part of eight groundwater basins: the Westside, Lobos, Marina, Downtown, and South basins, which are located wholly within the City limits; and the Islais Valley, South San Francisco, and Visitation Valley basins, which extend south into San Mateo County. The portion of the Westside Basin located within San Francisco is commonly referred to as the North Westside Basin. Except in the Westside and Lobos basins, groundwater is insufficient for municipal supply due to low yield. Local groundwater in San Francisco is used for irrigation in some parks, as well as for non-potable purposes at the San Francisco Zoo and Golden Gate Park.

Early in its history, San Francisco made significant use of local groundwater, springs, and spring-fed surface water, and in the 1930s pumping rates from the groundwater basin on the west side of the City were reported to be up to a total of 6 mgd. However, since the development of surface

[2] Three large projects are proposed: Parkmerced, Treasure Island-Yerba Buena Island Redevelopment Plan, and Candlestick Point-Hunters Point Shipyard Phase II Project.
[3] PBS&J, *Final Water Supply Availability Study*, October 2009 (hereinafter referred to as "WSAS"), pp. 5-6. A copy of this study is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File 2008.0021E.
[4] The SFPUC's retail customers are homes and businesses, mostly in San Francisco, served directly by the SFPUC. Retail customers also include Treasure Island and customers outside the City at the San Francisco Airport, the Town of Sunol, Lawrence Livermore Laboratories, Castlewood, and Groveland Community Services District.

water supplies in the Peninsula and Alameda watersheds and the subsequent completion of the Hetch Hetchy system in the 1930s, the use of groundwater for the water supply system has been minimal.[5]

The SFPUC is currently studying implementation of the San Francisco Groundwater Supply Project, created as part of the WSIP, to expand use of the local groundwater resource to provide ongoing supply and to improve reliability during droughts, during maintenance activities, and after an earthquake or other emergency. The Groundwater Supply Project proposes the construction of up to six wells and associated facilities in the western part of San Francisco to extract up to 4 mgd of water from the North Westside Basin for distribution in the City. The extracted groundwater would be treated, disinfected, and blended in small quantities with surface water supplies before entering the municipal drinking water system.

Recycled Water

For 50 years prior to 1981, San Francisco's McQueen Treatment Plant provided recycled water to Golden Gate Park for irrigation. Because of changes in regulations, the City closed the McQueen plant and discontinued use of recycled water in Golden Gate Park. Currently, disinfected secondary-treated[6] recycled water from the SFPUC's Southeast Water Pollution Control Plant is used on a limited basis for wash-down operations in the combined sewer system and is also provided to construction contractors for dust control and other construction purposes. Current use of recycled water for these purposes in San Francisco is less than 1 mgd.[7]

In March 2006, the SFPUC updated the Recycled Water Master Plan for the City. The 2006 Recycled Water Master Plan identified where and how San Francisco could most feasibly develop recycled water in the City and provided strategies for implementing the recycled water projects that were identified. The SFPUC plans to continue to diversify San Francisco's water supply portfolio by increasing the use of local water sources, such as recycled water, groundwater, water conservation, and desalination.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects. These proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco. Recycled water would primarily be used for landscape irrigation, toilet flushing, and industrial purposes.

[5] SFPUC, *2005 Urban Water Management Plan for the City and County of San Francisco*, December 2005.
[6] Secondary effluent has undergone treatment to remove floatable materials (such as oil and grease), settleable materials (such as sand and gravel), and a substantial portion of the organic compounds in the waste. In San Francisco, it is treated with chlorine to kill bacteria and the chlorine is removed before being discharged.
[7] WSAS, pp. 7-8.

The Westside Recycled Water Project would provide recycled water to several sites on the west side of San Francisco. The system would produce recycled water at a proposed recycled water treatment facility in Golden Gate Park and deliver the water to the San Francisco Zoo, Golden Gate Park, and Lincoln Park Golf Course for landscape irrigation, and for non-potable uses at the zoo and Golden Gate Park, including at the California Academy of Sciences. The SFPUC has begun the project-specific environmental review for this project.

Water Conservation

The SFPUC is committed to demand-side management[8] programs, and the City's per capita water use has dropped by about one-third since 1977 due in part to these programs.[9] The first substantial decrease occurred following the 1976-77 drought. Gross per capita water use dropped from 160 gallons to 130 gallons per capita per day. Despite continuous growth in the City since then, water demand has remained lower than pre-drought levels.[10]

In addition to plans for repairs and improvements to the water supply system infrastructure, the WSIP calls for increased water conservation. The SFPUC's current demand management programs range from financial incentives for plumbing devices to improvements in the distribution efficiency of the system. With this conservation program, the SFPUC anticipates reducing gross per household consumption from 91.5 gallons per capita per day in 2009 to 87.4 gallons per capita per day by 2018, which would result in a conservation supply potential of approximately 4.0 mgd annually.

Water Supply Reliability Planning

To enhance the reliability of the RWS, improve dry-year supplies, diversify the water supply portfolio, and meet projected wholesale and retail demand through 2030, the SFPUC developed the WSIP in 2005. After certification of the Final Program EIR (PEIR) for the WSIP by the Planning Commission on October 30, 2008, the SFPUC adopted the Phased WSIP option analyzed in the PEIR. The Phased WSIP would meet projected 2018 demand of approximately 285 mgd by capping deliveries from the RWS at 265 mgd, with 184 mgd allocated to wholesale customers and 81 mgd allocated to retail customers.[11] The remaining 20 mgd of demand would be met through water conservation, recycling, and groundwater, with 10 mgd provided by wholesale customers and 10 mgd provided by local projects within San Francisco. The 10 mgd

[8] Demand-side management involves programs that discourage water use and encourage conservation, with the objective of reducing overall water demand.
[9] WSAS, p. 8.
[10] SFPUC, *2005 Urban Water Management Plan for the City and County of San Francisco*, December 2005, pp. 38-40. A copy of this study is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File 2008.0021E.
[11] WSAS, pp. 9-10.

of local supply committed to by the SFPUC upon adoption of the Phased WSIP would be provided through development of the local water supply improvements discussed below.

Water Treatment Capacity

Water from the Hetch Hetchy system is delivered to customers without filtration. Water from the Alameda system is treated at the Sunol Valley Water Treatment Plant (WTP), located in Alameda County. Peninsula system water and any Hetch Hetchy or Alameda system water stored in Peninsula reservoirs is treated at the Harry Tracy WTP, located in northern San Mateo County. These treatment plants have existing treatment capacities of 160 mgd and 120 mgd, respectively. To ensure treatment capacity into the future, the SFPUC is planning to upgrade the Sunol Valley WTP to reliably treat 160 mgd and increase the plant's storage capacity of treated water. The SFPUC is also currently designing an expansion of the Harry Tracy WTP to reliably deliver 160 mgd, which would increase the total treatment capacity of the RWS to 320 mgd. These projects would further the delivery reliability goals identified by the SFPUC as part of the Phased WSIP by allowing the SFPUC to deliver water to meet demands during maintenance and emergency supply in the event of loss of the Hetch Hetchy system supply. In addition, the SFPUC has initiated construction of the Tesla advanced disinfection treatment facility in Tracy, California, to provide advanced disinfection of water from the Hetch Hetchy system.

Water Shortage and Dry-Year Planning

To ensure that water could be delivered continuously throughout a drought, the SFPUC has adopted a drought planning sequence and associated operating procedures that trigger different levels of water delivery reductions relative to the volume of water stored in SFPUC reservoirs.

Each year, during the snowmelt period, the SFPUC evaluates the amount of total water storage expected to occur throughout the RWS. If this evaluation finds the projected total water storage to be less than a level sufficient to provide sustained deliveries, the SFPUC may impose delivery reductions or rationing. The amount of reduction has been established in contractual agreements between the SFPUC and its customers in the Water Shortage Allocation Plan. The SFPUC has adopted the Retail Water Shortage Allocation Plan to formalize the three-stage program of action to be taken in San Francisco. During a shortage of between 5 to 10 percent (Stage 1), SFPUC retail customers would experience no reduction in deliveries, but the SFPUC would issue a voluntary rationing request to customers, alert customers to water supply conditions, remind them of existing water use prohibitions, and provide education on, and possible acceleration of, incentive programs. For a shortage of between 10 to 20 percent (Stage 2), retail customers would experience a 1.9 percent reduction in retail deliveries. During Stage 2, all Stage 1 measures would be implemented, customers would receive a specific allotment of water, and if a customer's water use goes above their allotment, they would be subject to an excess use flow restrictor device and shut-off of water. For shortages in excess of 20 percent (Stage 3), all Stage 2

measures and additional reductions in retail allotments would be implemented, as determined by the SFPUC.

Current and Future Water Supplies

As discussed above on pp. II.A.4 – II.A.5, the Phased WSIP allocates 81 mgd to retail customers. In addition, approximately 3.5 mgd of groundwater is obtained from local groundwater basins in San Francisco for the zoo and Golden Gate Park, and in the Castlewood Community located in Alameda County. Per the Phased WSIP, an additional 10 mgd would be provided from local groundwater and recycled water projects and from conservation measures that reduce demand. Table II.A.1 provides an estimate of retail water supplies from 2010 through 2030. As shown in the table, water supply is projected to increase from 84.5 mgd in 2010 to 94.5 mgd in 2015 (at completion of the WSIP projects) and to remain at that level through 2030.

Table II.A.1: SFPUC Estimated Retail Water Supplies, 2010–2030 (mgd)

Water Supply Sources	2010	2015	2020	2025	2030
Current Surface Water Supply Sources					
SFPUC RWS (Surface water: Tuolumne River, Alameda Creek & Peninsula Watersheds)	81.0	81.0	81.0	81.0	81.0
Current Groundwater Sources					
Groundwater (In-City Irrigation Purposes)	2.5	0.5	0.5	0.5	0.5
Groundwater—Other Retail Users	1.0	1.0	1.0	1.0	1.0
Groundwater: Treated for Potable—Previously Used for In-City Irrigation Purposes	0.0	2.0	2.0	2.0	2.0
Groundwater Subtotal	*3.5*	*3.5*	*3.5*	*3.5*	*3.5*
Current Water Supply Subtotal	***84.5***	***84.5***	***84.5***	***84.5***	***84.5***
Future Water Supply Sources					
Groundwater Development: Potable from SF GWSP (Westside Groundwater Basin)	0.0	2.0	2.0	2.0	2.0
Recycled Water Expansion Irrigation	0.0	4.0	4.0	4.0	4.0
Supply Conservation Program	0.0	4.0	4.0	4.0	4.0
WSIP Supply Subtotal	*0.0*	*10.0*	*10.0*	*10.0*	*10.0*
Total Retail Supply (Current and WSIP Supplies)	***84.5***	***94.5***	***94.5***	***94.5***	***94.5***

Notes:
mgd = million gallons per day
SF GWSP = San Francisco Groundwater Supply Project
WSIP = Water System Improvement Program

Source: PBS&J, *Final Water Supply Availability Study*, October 2009

Current and Future Water Demand

To update the water supply and demand estimates provided in the 2005 update of the UWMP, the SFPUC developed a *Water Supply Availability Study*. The study incorporates new water supply information (per the Phased WSIP) and generates new estimates of future water demand for San Francisco. The future water demand estimates are based on the most current population and employment estimates, which include other major development proposals not anticipated in the 2005 UWMP, including the proposed Parkmerced Project.

To update future water demand, the *Water Supply Availability Study* compared the estimates of residential households and employees used in the 2005 UWMP with new population and employment forecasts provided by the San Francisco Planning Department, which were designed to closely match the recently adopted Association of Bay Area Governments *Projections 2009* target and take into account local knowledge of projects currently in various stages of the entitlement process. Updated water demand estimates were then generated. These updated estimates included the increment of future growth that was not previously included in the 2005 UWMP estimates.

Estimates of water demand for major development proposals[12] in San Francisco were based on information provided by project proponents.

Table II.A.2 provides an estimate of total SFPUC Retail Water Demands from 2010 through 2030, incorporating the most recent new residential development estimates from 2015 through 2030 and assuming some development not previously included in the 2005 UWMP estimates. Total retail water demand, including demand from the reasonably foreseeable development projects in the Corridor Study area, is estimated to increase from 91.81 mgd in 2010 to approximately 93.42 mgd by 2030.

Water Distribution System

San Francisco's water supply is delivered to the City in several major pipelines and stored in reservoirs located within the City. The City's internal distribution system is divided into the Eastside (roughly from Twin Peaks to the Bay) and the Westside (roughly from Twin Peaks to the ocean) systems. Water delivery to the Eastside of the City's distribution system is fed by two pipelines that terminate at University Mound, located the southeastern corner of San Francisco. Water delivery to the Westside, which includes the Corridor Study area, is fed by two pipelines and stored in Sunset Reservoir and Merced Manor Reservoir, located in the southwestern area of

[12] Parkmerced Project, Candlestick Point-Hunters Point Shipyard Phase II Project, and Treasure Island-Yerba Buena Island Redevelopment Plan.

San Francisco. Several smaller reservoirs, in addition to storage tanks and pumps, provide water to individual distribution zones based on elevation.

All of the reasonably foreseeable development project sites, except the Arden Wood and 1150 Ocean (Balboa) sites, are within the Sunset Reservoir zone. Arden Wood is on the boundary of the Sunset and Sutro zones, while 1150 Ocean is served by the Sutro Reservoir.[13]

Table II.A.2: SFPUC Estimated Average Annual Retail Water Demand

Users, Facilities, and Entities	Projected Water Demand (mgd)				
	2010	**2015**	**2020**	**2025**	**2030**
San Francisco Residential (Single- and Multiple-Family)	44.70	43.80	43.20	42.90	42.90
New San Francisco Residential (Generated by Projects and Incremental Growth)	—	0.47	0.95	1.42	1.89
Subtotal	*44.70*	*44.27*	*44.15*	*44.32*	*44.79*
San Francisco Non-Residential - Business/Industrial	30.21	30.52	30.83	31.14	31.73
Subtotal	*74.91*	*74.79*	*74.98*	*75.46*	*76.52*
Unaccounted-for System Losses	7.30	7.30	7.30	7.30	7.30
Subtotal	*82.21*	*82.09*	*82.28*	*82.76*	*83.82*
Other Retail Demands	4.90	4.90	4.90	4.90	4.90
Lawrence Livermore Laboratory; Groveland Community Services District	1.20	1.20	1.20	1.20	1.20
City Irrigation	2.50	2.50	2.50	2.50	2.50
Castlewood Community	1.00	1.00	1.00	1.00	1.00
Total Retail Demand	***91.81***	***91.69***	***91.88***	***92.36***	***93.42***

Notes:
mgd = million gallons per day
Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

Source: PBS&J, *Final Water Supply Availability Study*, October 2009

WSIP Reliability Improvements

Much of San Francisco's water delivery infrastructure is aged and in need of repair. Built in the early 1900s, many parts of the system are nearing the end of their working life. To protect the integrity of the water delivery system, in 2002 the SFPUC initiated the $4.6-billion Water Supply Improvement Program (WSIP) to improve the regional system with respect to water quality,

[13] Hydroconsult Engineers, Inc., *Technical Memorandum, 19th Avenue Corridor Study Area – Cumulative Utilities Analysis*, January 14, 2010 (hereinafter "Hydroconsult Engineers"), p. 3. A copy of this memo is available for public review and the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File 2008.0021E.

seismic response, water delivery, and water supply to meet water delivery needs in the service area through the year 2030.

Several regional facility improvement projects are planned within the Corridor Study area. These projects include the Sunset Reservoir upgrades recently completed, and upgrades to the Sutro Reservoir and the Lake Merced Pump Station. These improvements are not planned to change the supply of water available, but to improve delivery reliability. Construction of these facilities would result in typical temporary increases in truck traffic, dust, and noise in the immediate vicinity of each project.

19TH AVENUE CORRIDOR STUDY CONCLUSIONS

Buildout of the reasonably foreseeable development projects identified in the Corridor Study area is estimated to increase the City's population by about 16,850 persons by 2030. These projects would include about 7,375 residential units, 460,000 gsf of retail uses, 834,000 gsf of institutional/educational uses, 80,000 gsf of office uses, 214,000 gsf of community facilities, and an eight-screen movie theater.

Water Supply

The reasonably foreseeable development projects identified in the Corridor Study area would increase the number of residential units in the Corridor Study, thereby increasing the volume of potable water needed to serve the population. Table II.A.3 shows the estimated water demands for each of the reasonably foreseeable projects. As shown in the table, full implementation of the projects would increase water demand from 1.12 million gallons per day (mgd) to 1.65 mgd, an increase of approximately 47 percent over existing demand on these sites.[14]

The current water demand of 1.12 mgd represents approximately 1.2 percent of San Francisco total retail potable water demand of 90 mgd. The cumulative demand of 1.65 mgd at full build-out, which would not occur until approximately 2030, would represent approximately 1.8 percent of San Francisco's total retail potable water demand.

To assess the adequacy of San Francisco's current and projected future water supplies to meet estimated future demand, including the demand associated with the reasonably foreseeable projects and other projected future growth (e.g., background growth from the Association of Bay Area Governments projections), the WSAS included a comparison of retail water supply and demand. Table II.A.4 provides a comparison of the projected future retail water supply and demand in varying hydrologic conditions over the SFPUC's 20-year planning horizon through 2030.

[14] Hydroconsult Engineers, p. 5.

Table II.A.3: Estimated Water Demands by Project (mgd)

Project	Existing	New	Total
Parkmerced	0.71	0.29	0.98
San Francisco State University	0.30	0.10	0.40
800 Brotherhood Way	0.00	0.02	0.02
77-111 Cambon	0.003	0.02	0.02
700 Font (San Francisco Unified School District)	0.01	0.03	0.04
Stonestown	0.09	0.02	0.12
Arden Wood	0.00	0.02	0.02
1150 Ocean (Balboa Plan- Kragen Auto Site)	0.00	0.02	0.02
TOTAL	**1.12**	**0.52**	**1.65**

Source: Hydroconsult Engineers, January 14, 2010

The City's water supply is sufficient to meet projected demand for anticipated growth through 2030 in all but the second and third year of a multiple dry-year period.

Thus, during multiple dry-year periods, the SFPUC would need to implement the provisions of the demand management and water conservation measures discussed on p. II.A.4, which could include voluntary rationing or the curtailment of retail deliveries. With the implementation of these measures during multiple dry-year periods, existing and projected future water supplies would be sufficient to meet estimated future water demand.

Water Infrastructure

Each of the reasonably foreseeable projects would install their own internal water distribution infrastructure. Implementation of the reasonably foreseeable projects would not result in a substantial increase in water delivery from the SFPUC. No projects for increasing the size of any reservoirs or water treatment facilities would be necessary. [15] The existing SFPUC infrastructure for delivering water to the project sites is sufficient to meet the needs of the reasonably foreseeable projects.

[15] Chi Yu, SFPUC Water Enterprise, CDD Engineering, email to Beth Goldstein, Hydroconsult Engineers, Inc., August 31, 2009..

Table II.A.4: Comparison of Projected Water Supply and Demand for Normal, Single Dry, and Multiple Dry Years (mgd)

Retail Supply and Demand		Normal Year	Single Dry Year	Multiple Dry-Year Event		
				Year 1	Year 2	Year 3
2010	RWS Supply	81.00	81.00	81.00	79.50	79.50
	Groundwater Supply	3.50	3.50	3.50	3.50	3.50
	Total Retail Supply	***84.50***	***84.50***	***84.50***	***83.00***	***83.00***
	Total Retail Demand	91.81	91.81	91.81	91.81	91.81
	Surplus/(Deficit)[a]	(7.31)	(7.31)	(7.31)	(8.81)	(8.81)
2015	RWS Supply	81.00	81.00	81.00	79.50	79.50
	Groundwater	3.50	3.50	3.50	3.50	3.50
	WSIP Supply Sources	10.00	10.00	10.00	10.00	10.00
	Total City Supply	***94.50***	***94.50***	***94.50***	***93.00***	***93.00***
	Total Retail Demand	91.69	91.69	91.69	91.69	91.69
	Surplus/(Deficit)	2.81	2.81	2.81	1.31	1.31
2020	RWS Supply	81.00	81.00	81.00	79.50	79.50
	Groundwater	3.50	3.50	3.50	3.50	3.50
	WSIP Supply Sources	10.00	10.00	10.00	10.00	10.00
	Total City Supply	***94.50***	***94.50***	***94.50***	***93.00***	***93.00***
	Total Retail Demand	91.88	91.87	91.87	91.87	91.87
	Surplus/(Deficit)	2.62	2.63	2.63	1.12	1.12
2025	RWS Supply	81.00	81.00	81.00	79.50	79.50
	Groundwater	3.50	3.50	3.50	3.50	3.50
	WSIP Supply Sources	10.00	10.00	10.00	10.00	10.00
	Total City Supply	***94.50***	***94.50***	***94.50***	***93.00***	***93.00***
	Total Retail Demand	92.36	92.36	92.36	92.36	92.36
	Surplus/(Deficit)	2.14	2.14	2.14	0.64	0.64
2030	RWS Supply	81.00	81.00	81.00	79.50	79.50
	Groundwater	3.50	3.50	3.50	3.50	3.50
	WSIP Supply Sources	10.00	10.00	10.00	10.00	10.00
	Total City Supply	***94.50***	***94.50***	***94.50***	***93.00***	***93.00***
	Total Retail Demand	93.42	93.42	93.42	93.42	93.42
	Surplus/(Deficit)	1.08	1.08	1.08	(0.42)[b]	(0.42)[b]

Notes:
mgd = million gallons per day
RWS = Regional Water System
WSIP = Water System Improvement Program

[a] The deficit shown in 2010 is the result of reducing the RWS supply to 81 mgd as per the Phased WSIP Variant, without full development of the additional 10 mgd of new supplies. 10 mgd of new sources would be developed and available for use in San Francisco by 2015. However, San Francisco retail demand is currently lower than projected (Fiscal Year 07/08 use was 83.9 mgd). If San Francisco retail demands exceed the available supply of 84.5 mgd between 2010 and 2015, the Water Supply Agreement allows the San Francisco Public Utilities Commission (SFPUC) to purchase additional water from the RWS. If combined retail and wholesale deliveries exceed 265 mgd, the SFPUC retail customers would be required to pay an Environmental Surcharge for deliveries over 81 mgd. (Total RWS deliveries in Fiscal Year 07/08 were 256.7 mgd.)

[b] Deficit occurs in Year 2 and Year 3 of multiple dry-year event, SFPUC implements its Drought Year Water Shortage Contingency Plans - RWSAP and WSAP would be required to balance supply and demand under this projected shortfall.

Source: PBS&J, *Final Water Supply Availability Study*, October 2009

B. WASTEWATER COLLECTION, TREATMENT AND STORMWATER MANAGEMENT

EXISTING WASTEWATER COLLECTION AND TREATMENT CONDITIONS

San Francisco's wastewater system is a combined system that conveys and treats both sanitary sewage and stormwater. Large underground structures (storage/transport facilities [boxes]) collect sewage and stormwater and transport these flows, via pump stations, to treatment facilities.

Wastewater Collection

The City's wastewater collection system is divided into the Bayside (roughly from Twin Peaks to the Bay) and the Westside (roughly from Twin Peaks to the ocean) drainage basins. The Corridor Study area is located within the Westside drainage basin. The Westside system, which serves an area of about 9,000 acres, was completed in 1994 and includes the Richmond, Westside, and Lake Merced sewers, the Westside Pump Station (WSS), the Oceanside Water Pollution Control Plant (OSP), the Southwest Ocean Outfall (SWOO), and seven combined sewer overflow near-shore discharge points.

With the exception of the Arden Wood site, the reasonably foreseeable development sites are all within the Lake Merced basin, which is served primarily by the Ingleside sewer that flows to the Lake Merced tunnel and ultimately to the Westside Transport/Storage box (WST). The Arden Wood development site is located in the Sunset basin and is served primarily by the Vicente sewer that flows directly to the WST.

Wastewater Treatment

During dry weather, all sanitary sewage (a daily average of roughly 16 million gallons per day [mgd]) is pumped from the WST to the OSP and treated to secondary effluent[1] quality before flowing by gravity to the Ocean via the SWOO. During light rainfall, all flows continue to receive this level of treatment (up to 43 mgd). Combined storm and sanitary flows exceeding 43 mgd, and up to 65 mgd, receive primary treatment[2] and disinfection at the OSP. Combined flows exceeding the treatment plant maximum of 65 mgd and up to 110 mgd receive the equivalent of primary treatment without disinfection in the WST sewer before being pumped for Ocean disposal through the SWOO. The treatment in the WST is provided by decanting the combined

[1] Secondary effluent has undergone treatment to remove floatable materials (such as oil and grease), settleable materials (such as sand and gravel), and a substantial portion of the organic compounds in the waste. In San Francisco, it is treated with chlorine to kill bacteria and the chlorine is removed before the effluent is discharged.

[2] Primary treatment removes floatable and settleable materials.

flow under a baffle and over a weir. This process keeps settleable and floatable material from being discharged to the SWOO.

Overflows to Ocean Beach occur at seven locations, when the WSS wet weather pumps have reached their capacity. The Westside system is designed and operated to average eight combined sewer overflows annually. In the years 1998-2003, the Westside system averaged seven combined sewer overflows per year.[3]

Treated wastewater from the Oceanside Water Pollution Control Plant is discharged in the Pacific Ocean 4.5 miles off shore through the Southwest Ocean Outfall. Wastewater is discharged from the City's wastewater treatment plants under a National Pollutant Discharge Elimination System permit issued to the SFPUC by the Regional Water Quality Control Board, San Francisco Bay Region.

19TH AVENUE CORRIDOR STUDY CONDITIONS

Construction

During the various construction phases of the reasonably foreseeable development projects, excavation and grading on the development sites would require temporary removal of existing vegetation and pavements and disturbance of surface soils. Exposed soils would be exposed to stormwater runoff, potentially causing erosion and entrainment of sediments in the runoff. If not managed properly, the sediments would be carried in water courses and, as all runoff currently drains to the City's combined sewer system, cause sediments to be discharged to the sewer system where they would reduce the capacity of the sewer lines, potentially causing sewer overflows.

The potential for releases of fuels, oils, paints, and solvents is present at most construction sites. Once released, these chemicals would flow or be carried by stormwater runoff, wash water, and dust control water to the sewer, potentially reducing the quality of the receiving waters if they could not be removed in the treatment process at the Oceanside Water Pollution Control Plant.

The *San Francisco Public Works Code* regulates the quantity and quality of discharges to the combined sewer system. These requirements include Best Management Practices (BMPs) for control of sediments and erosion. Each project sponsor would implement a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the City's Construction Site Runoff Pollution Prevention Procedures and include, at a minimum, the BMPs specified. The SWPPPs would include provision for facilities and practices to prevent spills of fuels and chemicals and to

[3] Hydroconsult Engineers, Inc., *Technical Memorandum, 19th Avenue Corridor Study Area – Cumulative Utilities Analysis*, January 14, 2010 (hereinafter "Hydroconsult Engineers"), p. 8. A copy of this memo is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File 2008.0021E.

control the release of chemicals to surface water. Implementation of the SWPPPs with specified BMPs would reduce pollution of surface water throughout the construction phases of the proposed projects.

Operation

Stormwater Runoff

The construction of new buildings on the development sites is not expected to increase the total amount of stormwater runoff in the Corridor Study area. Table II.B.1 summarizes the existing and proposed total impervious area anticipated on the development sites. The "net change" column represents the effective change in impervious area contributing runoff to the combined sewer system. In the case of Parkmerced and SFSU, the overall site impervious surface area would increase; however, stormwater runoff from these projects is proposed to be diverted away from the combined sewer system such that a net decrease in runoff would be achieved. The individual development program for the Parkmerced Project would result in an increase of 4.56 acres in total impervious area due to more development on that site; however, the proposal includes diversion of 100 percent of the runoff from the combined sewer, resulting in a substantial decrease in area contributing to the flows in the combined sewer. SFSU anticipates an 18 percent net reduction in stormwater runoff into the combined sewer due to diversion of runoff from the combined sewer system[4] based on a 2 percent increase in total runoff from increased in impervious area, and a 20 percent decrease in runoff diverted to the combined sewer.

During operation of the reasonably foreseeable developments, new and intensified land uses at the project sites would result in increased vehicle use and potential discharge of associated pollutants to paved surfaces. Leaks of fuel or lubricants, tire wear, and fallout from vehicle exhaust would contribute petroleum hydrocarbons, heavy metals, and sediment to the pollutant load in stormwater runoff. Runoff from landscaped areas would contain nutrients. These pollutants would be carried to the combined sewer system and flow to the Oceanside Water Pollution Control Plant. Treatment is expected to remove these pollutants to the levels required in the City's National Pollutant Discharge Elimination System permit.

Runoff from San Francisco buildings, sidewalks, parking areas, and streets has typically been directed to storm drains, where it flows to the combined sewer system. In an effort to reduce the amount of stormwater runoff discharged to the City's sewer system, the SFPUC is developing a policy to require that new and redevelopment projects in San Francisco employ green technologies for managing stormwater runoff. These technologies include bioswales, biogutters,

[4] Hydroconsult Engineers, pp. 12-13.

Table II.B.1: Predicted Changes in Impervious Surface (by Project in acres)[1]

	PRE DEVELOPMENT				POST DEVELOPMENT			
	Total Area (acres)	**% impervious**	**Impervious Area (acres)**	**% Contributing to Combined Sewer**	**Total Area (acres)**	**% impervious**	**Impervious Area (acres)**	**% Contributing to Combined Sewer**
Parkmerced	152.0	53%	80.6	100	152.0	56%	85.1	0[2]
SFSU**	144.0	61%	87.84	100	144.0	63%	90.72	80[3]
800 Brotherhood	7.7	1%	0.08	100	7.7	70%	5.4	100
77-111 Cambon	2.8	85%	2.38	100	2.8	100%	2.8	100
700 Font	2.5	62%	1.6	100	2.5	50%	1.3	100
Stonestown	40.7	86%	35.0	100	40.7	86%	35.0	100
445 Wawona[4]	4.8	11%	0.53	100	4.8	49%	2.4	100
1150 Ocean	1.84	100%	1.84	100	1.84	95%	1.75	100

Notes:
[1] Changes in the amount of impervious surface were estimated based upon aerial photos and available site plans.
[2] Assumes 100 percent of runoff from the Parkmerced site would be diverted from the combined sewer system.
[3] San Francisco State University total runoff would increase by 2 percent but discharge to the combined sewer system would be reduced by 20 percent for a net reduction of 18 percent.
[4] Developable area on the 445 Wawona (Arden Wood) site excludes a planned 2.8 acre conservation area.

Source: Hydroconsult Engineers, Inc.

and use of pervious pavements. When these measures are employed, some runoff from buildings and other impervious surfaces is allowed to infiltrate into the ground and is not discharged to the storm drain. Thus, when sufficient green stormwater management facilities are employed, the amount of runoff leaving a site may be decreased, even though the impervious area of the site, such as building footprints, may be increased. The Parkmerced and SFSU projects would both incorporate green stormwater management measures to such a degree that, after full project buildout, runoff from the sites to the combined sewer would be reduced.

The Parkmerced Project would direct 100 percent of stormwater runoff away from the combined sewer system, and SFSU would direct about 18 percent of stormwater runoff away from the combined sewer system. Although the total runoff from the reasonably foreseeable development projects would increase, the portion of that runoff directed to the combined sewer system would decrease, which would reduce the volume of wet weather flows in the Westside system and reduce the potential for overflows.

Flooding

The combined sewer system is designed to carry both sanitary sewage and stormwater runoff. Therefore, dry weather flows use only a fraction of the typical sewer's capacity. Most sewers, however, are designed to carry the rainfall associated with up to the 5-year storm[5], which can cause flooding to occur during storms with intensities greater than the 5-year storm. General

[5] The 5-year storm is a storm event that has a 20-percent chance of occurring, or, on a long-term average, occurs once every five years.

development and growth in San Francisco has resulted in more residential and commercial users of the combined sewer system than anticipated for some portions of the system, using the wastewater capacity meant to carry wet weather flows. As a result, some of the City's sewers no longer have adequate capacity to convey the 5-year storm during heavy rainfall, resulting in flooding in some locations. Recent improvements to the Vicente sewer and Ingleside sewer (at its upstream end along Ocean Avenue) have increased the capacity of these sewers upstream, allowing more flow to reach the downstream portions and thus reducing the margin of safety designed into the size of the sewers. Any additional flow into these sewers during wet weather will further reduce the margin of safety. The Parkmerced and SFSU projects have the potential to improve the performance of the sewers in wet weather because both developments plan to direct stormwater runoff away from the combined sewer system. All other reasonably foreseeable development projects would likely increase the amount of impervious surface, and therefore are assumed to contribute stormwater runoff to the sewers. Development of these projects could increase the potential for flooding during periods of heavy rainfall.[6]

A portion of the Arden Wood site contains a vegetated depression/swale. This site sits above a medium-sized trunk sewer that crosses the Arden Wood site from the northeast to the southwest, and that passes under this depression area. Stormwater runoff likely has difficulty draining from this depression. There is also the possibility that there could be backflow from the combined sewer at this location. Future development of the Arden Wood site should investigate this localized flooding potential and design appropriate improvements. It is possible that such improvements would extend off-site, but they would not be expected to cause additional flooding downstream.

Sewer Overflows

Because both dry and wet weather flows are carried in the same pipes, increasing the volume of either flow can affect the available storage, pumping, and treatment capacity of the combined system. During a large storm, both the primary and secondary treatment capacity of the treatment plant can be exceeded, resulting in releases from the combined overflow structures. Currently the Westside portion of the combined sewer system overflows approximately 6.8 times per year, on average, based on analysis in the Westside Planning Model for wastewater overflows.[7] While the total dry weather (sanitary) flows are expected to increase due to the proposed development projects, the combined sewer overflow frequency, duration, and volume are all expected to decrease from the existing 6.8 times per year on average to approximately 6.5 times per year on

[6] Hydroconsult Engineers, p. 15.
[7] Hydroconsult Engineers, pp. 15-16.

average with separation of wastewater and stormwater flows planned in the Parkmerced and SFSU projects.[8]

Wastewater Conveyance and Treatment

Existing wastewater and stormwater flows from the project sites are collected for treatment at the Oceanside Water Pollution Control Plant and are discharged to the Pacific Ocean. The reasonably foreseeable projects would increase the number of residential units and the amount of commercial and other non-residential space in the 19th Avenue Corridor, thereby increasing the volume of wastewater to be collected and treated.

Table II.B.2 shows the increases in wastewater volumes that would be generated by the reasonably foreseeable projects. Wastewater volumes would increase by 0.43 mgd, an increase of approximately 48 percent compared to existing wastewater flows from these sites. This increase in sanitary sewage due to the development of the reasonably foreseeable projects represents less than 3 percent of the average daily dry weather flow to the Oceanside Water Pollution Control Plant and roughly 1 percent of the plant's secondary treatment capacity.[9] The plant has the capacity to provide secondary treatment for up to 43 mgd. Therefore, sanitary sewage alone from the reasonably foreseeable projects would not exceed the capacity of the treatment plant or cause the plant to exceed any treatment requirements established in the National Pollutant Discharge Elimination System permit.

Table II.B.2: Changes in Estimated Sanitary Sewage (mgd)

Development Project Site	Existing Volume	Proposed Additional Volume	Total Volume
Parkmerced	0.64	0.26	0.90
San Francisco State University	0.15	0.05	0.20
800 Brotherhood Way	0.00	0.02	0.02
77-111 Cambon	0.003	0.02	0.02
700 Font (San Francisco Unified School District)	0.01	0.03	0.04
Stonestown	0.08	0.02	0.10
Ardenwood	0.00	0.01	0.01
1150 Ocean	0.00	0.02	0.02
TOTAL	**0.89 mgd**	**0.43 mgd**	**1.32 mgd**

Source: Hydroconsult Engineers, Inc., Technical Memorandum, 19th Avenue Corridor Study Area – Cumulative Utilities Analysis, January 14, 2010.

[8] Hydroconsult Engineers, Inc., *Technical Memorandum, 19th Avenue Corridor Study Area – Cumulative Utilities Analysis*, January 14, 2010, Table 4.2.
[9] Hydroconsult Engineers, p. 15.

C. POLICE PROTECTION SERVICES

EXISTING POLICE PROTECTION SERVICES CONDITIONS

The San Francisco Police Department (SFPD), headquartered at 850 Bryant Street, provides public safety services in the City and County of San Francisco, including the Corridor Study area. The SFPD consists of three Bureaus (Operations, Administrative Services, and Chief of Staff) and ten Districts located throughout the City. The SFPD employs approximately 2,300 sworn officers. Police services are made up of four basic activities: responding to citizens' requests for service. carrying out activities to promote order and detect or deter criminal behavior, conducting administrative tasks, and engaging in community policing. Community policing is intended to prevent and control crime, violence, and disorder through the development of relationships between the police and community residents, merchants, and other stakeholders.

Taraval Police District

The Corridor Study area is located within the SFPD's Taraval Police District. The district is bounded on the north by Lincoln Way (the southern boundary of Golden Gate Park); on the east by 7th Avenue, Laguna Honda Boulevard, Portola Drive, Miraloma Drive, Yerba Buena Avenue, Faxon Avenue, Ocean Avenue, and San Jose Avenue/Interstate 280; on the south by the San Mateo County line; and on the west by the Pacific Ocean. Based on Census 2000 data, the Taraval Police District includes a population of about 147,810 people (about 19 percent of the City total) and covers about 11 square miles (about 24 percent of the City's total land area).[1]

The Taraval Police District is the largest of the SFPD's ten police districts. The area is mostly residential and includes the Inner Parkside, Parkside, Outer Parkside, Forest Hill, West Portal, Lake Shore, Inner Sunset, Sunset, Outer Sunset, Balboa Terrace, St. Francis Wood, Monterey Heights, Ingleside Terrace, Ocean Beach, Great Highway, Lincoln Way, Merced Manor, Merced Heights, Stonestown, Pine Lake Park, Ocean View, Parkmerced, and San Francisco State University neighborhoods. Prominent commercial areas include the Irving Street, Noriega Street, Ocean Avenue, Taraval Street, and West Portal corridors, as well as the Lakeshore Plaza and Stonestown Galleria shopping centers. The district also contains about 45 public and private schools, San Francisco State University, and other public and private community facilities such as religious institutions, parks, recreation centers, libraries, and health clinics.

The district's station, the Taraval Police Station, is located at 2345 24th Avenue between Santiago and Taraval Streets. The Taraval Police District is divided into six car patrol sectors.[2] The three

[1] Public Safety Strategies Group, *San Francisco Police Department District Station Boundaries Analysis–Final Report*, May 13, 2008 (hereinafter referred to as "*Boundaries Analysis* report"), p. 28. Available online at http://www.sfgov.org/site/uploadedfiles/controller/reports/SFPD_DSBAfinal_trnsmtl.pdf.

[2] The 11.2-square-mile district is divided into car patrol sectors 3I1, 3I2, 313, 3I4, 3I5, and 3I6.

northern sectors (3I1, 3I2, and 3I3) are generally divided north/south by Sunset Boulevard, 19th Avenue, and 7th Avenue. Sector 3I5 is located south of Sloat Boulevard, west of Junipero Serra Boulevard, and north of the San Mateo County line. The two remaining sectors (Sectors 3I4 and 3I6) are east of Junipero Serra Boulevard, with one extending north from Holloway Avenue to Taraval Street and the other extending south from Holloway Avenue to the San Mateo County line. There are also eight foot patrol corridors in this district (Irving Street, Judah Street, Judah Street/La Playa, Portola Drive, West Portal, Taraval Street, Ocean Avenue, and Randolph/Broad Street).[3]

Staffing

The SFPD does not have an adopted standard for the ratio of officers to population or developed acreage and bases its staffing levels on the number of service calls and crime incidents.[4] In 2007, the SFPD employed approximately 2,650 people, and approximately 2,370 of these employees were uniformed officers.[5] Authorized staffing at each District Station includes 1 captain, 4 lieutenants, and 16 sergeants, as well as members of the Patrol Division, who, together with the Traffic Division, make up the Field Operations Bureau. The Patrol Division is responsible for community policing throughout San Francisco by car and on foot. The number of patrol officers is based on the population and crime statistics reported within the District. The SFPD has over 65 beat patrol geographical areas.

Taraval Station personnel include district command staff, administrative officers, and patrol officers. In total, there are 120 sworn officers, up from the 94 sworn officers identified in 2007.[6] Officers are assigned to one of the six patrol sectors in the Taraval Police District. The number of officers on patrol varies by shift, and the shifts are staggered throughout the day.

The SFPD has increasingly focused its efforts on community policing strategies to improve public safety and empower residents to collaborate with police to improve neighborhoods. In the Taraval District, over 20 Neighborhood Watch Programs have been implemented, with calls for service dropping by approximately 75 percent in the Judah/La Playa neighborhood, for example.[7] In addition, there are eight beat areas with foot patrols[8] and special units like the Taraval Neighborhood Team, consisting of one sergeant and seven officers who work closely with

[3] Public Safety Strategies Group, *Foot Patrol Evaluation Report*, April 2008, Map 18, p. 90.
[4] San Francisco Police Department, http://www.sfgov.org/site/police_index.asp?id=19971, accessed December 3, 2009.
[5] The SFPD had 2,449 budgeted positions for uniformed officers. Of these budgeted positions, 2,374 (or approximately 97 percent) were filled.
[6] Commander Kitt Crenshaw, Response to Parkmerced Request for Information, November 24, 2009 (hereinafter referred to as "SFPD RFI"); Public Safety Strategies Group, pp. 46, D4. A copy of the SFPD RFI is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File No. 2008.0021E.
[7] SFPD, *San Francisco Community Policing a Report on Current Efforts*, November 2006, p. 13.
[8] Beat officers patrol the same beat on the same watch for at least a year.

community members to minimize crime and violence. The SFPD also operates several community-center-based programs for youth.

Current Police Activity

The SFPD's *Boundaries Analysis* report stated that crime patterns in the City did not change significantly over the five-year period between 2002 and 2007. The report also states that the northeastern portion of the City (the Northern, Central, Tenderloin, and Southern Police Districts) and certain sections in the middle of the City (the Mission Police District) continue to have the highest incidences of crime while the outlying areas of the City continue to place the least demand on police services.

Criminal incidents recorded by the SFPD are organized according to the severity of the crime. Part I crimes include aggravated assault, arson, auto boosting, burglary, homicide, larceny, motor vehicle theft, rape, and robbery. Part II crimes range from carrying weapons to receiving stolen property. They include embezzlement, forgery, other (non-aggravated) assaults, disorderly conduct, sex offenses, and other crimes. According to SFPD records, a total of 3,340 Part I crimes and 3,324 Part II crimes were reported in the Taraval Police District in 2007. District-specific Part I crimes accounted for approximately 8 percent of Citywide Part I crimes (43,690 incidents reported in total), and district-specific Part II crimes accounted for approximately 7 percent of Citywide Part II crimes (46,822 incidents in total).[9]

In recent years, the Taraval Police District responded to a number of vehicular fatalities. In 2009, Taraval officers wrote over 6,411 moving violations targeting major corridors including 19th Avenue and other parts of the district. Traffic calming plans have been implemented in conjunction with Caltrans and Muni.

Response Time

The type of police response varies according to the nature and urgency of the call. In San Francisco, the following four call priorities have been established:

- Priority A calls are defined as involving a "Life-threatening emergency." These calls are the highest priority.
- Priority B calls are defined as involving "Potential for harm to life and/or property." These calls are the second priority.
- Priority C calls are defined as involving "Crime committed with no threat to life or property. Suspect left crime scene." These calls are third in priority.
- Priority I calls are "Information only broadcast, e.g. public disturbance. Caller wants to remain anonymous."

[9] San Francisco Police Department, *2007 Annual Report*.

According to the SFPD *2007 Annual Report*, the Taraval Police District received 4,463 Priority A calls, 10,410 Priority B calls, and 9,512 Priority C calls, for a total of 24,385 calls for service. The Taraval Police District also dealt with a total of 29,385 on-view (i.e., on-site) incidents that required an officer-initiated response.[10] In total, the Taraval Police Station handled approximately 7 percent of all calls for service in the city, with the most frequent call for service in the District being traffic stops and bus inspections.

In the SFPD's "Performance Measures" set out as part of the City's 2008-2009 budget, the SFPD established the following target response times for 2008-2009:

- Priority A Calls – 4.4 minutes
- Priority B Calls – 8.3 minutes
- Priority C Calls – 10.8 minutes

Using 2007 data from the Computer Aided Dispatch System, the average response times for the Taraval Police District (measured from the time the call was dispatched until the unit arrived) were 3.4 minutes for Priority A calls, 11.1 minutes for Priority B calls, and 10.6 for Priority C calls. The 2007 Citywide average response times reported in the *Boundaries Analysis* report were 4.36 minutes for Priority A calls, 8.021 minutes for Priority B calls, and 11.37 for Priority C calls. While, in general, police department response times vary depending on a number of factors, including types of calls received and proximity of the nearest vehicle, response times in the vicinity of the Corridor Study area generally meet targets. Response time targets for Priority B calls, however, are not currently met.

Facilities

The *Boundaries Analysis* report identifies improvement needs at most existing stations:

> The stations are either at capacity or too small for the number of personnel assigned, storage is lacking, locker rooms are inadequate, and technology is outdated and/or non-existent. … [Most of the] stations, despite being fairly new or updated, do not fully meet the needs of the SFPD. Station facilities are small, locker rooms do not provide adequate space, juvenile facilities are lacking, interview and report-writing rooms compromise productivity, and facilities present safety and security concerns.[11]

The report identified particularly pressing shortcomings at two stations (Central and Southern), and recommended that those two stations be replaced. With regard to the Taraval Police Station, the *Boundaries Analysis* report notes:

[10] San Francisco Police Department, *2007 Annual Report*.
[11] *Boundaries Analysis* report, pp. 20 and 27.

> Taraval Police Station is a newly remodeled station; however, the facility has little room for growth and staffing increases and lacks a secure lot area for police vehicles.[12]

The report, however, does not call for replacement of the Taraval Police Station, which was remodeled in 1996.

19th AVENUE CORRIDOR STUDY CONCLUSIONS

The reasonably foreseeable development projects would be in an area of the Taraval Police District that is already being served by the SFPD. Buildout of the development projects would not be expected to increase police response times by placing new development in areas that are inaccessible or distant from an existing police station or existing neighborhood patrols.

Successful implementation of the reasonably foreseeable development projects in the Corridor Study area would result in an increase of about 16,850 residents over the next 20 years (to 2030). This increase does not exceed the projected population increase anticipated by 2025 for southwest San Francisco in the *Boundaries Analysis* report.[13] The development projects would likely be served by the Taraval Police Station, or through a consolidated Taraval/Ingleside "Southwest" district as recommended in the *Boundaries Analysis* report.[14]

Continued demand for police protection service in the Taraval District is expected to occur as the residences and commercial space in the development projects are built and occupied over the 20-year analysis period and may result in a demand for additional SFPD staff. Although the *Boundaries Analysis* report did not indicate the need to construct new facilities or expand existing facilities to serve anticipated cumulative growth, the SFPD, in a separate survey, identified the potential need for new satellite facilities or expansion of existing facilities to serve this anticipated cumulative growth in population within the Corridor Study area.[15] While no planning for new or expanded facilities is under way, the SFPD may consider initiating planning for facility expansion in the future if the anticipated development projects are built and occupied.

