BART WSX DSEIR
DRAFT TECHNICAL REPORT - TRANSPORTATION

Prepared for

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By

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1. SETTING AND EXISTING CONDITIONS

Along the new rail line from Fremont to Warm Springs, up to two new stations are proposed. One is located at Warm Springs, south of the intersection of South Grimmer Boulevard and Warm Springs Boulevard. A second optional station location would be in Irvington, located near the southwest corner of the intersection of Washington Boulevard and Driscoll Road / Osgood Road.

1.1 REGIONAL ROADWAY ACCESS

Several types of roadways serve Fremont, according to the Fremont General Plan. *Freeways* (including interstate highways and state routes) are defined as high-speed, high-capacity facilities with grade-separated intersections that are intended to meet the need for longer trips. Freeways are under Caltrans jurisdiction. *Arterials* are high-capacity local facilities that meet demand for longer, through trips in the community. Arterials have controlled access, can be divided, and typically have two to three lanes in each direction. The other types of streets in the city are parkways, collectors, and local roadways.

The regional roads in the Proposed Project area are listed and described below and shown in Figure 1-1. I-880, I-680, Mission Boulevard (includes SR 262 and SR 238), Stevenson Boulevard, Auto Mall Parkway/Durham Road, Fremont Boulevard, Grimmer Boulevard, Warm Springs Boulevard/ Osgood Road, and Washington Boulevard/Driscoll Road. Table 1-1 and Figure 1-2 summarize the traffic volumes of the roadways. Use of these regional roadways for access to the proposed BART stations is discussed below under *Proposed Project Conditions*.

1.1.1 Interstate Highways

I-880 runs generally north–south (northwest–southeast) through the East Bay just west of the study area. On a regional level, the interstate passes through Fremont as it runs between San Jose and Oakland. The segment of I-880 closest to the study area is an eight-lane facility, including one lane in each direction designated as a high-occupancy-vehicle (HOV) lane during peak periods.

I-680 runs north–south, then east–west, east of the study area. On a regional level, the interstate passes through Fremont as it runs between San Jose and eastern Alameda and Contra Costa Counties (eventually to Fairfield). The segment of I-680 in the Proposed Project vicinity is a six-lane facility. Along this corridor, Caltrans has recently completed a HOV lane in the southbound direction between the SR 237 and SR 84 interchanges with I-680. An auxiliary lane in the southbound direction between the Auto Mall Parkway and SR 262 interchanges with I-680 was completed last year. There are plans to build a northbound HOV lane when funding becomes available.

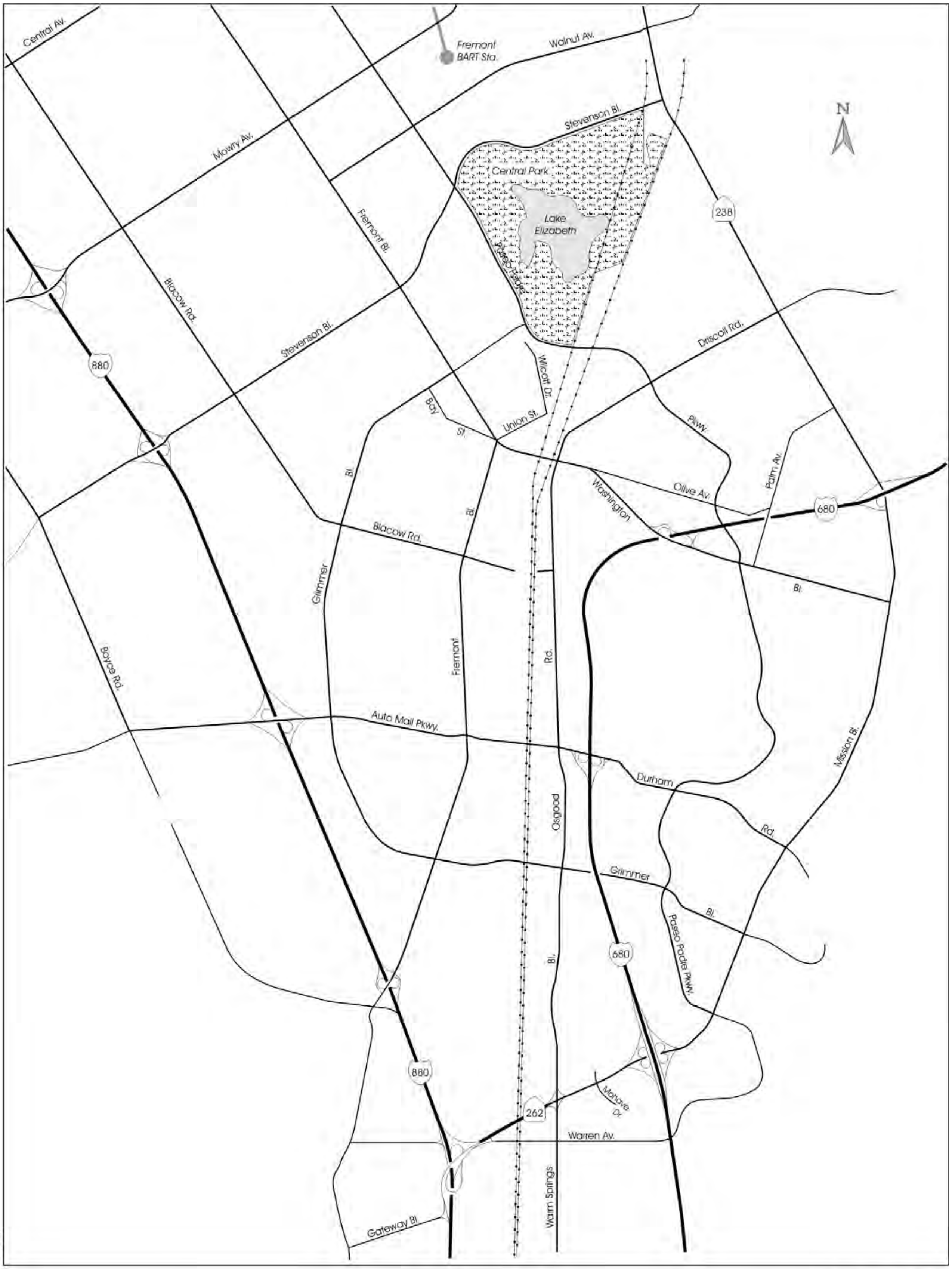

Figure 1-1
REGIONAL ROADS

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1.1.2 State Routes

Mission Boulevard (includes SR 238 and SR 262) is a four-lane facility in southern and eastern parts of the Proposed Project area. Mission Boulevard runs east from its interchange with I-880, intersects with I-680, after which it gradually turns northward, intersecting with another portion of I-680 and continuing to the north. Two parts of Mission Boulevard are designated as state routes: SR 262 between I-880 and the southern intersection with I-680, and SR 238 north of the northern intersection with I-680. (To minimize confusion, these segments are referenced by their state route designations in this chapter.)

1.1.3 Arterials

Stevenson Boulevard runs generally east–west just north of the Optional Irvington Station. Stevenson Boulevard and Blacow Road would provide access to I-880 from the Optional Irvington Station area. Stevenson Boulevard is generally a four-lane arterial. It becomes six lanes immediately west of the Civic Center Drive intersection, but narrows back to four lanes immediately east of the Fremont Boulevard intersection. There is an interchange where Stevenson Boulevard intersects I-880.

Auto Mall Parkway/Durham Road runs east–west through Fremont between Mission Boulevard and the Tri-Cities Landfill. It is a major, four- to six-lane arterial with interchanges at I-880 and I-680. Auto Mall Parkway was formerly known as Durham Road west of I-680; Durham Road is still the roadway designation east of I-680.

Fremont Boulevard extends from the southern part of Fremont, where there is an interchange with I-880, to a second interchange with I-880 in the northern part of Fremont. Fremont Boulevard is a primary north–south circulation route in Fremont. Currently, the roadway alternates between four and six lanes throughout the Proposed Project vicinity.

Grimmer Boulevard is a four-lane arterial. It begins at Paseo Padre Parkway and extends south past Auto Mall Parkway where it curves east past Fremont Boulevard and I-680 to end at Mission Boulevard. There is no access to I-680 from Grimmer Boulevard.

Warm Springs Boulevard/Osgood Road is a two-lane road that runs north–south from the City of Milpitas to Washington Boulevard in Fremont. Osgood Road extends from Washington Boulevard to Grimmer Boulevard. Warm Springs Boulevard extends south from Grimmer Boulevard to the City of Milpitas where it turns into Milpitas Boulevard.

Washington Boulevard extends from Fremont Boulevard to Mission Boulevard. It provides access from I-680 to the proposed Optional Irvington Station. Washington Boulevard currently has four lanes.

Driscoll Road is a four-lane road that runs generally east–west (northeast–southwest) from SR 238 to Washington Boulevard. At Washington Boulevard, Driscoll Road becomes Osgood Road.

Table 1-1
2000 Traffic Volumes in Fremont

STREET	SEGMENTS From:	To:	Average Daily Traffic Volume 2000 ADT
I-880			
	SR 262/Mission Boulevard	Auto Mall Parkway	161,000
	Auto Mall Parkway	Stevenson Boulevard	170,000
	Stevenson Boulevard	Mowry Avenue	173,000
I-680			
	SR 262/Mission Boulevard	Durham Road	147,000
	Durham Road	Washington Street	136,000
	Washington Street	Mission Boulevard/SR 238	131,000
Auto Mall Parkway			
	I-680	Osgood Road	47,800
	Osgood Road	Grimmer Boulevard	37,000
	Grimmer Boulevard	I-880	55,900
Blacow Road			
	Fremont Boulevard	Grimmer Boulevard	16,600
	Grimmer Boulevard	Stevenson Boulevard	24,800
	North of Stevenson Boulevard		23,300
Durham Road			
	Mission Boulevard	Paseo Padre Parkway	4,600
	Paseo Padre Parkway	I-680	9,400
Fremont Boulevard			
	W. Warren Avenue	Lakeview Boulevard	15,000
	I-880	W. Warren Avenue	22,300
	Grimmer Boulevard	I-880	30,100
	Auto Mall Parkway	Grimmer Boulevard	14,600
	Blacow Road	Auto Mall Parkway	32,100
	Washington Boulevard	Blacow Road	20,100
	Grimmer Boulevard	Washington Boulevard	32,800
	Stevenson Boulevard	Grimmer Boulevard	36,400
Grimmer Boulevard			
	Auto Mall Parkway	Blacow Road	21,200
	Blacow Road	Fremont Boulevard	19,200
	Fremont Boulevard	Paseo Padre Parkway	12,500
Mission Boulevard			
	I-880	Warm Springs Boulevard	68,100
	Warm Springs Boulevard	I-680	63,900
	I-680	Paseo Padre Parkway	29,700
	Grimmer Boulevard	Paseo Padre Parkway	26,400
	Durham Road	Grimmer Boulevard	20,500
	Washington Boulevard	Durham Road	26,400
	I-680	Washington Boulevard	20,400
	Driscoll Road	I-680	36,200
	Stevenson Boulevard	Driscoll Road	35,100
	Walnut Avenue	Stevenson Boulevard	33,000
	Mowry Avenue	Walnut Avenue	30,800
Osgood Road			
	Auto Mall Parkway	Grimmer Boulevard	17,600
	Washington Boulevard	Auto Mall Parkway	15,200
South Grimmer Boulevard			
	Mission Boulevard	Paseo Padre Parkway	3,400
	Paseo Padre Parkway	Warm Springs Boulevard	7,000
	Warm Springs Boulevard	Fremont Boulevard	22,100
	Fremont Boulevard	Auto Mall Parkway	22,600
Stevenson Boulevard			
	Paseo Padre Parkway	Fremont Boulevard	27,900
	Fremont Boulevard	Blacow Road	40,300
	Blacow Road	I-880	62,700
Warm Springs Boulevard			
	Grimmer Boulevard	Mission Boulevard	24,100
Washington Boulevard			
	Mission Boulevard	Paseo Padre Parkway	12,700
	Paseo Padre Parkway	I-680	16,300
	I-680	Osgood Road	23,000
	Osgood Road	Fremont Boulevard	31,400

Source: City of Fremont, 2000 Traffic Volumes

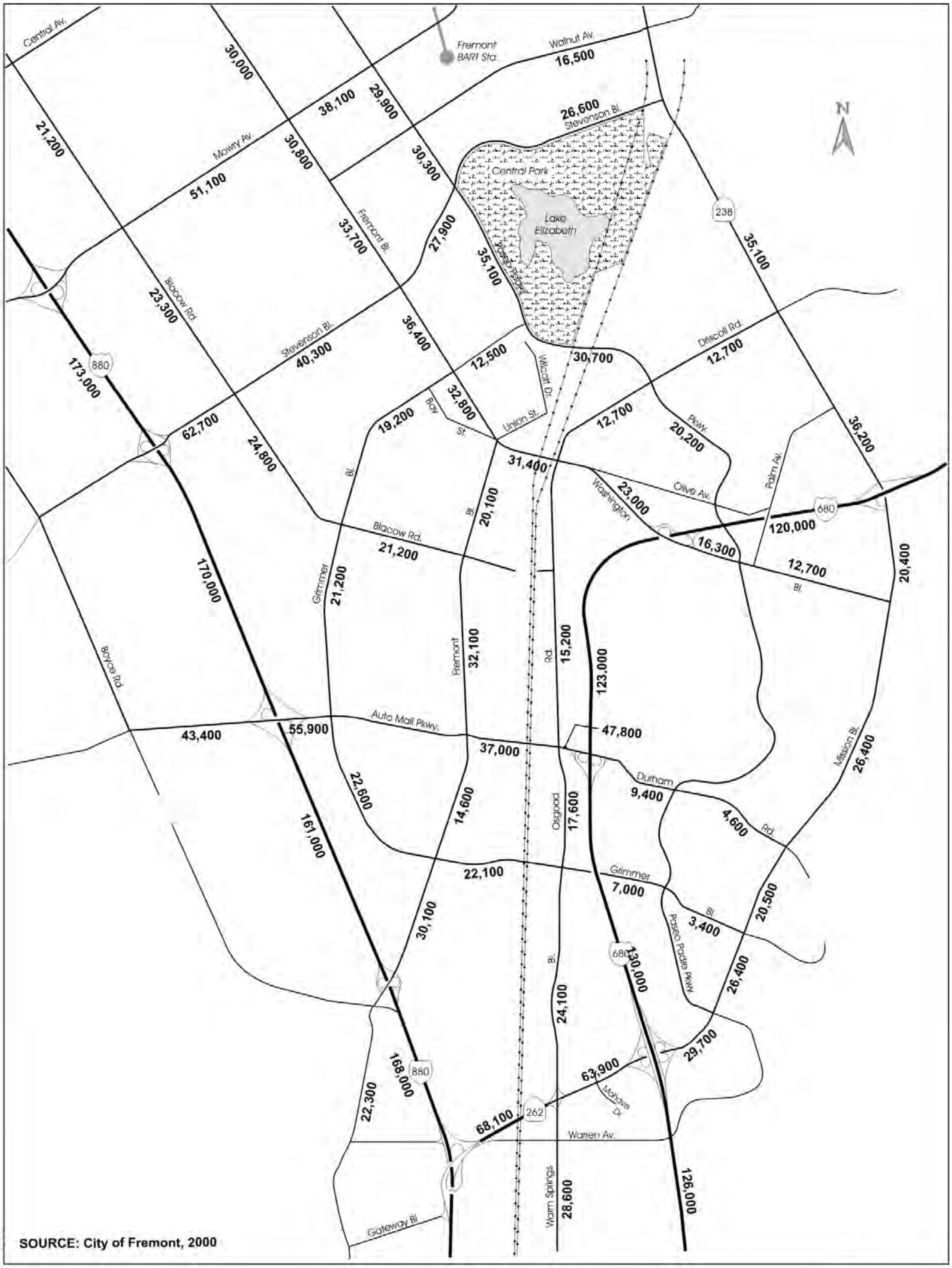

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Figure 1-2
AVERAGE DAILY TRAFFIC VOLUMES (2000)

1.2 TRANSIT SERVICES

BART, AC Transit, and VTA provide public transit (commuter rail, light rail and bus) services in the transportation study area. The service area for transit routes is shown in Figure 1-3. AC Transit provides the primary local bus service to the Fremont BART Station; 17 routes serve the station. AC Transit operates within Alameda and Contra Costa Counties, including a number of existing services throughout the transportation study area. The existing AC Transit services surrounding both the Warm Springs and the Optional Irvington Station vicinities are discussed in later sections of this section.

VTA provides both light rail and local bus services in the area known as Silicon Valley. VTA operates four express bus routes that connect Santa Clara County to the Fremont BART Station, only one of which (Route 180) operates throughout the day seven days per week. BART operates train service from the Fremont BART Station to Richmond in Contra Costa County and Daly City in San Mateo County. The daily ridership at the Fremont BART Station is approximately 12,800. Headways[1] on the Daly City and Richmond lines are 15 minutes on weekdays and 20 minutes after 7:15 PM on weekday evenings and weekends. Direct service to Daly City is not offered evenings and Sundays, but passengers can transfer to the Dublin/Pleasanton–Daly City line at the Bay Fair Station in San Leandro.

Both AC Transit and VTA have increased transit services in the transportation study area since the 1992 EIR. AC Transit implemented a major restructuring of its bus service in Fremont, Newark, and Union City based on its Fremont–Newark Transportation Development Plan. The plan revised existing routes and added new services in areas that were not previously served.

Warm Springs Station Area

AC Transit Routes 215 and 218 serve the area near the proposed Warm Springs Station, as shown in Figure 1-3. Route 215 serves Newpark Mall, Central Avenue, the Fremont BART Station, and the Warm Springs District via Mission Boulevard, Driscoll Road, and Warm Springs Boulevard. Service along the portion of Route 215 between the Fremont BART Station and the Warm Springs District on weekdays operates from 6:00 a.m. to 10:00 p.m. Buses operate every 30 minutes during the peak hours and every 60 minutes at other times. There is no weekend service. The entire route serves about 530 passengers per day. Route 218 serves Ohlone College and the Fremont BART Station via Paseo Padre Parkway, Grimmer Boulevard, and Mission Boulevard. The route operates weekdays every 30 minutes from 6:00 a.m. to 10:00 p.m.; it does not operate on the weekend. The route averages about 400 passengers per day. (Alameda–Contra Costa Transit District 2002.)

[1] *A headway is defined as the time interval between to vehicles moving in the same direction on a particular route.*

Optional Irvington Station Area

AC Transit Route 215 serves the area close to the Optional Irvington Station, as shown in Figure 1-3. Route 215 serves the Fremont BART Station and the Warm Springs District via Mission Boulevard, Driscoll Road, and Warm Springs Boulevard. It operates on weekdays every 30 minutes from 6:00 AM to 10:00 PM, and on weekends every hour from 7:00 AM to 7:00 PM Route 210 also travels along Fremont Boulevard/Washington Boulevard between South Hayward BART station and Ohlone College (located west of I-680).

1.3 ADEQUACY OF ROADWAY NETWORK

Capacity constraints on the local road network usually occur at local intersections. Consequently most traffic impact analyses are focused on the volume of traffic compared to the capacity at the intersection. Levels of congestion at each intersection during the AM and the PM peak periods are often shown by a Level of Service (LOS) analysis. LOS values generally range from LOS A (free flowing conditions) to LOS F (excessive delays and forced flow).

For the Proposed Project, LOS calculations were made using Fremont's adopted methodology, a variant of the Circular 212 methodology. The v/c ratio represents the ratio of traffic using a given intersection to the overall carrying capacity of that intersection (hence, a v/c ratio of 1.00 indicates that the intersection is at its maximum carrying capacity). LOS is indicated by a letter grade of A–F, which is assigned based on the v/c ratio. Table 1-2 shows the correlation between the v/c ratio and LOS under the Circular 212 methodology, and presents a general description of each LOS letter grade. Fremont's adopted methodology represents an increase in lane capacity per local conditions.

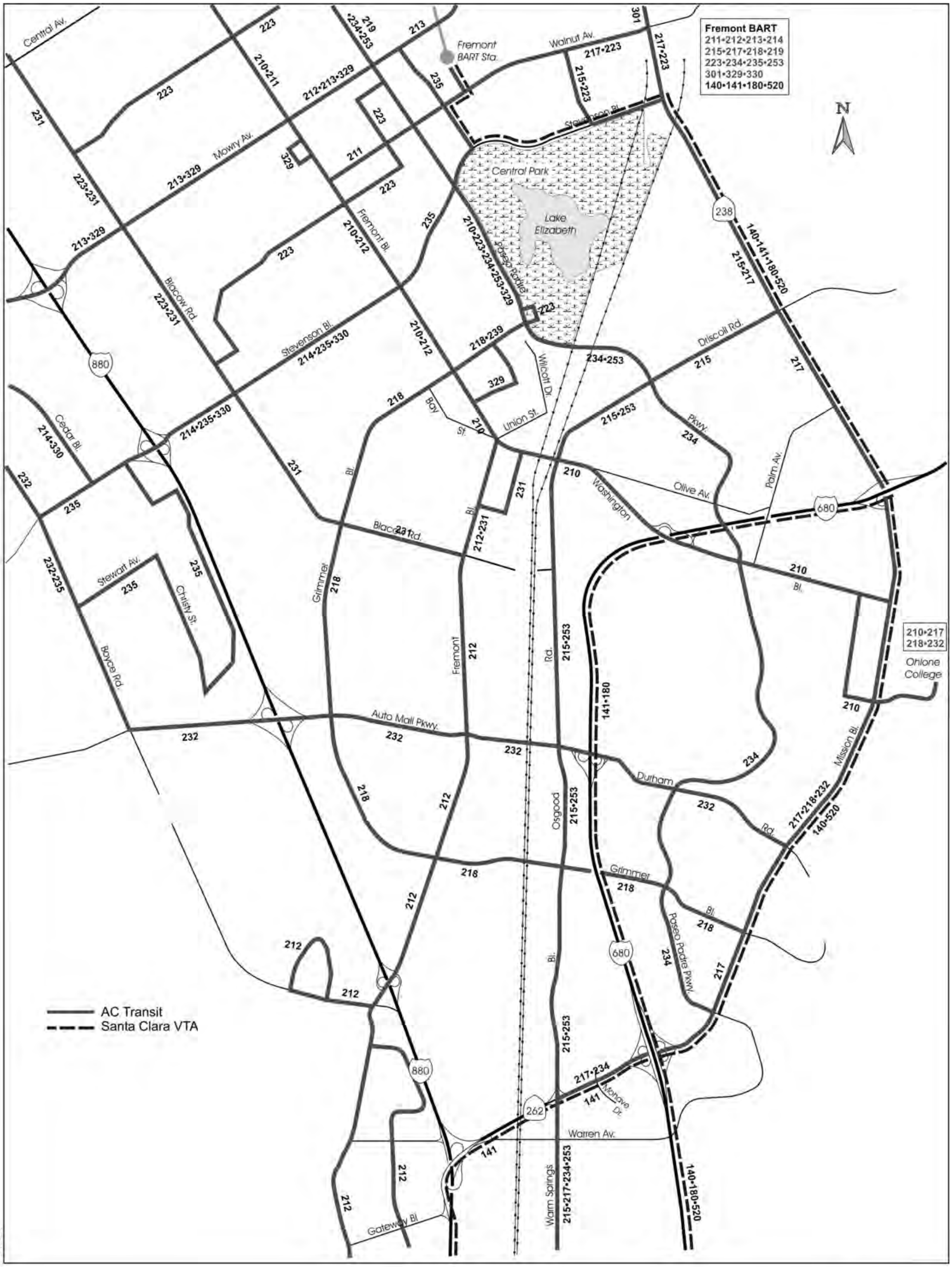

Figure 1-3
EXISTING TRANSIT SERVICE

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Table 1-2
Signalized Intersections LOS Criteria

Level of Service	Volume-to-Capacity Ratio	Description
A	0.00-0.60	Free Flow/Insignificant Delays: No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication.
B	0.61-0.70	Stable Operation/Minimal Delays: An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles.
C	0.71-0.80	Stable Operation/Acceptable Delays: Major approach phases fully utilized. Most drivers feel somewhat restricted.
D	0.81-0.90	Approaching Unstable/Tolerable Delays: Drivers may have to wait through more than one red indication. Queues may develop but dissipate rapidly, without excessive delays.
E	0.91-1.00	Unstable Operation/Significant Delays: Volumes at or near capacity. Vehicles may wait through several signal cycles. Long queues form upstream of intersection.
F	> 1.00	Forced Flow/Excessive Delays: Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections.

Source: Transportation Research Circular 212, "Interim Materials on Highway Capacity", Transportation Research Board, Washington DC, 1980.

Level of service calculations were performed for the weekday AM and PM peak hours. The AM peak hour is the one-hour segment between 7:00 and 9:00 AM with the highest traffic volumes. The PM peak hour is the highest one-hour traffic volume segment between 4:00 and 6:00 PM.

Warm Springs Station Area

With one addition, intersections that were previously analyzed in the 1992 EIR were also analyzed in the context of this updated study. These are illustrated in Figure 1-4. The intersection of Fremont Boulevard and I-880 SB Off-ramps was added as a study intersection in the Warm Springs station area. Two of the intersections presented in this list, numbers 11 and 12, will only be analyzed under Proposed Project conditions as they do not exist in the existing condition (and exist only under future conditions when the Proposed Project is in place). The study intersections are as follows (the numbers correspond with the numbers on Figure 1-4):

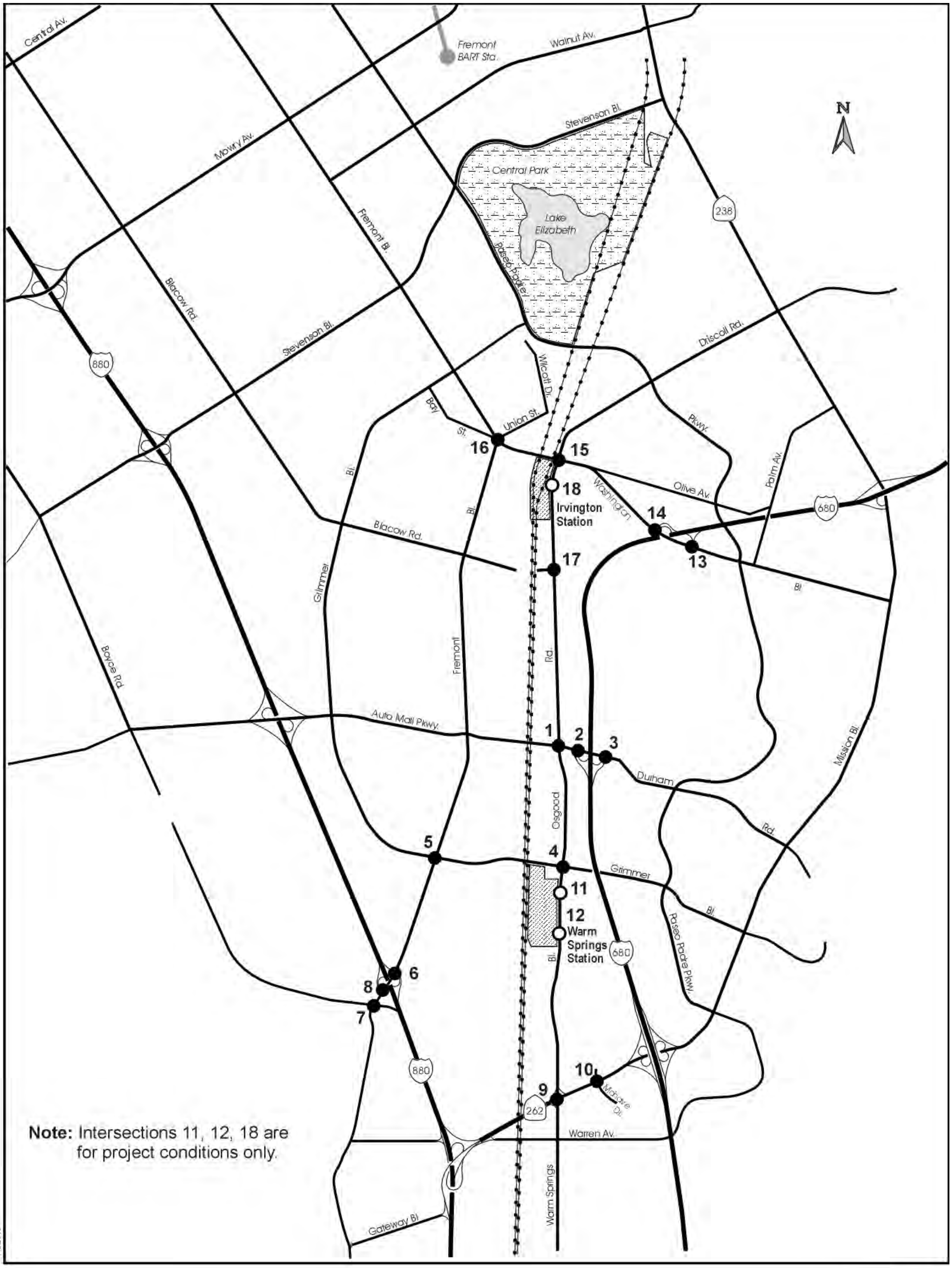

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Figure 1-4
EXISTING STUDY INTERSECTIONS

1. Osgood Road / Durham Road / Auto Mall Parkway
2. I-680 SB Ramps / Durham Road / Auto Mall Parkway
3. I-680 NB Ramps / Durham Road / Auto Mall Parkway
4. Osgood Road / Warm Springs Boulevard / South Grimmer Boulevard
5. Fremont Boulevard / South Grimmer Boulevard
6. Fremont Boulevard / I-880 NB Ramps
7. Fremont Boulevard / I-880 SB On-Ramp / Cushing Parkway
8. Fremont Boulevard / I-880 SB Off-Ramps
9. Warm Springs Boulevard / Mission Boulevard
10. Mohave Drive / Mission Boulevard
11. Warm Springs Boulevard / Proposed Warm Springs Station North Driveway (project conditions only)
12. Warm Springs Boulevard / Proposed Warm Springs Station South Driveway (project conditions only)

Traffic Conditions

The existing geometries are illustrated in Figure 1-5 and the existing turning movement volumes are provided in Figure 1-6. The existing turning movement volumes were used to calculate the existing LOS. Table 1-3 lists the existing LOS for each of the intersections in the study area. There are no study intersections in the Warm Springs area that currently operate at a LOS E or a LOS F during the AM or PM peak hour.

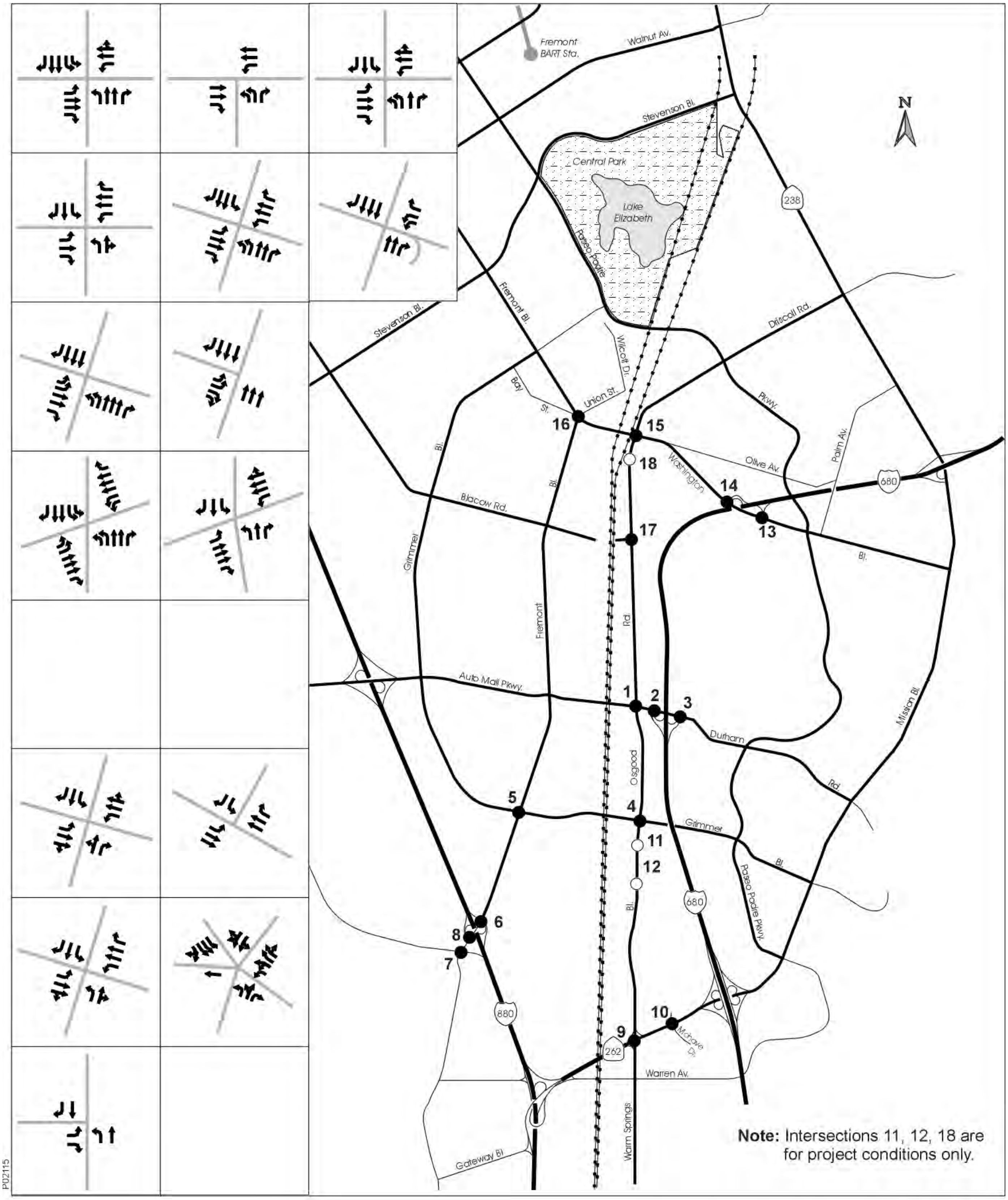

Figure 1-5
EXISTING INTERSECTION CONFIGURATION

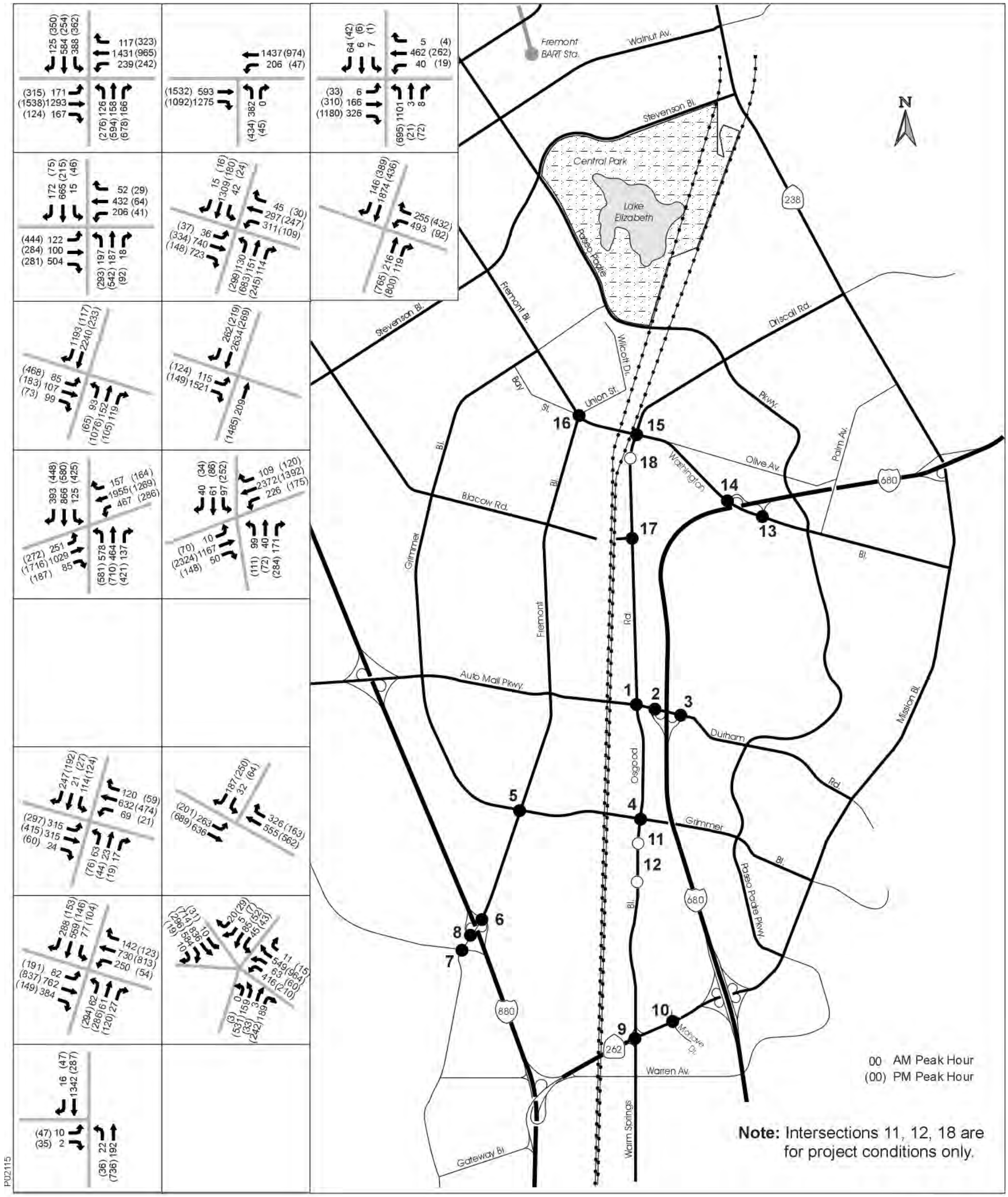

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Figure 1-6
EXISTING PEAK HOUR TURNING MOVEMENTS

Table 1-3
Results of the Level of Service Analysis
Existing Conditions – Warm Springs Station Area

Intersection[a]	AM Peak Hour LOS [b]	AM Peak Hour V/C [c]	PM Peak Hour LOS [b]	PM Peak Hour V/C [c]
1. Osgood Road / Durham Road / Auto Mall Parkway	D	0.84	D	0.87
2. I-680 SB Ramps / Durham Road / Auto Mall Parkway	D	0.88	C	0.75
3. I-680 NB Ramps / Durham Road / Auto Mall Parkway	A	0.54	A	0.39
4. Osgood Road / Warm Springs Boulevard / South Grimmer Boulevard	B	0.62	C	0.74
5. Fremont Boulevard / South Grimmer Boulevard	D	0.85	A	0.44
6. Fremont Boulevard / I-880 NB Ramps	A	0.57	A	0.33
7. Fremont Boulevard / I-880 SB On Ramp / Cushing Parkway	C	0.76	A	0.42
8. Fremont Boulevard / I-880 SB Off Ramps	D	0.90	A	0.39
9. Warm Springs Boulevard / Mission Boulevard	D	0.87	D	0.81
10. Mohave Drive / Mission Boulevard	B	0.66	D	0.81

Notes:
a. Numbers correspond with the numbers on the intersection diagrams
b. LOS = Level of Service.
c. V/C = Volume-to-Capacity ratio.

Source: DKS Associates, 2002

Irvington Station Area

To be consistent with the 1992 EIR, the same intersections have been evaluated in this study. The access intersection into the Optional Irvington Station will be analyzed under project conditions only as the intersection does not currently exist. The study intersections in the Irvington Station area are as follows (the numbers listed below correspond to the numbering on Figure 1-4):

13. I-680 NB Ramps / Washington Boulevard
14. I-680 SB Ramps / Washington Boulevard
15. Osgood Road / Driscoll Road / Washington Boulevard
16. Fremont Boulevard / Washington Boulevard / Union Street / Bay Street
17. Osgood Road / Blacow Road (Future Year Analysis Only)

18. Osgood Road / Proposed Irvington Station Access Road (project conditions only)

Traffic Conditions

The Osgood Road / Blacow Road intersection currently has very little traffic from Blacow Road, as the road ends to the east at the railroad tracks. The City of Fremont has plans to connect this part of Blacow Road with the other portion of Blacow Road on the eastern side of the railroad tracks. Once the connection is built, traffic and turning movements at this intersection are expected to increase.

Figure 1-5 details the existing geometries at each of the study intersections. The existing turning movements for the above intersections are illustrated in Figure 1-6. These volumes were used in calculating the existing AM and PM peak hour LOS. No intersections listed in Table 1-4 are currently operating at a LOS E or LOS F.

Table 1-4
Results of the Level of Service Analysis
Existing Conditions – Irvington Station Area

	AM Peak Hour		PM Peak Hour	
Intersection[a]	**LOS [b]**	**V/C [c]**	**LOS [b]**	**V/C [c]**
13. I-680 NB Ramps / Washington Boulevard	A	0.6	A	0.56
14. I-680 SB Ramps / Washington Boulevard	A	0.41	A	0.40
15. Osgood Road / Driscoll Road / Washington Boulevard	D	0.86	C	0.72
16. Fremont Boulevard / Washington Boulevard / Union Street / Bay St	A	0.60	C	0.74

Notes:
a. Numbers correspond with the numbers on the intersection diagrams
b. LOS = Level of Service.
c. V/C = Volume-to-Capacity ratio.

Source: DKS Associates, 2002

1.4 PEDESTRIAN FACILITIES

In general, the access roads to the proposed Warm Springs Station are not currently pedestrian oriented. There are no sidewalks on Warm Springs Boulevard south of Grimmer Boulevard, though sidewalks on the other streets would provide access to the station. At present there is a sidewalk on the north side of Grimmer Boulevard between Parkwood Drive and Fremont Boulevard.

The Optional Irvington Station area is also generally not pedestrian oriented, currently. There are sidewalks on Washington Boulevard and Fremont Boulevard in the vicinity of the proposed optional station. At present, sidewalks on Washington Boulevard between Fremont Boulevard and Osgood Road cross the existing rail lines at grade. Osgood Road has no sidewalks.

1.5 BICYCLE FACILITIES

According to the 2002 City of Fremont Bicycle and Pedestrian Plan, the proposed Warm Springs Station area contains the bicycle facilities described below. Bicycle lanes marked on the pavement are present on Auto Mall Parkway between I-880 and Mission Boulevard, South Grimmer Boulevard between Fremont Boulevard and Mission Boulevard, and Fremont Boulevard between Blacow Road and I-880. Signed bicycle lanes (a 15-foot travel lane with prohibited parking and no markings on the pavement) are located on Warm Springs Boulevard between Auto Mall Parkway and north of Mission Boulevard, and Auto Mall Parkway between Boyce Road and I-880.

According to the 2002 City of Fremont Bicycle and Pedestrian Plan, the Optional Irvington Station area contains several bicycle facilities. There are bicycle lanes marked on the pavement on Driscoll Road between Washington Boulevard and Mission Boulevard, and on Paseo Padre Parkway east of Driscoll Road. There are signed bicycle lanes (15-foot travel lanes with prohibited parking and no markings on the pavement) on Fremont Boulevard between Grimmer Boulevard and Washington Boulevard, and on Washington Boulevard between Mission Boulevard and I-680. There are frontage road facilities (roads running parallel to the main thoroughfare and separated by a median) on Fremont Boulevard between Walnut Avenue and Grimmer Boulevard, and on Blacow Road west of Grimmer Boulevard.

1.6 PARKING FACILITIES

There are currently 2,330 spaces available at the Fremont BART station for BART patrons. This parking area is often filled to capacity. There are approximately 30 spaces available for the Hertz BART car-sharing program, nearly 20 spaces available for disabled person parking, more than 60 spaces available for designated carpool vehicles, and nearly 50 spaces available for parking after 10:00 a.m.

There is no parking allowed on any of the roads surrounding the proposed Warm Springs Station site. Close to the optional Irvington Station site, parking is not allowed on Washington Boulevard in the vicinity of the station. On-street parking is allowed on the southern leg of Osgood Road near the optional Irvington Station. This parking is unrestricted at present. There is no off-street parking in the two proposed station study areas.

2. 2010 – NO PROJECT

2.1 DESCRIPTION

To estimate the potential impacts of the BART to Warm Springs Extension, a 2010 No Project condition also needs to be analyzed. The 2010 No Project condition is defined as the year 2010 without the BART extension.

2.2 APPROVED PROJECTS

For use in future travel activity, the City of Fremont staff provided information regarding all approved, pending, and under-consideration projects within the study area. Only those projects that would impact at least one study intersection (Figure 1-4) were included in the analysis. Trips generated by these projects were assigned to the street network along the most reasonable paths based on the existing intersection locations. The projects are described in Table 2-1.

Table 2-1
Approved and Pending Developments

Development	Location	Size	Trip Generation AM Peak	Trip Generation PM Peak
Approved Development				
Trumark	South Grimmer Blvd/Warm Springs Blvd.	594 ksf R&D	737	642
Skyway Business Center	Skyway Court/Osgood Rd.	103 ksf industrial	148	151
Pacific Commons	West of I-880, south of Auto Mall Pkwy	8316 ksf industrial and commercial	8,670	11,558
Pending Development				
Six Buildings	Auto Mall Pkwy near Technology Dr.	175 ksf industrial	118	88
Five Buildings	Fremont Blvd/Old Warm Springs Blvd.	92 ksf industrial	85	90
Wal-Mart	Osgood Rd near Skyway Ct	197 ksf commercial	226	627
Fremont MRF	Boyce Road near Auto Mall Pkwy	1700 intake tonnage	26	14
Total Approved and Pending Trip Generation			**10,010**	**13,170**

Source: City of Fremont, 2002

2.3 NETWORK CHANGES

There are several proposed network modification projects within the transportation study area; some are roadway changes, including widening, while others are changes to the intersection geometry. The following list outlines the projects within the transportation study area that are included in the City of Fremont's Impact Fee Program and are expected to be completed by 2010 (City of Fremont 2002).

The following list outlines the City of Fremont projects within the study area that are included in the City's Impact Fee Program and are expected to be completed by 2010[1]:

1. Roadway Projects
   - Cushing Parkway: Connection between Catellus Development to Fremont Boulevard
   - Fremont Boulevard: Washington Boulevard to Blacow Road - curb and guttering improvements, sidewalk construction
   - Osgood Road: widen to two lanes in each direction between Washington Boulevard and South Grimmer Boulevard along with new curb and gutters and sidewalk construction
2. Intersection Projects
   - Osgood Road and Washington Boulevard - signal modification
   - Osgood Road and Auto Mall Parkway - signal modification
   - Fremont Boulevard and Grimmer Boulevard - signal modification
   - Osgood Road and Blacow Road – new signal

In addition, regionally-funded roadway projects were identified based on discussions between the Alameda Congestion Management Agency and the City of Fremont. The Alameda Congestion Management Agency has included the following list of roadway projects in their travel forecasting model:

- Widen Washington Boulevard from two to four lanes between Driscoll Road / Osgood Road and I-680 interchange
- Widen Auto Mall Parkway from four to six lanes between Osgood Road and I-680 interchange
- Widen Grimmer Boulevard from two to four lanes between Warm Springs Boulevard and I-680 overpass
- Widen Warm Springs Boulevard from two to four lanes between Grimmer Boulevard and Mission Boulevard
- Extend Auto Mall Circle south of Boyce Road (four lanes) to join Cushing Parkway

[1] Source: City of Fremont Traffic Impact Fee Projects List, 2002

- Widen Cushing Parkway from four to six lanes between Northport Loop West and Fremont Boulevard

2.3.1 Grade Separation Project[2]

The City of Fremont has implemented a program to eliminate existing at-grade railroad crossings. One of the proposed grade-separation projects is located along Washington Boulevard from Roberts Avenue to Meredith Drive. This will impact the intersection of Washington Boulevard / Driscoll Road / Osgood Road.

The project will result in the entire intersection between Washington Boulevard / Driscoll Road and Osgood Road being raised to eliminate the at-grade railroad crossings. The following is a list of the associated geometric changes at the intersection:

- Eastbound movement (from Fremont Boulevard to I-680): one left-turn lane, three through lanes and one dedicated right-turn lane will be provided. A merge will be required on the eastern side of the intersection.
- Northbound movement (from Osgood Road to Driscoll Road): two left-turn lanes, two through lanes and one right-turn lane will be provided.
- Southbound movement (from Driscoll Road to Osgood Road): two left-turn lanes, two through lanes and one right turn lane will be provided.

In addition to the proposed geometry changes at this intersection, a new traffic signal is proposed as part of the grade separation project for the Washington Boulevard / Meredith Avenue intersection (to the east of the existing Washington Boulevard / Driscoll Road / Osgood Road intersection).

Osgood Road will be widened south of Washington Boulevard before the construction of the grade separation project. Washington Boulevard, beginning west of the Driscoll Road / Osgood Road intersection will also be widened to four-lanes (two in each direction), to the I-680 southbound and northbound on- / off-ramps.

2.4 IMPACTS

2.4.1 Trip Generation

Based on the 2010 No Project Scenario, there would be 6,560 daily vehicle trips at the Fremont Station, including 1,150 AM peak hour trips (930 inbound, 220 outbound) and 1,150 PM peak hour trips (220 inbound, 930 outbound).

Trip generation for the proposed project was based on the intersection turning movements and the VTA modified MTC travel forecast model, as summarized in Table 2-2. A description of the travel forecast model is provided later on in this traffic report.

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[2] Information provided by the City of Fremont, based on "Final Report: Technical Memorandum – Traffic Operation Analysis: Fremont Grade Separation Project on Washington Boulevard" CCS –Planning and Engineering Incorporated (2002).

Table 2-2
Trip Generation - 2010 No Project

Station	Daily	AM		PM	
		In	Out	In	Out
Fremont	6,560	930	220	220	930

Source: DKS Associates, 2002

2.4.2 Trip Distribution

Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B[3].

2.4.3 Intersection Analysis

The 2010 No Project conditions analysis adds vehicle trips generated by the approved and pending projects to the existing condition. Where there are programmed changes in the geometry of an intersection, these have been incorporated in the analysis. Turning movements from the 2010 No Project VTA modified MTC Model was used at two intersections where the proportion of regional traffic at the intersection is substantial. These intersections were: the intersection known as Five Ways (Fremont Boulevard / Bay Street / Washington Boulevard / Union Street) and Mission Boulevard / Warm Springs. In addition, as many of the through movements along Mission Boulevard are regional, the 2010 No Project VTA modified MTC model was used to predict the through movements at the Mohave Drive / Mission Boulevard intersection.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, the intersection LOS was evaluated at 18 study intersections. Because construction of the optional Irvington Station would redistribute trips that would have gone to either the Fremont or Warm Springs Station, all of the study intersections were evaluated under both with and without the optional Irvington Station scenarios

Changes in the intersection geometries for 2010 are depicted in, and the 2010 No Project Condition turning movements at each of the study intersections is illustrated in Figure 2-2. Within the Warm Springs study area, two intersections are programmed to have a change in lane geometry. The intersection of Fremont Boulevard and South Grimmer Boulevard will lose a northbound left turn lane and the right turn lane will become a through lane. The Osgood Road / Auto Mall Parkway intersection will have the existing southbound and eastbound right turn lanes converted to a through-right turn lane, and second left turn lanes will be added in the westbound, eastbound and northbound directions.

The intersections and their corresponding levels of service are presented in Table 2-3 for the 2010 No Project and the 2010 Proposed Project.

[3] All appendices are bound under separate cover and available from BART.

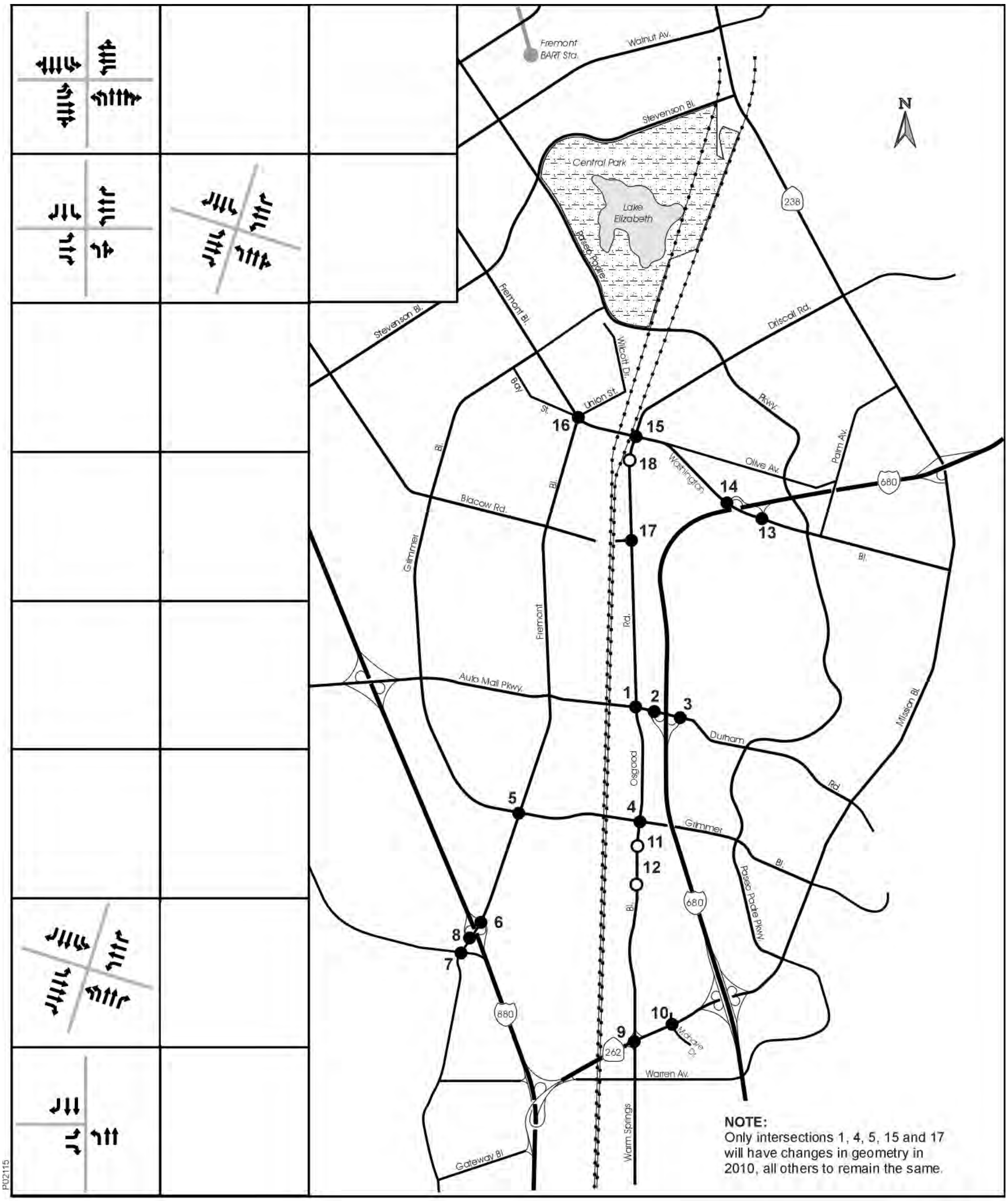
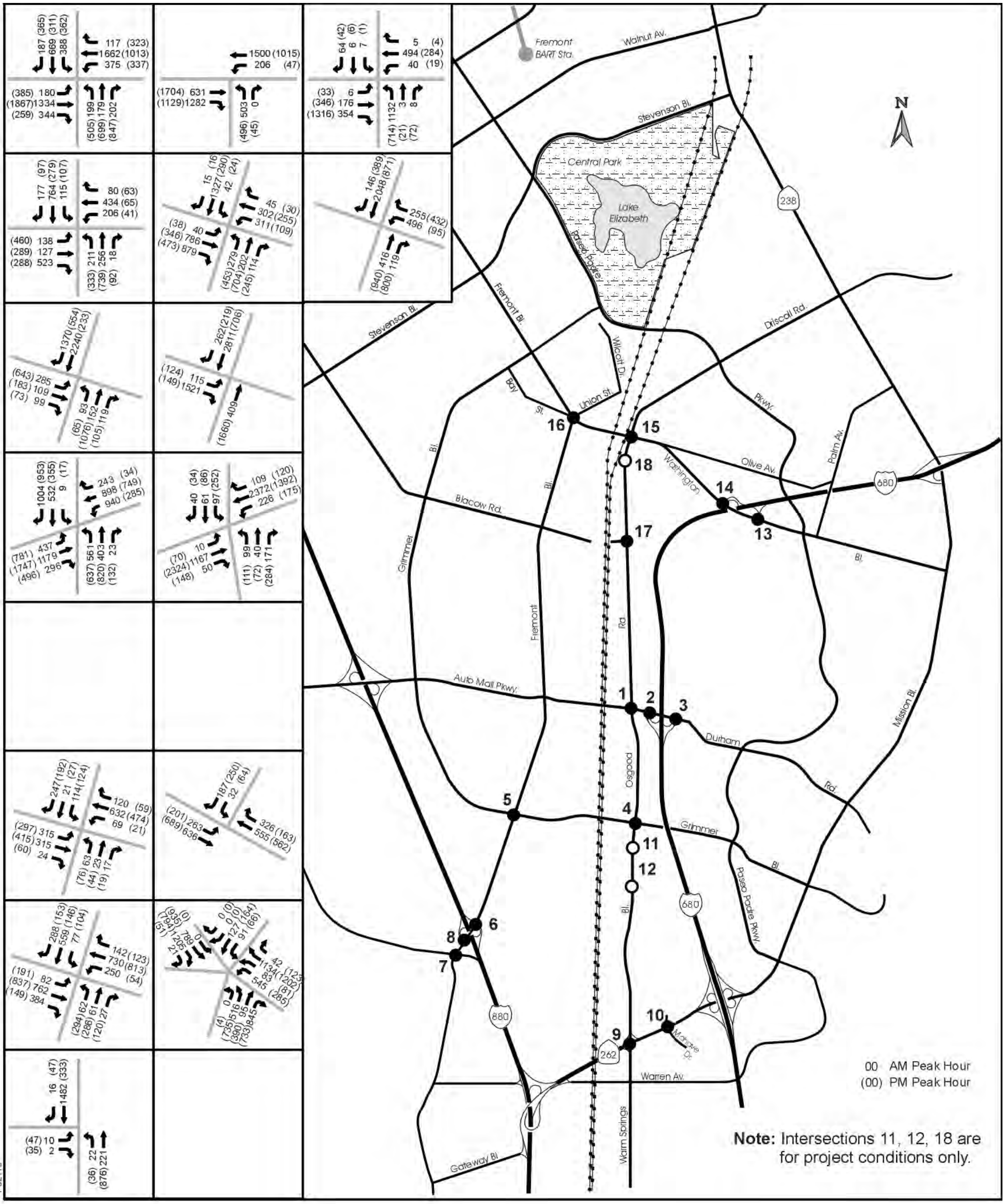


Figure 2-1
2010 NO PROJECT INTERSECTION CONFIGURATION CHANGES

DKS *Associates*



DKS *Associates*

Figure 2-2
2010 NO PROJECT
PEAK HOUR TURNING MOVEMENTS

Table 2-3
Results of the Level of Service Analysis, 2010 No Project

	Existing Conditions				2010 No Project Conditions			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	**LOS[b]**	**V/C[c]**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
1[a]. Osgood Road / Durham Road / Auto Mall Parkway[d]	D	0.84	D	0.87	D	0.84	D	0.89
2. I-680 SB Ramps / Durham Road / Auto Mall Parkway	D	0.88	C	0.75	D	0.89	C	0.78
3. I-680 NB Ramps / Durham Road / Auto Mall Parkway	A	0.54	A	0.39	A	0.56	A	0.40
4. Osgood Road / Warm Springs Boulevard / South Grimmer Boulevard [d]	B	0.62	C	0.74	D	0.88	D	0.86
5. Fremont Boulevard / South Grimmer Boulevard [d]	D	0.85	A	0.44	E	0.91	A	0.58
6. Fremont Boulevard / I-880 NB Ramps	A	0.57	A	0.33	A	0.60	A	0.37
7. Fremont Boulevard / I-880 SB On Ramp / Cushing Parkway	C	0.76	A	0.42	D	0.86	A	0.47
8. Fremont Boulevard / I-880 SB Off Ramps	D	0.90	A	0.39	E	0.91	A	0.43
9. Warm Springs Boulevard / Mission Boulevard	D	0.87	D	0.81	F	1.08	E	0.94
10. Mohave Drive / Mission Boulevard	B	0.66	D	0.81	B	0.61	C	0.74
13[a]. I-680 NB Ramps / Washington Boulevard	A	0.6	A	0.56	A	0.6	A	0.56
14. I-680 SB Ramps / Washington Boulevard	A	0.41	A	0.40	A	0.41	A	0.40
15. Osgood Road / Driscoll Road / Washington Boulevard [d]	D	0.86	C	0.72	A	0.51	A	0.58
16. Fremont Boulevard / Washington Boulevard / Union Street / Bay St	A	0.60	C	0.74	F	1.27	F	1.13
17. Osgood Road / Blacow Road [d]					A	0.51	A	0.36

Notes:
a. Numbers correspond with the numbers on the intersection diagrams
b. LOS = Level of Service.
c. V/C = Volume-to-Capacity ratio.
d. New geometry was analyzed for the 2010 No Project condition

Source: DKS Associates, 2002

2.4.4 Metropolitan Transportation System Roadways

The Alameda County Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.
- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.
- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.
- Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions and provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 MTS roadway segments.

In the year 2010, under the No Project Scenario, a number of road segments are expected to operate at LOS E and LOS F. These segments are presented in Table 2-4.

Table 2-4
MTS Road Segments Operating at LOS E or F 2010 No Project

Roadway Segment	From	To	LOS
I-580 East	West of San Ramon Road		F
I-580 East	Dougherty Road	Hacienda Drive	F
I-580 West	Hacienda Drive	Dougherty Road	E
I-580 West	West of San Ramon Road		E
I-680 North	North of Mission Boulevard (SR-238)		E
I-880 North	South of Mission Boulevard		F
I-880 North	Mission Boulevard	Fremont Boulevard	E
I-880 North	Fremont Boulevard	Auto Mall Parkway	E
I-880 North	Auto Mall Parkway	Stevenson Boulevard	F
I-880 North	Stevenson Boulevard	Mowry Avenue	F
I-880 North	North of Decoto Road & State Route 84		F
Mission Boulevard	Auto Mall Parkway	I-680	E
State Route 84 – East	Dumbarton Bridge		F
State Route 84 – West	Dumbarton Bridge		F

Source: DKS Associates 2002 from VTA modified MTC model.

Appendix C includes the detailed MTS roadway analysis sheets for the year 2010 No Project Scenario.

2.4.5 Transit

Transit Facilities

The following transit services were assumed to be provided in the Fremont area under the No Project scenario.

- There would be two pairs of daily BART lines in each direction serving the existing Fremont Station. Combined, they would provide a 7.5 minute headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 15 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport.
- A third pair of BART lines would operate during the AM and PM peak periods only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.

- VTA express buses would operate from Santa Clara to the Fremont BART station using the existing route. This includes Routes 140, 180, and 520. Route 140 would operate during the peak periods on a 15 minute headway. Route 180 would operate all day, with 15 minute headways, and route 520 would operate during the AM and PM peak periods with a 20 minute headway.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new ACE / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal terminal with Capitol Corridor trains and BART trains providing service at the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- The BART extension to Millbrae would be open and operational with 15 minute headways between SFO and Millbrae, between Millbrae and Bay Point (without stopping at SFO), and between SFO and Dublin BART stations.
- The West Dublin BART station would be operational and have a service headway of 15 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- CalTrain would extend service to the Transbay Terminal.
- The CalTrain Baby Bullet service would operate along the Peninsula with 60 minute headways.
- ACE headways would be increased to 30 minute peak service inbound in the AM and outbound in the PM.
- Capitol Corridor service would be increased to 60 minute headways all day in both directions.

Station Entries and Exits

Table 2-5 lists the station entries and exits at the existing Fremont Station. These station entries and exits are shown as a total for the day (rounded to the nearest ten), because the number of entries and exits are balanced in the daily model. System boardings are shown in this table (rounded to the nearest five) and are calculated by dividing the total entries and exits by two. This table provides a comparison between the 2000 Validated model and the 2010 No Project Condition. As expected, there would be an increase in entries and exits at the Fremont station which would continue to be the end-of-the-line station. There would be a net increase in total boardings at the Fremont BART stations of 630.

Table 2-5
Station Entries and Exits – 2010 No Project

	Entries and Exits	
Station	2000 Validated Model	2010 No Project
Southern Alameda County Existing Stations		
Union City	8,700	9,200
Fremont	11,900	13,200
Southern Alameda County Existing Stations Subtotal	**20,600**	**22,500**
Proposed Project Stations		
Irvington	—	—
Warm Springs	—	—
Proposed Project Stations Subtotal	**—**	**—**
Southern Alameda County Proposed and Existing Stations Subtotal	**20,600**	**22,500**
BART Systemwide Total Boardings	339,800	387,800

Notes:
Station-level and subtotal values are for station entries and exits (i.e. total persons entering and leaving station areas). Systemwide total boardings was calculated by dividing entries and exits by two.

Southern Alameda County stations are the existing Union City and Fremont Stations plus the proposed Warm Springs and optional Irvington Stations.

All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

Ridership

Station to Station Matrices

Table 2-6 lists the BART productions and attractions between stations for the 2000 Validated model and Table 2-7 lists the BART productions and attractions between stations for the 2010 No Project Condition. All tables are shown as daily numbers and are rounded to the nearest ten. Full station-to-station ridership tables are shown at the back of this appendix. In these tables, "Other Bay Area" refers to the other areas of the Bay Area that currently (or will in 2010) have BART service. This includes Alameda, San Francisco, San Mateo and Contra Costa Counties. Santa Clara and the North Bay are excluded from this analysis.

These tables show that most of the travelers from Fremont, would continue to travel to San Francisco and Oakland (65 percent in the 2000 Validated Model and 61 percent in the 2010 No Project Condition), even though there are very few travelers in the opposite direction.

Table 2-6
Station to Station BART Ridership – 2000 Validated Model

	Attractions			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	5,397	2,907	8,304
San Francisco / Oakland	284	15,809	27,635	43,728
Other Bay Area	3,354	211,222	72,794	287,370
Totals	3,638	232,428	103,336	339,402

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates from the VTA modified MTC model, 2002

Table 2-7
Station to Station BART Matrix – 2010 No Project

	Attractions			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	5,210	3,280	8,490
San Francisco / Oakland	420	18,700	27,810	46,930
Other Bay Area	4,340	243,100	84,910	332,350
Totals	4,760	267,010	116,000	387,770

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates from the VTA modified MTC model, 2002

<u>Ridership</u>

Table 2-8 provides the daily bi-directional ridership (rounded to the nearest hundred) between stations in the BART network. The total ridership on the section between Union City and Fremont would increase from the Validated (2000) model condition by approximately 13 percent. The volume of riders on the Ace trains would increase by 120 percent, and the Capitol Corridor train ridership would also increase in total ridership by approximately 110 percent during the 2010 No Project Condition.

Table 2-8
Rail Ridership – 2010 No Project

Station A	Station B	Mode	2000 Validated Model	2010 No Project
Union City	Fremont	BART	11,900	13,500
Alameda County / Santa Clara County Line (approx.)		Ace	3,600	8,000
Alameda County / Santa Clara County Line (approx.)		Capitol Corridor	1,100	2,300

Source: DKS Associates from the VTA modified MTC model, 2002 .

Table 2-9 lists the projected ridership for the VTA express buses and AC Transit service. The total bi-directional ridership levels are provided at the following locations:

- Paseo Padre between Fremont BART station and the Irvington Station location (AC Transit).
- Warm Springs Boulevard / Osgood Road between the Irvington Station location and the Warm Springs Station location (AC Transit).
- Warm Springs Boulevard between South Grimmer Boulevard and Mission Boulevard (AC Transit).
- Warm Springs Boulevard between Mission Boulevard and Kato Road (AC Transit).
- Warm Springs Boulevard south of Kato Road (at the Alameda County / Santa Clara County line) (AC Transit).
- I-680 south of Mission Boulevard (VTA).

AC Transit would provide local service in the area, while VTA would provide express services. For this reason, the VTA routes are shown on a route by route basis.

This table also makes a comparison back to the Validated (2000) Model condition. The ridership levels on each of the express bus services would remain relatively constant under the 2010 No Project Condition with the ridership on the VTA Route 180 decreasing slightly. A new route would be created in the 2010 No Project Condition (VTA Route 500) and would attract approximately 1000 riders. The projected ridership levels on the AC Transit routes would remain relatively stable, although the routes along Warm Springs Boulevard would show more than 100 percent growth in ridership.

Table 2-9
Bus Ridership – 2025 No Project

Operator	Route	Road	Validated (2000 model)	2010 No Project
AC Transit		Paseo Padre between Fremont BART Stn and Irvington Stn	1300	1000
AC Transit		Osgood Road between Warm Springs Stn and Irvington Stn	300	200
AC Transit		Warm Springs Boulevard between Grimmer Boulevard and Mission Blvd	300	300
AC Transit		Fremont Boulevard between Auto Mall Parkway and Blacow Rd	0	400
AC Transit		Warm Springs Boulevard between Mission Boulevard and Kato Rd	600	1,400
AC Transit		Warm Springs sth of Kato Rd	400	1,900
VTA	140	I-680 south of Mission Blvd	300	200
VTA	180	I-680 south of Mission Blvd	1800	1,400
VTA	520	I-680 south of Mission Blvd	200	400
VTA	500	I-680 south of Mission Blvd	N/A	1,000

Source: DKS Associates 2002 from VTA modified MTC model.

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A linked trip consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring onto BART at a BART station and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but is not considered a linked transit trip. Table 2-10 lists the number of projected linked transit trips (rounded to the nearest hundred) from areas that would logically use the service for both the 2010 No Project Condition. This table show the linked transit trips for four broad areas within the network: those people that stay within the Fremont/Newark/Union City area; those people traveling to Union City, Newark and Fremont; those people traveling from Newark, Fremont and Union City to other areas; and those people that travel through the Fremont/Newark/Union City area. Those people that travel through the area would include patrons from the East Bay who are traveling to Santa Clara County.

Table 2-10
Transit Mode Share – 2010 No Project

Trips:	2010 No Project	Percent Change
Intra	9,800	5.1%
To	7,700	15.6%
From	21,400	10.3%
Through	9,600	9.4%
Total WSX Corridor Transit Trips	**48,600**	9.7%
Change from No-Build		
Intra Santa Clara Transit Trips	214,700	

Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (.e.g., Hayward to San Jose).
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates 2002 from the VTA modified MTC model

Mode of Access/Egress

A mode of access analysis provides the potential demands for parking, kiss-and-ride, walk access, and the need for transit provision at each of the stations. Table 2-11 lists the mode of access/egress for the 2000 Validated Model and the 2010 No Project respectively. These figures have been rounded to the nearest hundred.

As expected, there would be increases in all modes of access at all stations with the exception of park-and-ride and kiss-and-ride at Dublin / Pleasanton which would be transferred to the new West Dublin station. Transit transfers at Bay Fair would increase as people would be attracted to BART from the new West Dublin BART station. The VTA express buses would continue service at the Fremont BART Station. Kiss-and-ride at all stations would increase as parking is constrained at each of the stations.

Table 2-11
Mode of Access/Egress – 2000 Validated Model and 2010 No Project

	Mode of Access/Egress				
Station	**PNR**	**KNR**	**Walk/Bike**	**Transit XFER**	**Total**
2000 Validated Model					
Union City	3,500	600	400	4,200	8,700
Fremont	5,000	800	1,500	4,500	11,800
Irvington	-	-	-	-	-
Warm Springs	-	-	-	-	-
Southern Alameda total	8,500	1,400	1,900	8,700	20,500
2010 No Project					
Union City	3,600	1,300	500	3,700	9,200
Fremont	5,000	1,500	1,600	5,100	13,200
Irvington	-	-	-	-	-
Warm Springs	-	-	-	-	-
Southern Alameda total	8,600	2,800	2,100	8,800	22,500

Notes:
PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

Travel Times

This section consists of sets of travel time comparisons between selected residential locations (northwest Milpitas, Irvington, Fremont, Union City, and Hayward) and selected Bay Area employment centers (Downtown San Francisco; Downtown San Jose, 1st Street and the Diridon Caltrain Depot; Lockheed Martin Corporation facilities in Sunnyvale; and the Pacific Commons development in Fremont).

The locations have been selected to be representative examples. The small set of times is not intended to characterize all travel patterns changed by the Proposed Project. Transit ridership in the Fremont-Warm Springs area is very diffuse, with no single area dominating. Transit ridership from MTC Super District 16 (Fremont-Union City and Newark) to other parts of the Bay Area is projected to be roughly similarly split among San Francisco, the South Bay (including San Mateo County), and the rest of the East Bay. Therefore, the list of travel time comparisons is intended to capture the essence of area-wide changes associated with the BART extension alternatives.

In some cases, transit is competitive with highway times in all alternatives (for example, northwest Milpitas to Downtown San Francisco). In other cases, transit travel times improve substantially for one or more of the build alternatives (i.e., Irvington to NUMMI). However, there is also an example where transit is not competitive with auto travel, even with improved transit times (Milpitas to Pacific Commons).

Table 2-12 provides a travel time comparison (in minutes) between the 2010 Proposed Project and the 2010 No Project Alternatives. Auto travel times would remain constant due to the peak spreading function built into the VTA modified MTC model. When demand during the peak hour exceeds capacity which is the case in 2010, the excess number of vehicles are assumed to travel either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading, but would not affect auto travel times during the peak hour.

The transit travel times are determined by measuring "perceived" times, as opposed to observed times. The use of perceived times means weighting the wait and walk elements of transit travel time higher than the time spent riding in a train or bus. Walk and wait times (out-of-vehicle time (OVT)) are weighted to an average of 2.7 times the value of the drive access and transit travel times (in-vehicle times (IVT)).

Table 2-12 lists actual (or clock) times, as opposed to perceived times. In some of the travel time comparisons, actual travel times for the build alternatives can be longer than the No Project times. Actual times can increase but perceived times decrease from one alternative to another when walk and wait times (IVT) are lengthened and drive access and transit travel times (OVT) are shortened. The travel time model assumes that riders will choose routes with shorter perceived travel times even if the corresponding actual travel times are longer.

Table 2-12
AM Peak Hour Travel Times – 2010 No Project

Sample Trip (Origin-Destination)	Drive Alone	Carpool	Transit
Northwest Milpitas-Northwest Downtown San Francisco	101	81	74
Northwest Milpitas-Northwest Pacific Commons	16	23	84
Irvington-NUMMI	11	18	37
Irvington-Downtown San Jose	35	35	80
Fremont-Lockheed	44	36	89
Fremont-Pacific Commons	12	19	43
Union City-Diridon CalTrain Depot	53	46	69
Union City-Downtown San Jose	52	44	78
Hayward-Lockheed	66	48	75

Notes:
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center.
Union City location is approximately the Dyer/Alvarado-Niles Parkway intersection (west of I-880).
Fremont locatoin is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates, 2002 from VTA-modified MTC model

The transit travel time between some pairs of locations would remain constant, some would decrease and others would increase. Locations that are located close to the Warm Springs Station, such as the Nummi Plant would generally experience a decrease in the travel time during the AM peak hour.

It should be noted that BART park-and-ride lots are reserved for BART patrons only, and bus rapid transit park-and-ride lots are reserved for bus rapid transit riders only. This helps explain some of the travel time differences between alternatives. For example, travel times from Irvington to Downtown San Jose decrease substantially when the Irvington BART Station is added. Under the Proposed Project, Irvington riders would drive to Fremont and ride one station to Warm Springs before transferring to the VTA Route 180.

The other viable option would be to ride a local bus from Irvington to Warm Springs so as to access the VTA 180 to Downtown San Jose (the path chosen in the No-Project Alternative). However, overall travel times indicate that it would be shorter to "backtrack" to Fremont BART than to use the local bus option. BART is much faster than local bus routes and operates much more frequently. In addition, the actual drive access time to the Fremont BART station is nearly equal to the actual walk time to the local bus stop.

Finally, the travel time calculations do not factor in trip reliability. Highway travel times, for example, can vary greatly depending on weather, special events, accidents, and traffic volumes. Rail systems with exclusive rights-of-way can enhance transit reliability, although severe disruptions can occur. Ridership models typically do not capture how day-to-day trip time reliability affects mode choice.

Load Factors

Table 2-13 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Fremont BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 2-13
Load Factors – 2010 No Project

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Fremont	Union City	5143	1901	771	285	5	5	0.245	0.090
Union City	South Hayward	8340	2070	1251	311	5	5	0.397	0.099
South Hayward	Hayward	10307	1948	1546	292	5	5	0.491	0.093
Hayward	Bay Fair	12821	2238	1923	336	5	5	0.610	0.107
Richmond Lines									
Fremont	Union City	1365	1648	205	247	4	4	0.183	0.221
Union City	South Hayward	2004	1832	301	275	4	4	0.269	0.246
South Hayward	Hayward	2537	1783	381	267	4	4	0.340	0.238
Hayward	Bay Fair	3264	2055	490	308	4	4	0.438	0.275
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	8996	1953	1349	293	4	4	0.535	0.116
West Dublin	Castro Valley	11686	2086	1753	313	4	4	0.696	0.124
Castro Valley	Bay Fair	14131	2225	2120	334	4	4	0.841	0.133

Notes:
NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates 2002 from VTA modified MTC model

Load factors during the 2010 No Project Condition would be relatively low, with all lines showing an availability of seats. As the train progresses northwards, (or westwards), more riders would board and the load factors would increase.

2.4.6 Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06 (from existing occupancy surveys conducted at the Fremont BART Station, *BART Station Access Improvements Study*).

Table 2-14 shows the estimated parking demand for each scenario, along with the number of parking spaces currently proposed. These demand figures include the demand generated by other transit services, such as bus vehicles.

Table 2-14
Parking Supply and Demand – 2010 No Project

2010	Fremont Station	
	Supply	**Demand**
	2,030	2,360
Note: Parking supply based actual number of spaces at Fremont Station from personal communication with BART staff Parking Demand based on VTA modified MTC model		
Source: DKS Associates, 2002		

In 2010, the total proposed parking supply at the Fremont station is 2,030 spaces. Based on the estimated demand of 2,360 spaces, there would be a shortfall of 330 spaces.

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3. ANALYSIS METHODOLOGY

3.1. LIST OF SCENARIOS

The traffic study includes the following scenarios:

1. Existing Condition (2002)
2. No Project (2010 and 2025)
3. Proposed Project (2010 and 2025)
4. Proposed Project with Optional Irvington Station (2010 and 2025)
5. Proposed Bus Alternative (2010 and 2025)
6. Proposed Project plus Silicon Valley Rapid Transit Corridor (SVRTC) (2025)
7. Proposed Project with optional Irvington Station plus SVRTC (2025)

3.2. TRAVEL DEMAND MODEL

One of the most common ways of forecasting future travel demand in any area is to use a travel demand model. Travel demand models are used in transportation planning to simulate current travel conditions and to forecast future travel patterns and conditions. Travel demand models are used to assist planners and policy makers in analyzing the effectiveness and the efficiency of transportation alternatives[1].

There are a number of models that could have been used for of this study: the Alameda Countywide model; the model being used in the I-680 / I-880 connector study; or the modified MTC model developed by the Santa Clara Valley Transportation Authority (VTA). To be consistent with the concurrent study for the BART extension to San Jose and the MTC model structure, it was decided to use the VTA modified MTC model. This decision was made in conjunction with staff from BART, Alameda County Congestion Management Agency, City of Fremont, VTA, and the Metropolitan Transportation Commission (MTC).

There are a number of other reasons why the VTA modified MTC model was chosen for this study. These are:

- The No Project condition for the Silicon Valley Rapid Transit Corridor (SVRTC) study is assumed to be the Warm Springs project condition under the 2025 traffic conditions for this analysis. The SRVTC extension assumes that the BART extension to Warm Springs already exists.
- The Alameda Countywide Model, did not include the 2010 forecast year or a recent base year validation (the last base year validation was based on 1995 conditions).
- The I-880 / I-680 model was not completed to a satisfactory stage to be used in this project, and was not validated to the BART system ridership

[1] Information from: *MTC, Travel Demand Models for the San Francisco Bay Area (BAYCAST-90), June 1997*

- The zone structure in southern Fremont and northern Santa Clara County would need to be updated to reflect the same zones as the VTA modified MTC model.
- The two other potential models did not include the alternatives to be analyzed. It was more practical to make adjustments in the VTA modified MTC model to replicate the project alternatives.

3.2.1. Description of Model[2]

The VTA modified MTC model is an enhanced version of the MTC regional model. The MTC model, BAYCAST – 90 (BAYCAST) was used to develop the 2002 Regional Transportation Plan and to prepare travel forecasts for major regional corridor studies. BAYCAST has recently been re-calibrated to 1998 traffic counts by MTC. This model was chosen as a base to the VTA modified MTC model as it encompasses all nine Bay Area counties. The regional coverage is important for analysis of the Proposed Project (and cumulative analysis of the Proposed Project plus SVRTC because many of the trips are long distance, county-to-county commutes. The BAYCAST model includes the standard four model steps: trip generation, trip distribution, mode choice and trip assignment. It also includes three extra main models: workers in household, auto-ownership choice and time of day choice models. BAYCAST is designed as an advanced state-of-the practice trip-based travel forecasting system. It is designed to be tractable, sophisticated and user-friendly.

Within the BAYCAST model there are five main trip purposes defined, with the trip purpose for schools divided further. The trip purposes are:

- Home-Based Work (divided in four income groups)
- Home-Based Shop / Other
- Home-Based Social / Recreational
- Home-Based School
    - Home-Based Grade School
    - Home-Based High School
    - Home-Based College
- Non Home-Based

There were a number of enhancements made to BAYCAST model by VTA staff which are described below.

- Addition of a lower - level nest to the MTC home-based work mode choice models. This was done in order to model transit submode choices (heavy rail, commuter rail, light rail, express bus and local buses), walk-access to transit and park-and-ride / kiss-and-ride choice for the drive to transit access. This is depicted in Figure 3-1.

[2] Information on the Model taken from: Hexagon Transportation Consultants, Working Paper #10 – *Travel Demand Modeling Methodology Report*, November 1, 2002. Full model documentation is included in the Appendix to the Traffic Report.

- Addition of a multinomial logit choice model to predict the auto and transit access for interregional commuters traveling between the Central Valley and the Bay Area. Previously, BAYCAST only included an estimate of interregional auto trips.
- Addition of a number of traffic analysis zones (TAZ) within the project corridor (southern Alameda County and Santa Clara County). This was done to allow more detailed estimation of station ridership by mode of access. A comparison of the zones by Superdistrict is shown in Table 3-1.
- Addition of a transit station park-and-ride constraint in the home-based work mode choice models.
- Estimation of air-passenger trips to the San Jose International Airport.
- Recalibration and validation of the models to the base year 2000 observed travel conditions in the project corridor.

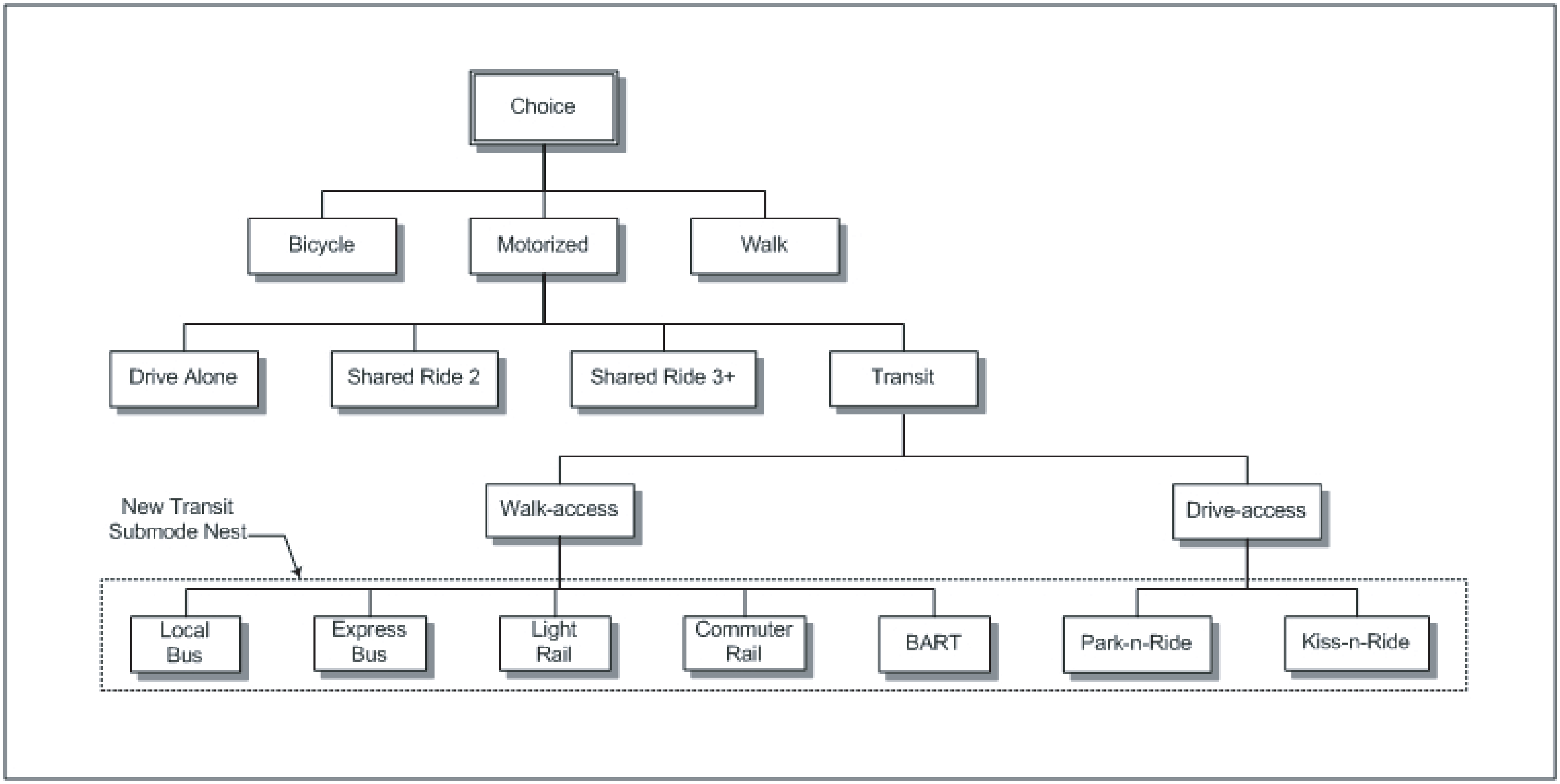

Figure 3-1
Home-based Work Mode Choice Structure

Table 3-1
TAZ Comparison between 1099 Zones and 1199 Zones

County	Superdistrict (SD) Location	SD #	1099 TAZ Range	1199 TAZ Range
San Francisco	--	1-4	1-127	
San Mateo	--	5-7	128-242	
Santa Clara	Palo Alto	8	243-274	
	Golden Triangle	9	275-331	1100-1127,1198
	Cupertino	10	332-378	1128-1131
	Downtown San Jose	11	380-422	1132-1143,1199
	Milpitas	12	423-468	1144-1175
	South County	13,14	469-511	
Alameda	Tri-Valley	15	512-535	1176-1181
	Fremont, Newark, Union City	16	536-581	1182-1194
	Hayward	17	582-637	1195-1197
	Oakland, Berkeley	18,19	638-747	
Contra Costa	--	20-24	748-901	
North Bay Counties	--	25-34	902-1099	

Source: Hexagon Transportation Consultants, 2002[3]

The model that was used as a part of this study was calibrated to 2000, the base year for all further analysis. The BART extension to Warm Springs analysis required two time periods to be studied: the proposed opening year (2010) and a future year (2025).

3.3. MODEL ASSUMPTIONS

There are four sets of assumptions used in developing the VTA modified MTC model:

- Pricing assumptions which include projected parking prices, gasoline, and non-gasoline auto operating costs, fuel economy, bridge tolls and transit fares;
- Travel behavior assumptions, which include trip peaking factors, vehicle occupancy factors and estimates of interregional commuters;
- Demographic assumptions, which are based on the socio-economic / land use forecast series *Projections 2000*[4] developed by the Association of Bay Area Governments (ABAG); and
- Network assumptions, which include roadway locations, capacities and speeds, as well as transit routes and frequencies.

[3] See Footnote 2
[4] Association of Bay Area Governments, *Projections 2000*, Dec 1999.

3.3.1. Pricing Assumptions

Parking Costs

The MTC travel demand model assumptions were used. These were estimated using nominal, or posted, parking prices as opposed to actual parking prices. The MTC assumption for parking costs is that they will increase in real terms by one or two percent per year between 1990 and 2025. The core areas of Berkeley, Oakland and San Jose are assumed to have annual increases of two percent with the other areas growing at one percent per year.

BART has recently implemented a system-wide parking cost structure for existing stations. These costs were included in the model as the constraining factor that is discussed in Section 3.4.

Transit Fares

MTC model assumptions were used, except where recent fare changes were made. Transit fares are assumed to increase based on the inflation rate. The current dollar fares are based on a four percent per year increase in consumer price indices and the fare changes that were incorporated to 1998 were included in the MTC revision of the model. The VTA modified MTC model updated transit fares to 2000 for use in the year 2000 calibration process.

3.3.2. Travel Behavior Assumptions

Vehicle Peaking Factors

The model is oriented to the production of daily and AM peak period traffic assignments. PM peak period traffic assignments can also be produced from the model, because the basic output of demand models are daily trips by trip purpose and travel model. From the two hour peak period vehicle trip tables, one hour peak periods can also be determined using peak period factors by trip purpose. The VTA modified MTC model is considered a “peak-spreading” model, which decreases the number of trips in the peak hour when congestion increases.

Interregional Commuters

Assumptions about the number of interregional commuters are essential to travel demand forecasting, particularly when dealing with heavy rail. These are important for two reasons:

- Intra-regional home-based-work productions and attractions need to be adjusted to reflect in-commuting and out-commuting to and from the Bay Area; and
- Inter-regional vehicle trips are needed to augment the intra-regional trips included in the standard BAYCAST travel demand models.

In the context of the VTA modified MTC model used in this study, interregional commuters are estimated using the 1990 Census Journey-to-Work data. There data are aggregated to the 34 Bay Area Superdistricts and the 12 neighboring counties.

3.3.3. Demographic Assumptions

ABAG *Projections 2000* socioeconomic data series were used in the model as these are the most recent forecasts available when the technical work commenced. The base year 2000 (validation), 2010 and 2025 forecasts use the ABAG *Projections 2000* data reallocated to the more detailed traffic analysis zones by the Alameda Congestion Management Agency (CMA) and VTA as part of their respective countywide travel demand models. Each of these two counties have reallocated the ABAG census tract information based on the expected growth areas provided by member cities. While this does lead to some variations within each city, the ABAG citywide control totals are respected (within one percent).

3.3.4. Network Coding

To ensure model consistency between the MTC model and the VTA modified MTC model, any new highway and transit network coding used the existing MTC network coding conventions. While there were network corrections and roadway additions, the majority of the transit and highway networks are directly based on the regional networks used by MTC for the 2001 update of the Regional Transportation Plan.

Transit Submode Network Development

A transit pathbuilding hierarchy was established for purposes of mode choice model calibration. The primary rule is that the transit service that typically provides the longest trip is at the top of the hierarchy. The MTC model places BART at the top of this hierarchy. In the VTA modified MTC model, commuter rail is assumed to be at the top of the hierarchy during the pathbuilding and transit assignments.

3.4. MODEL CONSTRAINTS

The results reported in this study are based on a constrained version of the model. Under a constrained scenario, the number of parking spaces at all existing BART stations is held constant. This is done through price mechanisms. The number of available commuter spaces at each of the existing BART stations was added into the model and a shadow parking cost was derived. This shadow parking cost is a variable that relates the parking demand to the parking capacity similar to a volume-to-capacity ratio.

3.5. VALIDATION GOALS

Model validation is an essential process in transportation forecasting. Validation is achieved by comparing the observed data to results estimated by the model. The validation goals for the VTA modified MTC model are described below.

- Daily transit ridership on BART within + or – 5% of observed counts (results are listed in Table 3-2).
- Daily transit ridership for major providers such as AC transit within + or – 15% of observed counts (results are listed in Table 3-2)
- Daily transit station boardings for groups of adjacent stations on BART within + or – 15% of observed counts (results for the two station groups closest to Fremont station are listed in Table 3-3).

- AM peak period volumes at the Alameda / Santa Clara County line within + or – 10% of observed counts (results are listed in Table 3-4).
- AM peak period model volumes at project screenlines within + or – 15% of observed counts.
- AM peak period travel times for selected origin – destination pairs within + or – 15% of observed speeds.

Table 3-2
Estimated Versus Observed Daily Boardings by Transit Operator, 2000

Operator	Estimated Daily Boardings	Observed Daily Boardings	% Difference
BART	339,420	335,600	1.1 %
VTA LRT	30,764	29,177	5.4 %
VTA Express (1)	3,715	2,409	54.2 %
VTA Express/Limited	9,298	5,298	75.5 %
VTA Local Bus	146,358	145,436	0.6 %
Caltrain	38,044	33,000	15.3 %
Caltrain Shuttle Bus	6,176	4,867	26.9 %
ACE	3,980	3,827	4.0 %
ACE Shuttle Bus	2,077	1,503	38.2 %
Capitols (2)	2,172	2,822	-23.0 %
MUNI	775,662	719,200	7.9 %
AC Transit	226,432	209,000	8.3 %
SamTrans	61,770	59,901	3.1 %
Livermore/Amador Transit	6,062	5,500	10.2 %
Union City Transit	2,466	1,733	42.3 %

Notes
(1) Express buses between Alameda County and Santa Clara County: VTA Express Routes 140, 180 and 520
(2) Boardings do not include external to internal transit trips on Capitol Corridor

Source: Hexagon Transportation Consultants, 2002[5]

[5] See footnote 2

Table 3-3
2000 Validation - BART Station Entries and Exits by Segment

BART Station	Modeled	Observed	Absolute Difference	% Difference
Station Group				
Fremont	11,939	12,796	-857	
Union City	8,732	8,280	452	
S. Hayward	6,740	6,386	354	
Total	**27,411**	**27,462**	**-51**	**-0.2%**
Station Group				
Hayward	9,690	10,235	-545	
Bay Fair	11,997	11,207	790	
San Leandro	10,856	10,753	103	
Total	**32,543**	**32,195**	**348**	**1.1%**
Source: Hexagon Transportation Consultants, 2002[6]				

Table 3-4
Year 2000 Traffic Volumes at Santa Clara/Alameda County Line (2-Hour AM Peak Period)

Facility	Location	Direction	Model	Count	% Difference
Southbound					
I-880	South of Dixon Landing Rd	SB	14,000	13,000	7.7 %
I-680	South of Scott Creek Rd	SB	12,900	13,000	0.1 %
Warm Springs Rd	North of Milpitas City Limits	SB	3,900	2,900	34.5 %
TOTAL		SB	30,800	28,900	6.6 %
Northbound					
I-880	South of Dixon Landing Rd	NB	10,100	8,400	20.2 %
I-680	South of Scott Creek Rd	NB	10,600	10,500	1.0 %
Warm Springs Rd	North of Milpitas City Limits	NB	500	1,400	-64.3 %
TOTAL		NB	21,200	20,300	4.4 %
Source: Santa Clara VTA and Caltrans traffic counts, 2000					

3.6. MODEL CALIBRATION

To maintain consistency with BAYCAST (calibrated to 1998), the calibration process for the VTA modified MTC model required a substantial effort. This was due to

- the finer TAZ structure in southern Alameda County and Santa Clara County; and
- the new mode choice structure, which required recalibration of the trip generation, distribution and mode choice models.

The calibrated model was then validated against highway count and transit ridership data for the year 2000.

[6] See Footnote 2

3.7. PRODUCTIONS / ATTRACTIONS VERSUS ORIGINS / DESTINATIONS

In a daily model such as the VTA modified MTC model used in this study, total daily origins and destinations are balanced in the model. When a peak period (or peak hour) model is run, they will not balance, because productions and attractions (the input to origins and destinations) for each zone in the model will differ. In any travel forecasting model, productions refer to the start of the trip (similar to origins) and attractions refer to the end of the trip (similar to destinations). Many trips in a model are related to the home-based work trip where people leave home in the morning to travel to work and return in the opposite direction in the evening.

3.8. PARK-AND-RIDE / KISS-AND-RIDE ANALYSIS

The travel model developed for use in this project, and in the BART to San Jose studies, provides an estimated set of modes of access for BART riders for work trips, calibrated to existing travel surveys. The modes of access include:

- walk to BART;
- bicycle to BART;
- local fixed-route bus transit to BART;
- drive to BART (park-and-ride); and
- drop off or kiss-and-ride to BART.

These modes of access represent the methods by which people travel to BART, rather than from BART. The travel model limits trips coming from BART by not allowing persons to drive from their non-home station. Non-work transit trips are assigned directly to transit or roadways.

Because these modes of access represent person trips, they are counted as daily person trips in the travel forecast model, as compared to vehicle trips. For this reason, a detailed method is required to represent person trip estimates on the local roadway system during peak hours, as vehicle trips.

Each of these modes is assigned according to the following system:

Walk and bicycle to BART. These trips are projected to be a small component of BART riders at study area stations. These trips never occur in private vehicles, so they do not need to be added to roadway traffic volumes. Appropriate allowances for pedestrian crossings are provided at particular intersections.

Local bus transit to BART. These trips represent an important percentage of people reaching BART at the study area stations, but the actual number of vehicles accessing a BART station is much smaller, as transit vehicles carry large numbers of people. Appropriate adjustments are provided for buses that move in and out of BART stations.

Drive to BART or park-and-ride. These trips represent an important arrival mode to BART at the study area stations, and also represent the majority of vehicles that would be found in the immediate station vicinity at peak hours. These trips are not directly assigned in the travel model, and must be added on top of forecasted horizon year trips.

The travel model provides person trip data for park-and-ride. To obtain vehicle trip estimates for stations, the number of persons that drive to BART must be adjusted for both time-of-day and for auto occupancy. Prior studies for the South Bay extension assume that 30 percent of daily station work-trip boardings (15 percent of all-day station boardings and alightings) would be a reasonable proportion to represent peak hour station park-and-ride activity. An adjustment for a percentage of carpoolers is needed, because some BART riders arrive in multiple-occupant vehicles.

Surveys from the Fremont BART station on modes of arrival (*BART Station Characteristics Database, 2000*) indicate that the average auto occupancy is slightly higher than 1.06 persons per vehicle. The 1.06 was developed by determining that approximately 3720 people drove to the Fremont BART station and parked in approximately 3490 vehicles. An average auto occupancy of 1.06 was therefore applied to the analysis.

Once the number of park-and-ride trips are estimated, the travel model provides an estimated distribution of these trips, so that percentages of the station traffic can be assigned on particular roads according to the minimum travel time paths to and from the station (determined by using congested travel times from the travel model).

Drop-off or kiss-and-ride trips. This trip type is a significant mode of arrival to BART, and encompasses a variety of modes. These include:

- persons driven to BART with the driver returning home or back in the direction of their home,
- persons driven to BART with the driver continuing in the same direction of travel,
- taxicabs,
- vanpools and
- other drop-off methods.

The travel model provides person trips for arrivals by drop-off or kiss-and-ride in a method similar to park-and-ride trips. Overall, the proportion of kiss-and-ride transit trips as a mode choice is not as high as the proportion of park-and-ride transit trips.

To convert daily work trips to a peak-hour period, kiss-and-ride trips are also assumed at 30 percent of daily BART entries (15 percent of total station activity). Since no survey data are available for the number of BART patrons in kiss-and-ride vehicles, the same ratio determined for park-and-ride auto occupancy (daily average of 1.06) is applied for these trips to total daily activity.

Unlike park-and-ride trips, the driver in the kiss-and-ride vehicle is not the transit passenger. Thus, kiss-and-ride vehicles are assumed to both enter and exit the station during a peak hour. Many kiss-and-ride BART riders are dropped off by another person traveling in the same direction, so that these trips would already be operating in the roadway system. To be conservative, the analysis assumes that these trips are all new trips generated for the purpose of dropping a BART rider at the station.

In all scenarios, the park-and-ride and kiss-and-ride trips are hand assigned to the network. In the model, zones that have park-and-ride connections to any of the three stations are assigned to the appropriate MTC Superdistrict, as trips from the same Superdistrict will generally follow the same path. The exception to this is the City of Fremont Superdistrict zone, where the zone has been split into five areas:

- south Fremont (south of Mission Boulevard);
- mid Fremont (the area to the west of the proposed BART line;
- east Fremont (the area east of I-680);
- Fremont BART area (the area between Fremont BART station and the proposed Irvington Station) and;
- north Fremont (the area between the Fremont BART station and the City of Fremont and Union City border).

Trips are hand assigned based on the shortest path to each of the three stations based on shortest path queries from the travel model.

3.9. INTERSECTION ANALYSIS

Turning movements at study intersections were generated by the VTA modified MTC model for future years. They were reported for both the AM and the PM peak hour as a text file. Excel macros were then used to convert the output file into the changes in forecasted turning movements at each of the study intersections.

Park-and-ride and kiss-and-ride volumes were then added to the appropriate turning movements in order to provide the total turning movements at each of the study intersections. All turning movements were checked for reasonableness and modifications were made if travel model changes did not result in higher forecasted volumes.

3.10. MTS ANALYSIS

As required by the Alameda County CMA, analysis of Metropolitan Transportation System (MTS) roadway segments are analyzed. Segments along the following roadways in the Alameda County MTS were analyzed for potential impacts:

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.

- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.
- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.
- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.
- Washington Boulevard between Mission Boulevard and Fremont Boulevard.

Analysis was completed for the PM peak hour using the travel forecasts from the VTA modified MTC model, for the years 2010 and 2025.

3.10.1. MTS Roadway Analysis

For the MTS roadway analysis, project traffic was assigned to the roadways using the same trip distribution assumptions outlined in this section. The tables present the worst-case model link in the study area for each major MTS route segment. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Roadway segments are expected to have both increases and decreases in traffic volumes as a result of the proposed project or its alternatives. Because there are no adopted significance criteria for impacts to MTS roadway segments, for reference purposes the summary paragraphs discuss which roadway segments would experience changes greater than two percent, changes greater than five percent, and also those that would operate at LOS E or LOS F.

PM peak hour volumes on each of the MTS analysis links, were taken from the VTA modified MTC model output files. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide PM peak hour volumes for the links.

4. LOCAL SIGNIFICANCE CRITERIA

The City of Fremont level-of-service policy, as stated in the City of Fremont General Plan 2000, Policy T 1.2.1, is as follows: Level of Service D (LOS D) with a target volume-to-capacity ratio of 0.85 be maintained at major intersections. Exceptions may occur where the achievement of such level of service can be demonstrated to conflict with environmental, historic or aesthetic objectives; where regional traffic is a significant cause of congestion; or where substantial transportation improvements have been required and further mitigation is not feasible because of identified constraints (*City of Fremont General Plan 2000*, Policy T 1.2.1).

Also, significant traffic impacts at signalized intersections are considered to occur when the addition of traffic from a project causes:

- intersection operations to deteriorate from LOS D or better under background conditions to LOS E or LOS F under project conditions; or
- intersection operations to deteriorate from a v/c ratio of 0.85 or better under background conditions to a v/c ratio of 0.85 or worse under project conditions.
- a substantial increase occurs in the v/c ratio at an intersection operating at LOS E or LOS F (for the purposes of this EIR, a substantial increase in V/C ratio is considered an increase of 0.05 or greater.)

The Alameda County Congestion Management Agency (CMA) Land Use Analysis Program requires a level-of-service analysis for roadway segments along the CMA's identified Metropolitan Transportation System, provided that these roadway segments are within the study area and if 100 PM peak hour net vehicle tips are generated by the proposed project. The CMA does not specify threshold criteria for analysis of these routes. Because there are no adopted significance criteria for impacts to MTS routes, roadway segments that experience changes of two percent or greater, changes of five percent or greater, or would operate at LOS E or F, are identified.

5. WARM SPRINGS STATION AREA

The proposed Warm Springs Station would be located on the southwest corner at the intersection of Warm Springs Boulevard/Osgood Road and Grimmer Boulevard. Appendix F includes station area plans.

5.1 ROADWAY ACCESS

The proposed Warm Springs Station would be located on the southwest corner at the intersection of South Grimmer Boulevard and Warm Springs Boulevard. Direct access to the project site would be provided along Warm Springs Boulevard via two signalized intersections and one right-in, right-out driveway. A secondary access point would be provided via a proposed extension of Warm Springs Court.

From I-880, it is expected that regional traffic would access the station via the Fremont Boulevard interchange, then South Grimmer Boulevard (from the west) and then access the station from Warm Springs Boulevard. Between I-880 and the station, Fremont Boulevard and South Grimmer Boulevard are both four-lane facilities. East of Warm Springs Boulevard (the east edge of the station), South Grimmer Boulevard is a two-lane facility. Traffic from I-880 could also use the SR 262 (Mission Boulevard) interchange, then Warm Springs Boulevard to access the station (from the south). At the SR 262/Warm Springs Boulevard intersection, SR 262 is six lanes and is heavily congested during both the a.m. and p.m. peak periods.

From I-680, access to the station would be from the interchange with Auto Mall Parkway/Durham Road (from the north) or the interchange with SR 262/Mission Boulevard (from the south). Traffic using the Auto Mall Parkway/Durham Road interchange would use Osgood Road/Warm Springs Boulevard to access the station directly. Warm Springs Boulevard currently has two lanes, but the City of Fremont plans to widen it to four lanes.

A third access route to the proposed Warm Springs Station would be via Mission Boulevard and Paseo Padre Parkway. Paseo Padre Parkway is a two-lane residential street between Grimmer Boulevard and Mission Boulevard.

5.2 PARKING

On-site parking would consist of daily parking (available for up to 24 hours), midday parking (free spaces for customers who arrive at stations after 10:00 a.m.), carpool (each car must have at least two passengers when parking), and disabled parking (located adjacent to the station's east entry pavilion and concourse), with BART staff parking integrated near the station. A total of 2,040 on-site spaces would be provided. Areas for paton pick up and drop off by private automobile would also be provided.

5.3 BICYCLE ACCESS AND STORAGE

The *2002 City of Fremont Bicycle and Pedestrian Plan* identified bicycle facilities in the vicinity of the Warm Springs Station study area. The existing facilities consist of the following: bicycle lanes on Auto Mall Parkway between I-880 and Mission Boulevard, on South Grimmer Boulevard between Fremont Boulevard and Mission Boulevard, and on Fremont Boulevard between Blacow Road and I-880. Signed bicycle lanes (a 15-foot travel lane with prohibited parking and no markings on the pavement) are located on Warm Springs Boulevard between Auto Mall Parkway and north of Mission Boulevard, and on Auto Mall Parkway between Boyce Road and I-880.

The proposed Warm Springs Station would include bicycle parking facilities adjacent to the station's conceptual entry pavilion on the north and south sides of the station. Bicycle lanes would be provided along all major driveways connecting with city streets and leading to the main station entrance. The City of Fremont has plans to expand bicycle facilities along Osgood Road/Warm Springs Boulevard to include bicycle lanes in each direction under the city's Capital Improvement Program. The City's Plans will be taken into account in the provision of bicycle access facility during the station design process.

5.4 PEDESTRIAN CIRCULATION

Major streets providing access to the proposed station would be designed for safe and convenient pedestrian access and would include sidewalks, landscape buffers, and enhanced crosswalks at signalized intersections. Within the proposed station site, special crosswalks would accommodate pedestrian movements and connect patron parking areas with the main station entry point provided as part of the Proposed Project. Pedestrian facilities that would be provided throughout the station include benches, stairs, escalators and waiting areas. Lighting plans would focus special illumination on these walkway and waiting areas. Pedestrian access to the Warm Springs Station would be available from Warm Springs Boulevard, and Warm Springs Court. The City's Plans will be taken into account in the provision of pedestrian access facility during the station design process.

5.5 TRANSIT SERVICE

AC Transit provides daily bus service within the Warm Springs Station study area, as previously illustrated in Figure 1.3. AC Transit currently operates two bus routes in the vicinity of the project study area.

Route 215 provides service between the Fremont Station and the Warm Springs District. It operates weekdays between 6:00 AM to 10:00 PM, at 30-minute headways. Weekend service is provided hourly between 7:00 AM to 7:00 PM Route 215 serves up to 530 passengers per day on weekdays; ridership declines to about 90 on Saturdays and 45 on Sundays. Route 215 travels along Mission Boulevard, Driscoll Road, and Warm Springs Boulevard.

Route 218 provides service between Ohlone College and the Fremont Station. It operates weekdays from 6:00 a.m. to 10:00 p.m. at 30-minute headways. It does not provide weekend service. Route 218 serves about 400 passengers, on average, per day. Route 218 travels along Paseo Padre Parkway, Grimmer Boulevard, and Mission Boulevard.

Future additional bus transit service is proposed to and from the proposed Warm Springs Station, when the two existing bus operators would re-structure their routes to serve the proposed Warm Springs Station. Based on conceptual plans, it is anticipated that seven bus layover bays would be provided within the station area. It is also anticipated that buses would access the station to and from the Warm Springs Boulevard/south driveway intersection with secondary access from the extended Warm Springs Court entrance.

5.5.1 Paratransit & Shuttle Service

Paratransit and shuttle services currently operate at the Fremont BART station. It is standard professional practice in transportation modeling to assume that these services would be provided by private companies and local employment centers at a new station. The paratransit and shuttle service stop would be located directly adjacent to the elevators at the main station entry based on conceptual plans for this station.

Paratransit services are those services provided to people with disabilities who are unable to use fixed-route transit service. These services often require the patron to call ahead of time and will result in the patron being picked up at the door (for example at home) and then dropped off at the door at the other end of the trip (for example the doctor).

Shuttle services are those services that normally operate on a fixed route between two destinations with no intermediate stops along the route. The most common shuttles are employee-based shuttles that serve one employment center and the local transit center or station. Shuttles connecting with major employment centers include those proposed by Pacific Commons and the potential employee shuttle service for NUMMI. Other potential shuttles may serve educational facilities, hotels, and visitor centers in the vicinity.

5.5.2 Taxi Service

Similar to the provision of shuttle and paratransit services, taxis are currently provided by local taxi companies at the Fremont BART station. It is standard professional practice in transportation modeling to assume similar services would be provided at any new station. Taxi service would be provided by local taxi companies to and from the proposed Warm Springs Station. Based on conceptual plans for this station taxis would access the station from the Warm Springs Boulevard/south driveway intersection, Warm Springs Court and the right-in, right-out driveway only. Taxis would drop-off and pick-up passengers via a one-way designated road near the kiss-and-ride area. It is anticipated that taxis would exit at the north driveway with access to Warm Springs Court and Warm Springs Boulevard.

5.6 KISS-N-RIDE

Kiss-n-ride traffic would access the Warm Springs Station from Warm Springs Boulevard/North Driveway intersection, Warm Springs Boulevard/South Driveway intersection, Warm Springs Court and the right-in, right-out driveway. The kiss-n-ride area would be adjacent to the east entry pavilion.

5.7 EMERGENCY AND MAINTENANCE VEHICLE ACCESS

Emergency and maintenance vehicles would have access to the Warm Springs Station from Warm Springs Boulevard/North Driveway intersection, Warm Springs Boulevard/South Driveway intersection, Warm Springs Court and the right-in, right-out driveway. Emergency and maintenance vehicles would have a designated parking area directly adjacent to the platform and under the elevated pedestrian walkway, according to the conceptual plans for this station.

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6. OPTIONAL IRVINGTON STATION AREA

The proposed optional Irvington Station would be located near the southwest corner of the intersection of Washington Boulevard and Driscoll Road-Osgood Road. Appendix F includes the station area plan for the optional Irvington Station.

Direct vehicular access to the station and parking areas would be along Osgood Road via two signalized intersections, a right-in, right-out driveway located on the east side of Osgood Road and a one-way driveway on the west side of Osgood Road. A secondary access would be provided from Main Street, south of Driscoll Road under Washington Boulevard.

Osgood Road is currently a two-lane facility. The City of Fremont plans to widen it to four lanes.

6.1 ROADWAY ACCESS

Regional access to the site is provided via I-880 and I-680.

From I-880, it is expected that regional traffic would access the station via the Stevenson Boulevard interchange in the north, and the Auto Mall Parkway interchange and/or the Fremont Boulevard interchange in the south. Traffic from I-880 via the Stevenson Boulevard interchange would access the Irvington Station from Fremont Boulevard then Olive Avenue. From the Auto Mall Parkway, vehicles would access the site via Fremont Boulevard onto Olive Avenue or via Osgood Road. Vehicles traveling to/from the Fremont Boulevard interchange would access the Irvington Station via Fremont Boulevard then Olive Avenue, or Grimmer Boulevard then Osgood Road, and from Auto Mall Parkway via Osgood Road. Access from I-680 would be via the Washington Boulevard interchange east of the station.

Local access is provided by Blacow Road, Fremont Boulevard, Driscoll Road and Washington Boulevard. Blacow Road is currently divided in two sections that do not connect: a four-lane section that terminates just west of the existing railroad tracks and a two-lane section that terminates on the east side of the tracks. The City of Fremont has no plans to connect the two sections of Blacow Road under the railroad tracks.

Fremont Boulevard is a four-lane arterial north of Washington Boulevard, a two-lane arterial between Blacow Road and Washington Boulevard and a four-lane arterial south of Blacow Road. Driscoll Road is also a four-lane road until it meets Osgood Road.

Washington Boulevard has one lane in each direction east of Driscoll Road/ Osgood Road then widens to two lanes in each direction at the I-680 interchange. Fremont plans to widen Washington Boulevard to four lanes from Fremont Boulevard to Mission Boulevard.

6.2 PARKING

There are no off-street parking facilities in the area that would be affected by construction of the station. On-site parking would consist of station parking (available for up to 24 hours), midday parking (free spaces for customers who arrive at stations after 10 a.m.), disabled parking (located near the west walkway entrance, south of Osgood Road via the Main Street connection), and official BART parking. A total of 960 on-site spaces would be provided.

6.3 BICYCLE ACCESS AND STORAGE

The *2002 City of Fremont Bicycle and Pedestrian Plan* identified bicycle facilities in the vicinity of the Irvington Station study area. The existing facilities consist of the following: bicycle lanes on Driscoll Road between Washington Boulevard and Mission Boulevard, and on Paseo Padre Parkway east of Driscoll Road. Signed bicycle lanes (a 15-foot travel lane with prohibited parking and no markings on the pavement) are located on Fremont Boulevard between Grimmer Boulevard and Washington Boulevard, and on Washington Boulevard between Mission Boulevard and I-680.

There are frontage road facilities (roads running parallel to the main thoroughfare and separated by a median) on Fremont Boulevard between Walnut Avenue and Grimmer Boulevard, and on Blacow Road west of Grimmer Boulevard.

The Irvington Station would provide bicycle lockers on both the east and west side of the station. Bicycle lanes within the BART station site would connect with street access routes to the station and would link to station entry points, bike locker and other bike parking. The City's Plans will be taken into account in the provision of bicycle access facility during the station design process.

6.4 PEDESTRIAN CIRCULATION

Existing pedestrian activity was observed throughout the day and was perceived to be minimal. The Irvington Station area is generally not pedestrian oriented, currently. There are sidewalks on Washington Boulevard and Fremont Boulevard. Sidewalks on Washington Boulevard between Fremont Boulevard and Osgood Road currently cross the existing rail lines at grade. Osgood Road has no sidewalks. Pedestrian signals would be provided at the Osgood Road-Driscoll Road/Washington Boulevard intersection only.

Pedestrian movements within the station would be accommodated by an elevated pedestrian walkway with access to and from the east and west side of the station. The proposed pedestrian walkway would cross over Osgood Road from the east side of the station and over the Union Pacific Railroad tracks from the west side of the Irvington station.

Pedestrian walkways and enhanced crosswalks would be incorporated into main streets with entry to the BART station and adjacent parking areas. A signalized intersection would be provided at the Osgood Road-Driscoll Road/Washington Boulevard intersection as part of the Proposed Project with Optional Irvington Station. Pedestrian access to the station concourse would be accommodated by an elevated pedestrian walkway with access to and from the east and west sides of the station. The proposed pedestrian walkway would cross over Osgood Road from the east side of the station and over the UP tracks from the west side of the optional Irvington Station. Pedestrian facilities would be provided throughout the station, including benches, stairs, escalators, and adequate waiting areas. Special pedestrian lighting along walkways and in entry plazas would be provided. The City's Plans will be taken into account in the provision of pedestrian access facility during the station design process.

6.5 TRANSIT SERVICE

AC Transit bus service is proposed to and from the Irvington Station. Five bus transit bays would be provided within the station. Transit buses would access the station to and from the Osgood Road via the secondary intersection on Osgood Road.

6.5.1 Paratransit & Shuttle Service

Paratransit and shuttle services currently operate at the Fremont BART station. It is standard professional practice in transportation modeling to assume that these services would be provided by private companies and local employment centers at a new station. The paratransit and shuttle service stop would be integrated with the bus intermodal accessed from Osgood Road.

Paratransit services are those services provided to people with disabilities who are unable to use fixed-route transit service. These services often require the patron to call ahead of time and will result on the patron being picked up at the door (for example at home) and then dropped off at the door at the other end of the trip (for example the doctor).

Shuttle services are those services that normally operate on a fixed route between two destinations with no intermediate stops along the route. Potential shuttles would connect with educational and civic centers accessible from Irvington.

6.5.2 Taxi Service

Similar to the provision of shuttle and paratransit services, taxis are currently provided by local taxi operators at the Fremont BART station. It is standard professional practice in transportation modeling to assume similar services would be provided at any new station. Taxi service would be provided by local taxi operators, to and from the optional Irvington Station via Osgood Road and Main Street. It is anticipated that taxis would drop-off and pick-up passengers via the right-in, right-out driveway northbound on Osgood Road and exit on Osgood Road. Taxis would also have a designated staging area on the west entrance via Main Street.

6.6 KISS-N-RIDE

Kiss-n-ride traffic would have access to the Irvington Station from the right-in, right-out driveway located along the east side of Osgood Road and via the one-way driveway from the west side of Osgood Road. A kiss-n-ride zone would also be provided on the west side of the station with access from Main Street.

6.7 RAILROAD LINES

Two sets of freight-rail lines, which are adjacent to one another, intersect Washington Boulevard at grade. These rail crossings are each equipped with crossing signals and automatic gates. Currently, freight-rail movements disrupt vehicle movements on Washington Boulevard, Driscoll Road, and Osgood Road. A grade separation project is currently programmed at this location.