[12] *Boundaries Analysis* report, Table 2, p. 20.
[13] *Boundaries Analysis* report, p. 31.
[14] *Boundaries Analysis* report, p. 9
[15] SFPD RFI.

D. FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES

EXISTING FIRE PROTECTION AND EMERGENCY MEDICAL SERVICE CONDITIONS

The San Francisco Fire Department (SFFD) is responsible for protecting life and property throughout San Francisco from fires, natural disasters, and hazardous materials incidents.[1] The SFFD also provides unified emergency medical services in the City, including basic life support and advanced life support services. In addition, several privately operated ambulance companies are authorized to provide basic and advanced life support services. Water supply for fire suppression in San Francisco is provided by an auxiliary water supply system (AWSS). Water for the AWSS is distributed through a network of pipes drawing water from a collection of reservoirs[2], pumping stations, and independent cisterns throughout the City. This system provides higher pressure than the domestic water system, allowing firefighters to direct water greater distances.

Staffing

The SFFD has approximately 1,700 firefighting and emergency personnel and consists of three divisions, divided into 10 battalions and 43 active stations located strategically throughout the City. Staffing at each station is determined based on the types of firefighting apparatuses each station maintains. Engines are staffed with one officer and three firefighters, and trucks are staffed with one officer and four firefighters.[3] Ambulances are staffed with a driver and one paramedic specialist who provides pre-hospital advanced medical and trauma care.

Response Times

Fire Stations are strategically located so that firefighters can reach emergencies in the surrounding area quickly. In San Francisco, response times are calculated from the time the dispatch is received and acknowledged at the station to the time the responding unit informs dispatch that it is on-scene. The SFFD target response time goals are 8 minutes for Code 1 (non-emergency) calls, 20 minutes for Code 2 (non life-threatening fire and medical emergencies) calls, and 4.5 minutes for Code 3 (life-threatening fire and medical emergencies) calls, the highest

[1] The mission of the SFFD is stated on the City and County of San Francisco Fire Department website at www.sfgov.org/site/sffd_index.asp, accessed December 4, 2009. The mission statement also includes fire prevention education and goals for the work environment.

[2] The reservoir, just below the summit of Twin Peaks, is one of the primary water sources for the gravity-driven AWSS.

[3] The terms fire engine and fire truck represent different types of firefighting apparatus.

response priority. The SFFD currently falls within the 90th percentile for attainment of its response time goals.[4]

Fire Stations

There are four fire stations located within the Corridor Study area that would be the first to respond to emergencies that occur on the reasonably foreseeable development project sites: Station 15, located at 1000 Ocean Avenue; Station 19, located at 390 Buckingham Way; Station 33, located at 8 Capital Avenue; and Station 39, located at 1091 Portola Drive.

Station 15 would be the first to respond to the 1150 Ocean Avenue site. Station 15 is equipped with an advanced life support engine, a medic unit, and truck company. Response times to this site from Station 15 are within the 5-minute range.[5]

Station 19 would be the first to respond to the Parkmerced, SFSU, 77-111 Cambon Drive, 700 Font Boulevard, and Stonestown development project sites. This station is equipped with an advanced life support engine (Engine Company No. 30) and a fire truck (Truck Company No. 19). Response times to these sites from Station 19 are within the 5-minute range, and the southern portion of the 77-111 Cambon Drive site is within the 4-minute range.[6]

Station 33 would be the first to respond to the 800 Brotherhood Way site. Station 33 is equipped with a fire engine (Engine Company No. 33). Response times to this site from Station 33 are within the 5-minute range.[7]

Station 39 would be the first to respond to the 445 Wawona Street (Arden Wood) site. This station is equipped with a fire engine (Engine Company No. 39). Response times to this site from Station 39 are within the 5-minute range.[8]

Station 40, located at 2155 18th Avenue, would be the first to respond to emergencies in the northeastern corner of the Corridor Study area. Currently, there are no specific development project sites that are within the first responder boundary of Station 40.

19th AVENUE CORRIDOR STUDY CONCLUSIONS

The reasonably foreseeable development projects would be in an area already served by the SFFD. Buildout of the development projects would not increase fire and emergency medical

[4] Office of the Controller, City and County of San Francisco, A Review of the San Francisco Fire-EMS System, April 2004, Appendix B. Available online at http://www.sfgov.org/site/controller_page.asp?id=24430.
[5] *Ibid*, Appendix D, p. 17.
[6] *Ibid*, Appendix D, p. 17.
[7] *Ibid*, Appendix D, p. 17.
[8] *Ibid*, Appendix D, p. 17.

response times by placing new development in an area that is inaccessible or distant from existing fire stations.

Successful implementation of the reasonably foreseeable development projects in the Corridor Study area would result in an increase of about 16,850 residents (over the next 20 years (to 2030). Buildout of the projects would result in about 7,375 net new residential units, 460,000 gsf of net new retail space, 834,000 gsf of net new institutional/educational space, 80,000 gsf of net new office space, 214,000 gsf of net new community facilities space, and an eight-screen movie theater.

Demand for fire protection and emergency medical service is expected to occur as the residences and commercial and other non-residential space in the reasonably foreseeable development projects are built and occupied over the 20-year analysis period. This development may result in a demand for additional SFFD staff, and the SFFD has identified the potential need for new or expanded facilities to serve this anticipated cumulative growth in population in southwest San Francisco. While no planning for new or expanded facilities is under way, the SFFD may consider initiating planning in the future if the anticipated development projects are built and occupied.

E. RECREATION AND PARK FACILITIES

EXISTING RECREATION AND PARK CONDITIONS

Citywide and Regional Resources

The San Francisco Recreation and Park Department (RPD) maintains more than 230 properties (parks, playgrounds, and open spaces) throughout the City. These properties are clustered geographically into nine individual neighborhood service areas (NSA) throughout the City. [1] Among its responsibilities are the management of 15 large, full-complex recreation centers; 9 swimming pools; 6 golf courses; and hundreds of tennis courts, ball diamonds, athletic fields, and basketball courts. Most of these properties have one or more buildings and/or recreation facilities as well as paving, signage, irrigation, electrical, water and sewer systems. The RPD also manages many of the City's signature facilities, such as the Palace of Fine Arts, Golden Gate Park, Coit Tower, the Marina Yacht Harbor, and Candlestick Park with its football stadium. The Corridor Study area is located near two of the City's unique facilities, the San Francisco Zoo and Lake Merced Park, including the Harding Park and Jack Fleming Golf Courses (the Lake Merced Complex). The San Francisco Zoo is managed by the nonprofit San Francisco Zoological Society in partnership with the City and County of San Francisco and attracts approximately 925,000 visitors a year.[2] The San Francisco Public Utilities Commission owns Lake Merced and the RPD maintains the recreational uses around it under the terms of a memorandum of understanding between the two agencies. Recreation activities at the lake include boating, fishing, golfing, jogging, bicycling, skeet shooting, and picnicking.

Parkland-Per-Resident Ratios

RPD-owned and operated property in San Francisco that is permanently dedicated to publicly-accessible recreational and open space uses totaled approximately 3,370 acres in 2009.[3] Together with the approximately 3,007 acres owned and operated by other City agencies and state and federal open space properties within the City, about 6,377 acres of parkland and open space (a variety of parks, walkways, landscaped areas, recreational facilities, playing fields, and unmaintained open areas) serve San Francisco.[4] According to the California Department of

[1] San Francisco Recreation and Park Website, http://www.parks.sfgov.org/wcm_recpark/NSA/NSAClusterMap.pdf , accessed December 8, 2009.
[2] San Francisco Zoo. Website, http://www.sfzoo.org/openrosters/ViewOrgPageLink.asp?LinkKey=14092&orgkey=1903, accessed November 20, 2009.
[3] San Francisco Department of Public Health, *Healthy Development Measurement Tool*. Website: http://www.thehdmt.org/indicators/view/8. Accessed November 17, 2009.
[4] *Ibid.*

Finance, the population of San Francisco as of January 1, 2009, was 845,559,[5] yielding a ratio of approximately 7.5 acres of parkland and open space per 1,000 San Francisco residents.

The City has not established a Citywide target ratio of parkland to residents,[6] and the Recreation and Open Space Element of the *San Francisco General Plan* recognizes that San Francisco is likely to provide less open space acreage than many communities, given land constraints, high population density, and existing urban development. However, under Policy 2.1 of the Open Space Element, the City identified a need to increase the per-capita supply of public open space within the City from the *General Plan*-identified ratio of 5.5 acres per 1,000 San Francisco residents to a level closer to the National Recreation and Park Association (NRPA) suggested ratio of 10 acres per 1,000 residents. As part of this effort, City residents voted in favor of the 2008 Clean and Safe Neighborhood Parks Bond, which is expected to augment the number of City parks (primarily in the eastern part of the City) and fund renovations and repairs to parks, playgrounds, and athletic fields throughout the City.[7]

Types of Parks and Recreational Facilities

Within San Francisco, publicly accessible open spaces and recreational facilities are categorized according to their size and particular amenities as serving the City, district, neighborhood, or subneighborhood.[8] District-serving parks are generally larger than 10 acres and have a service area consisting of a three-eighths-mile radius around the park, while neighborhood-serving parks are generally 1 to 10 acres and have a service area of one-quarter mile. Subneighborhood-serving open spaces, often referred to as mini parks, are less than an acre and are too small to accommodate athletic facilities. The service area for subneighborhood parks is one-eighth mile. These parks tend to include seating areas, small landscaped spaces, tot lots targeting pre-school age children, and playgrounds with amenities generally for elementary-school-age children.

Several large park and open space areas, including Golden Gate Park, the Lake Merced Complex, Glen Canyon Park, and John McLaren Park, amount to about one-half of the total RPD-owned acreage in recreational and open space use. In addition, smaller areas with unique attributes, such as water features or hilltop vista points, attract residents from the entire City and function as City-serving open spaces even though they are smaller in size. Unlike neighborhood facilities, City-

[5] State of California, Department of Finance, *E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change – January 1, 2008 and 2009*. Sacramento, California, May 2009.

[6] Although the National Park and Recreation Association formerly called for 10 acres of open space per 1,000 city residents, the association no longer recommends a single absolute "average" of park acreage per population, in recognition of the fact that it is more relevant that each area plan and program facilities based upon community need. More important than raw acreage is accessibility (location, walking distance) and whether the facility provides needed services to the population in question.

[7] San Francisco Recreation and Park Department, *2008 Clean and Safe Neighborhood Parks Bond - Planning Report*, October 2007, pp. 11-12.

[8] San Francisco Planning Department, *General Plan Recreation and Open Space Element*, see Policy 2.1 and Figure 2: Public Open Space Service Areas.

serving parks and open spaces provide programs, activities, or recreation opportunities that serve the City as a whole.

San Franciscans also benefit from the Bay Area regional open space system. The National Park Service operates the Golden Gate National Recreation Area (GGNRA) in Marin, San Francisco, and San Mateo Counties. The GGNRA includes attractions such as Muir Woods National Monument, the Marin Headlands, the Presidio, Fort Point National Historic Site, Alcatraz Island, the San Francisco Maritime National Historical Park, Ocean Beach, and Fort Funston. Other federal lands include the Point Reyes National Seashore in Marin County. State park and recreation areas that benefit San Francisco residents include attractions such as Mount Tamalpais State Park, Angel Island State Park, and the Candlestick Point State Recreation Area. Regional resources include the East Bay Regional Park District-owned public open spaces in Alameda and Contra Costa Counties,[9] the Midpeninsula Regional Open Space District-owned public open spaces in San Mateo and Santa Clara Counties,[10] and county park and recreation areas throughout the larger Bay Area. In addition, thousands of acres of watershed and agricultural lands are preserved as open spaces by water and utility districts, e.g., a portion of the San Francisco Peninsula watershed lands in San Mateo County and a portion of the Alameda Creek watershed lands in eastern Alameda County.

Recreational Facilities Identified in the Neighborhood Service Area (NSA 7)

The San Francisco Recreation and Park Department organizes park and recreation services in San Francisco into nine geographic Neighborhood Service Areas (NSA) in order to improve responsiveness and provide a single point of contact for neighborhood issues and concerns. The Corridor Study area is located in NSA 7. The general boundary of NSA 7 is Lincoln Way on the north, the Pacific Ocean on the west, the San Francisco county line to I-280 on the south, and Twin Peaks to the east.

City-Owned Recreational Facilities in NSA 7 within or in the Vicinity of the Corridor Study Area

NSA 7 contains about 928 acres of City-owned recreation and open space, including a number of Citywide public recreational facilities in the vicinity of the Corridor Study area. These include the 614-acre Lake Merced Park and the Harding Park and Fleming Golf Courses, which are owned by the SFPUC; the 131-acre San Francisco Zoo; the 30.8-acre Pine Lake Park; the 34.8-acre Sigmund Stern Recreation Grove; the 4.1-acre South Sunset Playground; the 8.9-acre Parkside Square; the 7-acre Larsen Park; the 8.0-acre McCoppin Square; the 3.8-acre Sunset Playground; the 4.9-acre Hawk Hill Park; the 7.0-acre Golden Gate Heights Park; the 1.3-acre JP

[9] The East Bay Regional Park District is the largest regional park district in the nation and includes 65 parks and more than 1,100 miles of trails on more than 98,000 acres.
[10] The Midpeninsula Regional Open Space District has 26 open space preserves (24 of which are open to the public) and has permanently preserved over 57,000 acres of open space.

Murphy Playground; the 1.6-acre Rocky Outcrop; the 0.6-acre Grand View Open Space; the 4.0-acre Grandview Park; the 0.5-acre 15th Avenue Steps; the 2.3-acre Edgehill Mountain; the 40.7-acre Mount Davidson Park; the 5.0-acre Aptos Playground; the 1.2-acre Merced Heights Playground; the 3.8-acre Brooks Park; the 0.5-acre Lakeview/Ashton Mini-Park; the 11.1-acre Minnie and Lovie Ward Recreation Center; the 0.6-acre Brotherhood/Chester Mini-Park; and the 0.13-acre Randolph/Bright Mini-Park.

There are three City-owned recreational facilities identified in NSA 7 that are located within the boundaries of the Corridor Study area: the 3.1-acre Rolph Nicol Playground, the 2.0-acre West Portal Playground, and the 1.75-acre Junipero Serra Playground.

Other Recreational and Open Space Facilities in NSA 7 within the Corridor Study Area

There are numerous other public and private recreational facilities in NSA 7 that are within the Corridor Study area. The private, 18-hole San Francisco Golf Club is the southernmost land use within the Corridor Study area.

North of San Francisco Golf Club, just north of Brotherhood Way, is the Benjamin Bufano open space area ("Peace Park"). Peace Park is under the jurisdiction of the San Francisco Department of Public Works.

North of Peace Park is the Parkmerced site. There are about 75 acres of existing private open space throughout the 152-acre Parkmerced site in a network of lawns, including the Meadow lawn area located west of Juan Bautista Circle, courtyard areas, private open space, and three playgrounds. Also included in this network of open space are the neighborhood's landscaped streets, roundabouts, and boulevards. The playground facilities are located in the northwest corner of the Parkmerced site near the intersection of Vidal Drive and Arballo Drive, in the southwest corner of the Meadow near the intersection of Gonzalez Drive and Arballo Drive (in the west-central portion of the site), and at the southeastern corner of the Parkmerced site near the intersection of Chumasero Drive and Font Boulevard.

Immediately north of Parkmerced is the San Francisco State University (SFSU) campus. Recreational facilities on the SFSU campus include an existing indoor 160,000-gross-square-foot gymnasium building with a basketball/volleyball court and a swimming pool; Cox Stadium, an outdoor stadium used for soccer; and Maloney Field, which is used for baseball and has an adjacent practice field that is used for multiple purposes; and tennis courts. All of these facilities are located in the central portion of the campus west of or adjacent to the valley between University Park North and the academic core. Another softball field is also located at the corner of Lake Merced Boulevard and Font Boulevard. As part of its Campus Master Plan, SFSU

intends to improve connections to district open space and the existing Parkmerced open space network.[11]

Other Recreational Facilities in NSA 7 in the Vicinity of the Corridor Study Area

There are other private and public open spaces located within NSA 7 but outside of the Corridor Study area. The private Olympic County Club is located west of the Corridor Study area and straddles the border between San Francisco County and San Mateo County. Fort Funston (part of the Golden Gate National Recreation Area) is west of Lake Merced Park, adjacent to the Pacific Ocean.

PARK AND RECREATION NEEDS

San Francisco General Plan Recreation and Open Space Element

The Recreation and Open Space Element of the *San Francisco General Plan* notes that "While the number of neighborhood parks and facilities is impressive, they are not well distributed throughout the City…The [unequal distribution] merits correction where neighborhoods lacking parks and recreation facilities also have relatively high needs for such facilities." The Recreation and Open Space Element defines "high need areas" as areas with high population density or high percentages of children, seniors, or low-income households relative to the City as a whole. The Recreation and Open Space Element defines "deficient" areas as areas that are not served by public open space, areas with population that exceeds the capacity of the open spaces that serve it, or areas with facilities that do not correspond well to neighborhood needs.

High need areas and deficient areas are identified in the Recreation and Open Space Element, based on information from the 1980 U.S. Census.[12] A deficient area is identified for a small portion of the eastern part of the Parkmerced neighborhood. This indicates that the area is not sufficiently served by public open space; however, this area of the Parkmerced neighborhood has a privately-owned playground near the intersection of Font Boulevard and Chumasero Drive, and other privately-owned publicly accessible open space on the east side of the Parkmerced neighborhood. No other areas within the Corridor Study area were identified as having any park deficits. The Recreation and Open Space Element also indicates that the Corridor Study area is not within a high need area for any of the demographic categories studied.[13]

The Planning Department is currently revising the Recreation and Open Space Element. The revision, which is still in draft form, is in the early stages of environmental review and is not yet

[11] San Francisco State University, *San Francisco State University Campus Master Plan*, p. 60.
[12] San Francisco Planning Department, *San Francisco General Plan*, Recreation and Open Space Element, Figure 3 through Figure 8 and Map 9.
[13] San Francisco Planning Department, *San Francisco General Plan*, Recreation and Open Space Element, Figure 5 through Figure 8.

official City policy. Similar to the current Recreation and Open Space Element, the proposed revision indicates that the Corridor Study area is not located within a high need area.[14]

Recreation and Park Department Assessment

In 1998, the City initiated the "Great Parks for a Great City Assessment Project" to determine the condition of the park system as well as future needs. In August 2004, the RPD published a *Recreation Assessment Report* that evaluated the recreation needs of San Francisco residents.[15] Nine service area maps were developed for the *Recreation Assessment Report*. The service area maps were intended to assist RPD staff and key leadership in assessing where services are offered, how equitable the service delivery is across the city, and how effective the service is based on participation levels and area demographics. The maps define service areas not by distance from the facility but by the capacity of the facility as designed and, in some cases, as actually used. Maps are provided for ball fields, pools, outdoor basketball courts, multi-use/soccer fields, recreation centers, and tennis courts.

The service area maps show defined RPD service areas within the Corridor Study area. Identified service areas are recreation centers (Merced Heights Park, Louise Lombard, Junipero Serra Clubhouse, Trocadero, Wawona Clubhouse, Pine Lake Clubhouse, and West Portal Clubhouse); basketball courts (Merced Heights Basketball Courts, Junipero Serra Basketball Courts, and Carl Larson Park Basketball Courts); tennis courts (Merced Heights Tennis Courts, Junipero Serra Tennis Courts, Aptos Tennis Courts, Sigmund Stern Recreation Grove, Parkside Square Tennis Courts, Carl Larson Park Tennis Courts, McCoppin Square Tennis Courts, and West Portal Tennis Courts); ballfields (Junipero Serra Ball Fields, Aptos Ball Fields, Parkside Square Ball Fields, and Carl Larson Park Ball Field); swimming pools (Sava Pool); and multi-use fields and soccer pitches (West Portal Multi-Use Playfield).[16]

19th AVENUE CORRIDOR STUDY CONCLUSIONS

For purposes of this discussion, parks are generally defined as areas of land set aside for various recreational opportunities for the public. Recreational facilities are those structures and/or improvements that are built at parks (e.g., benches, picnic tables, tennis courts, dog runs, gardens, etc.). Open space is generally defined as an undeveloped park area that may have a planted area not actively maintained by the RPD and that is neither an actively used park land nor a designated

[14] San Francisco Planning Department, Draft Recreation and Open Space Element, May 2009, Figure 2: High Needs Areas, p. 19. Website: http://openspace.sfplanning.org/docs/Recreation_and_Open_Space_Element.pdf. Accessed November 17, 2009.
[15] San Francisco Recreation and Park Department, *Recreation Assessment Report*, August 2004.
[16] *Ibid*.

natural area, such as right-of-way patches or unimproved lots.[17] Therefore, the terms "park" and "recreational facility" are typically used interchangeably, whereas "open space area" refers to an area where the land is either kept in its natural state or enhanced in order to return the land to its natural state.

New Corridor Study Area Recreational Facilities and Open Space

The Corridor Study area is located in an area that has a unique concentration of regional-attracting private and public open spaces and recreational facilities that together provide a wide range of nature-based active and passive recreational opportunities. Future development programs associated with the Corridor Study's reasonably foreseeable development sites are anticipated to contribute to the area's open space areas through incorporation of private or privately-owned, publicly accessible recreational facilities and open space. For the purposes of discussion in this Corridor Study, it is assumed that no new RPD facilities will be constructed on any of the individual development sites within the Corridor Study area, and that any new recreation or open space area will be privately owned and maintained.

The Parkmerced Project envisions the creation of a system of neighborhood parks, playgrounds, and open spaces with public plazas, courtyards, greenways, and athletic fields as well as walking and biking paths. Approximately 7 neighborhood parks and 24 playgrounds would be distributed evenly through the Parkmerced site. An organic farm and community gardens would also be included in the proposed 68 acres of active, passive, and informal gathering areas, all contributing to the overall neighborhood character of that site.[18]

As part of the SFSU Campus Master Plan, a contiguous network of pedestrian paths, bridges, recreation fields, and natural areas would be integrated into the other campus green spaces on the SFSU campus. SFSU also intends to improve connections to district open space, including Lake Merced and the existing Parkmerced open space network.

The development projects at 800 Brotherhood Way, 77-111 Cambon Drive, and 1150 Ocean Avenue propose passive recreational open space for the residential units through a combination of common outdoor areas, courtyards, and terraces. The design and development programs for the 700 Font Boulevard, Stonestown, and 445 Wawona (Arden Wood) are not yet conceptualized, but private recreation and open space would also likely be provided through a series of landscaped setbacks, plazas, balconies, and/or conservation areas.

[17] San Francisco Recreation and Park Department, *San Francisco Park Maintenance Standards: The Manual and Evaluation Form*, May 2005, p. 17.
[18] The 68 acres of open space would be owned and maintained by the project sponsor.

Corridor Study Area Recreation Assessment

Successful implementation of the reasonably foreseeable development projects in the Corridor Study area would result in an increase of about 16,850 residents over the next 20 years (to 2030). The existing City-serving recreation and open space facilities within NSA 7 would provide a ratio of approximately 55 acres of public parkland per 1,000 residents of the development project sites area. This ratio is substantially higher than the current citywide ratio of 7.5 acres of public parkland per 1,000 residents as well as the ratio of 5.5 acres of public parkland per 1,000 residents identified in the City's *General Plan*.

The various foreseeable development projects would provide additional parks, recreational facilities, and open space to accommodate the expected increase in demand resulting from the anticipated growth in the Corridor Study area. Together with the existing nearby GGNRA open space and City-owned network of parks and recreational facilities, as well as the anticipated augmentation of the City's network as a result of the passage of the 2008 Clean and Safe Neighborhood Parks Bond[19], there would be additions to the City's park and open space acreage able to accommodate the additional demand created by Corridor Study area's development projects. Because of this, the development projects would not be expected to increase the use of recreational resources such that substantial physical deterioration or degradation of existing facilities would occur, nor would they result in the need for new or expanded facilities beyond those proposed.

[19] San Francisco Recreation and Park Department, *2008 Clean and Safe Neighborhood Parks Bond - Planning Report*, October 2007, pp. 11-12.

F. PUBLIC SCHOOLS

EXISTING PUBLIC SCHOOLS CONDITIONS

The San Francisco Unified School District (SFUSD) provides public primary and secondary education in the City and County of San Francisco. As identified in the *SFUSD Capital Plan FY 2010-2019*,[1] the SFUSD has 107 K-12 school sites with 64 elementary schools (grades K-5), 11 alternatively-configured schools[2] (schools not configured grades K-5, 6-8, or 9-12), 14 middle schools[3] (grades 6-8), and 18 high schools[4] (grades 9-12). There are also 34 preschools, 3 charter schools,[5] and 2 San Francisco County Office of Education schools that have separate enrollment processes.

Enrollment

Total SFUSD enrollment for the 2008-2009 academic year was 56,116 students.[6] Religious and secular private schools have long been popular in the City. According to Census 2000 data, approximately 26 percent of school-aged children in the City attended private school compared to a California average of about 10 percent. At that time, this translated to approximately 21,000 private school students. The most recent data show that at the state level, private school enrollment declined from approximately 10 percent of school-aged children in 2000 to a little more than 8 percent in 2007.[7] In 2007, approximately 25,000 school-aged students in San Francisco, or 30 percent, were enrolled in approximately 107 private schools.[8] Thus private schools continue to serve a significant number of San Francisco families with school-aged children.

Over the last decade, overall enrollment in the SFUSD has declined. Although there have been periods of public school enrollment application increases, including the current academic year

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[1] San Francisco Unified School District Capital Plan, FY 2010-2019. Available online at: http://portal.sfusd.edu/data/facilities/FINAL%20APPROVED%20CAPITAL%20PLAN%202010-2019%20Oct%2027%202009.pdf, accessed December 8, 2009.
[2] Includes the Paul Revere Annex.
[3] Excludes Luther Burbank, which is the current site of June Jordan High School.
[4] Includes two programs co-located at 555 Portola Drive (SOTA and Academy of Arts & Sciences) and two programs co-located at 3750 18th Street (Mission High School and San Francisco International High School).
[5] Includes Creative Arts, Edison, and two programs co-located at Benjamin Franklin/Burl Toler Campus and excludes City Arts & Technology (former Luther Burbank Campus), Leadership Charter High School (co-located with James Denman Middle School), and Metropolitan Arts & Technology (co-located at Philip/Sala Burton High School).
[6] San Francisco Unified School District, *School Site List & Summary, CBEDS Information Day – October 1, 2008*, p.1. This figure includes the 55, 272 students enrolled in SFUSD schools plus the 844 students enrolled in the San Francisco County Office of Education school sites.
[7] California Department of Education, *Enrollment and Staff in California Private Schools*, August 2007, p. 10. Available at http://www.cde.ca.gov/ds/si/ps/index.asp. Accessed November 20, 2009.
[8] *Ibid*, pp. 3, 14, and 21.

(2009-2010), five-year projection estimates continue to show an overall decline in public school enrollment.[9] In the last decade, overall enrollment declined steadily, with many schools having had significant drops in enrollment and very few schools experiencing increased enrollment. Total SFUSD enrollment decreased from 63,925 in 1998-99 to 56,116 in 2008-2009, a decline of about 12.2 percent. Over the past ten years, SFUSD has lost an average of nearly 780 students annually. In response to enrollment declines, several schools, including Golden Gate Elementary School,[10] William De Avila Elementary School,[11] and Franklin Middle School, were closed or consolidated by the School Board in 2006. However, the new and growing communities in Mission Bay, Hunters Point, and Treasure Island may trigger the need to construct new school infrastructure.

According to the *SFUSD Capital Plan FY 2010-2019*, the decline that has been experienced over the last ten years slowed in the 2008-2009 school year. The SFUSD *Capital Plan FY 2010-2019* projections indicate that:

> "elementary enrollment will continue to grow due to the large birth cohorts[12] of the early 2000s. The number of elementary school students will eventually rise from 25,000 students in 2008 to 27,600 in 2013, representing an 11 percent increase in just five years. After a slight decline in 2009 and 2010, middle school enrollment will increase again, due to the large birth cohorts of the early 2000s. However, in 2013 it will still stand below current enrollment (at 11,640 compared with 11,816 in 2008). High school enrollment will experience a continuous decline over the next five years, from 19,696 students in 2008 to 18,396 in 2013, reflecting the declining birth trend of the 1990s."

Additionally, many schools in the SFUSD needed to be modernized, retrofitted, or improved in some way to serve the existing and future SFUSD students. As a result, City voters approved a $295 million bond in November 2003 to address modernization at 30 school sites, and a $450 million bond in November 2006 that included 64 projects at 59 additional school sites. Completion of this bond-funded work is expected in 2012. Future bond issues will be necessary to continue the modernization and rehabilitation efforts such as the construction of Americans with Disabilities Act-compliant access.

The SFUSD determines school capacity by applying target enrollment numbers, established each year, that reflect both the academic model of the school and the historical demand patterns. These capacity estimates are used by the Educational Placement Center for enrollment purposes. The SFUSD Facilities Department also provides capacity estimates that reflect the physical space. As part of a redesign of the enrollment process (expected to go into effect for the 2011-2012

[9] San Francisco Unified School District Capital Plan, FY 2010-2019, p. 19.
[10] The Golden Gate Elementary School site is now occupied by Creative Arts Charter School.
[11] William De Avila Elementary School has been reopened for the 2009-2010 academic year as a Mandarin Chinese immersion program serving Kindergarten and first-grade students.
[12] A birth cohort is a group of people who were born in a specified calendar period.

academic year), data showing capacity surplus/deficits indicate that the Lakeshore neighborhood, the Parkside neighborhood, the West of Twin Peaks neighborhood and the Oceanview-Merced-Ingleside neighborhood have a surplus of approximately 300 elementary school seats and 647 middle school seats.[13]

Student Assignment System

Since the 2002-2003 academic year, the SFUSD has operated a three-part, race-neutral, choice-based student assignment system that focuses on outreach and recruitment, program placement, and a diversity index lottery. Under this system, the most significant determinants of a student's school assignment are parental choice and school capacity. Under current practice, parents submit an application with a list of ranked school choices, and the SFUSD assigns students based on available openings, attendance areas, and the diversity index lottery. This system has been adjusted in subsequent years to address issues such as parental choice by expanding the list of potential schools from five to seven. Parents of students can now list up to seven schools to improve the chances of their children being assigned to a requested school.[14] Since the SFUSD allows students to apply to any school in the City, in-demand schools receive more enrollment requests than seats available. Whenever enrollment requests are greater than the number of seats available, the SFUSD uses the diversity index lottery to determine which students receive an assignment offer. The diversity index lottery results are based on a formula made up of race-neutral factors that calculates the probability that, in a given grade, randomly chosen students will be different from each other. The five race-neutral factors used are extreme poverty, socioeconomic status, student's home language, quality of student's prior school, and student's prior academic achievement. When elementary school students are assigned to a school outside of their neighborhood, the SFUSD provides them with bus transportation to the assigned school. Middle and high school students assigned to schools outside their neighborhoods rely on public or private transportation to travel to their assigned schools.

Existing Conditions in and in the Vicinity of the Corridor Study Area

There are seven public high schools (Lowell Alternative, School of the Arts, Abraham Lincoln, Newcomer,[15] City Arts and Technology Charter, Leadership Charter, and Balboa), four middle schools (Aptos, A.P. Giannini, Herbert Hoover, and James Denman), and 26 elementary schools (Francis Scott Key, Sunset, Ulloa, Lawton Alternative, Robert Louis Stevenson, Dianne Feinstein, Lakeshore Alternative, Jefferson, Alice Fong Yu, West Portal, Commodore Sloat, Jose Ortega, Sheridan, Clarendon Alternative, Grattan, Rooftop Alternative, Sanchez, Alvarado,

[13] San Francisco Unified School District, SFUSD Enrollment Process Redesign, Website: http://portal.sfusd.edu/data/epc/Comparison%20of%20Number%20of%20Students%20Living%20in%20Each%20SF%20City%20Planning%20Nhood.pdf. Accessed November 21, 2009.
[14] Applies to all SFUSD schools except Lowell Alternative High School and the School of the Arts.
[15] Newcomer is a one-year transitional educational program for newly arrived immigrant/refugee high school aged students.

Harvey Milk Civil Rights Academy, Miraloma, Sunnyside, Glen Park, S.F. Community Alternative, Monroe, Longfellow, and Guadalupe) located in the southwest quadrant of the City that could serve students generated from identified development sites within the Corridor Study area. The Corridor Study area is located within the attendance districts for Abraham Lincoln High School, Aptos and Herbert Hoover Middle Schools, and Commodore Sloat and Jose Ortega Elementary Schools. Jose Ortega Elementary School has a current enrollment of approximately 254 students and an average classroom size of 19.5 students. Commodore Sloat Elementary School has a current enrollment of approximately 355 students and an average classroom size of 22.2 students. Aptos Middle School has a current enrollment of approximately 988 students and an average classroom size of 29.4 students. Herbert Hoover Middle School has a current enrollment of approximately 1,205 students and an average classroom size of 29 students. Abraham Lincoln High School has a current enrollment of approximately 2,500 students and an average classroom size of 21.6 students.[16]

Within the Corridor Study area, which includes the Parkside, West of Twin Peaks, Lakeshore, and Oceanview-Merced-Ingleside neighborhoods, there were approximately 2,830 SFUSD elementary school students and 1,610 SFUSD middle school students in the 2008-2009 academic year.[17] The elementary schools in these neighborhoods have capacity for a total of approximately 3,550 students with a surplus of about 300 seats.[18] Approximately 28 percent of elementary school-aged children from these neighborhoods in SFUSD schools attended a neighborhood school, a percentage that is substantially lower than the Citywide average of 37 percent. Approximately 78 percent of elementary school-aged children in the Lakeshore neighborhood in SFUSD schools attended a district school in the southwestern quadrant of the City, which includes the Outer Sunset and Inner Sunset neighborhoods in addition to the identified neighborhood. About 71 percent of West of Twin Peaks elementary school-aged children, about 88 percent of Parkside elementary school-aged children, and about 61 percent of Oceanview-

[16] The California Department of Education collects, analyzes, and publishes a wide variety of fiscal, demographic, attendance, and student performance data from local educational agencies. This information is the source of the Education Data Partnership profiles and reports that provide data on school enrollment and average classroom size. Website: http://www.ed-data.k12.ca.us/Navigation/fsTwoPanel.asp?bottom=%2Fprofile.asp%3Flevel%3D07%26reportNumber%3D16. Accessed November 20, 2009

[17] San Francisco Unified School District, *Table 1: Elementary Matrix: Comparison of K-5 Students Residences with Locations of Schools Attended*, Fall 2008 and *Table 2 Middle School Matrix: Comparison of 6th to 8th Grade Students Residences with Locations of Schools Attended*, Fall 2008. Website: http://portal.sfusd.edu/data/epc/Enrollment%20patterns%20for%20each%20SF%20City%20Planning%20Neighborhood.pdf. Tabular data accessed at SFUSD website on November 19, 2009.

[18] San Francisco Unified School District, *Comparison of Number of Students Living in Each SF City Planning Neighborhood with Elementary and Middle School Capacity*. Tabular data accessed at http://portal.sfusd.edu/data/epc/Comparison%20of%20Number%20of%20Students%20Living%20in%20Each%20SF%20City%20Planning%20Nhood.pdf on November 19, 2009.

Merced-Ingleside elementary school-aged children in SFUSD schools attended a district school in the southwestern quadrant of the City.[19,20]

As noted earlier, U.S. Census 2000 data show that about 26 percent of school-aged children in the City were enrolled in private schools. The data show that, of the approximately 12,130 school-aged children in the Lakeshore, Parkside, West of Twin Peaks and Oceanview-Merced-Ingleside neighborhoods, about 4,160 (or about 34 percent) were enrolled in private schools.[21]

19TH AVENUE CORRIDOR STUDY CONCLUSIONS

Successful implementation of the reasonably foreseeable development projects in the Corridor Study area would result in an increase of about 7,375 net new housing units in the Corridor Study area over the next 20 years (to 2030), increasing the number of school-aged residents within the Corridor Study area. Based on the SFUSD student generation factor of 0.203 student per housing unit, the new residential units would contribute approximately 1,500 students to the SFUSD. For purposes of this analysis, although up to 500 might attend private schools, it is assumed that all 1,500 of these students would attend an SFUSD school. This number of students was distributed evenly by grade, resulting in approximately 690 new elementary students, 350 new middle school students, and 460 new high school students.

The geographic context for the analysis of the development projects' effects on schools is the entire City, because while school assignments take into account parents' preferences, which often include where a student lives, assignment is not necessarily to the closest neighborhood school. Enrollment requests for some schools within the southwestern area of San Francisco, such as Jose Ortega Elementary School and Lowell Alternative High School, generally exceed capacity for these schools. As a result, students within the Corridor Study area are less able to obtain school assignments near their residences than students in other areas of the City. Although exceeding capacity is not typical throughout the SFUSD, it is typical, and likely will continue to be, for highly desirable public schools, such as those in the southwestern area of the City, as well as those throughout San Francisco.

In addition to reasonably foreseeable development in the Corridor Study area over the next 20 years, other development proposals throughout the City, if approved, could result in additional

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[19] San Francisco Unified School District, *SFUSD Enrollment Patterns for Each SF City Planning Neighborhood*, Fall 2008, p. 6. Tabular data accessed at http://portal.sfusd.edu/data/epc/Enrollment%20patterns%20for%20each%20SF%20City%20Planning%20Neighborhood.pdf on November 19, 2009.

[20] San Francisco Unified School District, *Table 1: Elementary Matrix: Comparison of K-5 Students Residences with Locations of Schools Attended*, Fall 2008. Tabular data accessed at http://portal.sfusd.edu/data/epc/Enrollment%20patterns%20for%20each%20SF%20City%20Planning%20Neighborhood.pdf on November 19, 2009.

[21] San Francisco Unified School District, District data on private school enrollment. Website: http://portal.sfusd.edu/data/epc/Attending%20Private%20School.pdf. Accessed November 20, 2009.

increases in the school-aged population. However, the SFUSD has experienced declining enrollment in the past decade and before. As noted earlier, enrollment declined by more than 12 percent between 1998 and 2008, and the SFUSD closed several schools in 2006. Increases in elementary school enrollment are predicted, but middle school and high school enrollments are not expected to reach 1998 levels over the next five years. About 25 to 30 percent of the school-aged children in the City attend private schools, and it is reasonable to assume that this level of private school enrollment would continue in the future. For these reasons, at the Citywide level the development projects are not expected to contribute to any exceedance of capacity in public schools. As noted above, however, demand for schools in the vicinity of the Corridor Study area will likely continue to exceed capacity.

III. TRANSPORTATION AND CIRCULATION

EXECUTIVE SUMMARY

In accordance with the direction of the San Francisco Board of Supervisors, an assessment was conducted to evaluate future transportation conditions in the southwest corner of San Francisco. Multiple development projects within this area have recently been proposed or discussed, and this study, known as the 19th Avenue Corridor Study, is to serve as a comprehensive review of the combined effects of these or similar projects in the 19th Avenue Corridor area.

The transportation assessment evaluated existing and future traffic, transit, pedestrian, bicycle, and parking conditions in a transportation study area generally bounded by the San Francisco/San Mateo County line, Lake Merced Boulevard, Sunset Boulevard, Sloat Boulevard, 19th Avenue, Taraval Street, Claremont Boulevard, Portola Drive, and Junipero Serra Boulevard. Within this area, the Board of Supervisors resolution requesting the 19th Avenue Corridor Study identified the following eight development projects as "reasonably-foreseeable" future development projects (herein referred to as the "development projects") and specifically requested that they be included in the analysis:

- Parkmerced Project;
- 800 Brotherhood Way;
- 77-111 Cambon Drive;
- 700 Font Boulevard;
- 445 Wawona Street (the Arden Wood site);
- SFSU Campus Master Plan (2007-2020 SFSUCMP);
- Stonestown Galleria; and
- 1150 Ocean Avenue.

To isolate the effects of the background growth, proposed developments, and transportation improvements proposed by the City agencies and the developments, a series of analysis tiers was identified. These are:

- Tier 1: Future 2030 baseline conditions with no major development projects or transportation improvements within the study area.
- Tier 2: Tier 1 conditions plus the travel demand generated by the eight potential development projects in the study area, without their associated transportation improvements.
- Tier 3: Tier 2 conditions, plus implementation of the transportation improvements currently proposed by City, regional, and state agencies.
- Tier 4: Tier 3 conditions, plus implementation of the transportation improvements associated with the proposed development projects, which include roadway, intersection, bicycle, pedestrian, and transit enhancements at locations around the Parkmerced

neighborhood. Three different iterations of the Tier 4 scenario were evaluated, to address the issues associated with the potential rerouting of the M Ocean View light rail line as proposed by the Parkmerced Project. These iterations are referred to as:

- Tier 4A: M Ocean View remains in the 19th Avenue median.
- Tier 4B: M Ocean View reroutes off 19th Avenue and terminates within the Parkmerced neighborhood, with the southern portion of the line starting at Balboa Park covered by the J Church.
- Tier 4C: M Ocean View reroutes off 19th Avenue into Parkmerced, with a short-line segment terminating within the Parkmerced neighborhood and a long-line continuing to Balboa Park.

In addition, a variant of the Tier 4 scenarios was conducted to evaluate possible installation of a High-Occupancy/Toll (HOT) lane along southbound 19th Avenue and southbound Junipero Serra Boulevard.

Subsequent to the evaluation of these four future tiers, a Tier 5 study will be conducted that assesses large-scale and long-term projects to address corridor-wide transportation issues. This study will be scoped and conducted at a later date.

The following sections summarize the results and conclusions by mode for each tier.

INTERSECTION CONDITIONS

Intersection operating conditions, in terms of level of service (LOS), were determined for 27 study intersections during the weekday AM and PM peak hours, plus 7 study intersections during the weekend midday peak hour. (Five additional intersections were also assessed under Tier 4.)

The following table summarizes the number of intersections that would operate with unacceptable LOS (LOS E or F) under each tier.

Time Period	Existing	Tier 1	Tier 2	Tier 3	Tier 4A	Tier 4B	Tier 4C
Weekday AM Peak Hour	7	11	13	13	11	11	11
Weekday PM Peak Hour	11	15	20	20	19	19	19
Weekend Midday Peak Hour	3	5	6	6	6	6	7

Source: AECOM, 2009.

Currently, 7 intersections operate with unacceptable conditions (LOS E or F) during the weekday AM peak hour and 11 intersections operate with unacceptable conditions during the weekday PM peak hour, primarily the result of typical daily congestion on the major arterials in the study area. With the growth in traffic volumes associated with Tier 1 and Tier 2 combined, 6 additional intersections during the weekday AM peak hour and 9 additional intersections during the weekday PM peak hour would operate at LOS E or F, resulting in a total of 13 weekday AM and

20 weekday PM peak hour intersections operating with unacceptable conditions (Tier 2 compared to Existing).

With the upgraded traffic signals (with transit signal priority features) and lowered speed limits planned along 19th Avenue, and the various transit and roadway projects included in Tier 3, the study intersections along 19th Avenue would operate with similar conditions as under Tier 2. In general, this means that additional roadway improvements would be needed to address the worsened traffic conditions with the background growth and Tier 2 projects.

For Tier 4A, Tier 4B, and Tier 4C, intersection operation conditions would be relatively similar (the same number of intersections would operate with unacceptable conditions) and collectively better than Tier 2 and Tier 3 (except for weekend midday conditions). In general, the proposed modifications to the intersections would be sufficient to mitigate the effects of the light rail realignments proposed in Tier 4B and Tier 4C, and there would not be a substantial degradation in operating conditions with any of the proposed roadway reconfigurations or new access points included in Tier 4.

TRANSIT CONDITIONS

Transit conditions were assessed for each tier using two approaches: an evaluation of transit ridership and capacity conditions at a series of screenlines around the study area, and a calculation of the additional travel times that buses and light rail vehicles would encounter due to future congestion levels on the streets.

Overall, the increase in transit ridership due to background growth and the foreseeable development projects within the study area would result in an appreciable increase in transit ridership at the four identified screenlines (North, Northeast, East, and South). The Tier 3 route and service changes proposed by the San Francisco Municipal Transportation Agency (SFMTA) would be insufficient to accommodate this demand, causing multiple lines to operate over-capacity at the screenlines. The additional changes to the routing of the M Ocean View light rail line and bus lines as assessed in Tier 4A, Tier 4B, and Tier 4C would not affect these conditions. The following table lists the Muni lines that would operate above capacity under each tier.

In addition, the review of operating speeds indicated that bus delays would noticeably increase under Tier 1 and Tier 2 conditions, due to projected congestion levels along the streets. The transportation improvements included in Tier 3, Tier 4A, Tier 4B, and Tier 4C would help reduce the travel time increases, but buses would still operate more slowly than they do under existing conditions, which could have impacts on Muni schedule adherence and service reliability. In addition, the travel times associated with the M Ocean View light rail line would remain similar to those under current conditions, with the exception of the additional travel time required for the rerouted line across 19th Avenue and Junipero Serra Boulevard and into the Parkmerced neighborhood.

Time Period / Direction	Existing	Tier 1	Tier 2	Tier 3	Tier 4A	Tier 4B	Tier 4C
Weekday AM Peak Hour							
Inbound	--	29 (N) 29 (E)	29 (N) 29 (E)	28 (S)	28 (S)	28 (S)	28 (S)
Outbound	--	--	28 (N)	M (NE)	M (NE)	M (NE)	M (NE)
Weekday PM Peak Hour							
Inbound	29 (N)	29 (N) 29 (E)	29 (N) M (NE) 29 (E)	29 (N) M (NE) 28 (S)	29 (N) M (NE) 28 (S)	29 (N) M (NE) 28 (S)	29 (N) M (NE) 28 (S)
Outbound	--	29 (N) 29 (E)	28 (N) 29 (N) 29 (E)	28L (N) 28 (S)	28L (N) 28 (S)	28L (N) 28 (S)	28L (N) 28 (S)

Notes:
Parentheses indicates screenline: N = North, NE = Northeast, E = East, S = South.
Source: AECOM, 2009.

PEDESTRIAN/BICYCLE CONDITIONS

Pedestrian and bicycle conditions were qualitatively assessed throughout the study area. Adequate pedestrian and bicycle facilities are currently provided, and the low to moderate volumes can usually be accommodated without substantial conflicts. However, at several key locations along 19th Avenue, pedestrian conditions are constrained, such as at the 19th Avenue / Winston Drive and 19th Avenue / Holloway Avenue intersections (which provide access to M Ocean View stations). Increases in pedestrian and bicycle activity, as projected with Tier 1 and Tier 2, would worsen these conditions.

Tier 4A, Tier 4B, and Tier 4C include substantial modifications to pedestrian facilities, which would improve pedestrian conditions. In addition, Tier 4B and Tier 4C include the relocation of the M Ocean View station at 19th Avenue / Holloway Avenue into the Parkmerced neighborhood, which would improve pedestrian connections to SFSU and Parkmerced. (Note that Tier 4B also has a new J Church station in the median, requiring transfers between the lines which would be an inconvenience to riders traveling to points north and south.)