6.8 EMERGENCY AND MAINTENANCE VEHICLE ACCESS

Emergency and maintenance vehicles would have access to the proposed optional Irvington Station from the signalized intersection at Osgood Road and the proposed BART driveway, the two right-in and right-out intersections (one on either side of Osgood Road), Roberts Avenue, and the proposed extension from High Street (on the other side of Washington Boulevard). The conceptual plans for the optional Irvington Station do not have the emergency access parking areas clearly defined, but they would ideally be located directly adjacent to the platforms and under the elevated pedestrian walkways.

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7. 2010 PROPOSED PROJECT

The proposed Warm Springs Station would be located on the southwest corner the intersection of Warm Springs Boulevard/Osgood Road and Grimmer Boulevard in the City of Fremont, California. Direct access to the project site would be provided along Warm Springs Boulevard via two signalized intersections and one right-in, right-out driveway. Another access point would be via Warm Springs Court.

7.1. DESCRIPTION

In order to generate travel forecast model results for the 2010 Proposed Project alternative, year 2025 highway and transit networks were used and modified as appropriate. Discussions were held with the Alameda County Congestion Management Agency, City of Fremont, and the Metropolitan Transportation Commission (MTC) to establish the network. Some road projects assumed to be completed by 2025 in the VTA modified MTC model, were removed from this scenario. Most of these projects were road widening projects. Within Fremont the following projects were not included in the 2010 analysis:

- Widening of Cushing Parkway between North Loop Road and Fremont Boulevard
- Widening of Driscoll Road between Mission Boulevard and Chilton Avenue
- Widening of Durham Road between Osgood Road and I-680
- Widening of Mowry Avenue between I-880 and Blacow Road
- Widening of Paseo Padre Parkway between Driscoll Road and Mowry Avenue
- Widening of South Grimmer Boulevard between Warm Springs Boulevard and Old Warm Springs Boulevard
- Widening Washington Street between I-680 and Mission Boulevard

This scenario assumes that the proposed Warm Springs Extension is the end of the line station. This scenario does not include the optional Irvington Station in the analysis.

7.2. IMPACTS

7.2.1. Trip Generation

Based on the 2010 Scenario, the proposed project would generate 3,640 daily trips vehicle at the Warm Springs Station, including 600 AM peak hour trips (510 inbound, 90 outbound) and 600 P.M. peak hour trips (90 inbound, 510 outbound) (see Table 7-1). The proposed project would result in 4,690 daily trips at the Fremont Station, including 770 AM peak hour trips (660 inbound, 90 outbound) and 770 PM peak hour trips (110 inbound, 660 outbound). Compared to the No Project Condition, the Fremont Station would have 1,870 less vehicle trips per day.

Trip generation for the proposed project was based on the intersection turning movements and the VTA modified MTC model, as summarized in Table 7-1.

Table 7-1
Trip Generation 2010 Proposed Project

Station	Daily	AM		PM	
		In	Out	In	Out
Fremont	4,690	660	110	110	660
Warm Springs	3,640	510	90	90	510

Source: DKS Associates, 2002

7.2.2. Trip Distribution

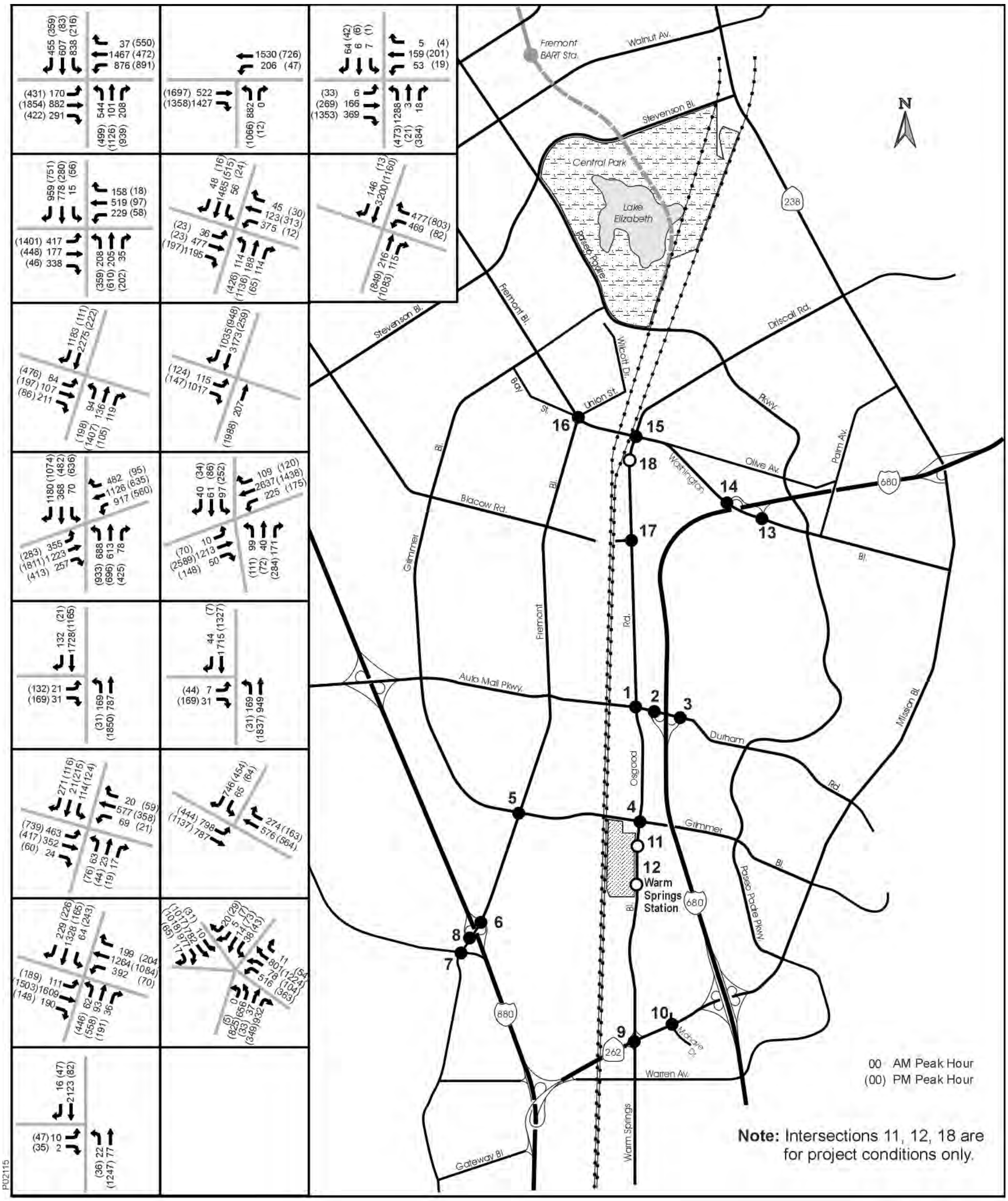
Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B.

7.2.3. Intersection Analysis

The 2010 Proposed Project condition analysis is based on a projection of vehicle trips in the VTA Modified MTC Model. A discussion of the model parameters and adjustments is provided in Chapter 3.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, the intersection LOS was evaluated at 18 study intersections. Because construction of the optional Irvington Station would redistribute trips that would have gone to either the Fremont or Warm Springs Station, all of the study intersections were evaluated under both with and without the optional Irvington Station scenarios. Figure 7-1 illustrates the turning movements for each study intersection under the 2010 Proposed Project scenario.

The intersections and their corresponding levels of service are presented in Table 7-2 for the 2010 No Project and the 2010 Proposed Project.



DKS Associates

Figure 7-1
2010 PROPOSED PROJECT
PEAK HOUR TURNING MOVEMENTS

Table 7-2
Intersection LOS, 2010 No Project and Proposed Project

#	Intersection	2010 No Project Condition				2010 Proposed Project			
		a.m. Peak Hour		**p.m. Peak Hour**		**a.m. Peak Hour**		**p.m. Peak Hour**	
		LOS[a]	**v/c[b]**	**LOS**	**v/c**	**LOS[a]**	**v/c[b]**	**LOS**	**v/c**
1	Osgood Road/Durham Road/Auto Mall Parkway	D	0.84	D	0.89	D	0.90	F	1.06
2	I-680 SB Ramps/Durham Road/Auto Mall Parkway	D	0.89	C	0.78	E	0.99	E	0.91
3	I-680 NB Ramps/Durham Road/Auto Mall Parkway	A	0.56	A	0.40	A	0.53	A	0.41
4	Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard	D	0.88	D	0.86	E	0.91	F	1.29
5	Fremont Boulevard/South Grimmer Boulevard	E	0.91	A	0.58	D	0.86	A	0.57
6	Fremont Boulevard/I-880 NB Ramps	A	0.60	A	0.37	C	0.79	A	0.35
7	Fremont Boulevard/I-880 SB On-ramp/Cushing Parkway	D	0.86	A	0.47	C	0.79	A	0.48
8	Fremont Boulevard/I-880 SB Off-ramp	E	0.91	A	0.43	D	0.88	A	0.48
9	Warm Springs Boulevard/Mission Boulevard	F	1.08	E	0.94	F	1.22	F	1.16
10	Mohave Drive/Mission Boulevard	B	0.61	C	0.74	B	0.70	D	0.85
11	Warm Springs Boulevard/Northern Warm Springs Station Entrance					B	0.66	B	0.66
12	Warm Springs Boulevard/Southern Warm Springs Station Entrance					B	0.65	B	0.62
13	I-680 NB Ramps/Washington Boulevard	A	0.60	A	0.56	B	0.64	C	0.78
14	I-680 SB Ramps/Washington Boulevard	A	0.41	A	0.40	C	0.73	A	0.53
15	Osgood Road/Washington Boulevard	A	0.51	A	0.58	D	0.85	B	0.70
16	Fremont Boulevard/Washington Boulevard/Bay St	F	1.27	F	1.13	F	1.05	F	1.06
17	Osgood Road/Blacow Road	A	0.51	A	0.36	B	0.68	A	0.45
18	Osgood Road/Irvington Station Entrance								

[a] LOS = level of service.

[b] v/c = volume-to-capacity ratio.

Source: DKS Associates 2002

7.2.4. Metropolitan Transportation System Roadways

The Alameda County Congestion Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Some roadway segments are expected to exhibit decreases in traffic volumes as a result of project conditions, while other segments are expected to exhibit increases. For informational purposes only, the number of roadway segments that would operate at LOS E or F are identified in Table 7-3. As discussed above, an impact on a roadway segment is considered significant if project trips cause that segment to deteriorate to LOS F, unless LOS F was measured when the County Congestion Management Plan was established in 1991. In addition, for informational purposes, Table 7-3 identifies the quantity of roadway segments that would experience small volume changes (2% to 4%) or large volume changes (5% or more).

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.
- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.
- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.

Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions and provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 MTS roadway segments. Table 7-3 indicates the quantity of segments that would have volume changes of plus or minus 2%, and plus or minus 5%, as well as changes in the LOS.

Table 7-3
MTS Roadway Analysis Summary, 2010 Proposed Project

Scenario	Roadway Volume Change				LOS Improvements		LOS Degradation	
	-5% or greater	-2% to -4%	+2 to +4%	+5% or greater	State Hwy	Local Roadway	State Hwy	Local Roadway
2010 No Project	13 state highway segments and one local roadway segment operating at LOS E or F							
2010 Proposed Project[a]	40	23	18	20	2	8	1	1
Notes: [a] Compared to 2010 No Project.								
Source: DKS Associates 2002 from VTA-modified MTC Model, BART								

Compared to the 2010 No Project, the 2010 Proposed Project would result in the following changes during the p.m. peak hour.

- One of the MTS state highway segments would show deterioration in the LOS.
- One of the MTS local roadway segments would show deterioration in the LOS.
- Two of the MTS state highway segments would experience an increase in LOS.
- Eight of the MTS local roadway segments would experience an increase in LOS.
- The remaining 142 MTS roadway segments would continue to operate with similar LOS.

Appendix C includes the complete MTS Analysis tables for each scenario.

7.2.5. Transit

Transit Facilities

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be one new BART station built in the City of Fremont: Warm Springs.
- There would be two pairs of daily BART lines in each direction serving the area between the existing Fremont Station and the Warm Springs Station. Combined, they would provide a 7.5 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 15 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections

would then need to be made in downtown San Francisco for service into San Francisco International Airport.

- A third pair of BART lines would operate during the AM and PM peak period only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would operate from Santa Clara County to the Warm Springs Station via I-680, Mission Boulevard and Warm Springs Boulevard. This includes Routes 140, 180, and 520. Route 140 would operate during the peak periods on a 15 minute headway. Route 180 would operate all day, with 15 minute headways, and route 520 would operate during the AM and PM peak period with a 20 minute headway.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new ACE / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- The BART extension to Millbrae would be open and operational with 15-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.
- The West Dublin BART station would be operational and have a service headway of 15 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- The CalTrain Baby Bullet service would operate along the Peninsula with 60 minute headways.

Station Entries and Exits

Table 7-4 list the daily station entries and exits and the system boardings for both the existing and proposed stations in southern Alameda County for the 2010 conditions. This table provides a comparison between the Proposed Project and the No-Project conditions. As expected, there are fewer entries and exits at the Fremont BART Station because it would no longer be the terminus.

Table 7-4
Station Entries and Exits – 2010 Proposed Project

Station	Entries and Exits No Project	Entries and Exits Proposed Project
Southern Alameda County Existing Stations		
Union City	9,200	10,300
Fremont	13,200	9,700
Southern Alameda County Existing Stations Subtotal	**22,500**	**19,900**
Proposed Project Stations		
Irvington	—	—
Warm Springs	—	11,600
Proposed Project Stations Subtotal	**—**	**11,600**
Southern Alameda County Proposed and Existing Stations Subtotal	**22,500**	**31,500**
BART Systemwide Total Entries and Exits	775,600	787,600
BART Systemwide Total Boardings	387,800	393,800

Notes:
Station-level and subtotal values are for station entries and exits (i.e. total persons entering and leaving station areas). Systemwide total boardings was calculated by dividing entries and exits by two.

Southern Alameda County stations are the existing Union City and Fremont Stations plus the proposed Warm Springs and optional Irvington Stations.

All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

In summary, the following observations can be made from the previous table.

- The total number of entries and exits would increase at the Union City BART Station when any scenario is compared to the No-Project condition.
- In 2010, the total entries and exits at the Fremont BART Station would decrease because the station would no longer be the terminus. When the Proposed Project is compared to the 2010 No-Project condition, there would be a decrease of 3,500 entries and exits.
- In 2010, the total entries and exits would be 11,600 at the Warm Springs Station.
- In 2010, there would be an increase in entries and exits for all southern Alameda County stations, which can be attributed to the new stations in the area. Under the 2010 Proposed Project condition, there would be an increase of 9,000 entries and exits when compared to the 2010 No-Project condition.

- In 2010, there would also be a systemwide increase in BART station entries and exits. Systemwide entries and exits increase by 22,000 under the Proposed Project condition.

Table 7-4 indicates the entries and exits at selected stations for the 2010 Proposed Project scenario. Another important ridership result can be gained through simple division and subtraction. The number of new trips on BART can be estimated by dividing the BART systemwide total entries and exits in half. This step is necessary to convert the entries and exits into and out of the system into the number of trips, otherwise each trip would be counted twice. Subtracting the number of trips under the No Project from the trips under the Proposed Project yields the number of new trips on BART resulting from the Proposed Project. For example, in 2010 the number of trips under the No Project would be 387,800 trips and the number under the Proposed Project would be 393,800 trips. The number of new BART trips under the Proposed Project would be 6,000 trips.

Ridership

Station to Station Matrices

Table 7-5 lists the BART productions and attractions between stations for the 2010 No Project Condition and Table 7-6 lists the BART productions and attractions between stations for the 2010 Proposed Project. All tables are shown as daily numbers and are rounded to the nearest ten. Full station-to-station ridership tables are shown at the back of this appendix. In these tables “Other Bay Area” refers to the other areas of the Bay Area that currently (or will in 2010) have BART service. This includes Alameda, San Francisco, San Mateo and Contra Costa Counties. Santa Clara and the North Bay are excluded from this analysis.

These tables show that most of the travelers from Fremont, Irvington, and Warm Springs would travel to San Francisco and Oakland (61 percent in the 2010 No Project Condition and 52 percent for the 2010 Proposed Project), even though there are very few travelers in the opposite direction. Table 7-6 also shows that there would be number of short trips between Fremont, Irvington and Warm Springs stations (21 percent of all trips from these three stations).

Table 7-5
Station to Station BART Matrix – 2010 No Project

Productions	Attractions Fremont	San Francisco / Oakland	Other Bay Area	Totals
Fremont	N/A	5,210	3,280	8,490
San Francisco / Oakland	420	18,700	27,810	46,930
Other Bay Area	4,340	243,100	84,910	332,350
Totals	4,760	267,010	116,000	387,770

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Table 7-6
Station to Station BART Matrix – 2010 Warm Springs Project

Productions	Attractions Fremont	Warm Springs	San Francisco / Oakland	Other Bay Area	Totals
Fremont	N/A	1,430	3,240	2,050	6,720
Warm Springs	840	N/A	2,270	1,590	3,860
San Francisco / Oakland	240	530	18,730	27,890	47,390
Other Bay Area	1,890	4,950	242,810	84,890	334,540
Totals	2,970	5,480	267,050	116,420	391,920

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Ridership

The ridership by segment for heavy rail is listed in Table 7-7 for 2010. This table provides the bidirectional ridership (rounded to the nearest hundred) between stations in the BART network. This table also provides the ridership at the county line for the ACE trains and the Capitol Corridor trains.

Table 7-7
Rail Ridership – 2010 Proposed Project

Station A	Station B	mode	2010 No Project	2010 Proposed Project
Union City	Fremont	BART	13,500	16,900
Fremont	Warm Springs	BART	N/A	11,800[a]
Alameda County / Santa Clara County Line (approx.)		Ace	8,000	7,900
Alameda County / Santa Clara County Line (approx.)		Capitol Corridor	2,300	1,900

Notes: [a] Ridership shown between Fremont and Warm Springs Stations.

Source: DKS Associates 2002 from the VTA modified MTC model

Table 7-8 lists the projected ridership for the VTA express buses and AC Transit service. The total bi-directional ridership levels are provided at the following locations:

- Paseo Padre between Fremont BART station and the Irvington Station location (AC Transit)
- Warm Springs Boulevard / Osgood Road between the Irvington Station location and the Warm Springs Station location (AC Transit)
- Warm Springs Boulevard between South Grimmer Boulevard and Mission Boulevard (AC Transit)
- Warm Springs Boulevard between Mission Boulevard and Kato Road (AC Transit)
- Warm Springs Boulevard south of Kato Road (at the Alameda County / Santa Clara County line) (AC Transit)
- I-680 south of Mission Boulevard (VTA)

AC Transit would provide local service in the area, while VTA would provide express services. For this reason, the VTA routes are shown on a route by route basis.

This table also makes a comparison back to the 2010 No Project condition. There would be more than a 100 percent increase in the ridership levels for all the express buses over the 2010 No Project Condition. This table also indicates that some of the ridership that the project would gain would come from the local AC Transit services. There would also be an increase in the potential ridership in AC Transit services to the south of the Warm Springs Station. This is shown by the reduction in ridership along the Warm Springs Boulevard / Osgood Road and Paseo Padre Parkway. There would also be increases in the ridership levels on the VTA express buses, with the daily VTA Route 180 service increasing its ridership levels by more than 110 percent. The VTA Routes 140 and 520, which would only operate in the peak periods, would increase ridership levels by nearly 400 percent.

Table 7-8
Bus ridership – 2010 Proposed Project

Operator	Route	Road	2010 No Project	2010 Proposed Project
AC Transit		Paseo Padre between Fremont BART Stn and Irvington Stn	1,000	700
AC Transit		Osgood Road between Warm Springs Stn and Irvington Stn	200	100
AC Transit		Warm Springs Boulevard between Grimmer Boulevard and Mission Blvd	300	600
AC Transit		Fremont Boulevard between Auto Mall Parkway and Blacow Rd	400	500
AC Transit		Warm Springs Boulevard between Mission Boulevard and Kato Rd	1,400	1,500
AC Transit		Warm Springs sth of Kato	1,900	1,900
VTA	140	I-680 south of Mission Blvd	200	800
VTA	180	I-680 south of Mission Blvd	1,400	2,900
VTA	520	I-680 south of Mission Blvd	400	1,400
VTA	500	I-680 south of Mission Blvd	1,000	1,600

Source: DKS Associates 2002 from the VTA modified MTC model

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A linked trip consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring onto BART at a BART station and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but is not considered a linked transit trip.

Table 7-9 lists the number of projected linked transit trips (rounded to the nearest hundred) from areas that would logically use the service for both the 2010 No Project Condition and the 2010 Proposed Project. . This table show the linked transit trips for four broad areas within the network: those people that stay within the Fremont/Newark/Union City area; those people traveling to Union City, Newark and Fremont; those people traveling from Newark, Fremont and Union City to other areas; and those people that travel through the Fremont/Newark/Union City area. Those people that travel through the area would include patrons traveling between the East Bay and Santa Clara County.

There would be approximately 4,700 (an increase of 10 percent) new transit riders when the BART to Warm Springs project is built. This table shows that one of the largest increases in the area is linked transit trips to the Southern Alameda County (an increase of 15 percent over the 2010 No Project Condition).

Table 7-9
Linked Transit Trips – 2010 Proposed Project

Trips:	2010 No Project	2010 Proposed Project	Percent Change
Intra	9,800	10,300	5.1%
To	7,700	8,900	15.6%
From	21,400	23,600	10.3%
Through	9,600	10,500	9.4%
Total WSX Corridor Transit Trips	**48,600**	**53,300**	9.7%
Change from No-Build		**4,700**	
Intra Santa Clara Transit Trips	214,700	216,000	0.6%

Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (e.g., Hayward to San Jose).
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates 2002 from the VTA modified MTC model

In 2010, with implementation of the Proposed Project, there would be a 10% increase in transit riders. The largest increase for linked transit trips would be for those people that travel into the Fremont/Newark/Union City area from other Bay Area locations (an increase of 15% over the 2010 No-Project condition).

Mode of Access/Egress

A mode of access analysis provides the potential demands for parking, kiss-and-ride, walk access, and the need for transit provision at each of the stations.

Table 7-10 lists the mode of access/egress at each of the southern Alameda stations 2010 No Project Condition and the 2010 Proposed Project, respectively. These figures have been rounded to the nearest hundred.

Table 7-10
Mode of Access/Egress – 2010 No Project and Proposed Project

	Mode of Access/Egress				
Station	PNR	KNR	Walk/Bike	Transit XFER	Total
2010 No Project					
Union City	3,600	1,300	500	3,700	9,200
Fremont	5,000	1,500	1,600	5,100	13,200
Irvington	0	0	0	0	0
Warm Springs	0	0	0	0	0
Southern Alameda total	8,600	2,800	2,100	8,800	22,500
2010 Proposed Project					
Union City	4,700	1,100	600	3,900	10,300
Fremont	3,900	800	2,200	2,800	9,700
Irvington	0	0	0	0	0
Warm Springs	3,000	600	1,100	6,800	11,600
Southern Alameda total	11,600	2,500	3,900	13,500	31,500

Notes:
PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value
Source: DKS Associates, 2002 from VTA modified MTC model

The previous table can be summarized as follows.

- More parking would be built in the area, and kiss-and-ride levels would decline as a result. As the VTA express buses move from the Fremont BART Station to the Warm Springs Station, there would be a corresponding change in the transit transfers. Any loss in transfers at the Fremont BART Station would be more than accounted for at the Warm Springs Station.

Travel Times

This section consists of sets of travel time comparisons between selected residential locations (northwest Milpitas, Irvington, Fremont, Union City, and Hayward) and selected Bay Area employment centers (Downtown San Francisco; Downtown San Jose, 1st Street and the Diridon Caltrain Depot; Lockheed Martin Corporation facilities in Sunnyvale; and the Pacific Commons development in Fremont).

The locations have been selected to be representative examples. The small set of times is not intended to characterize all travel patterns changed by the Proposed Project. Transit riders' destinations in the Fremont-Warm Springs area are very diffuse, with no single area dominating. Transit ridership from MTC Super District 16 (Fremont-Union City and Newark) to other parts of the Bay Area is projected to be roughly similarly split among San Francisco, the South Bay (including San Mateo County), and the rest of the East Bay. Therefore, the list of travel time comparisons is intended to capture the essence of area-wide changes associated with the BART extension alternatives.

In some cases, transit is competitive with highway times in all alternatives (for example, northwest Milpitas to downtown San Francisco). In other cases, transit travel times improve substantially for one or more of the build alternatives (for example, Irvington to NUMMI). However, there is also one case (Milpitas to Pacific Commons) where transit is not competitive with auto travel, even with improved transit times, due to the need to transfer and the absence of traffic congestion for this specific origin–destination pair.

Table 7-11 provides a comparison of a.m. peak hour travel time (in minutes) between the 2010 No Project and the Proposed Project conditions. Auto travel times would remain roughly constant among the various alternatives analyzed due to the peak spreading function built into the VTA-modified MTC model. When demand during the peak hour exceeds capacity, the excess vehicles are shifted to either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading but would not affect auto travel times during the peak hour.

In a few select cases transit travel times increase under the Proposed Project compares to the No Project. An example of this difference is the trip from Union City to Downtown San Jose. Under No Project Alternative, the traveler uses relatively infrequent Capitol Corridor service to travel to the Diridon Station in San Jose and the transfer to bus. Under the Proposed Project, the traveler uses more frequent BART service to travel to Warm Springs and transfer to bus for the trip to Downtown San Jose.

An example of the difference between actual and perceived time is evident in the Union City to downtown San Jose trip. Under the No-Project scenario, the rider would drive to the Union City Capitol Amtrak Station and ride Amtrak to the San Jose-Diridon Station. The rider would then need to transfer to a connecting bus to reach their downtown destination. Under the Proposed Project scenario, the rider would drive to the South Hayward BART Station[1] and ride to Warm Springs. The rider would then transfer to the VTA Route 180 bus to get to downtown San Jose. The key element for this trip is that BART would operate much more frequently than the Capitol Corridor trains. Even though the total trip takes more time, the Proposed Project would allow the rider get on a train sooner, thus alleviating the need to wait a comparatively longer time for the Capitol Corridor train to arrive.

[1] Due to the specific starting location of the trip in northern Union City and the crowded parking facilities at the Union City BART Station, the travel path went through the South Hayward BART Station.

Table 7-11
AM Peak Hour Travel Times – 2010 Proposed Project

Sample Trip (Origin-Destination)	Drive Alone	Carpool	Transit 2010 No Project	Transit 2010 Proposed Project
Northwest Milpitas-Northwest Downtown San Francisco	101	81	74	74
Northwest Milpitas-Northwest Pacific Commons	16	23	84	65
Irvington-NUMMI	11	18	37	26
Irvington-Downtown San Jose	35	35	80	70
Fremont-Lockheed	44	36	89	66
Fremont-Pacific Commons	12	19	43	43
Union City-Diridon CalTrain Depot	53	46	69	69
Union City-Downtown San Jose	52	44	78	81
Hayward-Lockheed	66	48	75	80

Notes:
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center.
Union City location is approximately the Dyer/Alvarado-Niles Boulevard intersection (west of I-880).
Fremont location is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates, 2002 from VTA-modified MTC model

The other viable option would be to ride a local bus from Irvington to Warm Springs to access the VTA 180 to downtown San Jose (the path chosen in the No-Project Alternative). However, overall travel times indicate that it would be shorter to "backtrack" to Fremont BART than to use the local bus option. BART is much faster than local bus routes and operates much more frequently. In addition, the actual drive access time to the Fremont BART station is nearly equal to the actual walk time to the local bus stop.

Finally, the travel time calculations do not factor in trip reliability. Highway travel times, for example, can vary greatly depending on weather, special events, accidents, and traffic volumes. Rail systems with exclusive rights-of-way can enhance transit reliability, although severe disruptions can occur. Ridership models typically do not capture how day-to-day trip time reliability affects mode choice.

Load Factors

Table 7 - 12 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Fremont BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The

average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 7 - 12
Load Factors – 2010 Proposed Project

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Warm Springs	Fremont	2520	2722	378	408	4	4	0.150	0.162
Fremont	Union City	5284	2918	793	438	5	5	0.252	0.139
Union City	South Hayward	8771	2762	1316	414	5	5	0.418	0.131
South Hayward	Hayward	10708	2544	1606	382	5	5	0.510	0.212
Hayward	Bay Fair	13207	2800	1981	420	5	5	0.629	0.133
Richmond Lines									
Warm Springs	Fremont	1151	2976	173	446	4	4	0.154	0.398
Fremont	Union City	1560	2932	234	440	4	4	0.209	0.393
Union City	South Hayward	2322	2695	348	404	4	4	0.311	0.361
South Hayward	Hayward	2818	2489	423	373	4	4	0.378	0.333
Hayward	Bay Fair	3513	2698	527	405	4	4	0.471	0.362
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	9071	1986	1361	298	4	4	0.540	0.118
West Dublin	Castro Valley	11781	2127	1767	319	4	4	0.701	0.127
Castro Valley	Bay Fair	14252	2272	2138	341	4	4	0.848	0.135

Notes:
NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates 2002 from VTA modified MTC model

Load factors during the 2010 Proposed Project Condition would be relatively low, with all lines showing an availability of seats. As the train progresses northwards, (or westwards), more riders would board and the load factors would increase.

7.2.6. Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06 (from existing occupancy surveys conducted at the Fremont BART Station, *BART Station Access Improvements Study*).

Table 7-13 shows the estimated parking demand for each scenario, along with the number of parking spaces currently proposed. These demand figures include the demand generated by other transit services, such as bus vehicles.

Table 7-13
Parking Supply and Demand – 2010 Proposed Project

	Fremont Station		Warm Springs Station	
	Supply	**Demand**	**Supply**	**Demand**
2010	1,880	1,840	2,040	1,415

Notes:
Parking supply based on presentation by BART Staff to the BART Warm Springs Extension Project Development Team Meeting, October 22, 2002. As stations are designed, actual parking supply could change.
Parking demand based on VTA modified MTC model.

Source: DKS Associates, 2002

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8. 2010 PROPOSED PROJECT WITH OPTIONAL IRVINGTON STATION

8.1 DESCRIPTION

This scenario is similar to the 2010 Proposed Project Scenario. The main difference is that this scenario includes the construction of the optional Irvington Station.

8.2 IMPACTS

8.2.1 Trip Generation

Under this scenario, 2,750 daily vehicle trips would be generated at the Warm Springs Station, including 460 A.M. peak hour trips (390 inbound, 70 outbound) and 460 P.M. peak hour trips (70 inbound, 390 outbound). In addition, 2,310 daily trips would be generated at the Irvington Station, including 390 A.M peak hour trips (340 inbound, 50 outbound) and 390 P.M. peak hour trips (50 inbound, 340 outbound). There would also be 3,770 daily trips generated at the Fremont Station, including 540 AM peak hour trips (450 inbound, 90 outbound) and 540 PM peak hour trips (90 inbound, 450 outbound).

Trip generation estimates for the proposed project were based on the intersection turning movements and the Santa Clara Valley Transportation Authority modified MTC model, as summarized in Table 8-1**.**

Table 8-1
Trip Generation – Proposed Project with Optional Irvington Station

Station	Daily Rate	AM In	AM Out	PM In	PM Out
Fremont	3770	450	90	90	450
Irvington	2310	340	50	50	340
Warm Springs	2750	390	70	70	390

Source: DKS Associates, 2002

8.2.2 Trip Distribution

Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B.

8.2.3 Intersection Analysis

The 2010 Proposed Project with Optional Irvington Station condition analysis is based on a projection of vehicle trips in the VTA Modified MTC Model. A discussion of the model parameters and adjustments is provided in Chapter 3.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, the intersection LOS was evaluated at 18 study intersections. Because construction of the optional Irvington Station would redistribute trips that would have gone to either the Fremont or Warm Springs Station, all of the study intersections were evaluated under both with and without the optional Irvington Station scenarios. Figure 8-1 illustrates the turning movements for each study intersection under the 2010 Proposed Project with optional Irvington Station scenario.

The intersections and their corresponding levels of service are presented in Table 8-2 for the 2010 No Project and the 2010 Proposed Project with optional Irvington Station.

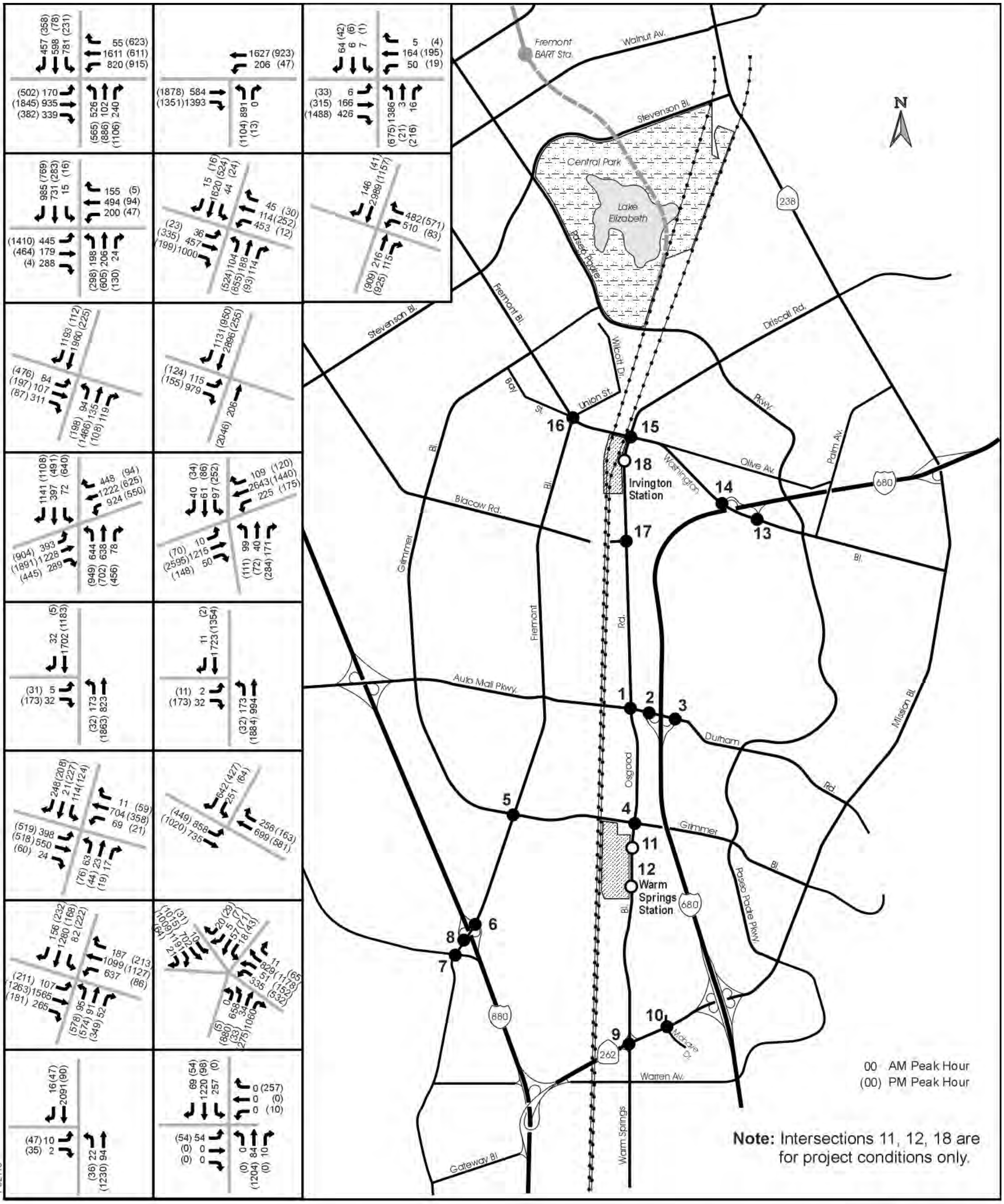
Table 8-2
Intersections LOS, 2010 No Project and Proposed Project with Optional Irvington Station

		2010 No Project Condition				2010 Proposed Project with Irvington Station Option			
		a.m. Peak Hour		**p.m. Peak Hour**		**a.m. Peak Hour**		**p.m. Peak Hour**	
#	**Intersection**	**LOS[a]**	**v/c[b]**	**LOS**	**v/c**	**LOS[a]**	**v/c[b]**	**LOS**	**v/c**
1	Osgood Road/Durham Road/Auto Mall Parkway	D	0.84	D	0.89	E	0.92	F	1.05
2	I-680 SB Ramps/Durham Road/Auto Mall Parkway	D	0.89	C	0.78	E	0.97	E	0.91
3	I-680 NB Ramps/Durham Road/Auto Mall Parkway	A	0.56	A	0.40	A	0.56	A	0.38
4	Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard	D	0.88	D	0.86	D	0.90	F	1.23
5	Fremont Boulevard/South Grimmer Boulevard	E	0.91	A	0.58	D	0.90	B	0.62
6	Fremont Boulevard/I-880 NB Ramps	A	0.60	A	0.37	C	0.77	A	0.36
7	Fremont Boulevard/I-880 SB On-ramp/Cushing Parkway	D	0.86	A	0.47	D	0.84	A	0.49
8	Fremont Boulevard/I-880 SB Off-ramp	E	0.91	A	0.43	D	0.85	A	0.49
9	Warm Springs Boulevard/Mission Boulevard	F	1.08	E	0.94	F	1.19	F	1.19
10	Mohave Drive/Mission Boulevard	B	0.61	C	0.74	B	0.70	D	0.85
11	Warm Springs Boulevard/Northern Warm Springs Station Entrance					C	0.71	B	0.63
12	Warm Springs Boulevard/Southern Warm Springs Station Entrance					B	0.65	B	0.64
13	I-680 NB Ramps/Washington Boulevard	A	0.60	A	0.56	B	0.63	B	0.66
14	I-680 SB Ramps/Washington Boulevard	A	0.41	A	0.40	D	0.87	A	0.54
15	Osgood Road/Washington Boulevard	A	0.51	A	0.58	E	0.91	C	0.74
16	Fremont Boulevard/Washington Boulevard/Bay St	F	1.27	F	1.13	F	1.27	F	1.05
17	Osgood Road/Blacow Road	A	0.51	A	0.36	B	0.67	A	0.45
18	Osgood Road/Irvington Station Entrance					A	0.45	A	0.59

[a] LOS = level of service.

[b] v/c = volume-to-capacity ratio.

Source: DKS Associates 2002



DKS *Associates*

Figure 8-1
2010 PROPOSED PROJECT WITH OPTIONAL IRVINGTON STATION PEAK HOUR TURNING MOVEMENTS

8.2.4 Metropolitan Transportation System Roadways

The Alameda County Congestion Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Some roadway segments are expected to exhibit decreases in traffic volumes as a result of project conditions, while other segments are expected to exhibit increases. For informational purposes only, the number of roadway segments that would operate at LOS E or F are identified in Table 8-3. As discussed above, an impact on a roadway segment is considered significant if project trips cause that segment to deteriorate to LOS F, unless LOS F was measured when the County Congestion Management Plan was established in 1991. In addition, for informational purposes, Table 8-3 identifies the quantity of roadway segments that would experience small volume changes (2% to 4%) or large volume changes (5% or more).

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.
- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.

- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.

Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions and provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 MTS roadway segments. Table 8-3 indicates the quantity of segments that would have volume changes of plus or minus 2%, and plus or minus 5%, as well as changes in the LOS.

Table 8-3
MTS Roadway Analysis Summary, 2010 Proposed Project with Optional Irvington Station

Scenario	5% or greater	-2% to -4%	+2 to +4%	+5% or greater	LOS Improvements		LOS Degradation	
					State Highway	Local Roadway	State Highway	Local Roadway
2010 No Project	13 state highway segments and one local roadway segment operating at LOS E or F							
2010 Proposed Project with Optional Irvington Station[a]	43	20	41	15	2	8	0	1
a Compared to 2010 No Project								
Source: DKS Associates 2002								

Compared to the 2010 No Project, the 2010 Proposed Project with optional Irvington Station would result in the following changes during the p.m. peak hour.

- One of the MTS local roadway segments would show deterioration in the LOS.
- Two of the MTS state highway segments would experience an increase in LOS.
- Eight of the MTS local roadway segments would experience an increase in LOS.

The remaining 143 MTS roadway segments would continue to operate with similar LOS.

Appendix C includes the MTS analysis for each study scenario.

8.2.5 Transit

Transit Facilities

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be two new BART stations built in the City of Fremont: Irvington and Warm Springs.
- There would be two pairs of daily BART lines in each direction serving the area between the existing Fremont Station and the Warm Springs Station. Combined, they would provide a 7.5 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 15 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport.
- A third pair of BART lines would operate during the AM and PM peak periods only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would operate from Santa Clara County to the Warm Springs Station via I-680, Mission Boulevard and Warm Springs Boulevard. This includes Routes 140, 180, and 520. Route 140 would operate during the peak periods on a 15 minute headway. Route 180 would operate all day, with 15 minute headways, and route 520 would operate during the AM and PM peak periods with a 20 minute headway.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new Ace / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- The BART extension to Millbrae would be open and operational with 15-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.
- The West Dublin BART station would be operational and have a service headway of 15 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- The CalTrain Baby Bullet service would operate along the Peninsula with 60 minute headways.

Station Entries and Exits

Table 8-4 list the daily station entries and exits and the system boardings for both the existing and proposed stations in southern Alameda County for the 2010 conditions. This table provides a comparison between the Proposed Project and the No-Project conditions. As expected, there are fewer entries and exits at the Fremont BART Station because it would no longer be the terminus.

Table 8-4
Station Entries and Exits – 2010 Proposed Project with Optional Irvington Station

	Entries and Exits	
Station	**No Project**	**Proposed Project with Optional Irvington Station**
Southern Alameda County Existing Stations		
Union City	9,200	10,400
Fremont	13,200	8,200
Southern Alameda County Existing Stations Subtotal	**22,500**	**18,500**
Proposed Project Stations		
Irvington	—	4,500
Warm Springs	—	11,000
Proposed Project Stations Subtotal	**—**	**15,600**
Southern Alameda County Proposed and Existing Stations Subtotal	**22,500**	**34,100**
BART Systemwide Total Entries and Exits	775,600	790,400
BART Systemwide Total Boardings	387,800	395,200

Notes:
Station-level and subtotal values are for station entries and exits (i.e. total persons entering and leaving station areas). Systemwide total boardings was calculated by dividing entries and exits by two.

Southern Alameda County stations are the existing Union City and Fremont Stations plus the proposed Warm Springs and optional Irvington Stations.

All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

In summary, the following observations can be made from the previous table.

- The total number of entries and exits would increase at the Union City BART Station when any scenario is compared to the No-Project condition.

- In 2010, the total entries and exits at the Fremont BART Station would decrease because the station would no longer be the terminus. With implementation of the Proposed Project with optional Irvington Station, there would be a further 1,500 decrease in entries and exits (a 5,000 total difference when compared to the 2010 No-Project condition) at the Fremont BART Station.
- In 2010, the total entries and exits would be 11,600 at the Warm Springs Station, with a 4,000 increase with implementation of the optional Irvington Station.
- In 2010, there would be an increase in entries and exits for all southern Alameda County stations, which can be attributed to the new stations in the area. When the Proposed Project with optional Irvington Station condition is compared to the 2010 No-Project condition, there would be an increase of 11,600 entries and exits in the southern Alameda County BART stations.
- In 2010, there would also be a systemwide increase in BART station entries and exits. Systemwide entries and exits increase by 26,000 under the Proposed Project with optional Irvington Station condition.

Table 8-4 indicates the entries and exits at selected stations for the 2010 Proposed Project with optional Irvington Station scenario. Another important ridership result can be gained through simple division and subtraction. The number of new trips on BART can be estimated by dividing the BART systemwide total entries and exits in half. This step is necessary to convert the entries and exits into and out of the system into the number of trips; otherwise each trip would be counted twice. Subtracting the number of trips under the No Project from the trips under the Proposed Project yields the number of new trips on BART resulting from the Proposed Project. For example, in 2010 the number of trips under the No Project would be 387,800 trips and the number under the Proposed Project with optional Irvington Station would be 395,200 trips. The number of new BART trips under the Proposed Project with optional Irvington Station would be 7,400 trips.

Ridership

Station to Station Matrices

Table 8-5 lists the BART productions and attractions between stations for the 2010 No ProjectCondition and Table 8-6 lists the BART productions and attractions between stations for the 2010 Proposed Project with Optional Irvington Station. All tables are shown as daily numbers and are rounded to the nearest ten. Full station-to-station ridership tables are shown at the back of this appendix. In these tables, “Other Bay Area” refers to the other areas of the Bay Area that currently (or will in 2010) have BART service. This includes Alameda, San Francisco, San Mateo and Contra Costa Counties. Santa Clara and the North Bay are excluded from this analysis.

These tables show that many of the travelers from Fremont, Irvington, and Warm Springs would travel to San Francisco and Oakland (61 percent in the 2010 No ProjectCondition and 48 percent for the 2010 Proposed Project with Optional Irvington Station), even though there are very few travelers in the opposite direction. Table 8-6 also shows that there would be number of short trips between Fremont, Irvington and Warm Springs stations (27 percent of all trips from these three stations).

Table 8-5
Station to Station BART Ridership –2010 No Project

	Attractions			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	5,210	3,280	8,490
San Francisco / Oakland	420	18,700	27,810	46,930
Other Bay Area	4,340	243,100	84,910	332,350
	4,760	267,010	116,000	387,770

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates from the VTA modified MTC model, 2002

Table 8-6
Station to Station BART Ridership – 2010 Proposed Project with Optional Irvington Station

	Attractions					
Productions	**Fremont**	**Irvington**	**Warm Springs**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	180	1,080	2,580	1,660	5,500
Irvington	190	N/A	1,030	1,370	770	3,170
Warm Springs	540	390	N/A	1,580	1,250	2,830
San Francisco / Oakland	210	80	470	18,730	27,870	47,360
Other Bay Area	1,720	530	4,710	243,150	85,200	335,310
Totals	2,660	1000	5,180	267,410	116,750	393,000

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates from the VTA modified MTC model, 2002

Ridership

The ridership by segment for heavy rail is listed in Table 8-7 for 2010 Proposed Project with optional Irvington Station. This table provides the bidirectional ridership (rounded to the nearest hundred) between stations in the BART network. This table also provides the ridership at the county line for the ACE trains and the Capitol Corridor trains.

Table 8-7
Rail Ridership – 2010 Proposed Project with Optional Irvington Station

Station A	Station B	Mode	2010 No Project	2010 Proposed Project with Optional Irvington Station
Union City	Fremont	BART	13,500	16,900
Fremont	Irvington	BART	N/A	12,800
Irvington	Warm Springs	BART	N/A	11,100
Alameda County / Santa Clara County Line (approx.)		Ace	8,000	7,900
Alameda County / Santa Clara County Line (approx.)		Capitol Corridor	2,300	1,900

Source: DKS Associates from the VTA modified MTC model, 2002

Table 8-8 lists the projected ridership for the VTA express buses and AC Transit service. The total bi-directional ridership levels are provided at the following locations:

- Paseo Padre between Fremont BART station and the Irvington Station location (AC Transit)
- Warm Springs Boulevard / Osgood Road between the Irvington Station location and the Warm Springs Station location (AC Transit)
- Warm Springs Boulevard between South Grimmer Boulevard and Mission Boulevard (AC Transit)
- Warm Springs Boulevard between Mission Boulevard and Kato Road (AC Transit)
- Warm Springs Boulevard south of Kato Road (at the Alameda County / Santa Clara County line) (AC Transit)
- I-680 south of Mission Boulevard (VTA)

AC Transit would provide local service in the area, while VTA would provide express services. For this reason, the VTA routes are shown on a route by route basis.

This table also makes a comparison back to the 2010 No Project condition. There would be more than a 100 percent increase in the ridership levels for all the express buses over the 2010 No Project Condition. This table indicates that some of the ridership that the project would gain would come from the local AC Transit services. This is shown by the reduction in ridership along the Warm Springs Boulevard / Osgood Road and Paseo Padre Parkway. There would also be increases in the ridership levels on the VTA express buses, with the daily VTA Route 180 service increasing its ridership levels by more than 120 percent. The VTA Routes 140 and 520, which would only operate in the peak periods, would increase ridership levels by more than 400 percent.

Table 8-8
Bus Ridership – 2010 Proposed Project with Optional Irvington Station

Operator	Route	Road	2010 No Project	2010 Proposed Project with Optional Irvington Station
AC Transit		Paseo Padre between Fremont BART Stn and Irvington Stn	1,000	400
AC Transit		Osgood Road between Warm Springs Stn and Irvington Stn	200	100
AC Transit		Warm Springs Boulevard between Grimmer Boulevard and Mission Blvd	300	600
AC Transit		Fremont Boulevard between Auto Mall Parkway and Blacow Rd	400	400
AC Transit		Warm Springs Boulevard between Mission Boulevard and Kato Rd	1,400	1,500
AC Transit		Warm Springs sth of Kato	1,900	1,800
VTA	140	I-680 south of Mission Blvd	200	900
VTA	180	I-680 south of Mission Blvd	1,400	3,100
VTA	520	I-680 south of Mission Blvd	400	1,600
VTA	500	I-680 south of Mission Blvd	1,000	1,500

Source: DKS Associates from the VTA modified MTC model, 2002

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A linked trip consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring onto BART at a BART station and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but is not considered a linked transit trip.

Table 8-9 lists the number of projected linked transit trips (rounded to the nearest hundred) from areas that would logically use the service for both the 2010 No Project Condition and the 2010 Proposed Project with Optional Irvington Station. This table show the linked transit trips for four broad areas within the network: those people that stay within the Fremont/Newark/Union City area; those people traveling to Union City, Newark and Fremont; those people traveling from Newark, Fremont and Union City to other areas; and those people that travel through the Fremont/Newark/Union City area. Those people that travel through the area would include patrons traveling between the East Bay and Santa Clara County.

There would be approximately 5,700 (an increase of 12 percent) new transit riders when the BART to Warm Springs including the Irvington Station is built. This table shows that the largest increases in the area is linked transit trips to the Southern Alameda County (an increase of 17 percent over the 2010 No Project Condition.

Table 8-9
Linked Transit Trip – 2010 Proposed Project with Optional Irvington Station

Trips:	**2010 No Project**	**2010 Proposed Project with Optional Irvington Station**	**Percent Change**
Intra	9,800	10,600	8.2%
To	7,700	9,000	16.9%
From	21,400	24,100	12.6%
Through	9,600	10,400	8.3%
Total WSX Corridor Transit Trips	**48,600**	**54,200**	11.5%
Change from No-Build	--	**5,700**	
Intra Santa Clara Transit Trips	*214,700*	216,000	0.6%

Notes*:*
Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (e.g., Hayward to San Jose).
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates from the VTA modified MTC model, 2002

- In 2010, with implementation of the Proposed Project with optional Irvington Station, there would be a 12% increase in transit riders in the Proposed Project corridor. Similar to the 2010 Proposed Project, the largest increase in the linked transit trips would be in transit trips to the Fremont/Newark/Union City area (an increase of 17% over the 2010 No-Project condition).

Mode of Access/Egress

A mode of access analysis provides the potential demands for parking, kiss-and-ride, walk access, and the need for transit provision at each of the stations. Table 8-10 list the mode of access/egress at each of the southern Alameda stations for the 2010 No Project Condition and the 2010 Proposed Project with Optional Irvington Station, respectively. These figures have been rounded to the nearest hundred.

Table 8-10
Mode of Access/Egress –2010 No Project and 2010 Proposed Project with Optional Irvington Station

	Mode of Access/Egress				
Station	**PNR**	**KNR**	**Walk/Bike**	**Transit XFER**	**Total**
2010 No Project					
Union City	3,600	1,300	500	3,700	9,200
Fremont	5,000	1,500	1,600	5,100	13,200
Irvington	0	0	0	0	0
Warm Springs	0	0	0	0	0
Southern Alameda total	8,600	2,800	2,100	8,800	22,500
2010 Proposed Project with Optional Irvington Station					
Union City	4,800	1,000	600	3,900	10,400
Fremont	3,100	600	2,200	2,100	8,200
Irvington	1,900	400	1,100	1,200	4,500
Warm Springs	2,300	500	1,300	7,100	11,000
Southern Alameda total	12,100	2,500	5,200	14,300	34,100

Notes:
PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value
Source: DKS Associates, 2002 from VTA modified MTC model

The previous table can be summarized as follows.

- More parking would be built in the southern Alameda County area, and kiss-and-ride volumes would decline. The loss in the existing transfers at the Fremont Station would be accounted for at Warm Springs. There would be more people walking to the optional Irvington Station than to the proposed Warm Springs Station.

Travel Times

This section consists of sets of travel time comparisons between selected residential locations (northwest Milpitas, Irvington, Fremont, Union City, and Hayward) and selected Bay Area employment centers (Downtown San Francisco; Downtown San Jose, 1st Street and the Diridon Caltrain Depot; Lockheed Martin Corporation facilities in Sunnyvale; and the Pacific Commons development in Fremont).

The locations have been selected to be representative examples. The small set of times is not intended to characterize all travel patterns changed by the Proposed Project. Transit riders' destinations in the Fremont-Warm Springs area are very diffuse, with no single area dominating. Transit ridership from MTC Super District 16 (Fremont-Union City and Newark) to other parts of the Bay Area is projected to be roughly similarly split among San Francisco, the South Bay (including San Mateo County), and the rest of the East Bay. Therefore, the list of travel time comparisons is intended to capture the essence of area-wide changes associated with the BART extension alternatives.

In some cases, transit is competitive with highway times in all alternatives (for example, northwest Milpitas to downtown San Francisco). In other cases, transit travel times improve substantially for one or more of the build alternatives (for example, Irvington to NUMMI). However, there is also one case (Milpitas to Pacific Commons) where transit is not competitive with auto travel, even with improved transit times, due to the need to transfer and the absence of traffic congestion for this specific origin–destination pair.

Table 8-11 provides a comparison of a.m. peak hour travel time (in minutes) between the 2010 No Project and the Proposed Project with Optional Irvington Station conditions. Auto travel times would remain roughly constant among the various alternatives analyzed due to the peak spreading function built into the VTA-modified MTC model. When demand during the peak hour exceeds capacity, the excess vehicles are shifted to either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading but would not affect auto travel times during the peak hour.

In a few select cases transit travel times increase under the Proposed Project with optional Irvington Station compares to the No Project. An example of this difference is the trip from Union City to Downtown San Jose. Under No Project Alternative, the traveler uses relatively infrequent Capitol Corridor service to travel to the Diridon Station in San Jose and the transfer to bus. Under the Proposed Project with optional Irvington Station, the traveler uses more frequent BART service to travel to Warm Springs and transfer to bus for the trip to Downtown San Jose.

Table 8-11
AM Peak Hour Travel Times – 2010 Proposed Project with Optional Irvington Station (minutes)

			Transit	
Sample Trip (Origin-Destination)	**Drive Alone**	**Carpool**	**2010 No Project**	**2010 Proposed Project with Optional Irvington Station**
Northwest Milpitas-Northwest Downtown San Francisco	101	81	74	75
Northwest Milpitas-Northwest Pacific Commons	16	23	84	66
Irvington-NUMMI	11	18	37	18
Irvington-Downtown San Jose	35	35	80	63
Fremont-Lockheed	44	36	89	67
Fremont-Pacific Commons	12	19	43	43
Union City-Diridon CalTrain Depot	53	46	69	69
Union City-Downtown San Jose	52	44	78	82
Hayward-Lockheed	66	48	75	81

Notes:
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center.
Union City location is approximately the Dyer/Alvarado-Niles Boulevard intersection (west of I-880).
Fremont location is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates, 2002 from VTA-modified MTC model

An example of the difference between actual and perceived time is evident in the Union City to downtown San Jose trip. Under the No-Project scenario, the rider would drive to the Union City Capitol Amtrak Station and ride Amtrak to the San Jose-Diridon Station. The rider would then need to transfer to a connecting bus to reach their downtown destination. Under the Proposed Project scenario, the rider would drive to the South Hayward BART Station[1] and ride to Warm Springs. The rider would then transfer to the VTA Route 180 bus to get to downtown San Jose. The key element for this trip is that BART would operate much more frequently than the Capitol Corridor trains. Even though the total trip takes more time, the Proposed Project would allow the rider get on a train sooner, thus alleviating the need to wait a comparatively longer time for the Capitol Corridor train to arrive.

[1] Due to the specific starting location of the trip in northern Union City and the crowded parking facilities at the Union City BART Station, the travel path went through the South Hayward BART Station.

The addition of the optional Irvington Station would add 1.0 minute of additional travel time on BART. This is seen in a number of the transit time comparisons such as Fremont to Lockheed and Union City to downtown San Jose.

It should be noted that BART park-and-ride lots are reserved for BART patrons only. This helps explain some of the travel time differences between alternatives. For example, travel times from Irvington to downtown San Jose decrease substantially when the optional Irvington BART Station is added. Under the Proposed Project, Irvington riders would drive to Fremont and ride one station to Warm Springs before transferring to the VTA Route 180. The optional Irvington Station would substantially increase convenience for these riders as they would have a shorter park-and-ride access time, and a shorter BART ride to Warm Springs.

The other viable option would be to ride a local bus from Irvington to Warm Springs to access the VTA 180 to downtown San Jose (the path chosen in the No-Project Alternative). However, overall travel times indicate that it would be shorter to "backtrack" to Fremont BART than to use the local bus option. BART is much faster than local bus routes and operates much more frequently. In addition, the actual drive access time to the Fremont BART station is nearly equal to the actual walk time to the local bus stop.

Finally, the travel time calculations do not factor in trip reliability. Highway travel times, for example, can vary greatly depending on weather, special events, accidents, and traffic volumes. Rail systems with exclusive rights-of-way can enhance transit reliability, although severe disruptions can occur. Ridership models typically do not capture how day-to-day trip time reliability affects mode choice.

Load Factors

Table 8-12 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Warm Springs BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 8-12
Load Factors – 2010 Proposed Project with Optional Irvington Station

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Warm Springs	Irvington	1858	2826	279	424	4	4	0.111	0.168
Irvington	Fremont	3067	2669	460	400	4	4	0.183	0.159
Fremont	Union City	5263	2901	789	435	5	5	0.250	0.138
Union City	South Hayward	8780	2747	1317	412	5	5	0.418	0.131
South Hayward	Hayward	10709	2556	1606	383	5	5	0.510	0.122
Hayward	Bay Fair	13220	2812	1983	422	5	5	0.630	0.134
Richmond Lines									
Warm Springs	Irvington	969	3095	145	464	4	4	0.129	0.414
Irvington	Fremont	1248	2914	187	437	4	4	0.167	0.390
Fremont	Union City	1589	2928	238	439	4	4	0.213	0.392
Union City	South Hayward	2354	2692	353	404	4	4	0.315	0.361
South Hayward	Hayward	2837	2498	426	375	4	4	0.380	0.335
Hayward	Bay Fair	3538	2703	531	405	4	4	0.474	0.362
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	9062	1991	1359	299	4	4	0.539	0.119
West Dublin	Castro Valley	11774	2130	1766	320	4	4	0.701	0.127
Castro Valley	Bay Fair	14239	2275	2136	341	4	4	0.848	0.135

Notes:
NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates 2002 from VTA modified MTC model

Load factors during the 2010 Proposed Project with Optional Irvington Station Condition would be relatively low, with all lines showing an availability of seats. As the train progresses northwards, (or westwards), more riders would board and the load factors would increase.