The short-term projects described in the San Francisco Bicycle Plan, incorporated into Tier 3, would help improve bicycle conditions at several locations throughout the study area. Beyond the bicycle improvements in Tier 3, improvements included in Tier 4 would be limited to those benefits to cyclists extended by the pedestrian crossing improvements described above. In addition, the proposed transportation improvements in Tier 4 were designed so that they would not conflict with implementation of the short-term and long-term projects included in the Bicycle Plan.

PARKING CONDITIONS

Parking supply and demand conditions were qualitatively assessed throughout the study area. Overall, most on-street parking is well-used throughout the weekday midday and evening periods, with pockets of high demand near shopping areas and adjacent to SFSU. With the new background growth and development projects in the area (Tier 1 and Tier 2), there would be an increase in parking demand, with the potential for high levels of unmet demand in the vicinity of SFSU and Parkmerced. As a result, some portions of the study area could encounter worsened on-street parking conditions.

Parking conditions under Tier 3, Tier 4A, Tier 4B, and Tier 4C would be similar to those under Tier 2. The proposed improvements included in these tiers would result in the elimination of some on-street parking spaces; as such, parking conditions in the vicinity of the modifications would be somewhat worse than under Tier 2. However, parking conditions throughout the remainder of the study area would not substantially change from those determined for Tier 2.

A. INTRODUCTION

In accordance with Board of Supervisors' legislation (Resolution Nos. 081004 and 081005), this traffic assessment has been prepared for the greater 19th Avenue Corridor in the southwest corner of San Francisco. (A copy of the legislation is provided in **Appendix A.**) The transportation study area, as defined in the legislation, includes the area commencing at Lake Merced Boulevard where it begins at the County line, north along Lake Merced Boulevard to Sloat Boulevard, east along Sloat Boulevard to 19th Avenue, north along 19th Avenue to Taraval Street, east along Taraval Street to Claremont Boulevard, south of Claremont Boulevard to Portola Drive, southwest along Portola Drive to Junipero Serra Boulevard, and south along Junipero Serra Boulevard to the County line. In addition, an expanded study area was defined, which extended west to the Great Highway (instead of Lake Merced Boulevard) and north along Taraval Street (instead of a combination of Sloat Boulevard and Taraval Street). In general, the differences between the study areas are in the northwest corner of the expanded study area (west of 19th Avenue and north of Sloat Boulevard) and are minimally affected by conditions along the 19th Avenue Corridor.

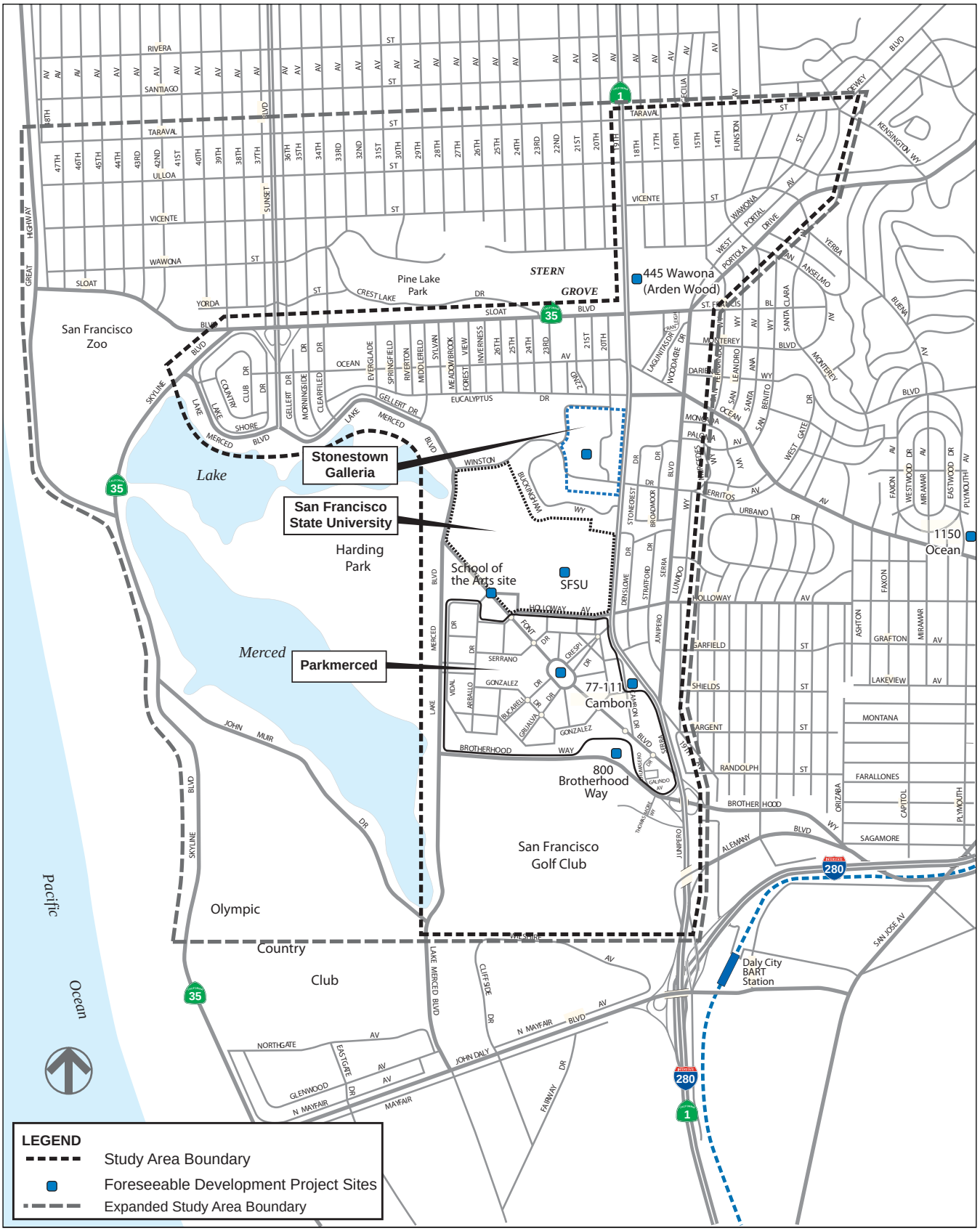
Within the 19th Avenue Corridor Study area, the Board of Supervisors resolution requesting the 19th Avenue Corridor Study identified the following eight development projects as "reasonably foreseeable" (herein referred to as the "reasonably foreseeable development projects") and specifically requested that they be included in the study:

- Parkmerced Project;
- 800 Brotherhood Way;
- 77-111 Cambon Drive;
- 700 Font Boulevard;
- 445 Wawona Street (the Arden Wood site);
- SFSU Campus Master Plan (2007-2020 SFSUCMP);
- Stonestown Galleria; and
- 1150 Ocean Avenue.

The study area, including the location of each of the reasonably foreseeable development projects, is illustrated in **Figure III.1**.

PURPOSE OF THIS STUDY

The purpose of this study is to identify deficiencies in the study area transportation system caused by activity in the area associated with regional development (i.e., development outside of San Francisco) and by potential development or redevelopment of a number of sites in the study area. Additionally, this study evaluates the adequacy of proposals by the City and the reasonably foreseeable development projects for a number of transportation-related improvements in the study area to reduce those deficiencies.



SOURCE: AECOM, Turnstone Consulting

19TH AVENUE CORRIDOR STUDY

FIGURE III.1: STUDY AREA

The following transportation topics are addressed:

- Traffic conditions;
- Transit operations;
- Parking conditions; and
- Pedestrian and bicycle circulation.

STUDY SCOPE AND APPROACH

For the Corridor Study, a detailed evaluation of existing and future conditions along 19th Avenue and the surrounding area was conducted to determine the effect of planned and proposed changes to the transportation network as a result of the foreseeable development projects in the area and the implementation of "City Family" transportation improvements, including those associated with SFMTA's Transit Effectiveness Project (TEP[1]) and other City, regional, and state agencies (as described below).

Analysis Scenarios

The following near-term and long-term scenarios were evaluated for each analysis topic. For future conditions, separate tiers were developed to isolate the effect of various levels of transportation improvements.

- **Existing Conditions:** Current (2009) conditions.
- **Tier 1 Cumulative Conditions:** Future 2030 baseline conditions with general background growth in population and employment and programmed transportation network modifications throughout the region, but with no major development projects or transportation improvements within the study area.
- **Tier 2 Cumulative Conditions**: Tier 1 conditions plus the travel demand generated by the development projects without their associated transportation improvements:
  - Parkmerced Project;
  - 800 Brotherhood Way;
  - 77-111 Cambon Drive;
  - 700 Font Boulevard;
  - 445 Wawona Street (the Arden Wood site);
  - SFSU Campus Master Plan (2007-2020 SFSUCMP);
  - Stonestown Galleria; and
  - 1150 Ocean Avenue.

[1] The TEP is a collaboration between SFMTA and the City Controller's Office that represents a comprehensive review of San Francisco's public transit system designed to make Muni bus and light rail service more reliable, quicker, and more frequent.

- **Tier 3 Cumulative Conditions:** Tier 2 conditions, plus implementation of the transportation improvements currently proposed within various City plans and studies. Primarily, these include the following major projects:
  - Implementation of SFMTA's proposed TEP changes;
  - Implementation of SFMTA's traffic calming proposals;
  - Implementation of the near-term projects proposed in the San Francisco Bicycle Plan; and
  - Implementation of the traffic signal modifications and reduced speed limits along 19th Avenue as planned by Caltrans and the San Francisco County Transportation Authority.
- **Tier 4 Cumulative Conditions:** Tier 3 conditions, plus implementation of the transportation improvements associated with the foreseeable development projects. In general, these include roadway, intersection, bicycle, pedestrian, and transit enhancements at locations around the Parkmerced neighborhood. Three different iterations of these conditions were evaluated, to address the issues associated with the potential rerouting of the M Ocean View light rail line as proposed by the Parkmerced Project:
  - **Tier 4A:** Assumes no changes to the existing Muni M Ocean View light rail line along 19th Avenue.
  - **Tier 4B:** Includes the rerouting of the M Ocean View from 19th Avenue into and terminating within Parkmerced, plus the extension of the J Church light rail line along the former M Ocean View route (from Balboa Park) and terminating at either the existing Stonestown or SFSU stations.
  - **Tier 4C:** Includes the rerouting of the M Ocean View from 19th Avenue into Parkmerced and splitting the service into short and long lines, with half the trains terminating within Parkmerced and half traveling through Parkmerced and continuing along the current alignment to Balboa Park.

In addition, a variant to the Tier 4 conditions was evaluated to assess the possible implementation of a HOT lane along southbound 19th Avenue between Holloway Avenue and Junipero Serra Boulevard.

Subsequent to the evaluation of these four future tiers, a Tier 5 study will be conducted that assesses large-scale and long-term projects to address corridor-wide transportation issues. This study will be scoped and conducted at a later date.

Intersection Evaluations

Intersection LOS conditions were analyzed at key intersections within the study area for the weekday AM and PM peak hours (generally 7:30 AM to 8:30 AM and 4:30 PM to 5:30 PM, respectively) of the morning and evening peak periods (7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM, respectively). In addition, intersection LOS conditions for the weekend midday peak hour (generally 1:30 PM to 2:30 PM) of the weekend midday peak period (1:00 PM to 3:00 PM) were analyzed for a subset of the weekday study intersections. The study analyzes these

intersections within the study area because they represent the major intersections where traffic movements currently, or could in the future, deteriorate during peak travel periods. The following intersections were studied:

1. Claremont Boulevard / Taraval Street / Dewey Boulevard / Kensington Way / Montalvo Avenue;
2. Santa Clara Avenue / Vicente Street / Portola Drive;
3. Junipero Serra Boulevard / Sloat Boulevard / St. Francis Boulevard / Portola Drive *(includes weekend midday analysis)*;
4. Junipero Serra Boulevard / Ocean Avenue / Eucalyptus Drive;
5. Junipero Serra Boulevard / Winston Drive;
6. Junipero Serra Boulevard / Holloway Avenue;
7. Junipero Serra Boulevard / 19th Avenue (*includes weekend midday analysis*);
8. Junipero Serra Boulevard / John Daly Boulevard / I-280 Northbound (NB) Ramps;
9. Junipero Serra Boulevard / John Daly Boulevard / I-280 Southbound (SB) Ramps;
10. 19th Avenue / Taraval Street;
11. 19th Avenue / Sloat Boulevard (*includes weekend midday analysis*);
12. 19th Avenue / Ocean Avenue;
13. 19th Avenue / Eucalyptus Drive;
14. 19th Avenue / Winston Drive *(includes weekend midday analysis)*;
15. 19th Avenue / Buckingham Way (*includes weekend midday analysis*);
16. 19th Avenue / Holloway Avenue (*includes weekend midday analysis*);
17. 19th Avenue / Crespi Drive;
18. Chumasero Drive / Brotherhood Way / Thomas More Way;
19. Sunset Boulevard / Taraval Street;
20. Sunset Boulevard / Ocean Avenue;
21. Skyline Boulevard / Sloat Boulevard / 39th Avenue;
22. Skyline Boulevard / Lake Merced Boulevard;
23. Sunset Boulevard / Lake Merced Boulevard;
24. Lake Merced Boulevard / Winston Drive;
25. Lake Merced Boulevard / Font Boulevard;
26. Lake Merced Boulevard / Higuera Avenue; and
27. Lake Merced Boulevard / Brotherhood Way (*includes weekend midday analysis*).

Figure III.2 illustrates the locations of the study intersections within and surrounding the study area.

In addition, new intersections that would be created, or intersections that would be substantially modified as part of Tier 3 or Tier 4 conditions, were also assessed. These are:

7a. Junipero Serra Boulevard / Chumasero Drive;
18a. Thomas More Way / Brotherhood Way;
26a. Lake Merced Boulevard / Vidal Drive;
26b. Lake Merced Boulevard / Acevedo Avenue; and
26c. Lake Merced Boulevard / Gonzalez Drive.

SOURCE: AECOM, Turstone Consulting

FIGURE III.2: ANALYSIS LOCATIONS

Transit Evaluation

For each analysis tier, transit ridership and capacity conditions were assessed for the Muni bus and light rail lines that serve the study area. Since several routes provide service to similar locations or operate along parallel streets, the bus and light rail lines were aggregated into a series of screenlines and corridors. In addition, future transit operations, in particular for buses and light rail lines along 19th Avenue, were qualitatively assessed based on the projected congestion levels developed as part of the intersection analyses.

Pedestrian and Bicycle Evaluation

Pedestrian and bicycle conditions throughout the study area were qualitatively assessed during typical weekday midday and evening periods. However, at potential conflict locations (e.g., the 19th Avenue / Sloat Boulevard, 19th Avenue / Holloway Avenue, and 19th Avenue / Winston Drive intersections), field observations were performed and accident data were evaluated.

Parking Evaluation

Discussion and analysis of parking conditions focused on the incremental effect of the proposed development projects and transportation improvements on the surrounding area as a whole. As such, a qualitative evaluation of general on-street parking conditions was conducted during the weekday midday (1:00 PM to 3:00 PM) and evening (7:00 PM to 9:00 PM) peak demand periods for the study area.

B. EXISTING CONDITIONS

This chapter describes existing transportation conditions in the 19th Avenue Corridor Study area. Included in this chapter are descriptions of existing roadway and transit networks and documentation of existing traffic, transit, pedestrian, bicycle, and parking conditions.

ROADWAY NETWORK AND INTERSECTION OPERATING CONDITIONS

The study area is served by a series of streets and roadways with regional significance, as well as by local-serving and neighborhood facilities.

Park Presidio Boulevard, Crossover Drive, 19th Avenue, and Junipero Serra Boulevard combined constitute Highway 1, which is the major north-south thoroughfare in western San Francisco. This corridor provides both local and regional access, including connecting with Highway 101 to the north and Interstate 280 (I-280) to the south. During the weekday peak commute periods and during the peak weekend midday periods, 19th Avenue and the southern portion of Junipero Serra Boulevard accommodate substantial traffic volumes (between 86,000 and 123,000 vehicles on an average daily basis[2]), and often incur congested conditions at major intersections.

19th Avenue is part of Highway 1 between Golden Gate Park and Junipero Serra Boulevard. In this segment, 19th Avenue has six primary travel lanes (three lanes in each direction) with right-turn and left-turn pockets provided at some intersections. South of Junipero Serra Boulevard, 19th Avenue continues as a local two-lane roadway. Left turns are not allowed from 19th Avenue, with the exception of the following locations in the study area: northbound to Winston Drive and southbound to Sloat Boulevard.

Between Eucalyptus Drive and Junipero Serra Boulevard, the M Ocean View light rail line operates within a dedicated median along 19th Avenue. The alignment continues along 19th Avenue and Randolph Street to the south of Junipero Serra Boulevard, where it operates in mixed-flow with regular vehicular traffic.

Within San Francisco, Junipero Serra Boulevard extends from Sloat Boulevard to the San Francisco / San Mateo County line. (South of 19th Avenue, Junipero Serra Boulevard is part of Highway 1.) Through the study area, Junipero Serra Boulevard has six primary travel lanes (three lanes in each direction), with right-turn and left-turn pockets provided at some intersections, on-street parking, and frontage roads. South of the county line, Junipero Serra Boulevard continues through Daly City, Colma, and South San Francisco, connecting with I-280 near its junction with Interstate 380 (I-380).

Sunset Boulevard extends from Golden Gate Park south to the study area, where it becomes Lake Merced Boulevard. Lake Merced Boulevard runs along the east side of the lake, terminating five

[2] Caltrans, 2008 Traffic Volumes on the California State Highway System.

blocks south of John Daly Boulevard. Throughout the study area, Sunset Boulevard has six travel lanes (three lanes in each direction). Lake Merced Boulevard has four travel lanes (two lanes in each direction). This corridor provides connections for local through traffic and acts as a reliever route when conditions along 19th Avenue are congested.

These facilities provide connections to the regional highway system at the south end of the study area, in particular I-280. I-280 connects the study area with downtown San Francisco and with the Peninsula and South Bay. The nearest I-280 on- and off-ramps are provided at John Daly Boulevard, Alemany Boulevard, and Ocean Avenue.

Existing intersection operations were evaluated for the weekday AM and PM peak hours, as well as the weekend midday peak hour, using the 2000 *Highway Capacity Manual* (HCM) methodology.[3] Traffic counts for each of the 27 study intersections were collected between April 2008 and February 2009, while SFSU was in normal session, and balanced between time periods. Current traffic signal timing plans were obtained from SFMTA and existing lane geometries were determined from observations in the field. The existing lane geometry and traffic volumes for each of the study intersections are included in **Appendix D**. Included in **Appendix E** are adjustment factors applied in the analysis to account for factors such as the percentage of heavy vehicles (buses and trucks) and the effect of coordinated traffic signals.

The operations of the study intersections were analyzed using the level of service (LOS) methodology.[4] The LOS methodology is a qualitative description of the performance of an intersection based on the average delay per vehicle. Intersection levels of service range from LOS A, which indicates free flow or excellent conditions with short delays, to LOS F, which indicates congested or overloaded conditions with extremely long delays. In San Francisco, LOS A through D are considered excellent to satisfactory service levels, and LOS E and F represent unacceptable service levels.

The HCM methodology includes different techniques for calculating level of service depending upon the intersection controls, as follows:

- For signalized intersections, the methodology determines the capacity of each lane group approaching the intersection. The LOS is then based on average delay (in seconds per vehicle) for the various movements within the intersection. A combined weighted average delay and LOS are presented for the intersection.

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[3] As part of the HCM methodology, adjustments are typically made to the capacity of each intersection to account for various factors that reduce the ability of the streets to accommodate vehicles (such as the downtown nature of the area, number of pedestrians, vehicle types, lane widths, grades, on-street parking, and queues). These adjustments are performed to ensure that the LOS analysis results reflect the operating conditions that are observed in the field.

[4] Intersection level of service was calculated using Dowling's Traffix 8.0 software package, as is customary in the City and County of San Francisco.

- For unsignalized study intersections, the methodology determines LOS for each stop-controlled movement or approach. The intersection LOS is presented for the worst stop-controlled approach.

The Existing Conditions intersection level of service is summarized in **Table III.1** and **Table III.2**. The City of San Francisco generally considers LOS E and F to be unacceptable operating conditions. As such, where conditions are unacceptable, LOS and delay are shown in boldface type in the table. It should be noted that, at unsignalized intersections, operating conditions are considered unacceptable only if the worst stop-controlled approach operates at LOS E or F and the conditions of the Manual on Uniform Traffic Control Devices (MUTCD) peak hour volume signal warrant are met. In addition, at intersections that operate at LOS F conditions, the overall intersection volume-to-capacity ratio (V/C) is presented. Detailed LOS calculations and figures are provided in **Appendix E**.

As shown in **Table III.1** and **Table III.2**, 16 of the 27 study intersections currently operate at acceptable conditions during all of the analysis periods. The following 11 intersections currently operate at unacceptable conditions under the weekday AM, weekday PM, or weekend midday peak hour:

3. Junipero Serra Boulevard / Sloat Boulevard / St. Francis Boulevard / Portola Drive: This signalized intersection operates at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour and weekend midday peak hour. In general, this intersection has poor operating conditions due to the relative complexity of its configuration (with five approaches) and the crossing of the M Ocean View and K Ingleside light rail lines. In combination with the high traffic volumes along the Portola Drive, Junipero Serra Boulevard, and Sloat Boulevard approaches, the intersection operates with over-capacity conditions.
7. Junipero Serra Boulevard / 19th Avenue: This signalized intersection operates at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour and weekend midday peak hour, primarily due to the high volume of traffic on the northbound Junipero Serra Boulevard left-turn and southbound 19th Avenue right-turn movements (e.g., vehicles traveling northbound and southbound on Highway 1). With these conditions, backups often form along these approaches.
8. Junipero Serra Boulevard / John Daly Boulevard / I-280 NB Ramps: This signalized intersection operates at LOS E during the weekday PM peak hour. Volumes on the northbound, southbound, and westbound movements exceed the existing lane capacity.
11. 19th Avenue / Sloat Boulevard: This signalized intersection operates at LOS E during the weekday AM peak hour and weekend midday peak hour, and LOS F during the weekday PM peak hour, primarily due to delays at the northbound approach. In general, this is due to the provision of an exclusive southbound left-turn phase, which results in a short northbound green phase and over-capacity conditions.

Table III.1: Intersection Level of Service – Existing Conditions (Weekday Peak Hours)

	Intersection	Traffic Control	Peak Hour	Existing Conditions	
				LOS	Delay or V/C[2]
1	Claremont Blvd. / Taraval St. / Dewey Blvd. / Kensington Wy.[1]	Roundabout	AM	A	6.8
			PM	B	14.3
2	Santa Clara Ave./ Vicente St./ Portola Dr.	Signal	AM	C	26.5
			PM	C	29.4
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd./ Portola Dr.	Signal	AM	**E**	**65.2**
			PM	**F**	**>80 / 1.01**
4	Junipero Serra Blvd. / Ocean Ave. / Eucalyptus Dr.	Signal	AM	C	31.7
			PM	C	31.8
5	Junipero Serra Blvd. / Winston Dr.	Signal	AM	C	29.1
			PM	C	28.4
6	Junipero Serra Blvd. / Holloway Ave.	Signal	AM	C	29.8
			PM	C	28.6
7	Junipero Serra Blvd. / 19th Ave.	Signal	AM	**E**	**57.9**
			PM	**F**	**>80 / 1.15**
8	Junipero Serra Blvd. / John Daly Blvd. / I-280 NB Ramps	Signal	AM	D	39.7
			PM	**E**	**74.0**
9	Junipero Serra Blvd. / John Daly Blvd. / I-280 SB Ramps	Signal	AM	B	19.8
			PM	C	33.6
10	19th Ave. / Taraval St.	Signal	AM	B	19.7
			PM	B	16.4
11	19th Ave. / Sloat Blvd.	Signal	AM	**E**	**58.1**
			PM	**F**	**>80 / 1.54**
12	19th Ave. / Ocean Ave.	Signal	AM	C	23.5
			PM	**F**	**>80 / 1.41**
13	19th Ave. / Eucalyptus Dr.	Signal	AM	B	14.3
			PM	D	49.9
14	19th Ave. / Winston Dr.	Signal	AM	D	37.9
			PM	**F**	**>80 / 1.29**
15	19th Ave. / Buckingham Wy.	OWSC	AM	**E**	**47.7**
			PM	**F**	**>50 / 1.31**
16	19th Ave. / Holloway Ave.	Signal	AM	D	40.6
			PM	**E**	**61.2**
17	19th Ave. / Crespi Dr.	Signal	AM	D	37.3
			PM	B	19.7
18	Chumasero Dr. / Brotherhood Wy. / Thomas More Wy.	Signal	AM	**E**	**77.5**
			PM	**E**	**68.1**
19	Sunset Blvd. / Taraval St.	Signal	AM	B	17.7
			PM	C	20.9
20	Sunset Blvd. / Ocean Ave.	Signal	AM	B	11.8
			PM	B	12.0
21	Skyline Blvd. / Sloat Blvd. / 39th Ave.	AWSC	AM	B	14.5
			PM	C	21.4

Table III.1 (continued)

	Intersection	Traffic Control	Peak Hour	Existing Conditions	
				LOS	Delay or V/C[2]
22	Skyline Blvd. / Lake Merced Blvd. (North)	OWSC	AM	B	11.9
			PM	B	13.1
	Skyline Blvd. / Lake Merced Blvd. (South)[3]	OWSC	AM	D	29.3
			PM	E	42.8
23	Sunset Blvd. / Lake Merced Blvd.	OWSC	AM	**F**	**>50 / 0.54**
			PM	D	28.2
24	Lake Merced Blvd. / Winston Dr.	Signal	AM	C	21.9
			PM	D	48.2
25	Lake Merced Blvd. / Font Blvd.	Signal	AM	D	39.1
			PM	C	32.8
26	Lake Merced Blvd. / Higuera Ave.	Signal	AM	**E**	**66.9**
			PM	**E**	**59.2**
27	Lake Merced Blvd. / Brotherhood Wy.	Signal	AM	D	42.7
			PM	C	30.3

Notes:
Bold indicates intersection operating at unacceptable LOS.
AWSC = All-way stop-controlled
OWSC = One way stop-controlled
LOS = level of service
V/C = volume-to-capacity
[1] Although intersection is designed as a roundabout, all approaches are controlled by stop signs; as such, it was analyzed as an all-way stop-controlled intersection.
[2] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and V/C ratio are presented.
[3] Though the intersection would operate at an unacceptable LOS, the conditions of the Manual on Uniform Traffic Control Devices (MUTCD) peak hour volume signal warrant would not be met.

Source: AECOM, 2009.

Table III.2: Intersection Level of Service – Existing Conditions (Weekend Midday Peak Hour)

	Intersection	Traffic Control	Existing Conditions	
			LOS	Delay or V/C[1]
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd./ Portola Dr.	Signal	**F**	**>80 / 1.00**
7	Junipero Serra Blvd. / 19th Ave.	Signal	**F**	**>80 / 1.64**
11	19th Ave. / Sloat Blvd.	Signal	**E**	**56.0**
14	19th Ave. / Winston Dr.	Signal	D	42.0
15	19th Ave. / Buckingham Wy.	OWSC	D	30.2
16	19th Ave. / Holloway Ave.	Signal	B	14.3
27	Lake Merced Blvd. / Brotherhood Wy.	Signal	C	25.1

Notes:
Bold indicates intersection operating at unacceptable LOS.
OWSC = One way stop-controlled
[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and V/C ratio are presented.

Source: AECOM, 2009.

12. 19th Avenue / Ocean Avenue: This signalized intersection operates at LOS F during the weekday PM peak hour, primarily due to high volumes at the northbound approach that exceed the existing lane capacity. In addition, the westbound Ocean Avenue approach also experiences a significant amount of delay, due to the green time needed for the heavy northbound and southbound traffic flows.

14. 19th Avenue / Winston Drive: This signalized intersection operates at LOS F during the weekday PM peak hour, due in part to northbound left-turn volumes exceeding the existing lane capacity. In addition, as a result of the heavy northbound and southbound traffic flows, there is insufficient green time available to the Winston Drive approaches.

15. 19th Avenue / Buckingham Way: The worst minor approach to this stop-controlled intersection (eastbound Buckingham Way right-turn movement) operates at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour due to the high southbound through volume along 19th Avenue, which makes it difficult for right-turning traffic to find gaps. The intersection would meet the conditions of the MUTCD peak hour volume signal warrant.

16. 19th Avenue / Holloway Avenue: This signalized intersection operates at LOS E during the weekday PM peak hour, as during this time period the northbound approach operates over capacity.

18. Chumasero Drive / Brotherhood Way / Thomas More Way: This signalized intersection operates at LOS E during both the weekday AM and PM peak hours. During both time periods, the westbound approach is at over-capacity conditions.

23. Sunset Boulevard/Lake Merced Boulevard: This one-way stop-controlled intersection operates at LOS F during the weekday AM peak hour. The eastbound Lake Merced Boulevard left-turn movement experiences considerable delay due to the high northbound and southbound Sunset Boulevard through movements that are not required to stop.

26. Lake Merced Boulevard / Higuera Avenue: This signalized intersection operates at LOS E during both the weekday AM and PM peak hours, primarily due to the high traffic volumes at the northbound approach and the limited available green time due to the provision of a protected southbound left-turn phase. Note that this intersection would meet the MUTCD peak hour signal warrants.

TRANSIT NETWORK

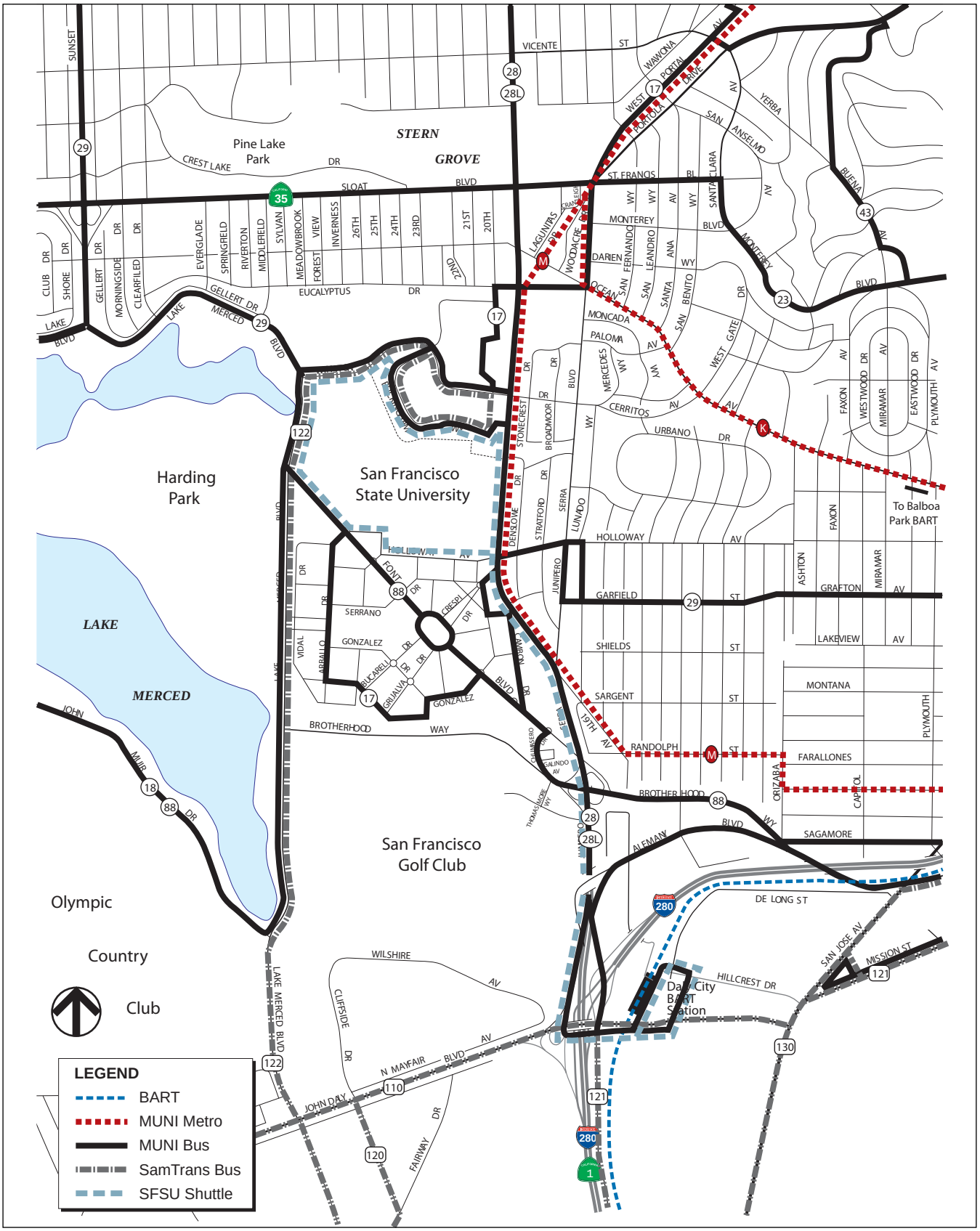
This section discusses the transit network within the study area. For this analysis, existing transit data were compiled for Muni bus and light rail lines that operate within the study area. Existing ridership data were obtained from SFMTA's TEP, which collected ridership data on Muni lines between October 2006 and May 2008.[5]

The study area is served by several Muni bus and light rail lines that provide localized service, as well as connections between the 19th Avenue Corridor and downtown San Francisco. The West Portal Muni Metro Station, located in the northeast section of the study area, as well as the intersection of 19th Avenue / Holloway Avenue, are major transfer points for transit service. 19th Avenue itself is served by the 28 19th Avenue and 28L 19th Avenue Limited bus routes for its entire length through the study area. The Muni M Ocean View train also aligns with 19th Avenue from the intersection of Junipero Serra Boulevard to the intersection of Eucalyptus Drive. Within the study area, the 29 Sunset bus line runs on Sunset Boulevard, Winston Drive, 19th Avenue, and Holloway Avenue. The Muni 17 Parkmerced bus line is located entirely within the study area boundaries and serves primarily the Parkmerced neighborhood and the immediate surrounding areas, as does the 88 Mission / BART Shuttle. In addition, the 18 46th Avenue operates in the western portion of the study area, including along 46th Avenue, Sloat Bouelvard, John Muir Drive, Lake Merced Boulevard, and Winston Drive, terminating at Stonestown Galleria. **Figure III.3** shows the existing transit network within and around the study area. **Table III.3** summarizes the route, frequency, and vehicle information for Muni services in the study area.

Muni Screenline Groupings

The analysis of existing capacity, ridership, and capacity utilization, as well as maximum load points, on Muni was conducted through a series of screenlines. The concept of screenlines is typically used to describe the magnitude of travel to or from the study area, and to compare

[5] Bus data were obtained from "SFMTA Automatic Passenger Counters, Collected Fall 2006 – Spring 2007," M Ocean View data were obtained from "SFMTA Manual Ride Checks, Collected Fall 2006 – Spring 2007," and J Church data were obtained from "SFMTA Manual Ride Checks, Collected February-May 2008." Note that these data were collected prior to the bus and light rail service changes instituted on December 5, 2009.



SOURCE: AECOM, Turnstone Consulting

FIGURE III.3: EXISTING TRANSIT NETWORK

Table III.3: Existing Muni Service in the Study Area

Line	Route	Headways (minutes)			Vehicle
		Weekday		Week-end	
		Peak	Midday		
M Ocean View	Balboa Park to Downtown via Ocean View, SFSU, West Portal, the Twin Peaks Tunnel, and the Market Street Subway	8-10	10	12-15	Metro Streetcar (1- or 2-car)
17 Parkmerced	Loop from West Portal, Stonestown, SFSU, Parkmerced, and back	20	20	30	Diesel Bus 30'
18 46th Avenue	Stonestown to Legion of Honor via Lake Merced, 46th Avenue, and Ocean Beach	15	20	20	Diesel Bus 40' (Standard)
28 19th Avenue	Daly City BART to Fort Mason via SFSU, 19th Avenue, Park Presidio, and the Golden Gate Bridge Toll Plaza	8-12	12	12	Diesel Bus 40' (Standard)
28L 19th Avenue	Daly City BART to Park Presidio / California via SFSU and 19th Avenue	10	--	--	Diesel Bus 40' (Standard)
29 Sunset	Candlestick Park to the Presidio via McLaren Park, Balboa Park BART, SFSU, Sunset, Lincoln, Golden Gate Park, and 25th Avenue	8-10	15	15	Diesel Bus 40' (Standard)
88 Mission / BART Shuttle	Lake Merced to Balboa Park BART via Parkmerced and Mission	8-15	--	--	Diesel Bus 40' (Standard)

Source: Muni, 2009; AECOM, 2009.

estimated transit volumes to available capacities. Screenlines are hypothetical lines that would be crossed by persons traveling between the study area and other parts of San Francisco and the region, and are typically assessed at the Maximum Load Point (MLP) of each line. **Table III.4** summarizes the assumed screenline groupings for this study and **Figure III.4** illustrates the screenlines in relation to the study area.

Note that four transit routes are analyzed in more than one screenline. The routing of these transit lines is such that they enter the study area from one direction and exit to another direction. Thus, the MLP for each of these routes was derived from the section of the route that corresponds to the direction of the screenline. If this did not correspond to the overall MLP for the line, the stop with the highest ridership in the vicinity of the study area was identified and deemed a MLP.

It should be noted that the 17 Parkmerced, given its low frequencies (every 20 minutes even during the peak hour), circuitous route, and "community service" nature, was not included in the screenline analysis. The 17 Parkmerced supplements the M Ocean View transit trips to

SOURCE: AECOM, Turnstone Consulting

FIGURE III.4: MUNI SCREENLINES

Table III.4: Muni Screenline Groupings Used for the Corridor Study

Screenline	Line
North	18 46th Avenue 28 19th Avenue 28L 19th Avenue Limited 29 Sunset
Northeast	M Ocean View
East	M Ocean View 29 Sunset
South	28 19th Avenue 28L 19th Avenue Limited

Source: AECOM, 2009.

downtown and West Portal, with overlapping stops at three locations (Holloway Avenue, Eucalyptus Drive, and along West Portal Avenue); as such, the number of riders that would use the 17 Parkmerced would be relatively low. In addition and in consideration of this service supplementation, as part of the Parkmerced Project, a new shuttle service connecting Parkmerced with Daly City BART would assume some of the ridership demand from the 17 Parkmerced, particularly internal transit demand within Parkmerced as well as riders from Parkmerced who need to transfer to other lines. In addition, it should be noted that the K Ingleside was also not included in the screenline analysis because its overlap area with the M Ocean View is limited to only two stops before West Portal, both in areas along Junipero Serra Boulevard largely unaffected by growth in the corridor. Finally, the 88 Mission / BART Shuttle was analyzed separately and is not grouped into any of the screenlines.

The capacities for each type of Muni vehicle type are shown in **Table III.5**. These capacities account for both seated passengers and standees. Peak hour utilization for each screenline is determined using these vehicle capacities. In accordance with Proposition E, the SFMTA Board has adopted an 85 percent policy threshold for transit vehicle loads, which the Board has determined more accurately reflects actual operations and the likelihood of "pass-ups" (i.e., vehicles not stopping to pick up more passengers). As such, all screenline capacity and capacity utilization calculations incorporate the 85 percent "policy threshold" for passenger loading—i.e., the design capacity of transit vehicles is decreased by 15 percent, meaning a capacity utilization over 100 percent would exceed the 85 percent policy threshold.

Existing Muni Screenline Analysis

Existing ridership and capacity for each line were obtained from the TEP data collection efforts for the weekday AM and PM peak hours, with the weekday AM peak period defined as 6:00 AM to 9:00 AM and the weekday PM peak period defined as 3:00 PM to 6:00 PM. As the TEP provides data by the hour, the ridership during the peak hour of each period was selected.

Table III.5: Muni Vehicle Capacity

Vehicle	Capacity (passengers)	
	Design	**Policy Threshold**
Diesel Bus 30'	45	38
Diesel Bus 40' (Standard)	63	54
Metro Streetcar (1-car train)	119	101
Metro Streetcar (2-car train)	238	202

Source: City of San Francisco, Transportation Guidelines for Environmental Review, 2002; AECOM, 2009.

The screenlines were evaluated at MLPs generally outside of the envelope containing the foreseeable development projects, selected by examining ridership patterns across the whole length of each line from the TEP data. Given the nature of existing and proposed development in the area as both a trip attractor (e.g., SFSU, Stonestown) and trip generator, the analysis evaluates both directions of transit service (i.e., inbound to the study area and outbound from the study area).

In general, the screenline analysis selects the MLP across the entire line and assumes that all transit ridership assigned to a specific line will pass through the MLP—in other words, there is no assumed loss of ridership between the study area and the MLP. In reality, however, some of the new transit riders generated by the area projects would be expected to get off before the MLP. The screenline analysis conducted for this study, therefore, represents a "worst-case" scenario since it assumes that all riders need to pass through the most-congested location along the line.

The resulting ridership, capacity, and capacity utilization for the Muni lines and screenline groupings in **Table III.4** are summarized in **Table III.6** and **Table III.7**. Detailed Muni screenline calculations are provided in **Appendix G**.

As shown in **Table III.6**, during the weekday AM peak hour, all bus and light rail lines operate at less than capacity at the study analysis locations. In general, the highest capacity utilization is currently found on the 29 Sunset, which operates between 66 and 72 percent of capacity in the outbound direction from the study area, and between 90 and 99 percent of capacity in the inbound direction to the study area. Overall, capacity utilization in the weekday AM peak hour is 40 percent in the inbound direction and 47 percent in the outbound direction.

Table III.6: Muni Screenline Summary – Existing Conditions (Weekday AM Peak Hour)

Screenline		Existing Conditions		
		Ridership	**Capacity**	**Utilization**
Outbound				
N	18 46th Avenue	108	216	50%
	28 19th Avenue	292	378	77%
	28L 19th Avenue Limited	110	216	51%
	29 Sunset	214	324	66%
	Subtotal	*724*	*1,134*	*64%*
NE	M Ocean View	1,038	1,414	73%
	Subtotal	*1,038*	*1,414*	*73%*
E	M Ocean View	166	1,414	12%
	29 Sunset	233	324	72%
	Subtotal	*399*	*1,738*	*23%*
S	28 19th Avenue	76	378	20%
	28L 19th Avenue Limited	20	270	7%
	Subtotal	*96*	*648*	*15%*
88 Mission / BART Shuttle		253	378	68%
TOTAL All Screenlines		**2,510**	**5,312**	**47%**
Inbound				
N	18 46th Avenue	76	216	35%
	28 19th Avenue	290	486	60%
	28L 19th Avenue	104	270	39%
	29 Sunset	195	216	90%
	Subtotal	*665*	*1,188*	*56%*
NE	M Ocean View	363	1,414	26%
	Subtotal	*363*	*1,414*	*26%*
E	M Ocean View	229	1,414	16%
	29 Sunset	321	324	99%
	Subtotal	*550*	*1,738*	*32%*
S	28 19th Avenue	271	378	72%
	28L 19th Avenue Limited	150	270	56%
	Subtotal	*421*	*648*	*65%*
TOTAL All Screenlines		**1,999**	**4,988**	**40%**

Source: Muni, 2008; AECOM, 2009.

Table III.7: Muni Screenline Summary – Existing Conditions (Weekday PM Peak Hour)

Screenline		Existing Conditions		
		Ridership	**Capacity**	**Utilization**
Outbound				
N	18 46th Avenue	97	216	45%
	28 19th Avenue	264	378	70%
	28L 19th Avenue	150	324	46%
	29 Sunset	187	216	87%
	Subtotal	*698*	*1,134*	*62%*
NE	M Ocean View	796	1,212	66%
	Subtotal	*796*	*1,212*	*66%*
E	M Ocean View	509	1,414	36%
	29 Sunset	263	270	97%
	Subtotal	*772*	*1,684*	*46%*
S	28 19th Avenue	184	324	57%
	28L 19th Avenue	89	270	33%
	Subtotal	*273*	*594*	*46%*
TOTAL All Screenlines		**2,539**	**4,624**	**55%**
Inbound				
N	18 46th Avenue	114	216	53%
	28 19th Avenue	290	432	67%
	28L 19th Avenue	105	270	39%
	29 Sunset	272	270	101%
	Subtotal	*781*	*1,188*	*66%*
NE	M Ocean View	1,194	1,414	84%
	Subtotal	*1,194*	*1,414*	*84%*
E	M Ocean View	242	1,212	20%
	29 Sunset	284	378	75%
	Subtotal	*526*	*1,590*	*33%*
S	28 19th Avenue	131	378	35%
	28L 19th Avenue	63	324	19%
	Subtotal	*194*	*702*	*28%*
88 Mission / BART Shuttle		144	324	44%
TOTAL All Screenlines		**2,839**	**5,218**	**54%**

Notes:
Shading indicates unacceptable conditions (at or exceedance of 100% capacity utilization).

Source: Muni, 2008; AECOM, 2009.

As shown in **Table III.7**, during the weekday PM peak hour, overall capacity utilization is higher, with the inbound and outbound directions both operating near 55 percent. During this time period, the 29 Sunset operates over capacity (i.e., at 101 percent of capacity) inbound to the study area. However, all other lines and all screenlines operate below capacity, as they do during the weekday AM peak hour.

Other Transit Operational Issues

In addition to transit capacity, there are other issues of concern regarding transit service in the study area. Due to the heavy vehicular traffic along Junipero Serra Boulevard and 19th Avenue and the limited capacity of intersections along this corridor, substantial queuing and congestion often occurs during peak periods. This queuing results in delays to transit service on 19th Avenue—particularly the 28 19th Avenue, 28L 19th Avenue Limited, and 29 Sunset—and makes it difficult for transit vehicles to merge into traffic after departing stops or to enter turn lanes, in the case of northbound buses on the 29 Sunset. In addition, congested conditions can affect Muni operations (by increasing travel times) and service reliability.

Light rail service (on the M Ocean View) along 19th Avenue also is affected by conflicts with vehicles at three locations: the merge from 19th Avenue east of Junipero Serra Boulevard into the median of 19th Avenue, the northbound left turn from 19th Avenue into Winston Drive, and the crossing on 19th Avenue at Rossmoor Drive. The conflicts are as follows:

- At 19th Avenue and Junipero Serra Boulevard, M Ocean View trains need to cross two pedestrian crosswalks and four lanes of northbound traffic with complex merge patterns at a wide intersection in order to connect the median of 19th Avenue with 19th Avenue east of Junipero Serra Boulevard.
- There are two left-turn pockets along 19th Avenue at Winston Drive, but the left-most pocket is shared between northbound M Ocean View trains and left-turning vehicles, typically resulting in delays to transit service when these left-turning vehicles are waiting in queue. When this left turn receives a green arrow and the train reaches the first position in the queue, however, any additional left-turning vehicles stuck behind the train must wait again until the next left-turn phase. This configuration also results in an awkward situation where left-turning vehicles in the right-most pocket can make their turn while a train and any vehicles trapped behind must wait. When a train waiting in the first position in the queue finally receives the green light with the northbound through vehicles, left-turning vehicles in the right-most pocket may mistakenly believe they have the green light, potentially causing a side-swipe accident.
- Along 19th Avenue at Rossmoor Drive, trains must cross northbound 19th Avenue to enter and exit a dedicated transit right-of-way. Although "Keep Clear" signs are painted onto the road surface, downstream queuing from the intersection of 19th Avenue / Eucalyptus Avenue can block the path of trains at this crossing. In addition, southbound trains must cross almost head-on with northbound traffic, increasing the potential for collisions.

Light rail station capacity and pedestrian access are also issues of concern. In general, platform widths at the median stations at 19th Avenue / Holloway Avenue and 19th Avenue / Winston Drive

are inadequate to handle current passenger flows during peak hours. The station at 19th Avenue / Holloway Avenue is particularly problematic as it is the primary stop for passengers bound to and from the SFSU campus. During the morning period (at the start of the school day), there is a large surge in passengers with each arrival of a southbound train, while during the afternoon period there is a steady buildup of passengers waiting for a northbound train.

As these stations are located in the median of 19th Avenue, passengers coming to and from the train must also cross three to four lanes of moving traffic, in addition to one set of light rail tracks. Due to insufficient space between the two sets of light rail tracks, there is limited queuing area for passengers waiting to cross away from the station, who often queue up along the sloped walkway up to the platform or wait within the light rail tracks.

BICYCLE AND PEDESTRIAN CONDITIONS

Throughout the study area, bicycle and pedestrian conditions were qualitatively evaluated. In addition, at potential conflict locations (e.g., the 19th Avenue / Sloat Boulevard, 19th Avenue / Holloway Avenue, and 19th Avenue / Winston Drive intersections), field observations were performed and an evaluation of accident data was conducted.

Pedestrian Facilities

Sidewalks are provided along almost all streets within the study area, and crosswalks and pedestrian signals are provided at major signalized intersections. In addition, high-visibility crosswalks are in place at some intersections, such as adjacent to Stonestown Galleria and SFSU. Pedestrian volumes are at their highest near Stonestown Galleria and SFSU, where M Ocean View light rail stops are provided (at the 19th Avenue / Winston Drive and 19th Avenue / Holloway Avenue intersections, respectively).

Pedestrian crossings at the Lake Merced Boulevard / Brotherhood Way, Junipero Serra Boulevard / 19th Avenue, 19th Avenue / Font Boulevard, and Junipero Serra Boulevard / Brotherhood Way intersections are somewhat limited or difficult. Specifically:

- At both the 19th Avenue / Winston Drive and 19th Avenue / Holloway Avenue intersections, there are typically high volumes of pedestrians walking to and from the M Ocean View stations located in the median of the roadway. During peak activity hours, there is a substantial volume of pedestrians in the adjacent crosswalks, and pedestrians can overflow the crosswalks and corners. In addition, the waiting area for riders leaving the stations is inadequate during peak times, resulting in passengers waiting in the adjacent train right-of-way for the pedestrian signal phase.
- At the Junipero Serra Boulevard / Font Boulevard intersection, no crosswalk is provided to cross Font Boulevard, a distance of about 140 feet. Considering that vehicles turning right into Font Boulevard are uncontrolled, this makes for a difficult pedestrian crossing.
- At the Junipero Serra Boulevard / 19th Avenue intersection, crosswalks are provided on three of the four approaches. The wide roadways (seven lanes on 19th Avenue and six to

eight lanes on Junipero Serra Boulevard), in conjunction with the angled approaches and the light rail median, result in extremely long pedestrian walk distances. In addition, there are channelized right turns for the northbound and southbound Junipero Serra Boulevard approaches with free right turns, which can lead to conflicts due to higher vehicular travel speeds and poor visibility for pedestrians.

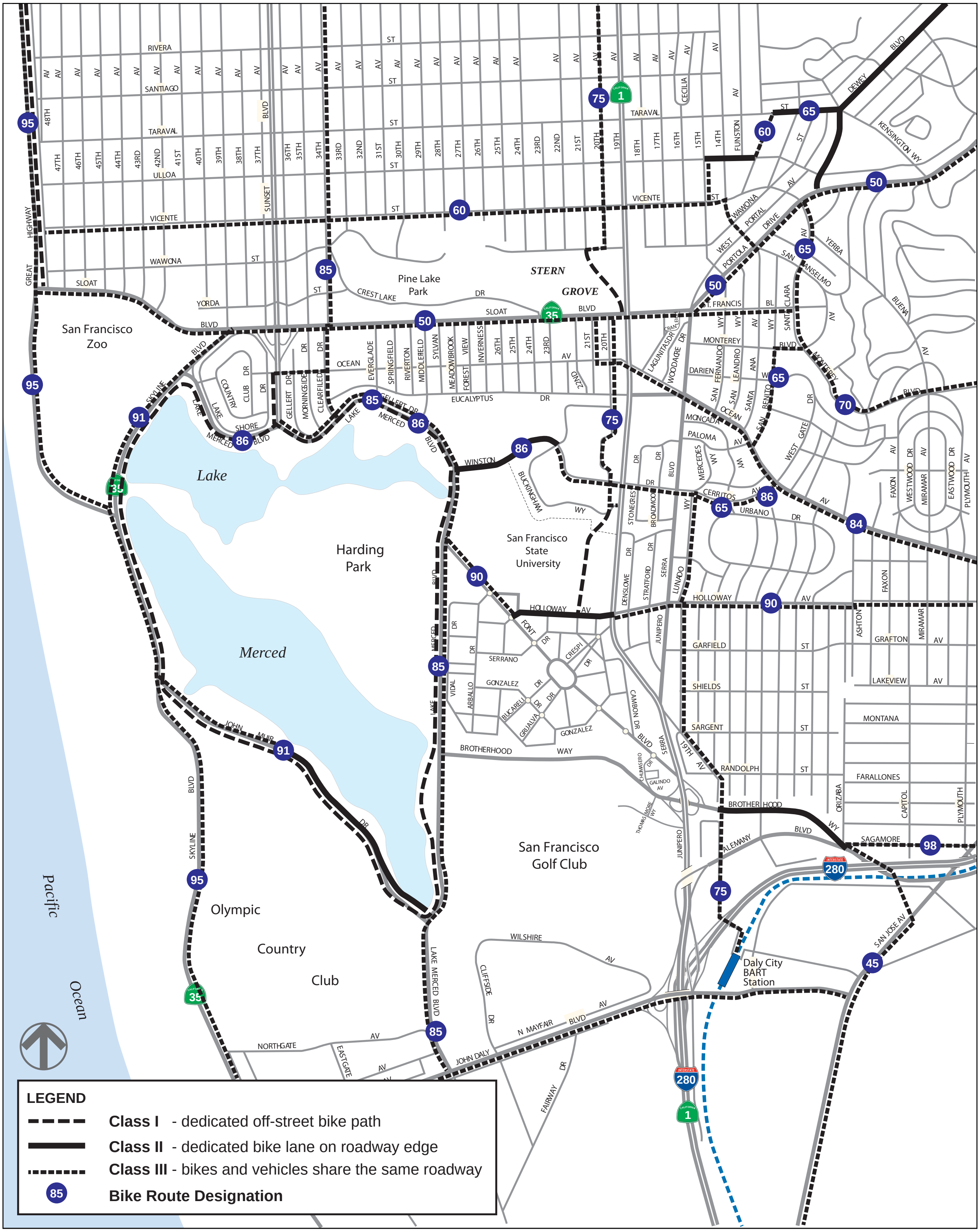
- At the Junipero Serra Boulevard / Brotherhood Way interchange, no formal pedestrian facilities are provided across any of the on- or off-ramps, and no formal sidewalks have been created. Although there are minimal pedestrian volumes at this location, pedestrians are required to cross against uncontrolled and relatively high-speed traffic at multiple locations.
- At the Lake Merced Boulevard / Brotherhood Way intersection, there are channelized right turns for the northbound and westbound approaches. At these locations, pedestrians must cross against uncontrolled free right-turns. Due to the speed of vehicles and the volume of traffic, these crossings can be difficult, especially during peak hours.

Pedestrian access to and from the Parkmerced neighborhood is somewhat limited on both 19th Avenue and Lake Merced Boulevard. Along 19th Avenue, four pedestrian access points are provided in succession at Holloway Avenue, Crespi Drive, Cardenas Avenue, and 200 feet south of Cardenas Avenue, but the next access point is not provided until Font Boulevard, about 2,000 feet to the south. Along Lake Merced Boulevard, pedestrian access in provided only through Higuera Avenue. As a result, connections to nearby uses and the surrounding neighborhoods are fairly limited.

In general, field observations indicated potential safety hazards that could pose significant risks to pedestrians for two of the three potential conflict locations evaluated below (the 19th Avenue / Holloway Avenue and 19th Avenue / Winston Drive intersections). At these locations, the traffic signals are pre-timed to allow pedestrians sufficient time to cross and crosswalks are provided on all legs, with the exception of the south leg of the 19th Avenue / Winston Drive intersection. However, the high volume of pedestrians destined to the M Ocean View light rail stations in the median of 19th Avenue, in conjunction with the limited pedestrian waiting areas at the platforms and on the sidewalks, can result in substantial overcrowded conditions and safety concerns.

Bicycle Facilities

Throughout the study area, bicycle facilities consisting of bike paths (Class I), bike lanes (Class II), wide curb lane bike routes, and bike routes (Class III) are provided. These routes are interconnected to the Citywide Bicycle Network and provide access between the study area and other locations throughout San Francisco. Bike paths are separated from the roadway with dedicated paths for bicyclists. Bike lanes include a dedicated lane on the street adjacent to the curb lane for bicyclists' use. Wide curb lane bike routes are designated on wider roadways, where bicyclists may be able to ride outside the path of motor vehicle travel. Bike routes are signed routes only, where bicyclists share travel lanes with vehicles. The major bicycle facilities in the study area are illustrated in **Figure III.5** and consist of the following:



SOURCE: AECOM, Turnstone Consulting

FIGURE III.5: EXISTING BICYCLE NETWORK

- **Route 50** is a bike route that runs eastbound-westbound along Sloat Boulevard.
- **Route 60** is a wide curb lane bike route that runs eastbound-westbound along Vicente Street.
- **Route 75** runs northbound-southbound from the Daly City BART station as a bike route one roadway east of Junipero Serra Boulevard (i.e., St. Charles Avenue, 19th Avenue, Beverly Street, Junipero Serra Boulevard frontage), runs through SFSU and Stonestown Galleria as a bike route, and runs along 20th Avenue as a wide curb lane bike route north toward Golden Gate Park.
- **Route 84** is a bike route that runs eastbound-westbound along Ocean Avenue.
- **Route 85** is a wide curb lane bike route that runs northbound-southbound along 34th Avenue and Lake Merced Boulevard.
- **Route 86** circles Lake Merced as a bike path, extends east along Winston Drive as a bike lane and a bike route, and continues along Cerritos Avenue as a wide curb lane bike route to Ocean Avenue, where it terminates.
- **Route 90** runs eastbound-westbound along Holloway Avenue as a bike route, bike lane, and a wide curb lane bike route for various segments.
- **Route 91** is a bike route that runs northbound-southbound along Skyline Boulevard and John Muir Drive.
- **Route 95** is a bike route that runs northbound-southbound along Skyline Boulevard.

As with pedestrian conditions, bicycle volumes were relatively low along the established bicycle routes in the study area, specifically near 19th Avenue. However, high bicycle volumes were observed near the major destinations, such as Stonestown and SFSU. Bicycle conditions were observed to be generally operating acceptably throughout the study area.

Conflict Assessment

At the three potential conflict locations as chosen by City of San Francisco Planning staff (the 19th Avenue / Sloat Boulevard, 19th Avenue / Holloway Avenue, and 19th Avenue / Winston Drive intersections), collision data were obtained for a five-year period from 2003/2004 through 2007/2008. The data are summarized in **Table III.8**.

For comparison purposes, pedestrian and bicycle counts taken in May 2009 were collected for the weekday PM peak hour at these intersections. (The pedestrian counts included all pedestrians at each crosswalk.) These counts are summarized in **Table III.9**.

Table III.8: Collision Summary, 2003/2004 – 2007/2008

Intersection		Number of Collisions					Collision Rate[1]
		Vehicle/ Vehicle	Vehicle/ Pedestrian	Vehicle/ Bike	Vehicle/ Other	Total	
11	19th Ave. / Sloat Blvd.	35	0	1	3	39	0.244
14	19th Ave. / Winston Dr.	8	4	0	2	14	0.110
16	19th Ave. / Holloway Ave.	9	4	0	2	15	0.126

Note:
[1] Collision rate is in collisions per million vehicles entering the intersection.

Source: Caltrans SWITRS database, AECOM, 2009.

Table III.9: Pedestrian and Bicycle Count Summary, May 2009 (Weekday PM Peak Hour)

Intersection		Pedestrian Count	Bicycle Count
11	19th Ave / Sloat Blvd.	77	6
14	19th Ave. / Winston Dr.	464	11
16	19th Ave. / Holloway Ave.	866	19

Source: AECOM, 2009.

As shown in **Table III.8**, over the five-year period, the 19th Avenue / Sloat Boulevard intersection had a total of 39 collisions (about eight per year), the 19th Avenue / Winston Drive intersection had 14 collisions (about three per year), and the 19th Avenue / Holloway Avenue intersection had 15 collisions (about three per year). It should be noted that at the 19th Avenue / Sloat Boulevard intersection, one of the vehicle-to-vehicle collisions resulted in a fatality. At the 19th Avenue / Winston Drive and 19th Avenue / Holloway Avenue intersections, none of the collisions resulted in fatalities.

In particular, the intersections of 19th Avenue / Winston Drive and 19th Avenue / Holloway Avenue—both with substantial pedestrian volumes—showed four vehicle-pedestrian collisions each (less than one per year). At both of these locations, pedestrians must cross three to four lanes of traffic in each direction, in addition to the exclusive light rail median. This large crossing distance (over 100 feet), combined with the high traffic volumes and flow speeds along 19th Avenue, results in a pedestrian environment that has an appreciable potential for conflicts.

PARKING CONDITIONS

The evaluation of parking conditions throughout the study area focused on the incremental effect of the foreseeable development projects and the proposed transportation improvements on the surrounding area as a whole.

Weekday midday (1:00 to 3:00 PM) and evening (7:00 to 9:00 PM) parking observations were conducted throughout the study area to determine general availability and occupancy. In general, on-street parking within the study area consists of time-limited unmetered parking (generally in the residential areas) or metered parking (generally near commercial areas or in locations with high parking demand). Specifically, along Junipero Serra Boulevard, all-day parking is provided on both sides of the street. Along the west side of 19th Avenue, all-day parking is provided, and on the east side of 19th Avenue two-hour parking is provided. In areas where students may be likely to park on the street (Holloway Avenue), one-hour and metered parking is provided. Also, where there is neighborhood-serving retail without large off-street parking lots (Ocean Avenue), metered parking is provided. It should be noted that most of the metered parking is limited to one hour in duration.

Observations indicate that on-street parking is generally well-used throughout the day, particularly near SFSU. Off-street parking facilities are provided for major vehicle trip-generating uses such as SFSU, Parkmerced, and Stonestown Galleria. However, patrons of these sites also use the on-street parking available in the study area.

C. DESCRIPTION OF ANALYSIS TIERS

As discussed previously, a detailed evaluation of future conditions within the 19th Avenue corridor was commissioned to determine the effect of planned and proposed changes to the transportation network as a result of the foreseeable development projects in the area and the implementation of "City Family" transportation improvements, including those associated with Muni's TEP. As such, to properly assess the effects of all potential changes to the transportation network, Cumulative Conditions were addressed in separate tiers. A description of each tier and associated methodology is provided below.

FUTURE BASELINE (TIER 1 AND TIER 2)

Tier 1 includes just the background growth in development throughout the region, excluding projects within the study area, expected between now (existing conditions) and future year 2030. The background growth information was provided by the San Francisco County Transportation Authority (SFCTA), based on information in the San Francisco Planning Department's land use projections.

Tier 2 includes the travel demand associated with the following eight foreseeable development projects that have been proposed in the study area:

- Parkmerced Project;
- 800 Brotherhood Way;
- 77-111 Cambon Drive;
- 700 Font Boulevard;
- 445 Wawona Street (the Arden Wood site);
- SFSU Campus Master Plan (2007-2020 SFSUCMP);
- Stonestown Galleria; and
- 1150 Ocean Avenue.

These development sites are illustrated in **Figure III.6**.

In addition, Tier 2 includes the shuttle proposed by the Parkmerced Project sponsor, which would be available to Parkmerced residents only. This shuttle, as shown in **Figure III.7**, would operate between the Parkmerced neighborhood and the Daly City BART station with 5- to 10-minute headways during peak periods and 10-minute headways during off-peak periods. In addition, the shuttle would be expanded to provide service to the nearby Stonestown and Westlake shopping districts during off-peak periods.

Combined, Tier 1 and Tier 2 make up the Future Baseline scenario, to which all other tiers are compared.

SOURCE: AECOM, Turnstone Consulting

19TH AVENUE CORRIDOR STUDY

FIGURE III.6: TIER 2 PROJECTS

SOURCE: AECOM, Turnstone Consulting

19TH AVENUE CORRIDOR STUDY

FIGURE III.7: TIER 2 TRANSIT NETWORK

FUTURE BASELINE PLUS PUBLIC IMPROVEMENTS (TIER 3)

Tier 3 consists of Tier 2 conditions, plus implementation of the transportation improvements currently proposed by City, regional and state agencies. The following transportation improvements were assessed as part of Tier 3. In general, these are changes to the roadway and transit network that are proposed by and would be implemented by the various public agencies (such as SFMTA, SFCTA, or Caltrans).

These major roadway and transit modifications are illustrated in **Figure III.8** and **Figure III.9**.

Street Network

As part of ongoing studies and programs, the following modifications to the existing roadway network are planned within the study area:

- SFCTA, in conjunction with Caltrans, is in the process of modifying the traffic signals at key locations along 19th Avenue and Park Presidio Boulevard. Within the study area, intersections along 19th Avenue at Taraval Street, Ulloa Street, Vicente Street, Sloat Boulevard, Ocean Avenue, Eucalyptus Drive, Winston Drive, Holloway Avenue, and Junipero Serra Boulevard will be changed to provide transit signal priority treatments. As proposed, this modification would allow an approaching Muni vehicle the ability to hold a green phase for a short duration as it approaches an intersection, which would reduce the potential for delays of Muni vehicles along the corridor. In addition, a reduced speed limit (from 35 to 30 miles per hour) will be applied.
- As part of its Better Streets program, in 2008, SFMTA evaluated the implementation of traffic calming along Holloway Avenue and Garfield Avenue between Junipero Serra Boulevard and Ashton Street. Treatments under consideration for these streets include installation of chicanes (shifting of the travel lanes through staggered curb extensions), pedestrian islands, bulb-outs, gateway treatments, and speed humps/cushions. The purpose of these measures is to address vehicular speed and pedestrian safety issues; as such, it is not anticipated that significant reduction in traffic volumes would occur. In addition, no changes to the intersection geometries are anticipated.

Transit Network

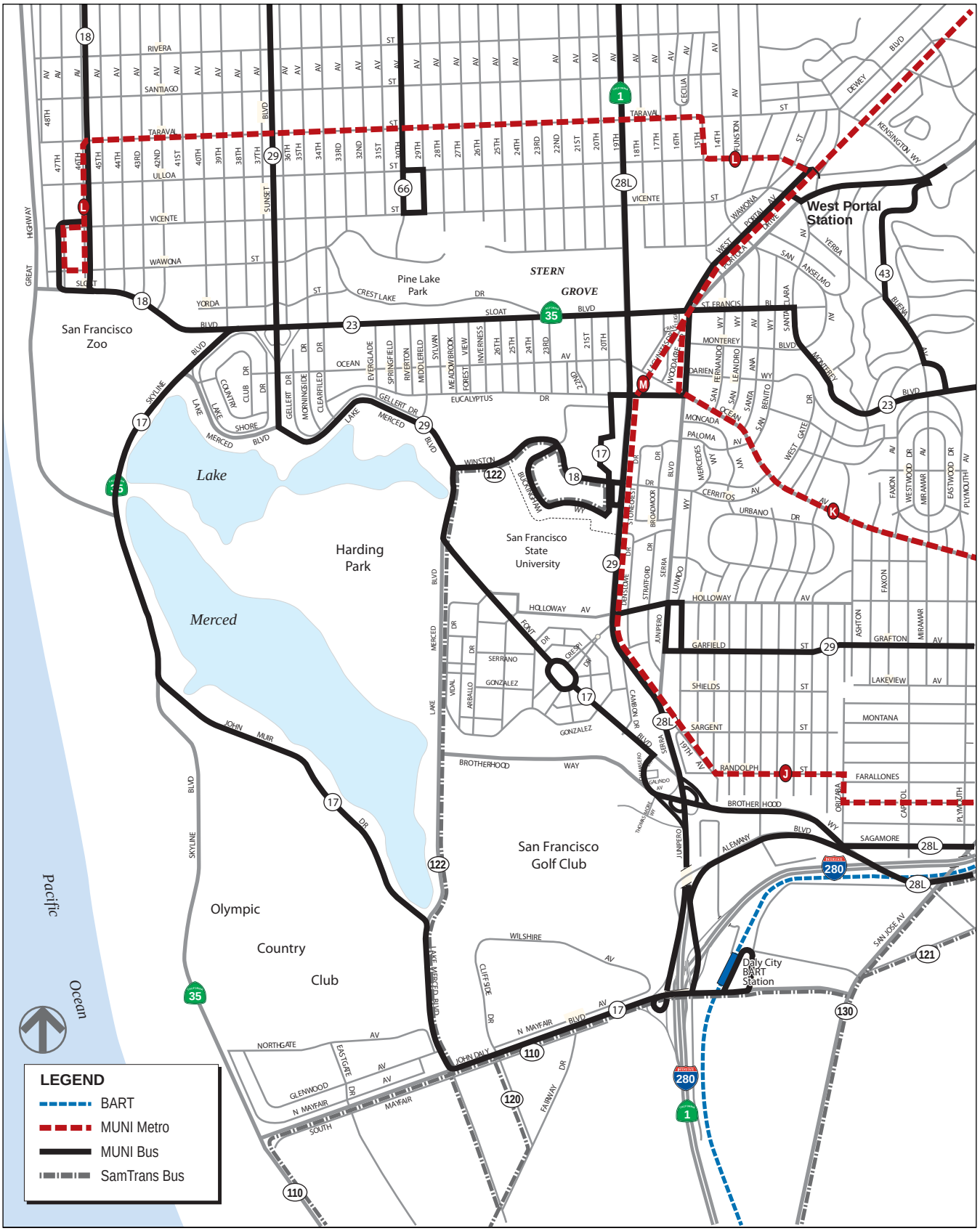
As part of their proposed TEP, SFMTA is proposing modifications to the routing and scheduling of bus and light rail lines throughout the City.[6] The following proposals would affect the current lines that operate within the study area:

- M Ocean View / J Church: The segment of the M Ocean View south of SFSU would be transferred to the J Church (one-car trains), while the segment north of SFSU to downtown would continue to operate with two-car trains. To accommodate the new J Church line, a new station may need to be constructed south of Holloway Avenue. (The end-of-the-line location for the J Church has not been finalized.) Frequencies during the

[6] Some of these changes were implemented on December 5, 2009 as part of SFMTA's service adjustments.

SOURCE: AECOM, Turnstone Consulting

FIGURE III.8: TIER 3 ROADWAY NETWORK CHANGES



Daly CityBARTStation

FIGURE III.9: TIER 3 TRANSIT NETWORK

weekday AM and PM peak hours would drop from a train every 8 to 9 minutes to a train every 10 minutes on the M Ocean View. Frequency on the extended J Church would increase from a train every 8 to 9 minutes to a train every 6 to7 minutes during the weekday AM peak hour and from a train every 7 to 8 minutes to a train every 6 minutes during the weekday PM peak hour.

- 17 Parkmerced: The 17 Parkmerced would absorb discontinued portions of the 18 46th Avenue along Skyline Boulevard, John Muir Drive, and Lake Merced Boulevard, and be extended to serve Lakeshore Plaza, Daly City BART, and Westlake Shopping Center. (Service inside Daly City limits would be limited-stop only.) The one-way loop inside Parkmerced via Arballo Drive, Garces Drive, and Gonzalez Drive would be consolidated to two-way service on Font Boulevard.
- 18 46th Avenue: The segment along Lake Merced Boulevard, John Muir Drive, and Skyline Boulevard would be transferred to the 17 Parkmerced. (The section on Lake Merced Boulevard between Font Boulevard and John Muir Drive would have no replacement service.) The 18 46th Avenue would instead use Sunset Boulevard and Sloat Boulevard to get to and from the San Francisco Zoo and Stonestown. At the northern end of the line, the 18 46th Avenue would inherit the discontinued Ocean Beach branch of the 38 Geary, and the existing route via Point Lobos Avenue and Geary Boulevard would be discontinued.
- 28 19th Avenue: The segment east of the Golden Gate Bridge Toll Plaza, serving the Marina District and Fort Mason, would be transferred to the 28L 19th Avenue Limited and the 43 Masonic. Frequency during the weekday AM peak hour would be increased from a bus every 8 to 9 minutes to a bus every 7 to 8 minutes. During late night and owl periods when the 28L 19th Avenue Limited is not in service, the 28 19th Avenue would be extended to cover these segments. With the combined 28 19th Avenue and 28L-19th Avenue Limited changes, combined service along 19th Avenue and Park Presidio Boulevard would operate every 5 minutes.
- 28L 19th Avenue Limited: The 28L 19th Avenue Limited would be expanded to an all-day "rapid" service and extended at the south end to terminate at Geneva Avenue / Naples Street via Balboa Park BART station. (The existing segment south of Brotherhood Way serving Daly City BART would be discontinued.) At the north end, the 28L 19th Avenue Limited would be extended to Van Ness Avenue / North Point Street via Park Presidio Boulevard, Doyle Drive, Richardson Avenue, and Lombard Street, assuming portions of the discontinued segment of the 28 19th Avenue. With the combined 28 19th Avenue and 28L 19th Avenue Limited changes, combined service along 19th Avenue and Park Presidio Boulevard would operate every 5 minutes.
- 29 Sunset: The segment north of Baker Beach in the Presidio, serving the Golden Gate Bridge Toll Plaza and the former Letterman Hospital, would be discontinued, with a minor route addition to serve the Pershing Drive loop. At the south end of the line, the route would be consolidated to two-way service on Gilman Avenue, eliminating the section on Fitzgerald Avenue. Midday service would improve from a bus every 15 minutes to a bus every 12 minutes.
- 88 Mission/BART Shuttle: The segment west of Alemany Boulevard / Sickles Avenue, serving Parkmerced and neighborhoods bordering Lake Merced, would be discontinued, with some portions covered by the 17 Parkmerced and its extended service to Daly City BART. Service on the remaining section of the 88 Mission / BART Shuttle would be

increased from a bus every 8 to 9 minutes to a bus every 7 to 8 minutes during the weekday AM peak hour and from a bus every 10 minutes to a bus every 7 to 8 minutes during the weekday PM peak hour. As of December 5, 2009, the segment west of Alemany Boulevard / Sickles Avenue was discontinued.

Bicycle Network

As part of the recently approved San Francisco Bicycle Plan, new near-term bicycle facilities are planned for Sagamore Street/Sickles Avenue (Project 5.12), Portola Drive (Project 6.6), Buckingham Way (Project 8.2), Holloway Avenue (Project 8.3), and John Muir Drive (Project 8.4), as follows:

- Along Sagamore Street and Sickles Avenue, new bicycle lanes would be established in the westbound direction of Sagamore Street between Plymouth Avenue and Orizaba Avenue, and in the eastbound direction of Sagamore Street between Orizaba Avenue and Capitol Avenue and of Sickles Avenue between Capitol Avenue and Alemany Boulevard. Two versions of these configurations are under consideration and would include the removal of parking and narrowing of travel lanes. However, no modifications to the intersection geometries would result.
- For Portola Drive, between Sloat Boulevard and O'Shaughnessy Boulevard, bicycle facilities would be established in both the eastbound and westbound directions. Two versions of the configuration are under consideration. One version would include the provision of bicycle lanes, with the narrowing or removal of travel lanes; the other version would provide bicycle lanes by narrowing travel lanes and would establish a bicycle route and install "sharrows" to encourage vehicles to share the travel lane with bicycles.
- At the approach to 19th Avenue, on-street parking along eastbound and westbound Buckingham Way would be eliminated to create bicycle lanes in each direction. This proposal would not affect the overall roadway conditions.
- Between Varela Avenue and Junipero Serra Boulevard, new bicycle lanes would be established along eastbound and westbound Holloway Avenue. Two options for creating these lanes are under consideration: either removing one travel lane in each direction or removing on-street parking. Under both configurations, there would be minor modifications to the eastbound and westbound approaches to intersections along Holloway Avenue, including at 19th Avenue and Junipero Serra Boulevard.
- Along John Muir Drive, bicycle lanes would be established in both the northbound and southbound directions between Lake Merced Boulevard and Skyline Drive with no changes to the street configuration.

The San Francisco Bicycle Plan also lists new bicycle facilities to be implemented in the long term. Long-term improvements are either major improvements to segments of the existing bicycle route network or are potential future additions of new streets and pathways to the bicycle network. Neither a schedule nor specific designs for the following projects have been developed:

- Brotherhood Way between Arch Street and Lake Merced Boulevard;
- Holloway Avenue between Harold Avenue and Junipero Serra Boulevard; and

- Monterey Boulevard between Junipero Serra Boulevard and San Benito Way.

FUTURE BASELINE PLUS PUBLIC AND PRIVATE IMPROVEMENTS (TIER 4)

Tier 4 consists of Tier 3 conditions, plus implementation of the transportation improvements associated with the foreseeable development projects. Multiple versions of the Tier 4 scenario, including the various modifications to the roadway network, transit alignments, transit operations, pedestrian facilities, and transit network, were developed in conjunction with San Francisco Planning Department and SFMTA staff through a series of collaborative workshops. From these efforts, three distinct sets of improvements were identified and combined into three variations for evaluation in this Corridor Study. All proposed modifications have been reviewed and conceptually approved as feasible by the appropriate City agencies. For those improvements that are to be carried forward as part of the individual development projects, separate environmental assessment and approval from non-City agencies (such as Caltrans or the California Public Utilities Commission) will be required.

The iterations of Tier 4 (referred to as Tier 4A, Tier 4B, and Tier 4C) include a similar set of improvements to the intersections surrounding the Parkmerced neighborhood, plus new/modified access points into Parkmerced. The primary distinction among the three versions is the alignment of the M Ocean View light rail line that currently operates in the median of 19th Avenue adjacent to Parkmerced. To enhance transit accessibility for their project, the Parkmerced Project sponsors have proposed to reroute the M Ocean View into their site. As a result, this study evaluates two versions of this reconfiguration of the alignment (Tier 4B and Tier 4C), plus a version that retains the existing M Ocean View alignment for comparison purposes (Tier 4A).

In addition, to accommodate the additional vehicular activity to the Parkmerced neighborhood, new left-turn access from northbound Junipero Serra Boulevard into a realigned Chumasero Drive is included in all three tiers; plus, a new left turn from 19th Avenue into a realigned Crespi Drive is included in Tier 4C.

Finally, a series of improvements to the pedestrian network, including new crosswalks and connection points, widened/realigned crosswalks, median refuge areas, tightened corner radii, and corner bulb-outs/sidewalk extensions, is included.

It should be noted that all proposed modifications to the existing street network, such as the new bulb-outs or the modifications to the corner radii, were reviewed from a traffic engineering perspective and designed to accommodate the appropriate design vehicles.

Tier 4A

The following transportation improvements were assessed as part of Tier 4A, which include changes to the roadway and transit network that are proposed by and would be implemented as

part of the proposed development projects identified in Tier 2. These modifications are shown in **Figure III.10** and **Figure III.11**, and the conceptual plans for each location are provided in **Appendix B**. In general, these improvements were proposed to address existing problem locations, to enhance access to development sites or to address likely future problem locations.

Street Network

Modifications to several intersections along 19th Avenue, Brotherhood Way, and Lake Merced Boulevard, as well as reconfiguration of the streets internal to the Parkmerced neighborhood, are proposed as follows:

- 19th Avenue / Holloway Avenue: The channelized right turn from westbound Holloway Avenue to northbound 19th Avenue would be eliminated to improve pedestrian conditions.
- Crespi Drive: The street currently intersects with 19th Avenue immediately south of Holloway Avenue. Instead, it would be realigned to the south to intersect with 19th Avenue at a right angle and widened to provide two travel lanes in each direction.
- 19th Avenue / Crespi Drive: A new signalized intersection would be created with the realigned Crespi Drive.
- 19th Avenue / Junipero Serra Boulevard: The northbound 19th Avenue left turn to southbound Junipero Serra Boulevard movement would be eliminated to allow for improved operations of the M Ocean View light rail stop. An additional northbound Junipero Serra Boulevard left-turn pocket would be established by narrowing the existing median, allowing the approach to be restriped for three exclusive left-turn lanes and two exclusive through lanes.
- Chumasero Drive: Currently, Font Boulevard ends at Junipero Serra Boulevard, with a right-in/right-out configuration. Instead, Font Boulevard would end at Chumasero Drive, and Chumasero Drive would extend to Junipero Serra Boulevard, with a new right-angle intersection.
- Junipero Serra Boulevard / Chumasero Drive: A new signalized intersection would be created with the realigned Chumasero Drive, and a northbound left-turn pocket would be established within the existing median.
- Junipero Serra Boulevard / Brotherhood Way: At this grade-separated urban interchange, a third travel lane on Brotherhood Way would be added in both the eastbound and westbound directions by narrowing the shoulder areas. Eastbound, this would be an auxiliary lane between the off-ramp and on-ramp to facilitate merge/diverge activities. Westbound, this would be an additional lane starting at the off-ramp and continuing west to Chumasero Drive. In addition, the on- and off-ramp junctions with Brotherhood Way would be reconfigured with tighter turning radii.
- Chumasero Drive: Currently, Chumasero Drive connects with Brotherhood Way across from Thomas More Way. The roadway would be realigned to the west by approximately 200 feet.

SOURCE: AECOM, Turnstone Consulting

FIGURE III.10: TIER 4A ROADWAY NETWORK CHANGES

SOURCE: AECOM, Turnstone Consulting

FIGURE III.11: TIER 4A TRANSIT NETWORK

- Brotherhood Way / Chumasero Drive: This would be a new signalized intersection with the realigned Chumasero Drive, located about 200 feet west of the revised Brotherhood Way / Thomas More Way intersection. The traffic signals at these two intersections would be coordinated to minimize queuing between intersections. At Thomas More Way, the existing westbound left-turn pocket would be extended to provide additional queuing space.
- Lake Merced Boulevard / Brotherhood Way: The channelized right-turns from westbound Brotherhood Way to northbound Lake Merced Boulevard and from northbound Lake Merced Boulevard to eastbound Brotherhood Way would be eliminated to improve pedestrian conditions. The westbound approach would be restriped to provide two right-turn lanes and a left-turn lane; at the northbound approach, the former channelized right turn would be converted into a standard right-turn lane.
- Gonzalez Drive, Acevedo Avenue, and Vidal Drive: New streets would be provided for access to and from the Parkmerced neighborhood from Lake Merced Boulevard. Each street would have one travel lane in each direction.
- Lake Merced Boulevard /Gonzalez Drive: This would be a new signalized intersection with the new Gonzalez Drive. A southbound left-turn pocket and northbound right-turn pocket would be provided.
- Lake Merced Boulevard / Higuera Avenue: The intersection would be modified, and a southbound left-turn pocket and northbound right-turn pocket would be provided.
- Lake Merced Boulevard / Acevedo Avenue: This would be a new signalized intersection with the new Gonzalez Drive. A southbound left-turn pocket and northbound right-turn pocket would be provided.
- Lake Merced Boulevard / Vidal Drive: This would be a new signalized intersection with the new Vidal Drive. A southbound left-turn pocket and northbound right-turn pocket would be provided.

Transit Network

The following modifications to the existing and TEP-modified bus and light rails, as documented in Tier 3, would be included in Tier 4A. Routings would remain the same as under Tier 3, with the exception of the M-Oceanview and J-Church light rail lines.

- M Ocean View / J Church: The proposed reconfiguration of the Muni M Ocean View and J Church light rail lines in the TEP would be converted back to the existing configuration of just the M Ocean View line. However, the proposed service changes would remain. The current M Ocean View stop at 19th Avenue / Randolph Street (at the southeast corner of the 19th Avenue / Junipero Serra Boulevard intersection) would be enhanced with boarding islands and crosswalk connections to the sidewalks.
- 17 Parkmerced: Routing for the Muni 17 Parkmerced bus lines would be modified to account for the new Parkmerced street plan.
- 28 19th Avenue: The existing Muni 28 19th Avenue bus stop, which is located at the northwest corner of the 19th Avenue / Holloway Avenue intersection, would be relocated to the southwest corner of the intersection.

- 28L 19th Avenue Limited: The existing Muni 28 19th Avenue Limited bus stop, which is located at the northwest corner of the 19th Avenue / Holloway Avenue intersection, would be relocated to the southwest corner of the intersection.
- 29 Sunset: Routing for the Muni 29 Sunset bus lines would be modified to account for the new Parkmerced street plan. Primarily, this would include shifting the turnaround from Crespi Drive to off Holloway Avenue.

Pedestrian Network

New and/or revised crosswalks and improved sidewalk/corner facilities would be provided at the following intersections:

- 19th Avenue / Holloway Avenue: The crosswalks on the north side and south side of the intersection would be reconfigured, bulb-outs would be installed at the corners, and the radius of the northeast and southeast corners would be modified to reduce crossing distances and increase pedestrian waiting areas.
- 19th Avenue / Crespi Drive: With the new signalized intersection, crosswalks would be established across the north, south, and west sides of the intersection, a bulb-out would be installed at the southwest corner, and median areas would be created adjacent to the existing light-rail median to improve pedestrian connections, reduce crossing distances and provide refuge areas for crossing pedestrians.
- 19th Avenue / Junipero Serra Boulevard: Sidewalks across the northwest, northeast, and southeast sides of the intersection would be reconfigured to shorten the walk distances, and bulb-outs would be installed along the northeast side. In addition, at the channelized right turns from northbound Junipero Serra Boulevard to southbound 19th Avenue and from southbound Junipero Serra Boulevard to northbound 19th Avenue, stop signs would be installed and new crosswalks would be established.
- Junipero Serra Boulevard / Chumasero Drive: With the new signalized intersection, a new crosswalk would be provided across the north side (with a median refuge) and west side of the intersection, and a bulb-out would be provided at the southwest corner.
- Junipero Serra Boulevard / Brotherhood Way: Enhanced pedestrian facilities would be provided along eastbound Brotherhood Way, including high-visibility crosswalks across the on- and off-ramps on the south side of the interchange and the creation of a formal sidewalk.
- Brotherhood Way / Chumasero Drive: With the reconfiguration of the intersection, a new at-grade crosswalk would be added on the east side of the intersection – in addition to a crosswalk on the north side of the intersection. In addition, a sidewalk bulb would be created on the south side of the intersection to reduce the walk distances. It should be noted that the current pedestrian overcrossing would remain.
- Lake Merced Boulevard / Brotherhood Way: The existing crosswalk on the north side of the intersection would be relocated to the south side and would include a median pedestrian refuge area. In addition, the radius of the northeast and southeast corners would be modified and the travel lanes in the southbound direction would be narrowed to reduce crossing distances.

- Lake Merced Boulevard / Gonzalez Drive: At this new intersection, crosswalks would be provided on the north, east, and south sides of the intersection. In addition, the travel lanes in the southbound direction would be narrowed to reduce crossing distances.
- Lake Merced Boulevard / Higuera Avenue: At this revised intersection, crosswalks would be provided on the north, east, and south sides of the intersection. In addition, the travel lanes in the southbound direction would be narrowed to reduce crossing distances.
- Lake Merced Boulevard / Acevedo Avenue: At this new intersection, crosswalks would be provided on the north, east, and south sides of the intersection. In addition, the travel lanes in the southbound direction would be narrowed to reduce crossing distances.
- Lake Merced Boulevard / Vidal Drive: At this new intersection, crosswalks would be provided on the north, east, and south sides of the intersection. In addition, the travel lanes in the southbound direction would be narrowed to reduce crossing distances.

Bicycle Network

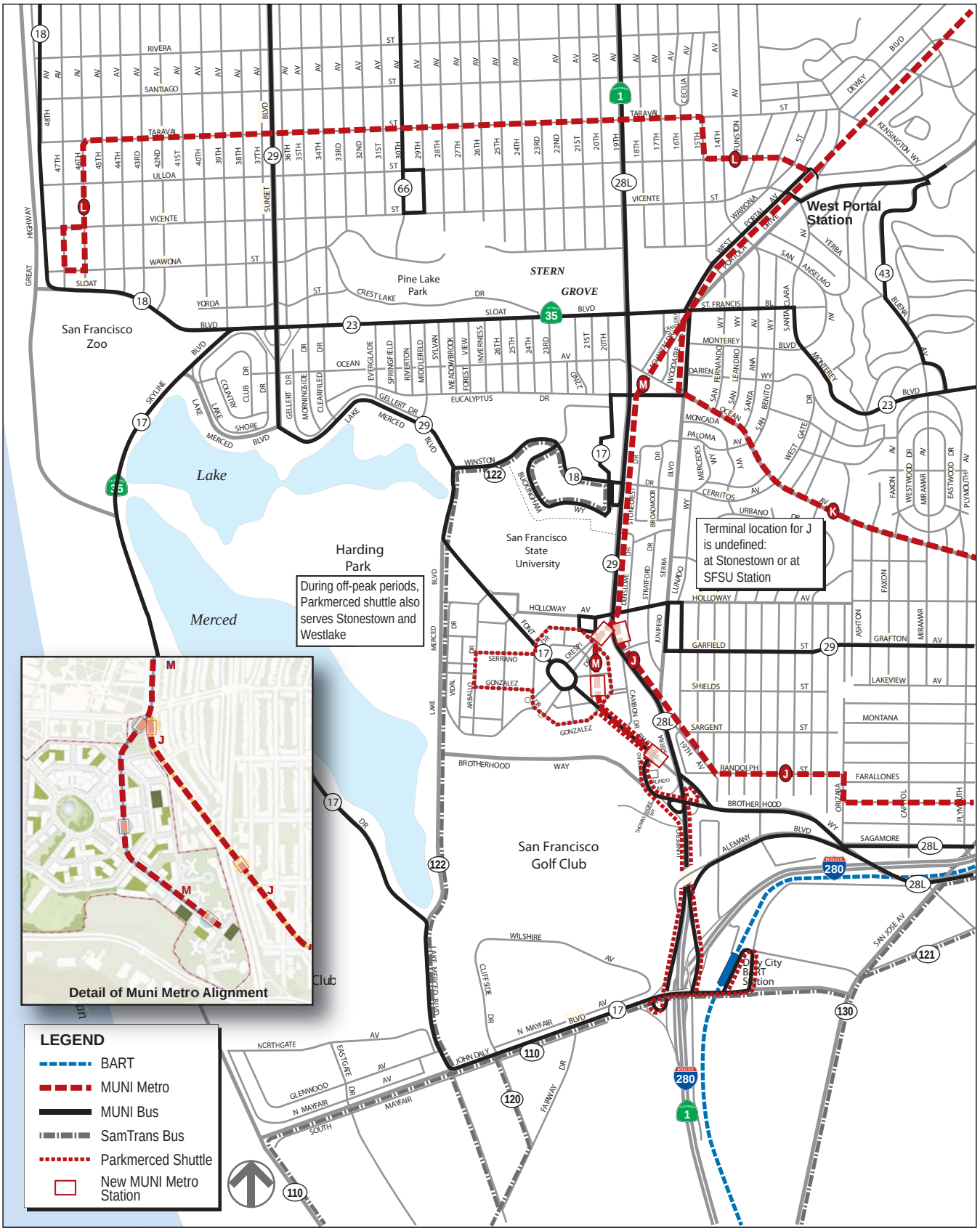
No new bicycle facilities beyond those provided by the Bicycle Plan (analyzed as part of Tier 3) and modifications in the pedestrian facilities described above to accommodate bicycles would be created on City streets, with the exception of streets internal to Parkmerced.

Tier 4B

The following transportation improvements were assessed as part of Tier 4B. The improvements would be the same as Tier 4A, with minor exceptions. Primarily, this scenario includes the proposed rerouting of the M Ocean View light rail line into the Parkmerced neighborhood at the intersection of 19th Avenue / Holloway Avenue and the extension of the J Church line rail line from Balboa Park to cover the southern portion of the M Ocean View line. This transit plan would be similar to that proposed with the TEP, but with a new terminal location for the M Ocean View. Under the proposed realignment, the existing SFSU station would be relocated into the Parkmerced neighborhood, two new M Ocean View stations would be constructed (including an end-of-the-line terminal), and a new terminal for the J Church would be constructed on the south side of the 19th Avenue / Holloway Avenue intersection. These modifications are shown in **Figure III.12** and **Figure III.13**, and the conceptual plans for each location are provided in **Appendix B**.

SOURCE: AECOM, Turnstone Consulting

FIGURE III.12: TIER 4B ROADWAY NETWORK CHANGES



SOURCE: AECOM, Turnstone Consulting

FIGURE III.13: TIER 4B TRANSIT NETWORK

Street Network

Modifications to the following intersections would be included to accommodate for the changes to the light rail alignment:

- 19th Avenue / Holloway Avenue: A fourth southbound through lane would be established by narrowing the existing lanes and widening the approach by approximately 8 feet to the west. To account for the diagonal crossing of the intersection by the light rail, a 26-second all-red phase (except for northbound 19th Avenue approach) would be added to the intersection signalization plan.
- 19th Avenue / Crespi Drive: The fourth southbound travel lane would be extended south and converted into a right-turn lane into Crespi Drive.

Transit Network

The following modifications to the existing and TEP-modified bus and light rails, as documented in Tier 3, would be included in Tier 4B:

- M Ocean View: The light rail alignment would be reconfigured to divert into the Parkmerced neighborhood at the southwest corner of the 19th Avenue / Holloway Avenue intersection. The existing SFSU station would be relocated into the Parkmerced neighborhood, and two new stations would be created within Parkmerced (including a new end-of-the-line terminal at the intersection of Font Boulevard / Chumasero Drive). Operations of the M Ocean View would continue to be with two-car trains and the proposed TEP service frequency.
- J Church: The J Church would be extended from its current terminal at Balboa Park, along the southern portion of the M Ocean View alignment, to a new terminal located at the south side of the 19th Avenue / Holloway Avenue intersection or at the existing Stonestown station. Operations of the J Church would continue to be with one-car trains and the proposed TEP service frequency.
- 28 19th Avenue: The Muni 28 19th Avenue would continue to use its current bus stop at the northwest corner of the 19th Avenue / Holloway Avenue intersection, instead of being relocated to the southwest corner of the intersection. Since the J Church would be operating in the 19th Avenue median, there would be insufficient width to establish 2 new bus stops in this location.
- 28L 19th Avenue Limited: The Muni 28 19th Avenue Limited would continue to use its current bus stop at the northwest corner of the 19th Avenue / Holloway Avenue intersection, instead of being relocated to the southwest corner of the intersection. Since the J Church would be operating in the 19th Avenue median, there would be insufficient width to establish 2 new bus stops in this location.