8.2.6 Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06(from existing occupancy surveys conducted at the Fremont BART Station, *BART Station Access Improvements Study*).

Table 8-13 shows the estimated parking demand for each scenario, along with the number of parking spaces currently proposed. These demand figures include the demand generated by other transit services, such as bus vehicles.

Table 8-13
Parking Supply and Demand – 2010 Proposed Project with Optional Irvington Station

	Fremont Station		Irvington Station		Warm Springs Station	
	Supply	**Demand**	**Supply**	**Demand**	**Supply**	**Demand**
2010	1,880	1,480	960	910	2,040	1,060

Note:
Parking supply based on presentation to the BART Warm Springs Extension Project Development Team Meeting, October 22, 2002. As stations are designed, actual parking supply could change.
Parking Demand based on VTA modified MTC model.

Source: DKS Associates, 2002

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9. 2010 PROPOSED BUS ALTERNATIVE

9.1. DESCRIPTION

Bus Rapid Transit (BRT) is a rubber-tired vehicle operation that is configured to offer speeds and capacity similar to rail transit, with exclusive travel lanes, busways or HOV lanes, limited stops and signal preemption. Section 65088.1 of the California Government Code defines a BRT corridor as a bus service that includes at least four of the following characteristics.

- Coordination with land use planning.
- Exclusive right-of-way.
- Improved passenger boarding facilities.
- Limited stops.
- Passenger boarding at the same height as the bus.
- Prepaid fares.
- Real-time passenger information.
- Traffic priority at intersections.
- Signal priority.
- Unique vehicles.

BRT is most appropriate in corridors with high ridership where there is sufficient right-of-way available to provide exclusive lanes. With the exclusive right-of-way, buses would now be separated from other vehicles using public roadway rights-of-way. Using limited stops, buses would stop less frequently. With both of these elements of BRT in place, travel times would be generally reduced. The addition of traffic priority at intersections and/or signal priority throughout the corridor would further reduce bus travel times. The elements of BRT that are the most quantifiable using regional travel forecasting methods are traffic signal priority systems, limited bus stops, and exclusive bus lanes. The effects of BRT elements have been shown to provide up to a 30% improvement in travel time savings and a similar growth in ridership.

The following describes those elements of BRT that are included in the proposed Bus Alternative. It should be noted that not all BRT elements are included in the proposed Bus Alternative. Coordination with land use planning has not been included, as local plans are supportive of the Proposed Project. Unique vehicles have not been included, as both bus operators would use rolling stock that is similar to their current fleet. Articulated buses, similar to the ones currently in operation, would be needed for the county-to-county bus trips. However, many other elements, including exclusive right-of-way, limited stops, improved passenger boarding facilities, prepaid fares, real-time passenger information, traffic priority at intersections, passenger boarding at the same height as the bus, and signal priority are included.

Proposed Busway

Because of the availability of the UP alignment for an exclusive right-of-way to separate buses from other vehicles, the Proposed Project corridor is suitable for bus rapid transit. The proposed busway would include the creation of a paved busway within the UP right-of-way in place of the 2003 Proposed Project (Figure 9-1). The busway would run along the Proposed Project alignment in the UP right-of-way from South Grimmer Boulevard to Paseo Padre Parkway, for a length of approximately 3 miles. Access to the busway at Paseo Padre Parkway would be provided by flyover ramps that would pass over the adjacent at-grade UP railroad track. The two-way flyover from the busway would provide access to both directions of travel on Paseo Padre Parkway. One leg of the flyover would provide access from eastbound Paseo Padre Parkway to the southbound direction on the busway. The second leg of the flyover would provide access from the northbound direction on the busway over Paseo Padre Parkway merging with westbound Paseo Padre Parkway. Gates will be required at the beginning and end of the exclusive right-of-way, such as at the proposed Warm Springs Transit Center and at Paseo Padre Parkway, to prohibit non-transit vehicles from accessing the right-of-way.

The busway would carry both VTA and AC Transit routes. Passengers would board and alight on any bus operating in the busway, with stops located at the Fremont BART Station and at two proposed transit centers, which would be located on the same sites as the proposed Warm Springs Station and the optional Irvington Station. These facilities could provide the opportunity for connections to other local bus routes within Fremont. Additional stops would be located at Paseo Padre Parkway and Stevenson Boulevard, and at Auto Mall Parkway and Grimmer Boulevard, and Auto Mall Parkway and Warm Springs Boulevard. Both the transit centers and regular stops would facilitate connections to other local bus routes within Fremont.

Access to the busway for transit vehicles could be constrained because arterial roadways in this corridor are congested in the peak direction. The congestion is most significant on north-south roadways and roadways that intersect I-680. Examples of congested roadways include Warm Springs Boulevard, Mission Boulevard south of Palm Avenue, and Mission Boulevard between I-880 and I-680. The addition of HOV lanes to this corridor would improve access to and from the busway from both freeways. A new bridge (or enhancements to the existing bridge) will need to be made at Grimmer Boulevard because the busway will pass over the roadway, as with the Proposed Project.

The opening of the HOV lanes will improve the ability of express buses to use I-680, but benefits will be limited. The I-680 southbound HOV lane will be completed first, and a northbound HOV lane is also funded. A constraint for southbound buses using these lanes is that they do not continue through into Santa Clara County, and that buses exiting the roadway would have to merge with mixed-flow traffic because no connecting local arterial ramps are provided.

Travel time estimates show that buses would take between 10 and 11 minutes to travel southward between the Fremont BART Station and the Warm Springs Transit Center during peak hours using the proposed busway. Allowances of up to 1 minute of dwell time to account for boarding and alighting activity at each stop, as well as for acceleration and deceleration of the buses are included in the travel time estimate. The suggested travel time between the Fremont BART Station to the Warm Springs Transit Center would be approximately 15 minutes with the additional stops identified above. If either route were extended beyond the Warm Springs area, travel times would be lengthened.

According to this analysis, there does not seem to be a travel time advantage north of Paseo Padre using the proposed busway. North of Paseo Padre, the right-of-way runs perpendicular to the Fremont BART Station. Therefore continuing on the right-of-way would not improve travel times, when compared to current travel times. Specifically, following the right-of-way to Mission Boulevard near Stevenson Boulevard, and then using Walnut Avenue or Stevenson Boulevard to reach the Fremont BART Station proves to be more circuitous with longer travel times than using the existing arterial roadway network. Additionally, the construction of a busway through Fremont Central Park would be considered an incompatible land use that would also be inconsistent with the *Fremont General Plan*, and therefore infeasible under CEQA Guidelines (Section 15126.6 (f) (1)). Accordingly, between Paseo Padre Parkway and the Fremont BART Station, buses would operate on local streets.

However, to further reduce travel times, the proposed Bus Alternative includes signal preemption and upgrades to eight intersections along the path of the proposed bus routes. Passengers would be informed of bus schedules through the use of “next-bus” technology which would announce the impending arrival of the buses at each bus shelter and passenger waiting area.

Proposed Bus Routes and Operating Plan

The proposed busway would be open to both transit operators. Two routes would provide service along the proposed busway, with eight buses an hour in each direction (for an average headway of 7.5 minutes) between Fremont BART and the Warm Springs area. This service level would be equivalent to the service provided under the operating plan for the Proposed Project with the optional Irvington Station. In addition, other services provided by these operators would continue.

VTA express buses would operate from Santa Clara County to the Warm Springs Transit Center via I-680, Mission Boulevard and Warm Springs Boulevard. This includes Routes 140, 180, and 520, which now serve the Fremont BART Station. Route 140 currently operates from the City of Sunnyvale to the Fremont BART Station and would provide service during the peak periods on a 15-minute headway. Route 520 provides service from the City of Mountain View to the Fremont BART Station and would operate during the a.m. and p.m. peak periods with a 20-minute headway. Route 180 begins at the Diridon Caltrain Station in San Jose and terminates at the Fremont BART Station. Route 180 is an all-day express service that would be upgraded to 15-minute headways throughout the entire day. As only VTA Route 180 is proposed to operate a daily schedule in either 2010 or 2025, this route would be the only VTA service using the busway. The other VTA routes would continue to use their existing routes to access the Fremont BART Station. Under the proposed Bus Alternative, Route 180 would operate from the Caltrain station to the proposed Warm Springs Transit Center, where it would enter the busway. Route 500 would be an all-day VTA express route operating to downtown San Jose using local streets from the Fremont BART Station.

In conjunction with AC Transit and VTA, it was decided that only one route from each provider would use the dedicated busway. From VTA the existing Route 180 was chosen as it currently operates on a 15-minute headway. This level of service is expected to be maintained in the future. Other than the new AC Transit route, any additional bus routes using the dedicated busway would change the average headways, which would then affect the comparison to the Proposed Project with optional Irvington Station.

AC Transit would maintain local service along Warm Springs Boulevard, as well as a new AC Transit route. Route 215 would continue to operate with 15-minute headways during the peak periods and 30-minute headways during the off-peak period. Route 253 would continue to operate with 60-minute headways during the peak period. A new AC Transit route could operate in addition to VTA Route 180 on the busway, at a 15-minute headway at peak hours and 30-minute headways midday. This route could serve areas to the east of the transit center, once it reaches Warm Springs. The new route would follow the path described above, but would start and finish at Grimmer Boulevard and Auto Mall Parkway.

The paths of the proposed bus routes are shown in Figure 9-1, and would operate as follows.

- The VTA Route 180 would start at the San Jose Caltrain Station, traveling along 1st Street to I-880, along I-880 to Main and Calaveras, along Jacklin Street to I-680. Stops that currently exist today would still be serviced by the VTA Route 180.

- VTA buses would travel along the I-680 corridor to Mission Boulevard, turning left onto westbound Mission Boulevard after exiting the freeway.

- VTA buses would then travel west along Mission Boulevard to Warm Springs Boulevard and turn right onto Mission Boulevard.

- The new AC Transit route would begin at Auto Mall Parkway and Grimmer Boulevard. AC transit buses would operate along Grimmer Boulevard to Warm Springs Boulevard.

- All buses would access the Warm Springs Transit Center at a newly created intersection (which would also be used a driveway for vehicles parking at the transit center).

- All buses would access the dedicated right-of-way and continue along the busway, stopping at Auto Mall Parkway and Warm Springs Boulevard and at the proposed Irvington Transit Center.

- All buses would travel along Paseo Padre Parkway to Stevenson Boulevard (making a stop in the vicinity of the Civic Center/Fremont Public Library/Senior Center) and then travel along Stevenson Boulevard to Civic Center Drive and then access the existing Fremont BART Station.

Figure 9-1
BUS RAPID TRANSIT ROUTES

DKS Associates

For the routes using I-680, the opening of the HOV lanes will improve the ability to use I-680 for express buses, but the benefits will be limited. The I-680 southbound HOV lane will be completed first, and a northbound HOV lane is also funded. A significant problem in using these lanes is that they do not continue through in Santa Clara County, and that exiting buses would have to merge with mixed-flow traffic because no connecting local arterial ramps are provided.

Warm Springs Transit Center

A bus *transit center* is defined as a fixed location where passengers change from one route or vehicle to another. A bus transit center has significant infrastructure such as a waiting room, benches, restrooms, sales outlet, ticket or pass vending machines, and/or other services. (American Public Transportation Association 2002.)

In order to provide a comparable level of passenger convenience and access for BRT passengers, improved passenger boarding facilities in the form of two transit centers are proposed along the dedicated busway at the proposed Warm Springs Station site and the proposed optional Irvington Station site, as described below. Facilities that would be provided at both of these locations would be reflective of the proposed station designs. To facilitate comparison between the proposed Bus Alternative and the Proposed Project (with the optional Irvington Station) the same amount of parking was assumed at each of the transit center sites as described in the Proposed Project station plans.

The Warm Springs Transit Center would serve as a regional park-and-ride facility, as well as providing a major transfer opportunity for transit users. The proposed design of the transit center would include canopies, restrooms, boarding platforms, landscaping, information systems, benches, , fare machines, and lighting. The transit center would occupy the 34-acre site and would include a loading area for buses with seven bus bays, as in the Proposed Project.

Osgood Road and Warm Springs Boulevard would provide the principal north-south access to the transit center. South Grimmer Boulevard would serve as the primary east-west access to the site. Parking would be available at the site, including disabled, daily and midday parking. Auto drop-off, bicycle and taxi parking would also be provided.

As noted previously, a connection between Warm Springs Boulevard and the exclusive right-of-way will need to be provided near the parking area at Warm Springs Transit Center.

Auto Mall Parkway Transfer Center

A transfer center is proposed along the busway at Auto Mall Parkway, where local bus services and employer shuttles would converge. The employer shuttles serve the Pacific Commons area and the industrial parks that are located along the Auto Mall Parkway corridor. At this proposed site, three diagonal or "sawtooth" bus bays with a reinforced concrete bus pad is proposed, with benches, shelters and lighting. The bus pad is proposed to support the weight of the buses stopped at the transfer center. An outdoor pedestrian waiting area with a canopy, and fare machines would also be provided. The transfer center would be smaller in scale than the two transit centers, but would also represent improved passenger boarding facilities for BRT riders.

Irvington Transit Center

A transit center is also proposed for the optional Irvington Station site. The design of this transit center would occupy the same acreage as proposed for the optional station with the Proposed Project. The facility would accommodate five bus bays, as in the Proposed Project with the optional station included. Canopies, restrooms, boarding platforms, landscaping, information systems, benches, fare machines and lighting would also be provided.

Vehicular access to the Irvington Transit Center would be provided from Washington Boulevard, Fremont Boulevard, and Olive Avenue from the east and west. Driscoll Road and Osgood Road would provide the principal north-south access. Parking would be available at the site, including disabled, daily and midday parking. Auto drop-off, bicycle, and taxi parking would also be provided.

Pedestrian bridges, with full ADA requirements, would be provided at two locations; one over Osgood Road from the eastern side to the western side of the street, and another over the adjacent UP tracks from the western side of the right-of-way.

9.2. IMPACTS

9.2.1. Trip Generation

Under this scenario, 2,678 daily vehicle trips would be generated at the Warm Springs Station, including 450 A.M. peak hour trips (380 inbound, 70 outbound) and 450 P.M. peak hour trips (70 inbound, 380 outbound). In addition, 2,430 daily trips would be generated at the Irvington Station, including 400 A.M peak hour trips (340 inbound, 60 outbound) and 400 P.M. peak hour trips (60 inbound, 340 outbound).

The proposed Bus Alternative would result in 3,020 daily trips at the Fremont Station. This would include 500 AM peak hour trips (430 inbound, 70 outbound) and 500 PM peak period trips (70 inbound, 430 outbound).

Trip generation estimates for this scenario were based on the intersection turning movements and the VTA modified MTC model, as summarized in Table 9-1**.**

Table 9-1
Trip Generation – Proposed Bus Alternative

Station	Daily	AM		PM	
		In	Out	In	Out
Fremont	3020	430	70	70	430
Irvington	2430	340	60	60	340
Warm Springs	2680	380	70	70	380

Source: DKS Associates, 2002.

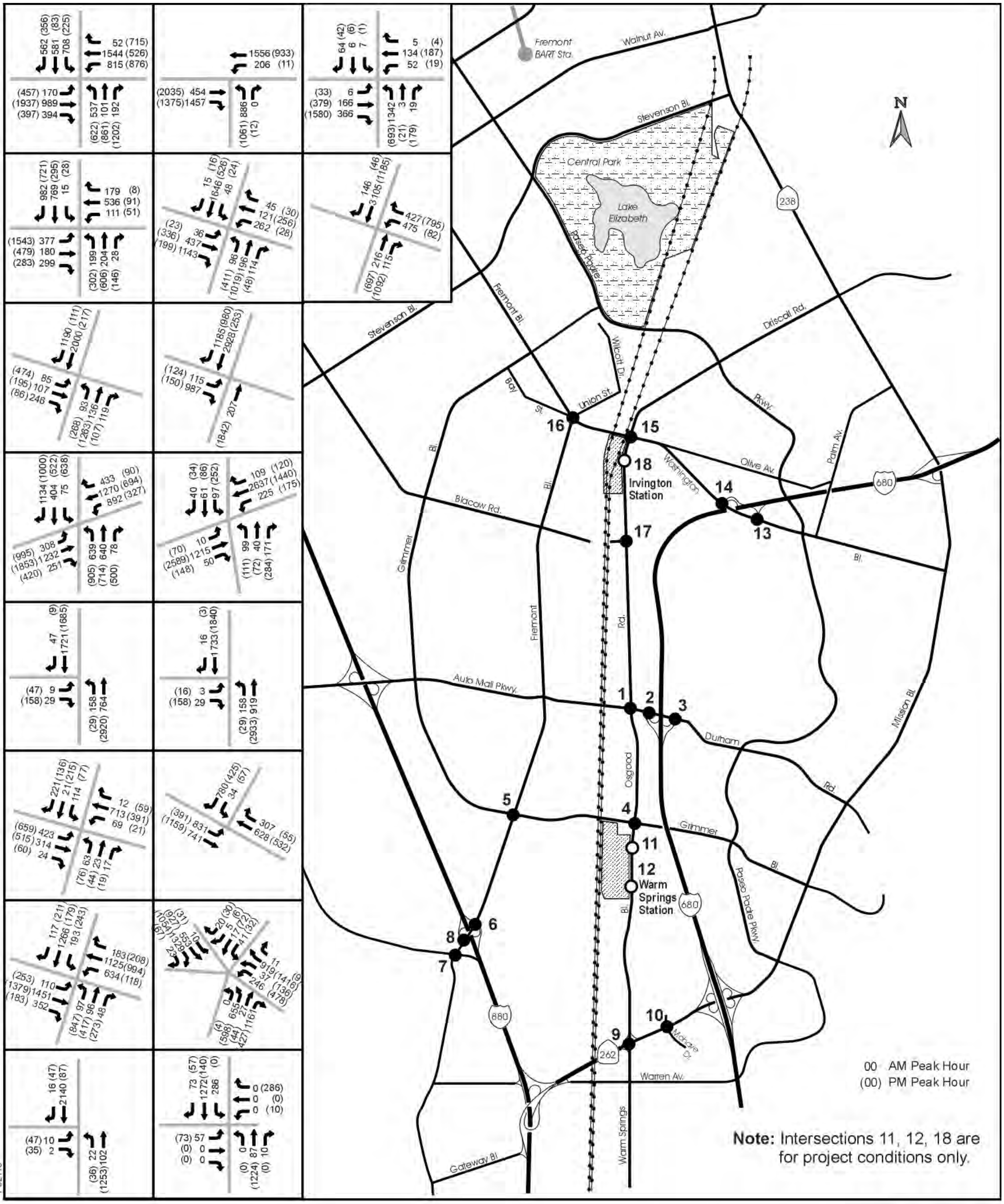
9.2.2. Trip Distribution

Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B.

9.2.3. Intersection Analysis

Intersection Level of Service (LOS) was evaluated at 18 study intersections. This includes six additional intersections than were identified under the Proposed Project. The six additional intersections are located in the vicinity of the proposed Irvington Transit Center and would be used for bus operations. The intersection evaluation provides a basis for comparison of conditions before and after traffic associated with the proposed Bus Alternative is added to the street system. To provide a comparison of the proposed Bus Alternative to the Proposed Project, data for the 2010 Proposed Project with the optional Irvington Station is also provided. The proposed Bus Alternative intersection analysis is based on a projection of vehicle trips from the VTA modified MTC model. The model analyzed ten intersections in both 2010 and 2025, with the addition of two access intersections at the proposed Warm Springs Transit Center.

Turning movements in 2010 for each of the study intersections are shown in Figure 9-2**.** Table 9-2 provides the LOS analysis for both the a.m. and p.m. peak periods in the Warm Springs Transit Center area for the 2010 proposed Bus Alternative.



DKS *Associates*

Figure 9-2
2010 PROPOSED BUS ALTERNATIVE PEAK HOUR TURNING MOVEMENTS

Table 9-2
Intersection LOS, 2010 Proposed Bus Alternative

		2010 No Project				2010 Proposed Project with optional Irvington Station				2010 Proposed Bus Alternative			
		a.m. Peak Hour		**p.m. Peak Hour**		**a.m. Peak Hour**		**p.m. Peak Hour**		**a.m. Peak Hour**		**p.m. Peak Hour**	
#	Intersection	**LOS[a]**	**V/C[b]**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**	**LOS**	**V/C**
1	Osgood Road/Durham Road/Auto Mall Parkway	D	0.84	D	0.89	E	0.92	F	1.05	E	0.94	F	1.07
2	I-680 SB Ramps/Durham Road/Auto Mall Parkway	D	0.89	C	0.78	E	0.97	E	0.91	E	1.00	D	0.90
3	I-680 NB Ramps/Durham Road/Auto Mall Parkway	A	0.56	A	0.40	A	0.56	A	0.38	A	0.55	A	0.41
4	Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard	D	0.88	D	0.86	D	0.90	F	1.23	D	0.90	F	1.31
5	Fremont Boulevard/South Grimmer Boulevard	E	0.91	A	0.58	D	0.90	B	0.62	D	0.84	A	0.57
6	Fremont Boulevard/I-880 NB Ramps	A	0.60	A	0.37	C	0.77	A	0.36	C	0.78	A	0.33
7	Fremont Boulevard/I-880 SB On-ramp/Cushing Parkway	D	0.86	A	0.47	D	0.84	A	0.49	D	0.81	A	0.45
8	Fremont Boulevard/I-880 SB Off-ramp	E	0.91	A	0.43	D	0.85	A	0.49	D	0.85	A	0.46
9	Warm Springs Boulevard/Mission Boulevard	F	1.08	E	0.94	F	1.19	F	1.19	F	1.18	F	1.05
10	Mohave Drive/Mission Boulevard	B	0.61	C	0.74	B	0.70	D	0.85	B	0.70	D	0.85
11	Warm Springs Boulevard/Northern Warm Springs Station Entrance					B	0.65	B	0.63	B	0.65	D	0.87
12	Warm Springs Boulevard/Southern Warm Springs Station Entrance					B	0.65	B	0.64	B	0.65	D	0.87
13	I-680 NB Ramps/Washington Boulevard	A	0.60	A	0.56	B	0.63	B	0.66	B	0.65	C	0.74
14	I-680 SB Ramps/Washington Boulevard	A	0.41	A	0.40	D	0.87	A	0.54	C	0.75	A	0.49
15	Osgood Road/Washington Boulevard	A	0.51	A	0.58	E	0.91	C	0.74	D	0.90	C	0.80
16	Fremont Boulevard/Washington Boulevard/Bay St	F	1.27	F	1.13	F	1.05	F	1.06	F	1.45	F	1.09
17	Osgood Road/Blacow Road	A	0.51	A	0.36	B	0.67	A	0.45	B	0.68	A	0.46
18	Osgood Road/Irvington Station Entrance					A	0.45	A	0.59	A	0.47	B	0.62

[a] LOS = level of service.
[b] v/c = volume-to-capacity ratio.

Source: DKS Associates 2002

9.2.4. Metropolitan Transportation System Roadways

The Alameda County Congestion Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Some roadway segments are expected to exhibit decreases in traffic volumes as a result of project conditions, while other segments are expected to exhibit increases. For informational purposes only, the number of roadway segments that would operate at LOS E or F are identified in Table 9 - 3. As discussed above, an impact on a roadway segment is considered significant if project trips cause that segment to deteriorate to LOS F, unless LOS F was measured when the County Congestion Management Plan was established in 1991. In addition, for informational purposes, Table 9 - 3 identifies the quantity of roadway segments that would experience small volume changes (2% to 4%) or large volume changes (5% or more).

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.
- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.

- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.
- Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 Metropolitan Transportation System (MTS) roadway segments. Table 9 - 3 indicates the number of segments that would have volume changes of plus or minus 2% and plus or minus 5%, as well as changes in LOS.

Table 9 - 3
MTS Roadway Analysis Summary, 2010 Proposed Bus Alternative

Scenario	-5% or greater	-2% to -4%	+2% to +4%	+5% or greater	LOS Improvements		LOS Degradation	
					State Highway	Local Roadway	State Highway	Local Roadway
2010 Proposed Bus Alternative[a]	49	25	19	20	1	7	3	1
2010 BRT Alternative[b]	24	24	19	19	1	1	2	3

Notes:
[a] Compared to 2010 No Project
[b] Compared to 2010 Proposed Project

Source: DKS Associates

Compared to the 2010 No Project, the 2010 Proposed Bus Alternative would result in the following changes during the p.m. peak hour.

- One of the MTS state highway segments would show deterioration in the LOS;
- Seven of the MTS local roadway segments would show deterioration in the LOS;
- Three of the MTS state highway segments would experience an increase in LOS; and
- One of the MTS local roadway segments would experience an increase in LOS.

142 MTS roadway segments would continue to operate with similar service levels (LOS).

Compared to the 2010 Proposed Project, the 2010 Proposed Bus Alternative would result in the following changes during the p.m. peak hour.

- One of the MTS state highway segments would show deterioration in the LOS;
- One of the MTS local roadway segments would show deterioration in the LOS;

- Two of the MTS state highway segments would experience an increase in LOS; and
- Three of the MTS local roadway segments would experience an increase in LOS.

The remaining 147 MTS roadway segments would continue to operate with similar service levels (LOS).

Appendix C includes the detailed MTS roadway analysis sheets for the year 2010 Proposed Bus Alternative Scenario compared to the 2010 No Project Scenario.

9.2.5. Transit

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be two new Transit Centers built in the City of Fremont: Irvington and Warm Springs to serve the Proposed Bus Alternative.
- There would be two pairs of daily BART lines in each direction serving the existing Fremont Station. Combined, they would provide a 7.5 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 15 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport.
- A third pair of BART lines would operate during the AM and PM peak periods only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would operate from Santa Clara County to the Warm Springs Transit Center via I-680, Mission Boulevard and Warm Springs Boulevard. This includes Routes 140, 180, and 520. Route 140 would operate during the peak periods on a 15 minute headway. Route 180 would operate all day, with 15 minute headways, and route 520 would operate during the AM and PM peak periods with a 20 minute headway.
- AC Transit would maintain local service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new Ace / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- The BART extension to Millbrae would be open and operational with 15-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.

- The West Dublin BART station would be operational and have a service headway of 15 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- The CalTrain Baby Bullet service would operate along the Peninsula with 60 minute headways.

Station Entries and Exits

Table 9-4 lists the BART station entries and exits at the Fremont Station and at the Warm Springs and Irvington Stations (for the 2010 Proposed Project with Optional Irvington Station only). These station entries and exits are shown as a total for the day (rounded to the nearest ten), because the number of entries and exits are balanced in the daily model. System boardings are shown in this table (rounded to the nearest ten) and are calculated by dividing the total entries and exits by two. This table provides a comparison between the 2010 No Project Condition, the 2010 Proposed Project with Optional Irvington Station and the 2010 Proposed Bus Alternative.

When the 2010 Bus Alternative is compared to the 2010 No Project, there would be more entries and exits at the Fremont BART station (200 more entries and exits at the station, which means that there would be 100 more boardings). The potential boardings for the Proposed Bus Alternative cannot be analyzed in this table as bus operations are analyzed differently in the VTA Modified Model.

Table 9-4
Station Entries and Exits – 2010 Proposed Bus Alternative

Station	2010 No Project		2010 BRT	
	Entries / Exits	System Boardings	Entries / Exits	System Boardings
Union City	9,200	4,600	9,400	4,700
Fremont	13,200	6,600	13,400	6,700
Irvington	N/A	N/A	N/A	N/A
Warm Springs	N/A	N/A	N/A	N/A
Total Bay Area	775,600	387,800	776,400	388,200

Source: DKS Associates from the VTA modified MTC model, 2002

Ridership

Station to Station Matrices

Table 9-5 list the BART productions and attractions between stations for the 2010 No Project Condition. Table 9-6 lists the BART productions and attractions for the 2010 Proposed Bus Alternative. All tables are shown as daily numbers and are rounded to the nearest ten. Full station-to-station ridership tables are shown at the back of this appendix. In these tables, "Other Bay Area" refers to the other areas of the Bay Area that currently (or will in 2010) have BART service. This includes Alameda, San Francisco, San Mateo and Contra Costa Counties. Santa Clara and the North Bay are excluded from this analysis.

These tables show that many of the travelers from Fremont area would travel to San Francisco and Oakland (61 percent in the 2010 No Project Condition), and 62 percent in the 2010 Proposed Bus Alternative, even though there are very few travelers in the opposite direction.

Table 9-5
Station to Station BART Matrix – 2010 No Project

	Attractions			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	5,210	3,280	8,490
San Francisco / Oakland	420	18,700	27,810	46,930
Other Bay Area	4,340	243,100	84,910	332,350
	4,760	267,010	116,000	387,770

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates from the VTA modified MTC model, 2002

Table 9-6
Station to Station BART Matrix – 2010 Proposed Bus Alternative

	Attractions			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	5,170	3,200	8,370
San Francisco / Oakland	480	18,790	27,880	47,150
Other Bay Area	4,510	244,520	85,710	334,740
Totals	4,990	268,480	116,790	390,260

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates from the VTA modified MTC model, 2002

Ridership

Changes in regional travel patterns associated with the proposed Bus Alternative were estimated using the VTA-Modified MTC Model that was developed by MTC and VTA. Table 9-7 presents regional rail ridership levels in the area for the Proposed Project with optional Irvington Station compared with the projected ridership on the buses using the proposed busway in the year 2010. These two modes are shown on the same tables, as they are effectively serving the same patrons. Passengers who would use rail transit (BART, CalTrain, or ACE) are assumed to be making a regional commute. It is assumed that the proposed Bus Alternative would provide the capability for regional commutes via bus transit. While one of the bus routes (VTA Route 180) would continue to provide service into Santa Clara County, the segments shown in these tables are only those segments that are comparable to the Proposed Project with the optional Irvington Station.

Table 9-7
Projected Ridership – 2010 Proposed Bus Alternative Compared to Proposed Project with Optional Irvington Station

Station A	Station B	Mode	2010 No Project	2010 Proposed Project with optional Irvington Station	2010 Proposed Bus Alternative
Union City	Fremont	BART	13,500	16,900	13,400
Fremont	Irvington[a]	BART	N/A	12,800	6,900
Irvington	Warm Springs[b]	BART/BRT	N/A	11,100	7,100
Alameda County/Santa Clara County Line (approx.)		ACE	8,000	7,900	8,200
Alameda County/Santa Clara County Line (approx.)		Capitol Corridor	3,300	1,900	2,500

Notes:
[a] Ridership taken along Paseo Padre.
[b] Ridership taken between Warm Springs Transit Station and Auto Mall Parkway.

Source: DKS Associates 2002

As shown in Table 9-7, the proposed Bus Alternative would generate fewer riders than the Proposed Project with optional Irvington Station.

Table 9-7 presents ridership projections for the proposed Bus Alternative in the year 2010. With the proposed Bus Alternative, the ridership on the Union City BART Station to the Fremont BART Station segment would be lower than in either the Background (2010 No-Project) condition or in the 2010 Proposed Project with optional Irvington Station. Compared to the 2010 Proposed Project with optional Irvington Station rail segments (between the Irvington and Fremont Stations, and the Warm Springs and Irvington Stations), there would be fewer riders on comparable busway segments. On the segment between the Fremont Station and the Irvington Station, the proposed Bus Alternative would only carry 54% of the ridership projected for the Proposed Project with optional Irvington Station. In the segment between the Warm Springs and the Irvington Stations, the proposed Bus Alternative would carry about 64% of the ridership projected for the Proposed Project with optional Irvington Station.

Some of the ridership that the proposed Bus Alternative would gain would come from the local AC Transit services providing service between the proposed Warm Springs Transit Center and the Fremont BART Station. There would be increases in the ridership levels on the VTA express buses, with the daily VTA Route 180 service increasing its ridership levels by 200% when the 2010 proposed Bus Alternative is compared to the Background (2010 No-Project) condition. The VTA Route 140 (peak hour service only) would experience a decrease in riders when comparing the 2010 proposed Bus Alternative to both the Background (2010 No-Project) condition and the 2010 Proposed Project with optional Irvington Station scenario. The VTA Route 520, which would only operate in the peak periods, would have a decrease in ridership, as would the VTA Route 500.

Table 9-8 lists the projected ridership for the VTA express buses and AC Transit service. The total bi-directional ridership levels are provided at the following locations:

- Paseo Padre Parkway between Fremont BART station and the Irvington Station location (AC Transit)
- Warm Springs Boulevard / Osgood Road between the Irvington Station location and the Warm Springs Station location (AC Transit)
- Warm Springs Boulevard between South Grimmer Boulevard and Mission Boulevard (AC Transit)
- Warm Springs Boulevard between Mission Boulevard and Kato Road (AC Transit)
- Warm Springs Boulevard south of Kato Road (at the Alameda County / Santa Clara County line) (AC Transit)
- I-680 south of Mission Boulevard (VTA)

AC Transit would provide local service in the area, while VTA would provide express services. For this reason, the VTA routes are shown on a route by route basis.

This table also makes a comparison back to the 2010 No Project condition and to the 2010 Proposed Project with Optional Irvington Station. With the exception of the VTA Route 180, there would be a decrease in the ridership on all express buses when the 2010 Proposed Bus Alternative is compared to the 2010 No Project Condition. There would be large increases on the VTA Route 180.

This table indicates that some of the ridership that the project would gain would come from the local AC Transit services. This is shown by the reduction in ridership along the Warm Springs Boulevard / Osgood Road and Paseo Padre Parkway. There would also be increases in the ridership levels on the VTA express buses, with the daily VTA Route 180 service increasing its ridership levels by 200 percent when the 2010 Proposed Bus Alternative is compared to the 2010 No Project Condition. The VTA Route 140 (peak hour service only) would experience a decrease in riders when comparing the 2010 Proposed Bus Alternative to the 2010 No Project. The VTA Route 520, which would only operate in the peak periods, would have a decrease in ridership, as would the VTA Route 500.

Table 9-8
Bus ridership – 2010 Proposed Bus Alternative

Operator	Route	Road	2010 No Project	2010 Proposed Bus Alternative
AC Transit		Paseo Padre between Fremont BART Stn and Irvington Stn	1,000	700*
AC Transit		Osgood Road between Warm Springs Stn and Irvington Stn	200	100
AC Transit		Warm Springs Boulevard between Grimmer Boulevard and Mission Blvd	300	100
AC Transit		Fremont Boulevard between Auto Mall Parkway and Blacow Rd	400	300
AC Transit		Warm Springs Boulevard between Mission Boulevard and Kato Rd	1,400	1,500
AC Transit		Warm Springs sth of Kato	1,900	1,900
VTA	140	I-680 south of Mission Blvd	200	100
VTA	180	I-680 south of Mission Blvd	1,400	4,200
VTA	520	I-680 south of Mission Blvd	400	300
VTA	500	I-680 south of Mission Blvd	1,000	100

Note:
Local bus ridership only, see Table 9-7 for the projected ridership for the 2010 Proposed Bus Alternative

Source: DKS Associates from the VTA modified MTC model, 2002

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A "linked trip" consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART, and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring to BART at a BART station, and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but it is not considered a linked transit trip.

Table 9-9 lists the number of projected linked transit trips (rounded to the nearest hundred) from areas that would logically use the service in 2010. These tables show the linked transit trips for four broad areas within the network: people staying within the Fremont/Newark/Union City area; people traveling to Union City, Newark, and Fremont; people traveling from Newark, Fremont, and Union City to other areas; and people traveling through the Fremont/Newark/Union City area. People traveling through the area would include patrons from the East Bay who are traveling to Santa Clara County.

Table 9-9
Linked Transit Trips – 2010 Proposed Bus Alternative

Trips	No Project	Proposed Project with Optional Irvington Station	Proposed Bus Alternative
Intra	9,800	10,600	11,000
To	7,700	9,000	8,800
From	21,400	24,100	23,600
Through	9,600	10,400	9,500
Total WSX Corridor Transit Trips	**48,600**	**54,200**	**52,800**
Change from No Project	**--**	**5,700**	**4,200**
Intra Santa Clara Transit Trips	214,700	216,000	216,500

Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (e.g., Hayward to San Jose).
All numbers have been independently rounded to the nearest hundred. Totals may not sum to displayed volumes.
Source: DKS Associates, 2002 from VTA-modified MTC model

The following information summarizes the information presented in the previous table.

- In 2010, with implementation of the proposed Bus Alternative Project, there would be nearly a 9% increase in transit riders compared to the No-Project scenario. The largest increase for linked transit trips is for those people that travel from the Fremont/Newark/Union City area to other Bay Area locations. Transit through movements would remain the same as for the 2010 No-Project Condition. When the proposed Bus Alternative is compared to the Proposed Project with optional Irvington Station, all movements with the exception of the internal movement would show a decline in the number of linked transit trips.

Mode of Access/Egress

The mode of access/egress analysis provides the potential demands for parking, auto drop-off locations, walk access, and the need for transit bus facilities for transfers among bus routes or between BART and buses at each of the stations.

Table 9-10 list the mode of access/egress to each of the stops along the proposed Bus Alternative route for 2010. For comparison purposes, the mode of access/egress for the BART stations is also shown.

Table 9-10
Mode of Access/Egress – 2010 Proposed Bus Alternative

	Mode of Access/Egress				
Station	PNR	KNR	Walk/ Bike	Transit XFER	Total
2010 No Project					
Fremont BART station	5,000	1,500	1,600	5,100	13,200
Irvington BART station	0	0	0	0	0
Warm Springs BART station	0	0	0	0	0
Southern Alameda total	5,000	1,500	1,600	5,100	13,200
2010 Proposed Project with Optional Irvington Station					
Fremont BART station	3,100	600	2,200	2,100	8,200
Irvington BART station	1,900	400	1,100	1,200	4,500
Warm Springs BART station	2,300	500	1,300	7,100	11,000
Southern Alameda total	7,300	1,500	4,600	10,400	23,700
2010 Proposed Bus Alternative					
Fremont BART station [1]	0	0	500	8,600	9,100
Paseo Padre / Stevenson	0	0	300	0	300
Irvington Transit Center	2,000	400	1,300	500	4,200
Auto Mall Parkway	0	0	300	0	300
Warm Springs Transit Center	2,200	500	2,100	600	5,300
Southern Alameda Total	4,200	900	4,500	9,700	19,200

Notes:

[1] Does not include the mode of Access / Egress for BART patrons. Only the Proposed Bus Alternative patrons are included.

PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to the nearest hundred: totals may not sum up to the displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

In 2010, almost one half of riders using the proposed Bus Alternative transfer between BART and buses at the Fremont BART station or transfer between buses at the Irvington and Warm Springs Transit Centers according to Table 9-10. More than one-quarter of the proposed Bus Alternative riders walk or use bicycles to either access or egress the buses and slightly less than one-quarter of the proposed Bus Alternative riders park-and-ride or kiss-and-ride to either the Irvington or Warm Springs Transit Centers. Users of the proposed Bus Alternative would not be permitted to park-and-ride from the Fremont BART station because only BART riders are allowed to use these parking facilities.

In general, the proposed Bus Alternative would have fewer people going to or coming from the stations than the Proposed Project with the optional Irvington Station in 2010.

While the proportion of riders transferring between buses or between BART and buses would be larger under the proposed Bus Alternative compared to the Proposed Project with the optional Irvington Station, the actual number of transfers would be larger under the Proposed Project with the optional Irvington Station. The total number of riders walking or bicycling to or from the stations would be virtually equal between the proposed Bus Alterntaive and the Proposed Project with the optional Irvington Station.

Travel Times

Table 9-11 provides a travel time comparison (in minutes) between the 2025 Proposed Project and the 2025 No Project Alternatives. Auto travel times would remain constant due to the peak spreading function built into the VTA modified MTC model. When demand during the peak hour exceeds capacity which is the case in 2025, the excess number of vehicles are assumed to travel either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading, but would not affect auto travel times during the peak hour.

Table 9-11
AM Peak Hour Travel Times – 2010 Proposed Bus Alternative

	2010 No Project			2010 Proposed Bus Alternative		
From / To	Drive Alone	Car Pool	Transit	Drive Alone	Car Pool	Transit
Milpitas-Downtown San Francisco	101[1]	81	74	101	81	87
Milpitas-Pacific Commons	16	23	83	16	23	52
Irvington-Nummi	11	18	37	11	18	22
Irvington-Downtown San Jose	35	35	80	35	35	72
Fremont-Lockheed	44	36	89	44	36	82
Fremont-Pacific Commons	12	19	43	12	19	43
Union City-Diridon Caltrain Depot	53	46	69	53	46	69
Union City-Downtown San Jose	52	44	78	52	44	78
Hayward-Lockheed	66	48	75	66	48	75

Notes:
1. 15 minute penalty applied for drive alone over the Bay Bridge
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center.
Union City location is approximately the Dyer/Alvarado-Niles Boulevard intersection (west of I-880).
Fremont location is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates from the VTA modified MTC model, 2002

The transit travel time between some pairs of locations would remain constant, some would decrease and others would increase. Locations that are located close to the Warm Springs Station, such as the Nummi Plant would generally experience a decrease in the travel time during the AM peak hour.

Load Factors

Table 9-12 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Fremont BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 9-12
BART Load Factors – 2010 Proposed Bus Alternative

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Fremont	Union City	4946	1970	742	296	5	5	0.236	0.094
Union City	South Hayward	8532	2108	1280	316	5	5	0.406	0.100
South Hayward	Hayward	10485	2002	1573	300	5	5	0.499	0.095
Hayward	Bay Fair	13020	2300	1953	345	5	5	0.620	0.110
Richmond Lines									
Fremont	Union City	1316	1617	197	243	4	4	0.176	0.217
Union City	South Hayward	2152	1780	323	267	4	4	0.288	0.238
South Hayward	Hayward	2661	1741	399	261	4	4	0.356	0.233
Hayward	Bay Fair	3385	2015	508	302	4	4	0.454	0.270
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	9082	1961	1362	294	4	4	0.540	0.117
West Dublin	Castro Valley	11794	2093	1769	314	4	4	0.702	0.125
Castro Valley	Bay Fair	14239	2234	2136	335	4	4	0.848	0.133

Notes:
NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates from the VTA modified MTC model, 2002

The BART load factors during the 2010 Proposed Bus Alternative Condition would be relatively low, with all lines showing an availability of seats. As the train progresses northwards, (or westwards), more riders would board and the load factors would increase.

Table 9-13 lists the load factors for the Bus Rapid Transit (BRT) lines between the Warm Springs Transit Center and the Fremont BART station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 9-13
Bus Load Factors – 2010 Proposed Bus Alternative

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB	SB	NB	SB	NB	SB	NB	SB
VTA - 180									
Leave / arrive Fremont BART station		1933	1356	290	203	4	4	1.813	1.269
Paseo Padre	Irvington Transit Center	1939	1358	291	204	4	4	1.819	1.275
Irvington Transit Center	Auto Mall Parkway	1364	2044	205	307	4	4	1.281	1.919
Auto Mall Parkway	Warm Springs Transit Center	1455	2070	218	311	4	4	1.363	1.944
Leave / Arrive Warm Springs Transit Center		775	1888	116	283	5	5	0.580	1.415
AC Transit									
Leave / arrive Fremont BART station		1606	337	241	51	4	4	1.506	0.319
Paseo Padre	Irvington Transit Center	1611	338	242	51	4	4	1.513	0.319
Irvington Transit Center	Auto Mall Parkway	955	399	143	60	4	4	0.894	0.375
Auto Mall Parkway	Warm Springs Transit Center	1024	425	154	64	4	4	0.963	0.400
Leave / Arrive Warm Springs Transit Center		0	167	0	25	5	5	0.000	0.125

Notes:
NB– Northbound
SB– Southbound
40 seats per Bus

Source: DKS Associates from the VTA modified MTC model, 2002

The BRT load factors during the 2010 Proposed Bus Alternative Condition would be relatively high, with all northbound lines showing a deficiency in the number of seats. When the load factors are above 1, there would be people standing on each of the northbound services. The load factors are not as consistent as the BART load factors, as more fluctuation would occur with the increased number of stops.

9.2.6. Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06. Table 9-14 shows the estimated parking demand for each scenario, along with the number of parking spaces currently proposed. These demand figures include the demand generated by other transit services, such as bus vehicles.

In each scenario at all locations, demand does not exceed the available supply, so there would be no significant parking impacts at the transit centers. The proposed Bus Alternative would have lower parking demand than the Proposed Project because more people would be able to walk to the intermediate stops and more bus riders would transfer at the Warm Springs Transit Center, rather than at the Fremont BART Station, to meet the VTA Route 180.

Table 9-14
Parking Supply and Demand – 2010 Proposed Bus Alternative

	Fremont Station		Irvington Station		Warm Springs Station	
	Supply	**Demand**	**Supply**	**Demand**	**Supply**	**Demand**
2010	2,030	1,480	960	940	2,040	1,040

Notes:
Parking supply based on presentation by BART Staff to the BART Warm Springs Extension Project Development Team Meeting, October 22, 2002. As stations are designed, actual parking supply could change.
Parking Demand based on VTA modified MTC model.
Source: DKS Associates, 2002

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10. 2025 NO PROJECT

10.1. DESCRIPTION

In order to generate travel forecast model results for the 2025 No Project Condition, discussions were held with the Alameda County Congestion Management Agency, City of Fremont, and the Metropolitan Transportation Commission (MTC) to establish the network. The road projects that were assumed to be completed by 2025 in the VTA modified MTC model, are as follows:

- Grade separation of Paseo Padre Parkway and the existing railroad lines
- Widening of Cushing Parkway between North Loop Road and Fremont Boulevard
- Widening of Driscoll Road between Mission Boulevard and Chilton Avenue
- Widening of Durham Road between Osgood Road and I-680
- Widening of Mowry Avenue between I-880 and Blacow Road
- Widening of Paseo Padre Parkway between Driscoll Road and Mowry Avenue
- Widening of South Grimmer Boulevard between Warm Springs Boulevard and Old Warm Springs Boulevard
- Widening Washington Street between I-680 and Mission Boulevard

This scenario assumes that the proposed Warm Springs Extension is the end of the line station. This scenario does not include the optional Irvington Station in the analysis.

10.2. IMPACTS

10.2.1. Trip Generation

Under this scenario, 8,310 daily trips would be generated at the Fremont BART Station. This includes 1630 AM peak hour trips (1180 inbound, 450 outbound) and 1630 PM peak hour trips (450 inbound, 180 outbound).

Trip generation estimates for this scenario were based on the intersection turning movements and the VTA modified MTC model, as summarized in Table 10-1.

Table 10-1
Trip Generation – 2025 No Project.

Station	Daily	AM		PM	
		In	Out	In	Out
Fremont	8310	1180	450	450	1180
Source: DKS Associates, 2002					

10.2.2. Trip Distribution

Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B.

10.2.3. Intersection Analysis

The 2025 No Project condition analysis is based on a projection of vehicle trips in the VTA Modified MTC Model. A discussion of the model parameters and adjustments is provided in Chapter 3.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, the intersection LOS was evaluated at 18 study intersections. Because construction of the optional Irvington Station would redistribute trips that would have gone to either the Fremont or Warm Springs Station, all of the study intersections were evaluated under both with and without the optional Irvington Station scenarios. Figure 10-1 illustrates the turning movements for each study intersection under the 2025 No Project.

The intersections and their corresponding levels of service are presented in Table 10-2 for the 2010 No Project and the 2025 No Project Conditions.

Table 10-2
Intersections LOS 2010 No Project and 2025 No Project

#	Intersection	2010 No Project Condition				2025 No Project			
		a.m. Peak Hour		p.m. Peak Hour		a.m. Peak Hour		p.m. Peak Hour	
		LOS[a]	v/c[b]	LOS	v/c	LOS[a]	v/c[b]	LOS	v/c
1	Osgood Road/Durham Road/Auto Mall Parkway	D	0.84	D	0.89	E	1.00	F	1.06
2	I-680 SB Ramps/Durham Road/Auto Mall Parkway	D	0.89	C	0.78	E	0.98	D	0.90
3	I-680 NB Ramps/Durham Road/Auto Mall Parkway	A	0.56	A	0.40	B	0.61	A	0.42
4	Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard	D	0.88	D	0.86	F	1.14	F	1.31
5	Fremont Boulevard/South Grimmer Boulevard	E	0.91	A	0.58	F	1.07	D	0.84
6	Fremont Boulevard/I-880 NB Ramps	A	0.60	A	0.37	D	0.83	A	0.42
7	Fremont Boulevard/I-880 SB On-ramp/Cushing Parkway	D	0.86	A	0.47	D	0.87	A	0.49
8	Fremont Boulevard/I-880 SB Off-ramp	E	0.91	A	0.43	D	0.86	A	0.51
9	Warm Springs Boulevard/Mission Boulevard	F	1.08	E	0.94	F	1.42	F	1.09
10	Mohave Drive/Mission Boulevard	B	0.61	C	0.74	B	0.66	D	0.81
11	Warm Springs Boulevard/Northern Warm Springs Station Entrance								
12	Warm Springs Boulevard/Southern Warm Springs Station Entrance								
13	I-680 NB Ramps/Washington Boulevard	A	0.60	A	0.56	A	0.58	D	0.81
14	I-680 SB Ramps/Washington Boulevard	A	0.41	A	0.40	C	0.71	D	0.86
15	Osgood Road/Washington Boulevard	A	0.51	A	0.58	D	0.89	D	0.85
16	Fremont Boulevard/Washington Boulevard/Bay St	F	1.27	F	1.13	E	0.98	F	1.13
17	Osgood Road/Blacow Road	A	0.51	A	0.36	C	0.77	A	0.46
18	Osgood Road/Irvington Station Entrance								

[a] LOS = level of service.

[b] v/c = volume-to-capacity ratio.

Source: DKS Associates 2002

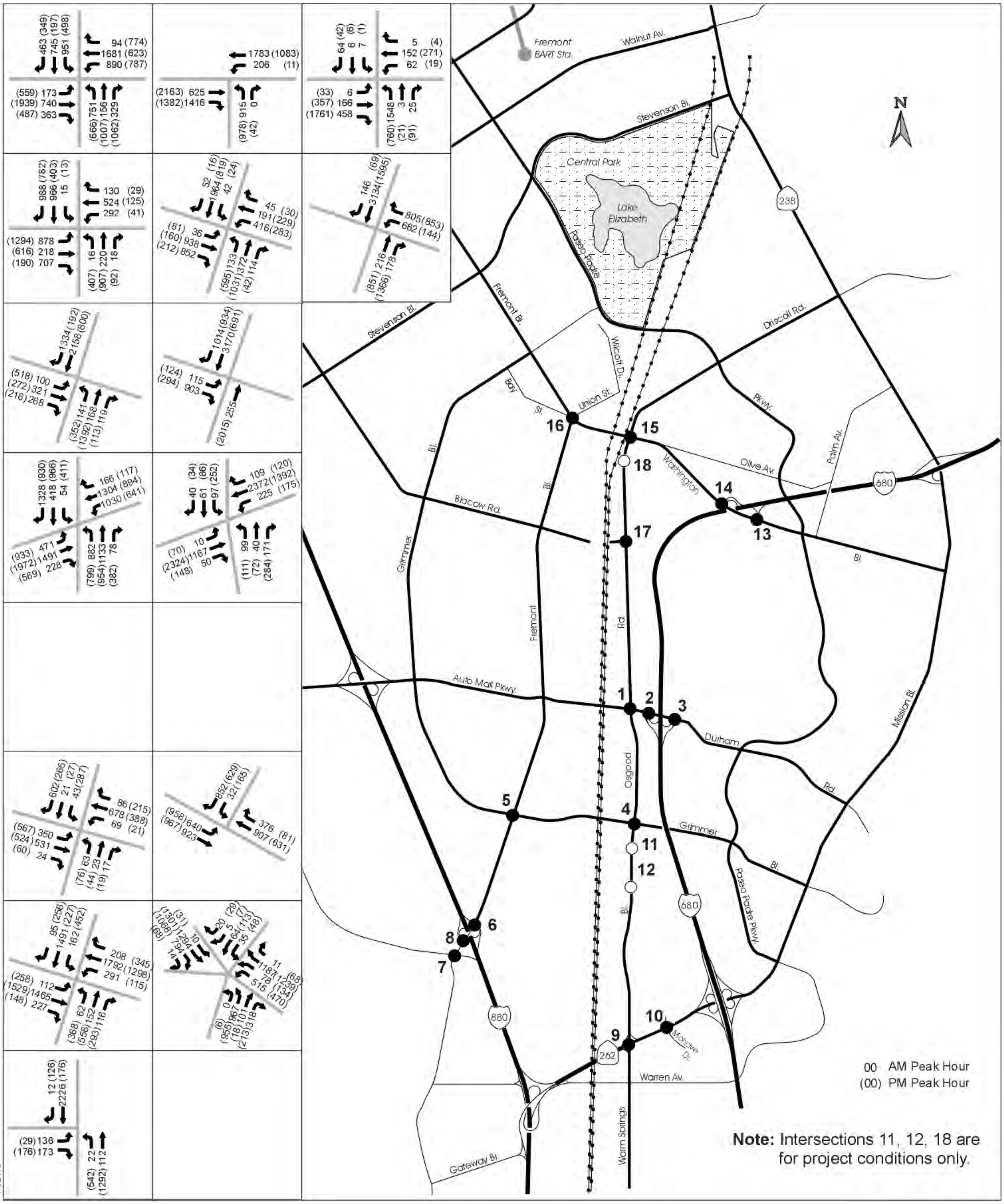

Figure 10-1
2025 NO PROJECT PEAK HOUR TURNING MOVEMENTS

***DKS** Associates*

10.2.4. Metropolitan Transportation System Roadways

The Alameda County Congestion Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Some roadway segments are expected to exhibit decreases in traffic volumes as a result of project conditions, while other segments are expected to exhibit increases. For informational purposes only, the number of roadway segments that would operate at LOS E or F are identified in Table 10-3. As discussed above, an impact on a roadway segment is considered significant if project trips cause that segment to deteriorate to LOS F, unless LOS F was measured when the County Congestion Management Plan was established in 1991. In addition, for informational purposes, Table 10-3 identifies the quantity of roadway segments that would experience small volume changes (2% to 4%) or large volume changes (5% or more).

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.

- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.
- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.
- Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions and provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 MTS roadway segments. Table 10-3 indicates the quantity of segments that would have volume changes of plus or minus 2%, and plus or minus 5%, as well as changes in the LOS.

Table 10-3
MTS Roadway Analysis Summary 2025 No Project

Scenario	-5% or greater	-2% to -4%	+2 to +4%	+5% or greater	LOS Improvements		LOS Degradation	
					State Highway	Local Roadway	State Highway	Local Roadway
2025 No Project	31 state highway segments operating at LOS E or F							
2025 No Project[a]	8	2	7	134	-	3	39	7
a Compare to 2010 No Project								
Source: DKS Associates 2002								

Appendix C includes the detailed MTS roadway analysis sheets for the 2025 No Project Scenario.

10.2.5. Transit

Transit Facilities

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be two pairs of daily BART lines in each direction serving the existing Fremont Station. Combined, they would provide a 6.0 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 12 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport.

- All BART lines would experience an improvement in headways from 15 minutes to 12 minutes. These increased headways throughout the existing BART network would be made possible through the implementation of Advanced Automatic Train Control (AATC). A third pair of BART lines would operate during the AM and PM peak periods only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would operate from Santa Clara County to the Warm Springs Station via I-680, Mission Boulevard and Warm Springs Boulevard. This includes Routes 140, 180, and 520. Route 140 would operate during the peak periods on a 15 minute headway. Route 180 would operate all day, with 15 minute headways, and route 520 would operate during the AM and PM peak periods with a 20 minute headway.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new Ace / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- Increased headways on BART would be made possible through the implementation of Advanced Automatic Train Control (AATC).
- The BART extension to Millbrae would be open and operational with 12-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.
- The West Dublin BART station would be operational and have a service headway of 15 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- The CalTrain Baby Bullet service would operate along the Peninsula with 60 minute headways.

Station Entries and Exits

Table 10-4 list the daily station entries and exits and the system boardings for both the existing and proposed stations in southern Alameda County for the 2025 conditions. This table provides a comparison between the 2010 and the 2025 No-Project conditions. As expected, there are fewer entries and exits at the Fremont BART Station because it would no longer be the terminus.

Table 10-4
Station Entries and Exits – 2010 and 2025 No Project

Station	2010 No Project	2025 No Project
Southern Alameda County Existing Stations		
Union City	9,200	11,400
Fremont	13,200	17,100
Southern Alameda County Existing Stations Subtotal	**22,400**	**28,500**
Proposed Project Stations		
Southern Alameda County Proposed and Existing Stations Subtotal	**22,500**	**28,500**
BART Systemwide Total Entries and Exits	775,600	972,800
BART Systemwide Total Boardings	387,800	486,400

Notes:
Station-level and subtotal values are for station entries and exits (i.e. total persons entering and leaving station areas). Total systemwide boardings was calculated by dividing entries and exits by two.

Southern Alameda County stations are the existing Union City and Fremont Stations plus the proposed Warm Springs and optional Irvington Stations.

All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

In summary, the following observations can be made from the previous table.

- The total number of entries and exits would increase at the Union City BART Station when any scenario is compared to the No-Project condition
- At the Fremont BART Station under the 2025 conditions, station entries and exits would decrease when compared to the 2025 No-Project condition. Entries and exits would decrease by 4,900 under the Proposed Project.
- In 2025, there would be 16,300 entries and exits at the Warm Springs Station.
- Similar to the 2010 conditions, there would be increases in the entries and exits when all the southern Alameda County stations are combined under the 2025 conditions. There would be an increase of 12,100 under the Proposed Project condition.
- In 2025, under the Proposed Project, there would be a 14,200 and a 20,400 increase in the systemwide entries and exits.

Ridership

Station to Station Matrices

Table 10-5 lists the BART productions and attractions between stations for the 2010 No Project Condition and Table 10-6 lists the BART productions and attractions between stations for the 2025 No Project condition. All tables are shown as daily numbers and are rounded to the nearest ten. Full station-to-station ridership tables are shown at the back of this appendix. In these tables, "Other Bay Area" refers to the other areas of the Bay Area that currently (or will in 2010) have BART service. This includes Alameda, San Francisco, San Mateo and Contra Costa Counties. Santa Clara and the North Bay are excluded from this analysis.

These tables show that most of the travelers from Fremont, would continue to travel to San Francisco and Oakland (61 percent in the 2010 No Project Condition and 63 percent for the 2025 No Project condition), even though there are very few travelers in the opposite direction.

Table 10-5
Station to Station BART Ridership – 2010 No Project

	Attractions			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	5,210	3,280	8,490
San Francisco / Oakland	420	18,700	27,810	46,930
Other Bay Area	4,340	243,100	84,910	332,350
Totals	4,760	267,010	116,000	387,770

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Table 10-6
Station to Station BART Matrix – 2025 No Project

	Attractions			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	6,980	4,100	11,080
San Francisco / Oakland	530	25,640	32,950	59,120
Other Bay Area	5,490	305,250	105,490	416,230
Totals	6,020	337,870	142,540	486,430

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Ridership

The ridership by segment for heavy rail is listed in Table 10-7 for 2010 and 2025 No Project. This table provides the bidirectional ridership (rounded to the nearest hundred) between stations in the BART network. This table also provides the ridership at the county line for the ACE trains and the Capitol Corridor trains.

Table 10-7
Rail Ridership – 2025 No Project

Station A	Station B	Mode	2010 No Project	2025 No Project
Union City	Fremont	BART	13,500	18,100
Alameda County / Santa Clara County Line (approx.)		Ace	8,000	11,700
Alameda County / Santa Clara County Line (approx.)		Capitol Corridor	2,300	2,800

Source: DKS Associates 2002 from the VTA modified MTC model

Table 10-8 lists the projected ridership for the VTA express buses and AC Transit service. The total bi-directional ridership levels are provided at the following locations:

- Paseo Padre between Fremont BART station and the Irvington Station location (AC Transit).
- Warm Springs Boulevard / Osgood Road between the Irvington Station location and the Warm Springs Station location (AC Transit).
- Warm Springs Boulevard between South Grimmer Boulevard and Mission Boulevard (AC Transit).
- Warm Springs Boulevard between Mission Boulevard and Kato Road (AC Transit).
- Warm Springs Boulevard south of Kato Road (at the Alameda County / Santa Clara County line) (AC Transit).
- I-680 south of Mission Boulevard (VTA).

AC Transit would provide local service in the area, while VTA would provide express services. For this reason, the VTA routes are shown on a route by route basis.

This table also makes a comparison back to the 2010 No Project condition. The ridership levels on each of the express bus services would remain relatively constant under the 2025 No Project Condition with the ridership on the VTA Route 180 increasing by only 14 percent. The ridership on the VTA Route 500 would show the most increase with a projected 40 percent new riders. The projected ridership on the AC Transit bus services would remain constant, with very few new riders.

Table 10-8
Bus Ridership – 2025 No Project

Operator	Route	Road	2010 No Project	2025 No Project
AC Transit		Paseo Padre between Fremont BART Stn and Irvington Stn	1,000	1200
AC Transit		Osgood Road between Warm Springs Stn and Irvington Stn	200	200
AC Transit		Warm Springs Boulevard between Grimmer Boulevard and Mission Blvd	300	400
AC Transit		Fremont Boulevard between Auto Mall Parkway and Blacow Rd	400	300
AC Transit		Warm Springs Boulevard between Mission Boulevard and Kato Rd	1,400	1200
AC Transit		Warm Springs sth of Kato	1,900	1300
VTA	140	I-680 south of Mission Blvd	200	100
VTA	180	I-680 south of Mission Blvd	1,400	1600
VTA	520	I-680 south of Mission Blvd	400	300
VTA	500	I-680 south of Mission Blvd	1,000	1400

Source: DKS Associates 2002 from the VTA modified MTC model

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A linked trip consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring onto BART at a BART station and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but is not considered a linked transit trip.

Table 10-9 lists the number of projected linked transit trips (rounded to the nearest hundred) from areas that would logically use the service for both the 2010 No Project Condition and the 2025 No Project. This table shows the linked transit trips for four broad areas within the network: those people that stay within the Fremont/Newark/Union City area; those people traveling to Union City, Newark and Fremont; those people traveling from Newark, Fremont and Union City to other areas; and those people that travel through the Fremont/Newark/Union City area. Those people that travel through the area would include traveling between the East Bay and Santa Clara County.

There would be approximately 8,200 (an increase of 16.8 percent) new transit riders under the 2025 No Project conditions. This table shows that the largest increases in the area is linked transit trips to the Southern Alameda County (an increase of 23 percent over the 2010 No Project Condition.

Table 10-9
Linked Transit Trips – 2025 No Project

Trips:	2010 No Project	2025 No Project	Percent Change
Intra	9,800	11,100	13.3%
To	7,700	8,600	11.7%
From	21,400	25,300	18.2%
Through	9,600	11,800	22.9%
Total WSX Corridor Transit Trips	**48,600**	**56,800**	16.8%
Change from No-Build	**--**	**8,200**	
Intra Santa Clara Transit Trips	*214,700*	243,000	13.2%

Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (e.g., Hayward to San Jose).
All numbers have been independently rounded to nearest hundred, Totals may not sum up to displayed value
Source: DKS Associates from the VTA modified MTC model, 2002

Mode of Access/Egress

A mode of access analysis provides the potential demands for parking, kiss-and-ride, walk access, and the need for transit provision at each of the stations. Table 10-10 lists the mode of access/egress at each of the southern Alameda stations for the 2010 and 2025 No Project Condition, respectively. These figures have been rounded to the nearest hundred.

Table 10-10
Mode of Access/Egress – 2010 and 2025 No Project

	Mode of Access/Egress				
Station	**PNR**	**KNR**	**Walk/Bike**	**Transit XFER**	**Total**
2010 No Project					
Union City	3,600	1,300	500	3,700	9,200
Fremont	5,000	1,500	1,600	5,100	13,200
Irvington	0	0	0	0	0
Warm Springs	0	0	0	0	0
Southern Alameda total	8,600	2,800	2,100	8,800	22,500
2025 No Project					
Union City	3,600	2,100	900	4,700	11,400
Fremont	5,100	2,600	1,800	7,500	17,100
Irvington	0	0	0	0	0
Warm Springs	0	0	0	0	0
Southern Alameda total	8,700	4,700	2,700	12,200	28,500

Notes:
PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

As expected, there would be increases in all modes of access at all stations with the exception of park-and-ride at West Dublin. The VTA express buses would continue service at the Fremont BART Station. Transfers at the Fremont BART station would show a 100 percent increase. Kiss-and-ride at all stations would increase as parking is constrained at each of the stations.

Travel Times

This section consists of sets of travel time comparisons between selected residential locations (northwest Milpitas, Irvington, Fremont, Union City, and Hayward) and selected Bay Area employment centers (Downtown San Francisco; Downtown San Jose, 1st Street and the Diridon Caltrain Depot; Lockheed Martin Corporation facilities in Sunnyvale; and the Pacific Commons development in Fremont).

The locations have been selected to be representative examples. The small set of times is not intended to characterize all travel patterns changed by the Proposed Project. Transit riders' destinations in the Fremont-Warm Springs area are very diffuse, with no single area dominating. Transit ridership from MTC Super District 16 (Fremont-Union City and Newark) to other parts of the Bay Area is projected to be roughly similarly split among San Francisco, the South Bay (including San Mateo County), and the rest of the East Bay. Therefore, the list of travel time comparisons is intended to capture the essence of area-wide changes associated with the BART extension alternatives.

In some cases, transit is competitive with highway times in all alternatives (for example, northwest Milpitas to downtown San Francisco). In other cases, transit travel times improve substantially for one or more of the build alternatives (for example, Irvington to NUMMI). However, there is also one case (Milpitas to Pacific Commons) where transit is not competitive with auto travel, even with improved transit times, due to the need to transfer and the absence of traffic congestion for this specific origin–destination pair.

Table 10-11 provides a comparison of a.m. peak hour travel time (in minutes) between the 2010 and the 2025 No Project conditions. Auto travel times would remain roughly constant among the various alternatives analyzed due to the peak spreading function built into the VTA-modified MTC model. When demand during the peak hour exceeds capacity, the excess vehicles are shifted to either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading but would not affect auto travel times during the peak hour.

Table 10-11
AM Peak Hour Travel Times – 2025 No Project

Sample Trip (Origin-Destination)	2010 No Project			2025 No-Project		
	Drive Alone	Car Pool	Transit	Drive Alone	Car Pool	Transit
Northwest Milpitas-Northwest Downtown San Francisco	101	81	74	110	85	71
Northwest Milpitas-Northwest Pacific Commons	16	23	84	20	26	86
Irvington-NUMMI	11	18	37	11	18	40
Irvington-Downtown San Jose	35	35	80	40	47	82
Fremont-Lockheed	44	36	89	52	49	98
Fremont-Pacific Commons	12	19	43	14	21	45
Union City-Diridon CalTrain Depot	53	46	69	60	60	69
Union City-Downtown San Jose	52	44	78	58	58	79
Hayward-Lockheed	66	48	75	72	60	75

Notes:
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center
Union City location is approximately the Dyer/Alvarado-Niles Boulevard intersection (west of I-880).
Fremont location is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates from the VTA modified MTC model, 2002

An example of the difference between actual and perceived time is evident in the Union City to downtown San Jose trip. Under the No-Project scenario, the rider would drive to the Union City Capitol Amtrak Station and ride Amtrak to the San Jose-Diridon Station. The rider would then need to transfer to a connecting bus to reach their downtown destination.

Finally, the travel time calculations do not factor in trip reliability. Highway travel times, for example, can vary greatly depending on weather, special events, accidents, and traffic volumes. Rail systems with exclusive rights-of-way can enhance transit reliability, although severe disruptions can occur. Ridership models typically do not capture how day-to-day trip time reliability affects mode choice.

Load Factors

Table 10-12 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Fremont BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 10-12
Load Factors –2025 No Project

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Fremont	Union City	6413	2240	962	336	6	6	0.254	0.089
Union City	South Hayward	10318	2425	1548	364	6	6	0.410	0.096
South Hayward	Hayward	12697	2542	1905	381	6	6	0.504	0.101
Hayward	Bay Fair	15717	3104	2358	466	6	6	0.624	0.123
Richmond Lines									
Fremont	Union City	1819	2250	273	338	5	5	0.195	0.241
Union City	South Hayward	2734	2525	410	379	5	5	0.293	0.271
South Hayward	Hayward	3376	2717	506	408	5	5	0.361	0.291
Hayward	Bay Fair	4349	3277	652	492	5	5	0.466	0.351
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	14403	2740	2160	411	5	5	0.686	0.130
West Dublin	Castro Valley	17906	3016	2686	452	5	5	0.853	0.143
Castro Valley	Bay Fair	21139	3120	3171	468	5	5	1.007	0.149

Notes:
NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates 2002 from VTA modified MTC model

Load factors during the 2025 No Project Condition would be relatively low, with most lines showing an availability of seats. The westbound section between Castro Valley and Bay Fair would be the only segment that has more passengers on the train than seats. Where this occurs, passengers would be required to stand. As the train progresses northwards, (or westwards), more riders would board and the load factors would increase.

10.2.6. Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06 (from existing occupancy surveys conducted at the Fremont BART Station, *BART Station Access Improvements Study*).

Table 10-13 shows the estimated parking demand for each scenario, along with the number of parking spaces currently proposed. These demand figures include the demand generated by other transit services, such as bus vehicles.

Table 10-13
Parking Supply and Demand – 2025 No Project

2025	Fremont Station Supply	Fremont Station Demand
	2,030	2,420

Note:
Parking supply based on presentation to the BART Warm Springs Extension Project Development Team Meeting, October 22, 2002. As stations are designed, actual parking supply could change.
Parking Demand based on VTA modified MTC model

Source: DKS Associates, 2002

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11. 2025 PROPOSED PROJECT

11.1. DESCRIPTION

This scenario reflects the conditions in the study area with the Warm Springs Extension in place during 2025. The BART Warm Springs station is assumed to be the end of the line station. The optional Irvington Station is not included in this scenario.

11.2. IMPACTS

11.2.1. Trip Generation

Under this scenario, 5,550 daily vehicle trips would be generated at the Warm Springs Station, including 920 A.M. peak hour trips (790 inbound, 130 outbound) and 920 P.M. peak hour trips (130 inbound, 790 outbound). 5,860 daily trips would be generated at the Fremont Station, including, 970 A.M. peak hour trips (830 inbound, 140 outbound) and 970 P.M. peak hour trips (140 inbound, 830 outbound).

Trip generation estimates for the proposed project were based on the intersection turning movements and the Santa Clara Valley Transportation Authority modified MTC model, as summarized in Table 11-1**.**

Table 11-1
Trip Generation 2025 Proposed Project

Station	Daily Rate	AM		PM	
		In	Out	In	Out
Fremont	5860	830	140	140	830
Warm Springs	5550	790	130	130	790

Source: DKS Associates, 2002.

11.2.2. Trip Distribution

Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B.

11.2.3. Intersection Analysis

The 2025 Proposed Project condition analysis is based on a projection of vehicle trips in the VTA modified MTC Model. A discussion of the model parameters is provided in Chapter 3.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, the intersection LOS was evaluated at 18 study intersections. Because construction of the optional Irvington Station would redistribute trips that would have gone to either the Fremont or Warm Springs Station, all of the study intersections were evaluated under both with and without the optional Irvington Station scenarios. Figure 11-1 illustrates the turning movements for each study intersection under the 2025 Proposed Project.

The intersections and their corresponding levels of service are presented in Table 11-2 for the 2025 No Project and the 2025 Proposed Project scenario.

Table 11-2
Intersection LOS, 2025 No Project and Proposed Project

		2025 No Project Condition				2025 Proposed Project			
		a.m. Peak Hour		**p.m. Peak Hour**		**a.m. Peak Hour**		**p.m. Peak Hour**	
#	**Intersection**	**LOS**[a]	**v/c**[b]	**LOS**	**v/c**	**LOS**[a]	**v/c**[b]	**LOS**	**v/c**
1	Osgood Road/Durham Road/Auto Mall Parkway	E	1.00	F	1.06	E	1.00	F	1.11
2	I-680 SB Ramps/Durham Road/Auto Mall Parkway	E	0.98	D	0.90	E	0.98	E	0.91
3	I-680 NB Ramps/Durham Road/Auto Mall Parkway	B	0.61	A	0.42	B	0.63	A	0.44
4	Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard	F	1.14	F	1.31	F	1.33	F	1.41
5	Fremont Boulevard/South Grimmer Boulevard	F	1.07	D	0.84	F	1.05	C	0.80
6	Fremont Boulevard/I-880 NB Ramps	D	0.83	A	0.42	D	0.82	A	0.47
7	Fremont Boulevard/I-880 SB On-ramp/Cushing Parkway	D	0.87	A	0.49	D	0.89	A	0.54
8	Fremont Boulevard/I-880 SB Off-ramp	D	0.86	A	0.51	D	0.85	A	0.55
9	Warm Springs Boulevard/Mission Boulevard	F	1.42	F	1.09	F	1.13	F	1.15
10	Mohave Drive/Mission Boulevard	B	0.66	D	0.81	C	0.73	D	0.86
11	Warm Springs Boulevard/Northern Warm Springs Station Entrance					C	0.75	C	0.75
12	Warm Springs Boulevard/Southern Warm Springs Station Entrance					C	0.73	C	0.75
13	I-680 NB Ramps/Washington Boulevard	A	0.58	D	0.81	A	0.56	D	0.85
14	I-680 SB Ramps/Washington Boulevard	C	0.71	D	0.86	A	0.60	B	0.63
15	Osgood Road/Washington Boulevard	D	0.89	D	0.85	D	0.82	D	0.82
16	Fremont Boulevard/Washington Boulevard/Bay St	E	0.98	F	1.13	E	0.91	F	1.09
17	Osgood Road/Blacow Road	C	0.77	A	0.46	C	0.74	A	0.52
18	Osgood Road/Irvington Station Entrance								

[a] LOS = level of service.

[b] v/c = volume-to-capacity ratio.

Source: DKS Associates 2002

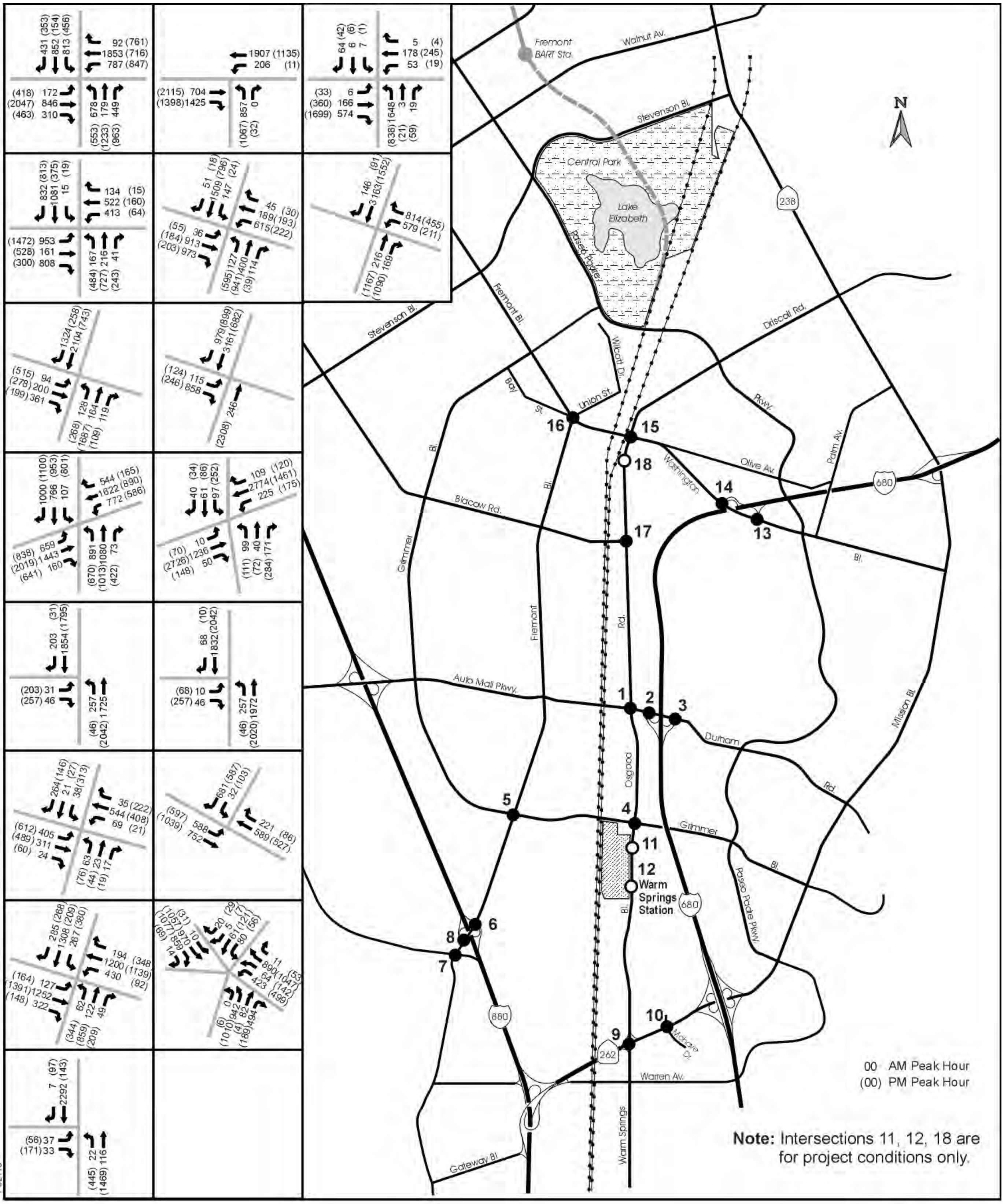

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Figure 11-1
2025 PROPOSED PROJECT PEAK HOUR TURNING MOVEMENTS

11.2.4. Metropolitan Transportation System Roadways

The Alameda County Congestion Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Some roadway segments are expected to exhibit decreases in traffic volumes as a result of project conditions, while other segments are expected to exhibit increases. For informational purposes only, the number of roadway segments that would operate at LOS E or F are identified in Table 11-3. As discussed above, an impact on a roadway segment is considered significant if project trips cause that segment to deteriorate to LOS F, unless LOS F was measured when the County Congestion Management Plan was established in 1991. In addition, for informational purposes, Table 11-3 identifies the quantity of roadway segments that would experience small volume changes (2% to 4%) or large volume changes (5% or more).

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.

- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.
- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.
- Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions and provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 MTS roadway segments. Table 11-3 indicates the quantity of segments that would have volume changes of plus or minus 2%, and plus or minus 5%, as well as changes in the LOS.

Table 11-3
MTS Roadway Analysis Summary, 2025 Proposed Project

Scenario	-5% or greater	-2% to -4%	+2 to +4%	+5% or greater	LOS Improvements		LOS Degradation	
					State Highway	Local Roadway	State Highway	Local Roadway
2025 No Project	31 state highway segments operating at LOS E or F							
2025 Proposed Project[a]	35	29	10	14	6	3	-	7
[a] Compared to 2025 No Project								
Source: DKS Associates 2002								

Compared to the 2025 No Project, the 2025 Proposed Project would result in the following changes during the p.m. peak hour.

- Seven of the MTS local roadway segments would show deterioration in the LOS.
- Six of the MTS state highway segments would experience an increase in LOS.
- Three of the MTS local roadway segments would experience an increase in LOS.
- The other 138 MTS roadway segments would continue to operate with similar LOS.

Appendix C includes the detailed MTS roadway analysis sheets for the year 2025 Proposed Project Scenario.

11.2.5. Transit

Transit Facilities

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be one new BART station built at Warm Springs in the City of Fremont.
- There would be two pairs of daily BART lines in each direction serving the existing Fremont Station. Combined, they would provide a 6.0 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 12 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport. Under the Proposed Project these lines would be extended south to the proposed Warm Springs Station.
- All BART lines would experience an improvement in headways from 15 minutes to 12 minutes. These increased headways throughout the existing BART network would be made possible through the implementation of Advanced Automatic Train Control (AATC).
- A third pair of BART lines would operate during the AM and PM peak periods only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would operate from Santa Clara County to the Warm Springs Station via I-680, Mission Boulevard and Warm Springs Boulevard. This includes Routes 140, 180, and 520. Route 140 would operate during the peak periods on a 15 minute headway. Route 180 would operate all day, with 15 minute headways, and route 520 would operate during the AM and PM peak periods with a 20 minute headway.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new ACE / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- Increased headways on BART would be made possible through the implementation of Advanced Automatic Train Control (AATC).

- The BART extension to Millbrae would be open and operational with 12-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.
- The West Dublin BART station would be operational and have a service headway of 15 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- The CalTrain Baby Bullet service would operate along the Peninsula with 60 minute headways.

Station Entries and Exits

Table 11-4 list the daily station entries and exits and the system boardings for both the existing and proposed stations in southern Alameda County for the 2025 conditions. This table provides a comparison between the Proposed Project and the No-Project conditions. As expected, there are fewer entries and exits at the Fremont BART Station because it would no longer be the terminus.

Table 11-4
Station Entries and Exits – 2025 Proposed Project

Station	No Project	Proposed Project
Southern Alameda County Existing Stations		
Union City	11,400	12,100
Fremont	17,100	12,200
Southern Alameda County Existing Stations Subtotal	**28,500**	**24,300**
Proposed Project Stations		
Warm Springs	—	16,300
Proposed Project Stations Subtotal	**—**	**16,300**
Southern Alameda County Proposed and Existing Stations Subtotal	**28,500**	**40,600**
BART Systemwide Total Entries and Exits	972,800	997,800
BART Systemwide Total Boardings	486,400	494,600

Notes:
Station-level and subtotal values are for station entries and exits (i.e. total persons entering and leaving station areas). Total systemwide boardings was calculated by dividing entries and exits by two.

Southern Alameda County stations are the existing Union City and Fremont Stations plus the proposed Warm Springs and optional Irvington Stations.

All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

In summary, the following observations can be made from the previous table.

- The total number of entries and exits would increase at the Union City BART Station when any scenario is compared to the No-Project condition.
- At the Fremont BART Station under all 2025 conditions, station entries and exits would decrease when compared to the 2025 No-Project condition. Entries and exits would decrease by 4,900 under the Proposed Project condition.
- In 2025, there would be 16,300 entries and exits at the Warm Springs Station.
- Similar to the 2010 conditions, there would be increases in the entries and exits when all the southern Alameda County stations are combined under the 2025 conditions.
- In 2025, under the Proposed Project conditions, there would be a 14,200 increase in the systemwide entries and exits.

Table 11-4 indicate the entries and exits at selected stations for 2025 Proposed Project. Another important ridership result can be gained through simple division and subtraction. The number of new trips on BART can be estimated by dividing the BART systemwide total entries and exits in half. This step is necessary to convert the entries and exits into and out of the system into the number of trips, otherwise each trip would be counted twice. Subtracting the number of trips under the No Project from the trips under the Proposed Project yields the number of new trips on BART resulting from the Proposed Project. For example, in 2025 the number of trips under the No Project would be 486,400 trips and the number under the Proposed Project would be 494,600 trips. The number of new BART trips under the Proposed Project would be 8,200 trips.

Ridership

<u>Station to Station Matrices</u>

Table 11-5 lists the BART productions and attractions between stations for the 2025 No project Condition and Table 11-6 lists the BART productions and attractions between stations for the 2025 Proposed Project. All tables are shown as daily numbers and are rounded to the nearest ten. Full station-to-station ridership tables are shown at back of this appendix. In these tables, “Other Bay Area” refers to the other areas of the Bay Area that currently (or will in 2025) have BART service. This includes Alameda, San Francisco, San Mateo and Contra Costa Counties. Santa Clara County and the North Bay are excluded from this analysis.

These tables show that many of the travelers from Fremont and Warm Springs would travel to San Francisco and Oakland (63 percent in the 2025 No Project Condition and 53 percent for the 2025 Proposed Project), even though there are very few travelers in the opposite direction.

Table 11-6 also shows that there would be number of short trips between Fremont and Warm Springs stations (21 percent of all trips from these two stations).

Table 11-5
Station to Station BART Matrix – 2025 No Project

Productions	Attractions Fremont	San Francisco / Oakland	Other Bay Area	Totals
Fremont	N/A	6,980	4,100	11,080
San Francisco / Oakland	530	25,640	32,950	59,120
Other Bay Area	5,490	305,250	105,490	416,230
Totals	6,020	337,870	142,540	486,430

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Table 11-6
Station to Station BART Matrix – 2025 Proposed Project

Productions	Attractions Fremont	Warm Springs	San Francisco / Oakland	Other Bay Area	Totals
Fremont	N/A	1,730	4,160	2,610	8,500
Warm Springs	1,130	N/A	3,590	2,620	6,210
San Francisco / Oakland	300	720	25,810	33,370	60,200
Other Bay Area	2,310	6,280	303,740	105,000	417,330
Totals	3,740	7,000	337,300	143,600	491,640

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Ridership

The ridership by segment for heavy rail is listed in Table 11-7 for 2025 Proposed Project. This table provides the bidirectional ridership (rounded to the nearest hundred) between stations in the BART network. This table also provides the ridership at the county line for the ACE trains and the Capitol Corridor trains.

Table 11-7
Rail Ridership – 2025 Proposed Project

Station A	Station B	mode	2025 No Project	2025 Proposed Project
Union City	Fremont	BART	18,100	22,800
Fremont	Warm Springs	BART	N/A	16,300
Alameda County / Santa Clara County Line (approx.)		ACE	11,700	11,100
Alameda County / Santa Clara County Line (approx.)		Capitol Corridor	2,800	2,100

Source: DKS Associates 2002 from the VTA modified MTC model

Table 11-8 lists the projected ridership for the VTA express buses and AC Transit service. The total bi-directional ridership levels are provided at the following locations:

- Paseo Padre between Fremont BART station and the Irvington Station location (AC Transit)
- Warm Springs Boulevard / Osgood Road between the Irvington Station location and the Warm Springs Station location (AC Transit)
- Warm Springs Boulevard between South Grimmer Boulevard and Mission Boulevard (AC Transit)
- Warm Springs Boulevard between Mission Boulevard and Kato Road (AC Transit)
- Warm Springs Boulevard south of Kato Road (at the Alameda County / Santa Clara County line) (AC Transit)
- I-680 south of Mission Boulevard (VTA)

AC Transit would provide local service in the area, while VTA would provide express services. For this reason, the VTA routes are shown on a route by route basis.

This table also makes a comparison back to the 2025 No Project condition. There would be more than a 100 percent increase in the ridership levels for most of the express buses over the 2025 No Project Condition. This table also indicates that some of the ridership that the project would gain would come from the local AC Transit services. There would also be increases in the ridership levels on the VTA express buses, with the daily VTA Route 180 service increasing its ridership levels by more than 140 percent. The VTA Routes 140, 520 and 500, which would only operate in the peak periods, would increase ridership levels by nearly 1100 percent, 160 percent, and 50 percent respectively.

Table 11-8
Bus Ridership – 2025 Proposed Project

Operator	Route	Road	2025 No Project	2025 Proposed Project
AC Transit		Paseo Padre between Fremont BART Stn and Irvington Stn	1200	900
AC Transit		Osgood Road between Warm Springs Stn and Irvington Stn	200	100
AC Transit		Warm Springs Boulevard between Grimmer Boulevard and Mission Blvd	400	500
AC Transit		Fremont Boulevard between Auto Mall Parkway and Blacow Rd	300	200
AC Transit		Warm Springs Boulevard between Mission Boulevard and Kato Rd	1200	1100
AC Transit		Warm Springs sth of Kato	1300	1200
VTA	140	I-680 south of Mission Blvd	100	1100
VTA	180	I-680 south of Mission Blvd	1600	3900
VTA	520	I-680 south of Mission Blvd	300	800
VTA	500	I-680 south of Mission Blvd	1400	2100

Source: DKS Associates 2002 from the VTA modified MTC model

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A linked trip consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring onto BART at a BART station and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but is not considered a linked transit trip.

Table 11-9 lists the number of projected linked transit trips (rounded to the nearest hundred) from areas that would logically use the service for both the 2025 No Project Condition and the 2025 Proposed Project. This table shows the linked transit trips for four broad areas within the network: those people that stay within the Fremont/Newark/Union City area; those people traveling to Union City, Newark and Fremont; those people traveling from Newark, Fremont and Union City to other areas; and those people that travel through the Fremont/Newark/Union City area. Those people that travel through the area would include patrons traveling between the East Bay and Santa Clara County.

There would be approximately 7,000 (an increase of 12.3 percent) new transit riders when the proposed project is built. This table shows that the largest increases in the area would be linked transit trips to the Southern Alameda County (an increase of 24 percent over the 2025 No Project Condition).

Table 11-9
Linked Transit Trips – 2025 Proposed Project

Trips:	2025 No Project	2025 Proposed Project	Percent Change
Intra	11,100	11,800	6.3%
To	8,600	10,700	24.4%
From	25,300	28,000	10.7%
Through	11,800	13,300	12.7%
Total WSX Corridor Transit Trips	**56,800**	**63,800**	12.3%
Change from No-Build		**7,000**	
Intra Santa Clara County Transit Trips	243,000	246,900	1.6%

Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (e.g., Hayward to San Jose).
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates 2002 from the VTA modified MTC model

Mode of Access/Egress

A mode of access analysis provides the potential demands for parking, kiss-and-ride, walk access, and the need for transit provision at each of the stations. Table 11-10 list the mode of access/egress at each of the southern Alameda stations.

Table 11-10
Mode of Access/Egress – 2025 No Project and 2025 Proposed Project

	Mode of Access				
Station	**PNR**	**KNR**	**Walk/Bike**	**Transit XFER**	**Total Entries and Exits**
2025 No Project					
Union City	3,600	2,100	900	4,700	11,400
Fremont	5,100	2,600	1,800	7,500	17,100
Irvington	0	0	0	0	0
Warm Springs	0	0	0	0	0
Southern Alameda total	8,700	4,700	2,700	12,200	28,500
2025 Proposed Project					
Union City	3,700	2,400	1,000	5,000	12,100
Fremont	4,900	1,000	2,500	3,800	12,200
Irvington	0	0	0	0	0
Warm Springs	4,600	1,000	2,500	8,000	16,300
Southern Alameda total	13,200	4,400	6,000	16,800	40,600

Notes:
PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

The previous table can be summarized as follows.

- More parking would be built in the area, and kiss-and-ride levels would decline as a result. As the VTA express buses move from the Fremont BART Station to the Warm Springs Station, there would be a corresponding change in the transit transfers. Any loss in transfers at the Fremont BART Station would be more than accounted for at the Warm Springs Station.

Travel Times

This section consists of sets of travel time comparisons between selected residential locations (northwest Milpitas, Irvington, Fremont, Union City, and Hayward) and selected Bay Area employment centers (Downtown San Francisco; Downtown San Jose, 1st Street and the Diridon Caltrain Depot; Lockheed Martin Corporation facilities in Sunnyvale; and the Pacific Commons development in Fremont).

The locations have been selected to be representative examples. The small set of times is not intended to characterize all travel patterns changed by the Proposed Project. Transit riders' destinations in the Fremont-Warm Springs area are very diffuse, with no single area dominating. Transit ridership from MTC Super District 16 (Fremont-Union City and Newark) to other parts of the Bay Area is projected to be roughly similarly split among San Francisco, the South Bay (including San Mateo County), and the rest of the East Bay. Therefore, the list of travel time comparisons is intended to capture the essence of area-wide changes associated with the BART extension alternatives.

In some cases, transit is competitive with highway times in all alternatives (for example, northwest Milpitas to downtown San Francisco). In other cases, transit travel times improve substantially for one or more of the build alternatives (for example, Irvington to NUMMI). However, there is also one case (Milpitas to Pacific Commons) where transit is not competitive with auto travel, even with improved transit times, due to the need to transfer and the absence of traffic congestion for this specific origin–destination pair.

Table 11-11 provides a comparison of a.m. peak hour travel time (in minutes) between the 2025 No Project and the Proposed Project conditions. Auto travel times would remain roughly constant among the various alternatives analyzed due to the peak spreading function built into the VTA-modified MTC model. When demand during the peak hour exceeds capacity, the excess vehicles are shifted to either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading but would not affect auto travel times during the peak hour.

Table 11-11
AM Peak Hour Travel Times – 2025 Proposed Project

			Transit	
Sample Trip (Origin-Destination)	**Drive Alone**	**Carpool**	**2025 No Project**	**2025 Proposed Project**
Northwest Milpitas-Northwest Downtown San Francisco	110	85	71	71
Northwest Milpitas-Northwest Pacific Commons	20	26	86	66
Irvington-Nummi	11	18	40	25
Irvington-Downtown San Jose	40	47	82	72
Fremont-Lockheed	52	49	98	67
Fremont-Pacific Commons	14	21	45	45
Union City-Diridon Caltrain Depot	60	60	69	69
Union City-Downtown San Jose	58	58	79	82
Hayward-Lockheed	72	60	75	80

Notes:
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center.
Union City location is approximately the Dyer/Alvarado-Niles Boulevard intersection (west of I-880).
Fremont location is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates, 2002 from VTA-modified MTC model

In a few select cases transit travel times increase under the Proposed Project compares to the No Project. An example of this difference is the trip from Union City to Downtown San Jose. Under No Project Alternative, the traveler uses relatively infrequent Capitol Corridor service to travel to the Diridon Station in San Jose and the transfer to bus. Under the Proposed Project, the traveler uses more frequent BART service to travel to Warm Springs and transfer to bus for the trip to Downtown San Jose.

An example of the difference between actual and perceived time is evident in the Union City to downtown San Jose trip. Under the No-Project scenario, the rider would drive to the Union City Capitol Amtrak Station and ride Amtrak to the San Jose-Diridon Station. The rider would then need to transfer to a connecting bus to reach their downtown destination. Under the Proposed Project scenario, the rider would drive to the South Hayward BART Station[1] and ride to Warm Springs. The rider would then transfer to the VTA Route 180 bus to get to downtown San Jose. The key element for this trip is that BART would operate much more frequently than the Capitol Corridor trains. Even though the total trip takes more time, the Proposed Project would allow the rider get on a train sooner, thus alleviating the need to wait a comparatively longer time for the Capitol Corridor train to arrive.

It should be noted that BART park-and-ride lots are reserved for BART patrons only. This helps explain some of the travel time differences between alternatives. For example, travel times from Irvington to downtown San Jose decrease substantially when the optional Irvington BART Station is added. Under the Proposed Project, Irvington riders would drive to Fremont and ride one station to Warm Springs before transferring to the VTA Route 180. The optional Irvington Station would substantially increase convenience for these riders as they would have a shorter park-and-ride access time, and a shorter BART ride to Warm Springs.

The other viable option would be to ride a local bus from Irvington to Warm Springs to access the VTA 180 to downtown San Jose (the path chosen in the No-Project Alternative). However, overall travel times indicate that it would be shorter to "backtrack" to Fremont BART than to use the local bus option. BART is much faster than local bus routes and operates much more frequently. In addition, the actual drive access time to the Fremont BART station is nearly equal to the actual walk time to the local bus stop.

Finally, the travel time calculations do not factor in trip reliability. Highway travel times, for example, can vary greatly depending on weather, special events, accidents, and traffic volumes. Rail systems with exclusive rights-of-way can enhance transit reliability, although severe disruptions can occur. Ridership models typically do not capture how day-to-day trip time reliability affects mode choice. Load Factors

Table 11-12 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Fremont BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The

[1] Due to the specific starting location of the trip in northern Union City and the crowded parking facilities at the Union City BART Station, the travel path went through the South Hayward BART Station.

average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 11-12
Load Factors – 2025 Proposed Project

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Warm Springs	Fremont	3782	3202	567	480	5	5	0.180	0.152
Fremont	Union City	7159	3359	1074	504	6	6	0.284	0.133
Union City	South Hayward	11058	3245	1659	487	6	6	0.439	0.129
South Hayward	Hayward	13376	3176	2006	476	6	6	0.531	0.126
Hayward	Bay Fair	16394	3531	2459	530	6	6	0.651	0.140
Richmond Lines									
Warm Springs	Fremont	1831	3858	275	579	5	5	0.087	0.184
Fremont	Union City	2403	3849	360	577	5	5	0.257	0.412
Union City	South Hayward	3297	3721	495	558	5	5	0.354	0.399
South Hayward	Hayward	3865	3646	580	547	5	5	0.414	0.391
Hayward	Bay Fair	4830	4013	725	602	5	5	0.518	0.430
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	14453	2797	2168	420	5	5	0.688	0.133
West Dublin	Castro Valley	17993	3096	2699	464	5	5	0.857	0.147
Castro Valley	Bay Fair	21263	3195	3189	479	5	5	1.012	0.152

Notes:
NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates from VTA modified MTC model, 2002

Load factors during the 2025 Proposed Project Condition would be relatively low, with most lines showing an availability of seats, with only the segment between the Castro Valley station and the Bay Fair station having more riders than seats. As the train progresses northwards, (or westwards), more riders would board and the load factors would increase.

11.2.6. Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06(from existing occupancy surveys conducted at the Fremont BART Station, *BART Station Access Improvements Study*).

Table 11-13 shows the estimated parking demand along with the number of parking spaces currently proposed. These demand figures include the demand generated by other transit services, such as bus vehicles.

Table 11-13
Parking Supply and Demand – 2025 Proposed Project

	Fremont Station		Warm Springs Station	
	Supply	**Demand**	**Supply**	**Demand**
2025	1,880	2,310	2,040	2,170

Notes:
Parking supply based on presentation to the BART Warm Springs Extension Project Development Team Meeting, October 22, 2002. As stations are designed, actual parking supply could change.
Parking Demand based on VTA modified MTC model.
Source: DKS Associates, 2002

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12. 2025 PROPOSED PROJECT WITH OPTIONAL IRVINGTON STATION

12.1. DESCRIPTION

As with the previous scenario, the proposed Warm Springs extension is assumed to be built. The conditions reflect the operating conditions for 2025 with the optional Irvington Station included in the analysis.

12.2. IMPACTS

12.2.1. Trip Generation

Under this scenario 4,390 daily vehicle trips would be generated at the Warm Springs BART Station, including 730 A.M. peak hour trips (620 inbound, 110 outbound) and 730 P.M. peak hour trips (110 inbound, 620 outbound). In addition, 2,990 daily trips would be generated at the Irvington Station, including 490 A.M peak hour trips (420 inbound, 70 outbound) and 490 P.M. peak hour trips (70 inbound, 420 outbound).

The 2025 Proposed Project with the Optional Irvington Station would result in 4,314 daily trips at the Fremont Station. This includes 810 AM peak hour trips (700 inbound, 110 outbound) and 810 PM peak hour trips (110 inbound, 700 outbound)

Trip generation estimates for the proposed project were based on the intersection turning movements and the Santa Clara Valley Transportation Authority modified MTC model, as summarized in Table 12-1.

Table 12-1
Trip Generation – 2025 Proposed Project with Optional Irvington Station

Station	Daily	AM		PM	
		In	Out	In	Out
Fremont	4310	700	110	110	700
Irvington	2990	420	70	70	420
Warm Springs	4390	620	110	110	620

Source: DKS Associates, 2002

12.2.2. Trip Distribution

Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B.

12.2.3. Intersection Analysis

The 2025 Proposed Project with Optional Irvington Station condition analysis is based on a projection of vehicle trips in the VTA Modified MTC Model. A discussion of the model parameters and adjustments is provided in Chapter 3.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, the intersection LOS was evaluated at 18 study intersections. Because construction of the optional Irvington Station would redistribute trips that would have gone to either the Fremont or Warm Springs Station, all of the study intersections were evaluated under both with and without the optional Irvington Station scenarios. Figure 12-1 illustrates the turning movements for each study intersection under the 2025 Proposed Project.

The intersections and their corresponding levels of service are presented in Table 12-2 for the 2025 No Project and the 2025 Proposed Project with optional Irvington Station scenario.

Table 12-2
Intersection LOS, 2025 No Project and Proposed Project with Optional Irvington Station

		2025 No Project Condition				2025 Proposed Project with optional Irvington Station			
		a.m. Peak Hour		**p.m. Peak Hour**		**a.m. Peak Hour**		**p.m. Peak Hour**	
#	**Intersection**	**LOS[a]**	**v/c[b]**	**LOS**	**v/c**	**LOS[a]**	**v/c[b]**	**LOS**	**v/c**
1	Osgood Road/Durham Road/Auto Mall Parkway	E	1.00	F	1.06	F	1.02	F	1.09
2	I-680 SB Ramps/Durham Road/Auto Mall Parkway	E	0.98	D	0.90	E	0.97	E	0.91
3	I-680 NB Ramps/Durham Road/Auto Mall Parkway	B	0.61	A	0.42	B	0.64	A	0.44
4	Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard	F	1.14	F	1.31	F	1.25	F	1.42
5	Fremont Boulevard/South Grimmer Boulevard	F	1.07	D	0.84	E	0.99	C	0.71
6	Fremont Boulevard/I-880 NB Ramps	D	0.83	A	0.42	D	0.82	A	0.45
7	Fremont Boulevard/I-880 SB On-ramp/Cushing Parkway	D	0.87	A	0.49	D	0.89	A	0.54
8	Fremont Boulevard/I-880 SB Off-ramp	D	0.86	A	0.51	D	0.85	A	0.55
9	Warm Springs Boulevard/Mission Boulevard	F	1.42	F	1.09	F	1.20	F	1.17
10	Mohave Drive/Mission Boulevard	B	0.66	D	0.81	C	0.73	D	0.86
11	Warm Springs Boulevard/Northern Warm Springs Station Entrance					C	0.73	C	0.77
12	Warm Springs Boulevard/Southern Warm Springs Station Entrance					C	0.76	C	0.77
13	I-680 NB Ramps/Washington Boulevard	A	0.58	D	0.81	B	0.69	C	0.76
14	I-680 SB Ramps/Washington Boulevard	C	0.71	D	0.86	B	0.66	B	0.62
15	Osgood Road/Washington Boulevard	D	0.89	D	0.85	D	0.86	C	0.78
16	Fremont Boulevard/Washington Boulevard/Bay St	E	0.98	F	1.13	E	0.92	F	1.13
17	Osgood Road/Blacow Road	C	0.77	A	0.46	C	0.73	A	0.49
18	Osgood Road/Irvington Station Entrance					A	0.52	B	0.68

[a] LOS = level of service.

[b] v/c = volume-to-capacity ratio.

Source: DKS Associates 2002

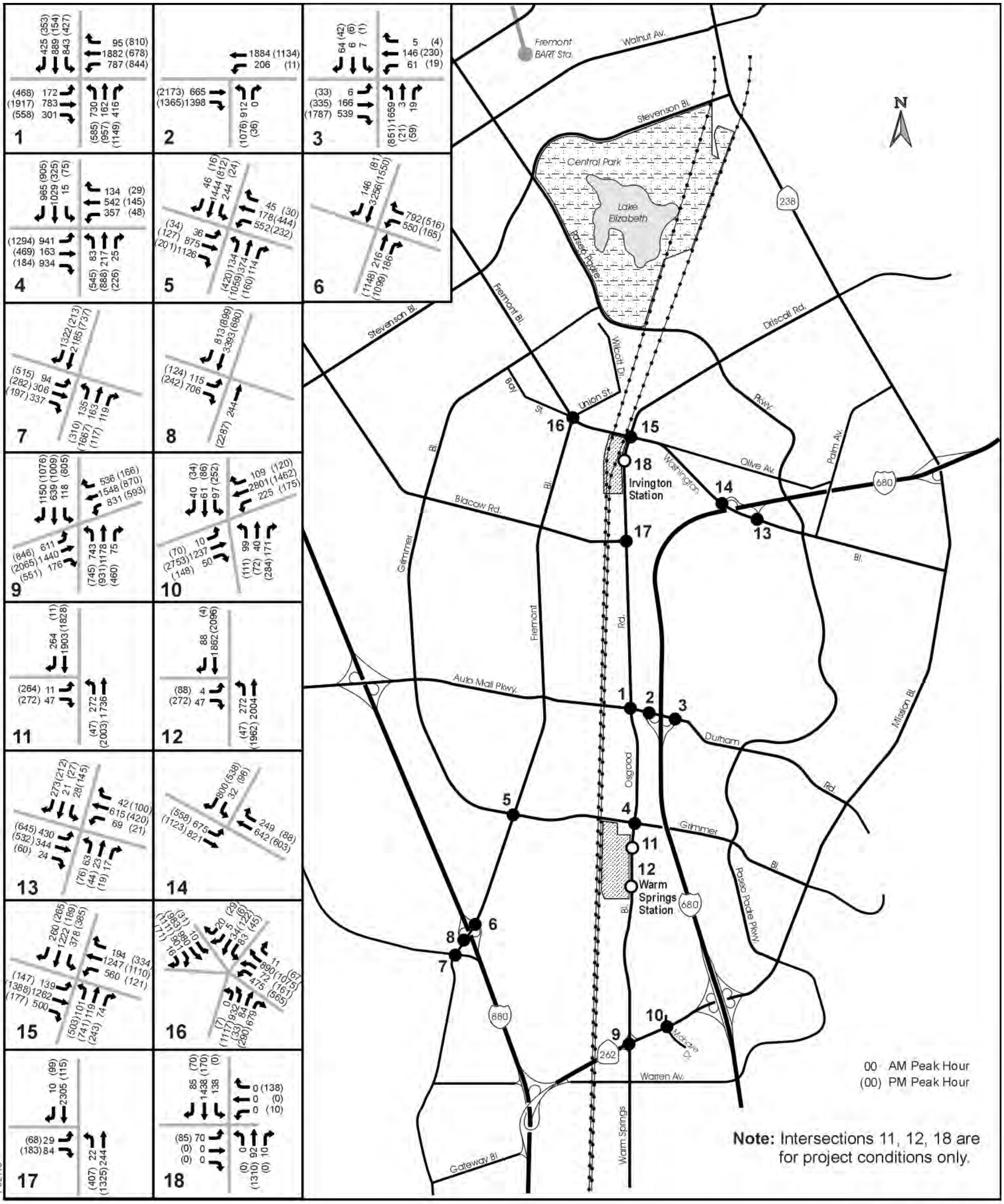

Figure 12-1
2025 PROPOSED PROJECT WITH OPTIONAL IRVINGTON STATION
PEAK HOUR TURNING MOVEMENTS

***DKS** Associates*

12.2.4. Metropolitan Transportation System Roadways

The Alameda County Congestion Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Some roadway segments are expected to exhibit decreases in traffic volumes as a result of project conditions, while other segments are expected to exhibit increases. For informational purposes only, the number of roadway segments that would operate at LOS E or F are identified in Table12-3. As discussed above, an impact on a roadway segment is considered significant if project trips cause that segment to deteriorate to LOS F, unless LOS F was measured when the County Congestion Management Plan was established in 1991. In addition, for informational purposes, Table12-3 identifies the quantity of roadway segments that would experience small volume changes (2% to 4%) or large volume changes (5% or more).

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.

- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.
- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.
- Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions and provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 MTS roadway segments. Table12-3 indicates the quantity of segments that would have volume changes of plus or minus 2%, and plus or minus 5%, as well as changes in the LOS.

Table12-3
MTS Roadway Analysis Summary, 2025 Proposed Project with Optional Irvington Station

Scenario	-5% or greater	-2% to -4%	+2 to +4%	+5% or greater	LOS Improvements		LOS Degradation	
					State Highway	Local Roadway	State Highway	Local Roadway
2025 No Project	31 state highway segments operating at LOS E or F							
2025 Proposed Project with Optional Irvington Station[A]	40	38	7	12	4	5	4	2
[A] Compared to 2025 No Project								
Source: DKS Associates 2002								

Compared to the 2025 No Project, the 2025 Proposed Project with optional Irvington Station would result in the following changes during the p.m. peak hour.

- Four of the MTS state highway segments would show deterioration in the LOS.
- Two of the MTS local roadway segments would show deterioration in the LOS.
- Four of the MTS state highway segments would experience an increase in LOS.
- Five of the MTS local roadway segments would experience an increase in LOS.

The other 139 MTS roadway segments would continue to operate with similar LOS.

Appendix C includes the detailed MTS roadway analysis sheets for the year 2025 Proposed Project with Optional Irvington Station.

12.2.5. Transit

Transit Facilities

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be two new BART stations built in the City of Fremont: Irvington and Warm Springs.
- There would be two pairs of daily BART lines in each direction serving the existing Fremont Station. Combined, they would provide a 6.0 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 12 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport. Under the Proposed Project these lines would be extended south to the proposed Warm Springs Station with stopping at the optional Irvington Station.
- All BART lines would experience an improvement in headways from 15 minutes to 12 minutes. These increased headways throughout the existing BART network would be made possible through the implementation of Advanced Automatic Train Control (AATC).
- A third pair of BART lines would operate during the AM and PM peak periods only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would operate from Santa Clara County to the Warm Springs Station via I-680, Mission Boulevard and Warm Springs Boulevard. This includes Routes 140, 180, and 520. Route 140 would operate during the peak periods on a 15 minute headway. Route 180 would operate all day, with 15 minute headways, and route 520 would operate during the AM and PM peak periods with a 20 minute headway.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new ACE / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- Increased headways on BART would be made possible through the implementation of Advanced Automatic Train Control (AATC).

- The BART extension to Millbrae would be open and operational with 12-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.
- The West Dublin BART station would be operational and have a service headway of 15 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- The CalTrain Baby Bullet service would operate along the Peninsula with 60 minute headways.

Station Entries and Exits

Table 12-4 list the daily station entries and exits and the system boardings for both the existing and proposed stations in southern Alameda County for the 2025 conditions. This table provides a comparison between the Proposed Project and the No-Project conditions. As expected, there are fewer entries and exits at the Fremont BART Station because it would no longer be the terminus.

Table 12-4
Station Entries and Exits – 2025 Proposed Project with Optional Irvington Station

Station	No Project	Proposed Project with Optional Irvington Station
Southern Alameda County Existing Stations		
Union City	11,400	12,500
Fremont	17,100	10,500
Southern Alameda County Existing Stations Subtotal	**28,500**	**23,000**
Proposed Project Stations		
Irvington	—	6,200
Warm Springs	—	15,700
Proposed Project Stations Subtotal	**—**	**21,900**
Southern Alameda County Proposed and Existing Stations Subtotal	**28,500**	**44,900**
BART Systemwide Total Entries and Exits	972,800	994,400
BART Systemwide Total Boardings	486,400	497,200

Notes:
Station-level and subtotal values are for station entries and exits (i.e. total persons entering and leaving station areas). Total systemwide boardings was calculated by dividing entries and exits by two.

Southern Alameda County stations are the existing Union City and Fremont Stations plus the proposed Warm Springs and optional Irvington Stations.

All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

In summary, the following observations can be made from the two previous tables.

- The total number of entries and exits would increase at the Union City BART Station when any scenario is compared to the No-Project condition.
- At the Fremont BART Station under all 2025 conditions, station entries and exits would decrease when compared to the 2025 No-Project condition. Entries and exits would decrease by 5,500 under the Proposed Project with optional Irvington Station condition.
- In 2025, there would be 16,300 entries and exits at the Warm Springs Station and a further 5,600 increase for the Proposed Project with implementation of the optional Irvington Station.
- Similar to the 2010 conditions, there would be increases in the entries and exits when all the southern Alameda County stations are combined under the 2025 conditions.

There would be an increase of 16,400 under the Proposed Project with optional Irvington Station condition.

- In 2025, under the Proposed Project and the Proposed Project with optional Irvington Station conditions, there would be a 14,200 and a 20,400 increase in the systemwide entries and exits.

Table 12-4 indicates the entries and exits at selected stations for 2025 Proposed Project with optional Irvington Station. Another important ridership result can be gained through simple division and subtraction. The number of new trips on BART can be estimated by dividing the BART systemwide total entries and exits in half. This step is necessary to convert the entries and exits into and out of the system into the number of trips; otherwise each trip would be counted twice. Subtracting the number of trips under the No Project from the trips under the Proposed Project with optional Irvington Station yields the number of new trips on BART resulting from the Proposed Project with optional Irvington Station. For example, in 2025 the number of trips under the No Project would be 486,400 trips and the number under the Proposed Project with optional Irvington Station would be 497,200 trips. The number of new BART trips under the Proposed Project would be 10,800 trips.

Ridership

The ridership by segment for heavy rail is listed in Table 12-5 for 2025 Proposed Project with optional Irvington Station. This table provides the bidirectional ridership (rounded to the nearest hundred) between stations in the BART network. This table also provides the ridership at the county line for the ACE trains and the Capitol Corridor trains.

Table 12-5
Rail Ridership – 2025 Warm Springs Project

Station A	Station B	Mode	2025 No Project	2025 Proposed Project with Optional Irvington Station
Union City	Fremont	BART	18,100	23,400
Fremont	Irvington	BART	N/A	18,200
Irvington	Warm Springs	BART	N/A	15,900
Alameda County / Santa Clara County Line (approx.)		Ace	11,700	10,900
Alameda County / Santa Clara County Line (approx.)		Capitol Corridor	2,800	2,100

Source: DKS Associates 2002 from the VTA modified MTC model

Table 12-6 lists the projected ridership for the VTA express buses and AC Transit service. The total bi-directional ridership levels are provided at the following locations:

- Paseo Padre between Fremont BART station and the Irvington Station location (AC Transit)
- Warm Springs Boulevard / Osgood Road between the Irvington Station location and the Warm Springs Station location (AC Transit)
- Warm Springs Boulevard between South Grimmer Boulevard and Mission Boulevard (AC Transit)
- Warm Springs Boulevard between Mission Boulevard and Kato Road (AC Transit)
- Warm Springs Boulevard south of Kato Road (at the Alameda County / Santa Clara County line) (AC Transit)
- I-680 south of Mission Boulevard (VTA)

AC Transit would provide local service in the area, while VTA would provide express services. For this reason, the VTA routes are shown on a route by route basis.

This table also makes a comparison back to the 2025 No Project condition. There would be more than a 100 percent increase in the ridership levels for most of the express buses over the 2025 No Project Condition. This table indicates that some of the ridership that the project would gain would come from the local AC Transit services. This is shown by the reduction in ridership along the Warm Springs Boulevard / Osgood Road and Paseo Padre Parkway. There would also be increases in the ridership levels on the VTA express buses, with the daily VTA Route 180 service increasing its ridership levels by more than 135 percent. The VTA Routes 140, 520 and 500 which would only operate in the peak periods, would increase ridership levels by more than 1200 percent, 600 percent and 50 percent respectively.

Table 12-6
Bus ridership – 2025 Proposed Project with Optional Irvington Station

Operator	Route	Road	2025 No Project	2025 Proposed Project with Optional Irvington Station
AC Transit		Paseo Padre between Fremont BART Stn and Irvington Stn	1200	400
AC Transit		Osgood Road between Warm Springs Stn and Irvington Stn	200	100
AC Transit		Warm Springs Boulevard between Grimmer Boulevard and Mission Blvd	400	500
AC Transit		Fremont Boulevard between Auto Mall Parkway and Blacow Rd	300	200
AC Transit		Warm Springs Boulevard between Mission Boulevard and Kato Rd	1200	1200
AC Transit		Warm Springs sth of Kato	1300	1300
VTA	140	I-680 south of Mission Blvd	100	1200
VTA	180	I-680 south of Mission Blvd	1600	3800
VTA	520	I-680 south of Mission Blvd	300	1800
VTA	500	I-680 south of Mission Blvd	1400	2100

Source: DKS Associates 2002 from the VTA modified MTC model

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A linked trip consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring onto BART at a BART station and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but is not considered a linked transit trip.

Table 12-7 lists the number of projected linked transit trips (rounded to the nearest hundred) from areas that would logically use the service for both the 2025 No Project Condition and the 2025 Proposed Project with Optional Irvington Station. This table show the linked transit trips for four broad areas within the network: those people that stay within the Fremont/Newark/Union City area; those people traveling to Union City, Newark and Fremont; those people traveling from Newark, Fremont and Union City to other areas; and those people that travel through the Fremont/Newark/Union City area. Those people that travel through the area would include patrons traveling between the East Bay and Santa Clara County.

There would be approximately 9,000 (an increase of 16 percent) new transit riders when the Proposed Project with Optional Irvington Station is built. This table shows that the largest increases in the area is linked transit trips to the Southern Alameda County (an increase of 28 percent over the 2025 No Project Condition.

Table 12-7
Linked Transit Trips – 2025 Proposed Project with Optional Irvington Station

Trips:	2025 No Project	2025 Proposed Project with Optional Irvington Station	Percent Change
Intra	11,100	12,300	10.8%
To	8,600	11,000	27.9%
From	25,300	29,100	15.0%
Through	11,800	13,400	13.6%
Total WSX Corridor Transit Trips	**56,800**	**65,800**	15.8%
Change from No-Build		**9,000**	
Intra Santa Clara County Transit Trips	243,000	246,800	1.6%

Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (e.g., Hayward to San Jose).
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value.

Source: DKS Associates 2002 from the VTA modified MTC model

In 2025, with implementation of the Proposed Project with optional Irvington Station, there would be an increase of 16% new transit riders when compared to the 2025 No-Project condition. The linked transit trips to the Fremont/Newark/Union City area would experience an increase of 28% over the 2025 No-Project condition.

Mode of Access/Egress

A mode of access analysis provides the potential demands for parking, kiss-and-ride, walk access, and the need for transit provision at each of the stations. Table 12-8 list the combined entries and exits by mode of access/egress for the 2025 No Project Condition and the 2025 Proposed Project with Optional Irvington Station, respectively. These figures have been rounded to the nearest hundred.

Table 12-8
Mode of Access/Egress – 2025 No Project and 2025 Proposed Project with Optional Irvington Station

	Mode of Access				
Station	**PNR**	**KNR**	**Walk/Bike**	**Transit XFER**	**Total Entries and Exits**
2025 No Project					
Union City	3,600	2,100	900	4,700	11,400
Fremont	5,100	2,600	1,800	7,500	17,100
Irvington	0	0	0	0	0
Warm Springs	0	0	0	0	0
Southern Alameda total	8,700	4,700	2,700	12,200	28,500
2025 Proposed Project with Optional Irvington Station					
Union City	4,600	2,000	1,000	5,000	12,500
Fremont	4,100	800	2,600	2,900	10,500
Irvington	2,500	500	1,600	1,700	6,200
Warm Springs	3,600	800	2,500	8,900	15,700
Southern Alameda total	14,800	4,100	7,700	18,500	44,900

Notes:
PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

The previous tables can be summarized as follows.

- More parking would be built in the southern Alameda County area, and kiss-and-ride volumes would decline. The loss in the existing transfers at the Fremont Station would be accounted for at Warm Springs. There would be more people walking to the optional Irvington Station than to the proposed Warm Springs Station.