Pedestrian Network

Relocation of the M Ocean View station from the median of 19th Avenue to the southwest corner of the 19th Avenue / Holloway Avenue intersection would serve to improve pedestrian conditions by reducing the crossing distance by riders from the west side of the street. In addition, the

pedestrian facilities described in Tier 4A would be modified to accommodate the train traversing the sidewalks and crosswalks, and additional pedestrian treatments would be provided to discourage and restrict use of the light rail right-of-way through the sidewalk and transit plaza.

Bicycle Network

No changes to the Tier 4A bicycle facilities would be included.

Tier 4C

The following transportation improvements were assessed as part of Tier 4C. The improvements would be the same as Tier 4A, with minor exceptions. Primarily, this scenario includes the proposed rerouting of the M Ocean View light rail line into the Parkmerced neighborhood at the intersection of 19th Avenue / Holloway Avenue. Under the proposed realignment, the existing SFSU station would be relocated into the Parkmerced neighborhood, and two new M Ocean View stations would be constructed (including an end-of-the-line terminal). In addition, a connection back to the existing alignment at 19th Avenue / Junipero Serra Boulevard would be constructed. The M Ocean View would have split service with short and long lines, with half of the trains ending at Parkmerced and half continuing to the current Balboa Park terminal. These modifications are shown in **Figure III.14** and **Figure III.15**, and the conceptual plans for each location are provided in **Appendix B**.

Street Network

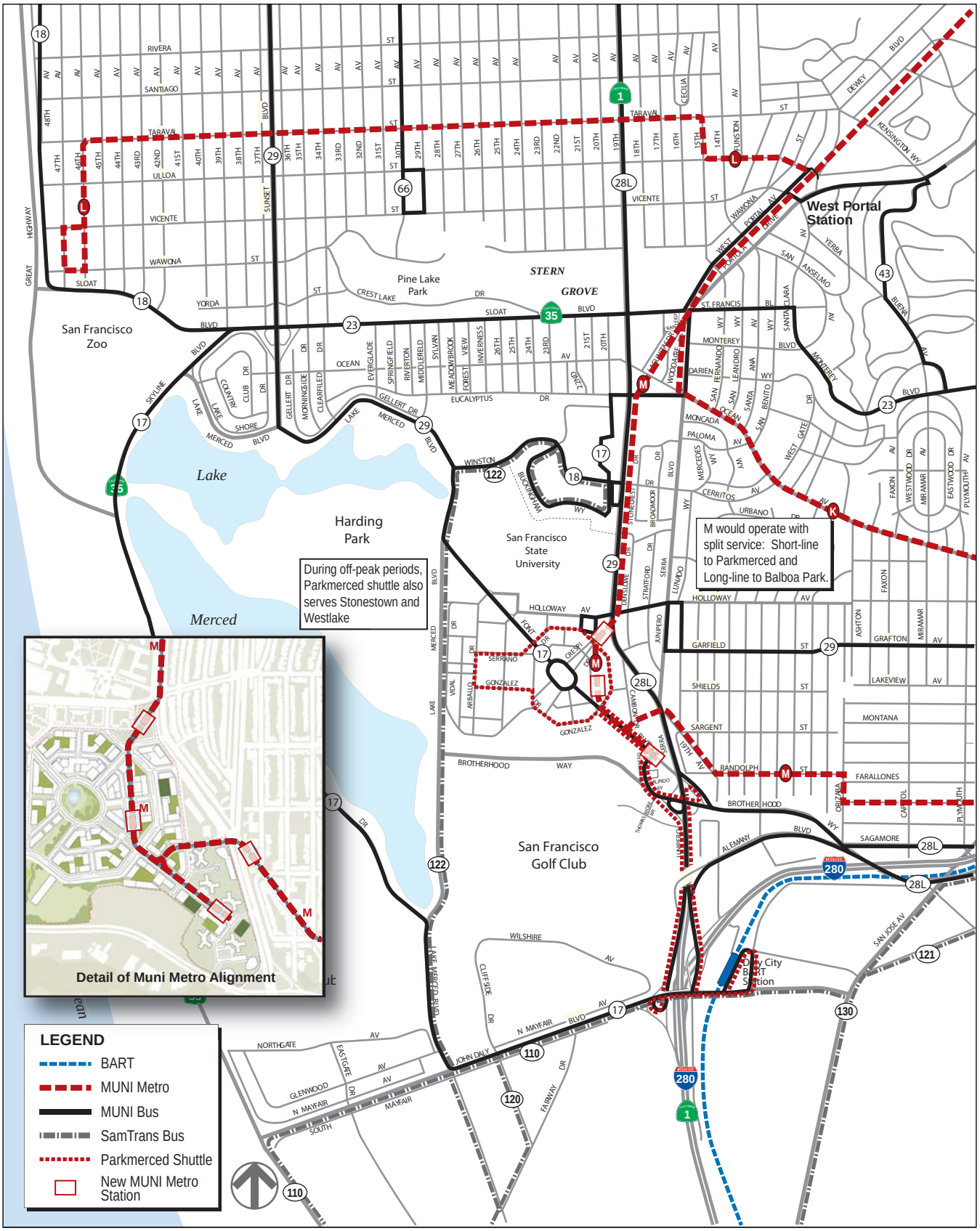
Modifications to the following intersections would be included to accommodate for the changes to the light rail alignment:

- 19th Avenue / Holloway Avenue: A fourth southbound through lane would be established by narrowing the existing lanes and widening the approach by approximately 4 feet to the east and west. To account for the diagonal crossing of the intersection by the light rail, a 26-second all-red phase (except for northbound 19th Avenue approach) would be added to the intersection signalization plan.
- 19th Avenue / Crespi Drive: The fourth southbound travel lane would be extended south and converted into a through-right lane into Crespi Drive. (This additional through lane would continue south to Junipero Serra Boulevard.) To accommodate this additional southbound lane, the former light rail median within 19th Avenue would be narrowed. In addition, a northbound left-turn pocket would be created within the former light rail median.
- 19th Avenue / Junipero Serra Boulevard: A fourth lane for the southbound 19th Avenue right turn to Junipero Serra Boulevard movement would be created by narrowing the former light rail median. To account for the diagonal crossing of the intersection by the light rail, a 26-second all-red phase would be added to the intersection signalization plan.

SOURCE: AECOM, Turnstone Consulting

19TH AVENUE CORRIDOR STUDY

FIGURE III.14: TIER 4C ROADWAY NETWORK CHANGES



SOURCE: AECOM, Turnstone Consulting

FIGURE III.15: TIER 4C TRANSIT NETWORK

Transit Network

The following modifications to the existing and TEP-modified bus and light rails, as documented in Tier 3, would be included in Tier 4C:

- M Ocean View: The light rail alignment would be reconfigured to divert into the Parkmerced neighborhood at the southwest corner of the 19th Avenue / Holloway Avenue intersection. The existing SFSU station would be relocated into the Parkmerced neighborhood, and two new stations would be created within Parkmerced (including a new end-of-the-line terminal at the intersection of Font Boulevard / Chumasero Drive). Within Parkmerced, the tracks would split, with a connection to the current alignment provided from the site at the west side of the 19th Avenue / Junipero Serra Boulevard intersection. Operations of the M Ocean View north of the split within Parkmerced would continue to be with two-car trains and the proposed TEP service frequency. However, service on the Balboa Park and Parkmerced terminals would be at half the TEP frequency.
- J Church: The J Church would continue to have its terminal at Balboa Park.
- 28 19th Avenue/28L 19th Avenue Limited: As with Tier 4A, the bus stops would be relocated to the southwest corner of the 19th Avenue/Holloway Avenue intersection.

Pedestrian Network

Relocation of the M Ocean View station from the median of 19th Avenue to the southwest corner of the 19th Avenue / Holloway Avenue intersection would serve to improve pedestrian conditions by reducing the crossing distance by riders from the west side of the street. In addition, the pedestrian facilities described in Tier 4A would be modified to accommodate the train traversing the sidewalks and crosswalks, and additional pedestrian treatments would be provided to discourage and restrict use of the light rail right-of-way through the sidewalk and transit plaza. Similarly, the pedestrian facilities described in Tier 4A for the intersection of 19th Avenue / Junipero Serra Boulevard would also be modified to accommodate the train traversing the sidewalks and crosswalks.

Bicycle Network

Changes to the network would be the same as those proposed and described in Tier 4A.

HOT Lane Variant

For Tier 4A, Tier 4B, and Tier 4C, a variant analysis was conducted to provide a High-Occupancy/Toll (HOT) lane along southbound 19th Avenue from north of Holloway Avenue through Junipero Serra Boulevard. The HOT lane would allow transit vehicles (including shuttles) and carpool vehicles free travel, but private vehicles would be charged a user fee to use the HOT lane. The purpose of this type of facility would be to provide a travel time savings compared to the adjacent mixed-flow lanes, thereby giving a benefit to the users. Note that the

carpool policy (whether the lane would be restricted to two-person carpools or three-person carpools) and user fees would be set to ensure free-flow conditions in the HOT lane.

For all three scenarios, the lane would start about 220 feet north of Holloway Avenue and be designated for transit vehicles and vehicles making a right turn onto Crespi Drive only. The lane would continue through the intersection of Holloway Avenue to Crespi Drive. At Crespi Drive, the lane would allow the Crespi Drive vehicles to make a right turn into the Parkmerced neighborhood while the transit vehicles could continue through. South of Crespi Drive, and through the intersection with Junipero Serra Boulevard, the lane would converted into an HOT lane, with transit vehicles, carpool vehicles and paying private vehicles. After the Junipero Serra Boulevard / 19th Avenue intersection, this lane would convert back into a regular traffic lane.

For both Tier 4A and Tier 4B, the HOT lane would be located within a new southbound travel lane, which would be implemented by eliminating on-street parking and narrowing the travel lanes. For Tier 4C, the HOT lane would be established within the fourth southbound lane already proposed as part of the scenario, which was created by narrowing the former light rail median.

METHODOLOGY

This section presents the methodology, approach, and assumptions used to develop conditions associated with each tier.

Tier 1

Information on background growth in traffic and transit volumes resulting from new residential, commercial, and other development outside the study area was obtained using output from the SFCTA recent travel demand model, based on land use forecasts provided by the San Francisco Planning Department. Model output for Existing Conditions (year 2005) was compared with output for Tier 1 Cumulative Conditions (year 2030) to derive growth factors, which were then applied to existing data counts to obtain 2030 baseline traffic and transit ridership volumes.

It should be noted that all model output was examined to understand future traffic behavior and, where necessary, adjustments were made to ensure reasonable results. These adjustments include the following:

- Growth factors were scaled to account for the fact that the Existing Conditions model output represents the year 2005 and the traffic counts were collected in 2008 and 2009.
- Where common growth patterns were detected (e.g., similar levels of growth along corridors due to large amounts of traffic traveling through an area), growth factors were clustered to ensure uniform, consistent growth. In general, it was found that background growth levels along 19th Avenue, Junipero Serra Boulevard, and Lake Merced Boulevard would be similar.

- Irregular traffic activity was noted in the vicinity of the Sunset Boulevard / Sloat Boulevard intersection. Under Cumulative Conditions, the model output showed vehicles diverting from Sunset Boulevard onto neighborhood streets due to the over-assignment of vehicles. In this case, the model was assigning traffic to nearby streets with available capacity; however, this behavior is unlikely in reality. As a result, the diverted trips were manually reassigned to the appropriate roadways, and growth factors were recalculated.

In general, traffic volume growth at intersections throughout the study area was found to be between 0.0 and 2.7 percent per year (0.0 to 58.5 percent total growth to the year 2030). Specifically, at intersections along 19th Avenue, growth was generally found to be between 0.5 and 0.9 percent per year (between 10.5 and 20.3 percent overall growth), representing increases of approximately 250 to 320 vehicles during the weekday AM peak hour and 435 to 625 vehicles during the weekday PM peak hour. By applying these growth factors to existing traffic counts, Tier 1 Cumulative Conditions traffic volumes were developed.

For transit, background growth was obtained from the "quickboards" database produced by the SFCTA travel demand model. Due to the variability and uncertainty in the way the model assigns transit demand to available transit facilities, ridership growth was calculated by summing the total boardings across the screenlines for the weekday AM and PM peak periods, instead of for each bus or light rail line. This aggregated screenline growth was then applied to existing TEP ridership for all lines within the screenline to obtain Tier 1 ridership.

In addition, no modifications to the existing roadway and transit networks were assumed as part of Tier 1.

Tier 2

To derive Tier 2 Cumulative Conditions traffic and transit volumes, trips associated with the eight foreseeable development projects were layered over Tier 1 Cumulative Conditions.

A summary of the land use program for each development project is provided in **Table III.10**. A summary of each project's weekday daily person-trips, overall mode split, and external vehicle trips is provided in **Table III.11**, **Table III.12,** and **Table III.13**. **Table III.14** summarizes external person-trips by mode and external vehicle-trips for the weekday AM and PM peak hours. Detailed travel demand calculations are included in **Appendix C**.

Table III.10: Tier 2 Development Projects Land Use Program

Project	Resi-dential (units)	Office (sq ft)	University (enrollment)[1]	Elem. School (sq ft)	General Retail (sq ft)	Movie Theater (seats)	Rec. Center (sq ft)
Parkmerced Project (total after buildout)	8,900	80,000		25,000	230,000		64,000
700 Font Boulevard	340						
445 Wawona Street (Arden Wood)	142						
77-111 Cambon Drive	199				15,000		
800 Brotherhood Way	182						
SFSU Campus Master Plan	657		5,000				
Stonestown Galleria					180,000	2,000	
1150 Ocean Avenue	175				35,000		
Total	**8,912**	**80,000**	**5,000**	**25,000**	**460,000**	**2,000**	**64,000**

Notes:
[1] Within the SFCTA model, the additional SFSU enrollment was translated to new employees (711 faculty/staff based on the average ratio of students to staffing).

Source: AECOM, 2009; Fehr + Peers, 2009.

Table III.11: Tier 2 Development Projects Weekday Daily Person-Trips

Project	Weekday Daily Person-Trips
Parkmerced Project (total after buildout)	96,684
700 Font Boulevard	2,146
445 Wawona Street (Arden Wood)	797
77-111 Cambon Drive	2,812
800 Brotherhood Way	1,090
SFSU Campus Master Plan	15,177
Stonestown Galleria	26,458
1150 Ocean Avenue	10,726
Total	**155,890**

Source: AECOM, 2009; Fehr + Peers, 2009.

Table III.12: Tier 2 Development Projects Overall Mode Split

Project	Vehicle	Transit	Other
Weekday AM Peak Hour			
Parkmerced Project (total)	80.7%	16.3%	3.0%
700 Font Boulevard	59.8%	20.1%	20.1%
445 Wawona Street (Arden Wood)	68.6%	18.6%	12.8%
77-111 Cambon Drive	63.2%	17.4%	19.4%
800 Brotherhood Way	70.3%	10.9%	18.8%
SFSU Campus Master Plan	47.5%	34.0%	18.5%
Stonestown Galleria	74.9%	16.5%	8.6%
1150 Ocean Avenue	64.4%	21.8%	13.8%
Weekday PM Peak Hour			
Parkmerced Project (total)	81.5%	15.5%	3.0%
700 Font Boulevard	63.7%	12.7%	23.6%
445 Wawona Street (Arden Wood)	74.8%	13.5%	11.7%
77-111 Cambon Drive	63.7%	10.7%	25.6%
800 Brotherhood Way	68.9%	7.4%	23.7%
SFSU Campus Master Plan	50.2%	30.8%	19.0%
Stonestown Galleria	82.8%	9.2%	8.0%
1150 Ocean Avenue	64.5%	17.6%	17.9%

Source: AECOM, 2009; Fehr + Peers, 2009.

Table III.13: Tier 2 Development Projects External Peak Hour Vehicle Trips

Project	Weekday AM Peak Hour		Weekday PM Peak Hour		Weekend Midday Peak Hour	
	In	Out	In	Out	In	Out
Parkmerced Project (total)	847	2,105	2,641	1,882	2,472	1,718
700 Font Boulevard	64	127	114	85	46	48
445 Wawona Street (Arden Wood)	22	64	63	44	21	21
77-111 Cambon Drive	97	145	124	92	79	78
800 Brotherhood Way	30	124	125	63	27	26
SFSU Campus Master Plan	331	319	321	328	143	155
Stonestown Galleria	269	129	584	800	993	1,198
1150 Ocean Avenue	42	157	206	175	253	257
Total	**1,702**	**3,170**	**4,178**	**3,469**	**4,034**	**3,501**

Source: AECOM, 2009; Fehr + Peers, 2009.

Table III.14: Tier 2 Development Projects External Peak Hour Transit Trips

Project	Weekday AM Peak Hour		Weekday PM Peak Hour	
	In	Out	In	Out
Parkmerced Project (total)	322	933	1,005	658
700 Font Boulevard	25	51	27	20
445 Wawona Street (Arden Wood)	7	20	13	9
77-111 Cambon Drive	43	65	62	46
800 Brotherhood Way	5	22	15	8
SFSU Campus Master Plan	268	259	224	228
Stonestown Galleria	66	31	71	97
1150 Ocean Avenue	15	84	95	72
Total	**751**	**1,465**	**1,512**	**1,138**

Source: AECOM, 2009; Fehr + Peers, 2009.

Although the travel demand characteristics of each foreseeable development project may slightly vary for each tier (for instance, the percentage of transit trips for Stonestown may change with implementation of the SFMTA TEP changes in Tier 3), for the purpose of this analysis, it was assumed that the total travel demand and the peak hour vehicle trips and transit trips would remain constant. This would allow for a more consistent comparison between tiers, allowing the physical effects of the proposed transportation changes to be isolated.

The assignments of the vehicle trips and transit trips to the local and regional roadway and transit network were developed using the following assumptions:

- Vehicle assignments: For each project, the origins and destinations of the vehicle trips were disaggregated into a series of zones throughout San Francisco and the region. For each zone, a series of assignments was developed based on the shortest path of travel plus the existing and projected future congestion levels on the surrounding streets. It should be noted that since Tier 2 did not include any of the transportation projects proposed by the individual developments, assignments were not made to new streets and connections.
- Transit assignments: The assignment of transit trips generated by each of the various projects generally assumes that riders select the "shortest route," minimizing the number of transfers, the walking distance to and from stop locations, and the waiting time at stops. In cases where the rider could use more than one route, existing ridership data (such as from the TEP or from resident surveys for Parkmerced) was reviewed to determine an approximation of the preferential selection of specific routes. For the planned Parkmerced shuttle to BART, ridership was estimated directly from the Parkmerced transit origin/destination patterns, with the assumption that all BART riders would use the Parkmerced shuttle.

In addition, no modifications to the existing roadway and transit networks were assumed as part of Tier 2, with the exception of the planned Parkmerced shuttle.

Tier 3

In Tier 3, the intersection and transit analyses were modified to account for the projects proposed by the various public agencies, as follows.

- Upgraded traffic signals on 19th Avenue: The planned new traffic signals along 19th Avenue would include transit signal priority treatments, which would allow transit vehicles to hold green phases for a short duration as they approach an intersection. This change would improve transit travel times and reliability but would have a minimal effect on traffic flow as this hold would not be allowed to happen in consecutive cycles and the green phase with the subsequent cycle would be reduced.
- New bicycle lanes / traffic calming: Based on the preliminary plans for the new bicycle lanes in the study area and the proposed traffic calming on Holloway Avenue and Garfield Avenue, there would be no material changes to the intersection signalization or striping plans that affect the study intersections.
- SFMTA TEP recommendations: The changes proposed under the TEP that would have a material effect on the screenline analysis—in particular, changes to frequency, area served, and vehicle type or formation—were incorporated into the line capacity calculations and project transit assignments. In cases where transit lines were removed from a screenline (mostly on corridors with duplicate service), ridership was shifted to the remaining lines. Although it is likely that the elimination of lines or segments of lines would result in a decrease in ridership, this approach allows for a conservative analysis of transit conditions. In cases where transit lines were added to a screenline, a portion of the ridership on other lines already serving the screenline was shifted to the new route.

Tier 4

As part of Tier 4, numerous changes to the existing roadway network were included, such as modifications to intersection configurations, new streets and access points, new crosswalk locations, and rerouting in transit lines. The following sections outline some of the key methodologies for the analysis of these modifications.

- New left turns and all-red times: The proposed new left turns from northbound Junipero Serra Boulevard to Chumasero Drive (Tier 4A, Tier 4B, and Tier 4C) and from northbound 19th Avenue to Crespi Drive (Tier 4C only), and the 26-second all-red phases at 19th Avenue / Holloway Avenue (Tier 4B and Tier 4C) and at Junipero Serra Boulevard (Tier 4C only) could affect the overall flow of traffic along the corridor, as the traffic signals are coordinated between intersections. To evaluate the effect of these elements, a simulation analysis was conducted (see below) and modifications to the intersection analysis parameters were incorporated to reflect the observed influence on roadway capacity.
- New access points: The assignment of vehicle trips generated by each of the foreseeable development projects assumed that drivers would select the shortest and most direct route, minimizing the number of turns and distance traveled on congested roadways. In

particular, the new access points along Lake Merced Boulevard for the Parkmerced project were assumed to draw traffic that would otherwise use the single access point at Higuera Avenue. The new left turn from northbound Junipero Serra Boulevard into Chumasero Drive was assumed to draw traffic that would otherwise use the Chumasero Drive access at Brotherhood Way. The new left turn from northbound 19th Avenue into Crespi Drive was assumed to draw traffic that would otherwise loop via northbound Junipero Serra Boulevard, westbound Holloway Avenue, southbound 19th Avenue, and westbound Crespi Drive, as well as a portion of the traffic using the new left turn into Chumasero Drive. As such, a portion of the existing and future traffic volumes were reassigned to the new access points based on the attractiveness of each new facility to serve the trip's origin and destination.

- Corner bulbs and sidewalk extensions: At several intersections, new corner bulbs and wider sidewalks were proposed to be implemented to improve pedestrian conditions. These facilities would result in reduced walking distances, and thereby shorter pedestrian walk phases. At each location, a conservative bulb width of four feet was assumed, and the pedestrian walk times (and the corresponding intersection green times) were recalculated and applied to the analyzed signal timing plan.
- Reoriented crosswalks: At the intersection of 19th Avenue / Holloway Avenue and Junipero Serra Boulevard / 19th Avenue, it was proposed to relocate the stop bars farther from the intersection to allow for wider and more direct crosswalks. At these locations, it would take longer for vehicles to travel through the intersection, affecting its operation. To account for these times, the yellow and all-red phases for the affected approaches were increased in the analyzed signal timing plan.
- Transit rerouting: As previously discussed, to be conservative it was assumed that the rerouting and reconfiguration of the transit lines, including the M Ocean View, would not generate additional riders over and above the number already projected for 19th Avenue between Junipero Serra Boulevard and Holloway Avenue. In the scenario where the J Church assumes the portion of the M Ocean View alignment south of Junipero Serra Boulevard (Tier 4B), the ridership formerly on the M Ocean View for this section was shifted onto the J Church, with no loss or other shifts in ridership. In the case where the portion of the M Ocean View south of Junipero Serra Boulevard is served by only half of the trains (Tier 4C), no loss in ridership was assumed.

Synchro / SimTraffic Simulation

The Traffix software, as used for the intersection level of service analysis in this report, has limited ability to account for conditions at upstream and downstream locations. In addition, the traffic signals along 19th Avenue are coordinated, which allows for vehicles to travel through multiple intersections without stopping. To address these limitations, a supplemental assessment was conducted using a simulation model (the Synchro / SimTraffic 7 software). For these evaluations, the intersections of 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, and Junipero Serra Boulevard / 19th Avenue were modeled for Tier 3 and Tier 4 conditions to determine how the various transportation network changes would affect general traffic flow along 19th Avenue. To conduct this work, the Synchro / SimTraffic model was used to optimize the transportation network, as would be done when new or enhanced signals are implemented. Network characteristics such as

signal timing, signal coordination and train priority were modified to accurately assess the interactions and minimize delays for all modes of transportation. Based on the optimized network, a series of adjustment factors was derived and applied to the Traffix analysis.

OTHER TRANSPORTATION PROJECTS DEFINED BUT NOT ANALYZED

During the Tier 4 development process, additional concepts for improvements and modifications to transit service (and their related modifications to the roadway network) were proposed and considered. However, it was the collective determination that these concepts did not provide the same level of benefits and resulted in unacceptable secondary effects to area conditions. Concepts considered included the following:

- Rerouting all service for the M Ocean View into the Parkmerced neighborhood at the southwest corner of 19th Avenue / Holloway Avenue and returning to its current alignment at the west corner of 19th Avenue / Juniper Serra Boulevard: In general, although this configuration would provide enhanced transit access for the Parkmerced neighborhood, it would result in a noticeable degradation in service for the M Ocean View due to its longer and less direct configuration (in comparison to the proposed Tier 4C configuration, which would have half the service terminate inside Parkmerced).
- Rerouting the M Ocean View into the Parkmerced neighborhood at the southwest corner of 19th Avenue / Holloway Avenue with a new terminal inside the site, plus extending the J Church along the former M Ocean View alignment and rerouting it into the Parkmerced neighborhood at the west corner of 19th Avenue / Junipero Serra Boulevard with a new terminal inside the site. Within the Parkmerced neighborhood, the two lines would share one set of tracks with combined service to two stations. In general, this configuration would result in potential operational difficulties between the two lines with the common tracks and shared stations.
- Wider bulb-outs and tighter corner radii: When the proposed street modifications were reviewed for traffic engineering design standards, these facilities were found to result in impacts on vehicular circulation; for instance, trucks would need to cross center lines into the opposing traffic direction to make turns around the wider bulb-outs. The configurations of these facilities were therefore modified until they worked from a design perspective.
- Different configurations for new/realigned streets: For the proposed realignment of Crespi Drive and Chumasero Drive, and for the proposed new access points of Gonzalez Drive, Acevedo Avenue, and Vidal Drive, multiple iterations of the streets were considered, including different number of travel lanes, the provision of turning movements, and the connections to the adjacent streets. These concepts were determined to result in secondary impacts, as compared to those included in the project evaluation.
- Reconfiguration of Junipero Serra Boulevard / Brotherhood Way interchange: Multiple design studies were conducted to determine if substantial modifications to the urban interchange were feasible, including reconfiguration of the on- and off-ramps, increases to the merge/diverge distances, combining on- and off-ramps, and other potential elements. Overall, it was determined that the available right-of-way would be insufficient for a major reconfiguration of the interchange, and the grade differentials between Junipero Serra Boulevard and Brotherhood Way would limit the possibility for modifications to the ramps.

D. FUTURE BASELINE CONDITIONS (TIER 1 AND TIER 2)

This chapter summarizes intersection operations, pedestrian, bicycle, and transit analysis for the Future Baseline Conditions.

INTERSECTION ANALYSIS

For purposes of the intersection analysis, Tier 1 and Tier 2 conditions combined represent the Future Baseline scenario. A comparison between the Future Baseline scenario (Tier 1 and Tier 2) and Existing Conditions was conducted to determine the number of intersections that would operate at an unacceptable level of service (LOS E or F), either due to application of background growth or the increase in traffic volume due to the foreseeable development projects.

A comparison of intersection LOS under Existing Conditions, Tier 1 Cumulative Conditions, and Tier 2 Cumulative Conditions is summarized in **Table III.15** and **Table III.16**. Detailed LOS calculations and figures are provided in **Appendix D**.

As indicated in **Table III.15** and **Table III.16**, overall conditions throughout the study area would substantially worsen as a result of the addition of background growth and the foreseeable development projects associated with Future Baseline (Tier 1 and Tier 2) Conditions. Intersections along major arterials such as 19th Avenue, Sunset Boulevard, and Lake Merced Boulevard would generally operate under unacceptable conditions (LOS E or LOS F), resulting in substantial delays to traffic flows.

Under Tier 1 weekday AM peak hour conditions, the following four intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Existing Conditions:

16. 19th Avenue / Holloway Avenue (LOS D to LOS E);
17. 19th Avenue / Crespi Avenue (LOS D to LOS E);
25. Lake Merced Boulevard / Font Boulevard (LOS D to LOS E); and
27. Lake Merced Boulevard / Brotherhood Way (LOS D to LOS F).

Under Tier 2 weekday AM peak hour conditions, the following two intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

14. 19th Avenue / Winston Drive (LOS D to LOS F); and
24. Lake Merced Boulevard / Winston Drive (LOS C to LOS F).

Table III.15: Intersection Level of Service – Tier 1 and Tier 2 (Weekday Peak Hours)

Intersection		Peak Hour	Existing		Tier 1		Tier 2	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
1	Claremont Blvd./ Dewey Blvd./ Taraval St.[2]	AM	A	6.8	A	6.9	A	7.0
		PM	A	6.7	A	7.2	A	7.4
2	Santa Clara Ave./ Vicente St./ Portola Dr.	AM	C	26.5	C	30.5	D	40.2
		PM	C	29.4	C	31.2	D	39.0
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd.	AM	**E**	**65.2**	**F**	**>80 / 1.09**	**F**	**>80 / 1.09**
		PM	**F**	**>80 / 1.01**	**F**	**>80 / 1.13**	**F**	**>80 / 1.17**
4	Junipero Serra Blvd. / Ocean Ave. / Eucalyptus Dr.	AM	C	31.7	D	41.7	D	46.9
		PM	C	31.8	D	41.0	**E**	**70.2**
5	Junipero Serra Blvd. / Winston Dr.	AM	C	29.1	D	35.7	D	38.3
		PM	C	28.4	C	30.8	D	49.3
6	Junipero Serra Blvd. / Holloway Ave.	AM	C	29.8	C	33.2	D	36.9
		PM	C	28.6	C	30.7	D	37.4
7	Junipero Serra Blvd. / 19th Ave.	AM	**E**	**57.9**	**F**	**>80 / 0.95**	**F**	**>80 / 0.97**
		PM	**F**	**>80 / 1.15**	**F**	**>80 / 1.25**	**F**	**>80 / 1.30**
8	Junipero Serra Blvd. / John Daly Blvd. / NB Ramps	AM	D	39.7	D	40.4	D	40.5
		PM	**E**	**74.0**	**F**	**>80 / 1.31**	**F**	**>80 / 1.40**
9	Junipero Serra Blvd. / John Daly Blvd. / SB Ramps	AM	B	19.8	C	20.5	C	20.4
		PM	C	33.6	D	52.5	**F**	**1.17**
10	19th Ave. / Taraval St.	AM	B	19.7	C	26.9	C	28.9
		PM	B	16.4	B	20.0	C	24.0
11	19th Ave. / Sloat Blvd.	AM	**E**	**58.1**	**F**	**>80 / 1.48**	**F**	**>80 / 1.51**
		PM	**F**	**>80 / 1.54**	**F**	**>80 / 1.56**	**F**	**>80 / 1.63**
12	19th Ave. / Ocean Ave.	AM	C	23.5	D	46.9	D	46.1
		PM	**F**	**>80 / 1.41**	**F**	**>80 / 1.58**	**F**	**>80 / 1.63**
13	19th Ave. / Eucalyptus Dr.	AM	B	14.3	C	22.7	C	23.1
		PM	D	49.9	**E**	**72.7**	**F**	**>80 / 1.18**
14	19th Ave. / Winston Dr.	AM	D	37.9	D	52.9	**F**	**>80 / 1.32**
		PM	**F**	**>80 / 1.29**	**F**	**>80 / 1.34**	**F**	**>80 / 1.70**
15	19th Ave. / Buckingham Wy.[3]	AM	**E**	**47.7**	**F**	**>50 / 0.70**	**F**	**>50 / 0.83**
		PM	**F**	**>50 / 1.31**	**F**	**>50 / 1.81**	**F**	**>50 / 2.20**
16	19th Ave. / Holloway Ave.	AM	D	40.6	**E**	**65.9**	**E**	**59.7**
		PM	**E**	**61.2**	**F**	**>80 / 0.88**	**F**	**>80 / 1.03**
17	19th Ave. / Crespi Dr.	AM	D	37.3	**E**	**58.1**	**E**	**64.8**
		PM	B	19.7	D	53.7	**E**	**69.9**
18	Chumasero Dr. / Brotherhood Wy.	AM	**E**	**77.5**	**F**	**>80 / 0.97**	**F**	**>80 / 1.48**
		PM	**E**	**68.1**	**F**	**>80 / 1.12**	**F**	**>80 / 1.74**
19	Sunset Blvd. / Taraval St.	AM	B	17.7	C	21.8	D	43.0
		PM	C	20.9	D	53.1	**F**	**>80 / 0.96**
20	Sunset Blvd. / Ocean Ave.	AM	B	11.8	B	12.1	B	13.7
		PM	B	12.0	B	13.5	C	30.5

Table III.15 (continued)

Intersection		Peak Hour	Existing		Tier 1		Tier 2	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
21	Skyline Blvd. / Sloat Blvd. / 39th Ave.[4]	AM	B	14.5	C	17.2	C	17.5
		PM	C	21.4	D	27.9	D	29.4
22	Skyline Blvd. / Lk. Merced Blvd. (North)[3]	AM	B	11.9	C	15.2	C	15.1
		PM	B	13.1	C	17.7	C	17.5
	Skyline Blvd. / Lk. Merced Blvd. (South)[3,5]	AM	D	29.3	F	>50 / 0.39	F	>50 / 0.38
		PM	E	42.8	F	>50 / 0.92	F	>50 / 0.90
23	Sunset Blvd. / Lake Merced Blvd.[3]	AM	**F**	**>50 / 0.54**	**F**	**>50 / 0.63**	**F**	**>50 / 1.10**
		PM	D	28.2	**F**	**>50 / 1.37**	**F**	**>50 / 2.49**
24	Lake Merced Blvd. / Winston Dr.	AM	C	21.9	C	29.2	**F**	**>80 / 0.81**
		PM	D	48.2	**F**	**>80 / 0.98**	**F**	**>80 / 1.37**
25	Lake Merced Blvd. / Font Blvd.	AM	D	39.1	**E**	**64.6**	**F**	**>80 / 1.47**
		PM	C	32.8	D	49.7	**F**	**>80 / 1.64**
26	Lake Merced Blvd. / Higuera Ave.	AM	**E**	**66.9**	**F**	**>80 / 0.79**	**F**	**>80 / 1.20**
		PM	**E**	**59.2**	**F**	**>80 / 0.85**	**F**	**>80 / 1.57**
27	Lake Merced Blvd. / Brotherhood Wy.	AM	D	42.7	**F**	**>80 / 2.12**	**F**	**>80 / 2.45**
		PM	C	30.3	**F**	**>80 / 2.46**	**F**	**>80 / 2.86**

Notes:

Bold indicates intersection operating at unacceptable level of service (LOS).

[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and volume-to-capacity (V/C) ratio are presented.

[2] Although intersection is designed as a roundabout, all approaches are controlled by stop signs; as such, it was analyzed as an all-way stop-controlled intersection.

[3] OWSC (one-way stop-controlled) intersection.

[4] AWSC (all-way stop-controlled) intersection.

[5] Though the intersection would operate at an unacceptable LOS, the conditions of the Manual on Uniform Traffic Control Devices (MUTCD) peak hour volume signal warrant would not be met.

Source: AECOM, 2009.

Table III.16: Intersection Level of Service – Tier 1 and Tier 2 (Weekend Peak Hour)

	Intersection	Existing		Tier 1		Tier 2	
		LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
3	Junipero Serra Blvd. / Sloat Blvd. / St. Francis Blvd.	**F**	**>80 / 1.00**	**F**	**>80 / 1.11**	**F**	**>80 / 1.18**
7	Junipero Serra Blvd. / 19th Ave.	**F**	**>80 / 1.64**	**F**	**>80 / 1.78**	**F**	**>80 / 1.86**
11	19th Ave. / Sloat Blvd.	**E**	**56.0**	**F**	**>80 / 1.51**	**F**	**>80 / 1.58**
14	19th Ave. / Winston Dr.	D	42.0	D	40.4	**F**	**>80 / 1.71**
15	19th Ave. / Buckingham Wy.[2]	D	30.2	**E**	**49.2**	**F**	**>50 / 0.95**
16	19th Ave. / Holloway Ave.	B	14.3	C	25.7	D	41.8
27	Lake Merced Blvd. / Brotherhood Wy.	C	25.1	**E**	**59.2**	**F**	**>80 / 2.44**

Notes:
Bold indicates intersection operating at unacceptable level of service (LOS).
AWSC = All-way stop-controlled
OWSC = One way stop-controlled
[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and volume-to-capacity (V/C) ratio are presented.
[2] OWSC (one-way stop-controlled) intersection.

Source: AECOM, 2009.

Under Tier 1 weekday PM peak hour conditions, the following four intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Existing conditions:

13. 19th Avenue / Eucalyptus Drive (LOS D to LOS E);
23. Sunset Boulevard / Lake Merced Boulevard (LOS D to LOS F);
24. Lake Merced Boulevard / Winston Drive (LOS D to LOS F); and
27. Lake Merced Boulevard / Brotherhood Way (LOS C to LOS F).

Under Tier 2 weekday PM peak hour conditions, the following five intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

4. Junipero Serra Boulevard / Ocean Avenue / Eucalyptus Drive (LOS D to LOS E);
9. Junipero Serra Boulevard / John Daly Boulevard / SB Ramps (LOS D to LOS F);
17. 19th Avenue / Crespi Drive (LOS D to LOS E);
19. Sunset Boulevard / Taraval Street (LOS D to LOS F); and
25. Lake Merced Boulevard / Font Boulevard (LOS D to LOS F).

Under Tier 1 weekend midday peak hour conditions, the following two intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F,) when compared to Existing conditions:

15. 19th Avenue / Buckingham Way (LOS D to LOS E); and
27. Lake Merced Boulevard / Brotherhood Way (LOS C to LOS E).

Under Tier 2 weekend midday peak hour conditions, the following intersection would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

14. 19th Avenue / Winston Drive (LOS D to LOS F).

The following seven study intersections would continue to operate at unacceptable conditions (LOS E or F) under both Tier 1 and Tier 2 conditions in the weekday AM peak hour:

3. Junipero Serra Boulevard / Sloat Boulevard / St. Francis Boulevard;
7. Junipero Serra Boulevard / 19th Avenue;
11. 19th Avenue / Sloat Boulevard;
15. 19th Avenue / Buckingham Way;
18. Chumasero Drive / Brotherhood Way;
23. Sunset Boulevard / Lake Merced Boulevard; and
26. Lake Merced Boulevard / Higuera Avenue.

During the weekday PM peak hour, the following 11 study intersections would continue to operate at unacceptable conditions (LOS E or F) under both Tier 1 and Tier 2 conditions:

3. Junipero Serra Boulevard / Sloat Boulevard / St. Francis Boulevard;
7. Junipero Serra Boulevard / 19th Avenue;
8. Junipero Serra Boulevard/John Daly Boulevard/Highway 1 NB Ramps;
11. 19th Avenue / Sloat Boulevard;
12. 19th Avenue / Ocean Avenue;
14. 19th Avenue / Winston Drive;
15. 19th Avenue / Buckingham Way;
16. 19th Avenue / Holloway Avenue;
18. Chumasero Drive/Brotherhood Way; and
26. Lake Merced Boulevard/Higuera Avenue.

During the weekend midday peak hour, the following three study intersections would continue to operate at unacceptable conditions (LOS E or F) under both Tier 1 and Tier 2 conditions:

3. Junipero Serra Boulevard / Sloat Boulevard / St. Francis Boulevard;
7. Junipero Serra Boulevard / 19th Avenue; and
11. 19th Avenue / Sloat Boulevard.

TRANSIT ANALYSIS

Transit Ridership and Capacity Analysis

The 2030 Baseline (Tier 1 and Tier 2) screenlines are summarized in **Table III.17** and **Table III.18**. Detailed screenline calculations are provided in **Appendix G**. The planned Parkmerced shuttle to and from the Daly City BART station was also included in the screenline analysis.

As shown in **Table III.17** and **Table III.18**, the background growth in transit riders associated with Tier 1 would increase overall transit utilization by 4 to 8 percent at the screenlines. In general, the growth in ridership would spread throughout all lines and would not be focused on one route or corridor. Overall, transit service at all screenlines would continue to operate below the SFMTA thresholds; however, the 29 Sunset is projected to operate at greater than 100 percent of capacity at all analysis periods except outbound during the weekday AM peak hour.

With the addition of the transit ridership generated by the foreseeable development projects in Tier 2, overall transit utilization would increase by an additional 8 to 13 percent at the screenlines. Each screenline would continue to operate below the capacity threshold, with the exception of the inbound Northeast screenline during the weekday PM peak hour, which would operate at about 109 percent of capacity. In addition, 3 individual lines would operate over capacity in the weekday AM peak hour and 6 would operate over capacity in the weekday PM peak hour.

In addition, as seen on the ridership projections for each line, the M Ocean View is anticipated to have an increase of about 650 passengers during the weekday AM peak hour and 900 passengers during the weekday PM peak hour. Based on the location of the foreseeable development projects, it is likely that most of these riders would use the SFSU station at 19th Avenue / Holloway Avenue. As noted previously, this station currently has overcrowded conditions during peak times. As such, this anticipated increase in activity at the station could substantially affect pedestrian conditions, worsening the current station and queuing area problems.

It should be noted that the proposed Parkmerced shuttle is projected to operate at or near capacity during the weekday peak hours. Since the shuttle would be privately operated, it would be able to increase or decrease vehicles to meet the service needs, thereby optimizing its capacity utilization.

Table III.17: Muni Screenline Summary – Tier 1 and Tier 2 (Weekday AM Peak Hour)

Screenline		Existing Conditions			Tier 1			Tier 2		
		Rid.	Cap.	Util.	Rid.	Cap.	Util.	Rid.	Cap.	Util.
Outbound										
N	18 46th Avenue	108	216	50%	117	216	54%	150	216	69%
N	28 19th Avenue	292	378	77%	317	378	84%	408	378	108%
N	28L 19th Avenue Limited	110	216	51%	119	216	55%	162	216	75%
N	29 Sunset	214	324	66%	232	324	72%	278	324	86%
N	*Subtotal*	*724*	*1,134*	*64%*	*786*	*1,134*	*69%*	*998*	*1,134*	*88%*
NE	M Ocean View	1,038	1,414	73%	1,118	1,414	79%	1,320	1,414	93%
NE	*Subtotal*	*1,038*	*1,414*	*73%*	*1,118*	*1,414*	*79%*	*1,320*	*1,414*	*93%*
E	M Ocean View	166	1,414	12%	208	1,414	15%	239	1,414	17%
E	29 Sunset	233	324	72%	292	324	90%	318	324	98%
E	*Subtotal*	*399*	*1,738*	*23%*	*499*	*1,738*	*29%*	*557*	*1,738*	*32%*
S	28 19th Avenue	76	378	20%	80	378	21%	136	378	36%
S	28L 19th Avenue Limited	20	270	7%	21	270	8%	45	270	17%
S	*Subtotal*	*96*	*648*	*15%*	*101*	*648*	*16%*	*181*	*648*	*28%*
88 Mission / BART Shuttle		253	378	67%	--	--	--	--	--	--
Parkmerced Shuttle		--	--	--	--	--	--	116	120	97%
TOTAL All Screenlines		**2,510**	**5,312**	**47%**	**2,505**	**4,934**	**51%**	**3,172**	**5,054**	**63%**
Inbound										
N	18 46th Avenue	76	216	35%	85	216	39%	119	216	55%
N	28 19th Avenue	290	486	60%	323	486	67%	406	486	83%
N	28L 19th Avenue Limited	104	270	39%	116	270	43%	156	270	58%
N	29 Sunset	195	216	90%	218	216	101%	264	216	122%
N	*Subtotal*	*665*	*1,188*	*56%*	*742*	*1,188*	*62%*	*945*	*1,188*	*80%*
NE	M Ocean View	363	1,414	26%	472	1,414	33%	581	1,414	41%
NE	*Subtotal*	*363*	*1,414*	*26%*	*472*	*1,414*	*33%*	*581*	*1,414*	*41%*

able III.17 (continued)

	Screenline	Existing Conditions			Tier 1			Tier 2		
		Rid.	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**
	M Ocean View	229	1,414	16%	283	1,414	20%	312	1,414	22%
E	29 Sunset	321	324	99%	397	324	122%	425	324	131%
	Subtotal	*550*	*1,738*	*32%*	*680*	*1,738*	*39%*	*737*	*1,738*	*42%*
	28 19th Avenue	271	378	72%	285	378	75%	326	378	86%
S	28L 19th Avenue Limited	150	270	56%	158	270	58%	180	270	67%
	Subtotal	*421*	*648*	*65%*	*442*	*648*	*68%*	*506*	*648*	*78%*
	Parkmerced Shuttle	--	--	--	--	--	--	37	120	31%
	TOTAL All Screenlines	**1,999**	**4,988**	**40%**	**2,336**	**4,988**	**47%**	**2,807**	**5,108**	**55%**

Notes: Rid= Ridership (number of riders); Cap= Capacity (number of riders; Util= Utilization (percent of capacity used))
Shading indicates unacceptable conditions (at or exceedance of 100% capacity utilization).

Source: Muni, 2008; AECOM, 2009.

Table III.18: Muni Screenline Summary – Tier 1 and Tier 2 (Weekday PM Peak Hour)

Screenline		Existing Conditions			Tier 1			Tier 2		
		Rid.	Cap.	Util.	Rid.	Cap.	Util.	Rid.	Cap.	Util.
Outbound										
N	18 46th Avenue	97	216	45%	116	216	54%	150	216	70%
N	28 19th Avenue	264	378	70%	315	378	83%	410	378	109%
N	28L 19th Avenue Limited	150	324	46%	179	324	55%	226	324	70%
N	29 Sunset	187	216	87%	223	216	103%	271	216	125%
N	*Subtotal*	*698*	*1,134*	*62%*	*833*	*1,134*	*73%*	*1,057*	*1,134*	*93%*
NE	M Ocean View	796	1,212	66%	958	1,212	79%	1,145	1,212	94%
NE	*Subtotal*	*796*	*1,212*	*66%*	*958*	*1,212*	*79%*	*1,145*	*1,212*	*94%*
E	M Ocean View	509	1,414	36%	564	1,414	40%	595	1,414	42%
E	29 Sunset	263	270	97%	291	270	108%	325	270	120%
E	*Subtotal*	*772*	*1,684*	*46%*	*855*	*1,684*	*51%*	*919*	*1,684*	*55%*
S	28 19th Avenue	184	324	57%	193	324	60%	235	324	73%
S	28L 19th Avenue Limited	89	270	33%	93	270	35%	112	270	42%
S	*Subtotal*	*273*	*594*	*46%*	*287*	*594*	*48%*	*348*	*594*	*59%*
Parkmerced Shuttle		--	--	--	--	--	--	115	180	64%
TOTAL All Screenlines		**2,539**	**4,624**	**55%**	**2,932**	**4,624**	**63%**	**3,584**	**4,804**	**75%**
Inbound										
N	18 46th Avenue	114	216	53%	120	216	55%	153	216	71%
N	28 19th Avenue	290	432	67%	305	432	70%	407	432	94%
N	28L 19th Avenue Limited	105	270	39%	110	270	41%	159	270	59%
N	29 Sunset	272	270	101%	286	270	106%	331	270	123%
N	*Subtotal*	*781*	*1,188*	*66%*	*820*	*1,188*	*69%*	*1,051*	*1,188*	*88%*
NE	M Ocean View	1,194	1,414	84%	1,293	1,414	91%	1,547	1,414	109%
NE	*Subtotal*	*1,194*	*1,414*	*84%*	*1,293*	*1,414*	*91%*	*1,547*	*1,414*	*109%*

Table III.18 (continued)

Screenline		Existing Conditions			Tier 1			Tier 2		
		Rid.	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**
	M Ocean View	242	1,212	20%	328	1,212	27%	359	1,212	30%
E	29 Sunset	284	378	75%	385	378	102%	418	378	111%
	Subtotal	*526*	*1,590*	*33%*	*714*	*1,590*	*45%*	*777*	*1,590*	*49%*
	28 19th Avenue	131	378	35%	138	378	36%	180	378	48%
S	28L 19th Avenue Limited	63	324	19%	66	324	20%	90	324	28%
	Subtotal	*194*	*702*	*28%*	*204*	*702*	*29%*	*270*	*702*	*38%*
88 Mission / BART Shuttle		144	324	44%	--	--	--	--	--	--
Parkmerced Shuttle		--	--	--	--	--	--	178	180	99%
TOTAL All Screenlines		**2,839**	**5,218**	**54%**	**3,030**	**4,894**	**62%**	**3,823**	**5,074**	**75%**

Notes: Rid= Ridership (number of riders); Cap= Capacity (number of riders; Util= Utilization (percent of capacity used))
Shading indicates unacceptable conditions (at or exceedance of 100% capacity utilization).