Travel Times

This section consists of sets of travel time comparisons between selected residential locations (northwest Milpitas, Irvington, Fremont, Union City, and Hayward) and selected Bay Area employment centers (Downtown San Francisco; Downtown San Jose, 1st Street and the Diridon Caltrain Depot; Lockheed Martin Corporation facilities in Sunnyvale; and the Pacific Commons development in Fremont).

The locations have been selected to be representative examples. The small set of times is not intended to characterize all travel patterns changed by the Proposed Project. Transit riders' destinations in the Fremont-Warm Springs area are very diffuse, with no single area dominating. Transit ridership from MTC Super District 16 (Fremont-Union City and Newark) to other parts of the Bay Area is projected to be roughly similarly split among San Francisco, the South Bay (including San Mateo County), and the rest of the East Bay. Therefore, the list of travel time comparisons is intended to capture the essence of area-wide changes associated with the BART extension alternatives.

In some cases, transit is competitive with highway times in all alternatives (for example, northwest Milpitas to downtown San Francisco). In other cases, transit travel times improve substantially for one or more of the build alternatives (for example, Irvington to NUMMI). However, there is also one case (Milpitas to Pacific Commons) where transit is not competitive with auto travel, even with improved transit times, due to the need to transfer and the absence of traffic congestion for this specific origin–destination pair. Table 12-9 provides a comparison of a.m. peak hour travel time (in minutes) between the 2025 No Project and the Proposed Project with optional Irvington Station conditions. Auto travel times would remain roughly constant among the various alternatives analyzed due to the peak spreading function built into the VTA-modified MTC model. When demand during the peak hour exceeds capacity, the excess vehicles are shifted to either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading but would not affect auto travel times during the peak hour.

Table 12-9
AM Peak Hour Travel Times – 2025 Proposed Project with Optional Irvington Station

			Transit	
Sample Trip (Origin-Destination)	**Drive Alone**	**Carpool**	**2025 No Project**	**2025 Proposed Project with Optional Irvington Station**
Northwest Milpitas-Northwest Downtown San Francisco	110	85	71	72
Northwest Milpitas-Northwest Pacific Commons	20	26	86	67
Irvington-Nummi	11	18	40	18
Irvington-Downtown San Jose	40	47	82	65
Fremont-Lockheed	52	49	98	68
Fremont-Pacific Commons	14	21	45	45
Union City-Diridon Caltrain Depot	60	60	69	69
Union City-Downtown San Jose	58	58	79	83
Hayward-Lockheed	72	60	75	81

Notes:
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center.
Union City location is approximately the Dyer/Alvarado-Niles Boulevard intersection (west of I-880).
Fremont location is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates, 2002 from VTA-modified MTC model

In a few select cases transit travel times increase under the Proposed Project with optional Irvington Station compares to the No Project. An example of this difference is the trip from Union City to Downtown San Jose. Under No Project Alternative, the traveler uses relatively infrequent Capitol Corridor service to travel to the Diridon Station in San Jose and the transfer to bus. Under the Proposed Project with optional Irvington Station, the traveler uses more frequent BART service to travel to Warm Springs and transfer to bus for the trip to Downtown San Jose.

An example of the difference between actual and perceived time is evident in the Union City to downtown San Jose trip. Under the No-Project scenario, the rider would drive to the Union City Capitol Amtrak Station and ride Amtrak to the San Jose-Diridon Station. The rider would then need to transfer to a connecting bus to reach their downtown destination. Under the Proposed Project scenario, the rider would drive to the South Hayward BART Station[1] and ride to Warm Springs. The rider would then transfer to the VTA Route 180 bus to get to downtown San Jose. The key element for this trip is that BART would operate much more frequently than the Capitol Corridor trains. Even though the total trip takes more time, the Proposed Project would allow the rider get on a train sooner, thus alleviating the need to wait a comparatively longer time for the Capitol Corridor train to arrive.

The addition of the optional Irvington Station would add 1.0 minute of additional travel time on BART. This is seen in a number of the transit time comparisons such as Fremont to Lockheed and Union City to downtown San Jose.

It should be noted that BART park-and-ride lots are reserved for BART patrons only. This helps explain some of the travel time differences between alternatives. For example, travel times from Irvington to downtown San Jose decrease substantially when the optional Irvington BART Station is added. Under the Proposed Project, Irvington riders would drive to Fremont and ride one station to Warm Springs before transferring to the VTA Route 180. The optional Irvington Station would substantially increase convenience for these riders as they would have a shorter park-and-ride access time, and a shorter BART ride to Warm Springs.

The other viable option would be to ride a local bus from Irvington to Warm Springs to access the VTA 180 to downtown San Jose (the path chosen in the No-Project Alternative). However, overall travel times indicate that it would be shorter to "backtrack" to Fremont BART than to use the local bus option. BART is much faster than local bus routes and operates much more frequently. In addition, the actual drive access time to the Fremont BART station is nearly equal to the actual walk time to the local bus stop.

Finally, the travel time calculations do not factor in trip reliability. Highway travel times, for example, can vary greatly depending on weather, special events, accidents, and traffic volumes. Rail systems with exclusive rights-of-way can enhance transit reliability, although severe disruptions can occur. Ridership models typically do not capture how day-to-day trip time reliability affects mode choice.

[1] Due to the specific starting location of the trip in northern Union City and the crowded parking facilities at the Union City BART Station, the travel path went through the South Hayward BART Station.

Load Factors

Table 12-10 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Fremont BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 12-10
Load Factors – 2025 Proposed Project with Optional Irvington Station

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Warm Springs	Irvington	1858	2826	279	424	5	5	0.089	0.135
Irvington	Fremont	3067	2669	460	400	5	5	0.146	0.127
Fremont	Union City	5263	2901	789	435	6	6	0.209	0.115
Union City	South Hayward	8780	2747	1317	412	6	6	0.348	0.109
South Hayward	Hayward	10709	2556	1606	383	6	6	0.425	0.101
Hayward	Bay Fair	13220	2812	1983	422	6	6	0.525	0.112
Richmond Lines									
Warm Springs	Irvington	969	3095	145	464	5	5	0.104	0.331
Irvington	Fremont	1248	2914	187	437	5	5	0.134	0.312
Fremont	Union City	1589	2928	238	439	5	5	0.170	0.314
Union City	South Hayward	2354	2692	353	404	5	5	0.252	0.289
South Hayward	Hayward	2837	2498	426	375	5	5	0.304	0.268
Hayward	Bay Fair	3538	2703	531	405	5	5	0.379	0.289
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	9062	1991	1359	299	5	5	0.431	0.095
West Dublin	Castro Valley	11774	2130	1766	320	5	5	0.561	0.102
Castro Valley	Bay Fair	14239	2275	2136	341	5	5	0.678	0.108

Notes:
NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates 2002 from VTA modified MTC model

Load factors during the 2025 Proposed Project with Optional Irvington Station Condition would be relatively low, with all lines showing an availability of seats. As the train progresses northwards, (or westwards), more riders would board and the load factors would increase.

12.2.6. Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06 (from existing occupancy surveys conducted at the Fremont BART Station*, BART Station Access Improvements Study*).

Table 12-11 shows the estimated parking demand, along with the number of parking spaces currently proposed. These demand figures include the demand generated by other transit services, such as bus vehicles.

Table 12-11
Parking Supply and Demand – 2025 Proposed Project with Optional Irvington Station

	Fremont Station		Irvington Station		Warm Springs Station	
	Supply	**Demand**	**Supply**	**Demand**	**Supply**	**Demand**
2025	1,880	1,940	960	1,175	2,040	1,710

Note:
Parking supply based on presentation to the BART Warm Springs Extension Project Development Team Meeting, October 22, 2002. As stations are designed, actual parking supply could change.
Parking Demand based on VTA modified MTC model.

Source: DKS Associates, 2002

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13. 2025 PROPOSED BUS ALTERNATIVE

13.1. DESCRIPTION

This alternative would be the same as the 2010 Bus Alternative, except that the analysis reflects year 2025 conditions.

13.2. IMPACTS

13.2.1. Trip Generation

Under the 2025 Bus Alternative Scenario, 3,930 daily trips at the Warm Springs Station, including 660 A.M. peak hour trips (560 inbound, 100 outbound) and 650 P.M. peak hour trips (100 inbound, 560 outbound). In addition, 2,490 daily trips would be generated at the Irvington Station, including 410 A.M peak hour trips (350 inbound, 60 outbound) and 410 P.M. peak hour trips (60 inbound, 350 outbound).

The 2025 Proposed Bus Alternative would result in 4,170 daily trips at the Fremont Station. This includes 640 AM peak hour trips (550 inbound, 90 outbound) and 640 PM peak hour trips (90 inbound, 550 outbound).

Trip generation estimates for the proposed project were based on the intersection turning movements and the Santa Clara Valley Transportation Authority modified MTC model, as summarized in Table 13-1**.**

Table 13-1
Trip Generation 2025 Bus Alternative

Station	Daily	AM		PM	
		In	Out	In	Out
Fremont	4170	550	90	90	550
Irvington	2490	350	60	60	350
Warm Springs	3930	560	100	100	560

Source: DKS Associates, 2002

13.2.2. Trip Distribution

Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B.

13.2.3. Intersection Analysis

Intersection Level of Service (LOS) was evaluated at 18 study intersections. The intersection evaluation provides a basis for comparison of conditions before and after traffic associated with the proposed Bus Alternative is added to the street system. To provide a comparison of the proposed Bus Alternative to the Proposed Project, data for the 2010 Proposed Project with the optional Irvington Station is also provided. The proposed Bus Alternative intersection analysis is based on a projection of vehicle trips from the VTA modified MTC model. The model analyzed ten intersections in both 2010 and 2025, with the addition of two access intersections at the proposed Warm Springs Transit Center. The methodology and assumptions including the criteria for determining significance for the intersection analysis are discussed in Section 3.9 (*Transportation)*, and in Appendix O.

Turning movements in 2025 for each of the study intersections are shown in Figure 13-1. Table 13-2 provides the LOS analysis for both the a.m. and p.m. peak periods in the Warm Springs Transit Center area for the 2025 proposed Bus Alternative.

Table 13-2
Intersection LOS, 2025 Proposed Bus Alternative

#	Intersection	2025 No-Project Condition				2025 Proposed Project with Optional Irvington Station				2025 Proposed Bus Alternative			
		a.m. Peak Hour		**p.m. Peak Hour**		**a.m. Peak Hour**		**p.m. Peak Hour**		**a.m. Peak Hour**		**p.m. Peak Hour**	
		LOS[a]	**v/c[b]**	**LOS**	**v/c**	**LOS[a]**	**v/c[b]**	**LOS**	**v/c**	**LOS[a]**	**v/c[b]**	**LOS**	**v/c**
1	Osgood Road/Durham Road/Auto Mall Parkway	E	1.00	F	1.06	F	1.02	F	1.09	F	1.05	F	1.10
2	I-680 SB Ramps/Durham Road/Auto Mall Parkway	E	0.98	D	0.90	E	0.97	E	0.91	D	0.89	E	0.91
3	I-680 NB Ramps/Durham Road/Auto Mall Parkway	B	0.61	A	0.42	B	0.64	A	0.44	B	0.64	A	0.43
4	Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard	F	1.14	F	1.31	F	1.25	F	1.37	F	1.26	F	1.50
5	Fremont Boulevard/South Grimmer Boulevard	F	1.07	D	0.84	E	0.95	C	0.71	E	0.94	D	0.86
6	Fremont Boulevard/I-880 NB Ramps	D	0.83	A	0.42	D	0.82	A	0.45	D	0.81	A	0.41
7	Fremont Boulevard/I-880 SB On-ramp/Cushing Parkway	D	0.87	A	0.49	D	0.89	A	0.54	D	0.87	A	0.51
8	Fremont Boulevard/I-880 SB Off-ramp	D	0.86	A	0.51	D	0.85	A	0.55	D	0.88	A	0.53
9	Warm Springs Boulevard/Mission Boulevard	F	1.42	F	1.09	F	1.20	F	1.17	F	1.18	F	1.20
10	Mohave Drive/Mission Boulevard	B	0.66	D	0.81	C	0.73	D	0.86	C	0.72	D	0.86
11	Warm Springs Boulevard/Northern Warm Springs Station Entrance					E	0.95	F	1.07	C	0.71	B	0.69
12	Warm Springs Boulevard/Southern Warm Springs Station Entrance					C	0.74	C	0.76	B	0.70	C	0.71
13	I-680 NB Ramps/Washington Boulevard	A	0.58	D	0.81	B	0.61	C	0.78	B	0.67	D	0.87
14	I-680 SB Ramps/Washington Boulevard	C	0.71	D	0.86	B	0.69	B	0.63	C	0.72	B	0.69
15	Osgood Road/Washington Boulevard	D	0.89	D	0.85	E	0.92	C	0.76	D	0.86	D	0.88
16	Fremont Boulevard/Washington Boulevard/Bay St	E	0.98	F	1.13	E	0.96	F	1.13	D	0.90	F	1.14
17	Osgood Road/Blacow Road	C	0.77	A	0.46	C	0.73	A	0.49	C	0.72	A	0.54
18	Osgood Road/Irvington Station Entrance					A	0.52	B	0.68	A	0.47	A	0.64

[a] LOS = level of service.
[b] v/c = volume-to-capacity ratio.

Source: DKS Associates 2002

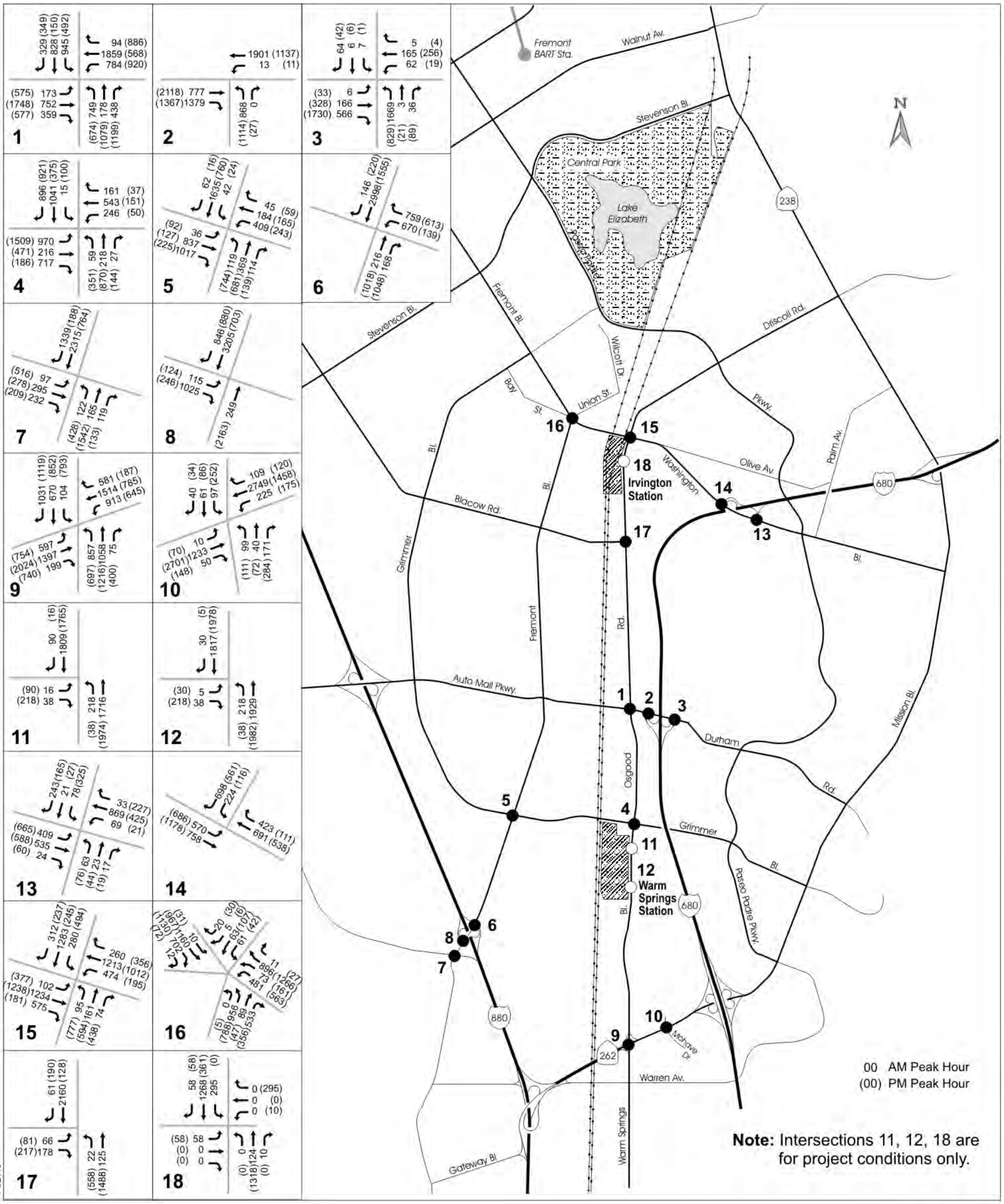

Figure 13-1
2025 PROPOSED BUS ALTERNATIVE PEAK HOUR TURNING MOVEMENTS

***DKS** Associates*

13.2.4. Metropolitan Transportation System Roadways

The Alameda County Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Some roadway segments are expected to exhibit decreases in traffic volumes as a result of project conditions, while other segments are expected to exhibit increases. For informational purposes only, the number of roadway segments that would operate at LOS E or F are identified in Table 13 - 3. As discussed above, an impact on a roadway segment is considered significant if project trips cause that segment to deteriorate to LOS F, unless LOS F was measured when the County Congestion Management Plan was established in 1991. In addition, for informational purposes, Table 13 - 3 identifies the quantity of roadway segments that would experience small volume changes (2% to 4%) or large volume changes (5% or more).

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.
- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.

- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.
- Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 Metropolitan Transportation System (MTS) roadway segments. Table 13 - 3 indicates the number of segments that would have volume changes of plus or minus 2% and plus or minus 5%, as well as changes LOS.

Table 13 - 3
MTS Roadway Analysis Summary, 2025 Proposed Bus Alternative

Scenario	-5% or greater	-2% to -4%	+2 to +4%	+5% or greater	LOS Improvements		LOS Degradation	
					State Highway	Local Roadway	State Highway	Local Roadway
2025 No Project	31 state highway segments operating at LOS E or F							
2025 Proposed Bus Alternative[a]	34	21	10	27	6	2	0	6
2025 Proposed Bus Alternative[b]	20	18	20	33	4	3	5	8

Notes:
[a] Compared to 2025 No Project
[b] Compared to 2025 Proposed Project
Source: DKS Associates

Compared to the 2025 No Project, the 2025 Proposed Bus Alternative would result in the following changes during the p.m. peak hour.

- Six of the MTS state highway segments would show deterioration in the LOS;
- Two of the MTS local roadway segments would show deterioration in the LOS; and
- Six of the MTS local roadway segments would experience an increase in LOS.

The remaining 140 MTS roadway segments would continue to operate with similar service levels (LOS).

Compared to the 2025 Proposed Project, the 2025 Proposed Bus Alternative would result in the following changes during the p.m. peak hour.

- Four of the MTS state highway segments would show deterioration in the LOS;
- Three of the MTS local roadway segments would show deterioration in the LOS;
- Five of the MTS state highway segments would experience an increase in LOS; and
- Eight of the MTS local roadway segments would experience an increase in LOS.

The remaining 146 MTS roadway segments would continue to operate with similar service levels (LOS).

Appendix C includes the detailed MTS roadway analysis sheets for the year 2025 Proposed Bus Alternative Scenario compared to the 2025 No Project Scenario.

13.2.5. Transit

Transit Facilities

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be two new transit centers built in the City of Fremont at Irvington and Warm Springs.
- There would be two pairs of daily BART lines in each direction serving the existing Fremont Station. Combined, they would provide a 6.0 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 12 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport.
- A third pair of BART lines would operate during the AM and PM peak periods only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would operate from Santa Clara County to the Warm Springs Station via I-680, Mission Boulevard and Warm Springs Boulevard. This includes Routes 140, 180, and 520. Route 140 would operate during the peak periods on a 15 minute headway. Route 180 would operate all day, with 15 minute headways, and route 520 would operate during the AM and PM peak periods with a 20 minute headway.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new ACE / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- Increased headways on BART would be made possible through the implementation of Advanced Automatic Train Control (AATC).

- The BART extension to Millbrae would be open and operational with 12-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.
- The West Dublin BART station would be operational and have a service headway of 12 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- CalTrain would extend service to the Transbay Terminal.
- The CalTrain Baby Bullet express service would operate along the Peninsula with 60 minute headways with a limited stop service.
- ACE headways would be increased to 30 minute peak service inbound in the AM and outbound in the PM.
- Capitol Corridor service would be increased to 60 minute headways all day in both directions.

Station Entries and Exits

Table 13-4 lists the station entries and exits at the Fremont Station. There would be no BART boardings under the 2025 Proposed Bus Alternative except at the Fremont BART station. These station entries and exits are shown as a total for the day (rounded to the nearest ten), because the number of entries and exits are balanced in the daily model. System boardings are shown in this table (rounded to the nearest five) and are calculated by dividing the total entries and exits by two. This table provides a comparison between the 2025 No Project condition and the 2025 Proposed Bus Alternative. There would be fewer boardings at the Fremont Station when the proposed bus alternative is compared to either the 2025 No Project.

Table 13-4
Station Entries and Exits – 2025 Proposed Bus Alternative

	2025 No Project		2025 Proposed Bus Alternative	
Station	**Entries / Exits**	**System Boardings**	**Entries / Exits**	**System Boardings**
Union City	11,400	5,700	11,600	5,800
Fremont	17,100	8,550	17,900	8,950
Total Bay Area	972,800	486,400	975,200	487,600

Source: DKS Associates 2002 from the VTA modified MTC model

Ridership

Station to Station Matrices

Table 13-5 list the BART productions and attractions between stations for the 2025 No Project Condition. Table 13-6 lists the BART productions and attractions for the 2025 Proposed Bus Alternative. All tables are shown as daily numbers and are rounded to the nearest ten. Full station-to-station ridership tables are shown at the back of this appendix. In these tables, "Other Bay Area" refers to the other areas of the Bay Area that currently (or will in 2025) have BART service. This includes Alameda, San Francisco, San Mateo and Contra Costa Counties. Santa Clara and the North Bay are excluded from this analysis.

These tables show that many of the travelers from Fremont, Irvington, and Warm Springs area would travel to San Francisco and Oakland (63 percent in the 2025 No Project Condition and 62 percent in the 2025 Proposed Bus Alternative), even though there are very few travelers in the opposite direction.

Table 13-5
Station to Station BART Matrix – 2025 No Project

2025 NP	**Attractions**			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	6,980	4,100	11,080
San Francisco / Oakland	530	25,640	32,950	59,120
Other Bay Area	5,490	305,250	105,490	416,230
Totals	6,020	337,870	142,540	486,430

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Table 13-6
Station to Station BART Matrix – 2025 Proposed Bus Alternative

2025 NP	**Attractions**			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	7,120	4,320	11,440
San Francisco / Oakland	620	26,470	33,600	60,690
Other Bay Area	5,840	308,460	107,020	421,320
Totals	6,460	342,050	144,940	493,450

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

<u>Ridership</u>

Changes in regional travel patterns associated with the proposed Bus Alternative were estimated using the VTA-Modified MTC Model that was developed by MTC and VTA. Table 13-7 presents regional rail ridership levels in the area for the Proposed Project with optional Irvington Station compared with the projected ridership on the buses using the proposed busway in the year 2025. These two modes are shown on the same tables, as they are effectively serving the same patrons. Passengers who would use rail transit (BART, CalTrain, or ACE) are assumed to be making a regional commute. It is assumed that the proposed Bus Alternative would provide the capability for regional commutes via bus transit. While one of the bus routes (VTA Route 180) would continue to provide service into Santa Clara County, the segments shown in these tables are only those segments that are comparable to the Proposed Project with the optional Irvington Station.

Table 13-7
Projected Ridership – 2025 Proposed Bus Alternative Compared to Proposed Project with Optional Irvington Station

Station A	Station B	Mode	2025 No Project	2025 Proposed Project with optional Irvington Station	2025 Proposed Bus Alternative
Union City	Fremont	BART	17,400	23,400	18,100
Fremont	Irvington[a]	BART	N/A	18,200	10,200
Irvington	Warm Springs[b]	BART/BRT	N/A	15,900	7,700
Alameda County/Santa Clara County Line (approx.)		ACE	10,900	10,900	11,700
Alameda County/Santa Clara County Line (approx.)		Capitol Corridor	2,500	2,100	2,800

Notes:
[a] Ridership taken along Paseo Padre.
[b] Ridership taken between Warm Springs Transit station and Auto Mall Parkway.

Source: DKS Associates 2002

As shown in Table 13-7, the proposed Bus Alternative would generate fewer riders than the Proposed Project with optional Irvington Station.

As shown in Table 5-2, in year 2025, when the proposed Bus Alternative is operating, there would be more ridership on the Union City BART Station to the Fremont BART Station segment than in the 2025 No-Project condition. Compared to the 2025 Proposed Project with optional Irvington Station rail segments (between the Irvington and Fremont Stations, and the Warm Springs and Irvington Stations), there would be fewer riders on comparable busway segments. The 2025 proposed Bus Alternative would have fewer riders traveling between the Warm Springs and Irvington Stations and the Irvington and

Fremont Stations than the 2025 Proposed Project with optional Irvington Station. On the segment between the Fremont and Irvington Stations, the proposed Bus Alternative would only carry 56% of the ridership projected for the Proposed Project with optional Irvington Station. Between the Warm Springs and Irvington Stations, the proposed Bus Alternative would carry about 48% of the ridership projected for the Proposed Project with optional Irvington Station.

Some of the ridership that the proposed Bus Alternative would gain would come from the local AC Transit services providing service between the proposed Warm Springs Transit Center and the Fremont BART Station. There would be increases in the ridership levels on the VTA express buses, with the daily VTA Route 180 service increasing its ridership levels by 200% when the 2025 proposed Bus Alternative is compared to the Background (2025 No-Project) condition. The VTA Route 140 (peak hour service only) would experience a decrease in riders when comparing the 2025 proposed Bus Alternative to both the Background (2025 No-Project) condition and the 2025 Proposed Project with optional Irvington Station scenario. The VTA Route 520, which would only operate in the peak periods, would have a decrease in ridership, as would the VTA Route 500.

With the exception of the VTA Route 180, there would be lower ridership on all other VTA express buses when the 2025 proposed Bus Alternative is compared to both the 2025 No Project and the 2025 Proposed Project with optional Irvington Station. However, it appears that there would be large increases on the VTA Route 180.

There would also be increases in the ridership levels on the VTA express buses, with the daily VTA Route 180 service increasing its ridership levels by 240% when the 2025 proposed Bus Alternative is compared to the 2025 No-Project condition. The VTA Routes 140 and 520 (peak hour service only) would have the same number of riders when compared to the 2025 No-Project Alternative.

Table 13-8 lists the projected ridership for the VTA express buses and AC Transit service. The total bi-directional ridership levels are provided at the following locations:

- Paseo Padre between Fremont BART station and the Irvington Station location (AC Transit)
- Warm Springs Boulevard / Osgood Road between the Irvington Station location and the Warm Springs Station location (AC Transit)
- Warm Springs Boulevard between South Grimmer Boulevard and Mission Boulevard (AC Transit)
- Warm Springs Boulevard between Mission Boulevard and Kato Road (AC Transit)
- Warm Springs Boulevard south of Kato Road (at the Alameda County / Santa Clara County line) (AC Transit)
- I-680 south of Mission Boulevard (VTA)

AC Transit would provide local service in the area, while VTA would provide express services. For this reason, the VTA routes are shown on a route by route basis.

This table also makes a comparison back to the 2025 No Project condition. With the exception of the VTA Route 180, there would be a decrease in the ridership on all express buses when the 2025 Proposed Bus Alternative is compared to the 2025 No Project. However, it appears that there would be large increases on the VTA Route 180.

This table indicates that some of the ridership that the project would gain would come from the local AC Transit services. This is shown by the reduction in ridership along the Warm Springs Boulevard / Osgood Road and Paseo Padre Parkway. There would also be increases in the ridership levels on the VTA express buses, with the daily VTA Route 180 service increasing its ridership levels by 240 percent when the 2025 Proposed Bus Alternative is compared to the 2025 No Project. The VTA Routes 140 and 520 (peak hour service only) would have the same number of riders when compared to the 2025 No Project Alternative.

Table 13-8
Bus ridership – 2025 Proposed Bus Alternative

Operator	Route	Road	2025 No Project	2025 Proposed Bus Alternative
AC Transit		Paseo Padre between Fremont BART Stn and Irvington Stn	1200	1000*
AC Transit		Osgood Road between Warm Springs Stn and Irvington Stn	200	100
AC Transit		Warm Springs Boulevard between Grimmer Boulevard and Mission Boulevard	400	100
AC Transit		Fremont Boulevard between Auto Mall Parkway and Blacow Boulevard	300	200
AC Transit		Warm Springs Boulevard between Mission Boulevard and Kato Boulevard	1200	1600
AC Transit		Warm Springs sth of Kato	1300	1900
VTA	140	I-680 south of Mission Boulevard	100	100
VTA	180	I-680 south of Mission Boulevard	1600	5500
VTA	520	I-680 south of Mission Boulevard	300	300
VTA	500	I-680 south of Mission Boulevard	1400	100

Note:
* Local Buses Only

Source: DKS Associates 2002 from the VTA modified MTC model

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A “linked trip” consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART, and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring to BART at a BART station, and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but it is not considered a linked transit trip.

Table 13-9 lists the number of projected linked transit trips (rounded to the nearest hundred) from areas that would logically use the service in 2025. These tables show the linked transit trips for four broad areas within the network: people staying within the Fremont/Newark/Union City area; people traveling to Union City, Newark, and Fremont; people traveling from Newark, Fremont, and Union City to other areas; and people traveling through the Fremont/Newark/Union City area. People traveling through the area would include patrons from the East Bay who are traveling to Santa Clara County.

Table 13-9
Linked Transit Trips – 2025 Proposed Bus Alternative

	Mode of Access/Egress				
Station	**PNR**	**KNR**	**Walk/ Bike**	**Transit XFER**	**Total**
2025 No Project					
Fremont BART station	5,100	2,600	1,800	7,500	17,100
Irvington BART station	0	0	0	0	0
Warm Springs BART station	0	0	0	0	0
Southern Alameda total	5,100	2,600	1,800	7,500	17,100
2025 Proposed Project with Optional Irvington Station					
Fremont BART station	4,100	800	2,600	2,900	10,500
Irvington BART station	2,500	500	1,600	1,700	6,200
Warm Springs BART station	3,600	800	2,500	8,900	15,700
Southern Alameda total	14,800	4,100	7,700	18,500	44,900
2025 Proposed Bus Alternative					
Fremont BART station [1]	0	0	500	12200	12700
Paseo Padre / Stevenson	0	0	500	0	500
Irvington Transit Center	1600	900	2000	600	5100
Auto Mall Parkway	0	0	700	0	700
Warm Springs Transit Center	2800	1100	3800	600	8400
Southern Alameda Total	4400	2000	7500	13400	27400

Station	Mode of Access/Egress PNR	KNR	Walk/ Bike	Transit XFER	Total

Notes:
[1] Does not include the mode of Access / Egress for BART patrons. Only the Proposed Bus Alternative patrons are included.

PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to the nearest hundred: totals may not sum up to the displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

The following information summarizes the information presented in the previous table.

- In 2025, with implementation of the proposed Bus Alternative, there would be an increase of 11% in linked transit trips. The largest increase is for those transit riders traveling within the Fremont/Newark/Union City. When the proposed Bus Alternative is compared to the Proposed Project with optional Irvington Station scenario, there are fewer transit trips overall, with the exception of the internal trips.

Mode of Access/Egress

The mode of access/egress analysis provides the potential demands for parking, auto drop-off locations, walk access, and the need for transit bus facilities for transfers among bus routes or between BART and buses at each of the stations.

Table 13-10 list the mode of access/egress to each of the stops along the proposed Bus Alternative route for 2025. For comparison purposes, the mode of access/egress for the BART stations is also shown.

The tables indicate that there would be a number of transit transfers that would occur at both the Irvington and the Warm Springs Transit Centers.

In 2025, almost one half of riders using the proposed Bus Alternative transfer between BART and buses at the Fremont BART station or transfer between buses at the Irvington and Warm Springs Transit Centers according to Table 13-10. More than one-quarter of the proposed Bus Alternative riders walk or use bicycles to either access or egress the buses and slightly less than one-quarter of the proposed Bus Alternative riders park-and-ride or kiss-and-ride to either the Irvington or Warm Springs Transit Centers. Users of the proposed Bus Alternative would not be permitted to park-and-ride from the Fremont BART station because only BART riders are allowed to use these parking facilities.

In general, the proposed Bus Alternative would have fewer people going to or coming from the stations than the Proposed Project with the optional Irvington Station in 2025. While the proportion of riders transferring between buses or between BART and buses would be larger under the proposed Bus Alternative compared to the Proposed Project with the optional Irvington Station, the actual number of transfers would be larger under the Proposed Project with the optional Irvington Station. The total number of riders walking or bicycling to or from the stations would be virtually equal between the proposed Bus Alternative and the Proposed Project with the optional Irvington Station.

Table 13-10
Mode of Access/Egress – 2025 Proposed Bus Alternative

Station	Mode of Access/Egress PNR	KNR	Walk/Bike	Transit XFER	TOTAL
2025 No Project					
Fremont BART Station	5,100	2,600	1,800	7,500	17,100
Irvington BART Station	0	0	0	0	0
Warm Springs BART Station	0	0	0	0	0
Southern Alameda Total	5,100	2,600	1,800	7,500	17,100
2025 Proposed Project with Optional Irvington Station					
Fremont BART Station	4,100	800	2,600	2,900	10,500
Irvington BART Station	2,500	500	1,600	1,700	6,200
Warm Springs BART Station	3,600	800	2,500	8,900	15,700
Southern Alameda Total	10,200	2,100	6,700	13,500	32,400
2025 Proposed Bus Alternative					
Fremont BART station	0	0	500	12,500	13,000
Paseo Padre/Stevenson	0	0	500	200	800
Irvington Transit Station	1,600	900	2,000	1,300	5,800
Auto Mall Parkway	0	0	700	700	1,400
Warm Springs Transit Center	2,800	1100	3,800	2,000	9,800
Southern Alameda Total	4,400	2,000	7,500	16,700	30,800

Notes:
PNR – Park-and-ride
KNR – Kiss-and-ride
Xfer – Transfer
Extra stops have been included in the proposed Bus Alternatives.
All numbers have been independently rounded to the nearest hundred. Totals may not sum up to displayed volumes.

Source: DKS Associates, 2002 from VTA-modified MTC model

Travel Times

Table 13-11 provides a travel time comparison (in minutes) between the 2025 Proposed Project and the 2025 No Project Alternatives. Auto travel times would remain constant due to the peak spreading function built into the VTA modified MTC model. When demand during the peak hour exceeds capacity which is the case in 2025, the excess number of vehicles are assumed to travel either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading, but would not affect auto travel times during the peak hour.

Table 13-11
AM Peak Hour Travel Times – 2025 Proposed Project

	Year 2025 No-Project			2025 Proposed Bus Alternative		
From / To	**Drive Alone**	**Car Pool**	**Transit**	**Drive Alone**	**Car Pool**	**Transit**
Milpitas-Downtown San Francisco	110[1]	85	71	110	85	84
Milpitas-Pacific Commons	20	26	86	20	26	37
Irvington-Nummi	11	18	48	11	18	22
Irvington-Downtown San Jose	40	47	82	40	47	75
Fremont-Lockheed	52	49	98	52	49	92
Fremont-Pacific Commons	14	21	45	14	21	45
Union City-Diridon Caltrain Depot	60	60	69	60	60	69
Union City-Downtown San Jose	58	58	79	58	58	79
Hayward-Lockheed	72	60	75	72	60	75

Notes:
1. 15 minute penalty applied for drive alone over the Bay Bridge
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center.
Union City location is approximately the Dyer/Alvarado-Niles Boulevard intersection (west of I-880).
Fremont location is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates from the VTA modified MTC model, 2002

The transit travel time between some pairs of locations would remain constant, some would decrease and others would increase. Locations that are located close to the Warm Springs Station, such as the Nummi Plant would generally experience a decrease in the travel time during the AM peak hour.

Load Factors

Table 13-12 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Fremont BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 13-12
BART Load Factors – 2025 Proposed Bus Alternative

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Fremont	Union City	6465	2464	970	370	6	6	0.257	0.098
Union City	South Hayward	10670	2609	1601	391	6	6	0.424	0.103
South Hayward	Hayward	13045	2688	1957	403	6	6	0.518	0.107
Hayward	Bay Fair	16131	3093	2420	464	6	6	0.640	0.123
Richmond Lines									
Fremont	Union City	1878	2372	282	356	5	5	0.201	0.254
Union City	South Hayward	2943	2620	441	393	5	5	0.315	0.281
South Hayward	Hayward	3549	2756	532	413	5	5	0.380	0.295
Hayward	Bay Fair	4540	3205	681	481	5	5	0.486	0.344
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	14746	2763	2212	414	5	5	0.702	0.131
West Dublin	Castro Valley	18333	3044	2750	457	5	5	0.873	0.145
Castro Valley	Bay Fair	21609	3140	3241	471	5	5	1.029	0.150

Notes:
NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates from the VTA modified MTC model, 2002

The BART load factors during the 2025 Proposed Bus Alternative Condition would be relatively low, with all lines showing an availability of seats except for the northbound section between Castro Valley and Bay Fair. As the train progresses northwards, (or westwards), more riders would board and the load factors would increase.

Table 13-13 lists the load factors for the Bus Rapid Transit (BRT) lines between the Warm Springs Transit Center and the Fremont BART station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 13-13
Bus Load Factors – 2025 Proposed Bus Alternative

	Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
	NB	SB	NB	SB	NB	SB	NB	SB
VTA - 180								
Leave / arrive Fremont BART station	2579	1977	387	297	5	5	1.935	1.485
Paseo Padre – Irvington Transit Center	2596	1979	389	297	5	5	1.945	1.485
Irvington Transit Center – Auto Mall Parkway	2034	2481	305	372	5	5	1.525	1.860
Auto Mall Parkway – Warm Springs Transit Center	2209	2523	331	378	5	5	1.655	1.890
Leave / Arrive Warm Springs Transit Center	1217	2274	183	341	5	5	0.915	1.705
AC Transit								
Leave / arrive Fremont BART station	2087	591	313	89	5	5	1.565	0.445
Paseo Padre – Irvington Transit Center	2099	592	315	89	5	5	1.575	0.445
Irvington Transit Center – Auto Mall Parkway	1406	590	211	89	5	5	1.055	0.445
Auto Mall Parkway – Warm Springs Transit Center	1534	633	230	95	5	5	1.150	0.475
Leave / Arrive Warm Springs Transit Center	0	190	0	29	5	5	0.000	0.145

Notes:
NB– Northbound
SB– Southbound
40 seats per Bus

Source: DKS Associates from the VTA modified MTC model, 2002

The BRT load factors during the 2025 Proposed Bus Alternative Condition would be relatively high, with all northbound lines showing a deficiency in the number of seats. When the load factors are above 1, there would be people standing on each of the northbound services. The load factors are not as consistent as the BART load factors, as more fluctuation would occur with the increased number of stops.

13.2.6. Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06. Table 13-14 shows the estimated parking demand for each scenario, along with the number of parking spaces currently proposed. These demand figures include the demand generated by other transit services, such as bus vehicles.

In each scenario at all locations, demand does not exceed the available supply, so there would be no significant parking impacts at the transit centers. The proposed Bus Alternative would have lower parking demand than the Proposed Project because more people would be able to walk to the intermediate stops and most bus riders would transfer at the Warm Springs Transit Center, rather than at the Fremont BART Station, to meet the VTA Route 180.

Table 13-14
Parking Supply and Demand – 2025 Proposed Bus Alternative

	Fremont Station		Irvington Station		Warm Springs Station	
	Supply	**Demand**	**Supply**	**Demand**	**Supply**	**Demand**
2025	2,030	1,510	960	760	2,040	1,370

Notes:
Parking supply based on presentation to the BART Warm Springs Extension Project Development Team Meeting, October 22, 2002. As stations are designed, actual parking supply could change.
Parking Demand based on VTA modified MTC model.

Source: DKS Associates, 2002

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14. 2025 PROPOSED PROJECT PLUS SVRTC

14.1. DESCRIPTION

The transportation model, as discussed above, incorporates local and regional government projections of future background growth, land use and employment intensities and locations, along with programmed highway, street and transit improvements and the transportation consequences of other anticipated development projects for 2010 and 2025. Accordingly, the impact analyses presented above already account for cumulative impacts of the Proposed Project together with other projects.

However, the projections of general regional growth and anticipated projects that are incorporated into the modeling analysis presented above do not include the proposed SVRTC (Silicon Valley Rapid Transit Corridor) project. Additional modeling analysis was performed in order to evaluate the potential cumulative effects of the Proposed Project with SVRTC, and then potential cumulative effects of the Proposed Project with optional Irvington Station plus SVRTC.

This scenario (2025 Proposed Project plus SVRTC) assumes implementation of both the Proposed Project, without the optional Irvington Station, and SVRTC.

The transportation projections for this analysis were based on the MTC travel demand model, as modified by VTA for this project. Inputs to the model include local and regional government projections of land use and employment intensities and locations, as well as programmed highway, street, and transit improvements. The model output for 2010 and 2025 conditions was reviewed and adjusted as described earlier in this chapter.

Since the transportation impacts analyses in this DSEIR are based on the adopted regional land use forecasts for 2010 and 2025, the cumulative transportation impacts of all such developments are included, and additional analysis of potential cumulative effects of specific projects would be redundant. Accordingly, the following assessment presents the combined effects of future background growth in conjunction with the Proposed Project and SVRTC.

14.2. IMPACTS

14.2.1. Trip Generation

Under this scenario, 3,820 daily vehicle trips would be generated at the Warm Springs BART Station, including 630 A.M. peak hour trips (540 inbound, 90 outbound) and 630 P.M. peak hour trips (90 inbound, 540 outbound).

This scenario would result in 7,490 daily trips at the Fremont Station. This includes 1240 AM peak hour trips (1060 inbound, 180 outbound) and 1240 PM peak hour trips (180 inbound, 1060 outbound).

Trip generation estimates for the proposed project were based on the intersection turning movements and the Santa Clara Valley Transportation Authority modified MTC model, as summarized in Table 14-1**.**

Table 14-1
Trip Generation – 2025 Proposed Project plus SVRTC

Station	Daily	AM		PM	
		In	Out	In	Out
Fremont	7,490	1,060	180	180	1,060
Warm Springs	3,820	540	90	90	540

Source: DKS Associates, 2002

14.2.2. Trip Distribution

Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B.

14.2.3. Intersection Analysis

The 2025 Proposed Project plus SVRTC analysis is based on a projection of vehicle trips in the VTA Modified MTC Model. A discussion of the model parameters and adjustments is provided in Chapter 3.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, the intersection LOS was evaluated at 18 study intersections. Because construction of the optional Irvington Station would redistribute trips that would have gone to either the Fremont or Warm Springs Station, all of the study intersections were evaluated under both with and without the optional Irvington Station scenarios. Figure 14-1 illustrates the turning movements for each study intersection under the 2025 Proposed Project.

The intersections and their corresponding levels of service are presented in Table 14-2 for the 2025 No Project and the 2025 Proposed Project with optional Irvington Station scenario.

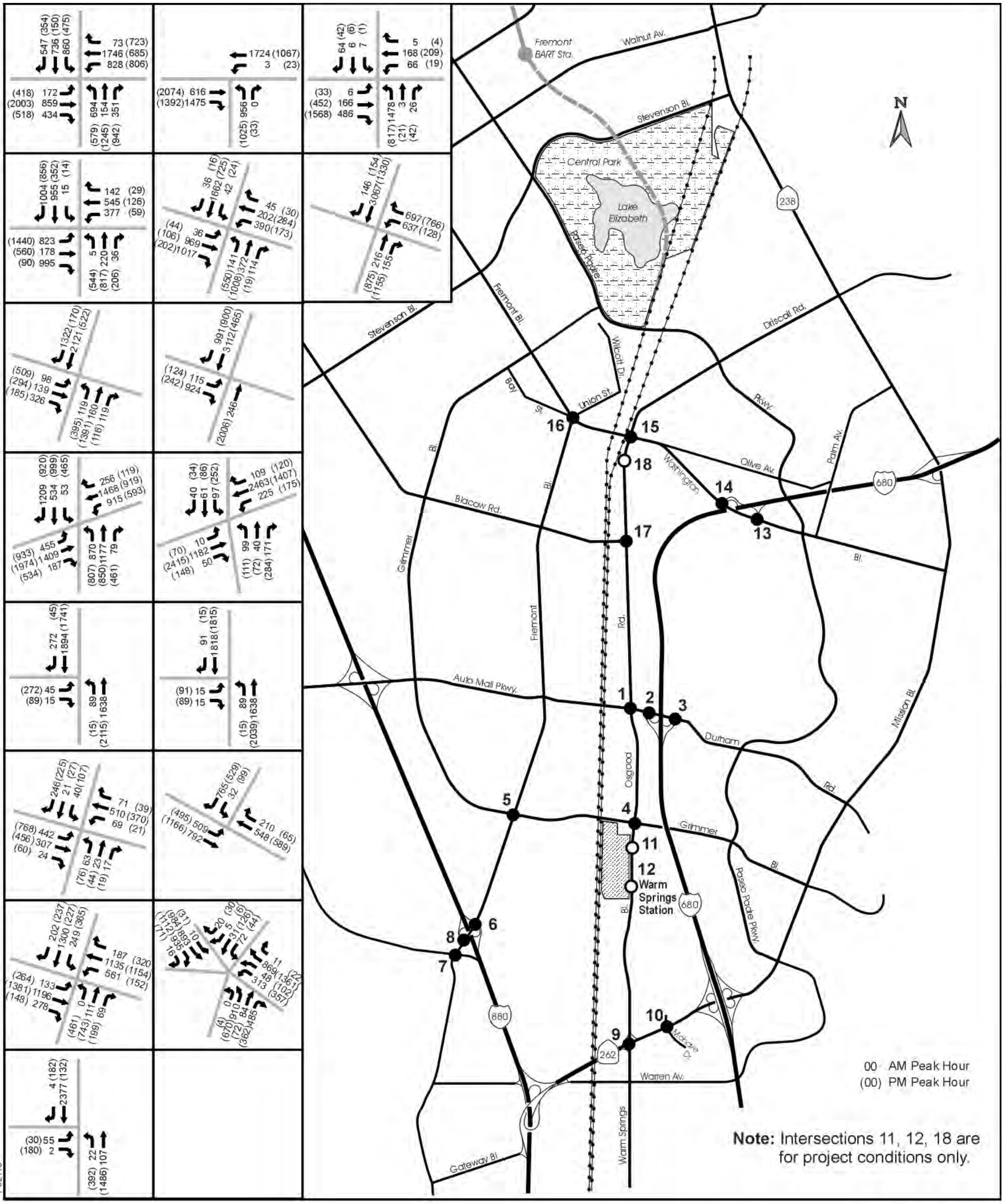

Figure 14-1
2025 SVRT WITH PROPOSED PROJECT PEAK HOUR TURNING MOVEMENTS

DKS Associates

Table 14-2
Intersection LOS, 2025 No Project and Proposed Project plus SVRTC

#	Intersection	2025 No Project Condition				2025 Proposed Project plus SVRTC			
		a.m. Peak Hour		p.m. Peak Hour		a.m. Peak Hour		p.m. Peak Hour	
		LOS[a]	v/c[b]	LOS	v/c	LOS[a]	v/c[b]	LOS	v/c
1	Osgood Road/Durham Road/Auto Mall Parkway	E	1.00	F	1.06	F	1.04	F	1.10
2	I-680 SB Ramps/Durham Road/Auto Mall Parkway	E	0.98	D	0.90	E	0.92	E	0.91
3	I-680 NB Ramps/Durham Road/Auto Mall Parkway	B	0.61	A	0.42	A	0.59	A	0.46
4	Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard	E	0.92	F	1.31	F	1.22	F	1.41
5	Fremont Boulevard/South Grimmer Boulevard	F	1.07	D	0.84	E	0.99	C	0.72
6	Fremont Boulevard/I-880 NB Ramps	D	0.83	A	0.42	D	0.82	A	0.37
7	Fremont Boulevard/I-880 SB On-ramp/Cushing Parkway	D	0.87	A	0.49	D	0.88	A	0.49
8	Fremont Boulevard/I-880 SB Off-ramp	D	0.86	A	0.51	D	0.86	A	0.50
9	Warm Springs Boulevard/Mission Boulevard	F	1.42	F	1.09	F	1.31	F	1.07
10	Mohave Drive/Mission Boulevard	B	0.66	D	0.81	B	0.67	D	0.83
11	Warm Springs Boulevard/Northern Warm Springs Station Entrance					B	0.67	D	0.81
12	Warm Springs Boulevard/Southern Warm Springs Station Entrance					B	0.64	B	0.69
13	I-680 NB Ramps/Washington Boulevard	A	0.58	D	0.86	A	0.58	C	0.77
14	I-680 SB Ramps/Washington Boulevard	C	0.71	B	0.70	A	0.54	A	0.59
15	Osgood Road/Washington Boulevard	D	0.89	D	0.85	D	0.84	D	0.84
16	Fremont Boulevard/Washington Boulevard/Bay St	E	0.98	F	1.13	E	0.92	F	1.14
17	Osgood Road/Blacow Road	C	0.77	A	0.46	C	0.77	A	0.51
18	Osgood Road/Irvington Station Entrance								

[a] LOS = level of service.

[b] v/c = volume-to-capacity ratio.

Source: DKS Associates 2002

14.2.4. Metropolitan Transportation System Roadways

The Alameda County Congestion Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Some roadway segments are expected to exhibit decreases in traffic volumes as a result of project conditions, while other segments are expected to exhibit increases. For informational purposes only, the number of roadway segments that would operate at LOS E or F are identified in Table 14-3. As discussed above, an impact on a roadway segment is considered significant if project trips cause that segment to deteriorate to LOS F, unless LOS F was measured when the County Congestion Management Plan was established in 1991. In addition, for informational purposes, Table 14-3 identifies the quantity of roadway segments that would experience small volume changes (2% to 4%) or large volume changes (5% or more).

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.
- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.
- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.
- Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions and provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 MTS roadway segments. Table 14-3 indicates the quantity of segments that would have volume changes of plus or minus 2%, and plus or minus 5%, as well as changes in the LOS.

Table 14-3
MTS Roadway Analysis Summary, 2025 Proposed Project plus SVRTC

Scenario	-5% or greater	-2% to -4%	+2 to +4%	+5% or greater	LOS Improvements		LOS Degradation	
					State Highway	Local Roadway	State Highway	Local Roadway
2025 No Project	31 state highway segments operating at LOS E or F							
2025 Proposed Project plus SVRTC[a]	55	36	16	10	18	2	0	3
a Compared to the 2025 No Project								
Source: DKS Associates								

Compared to the 2025 No Project, the 2025 Proposed Project plus SVRTC would result in the following changes during the p.m. peak hour.

- Three of the MTS local roadway segments would show deterioration in the LOS.
- Eighteen of the MTS state highway segments would experience an increase in LOS.
- Two of the MTS local roadway segments would experience an increase in LOS.

The remaining 131 MTS roadway segments would continue to operate with similar LOS.

Appendix C includes the detailed MTS roadway analysis sheets for the year 2025 Proposed Project Scenario.

14.2.5. Transit

Transit Facilities

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be one new BART station built in the City of Fremont at Warm Springs.
- BART would extend into Santa Clara County and would stop at the following new stations in Santa Clara County: Montague / Capitol, Berryessa, Alum Rock, Civic Plaza / SJSU, Market Street, Diridon / Arena and Santa Clara.
- There would be two pairs of daily BART lines in each direction serving south of the existing Fremont Station. Combined, they would provide a 6.0 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 12 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th

Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport. Under the Proposed Project these lines would be extended south to the proposed Warm Springs Station.

- All BART lines would experience an improvement in headways from 15 minutes to 12 minutes. These increased headways throughout the existing BART network would be made possible through the implementation of Advanced Automatic Train Control (AATC).
- A third pair of BART lines would operate during the AM and PM peak periods only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would no longer operate from Santa Clara County to the Warm Springs Station via I-680, Mission Boulevard and Warm Springs Boulevard. Instead enhanced local VTA services would operate in this corridor.
- New express services would be provided over the Sunol Grade from the Central Valley, Contra Costa, and Tri Valley to connect to BART services at Warm Springs Station.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new ACE / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- Increased headways on BART would be made possible through the implementation of Advanced Automatic Train Control (AATC).
- The BART extension to Millbrae would be open and operational with 12-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.
- The West Dublin BART station would be operational and have service headways of 12 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- CalTrain would extend service to the Transbay Terminal.
- The CalTrain Baby Bullet express service would operate along the Peninsula with 60 minute headways and a limited stop service.

- ACE headways would be increased to 30 minute peak service inbound in the AM and outbound in the PM.
- Capitol Corridor service would be increased to 60 minute headways all day in both directions.

Station Entries and Exits

Table 14-4 lists the daily station entries and exits and the system boardings for both the existing and proposed stations in southern Alameda County for the 2025 conditions. Both tables provide a comparison between the Proposed Project and the No-Project conditions. As expected, there are fewer entries and exits at the Fremont BART Station because it would no longer be the terminus. Transfers that were using the Fremont Station would be relocated to either the Warm Springs Station or, with implementation of SVRTC, the stations in Santa Clara County.

Table 14-4
Station Entries and Exits – 2025 Proposed Project plus SVRTC

Station	No Project	Proposed Project plus SVRTC
Southern Alameda County Existing Stations		
Union City	11,400	16,200
Fremont	17,100	16,900
Southern Alameda County Existing Stations Subtotal	**28,500**	**33,100**
Proposed Project Stations		
Irvington	—	—
Warm Springs	—	21,500
Proposed Project Stations Subtotal	**—**	**21,500**
Southern Alameda County Proposed and Existing Stations Subtotal	**28,500**	**54,600**
SVRTC Stations Subtotal	—	110,400
BART Systemwide Total Entries and Exits	972,800	1,136,400
BART Systemwide Total Boardings	486,400	568,200

Notes:
Station-level and subtotal values are for station entries and exits (i.e. total persons entering and leaving station areas). Total systemwide boardings was calculated by dividing entries and exits by two.

Cumulative analysis of the Proposed Project plus SVRTC, if it is adopted, is discussed below in Section 3.9.6. For convenience of comparison, this table presents results for the Proposed Project and for the Proposed Project plus SVRTC.

Southern Alameda County stations are the existing Union City and Fremont Stations plus the proposed Warm Springs and optional Irvington Stations.

All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

The previous table can be summarized as follows:

- At the Fremont BART Station under all 2025 conditions, station entries and exits would decrease compared to the 2025 No-Project condition. Entries and exits would decrease by 200 under the Proposed Project plus SVRTC condition.

- In 2025 with implementation of SVRTC, there would be an increase of 5,200 entries and exits at the Warm Springs Station compared to the Proposed Project.
- Compared to the 2025 No-Project condition, southern Alameda County would experience an increase of 26,100 entries and exits under the Proposed Project plus SVRTC condition.
- In 2025 with implementation of the Proposed Project plus SVRTC, entries and exits systemwide would increase by approximately 162,200.

Ridership

Station to Station Matrices

Table 14-5 lists the station entries and exits for the Proposed Project plus SVRTC scenario. In summary, the following observations can be made from the table.

- At the Fremont BART Station under all 2025 conditions, station entries and exits decrease compared to the 2025 No-Project condition. Entries and exits would decrease by 200 under the Proposed Project plus SVRTC condition and by 3,000 under the Proposed Project with optional Irvington Station plus SVRTC condition.

- In 2025 with implementation of SVRTC, there would be an increase of 5,200 entries and exits at the Warm Springs Station compared to the Proposed Project.

- Compared t the 2025 No-Project condition, southern Alameda County would experience an increase of 26,100 entries and exits under the Proposed Project plus SVRTC condition.

- In 2025 with implementation of the Proposed Project plus SVRTC, entries and exits systemwide would increase by approximately 162,200.

Table 14-5
Station to Station BART Matrix – 2025 No Project

	Attractions			
Productions	**Fremont**	**San Francisco / Oakland**	**Other Bay Area**	**Totals**
Fremont	N/A	6,980	4,100	11,080
San Francisco / Oakland	530	25,640	32,950	59,120
Other Bay Area	5,490	305,250	105,490	416,230
Totals	6,020	337,870	142,540	486,430

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Table 14-6
Station to Station BART Matrix – 2025 Proposed Project plus SVRTC

	Attractions					
Productions	**Fremont**	**Warm Springs**	**San Francisco / Oakland**	**Other Bay Area**	**Santa Clara County**	**Totals**
Fremont	N/A	780	4,040	2,490	5,020	12,330
Warm Springs	410	N/A	1,750	1,270	6,580	9,600
San Francisco / Oakland	290	430	25,580	33,250	4,910	64,460
Other Bay Area	2,230	3,090	303,580	105,320	17,640	431,860
Santa Clara County	1,610	7,230	9,220	4,780	26,670	49,510
Totals	4,540	10,750	344,170	147,110	60,820	567,390

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Ridership

Table 14-7 lists the rail ridership for the Proposed Project with SVRTC scenario. With implementation of the Proposed Project plus SVRTC, there would be a nearly 200% increase in the overall ridership levels on the BART segment between the Union City and Fremont BART Stations. There would be a slight decrease (5%) in ridership on the ACE trains with implementation of the Proposed Project. There would be a further decline in the ridership on ACE with implementation of the Proposed Project with optional Irvington Station plus the two SVRTC options.

Ridership declines would be even greater for the Capitol Corridor. Under the SVRTC scenarios, Capitol Corridor ridership drops sharply at the Alameda/Santa Clara County line. The Capitol Corridor could retain many long-distance riders traveling between Santa Clara County and points outside the BART service area (e.g., Fairfield, Davis, and Sacramento). This market currently comprises about half of the Capitol Corridor's Santa Clara County ridership (Capitol Corridor Joint Powers Authority 2002). However, any of the following reasons may cause many potential Capitol Corridor riders traveling between Santa Clara County and points within the BART service area (e.g. Richmond, Oakland, Hayward) to elect to ride BART instead.

- BART has more frequent operating headways (6 minutes compared to hourly on the Capitol Corridor).
- BART is more centrally located to areas of high population and employment.
- BART provides direct connections between downtown San Jose, Oakland, and San Francisco.

Schedule reliability issues may also impact Capitol Corridor ridership, although reliability was not addressed per se in the ridership model. Running-time adherence to within a few minutes of published schedules is particularly important when riders must connect to other transit services to reach their destinations. On-time performance can be difficult to achieve over long distances. Most Capitol Corridor trains originate in Sacramento, 134 miles from San Jose; some trains start as far away as Auburn, 170 miles from San Jose. Sharing tracks with freight trains can sometimes delay Capitol Corridor trains as well.

In some ways, the Capitol Corridor and BART will complement each other. For example, direct transfers between the two rail lines would be available at the planned Coliseum and Union City intermodal transit facilities. This connectivity would enable riders to use whichever system or combination of systems that best suits their needs.