Source: Muni, 2008; AECOM, 2009.

Operations Analysis

In addition to the assessment of transit ridership and capacity conditions in the screenlines analysis, the effect of roadway congestion on the on-time performance of transit services within the study area was also evaluated. This assessment was conducted for the three main bus routes– 28 19th Avenue, 28L 19th Avenue Limited and 29 Sunset–which are expected to see the most substantial increases in delay as a result of traffic congestion, as they all travel in mixed-flow lanes along 19th Avenue through the center of the study area. In addition, an evaluation of conditions for the M Ocean View light rail line was also conducted.

The following segments of each route were selected for analysis:

- 28 19th Avenue / 28L 19th Avenue Limited: between Junipero Serra Boulevard / Font Boulevard and 19th Avenue / Sloat Boulevard;
- 29 Sunset: between 19th Avenue / Crespi (or 19th Avenue / Holloway Avenue) and 19th Avenue / Winston Drive; and
- M Ocean View: between Rossmoor Drive and Junipero Serra Avenue.

Other bus routes, such as the 17 Parkmerced and 18 46th Avenue, are not expected to be substantially affected by future congestion levels on 19th Avenue (the 17 Parkmerced would be rerouted off 19th Avenue under the TEP and the 18 46th Avenue does not travel on 19th Avenue).

For the four selected lines, the average delays for each movement along the route (as calculated from the intersection LOS analysis) were summed to obtain the total route delay for each route, which was then compared across scenarios to determine the effect of increased traffic levels and the various proposed geometric changes on transit delay. For instance, to determine the route delay for the 29 Sunset bus line in the northbound direction within the analysis segment, the average vehicular delays at the westbound right-turn movement at 19th Avenue / Holloway Avenue and the northbound left-turn movement at 19th Avenue / Winston Drive were added.

Tier 1 and Tier 2 increases in transit travel time due to roadway congestion are summarized in **Table III.19**. These represented the projected increase in run times at the study intersections, as compared to Existing Conditions. Detailed travel time calculations and assumptions are provided in **Appendix H**.

As shown in **Table III.19**, transit travel time would increase by up to 5 minutes as a result of increased intersection delay due to the background growth included in Tier 1. Generally, the additional traffic congestion due to the foreseeable development projects in Tier 2 would result in 1- to 2-minute increases over the Tier 1 background growth.

Table III.19: Muni Travel Time Increases – Tier 1 and Tier 2

Route	Peak Hour	Transit Travel Time Increases (m:ss)	
		Tier 1	Tier 2
28 19th Avenue/ 28L 19th Avenue Limited			
NB	AM	2:20	3:00
	PM	5:10	7:00
SB	AM	3:50	3:50
	PM	5:00	6:40
29 Sunset			
NB	AM	0:00	0:10
	PM	0:00	1:50
SB	AM	0:50	-0:20
	PM	3:10	2:20
M Ocean View			
NB	AM	0:20	0:50
	PM	0:30	2:20
SB	AM	0:40	0:40
	PM	0:20	1:20

Notes:
All increases relative to existing travel time.
m:ss = minutes and seconds.
Source: AECOM, 2009.

Buses on the 28 19th Avenue and 28L 19th Avenue Limited lines would see relatively large increases in transit travel time due to anticipated roadway congestion at the intersections of 19th Avenue / Sloat Boulevard, 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, and Junipero Serra Boulevard / 19th Avenue. Congestion on 19th Avenue and the resulting increase in travel times could result in effects to the performance of these bus lines, particularly in terms of service reliability and schedule adherence.

Buses on the 29 Sunset route would see increases in travel time in the northbound direction due to roadway congestion at the intersections of 19th Avenue / Holloway Avenue and 19th Avenue / Winston Drive. In the southbound direction, the 29 Sunset currently travels south through the 19th Avenue / Holloway Avenue intersection, turns right onto Crespi Drive, travels around a traffic circle, turns left back onto northbound 19th Avenue, and then turns right onto Holloway Avenue. With the elimination of the Crespi Drive loop as part of the Parkmerced Project, the 29 Sunset would be rerouted. While the new route has not yet been finalized, it was assumed that southbound buses would instead turn right at Holloway Avenue, turn left on Cardenas Avenue, turn right to eastbound Holloway Avenue from Varela Avenue, and then pass eastbound through the 19th Avenue / Holloway Avenue intersection. Overall, however, this reroute is not expected to substantially change bus travel times. Although the proposed rerouting is slightly longer in distance, congestion at the key intersection movements (southbound right turn and westbound through at 19th Avenue / Holloway Avenue) would be less than at the key intersection movements with the current route (southbound through and northbound right turn at 19th Avenue / Holloway

Avenue, and eastbound left turn at 19th Avenue / Crespi Drive), thereby resulting in no increases to travel times.

Light rail vehicles on the M Ocean View would see increases in travel time in both directions under both Tier 1 and Tier 2 conditions. The foreseeable development projects would have only marginal effects on travel time in the southbound direction but would have more pronounced effects on travel time in the northbound direction, primarily as a result of delays associated with the train interaction with the northbound left-turn movement at 19th Avenue / Winston Drive and the crossing of 19th Avenue at Rossmoor Drive.

In general, transit service is affected by traffic controls, traffic congestion, and other operational characteristics (such as track design, location of switches and crossovers, and others), all of which can lead to delays in service. Some of these delays are relatively predictable, such as the need for a train to stop and the train operator to visually inspect a switch to ensure proper alignment. Other delays are unpredictable, such as increased travel time due to traffic congestion or signal delay (which can vary depending on when a transit vehicle arrives in the signal cycle). Whether delays are predictable or unpredictable, they result in longer transit travel times, expanding the uncertainty of travel times and introducing additional variability and reducing service reliability. In addition, longer travel times also increase the operating costs of a route, thereby reducing the quality of service for customers.

PARKING ANALYSIS

The projected growth in the region as part of Tier 1, in addition to the eight foreseeable development projects included in Tier 2, would result in new parking demands for study area uses.

At this point, the parking supply of the smaller development projects, such as 445 Wawona Street (the Arden Wood site), 77-111 Cambon Drive, 800 Brotherhood Way, and 700 Font Boulevard, is unknown. However, it is likely that they would provide off-street parking to meet their requirements per the San Francisco *Planning Code* (such as one space for each residential unit). However, they would still result in minor parking shortfalls and cars would consequently have to park in the surrounding neighborhoods. Since on-street parking is generally available throughout the study area, overall parking conditions would not noticeably worsen.

However, there would be the potential for a substantial parking shortfall in the vicinity of the proposed Stonestown, SFSU, and Parkmerced projects, as follows:

- The current Stonestown shopping center provides significant off-street parking facilities that can accommodate employee and visitor parking demand on most days; however, during the peak holiday seasons, parking can be at or near capacity conditions. The proposed development plan, in addition to increasing the amount of retail and restaurant space, may affect the overall parking ratio. As part of any future environmental review

for this project, a detailed parking supply and occupancy analysis would be conducted for normal and peak days, and means to accommodate any unmet parking demand would be established.

- At SFSU, improvements to the campus in accordance with the Campus Master Plan will result in additional parking demand. The campus currently contains about 3,200 parking spaces and experiences occupancy levels of 90 percent for student parking lots and 70 percent for staff parking lots. It should be noted, however, that intercept surveying conducted as part of the Campus Master Plan determined that only 26 percent of respondents parked on campus. Thus, although there appears to be capacity remaining in campus parking lots, it is likely that additional parking demand would spill into the nearby neighborhoods, where available parking is already nearly fully occupied during the day.
- The proposed Parkmerced Project is anticipated to continue to provide one parking space for each residential unit, plus limited parking for the planned commercial space. To help address the likely parking shortfall (as the San Francisco Planning Department estimates that residential units have a parking demand for between 1.1 and 1.5 spaces per unit), the project is proposing to implement a parking management program. As part of the ongoing environmental review process, a detailed parking supply, demand and code requirement analysis will be conducted, and strategies to minimize the effect of unmet parking demand will be developed. However, any demand that cannot be met on site would likely spill over to the residential neighborhood on the east side of 19th Avenue, which also accommodates parking from SFSU students. Combined, this area would likely encounter overflow parking conditions during peak times and overnight.

PEDESTRIAN AND BICYCLE ANALYSIS

With the addition of the background growth in Tier 1 and the eight foreseeable development projects in Tier 2, bicycle and pedestrian activity would increase throughout the study area. The majority of this increase would likely occur along 19th Avenue, with people walking to Parkmerced, SFSU, and Stonestown, or would occur within the project sites.. At other locations through the study area, such as near the proposed Arden Wood site, increases in pedestrian and bicycle activity would be relatively minor due to the size and type of the future developments.

As discussed in Section III.B, there are adequate pedestrian facilities throughout the study area, including sidewalks on all streets, sidewalks at most intersections, and pedestrian signals at signalized intersections. In general, these facilities would be sufficient to accommodate the additional pedestrian activity that would occur in the future.

However, there would likely be issues at the primarily pedestrian access points to the Stonestown, SFSU, and Parkmerced sites, based on the amount of pedestrian activity they are anticipated to generate. (This pedestrian activity would include people walking as their primary mode, plus people walking to and from transit and their parked vehicles.)

Currently, pedestrian conditions at the 19th Avenue / Winston Drive and 19th Avenue / Holloway Avenue intersections are restricted, due to the heavy volume of passengers boarding and alighting

the M Ocean View light rail stations at these two locations. For instance, at the entrance to the SFSU Station at the north side of the 19th Avenue / Holloway Avenue intersection, passengers exiting the train typically overflow the waiting area and spill into the adjacent train right-of-way. Pedestrians and new transit riders generated by these three foreseeable development projects would likely overload these pedestrian facilities during peak activity times, exacerbating these conditions. As a result, detailed evaluations of pedestrian crosswalk level of service conditions and pedestrian wait area level of service conditions should be conducted at these two intersections to identify potential impacts due to these projects and to identify appropriate mitigation measures.

Also as discussed in Section III.B, there is relatively low bicycle ridership throughout the study area, primarily concentrated on streets that have existing bicycle facilities and near major destinations (such as the Ocean Avenue commercial area near Junipero Serra Boulevard). As such, it is anticipated that any increase in bicycle activity generated by the background growth and the Tier 2 foreseeable development projects could be accommodated without substantially affecting bicycle conditions.

In addition, it should be noted that there are currently limited pedestrian connections to the Parkmerced neighborhood: at 19th Avenue / Holloway Avenue on the east side, at Lake Merced Boulevard / Higuera Avenue on the west side, and via a pedestrian overcrossing at Brotherhood Way / Chumasero Drive on the south side (although multiple connections are available on the north side at Holloway Avenue). Since the Parkmerced Project would include about 300,000 square feet of neighborhood-serving retail and office space, there would be an increased demand for pedestrian and bicycle access into the Parkmerced neighborhood. The lack of connections to the Parkmerced neighborhood would therefore focus all pedestrians and bicyclists to a few locations, likely resulting in worsening of conditions or minimizing the attractiveness of the new land use program.

E. FUTURE PLUS PROJECTS CONDITIONS (TIER 3 AND TIER 4)

This chapter summarizes the results of intersection, pedestrian, bicycle, and transit analysis under the future plus projects conditions. For this evaluation, the projects consist of those proposed by public agencies (Tier 3) and those proposed as part of the private development projects (Tier 4A, Tier 4B, and Tier 4C).

INTERSECTION ANALYSIS

Future Baseline plus Public Improvements (Tier 3)

Future Baseline plus Public Improvements Conditions (Tier 3) would be similar to those developed under the Future Baseline Conditions, with the exception of signal modifications along 19th Avenue and implementation of the traffic calming proposals and new bicycle lanes. A comparison of intersection LOS under Future Baseline (Tier 1 and Tier 2), and Future Baseline plus Public Improvements (Tier 3) conditions is summarized in **Table III.20** and **Table III.21**. Detailed LOS calculations and figures are provided in **Appendix D**. Overall, the intersection LOS and delay conditions under Tier 3 would be the same as with Tier 2, as the proposed Tier 3 transportation projects would not affect the configuration and geometry of the study intersections.

As presented in **Table III.20** and **Table III.21**, under Tier 3 weekday AM, weekday PM, and weekend peak hour conditions, no study intersections would improve from unacceptable LOS (LOS E or F) to acceptable LOS (LOS D or better) from Tier 1.

Under Tier 3 weekday AM peak hour conditions, the following intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

14. 19th Avenue / Winston Drive; and
24. Lake Merced Boulevard / Winston Drive.

Under Tier 3 weekday PM peak hour conditions, the following intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

4. Junipero Serra Boulevard / Ocean Avenue / Eucalyptus Drive;
9. Junipero Serra Boulevard / John Daly Boulevard / SB Ramps;
17. 19th Avenue/Crespi Street;
19. Sunset Boulevard / Taraval Street; and
25. Lake Merced Boulevard / Font Boulevard.

Table III.20: Intersection Level of Service – Tier 3 (Weekday Peak Hours)

	Intersection	Peak Hour	Tier 1		Tier 2		Tier 3	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
1	Claremont Blvd./ Dewey Blvd./ Taraval St.[2]	AM	A	6.9	A	7.0	A	7.0
		PM	A	7.2	A	7.4	A	7.4
2	Santa Clara Ave./ Vicente St./ Portola Dr.	AM	C	30.5	D	40.2	D	40.2
		PM	C	31.2	D	39.0	D	39.0
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd.	AM	**F**	**>80 / 1.09**	**F**	**>80 / 1.09**	**F**	**>80 / 1.09**
		PM	**F**	**>80 / 1.13**	**F**	**>80 / 1.17**	**F**	**>80 / 1.17**
4	Junipero Serra Blvd. / Ocean Ave. / Eucalyptus Dr.	AM	D	41.7	D	46.9	D	46.9
		PM	D	41.0	**E**	**70.2**	**E**	**70.2**
5	Junipero Serra Blvd. / Winston Dr.	AM	D	35.7	D	38.3	D	38.3
		PM	C	30.8	D	49.3	D	49.3
6	Junipero Serra Blvd. / Holloway Ave.	AM	C	33.2	D	36.9	D	36.9
		PM	C	30.7	D	37.4	D	37.4
7	Junipero Serra Blvd. / 19th Ave.	AM	**F**	**>80 / 0.95**	**F**	**>80 / 0.97**	**F**	**>80 / 0.97**
		PM	**F**	**>80 / 1.25**	**F**	**>80 / 1.30**	**F**	**>80 / 1.30**
8	Junipero Serra Blvd. / John Daly Blvd. / NB Ramps	AM	D	40.4	D	40.5	D	40.5
		PM	**F**	**>80 / 1.31**	**F**	**>80 / 1.40**	**F**	**>80 / 1.40**
9	Junipero Serra Blvd. / John Daly Blvd. / SB Ramps	AM	C	20.5	C	20.4	D	20.4
		PM	D	52.5	**F**	**>80 / 1.17**	**F**	**>80 / 1.17**
10	19th Ave. / Taraval St.	AM	C	26.9	C	28.9	C	28.9
		PM	B	20.0	C	24.0	C	24.0
11	19th Ave. / Sloat Blvd.	AM	**F**	**>80 / 1.48**	**F**	**>80 / 1.51**	**F**	**>80 / 1.51**
		PM	**F**	**>80 / 1.56**	**F**	**>80 / 1.63**	**F**	**>80 / 1.63**
12	19th Ave. / Ocean Ave.	AM	D	46.9	D	46.1	D	46.1
		PM	**F**	**>80 / 1.58**	**F**	**>80 / 1.63**	**F**	**>80 / 1.63**
13	19th Ave. / Eucalyptus Dr.	AM	C	22.7	C	23.1	C	23.1
		PM	**E**	**72.7**	**F**	**>80 / 1.18**	**F**	**>80 / 1.18**
14	19th Ave. / Winston Dr.	AM	D	52.9	**F**	**>80 / 1.32**	**F**	**>80 / 1.32**
		PM	**F**	**>80 / 1.34**	**F**	**>80 / 1.70**	**F**	**>80 / 1.70**
15	19th Ave. / Buckingham Wy.[3]	AM	**F**	**>50 / 0.70**	**F**	**>50 / 0.83**	**F**	**>50 / 0.83**
		PM	**F**	**>50 / 1.81**	**F**	**>50 / 2.20**	**F**	**>50 / 2.20**
16	19th Ave. / Holloway Ave.	AM	**E**	**65.9**	**E**	**59.7**	**E**	**59.7**
		PM	**F**	**>80 / 0.88**	**F**	**>80 / 1.03**	**F**	**>80 / 1.03**
17	19th Ave. / Crespi Dr.	AM	**E**	**58.1**	**E**	**64.8**	**E**	**64.7**
		PM	D	53.7	**E**	**69.9**	**E**	**69.9**
18	Chumasero Dr. / Brotherhood Wy.	AM	**F**	**>80 / 0.97**	**F**	**>80 / 1.48**	**F**	**>80 / 1.48**
		PM	**F**	**>80 / 1.12**	**F**	**>80 / 1.74**	**F**	**>80 / 1.74**
19	Sunset Blvd. / Taraval St.	AM	C	21.8	D	43.0	D	43.0
		PM	D	53.1	**F**	**>80 / 0.96**	**F**	**>80 / 0.96**

Table III.20 (continued)

	Intersection	Peak Hour	Tier 1		Tier 2		Tier 3	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
20	Sunset Blvd. / Ocean Ave.	AM	B	12.1	B	13.7	B	13.7
		PM	B	13.5	C	30.5	C	30.5
21	Skyline Blvd. / Sloat Blvd. / 39th Ave.[4]	AM	C	17.2	C	17.5	C	17.5
		PM	D	27.9	D	29.4	D	29.4
22	Skyline Blvd. / Lk. Merced Blvd. (North)[3]	AM	C	15.2	C	15.1	C	15.1
		PM	C	17.7	C	17.5	C	17.5
	Skyline Blvd. / Lk. Merced Blvd. (South)[3,5]	AM	F	>50 / 0.39	F	>50 / 0.38	F	>50 / 0.38
		PM	F	>50 / 0.92	F	>50 / 0.90	F	>50 / 0.90
23	Sunset Blvd. / Lake Merced Blvd.[3]	AM	**F**	**>50 / 0.63**	**F**	**>50 / 1.10**	**F**	**>50 / 1.10**
		PM	**F**	**>50 / 1.37**	**F**	**>50 / 2.49**	**F**	**>50 / 2.49**
24	Lake Merced Blvd. / Winston Dr.	AM	C	29.2	**F**	**>80 / 0.81**	**F**	**>80 / 0.81**
		PM	**F**	**>80 / 0.98**	**F**	**>80 / 1.37**	**F**	**>80 / 1.37**
25	Lake Merced Blvd. / Font Blvd.	AM	**E**	**64.6**	**F**	**>80 / 1.47**	**F**	**>80 / 1.47**
		PM	D	49.7	**F**	**>80 / 1.64**	**F**	**>80 / 1.64**
26	Lake Merced Blvd. / Higuera Ave.	AM	**F**	**>80 / 0.79**	**F**	**>80 / 1.20**	**F**	**>80 / 1.20**
		PM	**F**	**>80 / 0.85**	**F**	**>80 / 1.57**	**F**	**>80 / 1.57**
27	Lake Merced Blvd. / Brotherhood Wy.	AM	**F**	**>80 / 2.12**	**F**	**>80 / 2.45**	**F**	**>80 / 2.25**
		PM	**F**	**>80 / 2.46**	**F**	**>80 / 2.86**	**F**	**>80 / 2.86**

Notes:

Bold indicates intersection operating at unacceptable level of service (LOS).

[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and volume-to-capacity (V/C) ratio are presented.

[2] Although intersection is designed as a roundabout, all approaches are controlled by stop signs; as such, it was analyzed as an all-way stop-controlled intersection.

[3] OWSC (one-way stop-controlled) intersection.

[4] AWSC (all-way stop-controlled) intersection.

[5] Though the intersection would operate at an unacceptable LOS, the conditions of the Manual on Uniform Traffic Control Devices (MUTCD) peak hour volume signal warrant would not be met.

Source: AECOM, 2009.

Table III.21: Intersection Level of Service – Tier 3 (Weekend Peak Hour)

	Intersection	Tier 1		Tier 2		Tier 3	
		LOS	**Delay or V/C[1]**	**LOS**	**Delay or V/C[1]**	**LOS**	**Delay or V/C[1]**
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd.	**F**	**>80 / 1.11**	**F**	**>80 / 1.18**	**F**	**>80 / 1.18**
7	Junipero Serra Blvd. / 19th Ave.	**F**	**>80 / 1.78**	**F**	**>80 / 1.86**	**F**	**>80 / 1.86**
11	19th Ave. / Sloat Blvd.	**F**	**>80 / 1.51**	**F**	**>80 / 1.58**	**F**	**>80 / 1.58**
14	19th Ave. / Winston Dr.	D	40.4	**F**	**>80 / 1.71**	**F**	**>80 / 1.71**
15	19th Ave. / Buckingham Wy.[2]	**E**	**49.2**	**F**	**>50 / 0.95**	**F**	**>50 / 0.95**
16	19th Ave. / Holloway Ave.	C	25.7	D	41.8	D	41.8
27	Lake Merced Blvd. / Brotherhood Wy.	**E**	**59.2**	**F**	**>80 / 2.44**	**F**	**>80 / 2.44**

Notes:
Bold indicates intersection operating at unacceptable level of service (LOS).
[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and volume-to-capacity (V/C) ratio are presented.
[2] OWSC (one-way stop-controlled) intersection.

Source: AECOM, 2009.

Under Tier 3 weekend peak hour conditions, the following intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F, or from LOS E to LOS F) when compared to Tier 1 conditions:

14. 19th Avenue / Winston Drive.

As presented in **Table III.20** and **Table III.21**, under Tier 3 weekday AM, weekday PM, and weekend peak hour conditions, no study intersections would improve from unacceptable LOS (LOS E or F) to acceptable LOS (LOS D or better) from Tier 2. Similarly, under Tier 3 weekday AM, weekday PM, and weekend peak hour conditions, no study intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 2 conditions. The addition of the Tier 3 public projects to the Tier 2 conditions would not affect the analysis of the study intersections, and all intersections would operate with the same LOS and average delay per vehicle.

Future Baseline plus Public and Private Improvements (Tier 4A)

Tier 4A conditions include all the assumptions in Tier 3 with the addition of the following project-related features (see pages III.43 through III.48):

- Pedestrian improvements to 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, and Junipero Serra Boulevard / 19th Avenue intersections;
- Increased capacity to Junipero Serra Boulevard / 19th Avenue intersection (third northbound Junipero Serra left-turn lane added and northbound 19th Avenue left-turn movement eliminated);
- New northbound left turn from Junipero Serra Boulevard to Chumasero Drive;
- Revised Chumasero Drive / Brotherhood Way intersection;
- Reconfigured Lake Merced Boulevard / Brotherhood Way intersection; and
- Three new access points on Lake Merced Boulevard (Vidal Drive, Acevedo Avenue, and Gonzalez Drive).

A comparison of Tier 1, Tier 2, and Tier 4A conditions is presented in **Table III.22** and **Table III.23**. Detailed LOS calculations and figures are provided in **Appendix D**.

As shown in **Tables III.22** and **Table III.23**, under Tier 4A weekday AM peak hour conditions, the following two intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 1 conditions:

18. Chumasero Drive / Brotherhood Way: Conversion of this intersection into a split-T intersection with Brotherhood Way / Thomas More Way would improve operating conditions from LOS F to LOS B, as conflicting traffic movements would be reduced and the protected westbound left turn would be eliminated.
26. Lake Merced Boulevard / Higuera Avenue: The LOS would improve at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes between four intersections instead of one.

Under Tier 4A weekday AM peak hour conditions, the following two intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

14. 19th Avenue / Winston Drive: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.
24. Lake Merced Boulevard / Winston Drive: The LOS would worsen from LOS C to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

Table III.22: Intersection Level of Service – Tier 4A (Weekday Peak Hours)

Intersection		Peak Hour	Tier 1		Tier 2		Tier 4A	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
1	Claremont Blvd./ Dewey Blvd./ Taraval St.[2]	AM	A	6.9	A	7.0	A	7.0
		PM	A	7.2	A	7.4	A	7.4
2	Santa Clara Ave./ Vicente St./ Portola Dr.	AM	C	30.5	D	40.2	D	40.2
		PM	C	31.2	D	39.0	D	39.0
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd.	AM	**F**	**>80 / 1.09**	**F**	**>80 / 1.09**	**F**	**>80 / 1.09**
		PM	**F**	**>80 / 1.13**	**F**	**>80 / 1.17**	**F**	**>80 / 1.17**
4	Junipero Serra Blvd. / Ocean Ave. / Eucalyptus Dr.	AM	D	41.7	D	46.9	D	46.9
		PM	D	41.0	**E**	**70.2**	**E**	**70.2**
5	Junipero Serra Blvd. / Winston Dr.	AM	D	35.7	D	38.3	D	38.3
		PM	C	30.8	D	49.3	D	49.3
6	Junipero Serra Blvd. / Holloway Ave.	AM	C	33.2	D	36.9	D	36.9
		PM	C	30.7	D	37.4	D	37.4
7	Junipero Serra Blvd. / 19th Ave.	AM	**F**	**>80 / 0.95**	**F**	**>80 / 0.97**	**E**	**68.6**
		PM	**F**	**>80 / 1.25**	**F**	**>80 / 1.30**	**F**	**>80 / 1.08**
7a	Junipero Serra Blvd / Chumasero Dr.	AM	----	----	----	----	B	19.4
		PM	----	----	----	----	C	32.0
8	Junipero Serra Blvd. / John Daly Blvd. / NB Ramps	AM	D	40.4	D	40.5	D	40.5
		PM	**F**	**>80 / 1.31**	**F**	**>80 / 1.40**	**F**	**>80 / 1.40**
9	Junipero Serra Blvd. / John Daly Blvd. / SB Ramps	AM	C	20.5	C	20.4	C	20.4
		PM	D	52.5	**F**	**>80 / 1.17**	**F**	**>80 / 1.17**
10	19th Ave. / Taraval St.	AM	C	26.9	C	28.9	C	28.9
		PM	B	20.0	C	24.0	C	24.0
11	19th Ave. / Sloat Blvd.	AM	**F**	**>80 / 1.48**	**F**	**>80 / 1.51**	**F**	**>80 / 1.51**
		PM	**F**	**>80 / 1.56**	**F**	**>80 / 1.63**	**F**	**>80 / 1.63**
12	19th Ave. / Ocean Ave.	AM	D	46.9	D	46.1	D	46.1
		PM	**F**	**>80 / 1.58**	**F**	**>80 / 1.63**	**F**	**>80 / 1.63**
13	19th Ave. / Eucalyptus Dr.	AM	C	22.7	C	23.1	C	23.1
		PM	**E**	**72.7**	**F**	**>80 / 1.18**	**F**	**>80 / 1.18**
14	19th Ave. / Winston Dr.	AM	D	52.9	**F**	**>80 / 1.32**	**F**	**>80 / 1.32**
		PM	**F**	**>80 / 1.34**	**F**	**>80 / 1.70**	**F**	**>80 / 1.70**
15	19th Ave. / Buckingham Wy.[3]	AM	**F**	**>50 / 0.70**	**F**	**>50 / 0.83**	**F**	**>50 / 0.83**
		PM	**F**	**>50 / 1.81**	**F**	**>50 / 2.20**	**F**	**>50 / 2.20**
16	19th Ave. / Holloway Ave.	AM	**E**	**65.9**	**E**	**59.7**	**E**	**59.7**
		PM	**F**	**>80 / 0.88**	**F**	**>80 / 1.03**	**F**	**>80 / 1.03**
17	19th Ave. / Crespi Dr.	AM	**E**	**58.1**	**E**	**64.8**	**E**	**75.7**
		PM	D	53.7	**E**	**69.9**	**E**	**74.7**
18	Chumasero Dr. / Brotherhood Wy.	AM	**F**	**>80 / 0.97**	**F**	**>80 / 1.48**	B	19.7
		PM	**F**	**>80 / 1.12**	**F**	**>80 / 1.74**	**F**	**>80 / 0.93**
18a	Thomas More Wy. / Brotherhood Wy.	AM	----	----	----	----	C	23.0
		PM	----	----	----	----	C	21.9

Table III.22 (continued)

	Intersection	Peak Hour	Tier 1		Tier 2		Tier 4A	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
19	Sunset Blvd. / Taraval St.	AM	C	21.8	D	43.0	D	43.0
		PM	D	53.1	**F**	**>80 / 0.96**	**F**	**>80 / 0.96**
20	Sunset Blvd. / Ocean Ave.	AM	B	12.1	B	13.7	B	13.7
		PM	B	13.5	C	30.5	C	30.5
21	Skyline Blvd. / Sloat Blvd. / 39th Ave.[4]	AM	C	17.2	C	17.5	C	17.5
		PM	D	27.9	D	29.4	D	29.4
22	Skyline Blvd. / Lk. Merced Blvd. (North)[3]	AM	C	15.2	C	15.1	C	15.1
		PM	C	17.7	C	17.5	C	17.5
	Skyline Blvd. / Lk. Merced Blvd. (South)[3,5]	AM	F	>50 / 0.39	F	>50 / 0.38	F	>50 / 0.38
		PM	F	>50 / 0.92	F	>50 / 0.90	F	>50 / 0.90
23	Sunset Blvd. / Lake Merced Blvd.[3]	AM	**F**	**>50 / 0.63**	**F**	**>50 / 1.10**	**F**	**>50 / 1.10**
		PM	**F**	**>50 / 1.37**	**F**	**>50 / 2.49**	**F**	**>50 / 2.49**
24	Lake Merced Blvd. / Winston Dr.	AM	C	29.2	**F**	**>80 / 0.81**	**F**	**>80 / 0.81**
		PM	**F**	**>80 / 0.98**	**F**	**>80 / 1.37**	**F**	**>80 / 1.37**
25	Lake Merced Blvd. / Font Blvd.	AM	**E**	**64.6**	**F**	**>80 / 1.47**	**F**	**>80 / 1.40**
		PM	D	49.7	**F**	**>80 / 1.64**	**F**	**>80 / 1.55**
26a	Lake Merced Blvd. / Vidal Dr	AM	----	----	----	----	D	45.2
		PM	----	----	----	----	D	36.0
26b	Lake Merced Blvd / Acevedo Ave.	AM	----	----	----	----	D	43.3
		PM	----	----	----	----	C	34.6
26	Lake Merced Blvd./ Higuera Ave	AM	**F**	**>80 / 0.79**	**F**	**>80 / 1.20**	D	37.9
		PM	**F**	**>80 / 0.85**	**F**	**>80 / 1.57**	D	45.4
26c	Lake Merced Blvd./ Gonzalez Dr.	AM	----	----	----	----	D	47.1
		PM	----	----	----	----	D	52.4
27	Lake Merced Blvd. / Brotherhood Wy.	AM	**F**	**>80 / 2.12**	**F**	**>80 / 2.45**	**F**	**>80 / 1.78**
		PM	**F**	**>80 / 2.46**	**F**	**>80 / 2.86**	**F**	**>80 / 2.20**

Notes:

Bold indicates intersection operating at unacceptable level of service (LOS). Shaded rows indicate a change in LOS, delay, or volume-to-capacity (V/C) ratio from Tier 2 to Tier 4A.

[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and V/C ratio are presented.

[2] Although intersection is designed as a roundabout, all approaches are controlled by stop signs; as such, it was analyzed as an all-way stop-controlled intersection.

[3] OWSC (one-way stop-controlled) intersection.

[4] AWSC (all-way stop-controlled) intersection.

[5] Though the intersection would operate at an unacceptable LOS, the conditions of the MUTCD peak hour volume signal warrant would not be met.

Source: AECOM, 2009.

Table III.23: Intersection Level of Service – Tier 4A (Weekend Peak Hour)

	Intersection	Tier 1		Tier 2		Tier 4A	
		LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd.	**F**	**>80 / 1.11**	**F**	**>80 / 1.18**	**F**	**>80 / 1.18**
7	Junipero Serra Blvd. / 19th Ave.	**F**	**>80 / 1.78**	**F**	**>80 / 1.86**	**F**	**>80 / 1.86**
11	19th Ave. / Sloat Blvd.	**F**	**>80 / 1.51**	**F**	**>80 / 1.58**	**F**	**>80 / 1.58**
14	19th Ave. / Winston Dr.	D	40.4	**F**	**>80 / 1.71**	**F**	**>80 / 1.71**
15	19th Ave. / Buckingham Wy.[2]	**E**	**49.2**	**F**	**>50 / 0.95**	**F**	**>50 / 0.95**
16	19th Ave. / Holloway Ave.	C	25.7	D	41.8	D	40.2
27	Lake Merced Blvd. / Brotherhood Wy.	**E**	**59.2**	**F**	**>80 / 2.44**	**F**	**>80 / 1.91**

Notes:
Bold indicates intersection operating at unacceptable level of service (LOS). Shaded rows indicate a change in LOS, delay, or volume-to-capacity (V/C) ratio from Tier 2 to Tier 4A.
[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and V/C ratio are presented.
[2] OWSC (one-way stop-controlled) intersection.
Source: AECOM, 2009.

Under Tier 4A weekday PM peak hour conditions, the following intersection would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 1 conditions:

26. Lake Merced Boulevard / Higuera Avenue: The LOS would improve at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

During Tier 4A weekday PM peak hour conditions, the following five intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

4. Junipero Serra Boulevard / Ocean Avenue / Eucalyptus Drive: The LOS would worsen from LOS D to LOS E at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.
9. Junipero Serra Boulevard / John Daly Boulevard / SB Ramps: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.
17. 19th Avenue / Crespi Drive: The LOS would worsen from LOS D to LOS E at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

19. Sunset Boulevard / Taraval Street: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

25. Lake Merced Boulevard / Font Boulevard: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

Under Tier 4A weekend midday peak hour conditions, no study intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Future Baseline (Tier 1) conditions. However, the following intersection would worsen to unacceptable conditions (from LOS D or better to LOS E or F):

14. 19th Avenue / Winston Drive: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

As shown in **Tables III.22** and **Table III.23**, under Tier 4A weekday AM peak hour conditions, the following two intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 2 conditions:

18. Chumasero Drive / Brotherhood Way: Conversion of this intersection into a split-T intersection with Brotherhood Way / Thomas More Way would improve operating conditions from LOS F to LOS B, as conflicting traffic movements would be reduced and the protected westbound left turn would be eliminated.

26. Lake Merced Boulevard / Higuera Avenue: The LOS would improve at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

Under Tier 4A weekday PM peak hour conditions, the following intersection would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 2 conditions:

26. Lake Merced Boulevard / Higuera Avenue: The LOS would be improved at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

Under Tier 4A weekend midday peak hour conditions, no study intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 2 conditions.

As shown in **Table III.22** and **Table III.23**, under Tier 4A weekday AM, weekday PM, and midday weekend peak hour conditions, no intersections would worsen (from LOS D or better to LOS E or F) when compared to Tier 2 conditions.

All five of the new study intersections are forecasted to operate at an acceptable LOS under Tier 4A weekday AM, weekday PM, and weekend midday peak hour conditions:

7a. Junipero Serra Boulevard / Chumasero Drive;

18a. Thomas More Way / Brotherhood Way;
26a. Lake Merced Boulevard / Vidal Drive;
26b. Lake Merced Boulevard / Acevedo Avenue; and
26c. Lake Merced Boulevard / Gonzalez Drive.

The proposed intersection modifications included in Tier 4A would primarily affect the following five intersections:

7. Junipero Serra Boulevard / 19th Avenue: Although the intersection would continue to operate at an unacceptable LOS during the weekday AM and PM peak hours, the addition of the third northbound Junipero Serra Boulevard left-turn lane and elimination of the northbound 19th Avenue left-turn movement would improve the intersection operating conditions when compared to Tier 1 and Tier 2 (from LOS F to LOS E during the weekday AM peak hour, and with a reduced V/C ratio in the weekday PM peak hour).
16. 19th Avenue / Holloway Avenue: During the three peak analysis hours, operations would worsen compared to Tier 1 due to the travel demand associated with the foreseeable development projects proposed in the study area in Tier 2. Compared to Tier 2, all three peak hour operations would remain the same in Tier 4A, as the proposed intersection modifications would minimally affect the geometric configuration of the intersection.
17. 19th Avenue / Crespi Drive: The growth in traffic volumes under Tier 1 and Tier 2 would result in increased delays in the weekday AM and PM peak hours. The proposed intersection changes in Tier 4A, primarily the new east-west crosswalk, would further worsen operations at the intersection.
18. Chumasero Drive / Brotherhood Way: Although this intersection would continue to operate at an unacceptable LOS during the weekday PM peak hour, conversion of this intersection into a split-T intersection with Brotherhood Way / Thomas More Way would reduce delays compared to Tier 1 and Tier 2, as the conflicting traffic movements would be reduced and the protected westbound left turn would be eliminated.
27. Lake Merced Boulevard / Brotherhood Way: The intersection would continue to operate at unacceptable LOS during all three periods under Tier 1 and Tier 2. Although the intersection would continue to operate at unacceptable LOS under Tier 4A, the proposed reconfiguration of the intersection would slightly improve operating conditions when compared to Tier 2. The conversion of the existing channelized northbound Lake Merced Boulevard and westbound Brotherhood Way right-turn lanes into dual right-turn lanes with overlapping phasing would somewhat reduce the overall intersection delay at this location. With signal timing improvements, the heavy westbound right-turn movements would essentially not be required to stop, as that phase would be overlapped with the heavy southbound Lake Merced Boulevard left turns.

All other Future Baseline plus Public and Private Improvements (Tier 4A) study intersection LOS would remain the same as under Tier 2 conditions.

Future Baseline plus Public and Private Improvements (Tier 4B)

Tier 4B conditions include all the assumptions in Tier 4A with the addition of the following features (see pages III.47 through III.50):

- The M Ocean View would be diverted into the Parkmerced neighborhood at the southwest corner of 19th Avenue / Holloway Avenue;
- The intersection of 19th Avenue / Holloway Avenue would be modified to provide an additional southbound through lane, and a 26-second all-red phase (except for northbound traffic) would be added to the signalization plan; and
- A southbound right-turn lane would be added at 19th Avenue / Crespi Drive.

A comparison of intersection LOS under Tier 1, Tier 2, and Future Baseline plus Public and Private Improvements (Tier 4B) conditions is summarized in **Table III.24** and **Table III.25**. Detailed LOS calculations and figures are provided in **Appendix D**.

As shown in **Tables III.24** and **Table III.25**, under Tier 4B weekday AM peak hour conditions, the following two intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 1 conditions:

18. Chumasero Drive / Brotherhood Way: Conversion of this intersection into a split-T intersection with Brotherhood Way / Thomas More Way would improve operating conditions from LOS F to LOS B, as conflicting traffic movements would be reduced and the protected westbound left turn would be eliminated.
26. Lake Merced Boulevard / Higuera Avenue: The LOS would improve at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

Under Tier 4B weekday AM peak hour conditions, the following two intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

14. 19th Avenue / Winston Drive: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.
24. Lake Merced Boulevard / Winston Drive: The LOS would worsen from LOS C to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

Under Tier 4B weekday PM peak hour conditions, the following intersection would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 1 conditions:

26. Lake Merced Boulevard / Higuera Avenue: The LOS would be improved at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

Table III.24: Intersection Level of Service – Tier 4B (Weekday Peak Hours)

Intersection		Peak Hour	Tier 1		Tier 2		Tier 4B	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
1	Claremont Blvd./ Dewey Blvd./ Taraval St.[2]	AM	A	6.9	A	7.0	A	7.0
		PM	A	7.2	A	7.4	A	7.4
2	Santa Clara Ave./ Vicente St./ Portola Dr.	AM	C	30.5	D	40.2	D	40.2
		PM	C	31.2	D	39.0	D	40.5
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd.	AM	**F**	**>80 / 1.09**	**F**	**>80 / 1.09**	**F**	**>80 / 1.09**
		PM	**F**	**>80 / 1.13**	**F**	**>80 / 1.17**	**F**	**>80 / 1.17**
4	Junipero Serra Blvd. / Ocean Ave. / Eucalyptus Dr.	AM	D	41.7	D	46.9	D	46.9
		PM	D	41.0	**E**	**70.2**	**E**	**70.2**
5	Junipero Serra Blvd. / Winston Dr.	AM	D	35.7	D	38.3	D	38.3
		PM	C	30.8	D	49.3	D	49.3
6	Junipero Serra Blvd. / Holloway Ave.	AM	C	33.2	D	36.9	D	36.9
		PM	C	30.7	D	37.4	D	37.4
7	Junipero Serra Blvd. / 19th Ave.	AM	**F**	**>80 / 0.95**	**F**	**>80 / 0.97**	**E**	**68.6**
		PM	**F**	**>80 / 1.25**	**F**	**>80 / 1. 30**	**F**	**>80 / 1.08**
7a	Junipero Serra Blvd / Chumasero Dr.	AM	----	----	----	----	B	19.4
		PM	----	----	----	----	C	27.4
8	Junipero Serra Blvd. / John Daly Blvd. / NB Ramps	AM	D	40.4	D	40.5	D	40.5
		PM	**F**	**>80 / 1.31**	**F**	**>80 / 1.40**	**F**	**>80 / 1.40**
9	Junipero Serra Blvd. / John Daly Blvd. / SB Ramps	AM	C	20.5	C	20.4	C	20.4
		PM	D	52.5	**F**	**>80 / 1.17**	**F**	**>80 / 1.17**
10	19th Ave. / Taraval St.	AM	C	26.9	C	28.9	C	28.9
		PM	B	20.0	C	24.0	C	21.6
11	19th Ave. / Sloat Blvd.	AM	**F**	**>80 / 1.48**	**F**	**>80 / 1.51**	**F**	**>80 / 1.51**
		PM	**F**	**>80 / 1.56**	**F**	**>80 / 1.63**	**F**	**>80 / 1.63**
12	19th Ave. / Ocean Ave.	AM	D	46.9	D	46.1	D	46.1
		PM	**F**	**>80 / 1.58**	**F**	**>80 / 1.63**	**F**	**>80 / 1.63**
13	19th Ave. / Eucalyptus Dr.	AM	C	22.7	C	23.1	C	23.1
		PM	**E**	**72.7**	**F**	**>80 / 1.18**	**F**	**>80 / 1.18**
14	19th Ave. / Winston Dr.	AM	D	52.9	**F**	**>80 / 1.32**	**F**	**>80 / 1.32**
		PM	**F**	**>80 / 1.34**	**F**	**>80 / 1.70**	**F**	**>80 / 1.70**
15	19th Ave. / Buckingham Wy.[3]	AM	**F**	**>50 / 0.70**	**F**	**>50 / 0.83**	**F**	**>50 / 0.83**
		PM	**F**	**>50 / 1.81**	**F**	**>50 / 2.20**	**F**	**>50 / 2.20**
16	19th Ave. / Holloway Ave.	AM	**E**	**65.9**	**E**	**59.7**	**E**	**62.2**
		PM	**F**	**>80 / 0.88**	**F**	**>80 / 1.03**	**F**	**>80 / 0.93**
17	19th Ave. / Crespi Dr.	AM	**E**	**58.1**	**E**	**64.8**	**E**	**75.7**
		PM	D	53.7	**E**	**69.9**	**E**	**74.7**
18	Chumasero Dr. / Brotherhood Wy.	AM	**F**	**>80 / 0.97**	**F**	**>80 / 1.48**	B	19.7
		PM	**F**	**>80 / 1.12**	**F**	**>80 / 1.74**	**F**	**>80 / 0.93**
18a	Thomas More Wy. / Brotherhood Wy.	AM	----	----	----	----	C	23.0
		PM	----	----	----	----	C	21.9
19	Sunset Blvd. / Taraval St.	AM	C	21.8	D	43.0	D	43.0
		PM	D	53.1	**F**	**>80 / 0.96**	**F**	**>80 / 0.96**

Table III.24 (continued)

	Intersection	Peak Hour	Tier 1		Tier 2		Tier 4B	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
20	Sunset Blvd. / Ocean Ave.	AM	B	12.1	B	13.7	B	13.7
		PM	B	13.5	C	30.5	D	30.5
21	Skyline Blvd. / Sloat Blvd. / 39th Ave.[4]	AM	C	17.2	C	17.5	C	17.5
		PM	D	27.9	D	29.4	D	29.4
22	Skyline Blvd. / Lk. Merced Blvd. (North)[3]	AM	C	15.2	C	15.1	C	15.1
		PM	C	17.7	C	17.5	C	17.5
	Skyline Blvd. / Lk. Merced Blvd. (South)[3,5]	AM	F	>50 / 0.39	F	>50 / 0.38	F	>50 / 0.38
		PM	F	>50 / 0.92	F	>50 / 0.90	F	>50 / 0.90
23	Sunset Blvd. / Lake Merced Blvd.[3]	AM	**F**	**>50 / 0.63**	**F**	**>50 / 1.10**	**F**	**>50 / 1.10**
		PM	**F**	**>50 / 1.37**	**F**	**>50 / 2.49**	**F**	**>50 / 2.49**
24	Lake Merced Blvd. / Winston Dr.	AM	C	29.2	**F**	**>80 / 0.81**	**F**	**>80 / 0.81**
		PM	**F**	**>80 / 0.98**	**F**	**>80 / 1.37**	**F**	**>80 / 1.37**
25	Lake Merced Blvd. / Font Blvd.	AM	**E**	**64.6**	**F**	**>80 / 1.47**	**F**	**>80 / 1.40**
		PM	D	49.7	**F**	**>80 / 1.64**	**F**	**>80 / 1.55**
26a	Lake Merced Blvd. / Vidal Dr.	AM	----	----	----	----	D	45.2
		PM	----	----	----	----	D	36.0
26b	Lake Merced Blvd / Acevedo Ave.	AM	----	----	----	----	D	43.3
		PM	----	----	----	----	D	34.6
26	Lake Merced Blvd./ Higuera Ave	AM	**F**	**>80 / 0.79**	**F**	**>80 / 1.20**	D	37.9
		PM	**F**	**>80 / 0.85**	**F**	**>80 / 1.57**	D	45.4
26c	Lake Merced Blvd. / Gonzalez Dr.	AM	----	----	----	----	D	47.1
		PM	----	----	----	----	D	52.4
27	Lake Merced Blvd. / Brotherhood Wy.	AM	**F**	**>80 / 2.12**	**F**	**>80 / 2.45**	**F**	**>80 / 1.78**
		PM	**F**	**>80 / 2.46**	**F**	**>80 / 2.86**	**F**	**>80 / 2.20**

Notes:

Bold indicates intersection operating at unacceptable level of service (LOS). Shaded rows indicate a change in LOS, delay, or volume-to-capacity (V/C) ratio from Tier 2 to Tier 4B.