Table 14-7
Rail Ridership – 2025 Proposed Project plus SVRTC

Station A	Station B	Mode	2025 No Project	2025 Proposed Project plus SVRTC
Union City	Fremont	BART	18,100	52,400
Fremont	Warm Springs	BART	N/A	51,100 [a]
Warm Springs	Montague / Capitol	BART	N/A	57,200
Alameda County Line		ACE	11,700	7,000
Alameda County Line		Capitol Corridor	2,800	1,000 [b]

Notes: [a] Ridership taken between the Fremont and Warm Springs Station.
[b] Capitol Corridor Ridership has been manually adjusted to better reflect the operating conditions. This is due to the modeling process underestimating commuter rail

Source: DKS Associates 2002 from the VTA modified MTC model

Table 14-8
Bus Ridership – 2025 Proposed Project plus SVRTC

Operator	Road	2025 No Project	2025 Proposed Project plus SVRTC
AC Transit	Paseo Padre between Fremont BART Stn and Irvington Stn	1200	800
AC Transit	Osgood Road between Warm Springs Stn and Irvington Stn	200	200
AC Transit	Warm Springs Boulevard between Grimmer Boulevard and Mission Blvd	400	500 (3,600 local VTA)
AC Transit	Fremont Boulevard between Auto Mall Parkway and Blacow Rd	300	1000
AC Transit	Warm Springs Boulevard between Mission Boulevard and Kato Rd	1200	900
AC Transit	Warm Springs sth of Kato	1300	500

Source: DKS Associates 2002 from the VTA modified MTC model

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A linked trip consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring onto BART at a BART station and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but is not considered a linked transit trip.

The mode share (linked transit trips) for the SVRTC alternative is listed in Table 14-9. In 2025 with implementation of the Proposed Project plus SVRTC, there would be an increase of more than 60% in new transit riders throughout the corridor compared to the 2025 No-Project condition. Linked transit trips to the southern Alameda County area would increase by 93%, but the largest growth would be in trips through the Fremont/Newark/Union City corridor (trips that either start or finish in [or beyond] Santa Clara County), which would increase by more than 105% with implementation of the Proposed Project plus SVRTC.

Table 14-9
Linked Transit Trips– 2025 Proposed Project plus SVRTC

Trips:	2025 No Project	2025 Proposed Project plus SVRTC	Percent Change
Intra	11,100	12,000	8.1%
To	8,600	14,900[a]	73.3%
From	25,300	37,800	49.4%
Through	11,800	24,400	106.8%
Total WSX Corridor Transit Trips	**56,800**	**89,100**	56.9%
Change from No-Build		**32,300**	
Intra Santa Clara Transit Trips	243,000	253,500	4.3%

Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (e.g., Hayward to San Jose).
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value
[a] Number was manually adjusted due to not being able to reconcile modeling issues in time for release of document. Changed from 16,600 to 14,900.

Source: DKS Associates 2002 from the VTA modified MTC model

Mode of Access/Egress

A mode of access analysis provides the potential demands for parking, kiss-and-ride, walk access, and the need for transit provision at each of the stations. Table 14-10 lists the mode of access/egress at each of the southern Alameda stations. The proposed Montague/Capitol Station (the first station south of Warm Springs) is also listed for the two SVRTC scenarios.

Table 14-10
Mode of Access/Egress – 2025 No Project and 2025 Proposed Project plus SVRTC

Station	Mode of Access PNR	KNR	Walk/Bike	Transit XFER	Total Entries and Exits
2025 No Project					
Union City	3,600	2,100	900	4,700	11,400
Fremont	5,100	2,600	1,800	7,500	17,100
Irvington	0	0	0	0	0
Warm Springs	0	0	0	0	0
Southern Alameda total	8,700	4,700	2,700	12,200	28,500
2025 Proposed Project with SVRTC					
Union City	5,600	2,100	1,400	7,100	16,200
Fremont	6,200	1,300	3,300	6,100	16,900
Irvington	0	0	0	0	0
Warm Springs	3,200	600	6,700	11,000	21,500
Montague / Capitol	3,900	900	1,500	15,600	21,900
Southern Alameda total (without Montague / Capitol)	15,000	4,000	11,300	24,200	54,600
Source: DKS Associates, 2002 from VTA modified MTC model					

In summary, the table presents the following information for the SVRTC alternative.

- Park-and-ride demand would increase at the Fremont BART Station with implementation of the Proposed Project plus SVRTC, although kiss-and-ride levels would decline (due to the increase in parking at each of the new stations).

Travel Times

This section consists of sets of travel time comparisons between selected residential locations (northwest Milpitas, Irvington, Fremont, Union City, and Hayward) and selected Bay Area employment centers (Downtown San Francisco; Downtown San Jose, 1st Street and the Diridon Caltrain Depot; Lockheed Martin Corporation facilities in Sunnyvale; and the Pacific Commons development in Fremont).

The locations have been selected to be representative examples. The small set of times is not intended to characterize all travel patterns changed by the Proposed Project. Transit riders' destinations in the Fremont-Warm Springs area are very diffuse, with no single area dominating. Transit ridership from MTC Super District 16 (Fremont-Union City and Newark) to other parts of the Bay Area is projected to be roughly similarly split among San Francisco, the South Bay (including San Mateo County), and the rest of the

East Bay. Therefore, the list of travel time comparisons is intended to capture the essence of area-wide changes associated with the BART extension alternatives.

In some cases, transit is competitive with highway times in all alternatives (for example, northwest Milpitas to downtown San Francisco). In other cases, transit travel times improve substantially for one or more of the build alternatives (for example, Irvington to NUMMI). However, there is also one case (Milpitas to Pacific Commons) where transit is not competitive with auto travel, even with improved transit times, due to the need to transfer and the absence of traffic congestion for this specific origin–destination pair. Table 14-11 provides a comparison of a.m. peak hour travel time (in minutes) between the 2025 No Project and Proposed Project plus SVRTC conditions. Auto travel times would remain roughly constant among the various alternatives analyzed due to the peak spreading function built into the VTA-modified MTC model. When demand during the peak hour exceeds capacity, the excess vehicles are shifted to either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading but would not affect auto travel times during the peak hour.

Table 14-11
AM Peak Hour Travel Times – 2025 Proposed Project plus SVRTC

			Transit	
Sample Trip (Origin-Destination)	**Drive Alone**	**Carpool**	**2025 No Project**	**Proposed Project plus SVRTC**
Northwest Milpitas-Northwest Downtown San Francisco	110	85	71	71
Northwest Milpitas-Northwest Pacific Commons	20	26	86	53
Irvington-Nummi	11	18	40	25
Irvington-Downtown San Jose	40	47	82	38
Fremont-Lockheed	52	49	98	56
Fremont-Pacific Commons	14	21	45	45
Union City-Diridon Caltrain Depot	60	60	69	52
Union City-Downtown San Jose	58	58	79	48
Hayward-Lockheed	72	60	75	68

Notes:
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center
Union City location is approximately the Dyer/Alvarado-Niles Boulevard intersection (west of I-880).
Fremont location is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates, 2002 from VTA-modified MTC model

In a few select cases transit travel times increase under the Proposed Project plus SVRTC compares to the No Project. An example of this difference is the trip from Union City to Downtown San Jose. Under No Project Alternative, the traveler uses relatively infrequent Capitol Corridor service to travel to the Diridon Station in San Jose and the transfer to bus. Under the Proposed Project plus SVRTC, the traveler uses more frequent BART service to travel to Warm Springs and transfer to bus for the trip to Downtown San Jose.

The transit travel time between some pairs of locations would remain constant, some An example of the difference between actual and perceived time is evident in the Union City to downtown San Jose trip. Under the No-Project scenario, the rider would drive to the Union City Capitol Amtrak Station and ride Amtrak to the San Jose-Diridon Station. The rider would then need to transfer to a connecting bus to reach their downtown destination. Under the Proposed Project scenario, the rider would drive to the South Hayward BART Station[1] and ride to Warm Springs. The rider would then transfer to the VTA Route 180 bus to get to downtown San Jose. The key element for this trip is that BART would operate much more frequently than the Capitol Corridor trains. Even though the total trip takes more time, the Proposed Project would allow the rider get on a train sooner, thus alleviating the need to wait a comparatively longer time for the Capitol Corridor train to arrive.

It should be noted that BART park-and-ride lots are reserved for BART patrons only. This helps explain some of the travel time differences between alternatives. For example, travel times from Irvington to downtown San Jose decrease substantially when the optional Irvington BART Station is added. Under the Proposed Project, Irvington riders would drive to Fremont and ride one station to Warm Springs before transferring to the VTA Route 180. The optional Irvington Station would substantially increase convenience for these riders as they would have a shorter park-and-ride access time, and a shorter BART ride to Warm Springs.

The other viable option would be to ride a local bus from Irvington to Warm Springs to access the VTA 180 to downtown San Jose (the path chosen in the No-Project Alternative). However, overall travel times indicate that it would be shorter to "backtrack" to Fremont BART than to use the local bus option. BART is much faster than local bus routes and operates much more frequently. In addition, the actual drive access time to the Fremont BART station is nearly equal to the actual walk time to the local bus stop.

Finally, the travel time calculations do not factor in trip reliability. Highway travel times, for example, can vary greatly depending on weather, special events, accidents, and traffic volumes. Rail systems with exclusive rights-of-way can enhance transit reliability, although severe disruptions can occur. Ridership models typically do not capture how day-to-day trip time reliability affects mode choice.

Load Factors

Table 14-12 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Fremont BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

[1] Due to the specific starting location of the trip in northern Union City and the crowded parking facilities at the Union City BART Station, the travel path went through the South Hayward BART Station.

Table 14-12
Load Factors – 2025 Proposed Project

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Santa Clara	Diridon / Arena	2355	5303	353	795	5	5	0.112	0.252
Diridon / Arena	Market St	5284	5696	793	854	5	5	0.252	0.271
Market St	Civic Plaza / SJSU	5964	10497	895	1575	5	5	0.284	0.500
Civic Plaza / SJSU	Alum Rock	5968	11267	895	1690	5	5	0.284	0.537
Alum Rock	Berryessa	8505	9347	1276	1402	5	5	0.405	0.445
Berryessa	Montague	9362	9712	1404	1457	5	5	0.446	0.463
Montague	Warm Springs	10630	13168	1595	1975	5	5	0.506	0.627
Warm Springs	Irvington	9686	12719	1453	1908	5	5	0.461	0.606
Irvington	Fremont	12638	11345	1896	1702	6	6	0.502	0.450
Fremont	Union City	16478	9704	2472	1456	6	6	0.654	0.385
Union City	South Hayward	18698	9092	2805	1364	6	6	0.742	0.361
South Hayward	Hayward	21533	6662	3230	999	6	6	0.854	0.264
Hayward	Bay Fair	2355	5303	353	795	5	5	0.112	0.252
Richmond Lines									
Santa Clara	Diridon / Arena	1623	4893	243	734	5	5	0.174	0.524
Diridon / Arena	Market St	3501	5205	525	781	5	5	0.375	0.558
Market St	Civic Plaza / SJSU	3270	9878	491	1482	5	5	0.351	1.059
Civic Plaza / SJSU	Alum Rock	3237	10612	486	1592	5	5	0.347	1.137
Alum Rock	Berryessa	4832	8684	725	1303	5	5	0.518	0.931
Berryessa	Montague	5283	9002	792	1350	5	5	0.566	0.964
Montague	Warm Springs	5696	12334	854	1850	5	5	0.610	1.321
Warm Springs	Irvington	3735	12050	560	1808	5	5	0.400	1.291
Irvington	Fremont	3978	10505	597	1576	5	5	0.426	1.126
Fremont	Union City	4739	8877	711	1332	5	5	0.508	0.951
Union City	South Hayward	5199	8301	780	1245	5	5	0.557	0.889
South Hayward	Hayward	5990	8431	899	1265	5	5	0.642	0.904
Hayward	Bay Fair	1623	4893	243	734	5	5	0.174	0.524
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	23298	2873	3495	431	5	5	1.110	0.137
West Dublin	Castro Valley	28863	3260	4329	489	5	5	1.374	0.155
Castro Valley	Bay Fair	26609	3387	3991	508	5	5	1.267	0.161

Notes: NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates 2002 from VTA modified MTC model

Most load factors during the Proposed Project plus SVRTC conditions show an availability of seats except the Richmond trains that are traveling southwards. In the Warm Springs study area most of the segments are showing that demand exceeds capacity. It should be noted that the excess demand will be forced to stand over these segments. The westbound Dublin / Pleasanton trains are also showing high load factors with people being forced to stand along these segments if the Optional Irvington Station is not built.

14.2.6. Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06(from existing occupancy surveys conducted at the Fremont BART Station, *BART Station Access Improvements Study*).

Table 14-13 shows the estimated parking demand, along with the number of parking spaces currently proposed. These demand figures include the demand generated by other transit services, such as bus vehicles.

Table 14-13
Parking Supply and Demand – 2025 Proposed Project plus SVRTC

	Fremont Station		Warm Springs Station	
	Supply	**Demand**	**Supply**	**Demand**
2025	1,880	2,920	2,040	1,510

Notes:
Parking supply based on presentation to the BART Warm Springs Extension Project Development Team Meeting, October 22, 2002. As stations are designed, actual parking supply could change.
Parking Demand based on VTA modified MTC model.

Source: DKS Associates, 2002

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15. 2025 PROPOSED PROJECT WITH OPTIONAL IRVINGTON STATION PLUS SVRTC

15.1. DESCRIPTION

The transportation model, as discussed above, incorporates local and regional government projections of future background growth, land use and employment intensities and locations, along with programmed highway, street and transit improvements and the transportation consequences of other anticipated development projects for 2010 and 2025. Accordingly, the impact analyses presented above already account for cumulative impacts of the Proposed Project together with other projects.

However, the projections of general regional growth and anticipated projects that are incorporated into the modeling analysis presented above do not include the proposed SVRTC (Silicon Valley Rapid Transit Corridor) project. Additional modeling analysis was performed in order to evaluate the potential cumulative effects of the Proposed Project with SVRTC, and then potential cumulative effects of the Proposed Project, with optional Irvington Station plus SVRTC.

This scenario (2025 Proposed Project plus SVRTC) assumes implementation of both the Proposed Project, without the optional Irvington Station, and SVRTC.

The transportation projections for this analysis were based on the MTC travel demand model, as modified by VTA for this project. Inputs to the model include local and regional government projections of land use and employment intensities and locations, as well as programmed highway, street, and transit improvements. The model output for 2010 and 2025 conditions was reviewed and adjusted as described earlier in this chapter.

Since the transportation impacts analyses in this DSEIR are based on the adopted regional land use forecasts for 2010 and 2025, the cumulative transportation impacts of all such developments are included, and additional analysis of potential cumulative effects of specific projects would be redundant. Accordingly, the following assessment presents the combined effects of future background growth in conjunction with the Proposed Project with optional Irvington Station and SVRTC.

15.2. IMPACTS

15.2.1. Trip Generation

Under this scenario, 2,420 daily vehicle trips would be generated at the Warm Springs BART Station, including 410 A.M. peak hour trips (350 inbound, 60 outbound) and 410 P.M. peak hour trips (60 inbound, 350 outbound). In addition, 3,880 daily trips would be generated at the Irvington Station, including 643 A.M peak hour trips (550 inbound, 95 outbound) and 640 P.M. peak hour trips (95 inbound, 550 outbound).

This scenario would result in 6,022 daily trips at the Fremont Station.

Trip generation rates for the proposed project were based on the intersection turning movements and the Santa Clara Valley Transportation Authority modified MTC model, as summarized in Table 15-1**.**

Table 15-1
Trip Generation – 2025 Proposed Project with optional Irvington Station plus SVRTC

Station	Daily	AM		PM	
		In	Out	In	Out
Fremont	4314	850	150	150	850
Irvington	3880	550	100	100	550
Warm Springs Station	2420	350	60	60	350

Source: DKS Associates, 2002

15.2.2. Trip Distribution

Trip distribution patterns were based on inter and intra-zonal trip estimates in the VTA modified MTC model. Summary tables for the Fremont, Irvington and Warm Springs Stations, for each study scenario, are provided in Appendix B.

15.2.3. Intersection Analysis

The 2025 Proposed Project with optional Irvington Station plus SVRTC condition analysis is based on a projection of vehicle trips in the VTA Modified MTC Model. A discussion of the model parameters is provided in Chapter 3.

To evaluate the existing traffic conditions, as well as provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, the intersection LOS was evaluated at 18 study intersections. Because construction of the optional Irvington Station would redistribute trips that would have gone to either the Fremont or Warm Springs Station, all of the study intersections were evaluated under both with and without the optional Irvington Station scenarios. Figure 15-1 illustrates the turning movements for each study intersection under the 2025 Proposed Project.

The intersections and their corresponding levels of service are presented in Table 15-2 for the 2025 No Project and the 2025 Proposed Project with optional Irvington Station scenario.

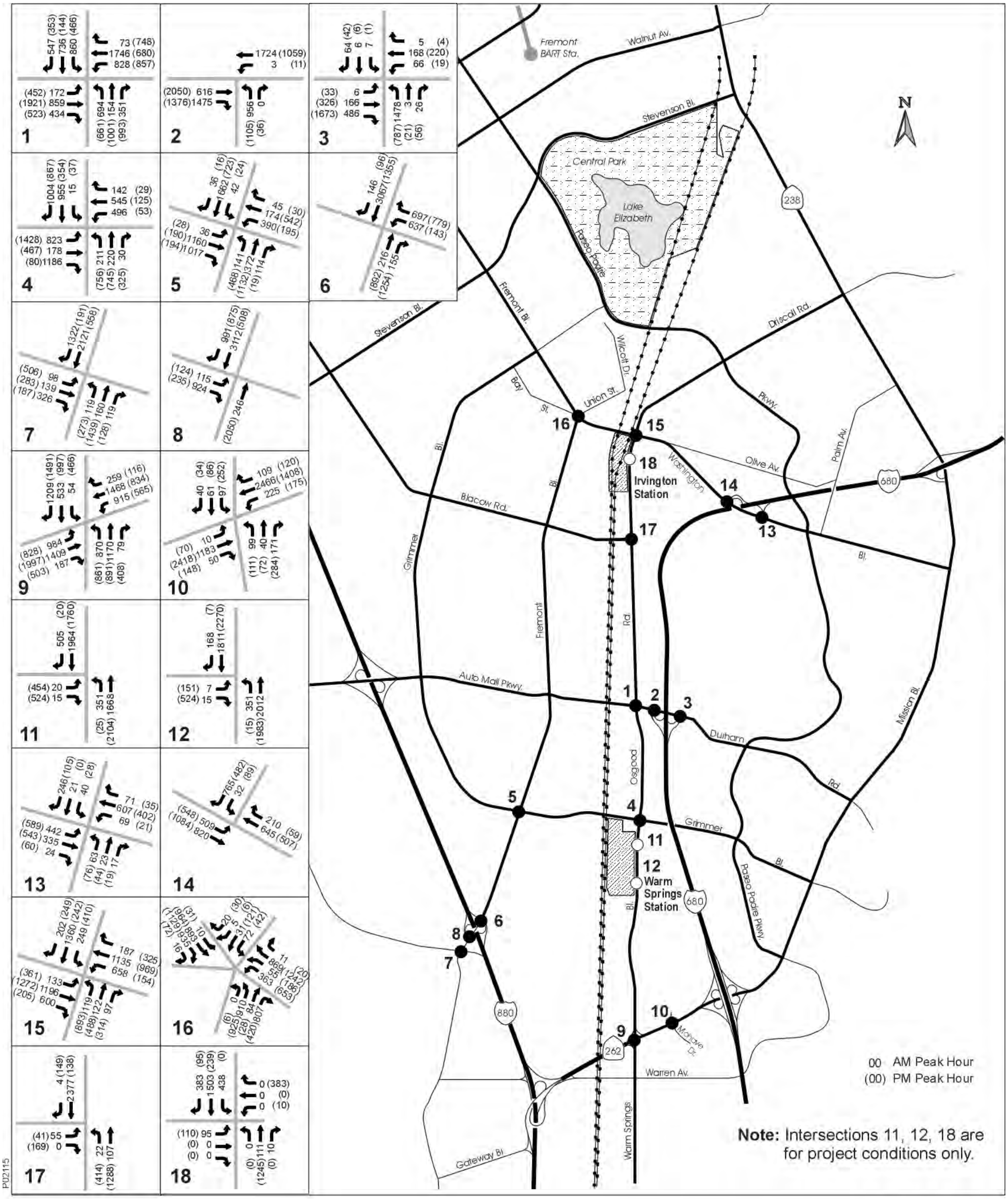
Table 15-2
Intersection LOS, 2025 No Project and Proposed Project with optional Irvington Station plus SVRTC

		2025 No Project Condition				2025 Proposed Project with optional Irvington Station plus SVRTC			
		a.m. Peak Hour		p.m. Peak Hour		a.m. Peak Hour		p.m. Peak Hour	
#	Intersection	LOS[a]	v/c[b]	LOS	v/c	LOS[a]	v/c[b]	LOS	v/c
1	Osgood Road/Durham Road/Auto Mall Parkway	E	1.00	F	1.06	F	1.04	F	1.07
2	I-680 SB Ramps/Durham Road/Auto Mall Parkway	E	0.98	D	0.90	E	0.92	E	0.91
3	I-680 NB Ramps/Durham Road/Auto Mall Parkway	B	0.61	A	0.42	A	0.59	A	0.42
4	Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard	E	0.92	F	1.31	F	1.45	F	1.44
5	Fremont Boulevard/South Grimmer Boulevard	F	1.07	D	0.84	F	1.04	C	0.80
6	Fremont Boulevard/I-880 NB Ramps	D	0.83	A	0.42	D	0.82	A	0.38
7	Fremont Boulevard/I-880 SB On-ramp/Cushing Parkway	D	0.87	A	0.49	D	0.88	A	0.49
8	Fremont Boulevard/I-880 SB Off-ramp	D	0.86	A	0.51	D	0.86	A	0.50
9	Warm Springs Boulevard/Mission Boulevard	F	1.42	F	1.09	F	1.26	F	1.42
10	Mohave Drive/Mission Boulevard	B	0.66	D	0.81	B	0.67	D	0.83
11	Warm Springs Boulevard/Northern Warm Springs Station Entrance					D	0.82	D	0.87
12	Warm Springs Boulevard/Southern Warm Springs Station Entrance					C	0.78	D	0.89
13	I-680 NB Ramps/Washington Boulevard	A	0.58	D	0.86	B	0.61	B	0.64
14	I-680 SB Ramps/Washington Boulevard	C	0.71	B	0.70	A	0.57	A	0.59
15	Osgood Road/Washington Boulevard	D	0.89	D	0.85	E	0.92	D	0.88
16	Fremont Boulevard/Washington Boulevard/Bay St	E	0.98	F	1.13	E	0.98	F	1.15
17	Osgood Road/Blacow Road	C	0.77	A	0.46	C	0.77	A	0.46
18	Osgood Road/Irvington Station Entrance					A	0.55	B	0.70

[a] LOS = level of service.

[b] v/c = volume-to-capacity ratio.

Source: DKS Associates 2002



DKS Associates

Figure 15-1
2025 SVRT WITH PROPOSED PROJECT WITH OPTIONAL IRVINGTON STATION PEAK HOUR TURNING MOVEMENTS

15.2.4. Metropolitan Transportation System Roadways

The Alameda County Congestion Management Agency (CMA) requires an analysis of roadways included in the Metropolitan Transportation System (MTS) only during the p.m. peak hour. MTS roadway segments in the transportation study area are listed below. For the MTS roadway analysis, project traffic was assigned to the roadways using the trip distributions from the VTA-modified MTC model. The analysis was completed for the p.m. peak hour using the travel forecasts from the VTA-modified MTC model for 2010 and 2025. The capacities per lane used in the analysis were obtained from the City of Fremont. The number of lanes for each roadway segment was also obtained from the City of Fremont and confirmed in a field review.

Some roadway segments are expected to exhibit decreases in traffic volumes as a result of project conditions, while other segments are expected to exhibit increases. For informational purposes only, the number of roadway segments that would operate at LOS E or F are identified in Table 15-3. As discussed above, an impact on a roadway segment is considered significant if project trips cause that segment to deteriorate to LOS F, unless LOS F was measured when the County Congestion Management Plan was established in 1991. In addition, for informational purposes, Table 15-3 identifies the quantity of roadway segments that would experience small volume changes (2% to 4%) or large volume changes (5% or more).

Based on the CMA requirements, p.m. peak hour volumes on each of the MTS roadway segments were taken from the appropriate version of the VTA-modified MTC model. Park-and-ride and kiss-and-ride trips were added into each set of volumes to provide p.m. peak hour volumes for the links.

The following is a list of MTS roadways analyzed.

- I-580 between west of San Ramon Road and east of Tassajara Road.
- I-680 between south of Mission Boulevard (SR 262) and north of Mission Boulevard (SR 238).
- I-880 between south of Mission Boulevard and north of Decoto Road/SR 84.
- Alvarado-Niles Road between Mission Boulevard and I-880.
- Auto Mall Parkway between Grimmer Boulevard and Mission Boulevard.
- Decoto Road between Fremont Boulevard and Mission Boulevard.
- Dougherty Road north of Dublin Boulevard.
- Dublin Boulevard between San Ramon Road and Dougherty Road.
- Fremont Boulevard between I-880 and SR 84.
- Mission Boulevard between I-680 and Decoto Road.
- Mowry Avenue between I-880 and Mission Boulevard.
- Osgood Road between Grimmer Boulevard and Washington Boulevard.

- Paseo Padre Parkway between Mission Boulevard and Thornton Avenue.
- Peralta Boulevard between Fremont Boulevard and Mowry Avenue.
- SR 84 (Dumbarton Bridge) just east of the toll booths.
- Stevenson Boulevard between I-880 and Fremont Boulevard.
- Thornton Avenue between I-880 and Fremont Boulevard.
- Warm Springs Boulevard between Mission Boulevard and Grimmer Boulevard.
- Washington Boulevard between Mission Boulevard and Fremont Boulevard.

To evaluate the existing traffic conditions and provide a basis for comparison of conditions before and after project-generated traffic is added to the street system, roadway segment service levels and traffic volume changes were evaluated along 154 MTS roadway segments. Table 15-3 indicates the quantity of segments that would have volume changes of plus or minus 2%, and plus or minus 5%, as well as changes in the LOS.

Table 15-3 MTS
Roadway Analysis Summary, 2025 Proposed Project with optional Irvington Station plus SVRTC

Scenario	-5% or greater	-2 to -4%	+2 to +4%	+5% or greater	LOS Improvements		LOS Degradation	
					State Highway	Local Roadway	State Highway	Local Roadway
2025 No Project	31 state highway segments operating at LOS E or F							
2025 Proposed Project with optional Irvington Station plus SVRTC[a]	63	38	10	12	17	5	-	1
a Compare to the 2025 No Project								
Source: DKS Associates								

Compared to the 2025 No Project, the 2025 Proposed Project with optional Irvington Station plus SVRTC would result in the following changes during the p.m. peak hour.

- Four of the MTS state highway segments would show deterioration in the LOS.
- One of the MTS local roadway segments would show deterioration in the LOS.
- Seventeen of the MTS state highway segments would experience an increase in LOS.
- Five of the MTS local roadway segments would experience an increase in LOS.

The remaining 131 MTS roadway segments would continue to operate with similar LOS.

Appendix C includes the detailed MTS roadway analysis sheets for the year 2025 Proposed Project with optional Irvington Station plus SVRTC Scenario.

15.2.5. Transit

Transit Facilities

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be two new BART stations built in the City of Fremont: Irvington and Warm Springs.
- BART would extend into Santa Clara County and would stop at the following new stations in Santa Clara County: Montague / Capitol, Berryessa, Alum Rock, Civic Plaza / SJSU, Market Street, Diridon / Arena and Santa Clara.
- There would be two pairs of daily BART lines in each direction serving south of existing Fremont Station. Combined, they would provide a 6.0 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 12 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport. Under the Proposed Project these lines would be extended south to the proposed Warm Springs Station with stopping at the optional Irvington Station.
- All BART lines would experience an improvement in headways from 15 minutes to 12 minutes. These increased headways throughout the existing BART network would be made possible through the implementation of Advanced Automatic Train Control (AATC).
- A third pair of BART lines would operate during the AM and PM peak periods only, from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would no longer operate from Santa Clara County to the Warm Springs Station via I-680, Mission Boulevard and Warm Springs Boulevard. Instead enhanced local VTA services would operate in this corridor.
- New express services would be provided over the Sunol Grade from the Central Valley, Contra Costa, and Tri Valley to connect to BART services at Warm Springs Station.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.
- A new ACE / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- Increased headways on BART would be made possible through the implementation of Advanced Automatic Train Control (AATC).
- The BART extension to Millbrae would be open and operational with 12-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.
- The West Dublin BART station would be operational and have service headways of 12 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 12 minute headways.
- CalTrain would extend service to the Transbay Terminal.
- The CalTrain Baby Bullet express service would operate along the Peninsula with 60 minute headways and a limited stop service.
- ACE headways would be increased to 30 minute peak service inbound in the AM and outbound in the PM.
- Capitol Corridor service would be increased to 60 minute headways all day in both directions.

Station Entries and Exits

Table 15-4 lists the daily station entries and exits and the system boardings for both the existing and proposed stations in southern Alameda County for the 2025 conditions. As reference only, the entries and exits at the proposed Santa Clara County stations are listed under the Proposed Project with the optional Irvington Station plus SVRTC for 2025. This table provides a comparison between the Proposed Project and the No-Project conditions. As expected, there are fewer entries and exits at the Fremont BART Station because it would no longer be the terminus. Transfers that were using the Fremont Station would be relocated to either the Warm Springs Station or, with implementation of SVRTC, the stations in Santa Clara County.

Table 15-4
Station Entries and Exits – 2025 Proposed Project with optional Irvington Station plus SVRTC

Station	No Project	Proposed Project with Optional Irvington Station plus SVRTC
Southern Alameda County Existing Stations		
Union City	11,400	16,600
Fremont	17,100	14,100
Southern Alameda County Existing Stations Subtotal	**28,500**	**30,700**
Proposed Project Stations		
Irvington	—	9,400
Warm Springs	—	15,400
Proposed Project Stations Subtotal	**—**	**24,700**
Southern Alameda County Proposed and Existing Stations Subtotal	**28,500**	**55,400**
SVRTC Stations Subtotal	—	108,000
BART Systemwide Total Entries and Exits	972,800	1,138,000
BART Systemwide Total Boardings	486,400	569,000

Notes:
Station-level and subtotal values are for station entries and exits (i.e. total persons entering and leaving station areas). Total systemwide boardings was calculated by dividing entries and exits by two.

Cumulative analysis of the Proposed Project plus SVRTC, if it is adopted, is discussed below in Section 3.9.6. For convenience of comparison, this table presents results for the Proposed Project and for the Proposed Project plus SVRTC.

Southern Alameda County stations are the existing Union City and Fremont Stations plus the proposed Warm Springs and optional Irvington Stations.

All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

In summary, the following observations can be made from the table.

- At the Fremont BART Station under all 2025 conditions, station entries and exits would decrease compared to the 2025 No-Project condition. Entries and exits would decrease by 3,000 under the Proposed Project with optional Irvington Station plus SVRTC condition.
- In 2025 with implementation of SVRTC, there would be an increase of 5,200 entries and exits at the Warm Springs Station compared to the Proposed Project. When the Proposed Project with optional Irvington Station and the Proposed Project with optional Irvington Station plus SVRTC are compared, there would be another 2,800 entries and exits at the two new southern Fremont stations.

- Compared to the 2025 No-Project condition, southern Alameda County would experience an increase of 26,900 entries and exits under the Proposed Project with optional Irvington Station plus SVRTC condition.
- In 2025 with implementation of the Proposed Project with optional Irvington Station plus SVRTC, entries and exits systemwide would increase by approximately 163,800.

Ridership

Station to Station Matrices

Table 15-5 lists the BART productions and attractions between stations for the 2025 No Project Condition and Table 15-6 lists the BART productions and attractions between stations for the 2025 Proposed Project with optional Irvington Station plus SVRTC. All tables are shown as daily numbers and are rounded to the nearest ten. Full station-to-station ridership tables are shown at the back of this appendix. In these tables, "Other Bay Area" refers to the other areas of the Bay Area that currently (or will in 2025) have BART service. This includes Alameda, San Francisco, San Mateo, Contra Costa and Santa Clara Counties. The North Bay is excluded from this analysis.

Overall, there is a 16 percent increase in the number of trips on the BART system when the 2025 Proposed Project with optional Irvington Station plus SVRTC condition is compared to the 2025 No Project condition. These tables show that many of the travelers from Fremont, Irvington, and Warm Springs would travel to San Francisco and Oakland (63 percent in the 2025 No Project Condition and 27 percent for the 2025 Proposed Project with optional Irvington Station plus SVRTC), even though there are very few travelers in the opposite direction from San Francisco / Oakland into one of the study area stations.

There are nearly 50 percent of travelers from the study area stations would be traveling south into Santa Clara County. From the other direction, there would be 15 percent of travelers from Santa Clara County would travel to one of the three study area stations.

Of those trips that would be attracted to one of the three study area stations, 51 percent of travelers would come from Santa Clara, with a further 14 percent coming from the Fremont BART station, the Irvington BART station or the Warm Springs BART station.

Table 15-6 also indicates that of the three study area stations: Fremont, Irvington and Warm Springs, nearly double the number of trips would be attracted to the Warm Springs Station when compared to the Fremont Station and nearly four times as many trips from the Irvington Station. In terms of productions, the Fremont BART station would produce more trips, followed by the Irvington Station and then the Warm Springs Station.

Table 15-5
Station to Station BART Matrix – 2025 No Project

Productions	Attractions Fremont	San Francisco / Oakland	Other Bay Area	Totals
Fremont	N/A	6,980	4,100	11,080
San Francisco / Oakland	530	25,640	32,950	59,120
Other Bay Area	5,490	305,250	105,490	416,230
Totals	6,020	337,870	142,540	486,430

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Table 15-6
Station to Station BART Matrix – 2025 Proposed Project with optional Irvington Station plus SVRTC

Productions	Attractions Fremont	Irvington	Warm Springs	San Francisco / Oakland	Other Bay Area	Santa Clara County	Totals
Fremont	N/A	240	530	3,190	2,020	3,950	9,930
Irvington	230	N/A	500	1,740	1,030	3,490	6,760
Warm Springs	290	230	N/A	1,130	1,000	3,660	5,790
San Francisco / Oakland	260	100	370	25,700	33,320	4,800	64,550
Other Bay Area	2,140	760	2,700	304,050	106,210	17,500	433,360
Santa Clara County	1,270	1,030	4,960	9,090	4,670	26,800	47,820
Totals	4,190	2,120	8,030	344,900	148,250	60,200	568,210

Note:
San Francisco / Oakland includes the following BART stations: Embarcadero, Montgomery, Powell, San Francisco Civic Center, 12th Street Oakland and 19th Street Oakland.

Source: DKS Associates 2002 from the VTA modified MTC model

Ridership

Table 15-7 lists the rail ridership for the 2025 Proposed Project with optional Irvington Station plus SVRTC scenario. With implementation of the Proposed Project plus SVRTC, there would be a nearly 200% increase in the overall ridership levels on the BART segment between the Union City and Fremont BART Stations. There would be a slight decrease (5%) in ridership on the ACE trains with implementation of the Proposed Project. There would be a further decline in the ridership on ACE with implementation of the Proposed Project with optional Irvington Station plus the two SVRTC options.

Ridership declines would be even greater for the Capitol Corridor. Under the SVRTC scenarios, Capitol Corridor ridership drops sharply at the Alameda/Santa Clara County line. The Capitol Corridor could retain many long-distance riders traveling between

Santa Clara County and points outside the BART service area (e.g., Fairfield, Davis, and Sacramento). This market currently comprises about half of the Capitol Corridor's Santa Clara County ridership (Capitol Corridor Joint Powers Authority 2002). However, any of the following reasons may cause many potential Capitol Corridor riders traveling between Santa Clara County and points within the BART service area (e.g. Richmond, Oakland, Hayward) to elect to ride BART instead.

- BART has more frequent operating headways (6 minutes compared to hourly on the Capitol Corridor).
- BART is more centrally located to areas of high population and employment.
- BART provides direct connections between downtown San Jose, Oakland, and San Francisco.

Schedule reliability issues may also impact Capitol Corridor ridership, although reliability was not addressed per se in the ridership model. Running-time adherence to within a few minutes of published schedules is particularly important when riders must connect to other transit services to reach their destinations. On-time performance can be difficult to achieve over long distances. Most Capitol Corridor trains originate in Sacramento, 134 miles from San Jose; some trains start as far away as Auburn, 170 miles from San Jose. Sharing tracks with freight trains can sometimes delay Capitol Corridor trains as well.

In some ways, the Capitol Corridor and BART will complement each other. For example, direct transfers between the two rail lines would be available at the planned Coliseum and Union City intermodal transit facilities. This connectivity would enable riders to use whichever system or combination of systems that best suits their needs.

Table 15-7
Rail Ridership –2025 Proposed Project with optional Irvington Station plus SVRTC

Station A	Station B	Mode	2025 No Project	2025 Proposed Project with optional Irvington Station plus SVRTC
Union City	Fremont	BART	18,100	52,300
Fremont	Irvington	BART	N/A	51,200
Irvington	Warm Springs	BART	N/A	52,400
Warm Springs	Montague / Capitol	BART	N/A	54,300
Alameda County Line		ACE	11,700	6,900
Alameda County Line		Capitol Corridor	2,800	1,000 [a]
Notes: [a] Capitol Corridor Ridership has been manually adjusted to better reflect the operating conditions. This is due to the modeling process underestimating commuter rail.				
Source: DKS Associates 2002 from the VTA modified MTC model				

Table 15-8 lists the projected ridership for the AC Transit service which would provide local services only. Under the Proposed Project plus SVRTC Option, no VTA services would be provided to the Warm Springs Station area. Instead there would be enhanced buses provided over the Sunol Grade from Contra Costa County, San Joaquin County and the Tri Valley area of Alameda County. The total bi-directional ridership levels (for AC Transit services only) are provided at the following locations:

- Paseo Padre between Fremont BART station and the Irvington Station location (AC Transit)
- Warm Springs Boulevard / Osgood Road between the Irvington Station location and the Warm Springs Station location (AC Transit)
- Warm Springs Boulevard between South Grimmer Boulevard and Mission Boulevard (AC Transit)
- Warm Springs Boulevard between Mission Boulevard and Kato Road (AC Transit)
- Warm Springs Boulevard south of Kato Road (at the Alameda County / Santa Clara County line) (AC Transit)
- I-680 south of Mission Boulevard (VTA)

This table also makes a comparison back to the 2025 No Project condition. Under the 2025 Proposed Project plus SVRTC condition there would be fewer riders on many of the local AC Transit routes, with a small increase on the routes serving Fremont Boulevard. It is likely that some of the projected ridership on the BART extension would transfer from the local AC Transit buses.

Table 15-8
Bus Ridership – 2025 Proposed Project with optional Irvington Station plus SVRTC

Operator	Road	Vol 2025 NP	Vol 2025 CP No I
AC Transit	Paseo Padre between Fremont BART Stn and Irvington Stn	1200	400
AC Transit	Osgood Road between Warm Springs Stn and Irvington Stn	200	0
AC Transit	Warm Springs Boulevard between Grimmer Boulevard and Mission Blvd	400	400 (3100 VTA)
AC Transit	Fremont Boulevard between Auto Mall Parkway and Blacow Rd	300	400
AC Transit	Warm Springs Boulevard between Mission Boulevard and Kato Rd	1200	700
AC Transit	Warm Springs sth of Kato	1300	400

Source: DKS Associates 2002 from the VTA modified MTC model

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A linked trip consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring onto BART at a BART station and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but is not considered a linked transit trip.

The mode share (linked transit trips) for the Proposed Project with optional Irvington SVRTC alternatives is listed in Table 15-9. In 2025 with implementation of the Proposed Project with optional Irvington Station plus SVRTC, there would be an increase of 58% (slightly lower overall than the Proposed Project plus SVRTC option) in linked transit riders in the corridor compared to the 2025 No-Project condition. Linked transit trips to the southern Alameda County area would increase by 80%, and the linked transit trips would increase by just under 105% compared to the 2025 No-Project condition.

Table 15-9
Linked Transit Trips – 2025 Proposed Project with optional Irvington Station plus SVRTC

Trips:	2025 No Project	2025 Proposed Project with optional Irvington Station plus SVRTC	Percent Change
Intra – Fremont/ Newark/ Union City only	11,100	12,500	12.6%
To Southern Alameda County (superdistrict 16)	8,600	15,500	80.2%
From Southern Alameda County (superdistrict 16)	25,300	37,800	49.4%
Through Southern Alameda County	11,800	24,100	104.2%
Total WSX Corridor Transit Trips	**56,800**	**89,900**	58.3%
Change from No-Build		**33,100**	
Intra Santa Clara Transit Trips	243,000	253,300	4.2%

Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (e.g., Hayward to San Jose).
All numbers have been independently rounded to nearest 100; Totals may not sum up to displayed value

Source: DKS Associates 2002 from the VTA modified MTC model

Mode of Access/Egress

A mode of access analysis provides the potential demands for parking, kiss-and-ride, walk access, and the need for transit provision at each of the stations. The proposed Montague/Capitol Station (the first station south of Warm Springs) is also listed for the two SVRTC scenarios. Table 15-10 list the mode of access/egress at each of the southern Alameda stations for the 2025 No Project Condition and the 2025 Proposed Project with optional Irvington Station plus SVRTC, respectively. These figures have been rounded to the nearest hundred.

In summary, the table presents the following information for the SVRTC alternative.

- Park-and-ride demand at the Fremont Station would decline compared to the 2025 No-Project condition. Kiss-and-ride demand would also decline when the two scenarios are compared.

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Table 15-10
Mode of Access/Egress – 2025 No Project and 2025 Proposed Project with optional Irvington Station plus SVRTC

	Mode of Access				
Station	**PNR**	**KNR**	**Walk/Bike**	**Transit XFER**	**Total Entries and Exits**
2025 No Project					
Union City	3,600	2,100	900	4,700	11,400
Fremont	5,100	2,600	1,800	7,500	17,100
Irvington	0	0	0	0	0
Warm Springs	0	0	0	0	0
Southern Alameda total	8,700	4,700	2,700	12,200	28,500
2025 Proposed Project with Optional Irvington Station with SVRTC					
Union City	6,400	1,700	1,400	7,000	16,600
Fremont	5,000	1,000	3,400	4,500	14,100
Irvington	3,200	700	2,300	3,200	9,400
Warm Springs	2,000	400	5,300	7,700	15,400
Montague / Capitol	3,700	900	1,300	15,600	21,500
Southern Alameda total (without Montague / Capitol)	16,600	3,800	12,400	26,000	55,400

Notes:
PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to nearest hundred; Totals may not sum up to displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

Travel Times

This section consists of sets of travel time comparisons between selected residential locations (northwest Milpitas, Irvington, Fremont, Union City, and Hayward) and selected Bay Area employment centers (downtown San Francisco; downtown San Jose, 1st Street and the Diridon Caltrain Depot; Lockheed Martin Corporation facilities in Sunnyvale; and the Pacific Commons development in Fremont).

The locations have been selected to be representative examples. The small set of times is not intended to characterize all travel patterns changed by the Proposed Project. Transit riders' destinations in the Fremont-Warm Springs area are very diffuse, with no single area dominating. Transit ridership from MTC Super District 16 (Fremont-Union City and Newark) to other parts of the Bay Area is projected to be roughly similarly split among San Francisco, the South Bay (including San Mateo County), and the rest of the East Bay. Therefore, the list of travel time comparisons is intended to capture the essence of area-wide changes associated with the BART extension alternatives.

In some cases, transit is competitive with highway times in all alternatives (for example, northwest Milpitas to downtown San Francisco). In other cases, transit travel times improve substantially for one or more of the build alternatives (for example, Irvington to NUMMI). However, there is also one case (Milpitas to Pacific Commons) where transit is not competitive with auto travel, even with improved transit times, due to the need to transfer and the absence of traffic congestion for this specific origin–destination pair.

Table 15-11 provides a comparison of a.m. peak hour travel time (in minutes) between the 2025 No Project and Proposed Project with optional Irvington Station plus SVRTC conditions. Auto travel times would remain roughly constant among the various alternatives analyzed due to the peak spreading function built into the VTA-modified MTC model. When demand during the peak hour exceeds capacity, the excess vehicles are shifted to either earlier or later than the peak hour. The shifting of trips from auto to transit would result in less peak spreading but would not affect auto travel times during the peak hour.

The travel time comparisons between each scenario are listed in Table 15-11 for selected pairs of destinations. Transit travel time savings are highest when both the origin and the destination are located adjacent to the BART system, such as from Irvington to Downtown San Jose.

Table 15-11
AM Peak Hour Travel Times – 2025 Proposed Project with optional Irvington Station plus SVRTC

			Transit	
Sample Trip (Origin-Destination)	Drive Alone	Carpool	2025 No Project	Proposed Project with Optional Irvington Station plus SVRTC
Northwest Milpitas-Northwest Downtown San Francisco	110	85	71	72
Northwest Milpitas-Northwest Pacific Commons	20	26	86	53
Irvington-Nummi	11	18	40	18
Irvington-Downtown San Jose	40	47	82	30
Fremont-Lockheed	52	49	98	57
Fremont-Pacific Commons	14	21	45	45
Union City-Diridon Caltrain Depot	60	60	69	53
Union City-Downtown San Jose	58	58	79	49
Hayward-Lockheed	72	60	75	69

Notes:
Travel times include all modes, including walking, driving, waiting, in-vehicle travel, and other times as appropriate.
Hayward location is assumed to be at the city center
Union City location is approximately the Dyer/Alvarado-Niles Boulevard intersection (west of I-880).
Fremont location is approximately the Stevenson Boulevard/Paseo Padre Parkway intersection.

Source: DKS Associates, 2002 from VTA-modified MTC model

In a few select cases transit travel times increase under the Proposed Project with optional Irvington Station plus SVRTC compares to the No Project. An example of this difference is the trip from Union City to Downtown San Jose. Under No Project Alternative, the traveler uses relatively infrequent Capitol Corridor service to travel to the Diridon Station in San Jose and the transfer to bus. Under the Proposed Project with optional Irvington Station plus SVRTC, the traveler uses more frequent BART service to travel to Warm Springs and transfer to bus for the trip to Downtown San Jose.

An example of the difference between actual and perceived time is evident in the Union City to downtown San Jose trip. Under the No-Project scenario, the rider would drive to the Union City Capitol Amtrak Station and ride Amtrak to the San Jose-Diridon Station. The rider would then need to transfer to a connecting bus to reach their downtown destination. Under the Proposed Project scenario, the rider would drive to the South Hayward BART Station[1] and ride to Warm Springs. The rider would then transfer to the VTA Route 180 bus to get to downtown San Jose. The key element for this trip is that BART would operate much more frequently than the Capitol Corridor trains. Even though the total trip takes more time, the Proposed Project would allow the rider get on a train sooner, thus alleviating the need to wait a comparatively longer time for the Capitol Corridor train to arrive.

The addition of the optional Irvington Station would add 1.0 minute of additional travel time on BART. This is seen in a number of the transit time comparisons such as Fremont to Lockheed and Union City to downtown San Jose.

It should be noted that BART park-and-ride lots are reserved for BART patrons only. This helps explain some of the travel time differences between alternatives. For example, travel times from Irvington to downtown San Jose decrease substantially when the optional Irvington BART Station is added. Under the Proposed Project, Irvington riders would drive to Fremont and ride one station to Warm Springs before transferring to the VTA Route 180. The optional Irvington Station would substantially increase convenience for these riders as they would have a shorter park-and-ride access time, and a shorter BART ride to Warm Springs.

The other viable option would be to ride a local bus from Irvington to Warm Springs to access the VTA 180 to downtown San Jose (the path chosen in the No-Project Alternative). However, overall travel times indicate that it would be shorter to "backtrack" to Fremont BART than to use the local bus option. BART is much faster than local bus routes and operates much more frequently. In addition, the actual drive access time to the Fremont BART station is nearly equal to the actual walk time to the local bus stop.

Finally, the travel time calculations do not factor in trip reliability. Highway travel times, for example, can vary greatly depending on weather, special events, accidents, and traffic volumes. Rail systems with exclusive rights-of-way can enhance transit reliability, although severe disruptions can occur. Ridership models typically do not capture how day-to-day trip time reliability affects mode choice.

[1] Due to the specific starting location of the trip in northern Union City and the crowded parking facilities at the Union City BART Station, the travel path went through the South Hayward BART Station.

Load Factors

Table 15-12 lists the load factors for the BART lines that service the area, including the Dublin / Pleasanton line. These factors are shown from the Fremont BART station to the Bay Fair station and from the Dublin / Pleasanton Station to Bay Fair station. The average ridership for the peak eight hours and the AM peak hour is also listed in this table.

Table 15-12
Load Factors – 2025 Proposed Project with optional Irvington Station plus SVRTC

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
San Francisco Lines									
Santa Clara	Diridon / Arena	2177	5175	327	776	5	5	0.104	0.246
Diridon / Arena	Market St	5053	5609	758	841	5	5	0.241	0.267
Market St	Civic Plaza / SJSU	5685	10423	853	1563	5	5	0.271	0.496
Civic Plaza / SJSU	Alum Rock	5711	11209	857	1681	5	5	0.272	0.534
Alum Rock	Berryessa	8160	9295	1224	1394	5	5	0.389	0.443
Berryessa	Montague	8977	9650	1347	1448	5	5	0.428	0.460
Montague	Warm Springs	10174	13192	1526	1979	5	5	0.484	0.628
Warm Springs	Irvington	9324	13445	1399	2017	5	5	0.444	0.640
Irvington	Fremont	10526	12262	1579	1839	5	5	0.501	0.584
Fremont	Union City	12823	11264	1923	1690	6	6	0.509	0.447
Union City	South Hayward	16828	9595	2524	1439	6	6	0.668	0.381
South Hayward	Hayward	18958	9006	2844	1351	6	6	0.752	0.357
Hayward	Bay Fair	21891	9141	3284	1371	6	6	0.869	0.363
Richmond Lines									
Santa Clara	Diridon / Arena	1457	4801	219	720	5	5	0.156	0.514
Diridon / Arena	Market St	3293	5156	494	773	5	5	0.353	0.552
Market St	Civic Plaza / SJSU	3027	9844	454	1477	5	5	0.324	1.055
Civic Plaza / SJSU	Alum Rock	3016	10597	452	1590	5	5	0.323	1.136
Alum Rock	Berryessa	4528	8676	679	1301	5	5	0.485	0.929
Berryessa	Montague	4939	8980	741	1347	5	5	0.529	0.962
Montague	Warm Springs	5292	12391	794	1859	5	5	0.567	1.328
Warm Springs	Irvington	3850	12757	578	1914	5	5	0.413	1.367
Irvington	Fremont	3960	11578	594	1737	5	5	0.424	1.241
Fremont	Union City	4102	10430	615	1565	5	5	0.439	1.118
Union City	South Hayward	4927	8773	739	1316	5	5	0.528	0.940
South Hayward	Hayward	5301	8225	795	1234	5	5	0.568	0.881
Hayward	Bay Fair	6169	8373	925	1256	5	5	0.661	0.897

		Peak 8 Hours		Peak Hour		Trains per Hour		Peak Hr Load Factor	
		NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
Dublin / Pleasanton Line									
Dublin / Pleasanton	West Dublin	16049	2937	2407	441	5	5	0.764	0.140
West Dublin	Castro Valley	19877	3321	2982	498	5	5	0.947	0.158
Castro Valley	Bay Fair	23392	3443	3509	516	5	5	1.114	0.164

Notes: NB/WB – Northbound / Westbound
SB/EB – Southbound / Eastbound
70 seats per BART car
The San Francisco Lines are assumed to have 9 cars per train,
The Richmond Line is assumed to have 4 cars per train
The Dublin/Pleasanton Line is assumed to have 9 cars per train

Source: DKS Associates 2002 from VTA modified MTC model

Most load factors during the Proposed Project with Optional Irvington Station plus SVRTC conditions show an availability of seats except the Richmond trains that are traveling southwards. In the Warm Springs study area most of the segments are showing that demand exceeds capacity. It should be noted that the excess demand will be forced to stand over these segments.

15.2.6. Parking

Parking demand was estimated by using the adjusted VTA modified MTC forecasts of auto spaces, divided by the auto occupancy factor for peak period auto access to park-and-ride, which is 1.06 (from existing occupancy surveys conducted at the Fremont BART Station, *BART Station Access Improvements Study*).

Table 15-7 list the parking supply and demand at the three stations in the study area for the Proposed Project with optional Irvington Station plus SVRTC scenario.

Table 15-7
Parking Supply and Demand – Proposed Project with Optional Irvington Station plus SVRTC

	Fremont Station		Irvington Station		Warm Springs Station	
	Supply	**Demand**	**Supply**	**Demand**	**Supply**	**Demand**
2025	1,880	2,360	960	1,510	2,040	940

Parking supply based on presentation to the BART Warm Springs Extension Project Development Team Meeting, October 22, 2002. As stations are designed, actual parking supply could change.
Parking Demand based on VTA modified MTC model

Source: DKS Associates, 2002

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16. 2025 PROPOSED BUS ALTERNATIVE WITH SVRTC ENHANCED BUS

16.1. DESCRIPTION

The transportation model, as discussed previously, incorporates local and regional government projections of future background growth, land use and employment intensities and locations, along with programmed highway, street and transit improvements and the transportation consequences of other anticipated development projects for 2010 and 2025.

However, the projections of general regional growth and anticipated projects that are incorporated into the modeling analysis presented above do not include the proposed SVRTC (Silicon Valley Rapid Transit Corridor) project. Additional modeling analysis was performed in order to evaluate the potential cumulative effects of the Proposed Bus Alternative with SVRTC Enhanced Bus, if it is adopted (as well as regional growth).

An additional Bus Alternative was considered for the year 2025 as a cumulative scenario. If this Bus Alternative were implemented, the future scenario most consistent with VTA's SVRTC EIS/EIR would be their Baseline Alternative, which is an enhanced bus scenario. This Baseline Alternative is an option to the No-Project and BART Project Alternatives in the SVRTC EIS/EIR that provides for enhanced level of bus service to a future Warm Springs Station. If the proposed Bus Alternative were implemented, the VTA routes would transfer operations to the existing Fremont BART Station, with all routes using the dedicated busway. The Baseline Alternative includes dedicated bus ramps between Mission Boulevard and I-880, Mission Boulevard and I-680, and I-880 and SR 237. VTA's proposed Baseline Alternative was combined with the proposed Bus Alternative described above to create an option labeled proposed Bus Alternative with SVRTC Enhanced Bus.

The term "SVRTC Enhanced Bus" is used in this document to refer to the "Baseline Alternative" in VTA's Major Investment Study (MIS) for the SVRTC project. The MIS identified an extension of the BART system as the Preferred Investment Strategy for that project, which will be analyzed in VTA's forthcoming EIS/EIR. In addition, the SVRTC EIS/EIR will examine a "Baseline Alternative" as required by federal law, which incorporates an enhanced level of bus service to the BART Warm Springs Station using existing roads and highways.

The transportation projections for this analysis were based on the MTC travel demand model, as modified by VTA for this project. Inputs to the model include local and regional government projections of land use and employment intensities and locations, as well as programmed highway, street, and transit improvements. The model output for 2010 and 2025 conditions was reviewed and adjusted as described earlier in this document.

Since the transportation impacts analyses in this report are based on the adopted regional land use forecasts for 2010 and 2025, the cumulative transportation impacts of all such developments are included, and additional analysis of potential cumulative effects of specific projects would be redundant. Accordingly, the following assessment presents the combined effects of future background growth in conjunction with the Proposed Bus Alternative with SVRTC Enhanced Bus.

An analysis of the proposed Bus Alternative with SVRTC Enhanced Bus was conducted to provide a comparison with the Proposed Project (with optional Irvington Station). Measures that were compared, includeridership, linked transit trips, and mode of access/egress, mode share, and VMT/VHT.

16.2. IMPACTS

16.2.1. Transit

The following transit services are assumed to be provided in the Fremont area in this scenario.

- There would be two new transit centers built in the City of Fremont at Irvington and Warm Springs.
- There would be two pairs of daily BART lines in each direction serving the existing Fremont Station. Combined, they would provide a 6.0 minute average headway for service into downtown Oakland; with all-day service provided (each set of lines operates on 12 minutes headways). One pair of lines would provide direct service to Richmond and the other would provide service to San Francisco (24th Street Station). Connections would then need to be made in downtown San Francisco for service into San Francisco International Airport.
- A third pair of BART lines would operate during the AM and PM peak periods only from Fremont to San Francisco (24th Street Station). This train would only operate once per day in each direction.
- VTA express buses would operate from Santa Clara County to the Fremont Station via I-680, I-880, Mission Boulevard and Warm Springs Boulevard. VTA would also operate a number of extra buses in the system, some with very low headways (as low as three minutes). Direct connector ramps would be provided from I-880 and I-680 directly to the Warm Springs Transit Center.
- There would be enhanced bus services over the Sunol Grade (using I-580 with all buses converging on the Fremont BART station. Express buses would travel up to 60 miles from Stockton, Modesto, Tracy, Livermore and Pleasanton to the Warm Springs Transit Center. Some of these buses would complete their route at the Warm Springs Transit Center while others would continue onto Fremont BART Station using the dedicated busway.
- AC Transit would maintain service provision along Warm Springs Boulevard. Route 215 would operate with 15 minute headways during the peak periods and 30 minute headways during the off-peak period. Route 253 would operate with 60 minute headways during the peak period.

- A new ACE / Capitol Corridor train station would be provided at the Pacific Commons Development (west of I-880).
- Union City would become an intermodal transit facility with Capitol Corridor trains and BART trains providing service to the station.

Some of the other transit assumptions that have been made in the model that affect the broader Bay Area include:

- Increased headways on BART would be made possible through the implementation of Advanced Automatic Train Control (AATC).
- The BART extension to Millbrae would be open and operational with 12-minute headways between San Francisco International Airport (SFO) and Millbrae, between Millbrae and Pittsburg/Bay Point (without stopping at SFO), and between SFO and Dublin/Pleasanton BART Stations.
- The West Dublin BART station would be operational and have a service headway of 12 minutes between Dublin / Pleasanton and SFO.
- The Oakland International Airport Connector would operate between the Coliseum BART station and the Oakland International Airport with 15 minute headways.
- CalTrain would extend service to the Transbay Terminal.
- The CalTrain Baby Bullet express service would operate along the Peninsula with 60 minute headways with a limited stop service.
- ACE headways would be increased to 30 minute peak service inbound in the AM and outbound in the PM.
- Capitol Corridor service would be increased to 60 minute headways all day in both directions.

New Transit Ridership

An examination of changes to linked transit trips indicates the number of new patrons attracted to a new transit service. A "linked trip" consists of all modes used from the beginning of the trip to the end of the trip. For example a person leaves home, walks to their car, drives to the BART station, catches BART, and then walks from the BART station to work. As transit is involved in this example, it is considered a linked transit trip. Similarly, if the trip involved walking to the local bus stop, catching a bus, transferring to BART at a BART station, and then walking to the final destination, this would also be considered a linked transit trip. However, if the trip involved the person simply driving to work, it is still a linked trip (due to the walk connections at either end of the trip), but it is not considered a linked transit trip.