[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and V/C ratio are presented.

[2] Although intersection is designed as a roundabout, all approaches are controlled by stop signs; as such, it was analyzed as an all-way stop-controlled intersection.

[3] OWSC (one-way stop-controlled) intersection.

[4] AWSC (all-way stop-controlled) intersection.

[5] Though the intersection would operate at an unacceptable LOS, the conditions of the Manual on Uniform Traffic Control Devices (MUTCD) peak hour volume signal warrant would not be met.

Source: AECOM, 2009.

Table III.25: Intersection Level of Service – Tier 4B (Weekend Peak Hour)

	Intersection	Tier 1		Tier 2		Tier 4B	
		LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd.	**F**	**>80 / 1.11**	**F**	**>80 / 1.18**	**F**	**>80 / 1.18**
7	Junipero Serra Blvd. / 19th Ave.	**F**	**>80 / 1.78**	**F**	**>80 / 1.86**	**F**	**>80 / 2.23**
11	19th Ave. / Sloat Blvd.	**F**	**>80 / 1.51**	**F**	**>80 / 1.58**	**F**	**>80 / 1.58**
14	19th Ave. / Winston Dr.	D	40.4	**F**	**>80 / 1.71**	**F**	**>80 / 1.71**
15	19th Ave. / Buckingham Wy.[2]	**E**	**49.2**	**F**	**>50 / 0.95**	**F**	**>50 / 0.95**
16	19th Ave. / Holloway Ave.	C	25.7	D	41.8	D	47.9
27	Lake Merced Blvd. / Brotherhood Wy.	**E**	**59.2**	**F**	**>80 / 2.44**	**F**	**>80 / 1.91**

Notes:
Bold indicates intersection operating at unacceptable level of service (LOS). Shaded rows indicate a change in LOS, delay, or volume-to-capacity (V/C) ratio from Tier 2 to Tier 4B.
[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and V/C ratio are presented.
[2] OWSC (one-way stop-controlled) intersection.

Source: AECOM, 2009.

Under Tier 4B weekday PM peak hour conditions, the following five intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

4. Junipero Serra Boulevard / Ocean Avenue / Eucalyptus Drive: The LOS would worsen from LOS D to LOS E at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.
9. Junipero Serra Boulevard / John Daly Boulevard / SB Ramps: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.
17. 19th Avenue / Crespi Drive: The LOS would worsen from LOS D to LOS E at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2 and the modifications to the intersection included in Tier 4B.
19. Sunset Boulevard / Taraval Street: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

25. Lake Merced Boulevard / Font Boulevard: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

Under Tier 4B weekend midday peak hour conditions, no study intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 1 conditions. However, the following intersection would worsen to unacceptable LOS (from LOS D or better to LOS E or F):

14. 19th Avenue / Winston Drive: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

As shown in **Table III.24** and **Table III.25**, under Tier 4B weekday AM peak hour conditions, the following two intersections would improve to acceptable conditions (from LOS E or F to LOS D or better, or from LOS F to LOS E) when compared to Tier 2 conditions:

18. Chumasero Drive / Brotherhood Way: Conversion of this intersection into a split-T intersection with Brotherhood Way / Thomas More Way would substantially improve operating conditions from LOS F to LOS B, as conflicting traffic movements would be reduced and the protected westbound left turn would be eliminated.
26. Lake Merced Boulevard / Higuera Avenue: Conditions would be improved at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

Under Tier 4B weekday PM peak hour conditions, the following intersection would improve to acceptable conditions (from LOS E or F to LOS D or better, or from LOS F to LOS E) when compared to Tier 2 conditions:

26. Lake Merced Boulevard / Higuera Avenue: The LOS would be improved at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

Under Tier 4B weekend midday peak hour conditions, no study intersections would improve from acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 2 conditions.

As shown in **Table III.24** and **Table III.25**, under Tier 4B weekday AM, weekday PM, and midday weekend peak hour conditions, no intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 2 conditions.

All five of the new study intersections are forecast to operate at an acceptable LOS under Tier 4B weekday AM, weekday PM, and weekend midday peak hour conditions:

7a. Junipero Serra Boulevard / Chumasero Drive;
18a. Thomas More Way / Brotherhood Way;
26a. Lake Merced Boulevard / Vidal Drive;

26b. Lake Merced Boulevard / Acevedo Avenue; and
26c. Lake Merced Boulevard / Gonzalez Drive.

The proposed intersection modifications included in Tier 4B would primarily affect five intersections, as follows:

7. Junipero Serra Boulevard / 19th Avenue: Although the intersection would continue to operate at an unacceptable LOS during the weekday AM and PM peak hours, the addition of the third northbound Junipero Serra Boulevard left-turn lane and elimination of the northbound 19th Avenue left-turn movement would improve the intersection operating conditions when compared to Tier 1 and Tier 2 (from LOS F to LOS E during the weekday AM peak hour, and with a reduced V/C ratio in the weekday PM peak hour).

16. 19th Avenue / Holloway Avenue: At this intersection, the M Ocean View would cross diagonally from its current alignment in the 19th Avenue median into Parkmerced, requiring a 26-second all-red phase (except for northbound vehicles). However, a fourth southbound lane would be created to offset the impact on southbound traffic flows. During all analysis periods, intersection operating conditions would be similar to those under Tier 1 and Tier 2.

17. 19th Avenue / Crespi Drive: The growth in traffic volumes under Tier 1 and Tier 2 would result in increased delays in the weekday AM and PM peak hours. The proposed intersection changes in Tier 4B, primarily the new east-west crosswalk, would further worsen operations at the intersection.

18. Chumasero Drive / Brotherhood Way: Although this intersection would continue to operate at an unacceptable LOS during the weekday PM peak hour, conversion of this intersection into a split-T intersection with Brotherhood Way / Thomas More Way would reduce delays compared to Tier 1 and Tier 2, as the conflicting traffic movements would be reduced and the protected westbound left turn would be eliminated.

27. Lake Merced Boulevard / Brotherhood Way: The intersection would continue to operate at unacceptable LOS during all three periods under Tier 1 and Tier 2. Although the intersection would continue to operate at unacceptable LOS under Tier 4B, the proposed reconfiguration of the intersection would slightly improve operating conditions when compared to Tier 2. The conversion of the existing channelized northbound Lake Merced Boulevard and westbound Brotherhood Way right-turn lanes into dual right-turn lanes with overlapping phasing would somewhat reduce the overall intersection delay at this location. With signal timing improvements, the heavy westbound right-turn movements would essentially not be required to stop, as that phase would be overlapped with the heavy southbound Lake Merced Boulevard left-turns.

All other Future Baseline plus Public and Private Improvements (Tier 4B) study intersection LOS would remain the same as under Tier 2 conditions.

As noted above, the rerouting of the M Ocean View light rail line into the Parkmerced neighborhood would require a 26-second all-red phase at the intersection of 19th Avenue / Holloway Avenue (except for the northbound approach) and the corresponding increase in the overall signal cycle length. Since the traffic signals along 19th Avenue are synchronized, these proposed modifications could affect the progression of vehicles in both the northbound and

southbound directions. However, signalization with the adjacent 19th Avenue / Crespi Drive intersection is coordinated (both intersections operate together), and the next signalized intersections (19th Avenue / Winston Drive to the north and Junipero Serra Boulevard / 19th Avenue to the south) are relatively far away. As such, the increase in cycle length and the all-red phase would not noticeably impair the progression of vehicles along 19th Avenue.

Future Baseline plus Public and Private Improvements (Tier 4C)

Tier 4C conditions include all the assumptions in Tier 4B with the addition of the following features (see pages III.50 through III.54):

- As with Tier 4B, the M Ocean View would be diverted into the Parkmerced neighborhood at the southwest corner of 19th Avenue / Holloway Avenue. The route would be configured into a short-line and long-line service, with half the trains directed from the Parkmerced neighborhood back out to its current alignment at the west corner of Junipero Serra Boulevard / 19th Avenue;
- A southbound through-right lane and a northbound left-turn pocket would be added at 19th Avenue / Crespi Drive; and
- An additional right-turn lane would be added to southbound 19th Avenue at Junipero Serra Boulevard, and a 26-second all-red phase would be added to the signalization plan.

A comparison of Tier 1, Tier 2, and Future Baseline Plus Public and Private Improvements (Tier 4C) conditions intersection LOS is summarized in **Table III.26** and **Table III.27**. Detailed LOS calculations and figures are provided in **Appendix D**.

As shown in **Tables III.26** and **Table III.27**, under Tier 4C weekday AM peak hour conditions, the following two intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 1 conditions:

18. Chumasero Drive / Brotherhood Way: Conversion of this intersection into a split-T intersection with Brotherhood Way / Thomas More Way would improve operating conditions from LOS F to LOS B, as conflicting traffic movements would be reduced and the protected westbound left turn would be eliminated.
26. Lake Merced Boulevard / Higuera Avenue: The LOS would improve at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

Under Tier 4C weekday AM peak hour conditions, the following two intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

14. 19th Avenue / Winston Drive: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.
24. Lake Merced Boulevard / Winston Drive: The LOS would worsen from LOS C to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

Table III.26: Intersection Level of Service – Tier 4C (Weekday Peak Hours)

Intersection		Peak Hour	Tier 1		Tier 2		Tier 4C	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
1	Claremont Blvd./ Dewey Blvd./ Taraval St.[2]	AM	A	6.9	A	7.0	A	7.0
		PM	A	7.2	A	7.4	A	7.4
2	Santa Clara Ave./ Vicente St./ Portola Dr.	AM	C	30.5	D	40.2	D	40.2
		PM	C	31.2	D	39.0	D	39.0
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd.	AM	**F**	**>80 / 1.09**	**F**	**>80 / 1.09**	**F**	**>80 / 1.09**
		PM	**F**	**>80 / 1.13**	**F**	**>80 / 1.17**	**F**	**>80 / 1.17**
4	Junipero Serra Blvd. / Ocean Ave. / Eucalyptus Dr.	AM	D	41.7	D	46.9	D	46.9
		PM	D	41.0	**E**	**70.2**	**E**	**70.2**
5	Junipero Serra Blvd. / Winston Dr.	AM	D	35.7	D	38.3	D	38.3
		PM	C	30.8	D	49.3	D	49.3
6	Junipero Serra Blvd. / Holloway Ave.	AM	C	33.2	D	36.9	C	34.8
		PM	C	30.7	D	37.4	C	31.8
7	Junipero Serra Blvd. / 19th Ave.	AM	**F**	**>80 / 0.95**	**F**	**>80 / 0.97**	**E**	**57.4**
		PM	**F**	**>80 / 1.25**	**F**	**>80 / 1.30**	**F**	**>80 / 0.87**
7a	Junipero Serra Blvd / Chumasero Dr.	AM	----	----	----	----	C	24.5
		PM	----	----	----	----	C	31.3
8	Junipero Serra Blvd. / John Daly Blvd. / NB Ramps	AM	D	40.4	D	40.5	D	40.4
		PM	**F**	**>80 / 1.31**	**F**	**>80 / 1.40**	**F**	**>80 / 1.40**
9	Junipero Serra Blvd. / John Daly Blvd. / SB Ramps	AM	C	20.5	C	20.4	C	20.4
		PM	D	52.5	**F**	**>80 / 1.17**	**F**	**>80 / 1.17**
10	19th Ave. / Taraval St.	AM	C	26.9	C	28.9	C	28.9
		PM	B	20.0	C	24.0	C	24.0
11	19th Ave. / Sloat Blvd.	AM	**F**	**>80 / 1.48**	**F**	**>80 / 1.51**	**F**	**>80 / 1.51**
		PM	**F**	**>80 / 1.56**	**F**	**>80 / 1.63**	**F**	**>80 / 1.63**
12	19th Ave. / Ocean Ave.	AM	D	46.9	D	46.1	D	46.1
		PM	**F**	**>80 / 1.58**	**F**	**>80 / 1.63**	**F**	**>80 / 1.63**
13	19th Ave. / Eucalyptus Dr.	AM	C	22.7	C	23.1	C	23.1
		PM	**E**	**72.7**	**F**	**>80 / 1.18**	**F**	**>80 / 1.18**
14	19th Ave. / Winston Dr.	AM	D	52.9	**F**	**>80 / 1.32**	**F**	**>80 / 1.32**
		PM	**F**	**>80 / 1.34**	**F**	**>80 / 1.70**	**F**	**>80 / 1.70**
15	19th Ave. / Buckingham Wy.[3]	AM	**F**	**>50 / 0.70**	**F**	**>50 / 0.83**	**F**	**>50 / 0.83**
		PM	**F**	**>50 / 1.81**	**F**	**>50 / 2.20**	**F**	**>50 / 2.20**
16	19th Ave. / Holloway Ave.	AM	**E**	**65.9**	**E**	**59.7**	**E**	**61.5**
		PM	**F**	**>80 / 0.88**	**F**	**>80 / 1.03**	**F**	**>80 / 0.88**
17	19th Ave. / Crespi Dr.	AM	**E**	**58.1**	**E**	**64.8**	**E**	**74.1**
		PM	D	53.7	**E**	**69.9**	**F**	**>80 / 0.76**
18	Chumasero Dr. / Brotherhood Wy.	AM	**F**	**>80 / 0.97**	**F**	**>80 / 1.48**	B	19.7
		PM	**F**	**>80 / 1.12**	**F**	**>80 / 1.74**	**F**	**>80 / 0.93**
18a	Thomas More Wy. / Brotherhood Wy.	AM	----	----	----	----	C	23.0
		PM	----	----	----	----	C	22.3

Table III.26 (continued)

	Intersection	Peak Hour	Tier 1		Tier 2		Tier 4C	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
19	Sunset Blvd. / Taraval St.	AM	C	21.8	D	43.0	D	43.0
		PM	D	53.1	**F**	**>80 / 0.96**	**F**	**>80 / 0.96**
20	Sunset Blvd. / Ocean Ave.	AM	B	12.1	B	13.7	B	13.7
		PM	B	13.5	C	30.5	C	30.5
21	Skyline Blvd. / Sloat Blvd. / 39th Ave.[4]	AM	C	17.2	C	17.5	C	17.5
		PM	D	27.9	D	29.4	D	29.4
22	Skyline Blvd. / Lk. Merced Blvd. (North)[3]	AM	C	15.2	C	15.1	C	15.1
		PM	C	17.7	C	17.5	C	17.5
	Skyline Blvd. / Lk. Merced Blvd. (South)[3,5]	AM	F	>50 / 0.39	F	>50 / 0.38	F	>50 / 0.38
		PM	F	>50 / 0.92	F	>50 / 0.90	F	>50 / 0.90
23	Sunset Blvd. / Lake Merced Blvd.[3]	AM	**F**	**>50 / 0.63**	**F**	**>50 / 1.10**	**F**	**>50 / 1.10**
		PM	**F**	**>50 / 1.37**	**F**	**>50 / 2.49**	**F**	**>50 / 2.49**
24	Lake Merced Blvd. / Winston Dr.	AM	C	29.2	**F**	**>80 / 0.81**	**F**	**>80 / 0.81**
		PM	**F**	**>80 / 0.98**	**F**	**>80 / 1.37**	**F**	**>80 / 1.37**
25	Lake Merced Blvd. / Font Blvd.	AM	**E**	**64.6**	**F**	**>80 / 1.47**	**F**	**>80 / 1.40**
		PM	D	49.7	**F**	**>80 / 1.64**	**F**	**>80 / 1.55**
26a	Lake Merced Blvd. / Vidal Dr.	AM	----	----	----	----	D	45.2
		PM	----	----	----	----	D	36.0
26b	Lake Merced Blvd / Acevedo Ave.	AM	----	----	----	----	D	43.3
		PM	----	----	----	----	C	34.6
26	Lake Merced Blvd./ Higuera Ave	AM	**F**	**>80 / 0.79**	**F**	**>80 / 1.20**	D	37.9
		PM	**F**	**>80 / 0.85**	**F**	**>80 / 1.57**	D	45.4
26c	Lake Merced Blvd. / Gonzalez Dr.	AM	----	----	----	----	C	33.6
		PM	----	----	----	----	D	52.4
27	Lake Merced Blvd. / Brotherhood Wy.	AM	**F**	**>80 / 2.12**	**F**	**>80 / 2.45**	**F**	**>80 / 1.78**
		PM	**F**	**>80 / 2.46**	**F**	**>80 / 2.86**	**F**	**>80 / 2.20**

Notes:

Bold indicates intersection operating at unacceptable level of service (LOS). Shaded rows indicate a change in LOS, delay, or volume-to-capacity (V/C) ratio from Tier 2 to Tier 4C.

[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and V/C ratio are presented.

[2] Although intersection is designed as a roundabout, all approaches are controlled by stop signs; as such, it was analyzed as an all-way stop-controlled intersection.

[3] OWSC (one-way stop-controlled) intersection.

[4] AWSC (all-way stop-controlled) intersection.

[5] Though the intersection would operate at an unacceptable LOS, the conditions of the Manual on Uniform Traffic Control Devices (MUTCD) peak hour volume signal warrant would not be met.

Source: AECOM, 2009.

Table III.27: Intersection Level of Service – Tier 4C (Weekend Peak Hour)

	Intersection	Peak Hour	Tier 1		Tier 2		Tier 4C	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
3	Junipero Serra Blvd./ Sloat Blvd./ St. Francis Blvd.	AM	**F**	**>80 / 1.11**	**F**	**>80 / 1.18**	**F**	**>80 / 1.18**
7	Junipero Serra Blvd. / 19th Ave.	AM	**F**	**>80 / 1.78**	**F**	**>80 / 1.86**	**F**	**>80 / 1.47**
11	19th Ave. / Sloat Blvd.	AM	**F**	**>80 / 1.51**	**F**	**>80 / 1.58**	**F**	**>80 / 1.58**
14	19th Ave. / Winston Dr.	AM	D	40.4	**F**	**>80 / 1.71**	**F**	**>80 / 1.71**
15	19th Ave. / Buckingham Wy.[2]	AM	**E**	**49.2**	**F**	**>50 / 0.95**	**F**	**>50 / 0.95**
16	19th Ave. / Holloway Ave.	AM	C	25.7	D	41.8	**E**	**56.8**
27	Lake Merced Blvd. / Brotherhood Wy.	AM	**E**	**59.2**	**F**	**>80 / 2.44**	**F**	**>80 / 1.91**

Notes:
Bold indicates intersection operating at unacceptable level of service (LOS). Shaded rows indicate a change in LOS, delay, or volume-to-capacity (V/C) ratio from Tier 2 to Tier 4C.
AWSC = All-way stop-controlled
OWSC = One way stop-controlled
[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and V/C ratio are presented.
[2] OWSC (one-way stop-controlled) intersection.

Source: AECOM, 2009.

Under Tier 4C weekday PM peak hour conditions, the following intersection would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 1 conditions:

26. Lake Merced Boulevard / Higuera Avenue: The LOS would be improved at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

During Tier 4C weekday PM peak hour conditions, the following five intersections would worsen to unacceptable conditions (from LOS D or better to LOS E or F) when compared to Tier 1 conditions:

4. Junipero Serra Boulevard / Ocean Avenue / Eucalyptus Drive: The LOS would worsen from LOS D to LOS E at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.
9. Junipero Serra Boulevard / John Daly Boulevard / SB Ramps: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.
17. 19th Avenue / Crespi Drive: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2 and the modifications to the intersection included in Tier 4C.

19. Sunset Boulevard / Taraval Street: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

25. Lake Merced Boulevard / Font Boulevard: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

Under Tier 4C weekend midday peak hour conditions, no study intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 1 conditions. However, the following two intersections would worsen to unacceptable LOS (from LOS D or better to LOS E or F):

14. 19th Avenue / Winston Drive: The LOS would worsen from LOS D to LOS F at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2.

16. 19th Avenue/Holloway Avenue: The LOS would worsen from LOS C to LOS E at this location due to the increase in traffic volumes from the foreseeable development projects included in Tier 2 and the intersection modifications included in Tier 4C.

As shown in **Table III.26** and **Table III.27**, under Tier 4C weekday AM peak hour conditions, the following two intersections would improve to acceptable conditions (from LOS E or F to LOS D or better, or from LOS F to LOS E) when compared to Tier 2 conditions:

18. Chumasero Drive / Brotherhood Way: Conversion of this intersection into a split-T intersection with Brotherhood Way / Thomas More Way would substantially improve operating conditions from LOS F to LOS B, as conflicting traffic movements would be reduced and the protected westbound left turn would be eliminated.

26. Lake Merced Boulevard / Higuera Avenue: Conditions would be improved at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

Under Tier 4C weekday PM peak hour conditions, the following intersection would improve to acceptable conditions (from LOS E or F to LOS D or better, or from LOS F to LOS E) when compared to Tier 2 conditions:

26. Lake Merced Boulevard / Higuera Avenue: Conditions would be improved at this location from LOS F to LOS D as a direct result of the provision of three new access points along Lake Merced Boulevard, thus distributing traffic volumes among four intersections instead of one.

During Tier 4C weekend midday peak hour conditions, no study intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 2 conditions.

As shown in **Table III.26** and **Table III.27**, under Tier 4C weekday AM, weekday PM, and midday weekend peak hour conditions, no intersections would worsen (from LOS D or better to LOS E or F) when compared to Tier 2 conditions.

All five of the new study intersections are forecast to operate at an acceptable LOS under Tier 4C in the weekday AM, weekday PM and weekend midday peak hour conditions:

7a. Junipero Serra Boulevard / Chumasero Drive;
18a Thomas More Way / Brotherhood Way;
26a. Lake Merced Boulevard / Vidal Drive;
26b. Lake Merced Boulevard / Acevedo Avenue; and
26c. Lake Merced Boulevard / Gonzalez Drive.

The proposed intersection modifications included in Tier 4C would primarily affect five intersections, as follows:

7. Junipero Serra Boulevard / 19th Avenue: Although the intersection would continue to operate at an unacceptable LOS during the weekday AM and PM peak hours, the addition of the third northbound Junipero Serra Boulevard left-turn lane, elimination of the northbound 19th Avenue left-turn movement, and provision of the fourth southbound right-turn lane would improve the intersection operating conditions when compared to Tier 1 and Tier 2, as seen in the improvement to the V/C ratios. In addition, weekday AM peak hour conditions would improve to LOS E.

16. 19th Avenue / Holloway Avenue: At this intersection, the M Ocean View would cross diagonally from its current alignment in the 19th Avenue median into Parkmerced, requiring a 26-second all-red phase (except for northbound vehicles). However, a fourth southbound lane would be created to offset the impact on southbound traffic flows. During all analysis periods, intersection operating conditions would be similar to those under Tier 1 and Tier 2.

17. 19th Avenue / Crespi Drive: The growth in traffic volumes under Tier 1 and Tier 2 would result in increased delays in the weekday AM and PM peak hours. The proposed intersection changes in Tier 4C, primarily the new east-west crosswalk, would further worsen operations at the intersection.

18. Chumasero Drive / Brotherhood Way: Although this intersection would continue to operate at an unacceptable LOS during the weekday PM peak hour, conversion of this intersection into a split-T intersection with Brotherhood Way / Thomas More Way would reduce delays compared to Tier 1 and Tier 2, as the conflicting traffic movements would be reduced and the protected westbound left turn would be eliminated.

27. Lake Merced Boulevard / Brotherhood Way: The intersection would continue to operate at unacceptable LOS during all three periods under Tier 1 and Tier 2. Although the intersection would continue to operate at unacceptable LOS under Tier 4C, the proposed reconfiguration of the intersection would slightly improve operating conditions when compared to Tier 2. The conversion of the existing channelized northbound Lake Merced Boulevard and westbound Brotherhood Way right-turn lanes into dual right-turn lanes with overlapping phasing would somewhat reduce the overall intersection delay at this location. With signal timing improvements, the heavy westbound right-turn movements would essentially not be required to stop, as that phase would be overlapped with the heavy southbound Lake Merced Boulevard left turns.

All other Future Baseline plus Public and Private Improvements (Tier 4C) study intersection LOS would remain the same as under Tier 2 conditions.

As noted above, the rerouting of the M Ocean View light rail line into the Parkmerced neighborhood would require a 26-second all-red phase at the intersection of 19th Avenue / Holloway Avenue (except for the northbound approach) and at the intersection of Junipero Serra Boulevard / 19th Avenue (for all movements), and the corresponding increase in the overall signal cycle lengths. Since the traffic signals along 19th Avenue are synchronized, these proposed modifications could affect the progression of vehicles in both the northbound and southbound directions. However, signalization of 19th Avenue / Holloway Avenue is coordinated with the adjacent 19th Avenue / Crespi Drive (both intersections operate together), and the next signalized intersection (19th Avenue / Winston Drive to the north) is relatively far away. As such, the increase in cycle length and the all-red phase would not noticeably impair the progression of vehicles along 19th Avenue.

TRANSIT ANALYSIS

Tier 3 would include the proposed reconfiguration of the M Ocean View light rail line, with the portion south of SFSU transferred to the J Church line. To accommodate the new J Church line, a new station may need to be constructed south of Holloway Avenue. (The end-of-the-line location for the J Church has not been finalized, but could be located at either the Stonestown Station or the SFSU Station.) With this line configuration, riders would be forced to transfer between the M Ocean View and J Church lines to continue to points north or south. The number of riders making this transfer would be between 200 and 250 riders during the weekday AM peak hour, and between 250 and 400 riders during the weekday PM peak hour. If the two lines do not share a station at SFSU, passengers would be inconvenienced as they would need to walk across Holloway Avenue and 19th Avenue to transfer. In addition, operational issues could result since the tail tracks and turnarounds of the two lines would overlap, which could cause delays to operations. Furthermore, since the station(s) would remain in the 19th Avenue median, walking access would not improve, although splitting the stations could reduce the current overcrowding issues.

Tier 4A would have the same M Ocean View operations as under current conditions, but with the service headway changes included in the TEP. As such, no additional ridership or operational concerns would arise. However, since the station would remain in the 19th Avenue median, walking access to the station would not improve and the current overcrowding issues would remain.

With Tier 4B, there would be transfers needed between the M Ocean View and J Church lines, with the M Ocean View station located within the Parkmerced neighborhood and the J Church station located at the south side of the 19th Avenue / Holloway Avenue intersection. Under this scenario, riders would need to transfer between the M Ocean View and J Church lines to continue to points north or south. The number of riders making this transfer would be between 200 and 250 riders during the weekday AM peak hour, and between 250 and 400 riders during the

weekday PM peak hour, as with Tier 3. Since the trains would not share a platform, however, this transfer would require crossing of a portion of 19th Avenue. This forced transfer between the lines and walk across 19th Avenue would be an inconvenience for riders. Since there would be a new station for the M Ocean View inside the Parkmerced neighborhood, however, walking access to the station would improve and the overcrowding issues would be reduced.

Since Tier 4C would include a new SFSU station within the Parkmerced neighborhood for the M Ocean View, rider conditions would be improved as compared to Tier 3 and Tier 4B. However, riders destined to and from the end-of-the-line station in the southeast corner of the Parkmerced neighborhood would need to transfer between the short-line and long-line service at one of the other new stations in the Parkmerced neighborhood. It is anticipated that few riders would be affected by this transfer, however.

Screenline Analysis

To determine the Tier 3 conditions, SFMTA's proposed TEP service changes, including modifications to route, frequency, and hours of operation, were incorporated into the screenline analysis. Additional minor modifications were made to the screenline groupings to calculate the Tier 4A, Tier 4B, and Tier 4C screenlines.

The Tier 3, Tier 4A, Tier 4B, and Tier 4C screenlines are summarized in **Table III.28** and **Table III.29**. Detailed screenline calculations are provided in **Appendix G**.

As shown in **Table III.28** and **Table III.29**, there would be substantial changes in capacity and capacity utilization along the East screenline and South screenline under Tier 3 and the various Tier 4 scenarios.

Under Tier 3, capacity would be reduced on the South screenline, as the 28L 19th Avenue Limited would no longer serve the Daly City BART station, but would be rerouted to serve the East screenline to/from the Balboa Park BART station and the Excelsior District. Capacity would also be reduced on the East screenline, as the segment of the M Ocean View east of Junipero Serra Boulevard / 19th Avenue currently served by two-car trains would instead be served by one-car J Church trains. While the rerouted 28L 19th Avenue Limited would cover some of this lost capacity, there would still be a noticeable decrease in capacity on the East screenline in the weekday AM peak hour under Tier 3.

Table III.28: Muni Screenline Summary – Tier 3 and Tier 4 (Weekday AM Peak Hour)

	Screenline	Tier 2			Tier 3			Tier 4A			Tier 4B			Tier 4C		
		Rid.	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**
Outbound																
N	18 46th Avenue	150	216	69%	144	216	67%	144	216	67%	144	216	67%	144	216	67%
	28 19th Avenue	408	378	108 %	319	432	74%	319	432	74%	319	432	74%	319	432	74%
	28L 19th Avenue Ltd	162	216	75%	257	324	79%	257	324	79%	257	324	79%	257	324	79%
	29 Sunset	278	324	86%	278	324	86%	278	324	86%	278	324	86%	278	324	86%
	Subtotal	*998*	*1,134*	*88%*	*998*	*1,296*	*77%*	*998*	*1,296*	*77%*	*998*	*1,296*	*77%*	*998*	*1,296*	*77%*
NE	M Ocean View	1,320	1,414	93%	1,320	1,212	109 %	1,320	1,212	109 %	1,320	1,212	109 %	1,320	1,212	109 %
	Subtotal	*1,320*	*1,414*	*93%*	*1,320*	*1,212*	*109 %*	*1,320*	*1,212*	*109 %*	*1,320*	*1,212*	*109 %*	*1,320*	*1,212*	*109 %*
E	M Ocean View	239	1,414	17%	--	--	--	239	1,212	20%	--	--	--	239	606	39%
	29 Sunset	318	324	98%	162	324	50%	162	324	50%	162	324	50%	162	324	50%
	J Church	--	--	--	239	909	26%	--	--	--	239	909	26%	--	--	--
	28L 19th Avenue Ltd	--	--	--	156	324	48%	156	324	48%	156	324	48%	156	324	48%
	Subtotal	*557*	*1,738*	*32%*	*557*	*1,557*	*36%*	*557*	*1,860*	*30%*	*557*	*1,557*	*36%*	*557*	*1,254*	*44%*
S	28 19th Avenue	136	378	36%	174	432	40%	174	432	40%	174	432	40%	174	432	40%
	28L 19th Avenue Ltd	45	270	17%	--	--	--	--	--	--	--	--	--	--	--	--
	Subtotal	*181*	*648*	*28%*	*174*	*432*	*40%*	*174*	*432*	*40%*	*174*	*432*	*40%*	*174*	*432*	*40%*
Parkmerced Shuttle		116	120	97%	116	120	97%	116	120	97%	116	120	97%	116	120	97%
TOTAL All Screenlines		**3,172**	**5,054**	**63%**	**3,165**	**4,617**	**69%**	**3,165**	**4,920**	**64%**	**3,165**	**4,617**	**69%**	**3,165**	**4,314**	**73%**
Inbound																
N	18 46th Avenue	119	216	55%	115	216	53%	115	216	53%	115	216	53%	115	216	53%
	28 19th Avenue	406	486	83%	383	486	79%	383	486	79%	383	486	79%	383	486	79%
	28L 19th Avenue Ltd	156	270	58%	183	324	57%	183	324	57%	183	324	57%	183	324	57%
	29 Sunset	264	216	122 %	264	324	82%	264	324	82%	264	324	82%	264	324	82%
	Subtotal	*945*	*1,188*	*80%*	*945*	*1,350*	*70%*	*945*	*1,350*	*70%*	*945*	*1,350*	*70%*	*945*	*1,350*	*70%*

Table III.28 (continued)

	Screenline	Tier 2			Tier 3			Tier 4A			Tier 4B			Tier 4C		
		Rid.	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**
NE	M Ocean View	581	1,414	41%	581	1,212	48%	581	1,212	48%	581	1,212	48%	581	1,212	48%
	Subtotal	*581*	*1,414*	*41%*	*581*	*1,212*	*48%*	*581*	*1,212*	*48%*	*581*	*1,212*	*48%*	*581*	*1,212*	*48%*
E	M Ocean View	312	1,414	22%	--	--	--	312	1,212	26%	--	--	--	312	606	52%
	29 Sunset	425	324	131 %	213	324	66%	213	324	66%	213	324	66%	213	324	66%
	J Church	--	--	--	312	909	34%	--	--	--	312	909	34%	--	--	--
	28L 19th Avenue Ltd	--	--	--	212	324	65%	212	324	65%	212	324	65%	212	324	65%
	Subtotal	*737*	*1,738*	*42%*	*737*	*1,557*	*47%*	*737*	*1,860*	*40%*	*737*	*1,557*	*47%*	*737*	*1,254*	*59%*
S	28 19th Avenue	326	378	86%	499	432	116 %	499	432	116 %	499	432	116 %	499	432	116 %
	28L 19th Avenue Ltd	180	270	67%	--	--	--	--	--	--	--	--	--	--	--	--
	Subtotal	*506*	*648*	*78%*	*499*	*432*	*116%*	*499*	*432*	*116%*	*499*	*432*	*116%*	*499*	*432*	*116%*
Parkmerced Shuttle		37	120	31%	37	120	31%	37	120	31%	37	120	31%	37	120	31%
TOTAL All Screenlines		**2,807**	**5,108**	**55%**	**2,800**	**4,671**	**60%**	**2,800**	**4,974**	**56%**	**2,800**	**4,671**	**60%**	**2,800**	**4,368**	**64%**

Notes: Rid= Ridership (number of riders); Cap= Capacity (number of riders; Util= Utilization (percent of capacity used))
Shading indicates unacceptable conditions (at or exceedance of 100% capacity utilization).

Source: Muni, 2008; AECOM, 2009.

Table III.29: Muni Screenline Summary – Tier 3 and Tier 4 (Weekday PM Peak Hour)

	Screenline	Tier 2			Tier 3			Tier 4A			Tier 4B			Tier 4C		
		Rid.	Cap.	Util.	Rid.	Cap.	Util.	Rid.	Cap.	Util.	Rid.	Cap.	Util.	Rid.	Cap.	Util.
Outbound																
N	18 46th Avenue	150	216	70%	146	216	67%	146	216	67%	146	216	67%	146	216	67%
	28 19th Avenue	410	378	109 %	317	378	84%	317	378	84%	317	378	84%	317	378	84%
	28L 19th Avenue Ltd	226	324	70%	324	324	100 %	324	324	100 %	324	324	100 %	324	324	100 %
	29 Sunset	271	216	125 %	271	324	84%	271	324	84%	271	324	84%	271	324	84%
	Subtotal	*1,057*	*1,134*	*93%*	*1,057*	*1,242*	*85%*	*1,057*	*1,242*	*85%*	*1,057*	*1,242*	*85%*	*1,057*	*1,242*	*85%*
NE	M Ocean View	1,145	1,212	94%	1,145	1,212	94%	1,145	1,212	94%	1,145	1,212	94%	1,145	1,212	94%
	Subtotal	*1,145*	*1,212*	*94%*	*1,145*	*1,212*	*94%*	*1,145*	*1,212*	*94%*	*1,145*	*1,212*	*94%*	*1,145*	*1,212*	*94%*
E	M Ocean View	595	1,414	42%	--	--	--	595	1,212	49%	--	--	--	595	606	98%
	29 Sunset	325	270	120 %	165	324	51%	165	324	51%	165	324	51%	165	324	51%
	J Church	--	--	--	596	1,010	59%	--	--	--	596	1,010	59%	--	--	--
	28L 19th Avenue Ltd	--	--	--	160	324	49%	160	324	49%	160	324	49%	160	324	49%
	Subtotal	*919*	*1,684*	*55%*	*920*	*1,658*	*56%*	*919*	*1,860*	*49%*	*920*	*1,658*	*56%*	*919*	*1,254*	*73%*
S	28 19th Avenue	235	324	73%	342	324	105 %	342	324	105 %	342	324	105 %	342	324	105 %
	28L 19th Avenue Ltd	112	270	42%	--	--	--	--	--	--	--	--	--	--	--	--
	Subtotal	*348*	*594*	*59%*	*342*	*324*	*105 %*	*342*	*324*	*105 %*	*342*	*324*	*105 %*	*342*	*324*	*105 %*
Parkmerced Shuttle		115	180	64%	114	180	63%	115	180	64%	114	180	63%	115	180	64%
TOTAL All Screenlines		**3,584**	**4,804**	**75%**	**3,578**	**4,616**	**78%**	**3,578**	**4,818**	**74%**	**3,578**	**4,616**	**78%**	**3,578**	**4,212**	**85%**

Table III.29 (continued)

Screenline		Tier 2			Tier 3			Tier 4A			Tier 4B			Tier 4C		
		Rid.	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**	**Rid.**	**Cap.**	**Util.**
Inbound																
N	18 46th Avenue	153	216	71%	147	216	68%	147	216	68%	147	216	68%	147	216	68%
	28 19th Avenue	407	432	94%	373	432	86%	373	432	86%	373	432	86%	373	432	86%
	28L 19th Avenue Ltd	159	270	59%	199	324	62%	199	324	62%	199	324	62%	199	324	62%
	29 Sunset	331	270	123 %	331	324	102 %	331	324	102 %	331	324	102 %	331	324	102 %
	Subtotal	*1,051*	*1,188*	*88%*	*1,051*	*1,296*	*81%*	*1,051*	*1,296*	*81%*	*1,051*	*1,296*	*81%*	*1,051*	*1,296*	*81%*
NE	M Ocean View	1,547	1,414	109 %	1,547	1,212	128 %	1,547	1,212	128 %	1,547	1,212	128 %	1,547	1,212	128 %
	Subtotal	*1,547*	*1,414*	*109 %*	*1,547*	*1,212*	*128 %*	*1,547*	*1,212*	*128 %*	*1,547*	*1,212*	*128 %*	*1,547*	*1,212*	*128 %*
E	M Ocean View	359	1,212	30%	--	--	--	359	1,212	30%	--	--	--	359	606	59%
	29 Sunset	418	378	111 %	213	324	66%	213	324	66%	213	324	66%	213	324	66%
	J Church	--	--	--	359	1,010	36%	--	--	--	359	1,010	36%	--	--	--
	28L 19th Avenue Ltd	--	--	--	206	324	63%	206	324	63%	206	324	63%	206	324	63%
	Subtotal	*777*	*1,590*	*49%*	*777*	*1,658*	*47%*	*777*	*1,860*	*42%*	*777*	*1,658*	*47%*	*777*	*1,254*	*62%*
S	28 19th Avenue	180	378	48%	264	378	70%	264	378	70%	264	378	70%	264	378	70%
	28L 19th Avenue Ltd	90	324	28%	--	--	--	--	--	--	--	--	--	--	--	--
	Subtotal	*270*	*702*	*38%*	*264*	*378*	*70%*	*264*	*378*	*70%*	*264*	*378*	*70%*	*264*	*378*	*70%*
Parkmerced Shuttle		178	180	99%	178	180	99%	178	180	99%	178	180	99%	178	180	99%
TOTAL All Screenlines		**3,823**	**5,074**	**75%**	**3,817**	**4,724**	**81%**	**3,817**	**4,926**	**77%**	**3,817**	**4,724**	**81%**	**3,817**	**4,320**	**88%**

Notes: Rid= Ridership (number of riders); Cap= Capacity (number of riders; Util= Utilization (percent of capacity used))
Shading indicates unacceptable conditions (at or exceedance of 100% capacity utilization).

Source: Muni, 2008; AECOM, 2009.

Among the Tier 4 scenarios, Tier 4C would result in the least capacity on the East screenline, as only half of the M Ocean View trains would serve the East screenline, with the other half terminating inside Parkmerced. In general, however, the various options for Tier 4 would not introduce new capacity utilization issues over Tier 3, as the ridership on the East screenline is low enough that the proposed changes would not result in at or exceedance of transit capacity.

As discussed under the Tier 2 analysis, the proposed Parkmerced shuttle to the Daly City BART station would operate at or near capacity. As this would be a privately operated shuttle, with the ability to adjust its operating plan to meet demand, it could operate with higher capacity utilization than typical public transit lines.

Operations Analysis

As documented in Section III.D, the effect of roadway congestion on the on-time performance of transit services within the study area was evaluated by aggregating the average approach delays at each study intersection the transit route passes through. The increases in travel times due to roadway congestion for Tier 3, Tier 4A, Tier 4B, and Tier 4C (as compared to Existing Conditions) are summarized in **Table III.30**. Detailed transit travel time calculations are included in **Appendix H**.

It should be noted that the travel time increases for the J Church assume a new station south of the intersection of 19th Avenue / Holloway Avenue and only represent travel time increases through the study area (i.e., west of Junipero Serra Boulevard / 19th Avenue).

Under Tier 3, the various public improvements at intersections along 19th Avenue are expected to result in slight changes to intersection delay. However, the planned transit signal priority treatments at the 19th Avenue intersections would enhance bus flows and result in reduced delays for the 28 19th Avenue, 28L 19th Avenue Limited, and 29 Sunset bus lines. The implementation of the TEP under Tier 3, with split M Ocean View and J Church operations, would reduce travel times on the M Ocean View through the study area, as the line would terminate at the existing station immediately north of the intersection of 19th Avenue / Holloway Avenue. Travel times on the J Church through the study area would be slightly lower than existing travel times on the M Ocean View through the study area because a new station would be constructed south of the intersection of 19th Avenue / Holloway Avenue. As a result, the J Church would not be subject to the additional travel time and delay at this intersection.

Table III.30: Muni Travel Time Increases – Tier 2, Tier 3 and Tier 4

Route	Peak Hour	Transit Travel Time Increases (m:ss)					
		Tier 1	Tier 2	Tier 3	Tier 4A	Tier 4B	Tier 4C
28 19th Avenue / 28L 19th Avenue Limited							
NB	AM	2:20	3:00	2:20	0:30	1:10	1:40
	PM	5:10	7:00	6:00	3:50	4:20	5:40
SB	AM	3:50	3:50	3:00	3:30	2:50	2:00
	PM	5:00	6:40	5:40	6:30	4:40	3:20
29 Sunset							
NB	AM	0:00	0:10	0:00	0:00	0:20	0:20
	PM	0:00	1:50	1:30	1:30	2:20	1:20
SB	AM	0:50	-0:20	-0:20	-0:20	0:20	0:20
	PM	3:10	2:20	2:20	2:20	2:50	2:30
M Ocean View							
NB	AM	0:20	0:50	-2;10[1]	0:30	1:10	2:30
	PM	0:30	2:20	-0:40[1]	1:50	2:30	3:50
SB	AM	0:40	0:40	-0:40[1]	0:40	2:40	4:00
	PM	0:20	1:20	-1:00[1]	0:30	2:20	3:30
J Church[2]							
NB	AM	--	--	-0:20	--	-0:40	--
	PM	--	--	-0:50	--	-0:50	--
SB	AM	--	--	0:00	--	0:00	--
	PM	--	--	-0:30	--	0:10	--

Notes:
All increases relative to existing travel time, except as noted below.
m:ss = minutes and seconds.
[1] Under Tier 3, the M Ocean View is assumed to terminate at the existing station immediately north of the intersection of 19th Avenue / Holloway Avenue.
[2] All travel times calculations for the J Church assume a new station built immediately south of the intersection of 19th Avenue / Holloway Avenue. J Church travel time increases are relative to the relevant existing M Ocean View travel times between 19th Avenue / Holloway Avenue and Junipero Serra Boulevard / 19th Avenue.

Source: AECOM, 2009.

Under Tier 4A, transit travel times on the 28 19th Avenue and 28L 19th Avenue Limited would decrease in the northbound direction as compared to Tier 1 and Tier 2 as a result of the additional northbound left-turn lane at Junipero Serra Boulevard / 19th Avenue. In the southbound direction, travel times would increase slightly in the weekday PM peak hour as compared to Tier 1 as a result of the new traffic signal at Junipero Serra Boulevard / Chumasero Drive. For the 29 Sunset and M Ocean View, minor fluctuations in travel time are expected as compared to both Tier 1 and Tier 2. (Under this scenario, the J Church would not operate in the study area.)

Under Tier 4B, transit travel times on the 28 19th Avenue and 28L 19th Avenue Limited would generally decrease in all directions as compared to Tier 1 and Tier 2, due to the major capacity improvements such as the additional southbound travel lane at 19th Avenue / Holloway Avenue (this lane would be sufficient to address the additional wait times from implementation of the 26-second all-red phase for train crossings) and the additional northbound left-turn lane at

Junipero Serra Boulevard / 19th Avenue. Travel times for the 29 Sunset in both directions would increase slightly over Tier 1 and Tier 2, as a result of increased delays at 19th Avenue / Holloway Avenue due to the 26-second all-red phase for train crossings. (Since the bus would be making a right turn at the southbound approach, it would not be affected by the proposed additional southbound through lane.) Travel times for the M Ocean View would increase as a result of the realignment to serve Parkmerced, causing net increases in travel time of approximately 1 to 2 minutes in both directions. (Note that under Tier 4B, the M Ocean View would terminate within Parkmerced and the southern portion of the route would be captured by the J Church line.) In addition, travel times for the J Church would be slightly less than for the corresponding existing M Ocean View alignment and similar to the values developed for Tier 3.

Similar to Tier 4B, Tier 4C would result in decreased transit travel times for the 28 19th Avenue and 28L 19th Avenue Limited as compared to Tier 1 and Tier 2. In the southbound direction, the travel time would decrease substantially as a result of the new southbound travel lane along 19th Avenue between Holloway Avenue and Junipero Serra Boulevard, which would offset any increases in delay at the 19th Avenue / Crespi Drive from the new northbound left-turn phase. As under Tier 4A and 4B, travel times for the 29 Sunset in both directions would increase slightly over Tier 1 and Tier 2 due to the 26-second all-red phase for train crossings. (Since the bus would be making a right turn at the southbound approach, it would not be affected by the proposed additional southbound through lane.) Travel times for the M Ocean View would increase between one to three minutes over Tier 1 and Tier 2 as a result of the realignment within Parkmerced and the additional signal delays required at 19th Avenue / Holloway Avenue and Junipero Serra Boulevard / 19th Avenue intersections, where the trains must wait to cross 19th Avenue during a transit-only signal phase.

It should be noted that the rerouting of the M Ocean View line within Parkmerced, as proposed in Tier 4C, would increase the run times for the portion of the line that continues to Balboa Park. Due to the longer distance of travel for this alignment, as compared to the current alignment within the median of 19th Avenue, the rerouted M Ocean View would have an increase of run times of between 2 to 3 minutes in both the inbound and outbound directions. (This was determined from a review of operating and acceleration/deceleration speeds, design speeds, wait times, dwell times, and other factors.) Based on the current run times from the start and end of each trip (typically between 40 and 50 minutes, depending on direction and time period), the additional travel time through the Parkmerced neighborhood would add about 5 percent to the operating times of the M Ocean View. Based on the planned service frequencies of the M Ocean View with the TEP, this increase in run times would require the use of one additional light rail vehicle during some time periods.

It should also be noted that Tier 4C would allow for the provision of a tail track (storage track) with the terminal stop at the southeast corner of the Parkmerced neighborhood. This tail track

would enhance Muni operations and service reliability by providing a storage area for an extra train or for a disabled train, and would enhance Muni system flexibility.

As previously discussed, increases in travel time have substantial effects for transit operations, as delays in service introduce more variability and reduce service reliability. In addition, longer travel times also increase the operating costs of each route and reduce the quality of service for passengers.

As indicated in **Table III.30**, however, a substantial portion of the future expected increase in transit travel times is due to background growth occurring under Tier 1 conditions. The foreseeable development projects included in Tier 2 would contribute additional increases to travel time, while the transit signal priority improvements proposed under Tier 3 would generally minimize this increase. The roadway and transit changes proposed under the Tier 4 scenarios would cause both travel time increases (e.g., the rerouting of the M Ocean View into the Parkmerced neighborhood under Tier 4B and Tier 4C) and decreases (e.g., the fourth southbound through lane along 19th Avenue under Tier 4C). In some cases, travel times would be slightly longer under the Tier 4 scenarios (such as for the M Ocean View and 29 Sunset) than under Tier 1 conditions, but in other cases, Tier 4 scenarios would improve travel times compared to Tier 1 conditions, offsetting the effects of increased traffic congestion on schedule adherence for transit services for not only the foreseeable development projects but also the background development.

PEDESTRIAN AND BICYCLE ANALYSIS

Tier 3

As described in Section III.C, improvements to the transportation network are proposed as part of ongoing studies and programs undertaken by City agencies. Specifically, as part of SFMTA's Better Streets Program, plans exist for traffic calming along Holloway Avenue and Garfield Avenue between Junipero Serra Boulevard and Ashton Street. The traffic calming measures are to include the installation of chicanes, pedestrian islands, bulb-outs, gateway treatments, and speed humps/cushions. Each measure would work to slow traffic through these roadways–especially as vehicles approach Junipero Serra Boulevard–making for safer crossing conditions for pedestrians.

As part of the San Francisco Bicycle Plan, new near-term bicycle facilities are planned for Holloway Avenue, Sagamore Street/Sickles Avenue, Buckingham Way, Portola Drive, and John Muir Drive. Along Holloway Avenue, new bike lanes would be established between Varela Avenue and Junipero Serra Boulevard. These bike lanes would provide a safe way for residents of Parkmerced and SFSU students to ride along Holloway Avenue as they pass both 19th Avenue and Junipero Serra Boulevard. Along Sagamore Street and Sickles Avenue, new bike lanes would be established in the westbound direction of Sagamore Street between Plymouth Avenue and Orizaba Avenue, and in the eastbound direction of Sagamore Street between Orizaba Avenue

and Capitol Avenue and of Sickles Avenue between Capitol Avenue and Alemany Boulevard. These new lanes would help bicyclists navigate through an I-280 on- and off-ramp area that is currently somewhat confusing for bicyclists. Along Buckingham Way approaching 19th Avenue, the bicycle lanes that would be provided would make space for bicyclists to enter the intersection without conflicting with vehicular traffic. Along Portola Drive, a combination of bicycle lanes and "sharrows" would be established between O'Shaunghnessy Boulevard and Sloat Boulevard. Along John Muir Drive, bicycle lanes would be provided in both the northbound and southbound directions between Lake Merced Boulevard and Skyline Drive, with no changes to the street capacities. Additional long-term improvements are also under consideration throughout the study area.

Tier 4A

As part of the improvements included in Tier 4A, enhanced pedestrian facilities are proposed at the intersections of 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, Junipero Serra Boulevard / 19th Avenue, Junipero Serra Boulevard / Chumasero Drive, Junipero Serra Boulevard / Brotherhood Way, Brotherhood Way / Chumasero Drive, Lake Merced Boulevard / Brotherhood Way, and Lake Merced Boulevard / Gonzalez Drive, Higuera Avenue, Acevedo Avenue, and Vidal Drive.

As described in Section III.C, numerous updates to the pedestrian network, such as improvements to crosswalks, additional bulb-outs, reconfigurations of sidewalks to shorten crossing distances, and the addition of stop signs on channelized right turns, are included in Tier 4A. Each improvement would be designed to improve upon the existing and Tier 2 facilities and to facilitate pedestrian activities.

Specifically, at the identified conflict locations, crossing conditions at the 19th Avenue / Holloway Avenue intersection would be greatly improved. Crosswalks would be reconfigured along the north side and south side of the intersection, bulb-outs would be installed at corners, and the radius of the northeast and southeast corners would be modified to reduce crossing distances and increase the size of pedestrian waiting areas. Given that this intersection is already heavily used by pedestrians and is expected to accommodate increased activity with the future background growth and development projects, these improvements would help improve pedestrian conditions and address existing issues.

In addition, Tier 4A includes new pedestrian crossings of 19th Avenue (at Crespi Drive), Junipero Serra Boulevard (at 19th Avenue and at Chumasero Drive), Brotherhood Way (at Chumasero Drive), and Lake Merced Boulevard (at Gonzalez Drive, Acevedo Avenue, and Vidal Drive). These additional access points would facilitate pedestrian and bicycle crossings into and out of Parkmerced and help reduce the potential pedestrian overcrowded conditions at the existing crosswalk locations that were identified under Tier 2.

Tier 4B

As part of the improvements included in Tier 4B, enhanced pedestrian facilities are proposed at the intersections of 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, Junipero Serra Boulevard / 19th Avenue, Junipero Serra Boulevard / Chumasero Drive, Junipero Serra Boulevard / Brotherhood Way, Brotherhood Way / Chumasero Drive, Lake Merced Boulevard / Brotherhood Way, and Lake Merced Boulevard / Gonzalez Drive, Higuera Avenue, Acevedo Avenue, and Vidal Drive. In addition, Tier 4B includes the relocation of the SFSU M Ocean View station from the 19th Avenue median to inside the Parkmerced neighborhood.

The proposed relocation of the SFSU station is anticipated to substantially enhance pedestrian conditions at the 19th Avenue / Holloway Avenue intersection. Currently, the vast majority of the M Ocean View riders at this station are destined to and from the west side of 19th Avenue (in particular, SFSU and Parkmerced). The volume of pedestrians would greatly increase in the future, with the proposed development projects at these two sites.

As previously discussed, pedestrian conditions at the current SFSU station are constrained as a result of the high volume of riders and the limited pedestrian facilities at the platform. In addition, riders need to cross half of 19th Avenue, which has limited pedestrian green times. By relocating the station to the southwest corner of the intersection, these riders would no longer have to cross 19th Avenue, and a larger station area would be provided. As a result, pedestrian conditions would be noticeably improved. It should be noted, however, that riders who are destined to points east of 19th Avenue would need to cross the entire width of 19th Avenue, which would somewhat increase their walking distance and exposure to potential conflicts.

In addition, Tier 4B includes the provision for a new station for the J Church extension in the median of 19th Avenue to the south of Holloway Avenue. As discussed earlier, ridership at this station would be relatively low (much lower than at the M Ocean View station); as such, the current issues associated with light rail stations in the 19th Avenue median would be minimized. However, transfer between the two lines would require pedestrians crossing the south crosswalk of 19th Avenue between the median and the relocated SFSU station, which would be an inconvenience to riders and would result in the potential for conflicts for pedestrians trying to walk between the two lines.

As described in Section III.C, numerous updates to the pedestrian network, such as improvements to crosswalks, additional bulb-outs, reconfigurations of sidewalks to shorten crossing distances, and the addition of stop signs on channelized right turns, are included in Tier 4B. Each improvement would be designed to improve upon the existing and Tier 2 facilities and to facilitate pedestrian activities.

Specifically, at the identified conflict locations, crossing conditions at the 19th Avenue / Holloway Avenue intersection would be improved. Crosswalks would be reconfigured along the north side

and south side of the intersection, bulb-outs would be installed at corners, and the radius of the northeast and southeast corners would be modified to reduce crossing distances and increase the size of pedestrian waiting areas. Given that this intersection is already heavily used by pedestrians and is expected to accommodate increased activity with the future background growth and development projects, these improvements would help improve pedestrian conditions.

In addition, Tier 4B includes new pedestrian crossings of 19th Avenue (at Crespi Drive), Junipero Serra Boulevard (at 19th Avenue and at Chumasero Drive), Brotherhood Way (at Chumasero Drive), and Lake Merced Boulevard (at Gonzalez Drive, Acevedo Avenue, and Vidal Drive). These additional access points would facilitate pedestrian and bicycle crossings into and out of Parkmerced and help reduce the potential pedestrian overcrowded conditions at the existing crosswalk locations that were identified under Tier 2.

It should be noted that to allow the M Ocean View to cross into the Parkmerced neighborhood at the intersection of 19th Avenue / Holloway Avenue, the cycle length of the traffic signal would need to be lengthened to accommodate the 26-second all-red phase. As a result of this increased cycle length, pedestrians and bicyclists crossing in both the northbound/southbound and eastbound/westbound directions may need to wait longer until the appropriate green signal phase starts.

Tier 4C

As part of the improvements included in Tier 4C, enhanced pedestrian facilities are proposed at the intersections of 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, Junipero Serra Boulevard / 19th Avenue, Junipero Serra Boulevard / Chumasero Drive, Junipero Serra Boulevard / Brotherhood Way, Brotherhood Way / Chumasero Drive, Lake Merced Boulevard / Brotherhood Way, and Lake Merced Boulevard / Gonzalez Drive, Higuera Avenue, Acevedo Avenue, and Vidal Drive. In addition, Tier 4C includes the relocation of the SFSU M Ocean View station from the 19th Avenue median to inside the Parkmerced neighborhood.

The proposed relocation of the SFSU station is anticipated to substantially enhance pedestrian conditions at the 19th Avenue / Holloway Avenue intersection. Currently, the vast majority of the M Ocean View riders at this station are destined to and from the west side of 19th Avenue (in particular, SFSU and Parkmerced). The volume of pedestrians would greatly increase in the future, with the proposed development projects at these two sites.

As previously discussed, pedestrian conditions at the current SFSU station are constrained as a result of the high volume of riders and the limited pedestrian facilities at the platform. In addition, riders need to cross half of 19th Avenue, which has limited pedestrian green times. By relocating the station to the southwest corner of the intersection, these riders would no longer have to cross 19th Avenue, and a more robust station area would be provided. As a result, pedestrian conditions would be noticeably improved. However, it should be noted that riders who

are destined to points east of 19th Avenue would need to cross the entire width of 19th Avenue, which would somewhat increase their walking distance and exposure to potential conflicts. The number of riders facing this situation would represent a low percentage of the total number of riders at this station, however.

As described in Section III.3, numerous updates to the pedestrian network, including improvements to crosswalks, additional bulb-outs, reconfigurations of sidewalks to shorten crossing distances, and the addition of stop signs on channelized right turns, are included in Tier 4C. Each improvement would be designed to improve upon the existing and Tier 2 facilities and to facilitate pedestrian activities.

Specifically, at the identified conflict locations, crossing conditions at the 19th Avenue / Holloway Avenue intersection would be greatly improved. Crosswalks would be reconfigured along the north side and south side of the intersection, bulb-outs would be installed at corners, and the radius of the northeast and southeast corners would be modified to reduce crossing distances and increase the size of pedestrian waiting areas. Given that this intersection is already heavily used by pedestrians and is expected to accommodate increased activity with the future background growth and development projects, these improvements would help improve pedestrian conditions.

In addition, Tier 4C includes new pedestrian crossings of 19th Avenue (at Crespi Drive), Junipero Serra Boulevard (at 19th Avenue and at Chumasero Drive), Brotherhood Way (at Chumasero Drive), and Lake Merced Boulevard (at Gonzalez Drive, Acevedo Avenue, and Vidal Drive). These additional access points would facilitate pedestrian and bicycle crossings into and out of Parkmerced and help reduce the potential pedestrian overcrowded conditions at the existing crosswalk locations that were identified under Tier 2.

It should be noted that to allow the M Ocean View to cross into the Parkmerced neighborhood at the intersection of 19th Avenue / Holloway Avenue and the intersection of Junipero Serra Boulevard / 19th Avenue, the cycle length of the traffic signal would need to be lengthened to accommodate the 26-second all-red phase. As a result of this increased cycle length, pedestrians and bicyclists crossing in both the northbound/southbound and eastbound/westbound directions may need to wait a longer duration until the appropriate green signal phase starts.

PARKING ANALYSIS

Tier 3

In general, the transportation network changes associated with the public projects in Tier 3 would not substantially affect parking conditions throughout the study area. However, the provision of new bike lanes as part of the San Francisco Bicycle Plan may result in the removal of on-street parking at certain locations. For instance, the bicycle lanes to be provided along Holloway Avenue between Varela Avenue and Junipero Serra Boulevard would likely require the

elimination of on-street parking along both eastbound and westbound Holloway Avenue. Similarly, the bicycle lanes to be provided along Sagamore Street and Sickles Avenue would also require either the removal of parking or the narrowing of travel lanes, and the bicycle lanes to be provided on Buckingham Way approaching 19th Avenue and on John Muir Drive will require the removal of on-street parking. In addition, implementation of the traffic calming improvements on Holloway Avenue and Garfield Avenue east of Junipero Serra Boulevard may necessitate the removal of some on-street parking spaces. Overall, parking occupancy throughout the study area would not be noticeably changed; however, there may be minor effects in the nearby vicinity of one of these projects.

Tier 4A

As part of the proposed Tier 4A improvements, some on-street parking along Holloway Avenue, 19th Avenue, Junipero Serra Boulevard, and Lake Merced Boulevard may need to be modified to accommodate the planned sidewalk improvements, intersection reconfigurations, and new access points. No substantial change in the provision of on-street parking spaces is anticipated as compared to Tier 2 conditions. In general, a nominal number of on-street parking spaces would likely be eliminated at each location where Tier 4A improvements are proposed. Overall, these changes would not noticeably change parking conditions throughout the study area and would have a minor effect on parking conditions in the immediate vicinity of the planned improvements.

Tier 4B

As part of the proposed Tier 4B improvements, some on-street parking along Holloway Avenue, 19th Avenue, Junipero Serra Boulevard, and Lake Merced Boulevard may need to be modified to accommodate the planned sidewalk improvements, intersection reconfigurations, and new access points. The addition of the M Ocean View realignment into Parkmerced and the associated extension of the J Church line along 19th Avenue would not affect on-street parking. No substantial change in the provision of on-street parking spaces is anticipated as compared to Tier 2 conditions. In general, a nominal number of on-street parking spaces would likely be eliminated at each location where Tier 4B improvements are proposed. Overall, these changes would not noticeably change parking conditions throughout the study area and would have a minor effect on parking conditions in the immediate vicinity of the planned improvements.

Tier 4C

As part of the proposed Tier 4C improvements, some on-street parking along Holloway Avenue, 19th Avenue, Junipero Serra Boulevard, and Lake Merced Boulevard may need to be modified to accommodate the planned sidewalk improvements, intersection reconfigurations, and new access points. The addition of the M Ocean View realignment into and out of Parkmerced would not affect on-street parking. No substantial change in the provision of on-street parking spaces is anticipated as compared to Tier 2 conditions. In general, a nominal number of on-street parking

spaces would likely be eliminated at each location where Tier 4C improvements are proposed. Overall, these changes would not noticeably change parking conditions throughout the study area and would have a minor effect on parking conditions in the immediate vicinity of the planned improvements.

HIGH-OCCUPANCY/TOLL LANE VARIANT

This section summarizes the results of the intersection, transit, pedestrian, bicycle, and parking analysis for the HOT Lane Variant conditions. For this evaluation, it was assumed that a new fourth southbound travel lane would be provided along 19th Avenue from north of Holloway Avenue through Junipero Serra Boulevard that would be dedicated to transit vehicles (including shuttles), carpool vehicles, and regular private automobiles that pay a user fee. North of Crespi Drive, the HOT lane would be available to transit vehicles only, plus vehicles making the right turn into Crespi Drive would also be allowed. (Carpool vehicles and private automobiles that pay user fees would not have access to the lane on this segment). South of Crespi Drive, transit vehicles, carpool vehicles, and private automobiles that pay a user fee would be able to use the HOT lane. The price of the user fee and the restrictions on carpool vehicles (whether two persons per vehicle or three persons per vehicle) would be set to limit the number of vehicles to ensure free-flow conditions.

For Tier 4A, this additional lane would necessitate the elimination of on-street parking along the west curb of 19th Avenue and geometric changes at the intersections of 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Avenue and Junipero Serra Boulevard / 19th Avenue. Since Tier 4B already includes an additional southbound travel lane between Holloway Avenue and Crespi Drive, this lane would be converted into the HOT lane, and the additional lane south of Crespi Drive would necessitate the elimination of on-street parking along the west curb of 19th Avenue and geometric changes at the intersection of Junipero Serra Boulevard / 19th Avenue. Since Tier 4C already includes an additional southbound travel lane, the lane was simply converted into the HOT lane for this analysis.

Intersection Analysis

To determine any impacts associated with the implementation of a fourth southbound 19th Avenue HOT lane from Holloway Avenue to Junipero Serra Boulevard, the southbound approach for each of the following three study area intersections was modified to include the HOT lane:

7. Junipero Serra Boulevard / 19th Avenue;
16. 19th Avenue / Holloway Avenue; and
17. 19th Avenue / Crespi Drive.

At the intersection of 19th Avenue / Holloway Avenue, the HOT lane would accommodate the transit vehicles plus private vehicles destined to make a right turn at Crespi Drive. (These right-turn vehicles were added to the lane due to the closely spaced intersections of 19th Avenue /

Holloway Avenue and 19th Avenue / Crespi Drive and the required merge distances.) At the intersection of 19th Avenue / Crespi Drive, the HOT lane would also include the transit vehicles (at the through movement) and the private vehicles destined to Crespi Drive (at the right-turn movement).

At these two intersections, the potential volumes that would use the HOT lane were developed using the TEP number of transit vehicles along that segment of 19th Avenue as a base (see the Tier 3 discussion). Southbound route and headway information for the 28 19th Avenue and 28L 19th Avenue Limited showed that approximately 13 transit trips would pass through each of the three intersections during weekday AM peak hour and 9 transit trips would pass through each of the three intersections during the weekday PM peak hour. The private vehicles making a right turn to Crespi Drive during the weekday AM and PM peak hours for each tier were obtained from the intersection analysis, as documented in Section III.E.

South of Crespi Drive, the HOT lane would still include the transit vehicles and would add carpool vehicles and private through vehicles that wish to pay the toll. To estimate the number of carpool vehicles and private vehicles in the HOT lane, a review of the HOT lane operations was conducted at the intersection of Junipero Serra Boulevard / 19th Avenue for each tier. At this location, the HOT lane was modeled individually, and traffic volumes were incrementally increased until the lane was determined to operate at LOS B conditions. (These conditions would ensure that the HOT lane would have a significant travel time advantage as compared to the regular traffic lane, and that congested conditions and queues would be avoided.) These HOT lane vehicles were then subtracted from the southbound through traffic volumes for the three regular travel lanes. Overall, it was determined that approximately 17 percent of the southbound through volumes at the intersection would use the HOT lane. As such, of the approximately 3,500 southbound vehicles at this approach, approximately 600 vehicles would be expected to use the HOT lane. As such, the HOT lane would need to have a user fee and the carpool restrictions set to limit the number of vehicles to this amount.

To determine the overall LOS of the HOT lane configuration at each intersection, two sets of analyses were performed. The first set evaluated the operating conditions of just the HOT lane. The second set of analyses evaluated the operating conditions of the three southbound mixed-flow lanes with the volume of the HOT lane subtracted out of the total southbound approach volumes. A comparison of the two sets of analyses was conducted to develop a weighted average of the HOT lane LOS and the southbound mixed-flow LOS. The resulting LOS was then applied to the southbound approach at each intersection to obtain the overall LOS of the HOT Lane Variant configuration.

Tier 4A

The Tier 4A HOT Lane Variant conditions include all the assumptions of Tier 4A with the exception of the following HOT lane features:

- Addition of a southbound through lane at 19th Avenue / Holloway Avenue, designated for transit vehicles and vehicles turning right to Crespi Drive;
- Conversion of the existing southbound through-right lane into a through lane, and the addition of a southbound through-right lane at 19th Avenue / Crespi Drive, designated for transit vehicles and vehicles turning right to Crespi Drive; and
- Addition of fourth southbound lane at Junipero Serra Boulevard / 19th Avenue, designed for transit vehicles, carpool vehicles, and vehicles paying the user toll, and relocation of the southbound 19th Avenue through lane (which continues to southbound 19th Avenue through the intersection) to a lane shared with the southbound Muni Metro light rail tracks.

A comparison of the Tier 4A and Tier 4A HOT Lane Variant conditions intersection LOS is summarized in **Table III.31**. Detailed LOS calculations are provided in **Appendix D**.

As shown in **Table III.31**, conditions at all three intersections would improve with the HOT lane. The addition of the southbound through lane designated for transit/right-turning vehicles and carpool vehicles/toll vehicles would noticeably improve the intersection operating conditions at all three intersections, as it would provide additional vehicular capacity. At all three intersections, the HOT lane is projected to operate at LOS A or LOS B conditions during both analysis time periods.

Table III.31: Intersection Level of Service – Tier 4A HOT Lane Variant (Weekday Peak Hours)

Intersection		Peak Hour	Tier 4A		Tier 4A HOT	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
7	Junipero Serra Blvd. / 19th Ave.	AM	**E**	**68.8**	D	54.3
		PM	**F**	**>80 / 1.26**	**E**	**70.1**
16	19th Ave. / Holloway Ave.	AM	**E**	**57.9**	D	40.2
		PM	**F**	**>80 / 1.06**	**E**	**68.2**
17	19th Ave. / Crespi Dr.	AM	**E**	**75.7**	**E**	**61.5**
		PM	**E**	**74.7**	**E**	**60.7**

Notes:
Bold indicates intersection operating at unacceptable level of service (LOS).
[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and volume-to-capacity (V/C) ratio are presented.

Source: AECOM, 2009.

Furthermore, during the weekday AM peak hour under the Tier 4A HOT Lane Variant conditions, the following two intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 4A conditions:

7. Junipero Serra Boulevard / 19th Avenue (LOS E to LOS D); and
16. 19th Avenue / Holloway Avenue (LOS E to LOS D).

Tier 4B

Tier 4B HOT Lane Variant conditions include all the assumptions of Tier 4B with the exception of the following HOT lane features:

- Conversion of the proposed additional fourth southbound through lane at 19th Avenue / Holloway Avenue to a HOT lane designated for transit vehicles and vehicles turning right to Crespi Drive;
- Conversion of the proposed additional southbound exclusive right-turn lane at 19th Avenue / Crespi Drive to a shared through-right-turn lane, designated for transit vehicles and vehicles turning right to Crespi Drive; and
- Addition of fourth southbound lane at Junipero Serra Boulevard / 19th Avenue, designed for transit vehicles, carpool vehicles, and vehicles paying the user toll, and relocation of the southbound 19th Avenue through lane (which continues to southbound 19th Avenue through the intersection) to a lane shared with the southbound Muni Metro light rail tracks.

A comparison of Tier 4B and Tier 4B HOT Lane Variant conditions intersection LOS is summarized in **Table III.32**. Detailed LOS calculations are provided in **Appendix E**.

As shown in **Table III.32**, conditions at two of the intersections (Junipero Serra Boulevard / 19th Avenue and 19th Avenue / Crespi Drive) would improve with the HOT lane. At all three intersections, the HOT lane is projected to operate a LOS A or LOS B conditions during both analysis periods.

Table III.32: Intersection Level of Service – Tier 4B HOT Lane Variant (Weekday Peak Hours)

Intersection		Peak Hour	Tier 4B		Tier 4B HOT	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
7	Junipero Serra Blvd. / 19th Ave.	AM	**E**	**69.1**	D	54.5
		PM	**F**	**>80 / 1.08**	**E**	**70.1**
16	19th Ave. / Holloway Ave.	AM	**E**	**62.2**	**E**	**67.2**
		PM	**F**	**>80 / 0.93**	**F**	**>80 / 0.93**
17	19th Ave. / Crespi Dr.	AM	**E**	**75.7**	**E**	**61.5**
		PM	**E**	**74.7**	**E**	**60.7**

Notes:
Bold indicates intersection operating at unacceptable level of service (LOS).
[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and volume-to-capacity (V/C) ratio are presented.

Source: AECOM, 2009.

Under Tier 4B, the intersection of 19th Avenue / Holloway Avenue already included the provision of a fourth southbound through lane. With this lane converted into a HOT lane, the number of

vehicles in the lane would decrease, thereby increasing the number of vehicles (and the associated delay) in the regular traffic lanes. Under Tier 4B, the intersection of 19th Avenue / Crespi Drive already included the provision of a fourth southbound right-turn lane. By converting this to a through lane, conditions would marginally improve. At the intersection of Junipero Serra Boulevard / 19th Avenue, the addition of the southbound through lane designated for transit, carpool vehicles, and toll vehicles would noticeably improve the intersection operating conditions, as it would provide additional vehicular capacity.

Furthermore, during the weekday AM peak hour under Tier 4B HOT Lane Variant conditions, the following intersection would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 4B conditions:

7. Junipero Serra Boulevard / 19th Avenue (LOS E to LOS D).

Tier 4C

Tier 4C HOT Lane Variant conditions include all the assumptions of Tier 4C with the exception of the following HOT lane variant features:

- Conversion of the proposed additional fourth southbound through lane at 19th Avenue / Holloway Avenue to a HOT lane designated for transit vehicles and vehicles turning right to Crespi Drive;
- Conversion of the proposed additional southbound through-right-turn lane at 19th Avenue / Crespi Drive to a HOT lane designated for transit vehicles and vehicles turning right to Crespi Drive; and
- Conversion of the proposed additional fourth southbound right-turn lane at Junipero Serra Boulevard / 19th Avenue into a HOT lane designated for transit vehicles, carpool vehicles, and vehicles paying the user toll.

A comparison of Tier 4C and Tier 4C HOT Lane Variant conditions intersection LOS is summarized in **Table III.33**. Detailed LOS calculations are provided in **Appendix F**.

As shown in **Table III.33**, during the Tier 4C HOT Lane Variant weekday AM and PM peak hour conditions, none of the three intersections would improve to acceptable conditions (from LOS E or F to LOS D or better) when compared to Tier 4C conditions. At all three intersections, the HOT lane is projected to operate at LOS A or LOS B conditions during both analysis periods.

The conversion of the fourth southbound lane at all three intersections into the HOT lane (designated for transit/right-turning vehicles, carpool vehicles, and toll vehicles) would slightly worsen intersection operating conditions. Although the HOT lane is expected to operate at LOS A or LOS B, overall intersection conditions would slightly worsen. With the proposed fourth additional southbound lane converted into a HOT lane, the number of vehicles in the lane would decrease, thereby increasing the number of vehicles (and the associated delay) in the regular traffic lanes, primarily due to the reduction in capacity of one through lane.

Table III.33: Intersection Level of Service – Tier 4C HOT Lane Variant (Weekday Peak Hours)

	Intersection	Peak Hour	Tier 4C		Tier 4C HOT	
			LOS	Delay or V/C[1]	LOS	Delay or V/C[1]
7	Junipero Serra Blvd. / 19th Ave.	AM	**E**	**57.4**	**E**	**66.6**
		PM	**F**	**>80 / 0.87**	**F**	**>80 / 0.87**
16	19th Ave. / Holloway Ave.	AM	**E**	**61.5**	**F**	**>80 / 0.78**
		PM	**F**	**>80 / 0.88**	**F**	**>80 / 0.88**
17	19th Ave. / Crespi Dr.	AM	**E**	**74.1**	**F**	**>80 / 0.64**
		PM	**F**	**>80 / 0.76**	**F**	**>80 / 0.76**

Notes:
Bold indicates intersection operating at unacceptable level of service (LOS).
[1] Delay presented in seconds per vehicle. For intersections that operate at LOS F, the delay per vehicle and volume-to-capacity (V/C) ratio are presented.

Source: AECOM, 2009.

Transit Analysis

The provision of a HOT lane along southbound 19th Avenue would improve operations and service reliability for the 28 19th Avenue and 28L 19th Avenue Limited bus lines. By providing a travel lane that has a limited number of regular vehicles, delays and congestion levels can be managed, which would result in enhanced conditions for transit vehicles. With the proposed configuration and operating plan for the HOT lane, buses heading in the southbound direction at the 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, and Junipero Serra Boulevard / 19th Avenue intersections would encounter minimal queues and wait times. However, the HOT lane would not improve conditions for the 29 Sunset bus line, as this route would not operate within the limits of the HOT lane, and would not affect conditions of the M Ocean View light rail line. To determine the effect of the HOT lane on operations of the 28 19th Avenue and 28L 19th Avenue Limited southbound, the travel times for the HOT Lane Variant were compared to the base scenario for Tier 4A, Tier 4B, and Tier 4C.

As shown in **Table III.34**, the addition of a HOT lane on a portion of southbound 19th Avenue is expected to substantially benefit Muni bus services traveling on this section. Under Tier 4A, travel times for the HOT Lane Variant would be 2 to 4 minutes shorter than with the original roadway configuration. Under Tier 4B, travel times for the HOT Lane Variant would be about 2 to 3 minutes shorter than with the original configuration. (This reduction would be less than with Tier 4A HOT Lane Variant, as Tier 4B already includes improvements along the southbound 19th Avenue at the 19th Avenue / Holloway Avenue and 19th Avenue / Crespi Drive intersections.) Under Tier 4C, travel times for the HOT Lane Variant would be approximately 1 minute shorter than with the original configuration. The Tier 4C HOT Lane Variant would have only a modest improvement as compared to Tier 4C, since Tier 4C already included an additional southbound 19th Avenue travel lane.

Table III.34: Muni Travel Time Increases – HOT Lane Variant

Route	Peak Hour	Transit Travel Time Increases (m:ss)					
		Tier 4A	Tier 4A HOT	Tier 4B	Tier 4B HOT	Tier 4C	Tier 4C HOT
28 19th Avenue / 28L 19th Avenue Limited							
SB	AM	3:30	1:10	2:50	1:10	2:00	1:20
	PM	6:30	1:50	4:40	1:40	3:20	2:00

Notes:
All increases relative to existing travel time.
m:ss = minutes and seconds.

Source: AECOM, 2009.

In addition, due to the available right-of-way width of the southbound 19th Avenue approach to Junipero Serra Boulevard, it would not be possible to provide a fourth southbound right-turn lane (to become the HOT lane) for Tier 4A and Tier 4B. In order to fit this lane, the southbound through lane (which continues on to southbound 19th Avenue) would need to be relocated to share a lane with the southbound light rail tracks. This would be a similar configuration as the existing northbound left-turn movement at the 19th Avenue / Winston Drive intersection. Since the southbound 19th Avenue through movement has relatively low traffic volumes through the day and during peak hours, and since the light rail travels during the same signal phase, this modification would not substantially degrade light rail operations for Tier 4A HOT Lane Variant and Tier 4B HOT Lane Variant.[7]

Bicycle and Pedestrian Analysis

At the locations where a new fourth southbound travel lane would need to be established to provide the HOT lane (at 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, and Junipero Serra Boulevard / 19th Avenue for Tier 4A, and at Junipero Serra Boulevard / 19th Avenue for Tier 4B), pedestrian conditions would be somewhat affected.

For the Tier 4A HOT Lane Variant and Tier 4B HOT Lane Variant, pedestrian circulation conditions at the intersections of 19th Avenue / Holloway Avenue and 19th Avenue / Crespi Drive would be similar to those described under Tier 4B, as adding a fourth southbound lane while maintaining the light rail median in the middle of 19th Avenue would limit the amount of pedestrian improvements that can be implemented. However, it would be feasible to establish a series of sidewalk bulbs and median refuge areas and widen crosswalks to improve conditions. Pedestrian circulation conditions at the intersection of Junipero Serra Boulevard / 19th Avenue would be similar to those described under Tier 4C. In addition, the elimination of on-street

[7] This configuration for the southbound 19th Avenue through movement was recommended by SFMTA staff. However, if this configuration is determined to be impractical or infeasible, it may be possible to instead eliminate the southbound through movement entirely (which would require vehicles to reroute to different streets to access this area).

parking along the west curb of 19th Avenue between Crespi Drive and Junipero Serra Boulevard could affect pedestrian conditions, as on-street parking typically acts as a "buffer" to help separate pedestrians from moving vehicles.

For the Tier 4C HOT Lane Variant, pedestrian circulation conditions at the intersections of 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, and Junipero Serra Boulevard / 19th Avenue would be similar to those described under Tier 4C.

In general, bicyclist conditions would not be substantially affected by the HOT lane, as it would not affect any existing or proposed future on-street bicycle facilities.

Parking Analysis

As noted above, it would be necessary to prohibit on-street parking along the west side of 19th Avenue to create the HOT lane (fourth southbound lane) for the Tier 4A HOT Lane Variant and Tier 4B HOT Lane Variant since both scenarios maintain the light rail median. Between the realigned Crespi Drive and Junipero Serra Boulevard, there are currently about 30 on-street parking spaces provided, all of which would be eliminated with the HOT Lane Variant. However, this reduction would be relatively minor in the context of the overall on-street parking supply in the study area.

For the Tier 4C HOT Lane Variant, parking conditions along 19th Avenue would be similar to those described under Tier 4C. Since the fourth southbound lane could be created by narrowing the former light rail median, on-street parking along the west side of 19th Avenue would not be affected by the HOT lane.

F. ANALYSIS SUMMARY

This chapter summarizes the results of the Tier 3, Tier 4A, Tier 4B, and Tier 4C analyses for intersection, transit, pedestrian/bicycle, and parking conditions.

INTERSECTION CONDITIONS

Table III.35 presents the number of analysis intersections that currently operate with unacceptable conditions (LOS E or F) and the number that are projected to operate with unacceptable conditions under each of the future tiers.

Table III.35: Summary of Intersections Operating at Unacceptable Levels of Service (LOS)

Time Period	Existing	Tier 1	Tier 2	Tier 3	Tier 4A	Tier 4B	Tier 4C
Weekday AM Peak Hour	7	11	13	13	11	11	11
Weekday PM Peak Hour	11	15	20	20	19	19	19
Weekend Midday Peak Hour	3	5	6	6	6	6	7

Source: AECOM, 2009.

Tier 2

When compared to Tier 1 conditions, the vehicle trips generated by the foreseeable development projects would result in two additional intersections that would operate at LOS E or F during the weekday AM peak hour, five additional intersections that would operate at LOS E or F during the weekday PM peak hour, and one additional intersection that would operate at LOS E or F during the weekend midday peak hour.

Tier 3

When compared to Tier 2 conditions, the addition of the public improvements (Tier 3) would not result in any additional intersections that would operate at LOS E or F.

Tier 4A

When compared to Tier 2 conditions, the Tier 4A improvements would not result in any additional intersections that would operate at LOS E or F. In addition, two intersections would improve to acceptable conditions during the weekday AM peak hour and one intersection would improve to acceptable conditions during the weekday PM peak hour with the private improvements included in Tier 4A.

Tier 4B

When compared to Tier 2 conditions, the Tier 4B improvements would not result in any additional intersections that would operate at LOS E or F. In addition, two intersections would improve to acceptable conditions during the weekday AM peak hour and one intersection would improve to acceptable conditions during the weekday PM peak hour with the private improvements included in Tier 4B.

Tier 4C

When compared to Tier 2 conditions, the Tier 4C improvements would result in one additional intersection that would operate at LOS E or F during the weekend midday peak hour. In addition, two intersections would improve to acceptable conditions during the weekday AM peak hour and one intersection would improve to acceptable conditions during the weekday PM peak hour with the private improvements included in Tier 4C.

Overall, the effects of the proposed realignment of the M Ocean View light rail line and its corresponding requirement for all-red signal phases at 19th Avenue / Holloway Avenue (Tier 4B and Tier 4C) and Junipero Serra Boulevard / 19th Avenue (Tier 4C), would generally be alleviated by the proposed additional travel lanes at both locations.

TRANSIT CONDITIONS

Table III.36 presents the number of analysis corridors and Muni bus and light rail lines that currently operate over capacity under Existing Conditions, as well as the number that are projected to operate over capacity under each of the future tiers (presented for the four screenlines: North, Northeast, East, and South).

Under Existing Conditions, all lines operate below capacity except for the 29 Sunset on the North screenline, inbound to the study area during the weekday PM peak hour. With the increase in ridership projected in Tier 1 and Tier 2, conditions on the 29 Sunset would worsen, expanding to both directions (inbound to the study area and outbound from the study area) and two screenlines (North and East) during the weekday PM peak hour. The 29 Sunset would also operate over capacity in the weekday AM peak hour under Tier 2, inbound to the study area on both the North and East screenlines. In addition, the 28 19th Avenue and M-Ocean View would also operate over capacity in multiple directions and time periods.

The rerouting of transit lines and changes to service levels by SFMTA as part of the TEP, as assessed in Tier 3, would improve most of the over-capacity conditions on the 29 Sunset, but would introduce additional over-capacity conditions for transit service in the 19th Avenue Corridor, particularly on the South screenline coming to and from Daly City BART station.

Table III.36: Summary of Muni Lines Operating above Capacity

Time Period	Existing	Tier 1	Tier 2	Tier 3	Tier 4A	Tier 4B	Tier 4C
Weekday AM Peak Hour							
Inbound	--	29 (N) 29 (E)	29 (N) 29 (E)	28 (S)	28 (S)	28 (S)	28 (S)
Outbound	--	--	28 (N)	M (NE)	M (NE)	M (NE)	M (NE)
Weekday PM Peak Hour							
Inbound	29 (N)	29 (N) 29 (E)	29 (N) M (NE) 29 (E)	29 (N) M (NE) 28 (S)	29 (N) M (NE) 28 (S)	29 (N) M (NE) 28 (S)	29 (N) M (NE) 28 (S)
Outbound	--	29 (N) 29 (E)	28 (N) 29 (N) 29 (E)	28L (N) 28 (S)	28L (N) 28 (S)	28L (N) 28 (S)	28L (N) 28 (S)

Notes:
Parentheses indicates screenline: N = North, NE = Northeast, E = East, S = South.

Source: AECOM, 2009.

The proposed changes to the M Ocean View and J Church lines in the Tier 4A, Tier 4B, and Tier 4C scenarios would not result in the addition or removal of over-capacity conditions above what occurs under Tier 3 with the TEP changes.

In addition, the transit run-time analysis indicates that the increased delay at intersections due to roadway congestion in Tier 1 and Tier 2 would have a minimal effect on the 29 Sunset's travel time through the study area, with increases of less than 2 minutes. Bus service in the 19th Avenue corridor on the 28 19th Avenue and 28L 19th Avenue Limited would encounter increases of between 3 and 8 minutes, depending on direction and peak hour, as a result of intersection delay under the Tier 1 and Tier 2 scenarios. In addition, light rail service on the M Ocean View in the study area would encounter a travel time increase of less than 2 minutes.

The public improvements, such as signal coordination along 19th Avenue under Tier 3, would slightly improve travel time through the study area on the 28 19th Avenue and 28L 19th Avenue Limited. Travel time on the 29 Sunset and M Ocean View would remain largely unchanged from the Tier 2 conditions. The proposed changes under Tier 4A, Tier 4B, and Tier 4C would have substantial effects on travel times for all three bus lines. In each Tier 4 scenario, the 28 19th Avenue and 28L 19th Avenue Limited would have reduced travel times as compared to Tier 2, due to the additional travel lanes provided at key intersections. For the 29 Sunset line, the various changes would have minimal effect on travel time, with only a maximum increase or decrease in travel time of approximately 30 seconds. However, travel times on the M Ocean View for Tier 4B and Tier 4C would increase due to the rerouting of the light rail through the Parkmerced neighborhood. These increases in delays due to traffic conditions would affect Muni service

reliability and operations, increasing the operating costs of the routes and reducing the quality of service to riders.

As assessed in Tier 4B and Tier 4C, the proposed relocation of the SFSU station into the Parkmerced neighborhood at the southwest corner of the 19th Avenue / Holloway Avenue intersection would improve rider access to the station and would address the outstanding station area and queuing area overcrowding conditions, as compared to Tier 3 and Tier 4A. However, since Tier 4B would also include the extension of the J Church with a new station at the south side of 19th Avenue / Holloway Avenue, passengers transferring between lines would be inconvenienced.

The rerouting of the M Ocean View line through Parkmerced in Tier 4C would result in an increase in total run times of about 5 percent in both the inbound and outbound directions, which would require the use of an additional train during some periods to meet the TEP's proposed service plan. Compared to the existing alignment in the median of 19th Avenue, an alignment through Parkmerced would increase travel times through the study area by approximately 1 to 2 minutes.

PEDESTRIAN AND BICYCLE CONDITIONS

The additional pedestrian activity within the study area was projected as part of Tier 1 and Tier 2. Overall, it is anticipated that, throughout most of the study area, there would be minor changes to pedestrian volumes and conditions that would not substantially change over existing conditions. However, in the vicinity of the proposed Stonestown, SFSU, and Parkmerced projects (as evaluated in Tier 2), there would be a substantial increase in pedestrians, primarily along 19th Avenue. This pedestrian activity would be due to people walking to and from these destinations, plus people walking to transit and parking. These additional pedestrians would exacerbate the current pedestrian problem locations, such as the intersections of 19th Avenue / Winston Drive and 19th Avenue / Holloway Avenue. The limited number of pedestrian connections to the Parkmerced neighborhood would cause additional access issues.

The proposed public improvements in Tier 3 would not address any of the existing and projected future pedestrian issues in the study area.

As part of the Tier 4A, Tier 4B, and Tier 4C scenarios, substantial enhancements to the pedestrian environment, such as wider and realigned crosswalks, corner bulbs and sidewalk extensions, and new crossing locations, would be included. Combined, these would help address the pedestrian conditions on streets around the Parkmerced neighborhood. Both Tiers 4B and 4C would include the relocation of the current M Ocean View station at 19th Avenue / Holloway Avenue into the Parkmerced neighborhood at the southwest corner of the intersection, which would improve the pedestrian experience at this intersection by reducing the walk distances and minimizing the crossing of 19th Avenue. However, since Tier 4B would require transfers between the M Ocean

View and the J Church lines (with a new station on the south side of the intersection) and additional crossings of 19th Avenue, riders would be inconvenienced.

It should be noted that since no improvements were assumed as part of the Stonestown and SFSU projects, problematic pedestrian locations would still exist north of Parkmerced.

Currently, there are several bicycle facilities within the study area, including signed bicycle routes and on-street bicycle lanes. There are low to moderate levels of bicycle activity in the study area, except near major destinations and the schools/institutions (in particular, SFSU). Overall, bicycle conditions are generally acceptable throughout the day and during peak hours. With the increase in development projected as part of the Tier 1 and Tier 2 conditions, there would be a commensurate increase in bicycle activity.

The San Francisco Bicycle Plan, addressed as part of Tier 3, includes several new short-term bicycle facilities in the study area, including along Buckingham Way, 19th Avenue, Holloway Avenue, Portola Drive, John Muir Drive, and Sagamore Street / Sickles Avenue. These new lanes would help address existing gaps in the bicycle network and serve to improve overall bicycle conditions.

No new or modified bicycle facilities were included in Tier 4A, Tier 4B, or Tier 4C. In general, the proposed intersection modifications within these tiers would not substantially affect bicycle conditions or conflict with implementation of the short-term projects.

PARKING CONDITIONS

On-street parking, including time-limited unmetered spaces and metered spaces, is currently provided throughout the study area. In addition, off-street parking is provided for the major destinations in the area, such as Lakeshore Plaza and SFSU. The on-street parking is generally well-used throughout the day and evening periods, with some pockets of higher demand.

With the growth in development in the area, as assessed in Tier 1 and Tier 2, there would be an increase in parking demand, primarily focused near Stonestown, SFSU, and Parkmerced. Although the future parking supply at these locations is not currently known, it is likely that both SFSU and Parkmerced would have a substantial parking shortfall. (It is anticipated that the Stonestown Galleria would continue to supply sufficient parking to accommodate its typical daily parking demand.) As a result, the unmet parking demand in the area would tend to spill over in the adjacent residential neighborhoods, exacerbating any current parking problems.

In general, parking conditions under Tier 3, Tier 4A, Tier 4B, and Tier 4C would be similar to those under Tier 2. The proposed improvements to roadways, pedestrian facilities, bicycle facilities, and transit facilities would result in the minor elimination of on-street parking spaces (e.g., along Holloway Avenue to accommodate the planned new bicycle lanes). As a result,

parking conditions in these areas would be somewhat worse than under Tier 2. However, parking conditions throughout the remainder of the study area would not substantially change from those determined for Tier 2.

HOT LANE VARIANT

A variant configuration for Tier 4A, Tier 4B, and Tier 4C that included the provision of a High-Occupancy/Toll (HOT) lane along southbound 19th Avenue from north of Holloway Avenue through Junipero Serra Boulevard was analyzed. North of Crespi Drive, this lane would be restricted to transit vehicles and private vehicles making a right turn into Crespi Drive; south of Crespi Drive, the lane would be restricted to transit vehicles, carpool vehicles, and private vehicles wishing to pay a toll. Carpool vehicle restrictions and the user fee for private vehicles would be set to limit the number of vehicles in the HOT lane and maintain free-flow travel.

In general, intersection operating conditions would be improved at the study intersections that would be affected by the HOT lane: 19th Avenue / Holloway Avenue, 19th Avenue / Crespi Drive, and Junipero Serra Boulevard / 19th Avenue. The largest benefit would be for the Tier 4A HOT Lane Variant scenario, as the HOT lane would result in an overall increase in capacity in the southbound direction. Since Tier 4B already includes an additional lane at the intersections of 19th Avenue / Holloway Avenue and 19th Avenue / Crespi Drive, the Tier 4B HOT Lane Variant scenario would have lesser improvement. Similarly, since Tier 4C already includes an additional lane at all three intersections, the Tier 4C HOT Lane Variant scenario would have worse intersection operating conditions. Note that for each scenario, the HOT lane itself would operate with free-flow conditions.

The HOT lane would also decrease delays for the 28 19th Avenue and 28L 19th Avenue Limited bus lines in the southbound direction, which would improve operating speeds and improve service reliability.

Provision of a fourth southbound lane for the HOT lane would not substantially affect pedestrian and bicyclist conditions, although the restriction of on-street parking along the west side of the street for Tier 4A and Tier 4B under the HOT Lane Variant would remove the buffer for pedestrians.

In addition, the restriction of on-street parking along the west side of 19th Avenue for Tier 4A and Tier 4B under the HOT Lane Variant would result in the elimination of about 30 on-street parking spaces.

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