Two cumulative scenarios are also presented in Table 16-1 (2025 conditions) for informational purposes. First, projected linked transit trips for Proposed Project (with optional Irvington station) together the SVRTC project's BART Alternative are provided for comparison. Second, projected linked transit trips are presented for the proposed Bus Alternative together with a bus alternative being considered for the SVRTC project, the

"SVRTC Enhanced Bus." VTA's Major Investment Study (MIS) for the SVRTC project identified an extension of the BART system as the Preferred Investment Strategy for that project, which will be analyzed in VTA's forthcoming EIS/EIR. In addition, the SVRTC EIS/EIR will examine a "Baseline Alternative" as required by federal law, which incorporates an enhanced level of bus service to the BART Warm Springs Station. The Baseline Alternative also includes dedicated bus ramps between Mission Boulevard and I-880, Mission Boulevard and I-680, and between I-880 and State Route 237. To avoid confusion between the baseline conditions and No-Project Alternative applicable to BART's Proposed Project and the Baseline Alternative for VTA's SVRTC project, the Baseline Alternative is referred to here as the "SVRTC Enhanced Bus."

An EIR is required to consider the cumulative impacts of a proposed project together with "past, present and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency." CEQA Guidelines section 15130(b)(1)(A). EIRs generally do not consider speculative scenarios in which multiple agencies might choose alternatives to their respective proposed projects. Nevertheless, for purposes of comparison, Table 16-1 present the cumulative consequences for new transit ridership and mode of access if both agencies adopt their respective bus alternatives; i.e., if BART adopts its Bus Alternative for the Warm Springs project and VTA adopts its Enhanced Bus alternative for the SVRTC project. If the proposed Bus Alternative is implemented by BART, it is assumed that the VTA routes would transfer operations to the existing Fremont BART station with all routes using the dedicated busway.

Table 16-1
Linked Transit Trips – 2025 Proposed Bus Alternative with SVRTC Enhanced Bus

Trips	No Project	Proposed Project with Optional Irvington Station plus SVRTC	Proposed Bus Alternative with SVRTC Enhanced Bus
Intra	11,100	12,000	14,300
To	8,600	14,900	12,100
From	25,300	37,800	28,800
Through	11,800	24,400	15,200
Total WSX Corridor Transit Trips	**56,700**	**89,100**	**70,400**
Change from No Project	--	**32,400**	**13,700**
Intra Santa Clara Transit Trips	243,000	253,500	245,000

Notes:
Intra: Trips solely within Southern Alameda County (MTC Super District 16: Fremont, Union City and Newark).
To: Trip attractions to SD 16.
From: Trip productions from SD 16.
Through: Trips passing through SD 16 (.e.g., Hayward to San Jose).
Cumulative analysis of the Proposed Project together with the SVRTC BART alternative, if it is adopted, is discussed below in Section 3.9.6. For convenience of comparison, this table presents results for the Proposed Project and for the Proposed Project together with the SVRTC BART alternative.
All numbers have been independently rounded to the nearest hundred. Totals may not sum to displayed volumes.
Source: DKS Associates, 2002 from VTA-modified MTC mode

The following information summarizes the information presented in the previous table.

- In 2025, with implementation of the proposed Bus Alternative with the SVRTC Enhanced Bus, there would be an increase of more than 24% in new transit riders in the area when compared to the 2025 No-Project condition, with increases in all directions. When the proposed Bus Alternative with the SVRTC Enhanced Bus is compared to the Proposed Project with optional Irvington Station with SVRTC there would be fewer riders overall, except for the internal trips.

Mode of Access/Egress

The mode of access/egress analysis provides the potential demands for parking, auto drop-off locations, walk access, and the need for transit bus facilities for transfers among bus routes or between BART and buses at each of the stations.

Table 16-2 lists the mode of access/egress to each of the stops along the proposed Bus Alternative route for 2025. For comparison purposes, the mode of access/egress for the BART stations is also shown. The table indicates that there would be no patrons driving to the Fremont BART Station to use the proposed Bus Alternative, although there would be transit transfers at the Fremont BART Station.

In 2025, almost one half of riders using the proposed Bus Alternative transfer between BART and buses at the Fremont BART station or transfer between buses at the Irvington and Warm Springs Transit Centers according to Table 16-2. More than one-quarter of the proposed Bus Alternative riders walk or use bicycles to either access or egress the buses and slightly less than one-quarter of the proposed Bus Alternative riders park-and-ride or kiss-and-ride to either the Irvington or Warm Springs Transit Centers. Users of the proposed Bus Alternative would not be permitted to park-and-ride from the Fremont BART station because only BART riders are allowed to use these parking facilities. Under the 2025 proposed Bus Alternative with SVRTC Enhanced Bus, the proportion of riders walking or bicycling to or from bus stops would increase while the proportion of riders using automobiles to access buses would decrease compared to proposed Bus Alternative. The proportion of BART to bus transfers and bus to bus transfers continues to be almost half of the users with a noticeable increase of bus to bus transfers at the Warm Springs Transit Center under the 2025 proposed Bus Alternative with SVRTC Enhanced Bus.

Table 16-2
Mode of Access/Egress -- 2025 Proposed Bus Alternative with SVRTC Enhanced Bus

	Mode of Access/Egress				
Station	PNR	KNR	Walk/ Bike	Transit XFER	Total
2025 No Project					
Fremont BART station	5,100	2,600	1,800	7,500	17,100
Irvington BART station	0	0	0	0	0
Warm Springs BART station	0	0	0	0	0
Southern Alameda total	5,100	2,600	1,800	7,500	17,100
2025 Proposed Project with Optional Irvington Station					
Fremont BART station	4,100	800	2,600	2,900	10,500
Irvington BART station	2,500	500	1,600	1,700	6,200
Warm Springs BART station	3,600	800	2,500	8,900	15,700
Southern Alameda total	14,800	4,100	7,700	18,500	44,900
2025 Proposed Bus Alternative					
Fremont BART station [1]	0	0	500	12,200	12,700
Paseo Padre / Stevenson	0	0	500	0	500
Irvington Transit Center	1,600	900	2,000	600	5,100
Auto Mall Parkway	0	0	700	0	700
Warm Springs Transit Center	2,800	1,100	3,800	600	8,400
Southern Alameda Total	4,400	2,000	7,500	13,400	27,400
2025 Proposed Project with Optional Irvington Station with SVRTC					
Fremont BART station	5,000	1,000	3,400	4,500	14,100
Irvington BART station	3,200	700	2,300	3,200	9,400
Warm Springs BART station	2,000	400	5,300	7,700	15,400
Montague/Capitol	3,700	900	1,300	15,600	21,500
Southern Alameda total (without Montague/Capitol)	16,600	3,800	12,400	26,000	55,400
2025 Proposed Bus Alternative with SVRTC Enhanced Bus					
Fremont BART station [1]	0	0	600	17,400	18,000
Paseo Padre / Stevenson	0	0	3,400	0	3,400
Irvington Transit Center	1,200	600	3,400	700	5,900
Auto Mall Parkway	0	0	900	0	900
Warm Springs Transit Center	3,000	1,400	5,000	2,200	11,600
Southern Alameda Total	4,200	2,000	13,400	20,300	39,900

Notes:

[1] Does not include the mode of Access / Egress for BART patrons. Only the Proposed Bus Alternative patrons are included.

PNR = Park-and-ride
KNR = Kiss-and-ride
XFER = Transfer
All numbers have been independently rounded to the nearest hundred: totals may not sum up to the displayed value

Source: DKS Associates, 2002 from VTA modified MTC model

In general, the proposed Bus Alternative would have fewer people going to or coming from the stations than the Proposed Project with the optional Irvington Station in 2025. While the proportion of riders transferring between buses or between BART and buses would be larger under the proposed Bus Alternative compared to the Proposed Project with the optional Irvington Station, the actual number of transfers would be larger under the Proposed Project with the optional Irvington Station. These relationships also apply when comparing the proposed Bus Alternative with SVRTC Enhanced Bus to the Proposed Project with the optional Irvington Station with SVRTC. The total number of riders walking or bicycling to or from the stations would be virtually equal between the proposed Bus Alterntaive and the Proposed Project with the optional Irvington Station. The Proposed Bus Alternative with SVRTC Enhanced Bus would have the greater number of walkers and bicyclists than the Proposed Project with the optional Irvington Station with SVRTC. The total number of people using the stations under the proposed Bus Alternative with SVRTC Enhanced Bus is lower than users of the stations with the Proposed Project with the optional Irvington Station with SVRTC.

17. CONSTRUCTION

17.1 DESCRIPTION

The construction of the Proposed Project, would introduce temporary, construction-related traffic impacts. Construction vehicles and equipment would use local roadways to access construction zones along the Proposed Project alignment. Trucks and equipment traffic could temporarily disrupt existing local traffic patterns during the 4-year construction of the Proposed Project. Construction traffic would include heavy equipment such as bulldozers, dump trucks, loaders, backhoes, and graders. Construction of retaining walls, embankments, and rails would also require cranes, concrete mixers, delivery trucks, compactors, and specialized track-laying equipment. Ballast would be hauled in from offsite. Workers driving to the construction site would also represent added traffic to the local and regional network.

Public roadways within the Proposed Project would not be blocked during construction, although temporary traffic rerouting and lane closures would be necessary although in some cases. Depending on the locations and times of day of reroutings and lane closures, disruption to local traffic circulation could potentially be significant. Contractor laydown locations could also disrupt local circulation, depending on the locations available.

Construction Impacts Related to Warm Springs Extension

In addition to the general effects of construction traffic and staging on existing traffic operations, the following potential impacts are anticipated in specific areas.

Fremont BART Station

The Proposed Project would require construction of an approximately 20-foot-high and 150-foot-wide embankment in the Fremont BART Station–Stevenson Boulevard area. Vehicular access and bus service at the Fremont Station could be affected during construction of the embankment. Current patterns of pedestrian and bicycle access could also be affected by construction. In addition, construction activity, including the potential use of a portion of the parking lot as a contractor laydown area, would require the temporary removal of approximately 200 existing parking spaces in the Fremont Station parking lot.

Walnut Boulevard

The Proposed Project would require construction of an overcrossing over Walnut Boulevard. Two lanes on Walnut Boulevard would be closed during construction of the center pier in the median. There would also be a temporary reduction in vehicle clearance height while temporary structural supports (falsework) are in place during construction of the bridge deck.

Stevenson Boulevard and Fremont Central Park

The Proposed Project would require construction of a tunnel beneath Stevenson Boulevard and Fremont Central Park. Portions of Stevenson Boulevard would be closed during construction of the tunnel. Traffic lanes would be temporarily diverted from Stevenson Boulevard to Fremont Central Park property, south of the existing alignment of Stevenson Boulevard, to minimize traffic disruption during tunnel construction,. Parking at Fremont Central Park could be temporarily reduced due to tunnel-related construction. In addition, a potential contractor laydown area would be located on a vacant parcel adjacent to the Proposed Project alignment, north of Stevenson Boulevard.

Paseo Padre Parkway

The Proposed Project would require construction of a grade-separated overpass over Paseo Padre Parkway. It may be possible to coordinate construction of the BART overpass with the City of Fremont's construction of an underpass at Paseo Padre Parkway, as part of the city's grade separations project. If the Proposed Project were to be constructed after the completion of the city's grade separation project, the two center lanes on Paseo Padre Parkway would need to be closed during construction of the center pier for the BART bridge structure, which would be located in the parkway median.

South Grimmer Boulevard

The Proposed Project would require construction of two BART bridge structures over South Grimmer Boulevard to replace the current grade-separated bridge used by Union Pacific Railroad (UP). Lanes on Grimmer Boulevard would be narrowed during construction of the bridges. Work that affects the UP tracks would be coordinated with UP and subject to railroad work restrictions.

Auto Mall Parkway

Should the Proposed Project require seismic retrofitting of the Auto Mall Parkway overpass structure (see Section 2.7.1), retrofit work could likely be performed from beneath the structure with little or no disruption to traffic on the deck above. Work that may affect the UP tracks beneath the overpass would be subject to railroad work restrictions.

Warm Springs BART Station

Construction of the Warm Springs Station would add construction equipment and worker traffic to the local and regional network as discussed above. In addition, the station site would be used as a storage and contractor laydown site during project construction. Construction of the new station access roadway would involve removing the existing curb at Warm Springs Court and grading 200 feet for the new roadway.

18. FREIGHT RAIL OPERATIONS

One railroad company currently operates in the proposed BART extension corridor, the Union Pacific Railroad (UPRR). The UPRR tracks currently are used approximately eight times a day (City of Fremont, *Pacific Union Homes General Plan Amendment EIR*, 1998).

Under the 2010 and 2025 Proposed Project scenarios, as well as under each project alternative, UPRR would operate on separate tracks and would not be impacted by BART or bus transit operations. UPRR would continue to use the westernmost (former SP) track. BART would cross under these tracks north of Paseo Padre Parkway and then run alongside south to the Warm Springs Station.

VTA, UPRR and BART are in the midst of negotiations and hope to reach agreement soon on the purchase/sale of the former Western Pacific (the easternmost) track. The negotiations include a Purchase and Sale Agreement, an Engineering and Construction Agreement, and a Trackage Rights Agreement.

UPRR has no active customer between Paseo Padre Parkway and South Grimmer Blvd, so there are no spurs to contend with in this area. South of South Grimmer, the UPRR would need to maintain service and storage capacity for NUMMI. This would require some local freight track modifications, and it is assumed that the scope of these modifications is part of the negotiations between BART and UPRR.

The only potential impacts to UPRR operations would be during the construction phases of the proposed project. These potential impacts, including railroad grade separation facilities, are discussed under the construction impacts section.

19. IMPACTS AND MITIGATION

19.1. TRANSIT IMPACTS

Impact 1 – Increase in new transit trips. The Proposed Project would result in an increase in new transit trips. Regional transit ridership, particularly for trips destined for, originating in, or passing through southern Alameda County would increase. Transit person trips would increase by 7,200 trips in 2025 with implementation of the Proposed Project in comparison to the No-Project conditions. As discussed in the MTS analysis below, increased transit usage would reduce auto congestion. This is a beneficial impact. (*Beneficial*.)

Mitigation – None required.

Impact 2 – Contribution to cumulative increase in new transit trips. Regional transit ridership, particularly for trips destined for, originating in, or passing through southern Alameda County, would increase. Transit person trips would increase with implementation of the Proposed Project compared to the No-Project Alternative. This increase in new transit trips would be 32,400 trips under the Proposed Project plus SVRTC compared to the No-Project Alternative in 2025. As discussed in the MTS analysis, increased transit usage would reduce auto congestion. This is a beneficial impact. (*Beneficial*.)

Mitigation – None required.

19.2. BICYCLE AND PEDESTRIAN IMPACTS RELATED TO WARM SPRINGS EXTENSION

Impact 3 – Obstruction of existing bicycle circulation facilities in the vicinity of the proposed station site. The existing bicycle facilities, under *Existing Conditions*, generally consist of signed bicycle lanes (a 15-foot travel lane with prohibited parking and no markings on the pavement) in the area of the proposed Warm Springs Station site. The Proposed Project would not create any bicycle hazards or eliminate any access compared to existing and No-Project conditions. (*No impact.*)

Mitigation – None required.

Impact 4 – Obstruction of existing pedestrian circulation facilities in the vicinity of the proposed station site. under *Existing Conditions*, the access roads to the proposed Warm Springs Station are generally not pedestrian oriented. The Proposed Project would not create any pedestrian hazards or eliminate any access compared to existing and No Project conditions. (*No impact.*)

Mitigation – None required.

19.3. BICYCLE AND PEDESTRIAN IMPACTS RELATED TO OPTIONAL IRVINGTON STATION

The bicycle and pedestrian impacts related to the optional Irvington Station would generally be the same as those related to the Proposed Project in that existing conditions in the vicinity of the optional Irvington Station are generally not bicycle or pedestrian oriented.

19.4. INTERSECTION AND ROADWAY IMPACTS RELATED TO WARM SPRINGS EXTENSION

19.4.1 Operational Impacts and Mitigation Measures, 2010

Impact 5 – 2010 change in V/C and LOS at the intersection of Osgood Road/Durham Road/Auto Mall Parkway. Under 2010 Proposed Project conditions, the intersection of Osgood Road/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 0.90 and LOS D in the a.m. peak hour, and at a V/C ratio of 1.06 and LOS F in the p.m. peak hour. Adding capacity to this intersection would require right-of-way acquisition and relocation of utilities. Signal timing and phasing changes would not reduce the v/c ratio enough to achieve an acceptable LOS. The intersection would require additional widening on both Auto Mall Parkway and Osgood Road, which would entail removal of sidewalks on the south side of Auto Mall as well as property takes from existing businesses. Widening of Auto Mall Parkway would be hindered by the roadway grade changes at this intersection and the proximity of the intersection to the I-680 southbound on-ramp to the east and the railroad overpass bridge structure to the west. No feasible mitigation measures are available to mitigate this impact. *(Significant and unavoidable.)*

Mitigation – None available.

Impact 6 – 2010 change in V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway. Under 2010 Proposed Project conditions, the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 0.99 and LOS E in the a.m. peak hour, and a V/C ratio of 0.91 and LOS E in the p.m. peak hour. Implementation of the following mitigation measure would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

Mitigation Measure 6 – Improve V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway. The intersection operations could be improved to a V/C ratio of 0.75 and LOS C in the a.m. peak hour, and a V/C ratio of 0.89 and LOS D in the p.m. peak hour with the conversion of an eastbound through lane to a shared right-turn/through lane (to create another right-turn lane). This measure could be accommodated within the existing right-of-way, although the southernmost eastbound through lane would need to be restriped to accommodate the measure. Although not achieving the goal of a V/C ratio of 0.85, the measure would result in LOS D operations, which reduce the impact to a less-than-significant level.

Impact 7 – 2010 change in V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard. Under 2010 Proposed Project conditions, the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard would operate at a V/C ratio of 0.91 and LOS E in the a.m. peak hour, and a

V/C ratio of 1.29 and LOS F in the p.m. peak hour. Implementation of the following mitigation measure would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

> **Mitigation Measure 7 – Improve V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard.** The intersection operations could be improved to a V/C ratio of 0.84 and LOS D in the a.m. peak hour, and a V/C ratio of 0.79 and LOS C in the p.m. peak hour with the addition of a second northbound left-turn lane, a second eastbound left-turn lane, and an exclusive eastbound right-turn lane, and conversion of the northbound right-turn lane to a shared right-turn/through lane. The mitigation for the northbound approach could be accommodated within the existing right-of-way. With the conversion of the northbound right-turn lane to a shared right-turn/through lane, a second left-turn lane could be accommodated. The northbound approach would need to be restriped. To accommodate the mitigation for the eastbound approach, right-of-way would need to be acquired on the south side of Grimmer Boulevard. The west leg of the intersection would need to be restriped to accommodate the second eastbound left-turn lane and the exclusive eastbound right-turn lane.

Impact 8 – 2010 change in V/C and LOS at the intersection of Mission Boulevard/Warm Springs Boulevard. Under 2010 Proposed Project conditions, the intersection of Mission Boulevard/Warm Springs Boulevard would operate at a V/C ratio of 1.22 and LOS F in the a.m. peak hour, and a V/C ratio of 1.16 and LOS F in the p.m. peak hour. This intersection is built out along each approach; there are commercial properties on each of the four corners of this intersection. Widening or adding turn lanes is not feasible.

The existing and projected congestion is related largely to regional traffic traveling between I-680 and I-880. No feasible mitigation measures are available to mitigate this impact. *(Significant and unavoidable.)*

> **Mitigation – None available.**

19.4.2 Operational Impacts and Mitigation Measures, 2025

Impact 9 – 2025 change in V/C and LOS at the intersection of Osgood Road/Durham Road/Auto Mall Parkway. Under 2025 Proposed Project conditions, the intersection of Osgood Road/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 1.11 and LOS F in the p.m. peak hour. Adding capacity to this intersection would require right-of-way acquisition and relocation of utilities. No feasible mitigation measures are available to mitigate this impact. *(Significant and unavoidable.)*

> **Mitigation – None available**.

Impact 10 – 2025 change in V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway. Under 2025 Proposed Project conditions, the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 0.91 and LOS E in the p.m. peak hour. Implementation of

Mitigation Measure 5 would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

> **Mitigation Measure 5 – Improve V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway.** The intersection operations for 2025 could be improved to a V/C ratio of 0.84 and LOS D in the a.m. peak hour, and a V/C ratio of 0.90 and LOS D in the p.m. peak hour with implementation of Mitigation Measure 5 .

Impact 11 – 2025 change in V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard. Under 2025 Proposed Project conditions, the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard would operate at a V/C ratio of 1.33 and LOS F in the a.m. peak hour, and a V/C ratio of 1.41 and LOS F in the p.m. peak hour. Implementation of Mitigation Measure 6 would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

> **Mitigation Measure 6 – Improve V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard.** The intersection operations could be improved to a V/C ratio of 0.83 and LOS D in the a.m. peak hour, and a V/C ratio of 0.86 and LOS D in the p.m. peak hour with implementation of Mitigation Measure 6 .

19.5. INTERSECTION AND ROADWAY IMPACTS RELATED TO OPTIONAL IRVINGTON STATION

19.5.1. Operational Impacts and Mitigation Measures, 2010

This scenario (2010 Proposed Project with optional Irvington Station) assumes implementation of the Proposed Project with the optional Irvington Station.

Impact 12 – 2010 change in V/C and LOS at the intersection of Osgood Road/Durham Road/Auto Mall Parkway. The intersection of Osgood Road/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 0.92 and LOS E in the a.m. peak hour, and a V/C ratio of 1.05 and LOS F in the p.m. peak hour. Adding capacity to this intersection would require right-of-way acquisition and relocation of utilities. No feasible mitigation measures are available to mitigate this impact. *(Significant and unavoidable.)*

> **Mitigation – None available.**

Impact 13 – 2010 change in V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway. The intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 0.97 and LOS E in the a.m. peak hour, and a V/C ratio of 0.91 and LOS E in the p.m. peak hour. Implementation of Mitigation Measure 5 would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

> **Mitigation Measure 5 – Improve V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway.** The

intersection operations could be improved to a V/C ratio of 0.75 and LOS C in the a.m. peak hour, and a V/C ratio of 0.89 and LOS D in the p.m. peak hour with implementation of Mitigation Measure 5 .

Impact 14 – 2010 change in V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard. The intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard would operate at a V/C ratio of 0.90 and LOS D in the a.m. peak hour, and a V/C ratio of 1.23 and LOS F in the p.m. peak hour. Implementation of Mitigation Measure 6 would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

Mitigation Measure 6 – Improve V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard. The intersection operations could be improved to a V/C ratio of 0.84 and LOS D in the a.m. and p.m. peak hours with implementation of Mitigation Measure 6 .

Impact 15 – 2010 change in V/C and LOS at the intersection of Mission Boulevard/Warm Springs Boulevard. The intersection of Mission Boulevard/Warm Springs Boulevard would operate at a V/C ratio of 1.19 and LOS F in the a.m. peak hour, and a V/C ratio of 1.19 and LOS F in the p.m. peak hour. This intersection is built out along each approach; there are commercial properties on each of the four corners of this intersection. Widening or adding turn lanes is not feasible. The existing and projected congestion is related largely to regional traffic traveling between I-680 and I-880. No feasible mitigation measures are available to mitigate this impact. *(Significant and unavoidable.)*

Mitigation – None available.

Impact 16 – 2010 change in V/C and LOS at the intersection of Osgood Road/Driscoll Road/Washington Boulevard. The intersection of Osgood Road/Driscoll Road/Washington Boulevard would operate at a V/C ratio of 0.91 and LOS E in the a.m. peak hour. The proposed changes to the southbound and westbound approaches can be accommodated within the existing right-of-way. The approaches would need to be restriped. The mitigation measure proposed below, which requires widening the west side of Warm Springs Boulevard along the BART frontage to accommodate four southbound receiving lanes, would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

Mitigation Measure 16 – Improve V/C and LOS at the intersection of Osgood Road/Driscoll Road/Washington Boulevard. The intersection operations could be improved to a V/C ratio of 0.83 and LOS D in the a.m. peak hour with the conversion of the second southbound left lane to a third through lane, conversion of the southbound right-turn lane to a shared through/right-turn lane (to create four southbound through lanes), and conversion of a westbound left-turn lane to a shared left-turn/through lane (creating two westbound left turn lanes). The proposed changes to the southbound and westbound approaches could be accommodated within the existing right-of-way, although the approaches would need to be restriped. This measure would require widening the west side of Warm Springs Boulevard along the BART frontage to accommodate four southbound receiving lanes.

19.5.2. Operational Impacts and Mitigation Measures, 2025

This scenario (2025 Proposed Project with optional Irvington Station) assumes implementation of the Proposed Project with the optional Irvington Station.

Impact 17 – 2025 change in V/C and LOS at the intersection of Osgood Road/Durham Road/Auto Mall Parkway. Under 2025 Proposed Project with optional Irvington Station conditions, the intersection of Osgood Road/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 1.02 and LOS F in the a.m. peak hour. Adding capacity to this intersection would require right-of-way acquisition and relocation of utilities. No feasible mitigation measures are available to mitigate this impact. *(Less than significant because v/c ratio increase is less than 0.05).*

Mitigation – None required.

Impact 18 – 2025 change in V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway. Under 2025 Proposed Project with optional Irvington Station conditions, the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 0.91 and LOS E in the p.m. peak hour. Implementation of Mitigation Measure 5 would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

Mitigation Measure 5 – Improve V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway. The intersection operations could be improved to a V/C ratio of 0.90 and LOS D in the p.m. peak hour with implementation of Mitigation Measure 5 .

Impact 19 – 2025 change in V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard. Under 2025 Proposed Project with optional Irvington Station conditions, the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard would operate at a V/C ratio of 1.25 and LOS F in the a.m. peak hour, and a v/c ratio of 1.42 and LOS F in the p.m. peak hour. Implementation of Mitigation Measure 6 would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

Mitigation Measure 6 – Improve V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard. The intersection operations could be improved to a V/C ratio of 0.86 and LOS D in the in the a.m. peak hour, and a v/c ration of 0.84 and LOS D in the p.m. peak hour, with implementation of Mitigation Measure 6 .

Impact 20 – 2025 change in V/C and LOS at the intersection of Mission Boulevard/Warm Springs Boulevard. Under 2025 Proposed Project with optional Irvington Station conditions, the intersection of Mission Boulevard/Warm Springs Boulevard would operate at a V/C ratio of 1.17 and LOS F in the p.m. peak hour. This intersection is built out along each approach; there are commercial properties on each of the four corners of this intersection. Widening or adding turn lanes is not feasible. The existing and projected congestion is related largely to regional traffic traveling between I-680 and I-880. To reduce congestion and alleviate impacts at this intersection would require substantial right-of-way acquisition and utility relocation. No feasible mitigation measures are available to mitigate this impact. *(Significant and unavoidable.)*

Mitigation – None available.

Impact 21 – 2025 change in V/C and LOS on northbound I-880 just south of Mission Boulevard. Under 2025 Proposed Project conditions, northbound I-880 just south of Mission Boulevard would operate at LOS F, compared to LOS E under the 2025 No-Project conditions. Adding capacity to the mainline freeway system is not feasible, however. Adding capacity to this segment would require substantial regional coordination, costs, and political and public approval. All freeway projects affecting I-880 that are currently programmed (effectively, projects in progress, planned, or anticipated) were included in this analysis. No feasible mitigation measures are available to mitigate this impact. *(Significant and unavoidable.)*

Mitigation – None available.

Impact 22 – 2025 change in V/C and LOS on northbound I-880 just south of Mission Boulevard. Under 2025 Proposed Project with optional Irvington Station conditions, northbound I-880 just south of Mission Boulevard would operate at LOS F, compared to LOS E under the 2025 The No-Project conditions. Adding capacity to the mainline freeway system is not feasible, however. Adding capacity to this segment would require substantial regional coordination, costs, and political and public approval. All freeway projects affecting I-880 that are currently programmed (effectively, projects in progress, planned, or anticipated) were included in this analysis. No feasible mitigation measures are available to mitigate this impact. *(Significant and unavoidable.)*

Mitigation – None available.

Impact 23 – Reduction in traffic congestion overall on state highways. In 2010, the Proposed Project would result in LOS improvements on two state highway segments, and a reduction on one segment. Also, 63 of the analyzed roadway segments would experience reductions in traffic volumes in 2010 as a result of the Proposed Project, compared to 38 that would have an increase and 53 that would have no change. In 2025, the Proposed Project would result in LOS improvements on six state highway segments, and degradation on no segments. Also, 64 of the analyzed roadway segments would experience reductions in traffic volumes in 2025 as a result of the Proposed Project, compared to 24 that would have an increase and 66 that would have no change. (*Beneficial*.)

Mitigation – None required.

19.6. PARKING IMPACTS RELATED TO WARM SPRINGS EXTENSION

19.6.1. Operational Impacts and Mitigation Measures, 2025

Impact 24 – Reduced parking supply at Fremont Station resulting in spillover into residential or commercial areas. Under 2025 Proposed Project conditions, there would be a parking shortfall of 430 spaces at the Fremont BART Station and 130 spaces at the proposed Warm Springs Station. Under 2025 No-Project conditions, there would be a parking shortfall of 390 spaces at the Fremont BART Station. The Proposed Project would therefore add 40 spaces to the anticipated shortfall at the Fremont Station in 2025. In addition, there would be a parking shortfall of 130 spaces at the proposed Warm Springs Station. It is assumed that BART patrons would travel to stations where parking is perceived to be available (i.e., the Warm Springs Station).

These parking shortfalls would be considered a significant impact of the Proposed Project in 2025. Implementation of the following mitigation measure, which provides for 170 additional spaces at the Warm Springs Station, is expected to minimize spillover parking because the parking supply would be adequate to meet the anticipated demand. This impact would therefore be reduced to less than significant.

Although spillover parking is not expected to be significant, a monitoring program would be implemented to assess whether unanticipated events would cause spillover parking from the BART stations to become a significant problem. Accordingly, BART would provide a parking monitoring program and, if necessary to ensure that spillover remains at an insignificant level, assistance with parking management as described below. (*Less than significant with mitigation incorporated*.)

Mitigation Measure 24 – Provide additional parking and implement parking monitoring program.

(A) If neither the Irvington Station nor SVRTC has commenced construction by 2010, BART will provide an additional 170 parking spaces at the Warm Springs Station.

(B) To determine whether substantial spillover parking occurs, BART will institute a monitoring program on streets adjacent to the Fremont and Warm Springs Stations. A baseline survey of parking conditions in the vicinity of the station will be conducted prior to commencement of the Proposed Project. The baseline survey will establish parking conditions in the vicinity of the station during weekday morning hours. Monitoring will be conducted during the first six months of operation of the Proposed Project to verify if spillover parking is occurring. Such monitoring will be based on field surveys and any complaints received by BART and local parking authorities. After the first six months of operation of the station, BART Community Relations staff will respond to parking complaints and BART will investigate such complaints to verify parking concerns.

If a parking spillover problem is confirmed by this monitoring, BART staff will assist the City of Fremont in implementing a parking management program. The program will incorporate appropriate parking control measures based on BART's Parking Management Toolkit. The Toolkit identifies a detailed process for understanding local parking issues, evaluating parking conflicts, and implementing specific parking control measures. These measures could include time limits and time-based restrictions, increased enforcement, or parking fees. The parking management program would be implemented by the City of Fremont. BART staff will assist the city to ensure that the parking control measures, adapted as appropriate for site-specific conditions, are implemented and are achieving the necessary effect. BART staff would also continue discussions as necessary with the city to help adjust any parking control measures in response to issues that may arise during implementation of such measures.

19.7. PARKING IMPACTS RELATED TO OPTIONAL IRVINGTON STATION

19.7.1. Operational Impacts and Mitigation Measures, 2025

Impact 25 – Reduced parking supply at Fremont and Irvington Stations resulting in spillover into residential or commercial areas. Under 2025 Proposed Project with optional Irvington Station conditions, there would be a parking shortfall of 60 spaces at the Fremont BART Station and 215 spaces at the optional Irvington Station. However, the proposed Warm Springs Station would have a projected excess of 330 spaces, which is 55 spaces greater than the combined shortfall at the Fremont and optional Irvington Stations. It is assumed that BART patrons would travel to stations where parking is perceived to be available (i.e., the Warm Springs Station). Accordingly, the parking supply across stations would be adequate to meet the demand, and spillover parking is not anticipated to occur. Although spillover parking is not expected to be significant, a monitoring program would be implemented to assess whether unanticipated events would cause spillover parking from the BART stations to become a significant problem. BART would provide a parking monitoring program and, if necessary to ensure that spillover remains at an insignificant level, assistance with parking management as described below. (*Less than significant*.)

Mitigation Measure 25 – Implement parking monitoring program. To determine whether substantial spillover parking occurs if the optional Irvington Station has commenced construction by 2010, BART will institute a monitoring program on streets adjacent to the Fremont and Irvington Stations and, if necessary, provide parking management assistance in Mitigation Measure 23, part (B).

19.8. CONSTRUCTION IMPACTS RELATED TO WARM SPRINGS EXTENSION

Impact 26 – Construction-period traffic impacts. Construction of the Proposed Project would potentially result in impacts as described in Chapter 17 on local streets and at the Warm Springs Station site. Implementation of the following mitigation measure would reduce this impact to less than significant. (*Less than significant with mitigation incorporated*.)

Mitigation Measure 26 – Develop and implement a construction phasing and traffic management plan. BART will prepare and implement a construction phasing and traffic management plan that defines how traffic operations (including construction equipment and worker traffic) are managed and maintained during each phase of construction. The plan will be developed in consultation with the City of Fremont, Caltrans, AC Transit, and VTA, and will be coordinated with the plan to maintain access and parking for businesses and residences. To the maximum practical extent, the plan will include the following measures.

- Plan, schedule, and coordinate construction activities to reduce effects on AC Transit and VTA bus lines, so that additional buses or larger buses are not required on any route to maintain on-time performance.
- Specify predetermined haul routes from staging areas to construction sites and disposal areas by agreement with the City of Fremont prior to construction. The routes will follow streets and highways that provide the safest route and have the least feasible impact on traffic.
- Identify construction activities that, due to concerns regarding traffic safety or congestion, must take place during off-peak traffic hours. Any road closures will be done at night under ordinary circumstances. If unforeseen circumstances require road closure during the day, the City of Fremont will be consulted.
- Provide a detour plan for lane closures and for the diversions of Walnut Avenue, Stevenson Boulevard, and South Grimmer Boulevard, and require information be provided to the public on lane closures and detours using signs, press releases, and other media tools.
- Identify a telephone number that the public can call for information on construction scheduling, phasing, and duration, as well as for complaints. Such information will also be posted on BART's website.

- Provide safe access and circulation routes for vehicles, bicycles, and pedestrians during construction at the Fremont BART Station.
- Provide parking replacement where construction results in temporary displacement of parking in Fremont Central Park.
- Coordinate, to the extent feasible, with the city's grade separations project to reduce traffic disruption.
- In order to reduce the total duration of construction were the BART alignment crosses Paseo Padre Parkway and the corresponding potential for traffic disruption, to the greatest extent possible, elements of the BART bridge structure should be constructed at the time as the city's underpass project.
- BART will develop and implement a traffic and access control plan in consultation with the City of Fremont, local business associations, and local neighborhood and homeowners' associations. Before construction begins, BART and its contractors will verify that the traffic and access control plan avoids restriction of access and that flaggers are used to direct traffic in potentially congested zones such as the Washington Boulevard and Osgood Road area. Construction workers and contractors will be advised to carpool and park on-site when feasible to reduce temporary impacts to parking for adjacent residences and businesses. Movement of heavy equipment and supplies to and from construction sites will be scheduled during non-peak travel times. Similarly, temporary lane closures due to work on aerial or below-grade structures will be scheduled for non-peak travel times. Access to businesses and residences will be maintained throughout construction phases, and existing parking supply will not be reduced.

19.9. CONSTRUCTION IMPACTS RELATED TO OPTIONAL IRVINGTON STATION

Impact 27 – Construction-period traffic impacts in the vicinity of the optional Irvington Station. The construction-related impacts and mitigation measures for the optional Irvington Station would be similar to those for the Proposed Project. Impacts would be mitigated to less than significant by implementation of Mitigation Measure 26 and . (*Less than significant with mitigation incorporated*.)

Mitigation Measure 26 – Develop and implement a construction phasing and traffic management plan. This mitigation measure is described above.

19.10.CONTRIBUTION OF PROPOSED PROJECT PLUS SVRTC TO PROJECT INTERSECTION IMPACTS

Impact 28 – Contribution to cumulative change in 2025 in V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway. Under 2025 Proposed Project plus SVRTC conditions, the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 0.91 and LOS E in the p.m. peak hour. Implementation of Mitigation Measure 5 would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

> **Mitigation Measure 5 – Improve V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway.** The intersection operations could be improved to a V/C ratio of 0.90 and LOS D in the p.m. peak hour with implementation of Mitigation Measure 5 .

Impact 29 – Contribution to cumulative change in 2025 V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard. Under 2025 Proposed Project plus SVRTC conditions, the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard would operate at a V/C ratio of 1.26 and LOS F in the a.m. peak hour, and a v/c ratio of 1.41 and LOS F in the p.m. peak hour. Implementation of Mitigation Measure 6 would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

> **Mitigation Measure 6 – Improve V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard.** The intersection operations could be improved to operate at a v/c ratio of 0.86 and LOS D in the a.m. peak hour and a v/c ration of 0.88 and LOS D in the p.m. peak hour with implementation of Mitigation Measure 6 .

19.11.CONTRIBUTION OF PROPOSED PROJECT WITH OPTIONAL IRVINGTON STATION PLUS SVRTC TO PROJECT INTERSECTION IMPACTS

This scenario (2025 Proposed Project with optional Irvington Station plus SVRTC) assumes implementation of both the Proposed Project, with the optional Irvington Station, and SVRTC.

Impact 30 -– Contribution to cumulative change in 2025 V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway. Under 2025 Proposed Project with optional Irvington Station plus SVRTC conditions, the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway would operate at a V/C ratio of 0.91 and LOS E in the p.m. peak hour. Implementation of Mitigation Measure 5 would reduce this impact to less than significant. *(Less than significant with mitigation incorporated.)*

> **Mitigation Measure 5 –Improve V/C and LOS at the intersection of I-680 southbound ramps/Durham Road/Auto Mall Parkway.** The intersection operations could be improved to a V/C ratio of 0.89 and LOS D in the p.m. peak hour with implementation of Mitigation Measure 5 .

Impact 31 – Contribution to cumulative change in 2025 V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard. Under 2025 Proposed Project with optional Irvington Station plus SVRTC conditions, the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard would operate at a V/C ratio of 1.45 and LOS F in the a.m. peak hour, and a V/C ratio of 1.47 and LOS F in the p.m. peak hour. Implementation of Mitigation Measure 6 would reduce this impact to less than significant *(Less than significant with mitigation incorporated.)*

> **Mitigation Measure 6 – Improve V/C and LOS at the intersection of Osgood Road/Warm Springs Boulevard/South Grimmer Boulevard.** The intersection operations could be improved to a V/C ratio of 0.88 and LOS D in the a.m. and p.m. peak hours with implementation of Mitigation Measure 6.

Impact 32 - 2025 change in v/c and LOS at the intersection of Mission Boulevard/Warm Springs Boulevard. Under 2025 Proposed Project with optional Irvington Station plus SVRTC conditions, the intersection of Mission boulevard/Warm Springs Boulevard would operate at a v/c ratio of 1.42 and LOS F in the p.m. peak hour. The intersection is built out along each approach; there are commercial properties on each of the four corners of this intersection. Widening or adding turn lanes is not feasible. The existing and projected congestion is related largely to regional traffic traveling between I-680 and I-880. To reduce congestion and alleviate impacts at this intersection would require substantial right-of-way acquisition and utility relocation. No feasible mitigation measures are available to mitigate this impact. *(Significant and unavoidable)*

> **Mitigation - none available.**

Impact 33 – Contribution to cumulative change in 2025 V/C and LOS at the intersection of Osgood Road/Driscoll Road/Washington Boulevard. Under 2025 Proposed Project with optional Irvington Station plus SVRTC conditions, the intersection of Osgood Road/Driscoll Road/Washington Boulevard would operate at a V/C ratio of 0.92 and LOS E in the a.m. peak hour. Implementation of the following mitigation measure would reduce this impact to less than significant *(Less than significant with mitigation incorporated.)*

> **Mitigation Measure 33 – Improve V/C and LOS at the intersection of Osgood Road/Driscoll Road/Washington Boulevard.** The intersection operations can be improved to a V/C ratio of 0.45 and LOS A for the a.m. peak hour with the conversion of the southbound right-turn lane to a shared through/right-turn lane (to create four southbound through lanes) and conversion of a westbound left-turn lane to a shared left-turn/through lane (to create two left-turn lanes). Although there would be a slight decrease in the V/C ratio in the p.m. peak hour, the intersection would still operate at LOS D. The proposed changes to the southbound and westbound approaches can be accommodated within the existing right-of-way, although the approaches would need to be restriped. This measure would require widening on the west side of Warm Springs Boulevard along the BART frontage to accommodate four southbound receiving lanes.

19.12. CONTRIBUTION OF PROPOSED PROJECT PLUS SVRTC TO PARKING IMPACTS

Impact 34 – Reduced parking supply at Fremont Station resulting in spillover into residential or commercial areas. Under 2025 Proposed Project plus SVRTC conditions, there would be a parking shortfall of 1,040 spaces at the Fremont BART Station. Under 2025 No-Project conditions, there would be a parking shortfall of 390 spaces. Therefore, an additional shortfall of 650 spaces (1,040 – 390 = 650) at the Fremont Station is attributable to the Proposed Project plus SVRTC. Under 2025 Proposed Project plus SVRTC conditions, the parking demand at the Warm Springs Station would be 530 spaces less than the supply (i.e., there would be an excess of 530 spaces). It is assumed that BART patrons would travel to stations where parking is perceived to be available (i.e., the Warm Springs Station). With the redistribution of traffic towards the Warm Spring Station from the Fremont Station, there would be minimal change to study intersection service levels compared to the analysis presented above.

However, the net parking shortfall of 120 spaces (650 – 530 = 120) would be considered a significant impact of the Proposed Project plus SVRTC in 2025. Implementation of the following mitigation measure, which provides for 120 additional spaces at the Warm Springs Station, is expected to minimize spillover parking because the parking supply would be adequate to meet the anticipated demand. This impact would therefore be reduced to less than significant.

Although spillover parking is not expected to be significant, a monitoring program would be implemented to assess whether unanticipated events would cause spillover parking from the BART stations to become a significant problem. Accordingly, BART would provide a parking monitoring program and, if necessary to ensure that spillover remains at an insignificant level, assistance with parking management as described below. (*Less than significant with mitigation incorporated*.)

Mitigation Measure 34 – Provide additional parking and implement parking monitoring program.

(A) If SVRTC has commenced construction by 2010 but the Irvington Station has not, BART will provide an additional 120 parking spaces at the Warm Springs Station.

(B) To determine whether substantial spillover parking occurs, BART will institute a monitoring program on streets adjacent to the Fremont Station and, if necessary, will provide parking management assistance, as described in Mitigation Measure 24, part (B).

19.13. CONTRIBUTION OF PROPOSED PROJECT WITH OPTIONAL IRVINGTON STATION PLUS SVRTC TO PARKING IMPACTS

Impact 35 – Cumulative contribution to reduced parking supply at Fremont and Irvington Stations resulting in spillover into residential or commercial areas. If the Proposed Project with optional Irvington Station and SVRTC are both constructed, a parking shortfall of 480 spaces is predicted at the Fremont Station, and a shortfall of 550 spaces is predicted at the Irvington Station. However, the Warm Springs Station would have a projected excess of 1,100 spaces, which is 70 spaces more than the combined shortfall at the Fremont and Irvington Stations (480 + 550 = 1030). It is assumed that BART patrons would travel to stations where parking is perceived to be available (i.e., the Warm Springs Station). Accordingly, the parking supply across stations would be adequate to meet the demand, and spillover parking is not anticipated to occur.

Although spillover parking is not expected to be significant, a monitoring program would be implemented to assess whether unanticipated events would cause spillover parking from the BART stations to become a significant problem. BART would provide a parking monitoring program and, if necessary to ensure that spillover remains at an insignificant level, assistance with parking management as described below. (*Less than significant*.)

> **Mitigation Measure 35 – Implement parking monitor program.** To determine whether substantial spillover parking occurs if the optional Irvington Station and SVRTC have both commenced construction by 2010, BART will implement a monitoring program on streets adjacent to the Fremont and Irvington Stations and, if necessary, provide parking management assistance in Mitigation Measure 24, part (B).

19.14. CUMULATIVE CONSTRUCTION IMPACTS OF PROPOSED PROJECT PLUS SVRTC

Impact 36 – Cumulative contribution to construction-related impacts. The construction-related impacts and mitigation measures of the Proposed Project plus SVRTC would be similar to those of the Proposed Project without SVRTC with the assumption that there would no overlap between construction of the two projects. However, to account for the SVRTC construction schedule if construction of SVRTC overlaps with that of the Proposed Project, adjustment of the construction traffic management plan described above in Mitigation Measure 25 would suffice to reduce the Proposed Project's contribution to cumulative construction-period traffic impacts to a less-than-significant level. (*Less than significant with mitigation incorporated*.)

> **Mitigation Measure 36 – Adjust the construction traffic management plan described above in Mitigation Measure 26.** If construction of the Proposed Project and SVRTC overlap, the construction traffic management plan identified in Mitigation Measure 26 will be adjusted to account for the SVRTC construction schedule. BART will ensure that the plan as adjusted satisfies the goals identified in Mitigation Measure 25.

19.15. CUMULATIVE CONSTRUCTION IMPACTS OF PROPOSED PROJECT WITH OPTIONAL IRVINGTON STATION PLUS SVRTC

Impact 37 – Construction-period traffic impacts in the vicinity of the optional Irvington Station. The construction-related impacts and mitigation measures for the optional Irvington Station would be similar to those for the Proposed Project. Impacts would be mitigated to less than significant by implementation of Mitigation Measure 36. (*Less than significant with mitigation incorporated*.)

> **Mitigation Measure 36 – Develop and implement a construction phasing and traffic management plan.** This mitigation measure is described above.

Parking Management Toolkit

Strategies for Action in BART Station Areas

Prepared for: Bay Area Rapid Transit District

Prepared by: Richard Willson, Ph.D. AICP

October 2000

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How to Use This Toolkit

This toolkit outlines ways to address parking issues in the vicinity of the BART stations. It is intended to help key stakeholders--community members, city officials, property owners, merchants and others--as they develop parking strategies that support community goals.

The report provides a step-by-step process for exploring parking issues and selecting parking management strategies. The toolkit includes worksheets that can be used to facilitate problem solving at community meetings and workshops.

Parking management techniques work best when they are tailored to local conditions. A "one-size-fits-all" approach is less effective than carrying out the specific planning activities suggested in this toolkit. BART is issuing this report to support collaborative approaches to parking management.

About BART

The BART system consists of 95 miles of track and 39 stations in four Bay Area counties. Now under construction, the BART San Francisco International Airport Extension will add 8.7 miles of new revenue service track and four new stations in San Mateo County.

BART connects residential areas with key employment, shopping and recreational destinations throughout the Bay Area. At the same time, BART provides a focus for community development in the areas surrounding the stations. Parking for BART patrons and local uses is an integral part of station area planning.

The BART system is changing, as are the land use patterns around stations. For BART, ridership is up and the upcoming SFO Extension will provide new services and accessibility. For many local communities, station area development presents opportunities for parking management. This toolkit provides a process for addressing these issues and ideas about effective strategies.

Who to Call for More Information

BART is providing this document as resource to community members, city officials, property owners, merchants and others. The primary responsibility for addressing local parking regulations lies with the respective cities. They adopt, implement and enforce on-street parking regulations, set policies for city-owned off-street parking, and control the amount of parking that private developers must provide. However, property owners, merchants, employers and others generally control the use of off-street parking. Finally, BART manages the parking in its own station facilities.

If you wish to discuss station area parking issues in your city, you should call your city staff, usually in the Planning or Engineering department.

For BART-specific questions call Peter Albert, Station Area Planning Manager, at (510) 287-4702.

Introduction

Parking management involves the use of programs and policies that affect the use, price and availability of parking. Parking management ranges from simple time limits to sophisticated computer-based systems that direct traffic flow to available parking. Nationwide, communities are using parking management to support their transportation, environmental and community development objectives.

BART provides over 40,000 parking spaces throughout the region. Although more than half of BART riders in the AM peak (57 percent) reach stations by travel modes that *do not* involve parking, parking is still an important part of BART service.

Recent trends call for a closer look at station area parking. For BART, policy issues related to transit-oriented development, environmental quality and customer service are important strategic directions. Furthermore, BART ridership is increasing and new BART service--the SFO Extension--will open soon. These service additions will affect station areas throughout the region. For new stations, there will be easy connections to the region, a new community focus, and community development opportunities. Existing station areas may be used more intensively as their transportation and land use focus increases. Parking management can ensure that the available parking is used in an efficient manner in keeping with the goals of BART and the community.

BART recently addressed parking and other access issues with the adoption of a new BART Access Management and Improvement Policy Framework. It provides guidance on the strategies BART may consider on a system- and station-specific basis. With respect to parking, the policy directs BART to reconsider existing parking management strategies and create new strategies that make station areas functional, accessible and attractive.

For local communities, BART station areas are important elements of their community development and economic development plans. In addition, station areas play a part in livable community and traffic mitigation objectives.

Local communities may initiate their own reviews of on- and off-street parking policy and programs in station areas for a variety of reasons. This toolkit is provided to support those efforts.

Sometimes, a strategy that phases in parking programs can help local stakeholders adjust to a new approach and provide opportunities for refinements. Some policies may already be in place and working well. If change is expected, however, development of a preliminary consensus may be needed before that change occurs, with implementation keyed to actual changes. Still other long-term strategies may be discussed in a conceptual way but not required until a station area reaches a certain maturity.

Many entities control parking. BART is responsible for BART parking at BART stations. Local jurisdictions are responsible for managing on-street and municipal off-street parking, setting development standards for private development, and facilitating traffic flow. Finally, property owners, employers and merchants are responsible for managing their own private parking.

Many people (e.g., neighbors, businesses, and commuters) have a stake in station-area parking, and their interests and perspectives may vary quite considerably. Studies have shown that when the various stakeholders work together they can achieve “win-win” parking solutions that promote community development and community livability. With the release of this toolkit, it is BART's hope to encourage such collaborative solutions.

The Parking Management Toolkit

This toolkit provides ideas and suggestions on how to analyze and respond to parking issues in BART station areas. It includes diagrams and checklists to assist stakeholders in finding mutually beneficial solutions to parking issues.

Who should undertake such a study? Any stakeholder could initiate a station area parking study, but the best approach is collaboration between BART, the city and relevant stakeholders. This way, the analysis is more informed and conclusions can respond to the issues of the primary stakeholders.

The first step is to understand the parking issues as outlined in Figure 1: The What-When-Where-Who-Why of Parking Management. This modification of the classic reporter's approach to writing a newspaper story is useful for understanding parking issues. Good parking strategies depend on a solid understanding of existing conditions.

The second step is to consider alternative strategies. Tables 1 and 2 (pages 8 and 13, respectively) identify possible strategies, addressing on-street and off-street parking, respectively. Appendix A includes blank versions of these figures and tables for use in workshop activities.

The third step is to design and implement programs. The advice provided in this section emphasizes the importance of gaining support from all stakeholders and establishing the mechanisms to implement the strategy.

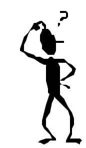
Step 1: Understand the Parking Issues

Developing effective parking strategies depends on a complete understanding of the nature of the parking issues at hand. This is particularly important in station areas because there are many groups of people using the area's parking resources--BART riders, local residents, shoppers, workers and others--and the patterns of parking use by each group may be different.

Detailed information about existing conditions is required if the parking study is to sort out the priorities to be given to each parking user group.

Faulty conclusions about parking strategies can be reached if the causes of a parking problem are not fully understood. An example is when a decision is made to build additional parking when in fact the problem stems from the inconvenience of using existing parking. Alternatively, a parking strategy could inadvertently disadvantage one group of parkers while trying to solve the problems of another group. For example, unrestricted parking in residential areas provides flexibility for all, but can be problematic if too many parkers from outside the neighborhood use on-street parking, reducing parking availability for residents and their guests.

The following paragraphs outline in greater detail what is meant by the what-when-where-who-why framework.

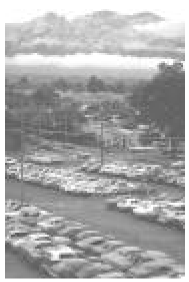


What? What is the issue? Parking issues usually concern the availability, price, convenience and/or safety of parking. Other possible issues include the predictability of space availability and traffic congestion issues related to drivers searching for parking spaces. Often, the bottom line for parkers is that the space they want is not available when they want it (or at a price they are willing to pay).

The "what" question is important because the definition of the problem is closely tied to the type of strategies selected. It is not unusual to start with one issue but arrive at a series of other issues after more detailed analysis. For example, when shoppers have difficulty finding parking they may assume that there are not enough

spaces, when in fact the issue is the turnover rate of the most convenient spaces (e.g., how many cars use each space per day).

When? When does the problem occur? Parking may have a particular pattern of use throughout the day, among days of the week, or even among different seasons. For example, an issue may be related to the holiday shopping period (for merchants), or weekday lunch periods (for restaurants), throughout the day (for workers), or in the evening (for movie theaters). The shorter the duration of a parking problem, the greater the possibility that some sort of shared parking arrangement can be developed. Nearby uses may have spaces available when another use has a shortage.



Where? Where is the parking issue occurring? The geographic location and the extent of the area affected will affect the type of strategies that may be used. Does the issue affect a single block, a commercial district, a neighborhood, or the entire community? Are there concerns about the impact of a commercial area on a residential area, or visa versa? It is a good practice to map the area affected by the parking issue. The answers to the "where" questions determine the geographic extent of policies and possible effects at the boundary of the area affected by a new policy.

Who? Who is using parking in a way that is creating impacts? Who is affected by the new parking use patterns? The needs of different users of parking must be understood, as should the way in which different uses affect each other's access to parking. People who use station area parking include the residents of the station area, those who work in the station area, visitors to local businesses, shoppers, and transit riders. Among transit riders, users include those who park at stations for all-day work trips, shorter mid-day trips, and when the SFO Extension opens, possibly airport travelers using BART to access the SFO airport.

A comprehensive parking strategy should address and set priorities for each user group. A consensus should be built among those who own or control parking about the entitlement of each group to use parking, taking into account their historical claim to the parking, broader city goals, willingness to pay, and how much parking each group owns. Such a discussion should include consideration of how alternative transportation modes could be used to shift parking demand characteristics. For example, how would shifting BART access modes to bus transit affect parking for patrons of local merchant parking? Similarly, how can rideshare programs for station area employees free up spaces for shoppers?

Why? Why has the issue emerged and why now? Has there been growth in business activity that has brought more visitors to the area? Has residential population and automobile ownership growth outpaced parking supply? Has the growth in BART patronage increased parking by transit riders? Have parking issues emerged simply because of a lack of information or a lack of coordination between property owners and activities? The answers to the "why" questions point to the type of responses that are appropriate and who should be responsible for solving them.

How to Answer These Questions

The framework presented in Figure 1 is a tool to assist stakeholders in analyzing parking issues. Answering these questions requires local research. Depending on local circumstances, a consortium of station area businesses, public agencies and resident groups could be formed to sponsor these studies. A variety of study techniques can provide the needed information:

1) Parking utilization studies. Such surveys provide a baseline of the conditions, including a map that shows the percentage of spaces occupied at different times of the day. They can answer questions about where shortages or surpluses exist, highlight shared parking opportunities and provided a basis against which change can be assessed. As appropriate, they should also survey parking charges and rates, the presence of validation systems and other parking control measures in place.

2) Field studies of parking conditions, which can include observation of parking patterns, parking counts, license plate surveys, or duration surveys over multiple time periods.

3) Surveys of parkers, addressing parking purposes, trip origin, length of time parked, and attitudes about parking facilities. Such surveys could also probe for reasons why parkers do not use other access modes such as bus transit, walking, biking, etc.

4) Studies of comparable station areas. These studies can reveal strategies that have been effective in similar situations.

Parking utilization surveys are most useful in addressing the what, when and where questions. Field studies, parking surveys and interviews can address the who and why questions.

In answering these questions, one needs to understand trends and likely future events that might change the context for station area parking policy. That trend analysis is needed for the station area and the broader regional context.

An important question in addressing parking issues is determining the degree of responsibility of different land uses for accommodating parking demand. For example, if BART commences operations at a new station and a new development opens at the same time, it is important to distinguish between the impact of each of those activities. Comparing those conditions to the pre-BART conditions is a good way of measuring impacts.

Finally, there must be a discussion and a consensus formed on the broader community goals that parking programs must serve. For example, some communities might make automobile mobility their priority, while others might shift their policies to promote livable communities that do not rely on the automobile. These basic directions strongly influence which alternative programs would be chosen, particularly with regard to the question of whether new parking is to be added in response to demand.

Notes:

Step 2: Consider Alternative Strategies

Strategy checklists have been developed for on-street parking (Table 1) and off-street parking (Table 2). A series of common parking issues is listed on the vertical axis. These issues are typical of what might result from a "what-when-where-who-why" analysis. The horizontal axis lists various strategies for parking management. The checks in the matrix represent strategies that are worthy of investigation for each parking issue.

On-Street Parking

On-street parking regulation is under the purview of each city. A city can address parking issues in establishing and enforcing regulations, time limits and parking meter rates. Modification of on-street parking regulations is most effective when done in coordination with changes in policies for off-street facilities.

Issues

The following explains four typical on-street parking issues that are summarized in Table 1. They include:

1. *Residents and/or their guests cannot find on-street parking spaces in their neighborhood*. If residents complain of insufficient parking, it is important to measure parking utilization at various times and days of the week. Residential neighborhoods may lack available on-street parking for a number of reasons. For example, shortages can exist if the residential population and automobile ownership exceed levels anticipated in local off-street parking regulations. Similarly, if neighborhoods are located near other uses that have high parking demand, such as commercial areas or transit stations, then those seeking parking may be using neighborhood parking resources. Finding the cause of the problem has a bearing on the type of strategy to be implemented.

Sometimes residents have plenty of neighborhood parking but do not want others to use it. Discussions can explore programs that provide benefits to communities that share their on-street parking, such as returning parking revenues to neighborhood improvement projects.

2. *Convenient spaces are not available to shoppers in commercial areas.* This is often an issue because the desirable spaces are not used productively. On-street spaces are often shoppers' first choice for parking; each of these spaces can serve many short-term patrons during the day.

Understanding the reason for the lack of availability is important. For example, if an employee parks all-day in a desirable space, then many potential customers are prevented from using that space. Similarly, if parkers from adjacent areas "invade" commercial parking there could be shortages for shoppers.

3. *It is difficult to find on-street parking anywhere in the station area.* If there is a lack of available on-street parking in the entire station area, it suggests an imbalance between activity levels. Some communities may have removed on-street parking to enable greater through traffic flow, address safety concerns or achieve aesthetic goals, making off-street parking insufficient. Alternatively, the lack of on-street spaces could be connected to a shortage of off-street parking or a problem regarding the management of on-street parking, e.g., on-street parking is being used for long-term parking and vehicle storage.

The approach taken to this situation depends on the overall character that is appropriate for the station area--in a suburban context there may be an effort to accommodate parking demand, while in an urban context the total demand would not be supplied because of land constraints, urban design priorities and transit and pedestrian objectives. But even in suburban areas, the total demand might not be supplied because of a community vision to support public transit and reduce automobile use for local trips.

4. *Traffic congestion problems occur as drivers search for on-street parking spaces.* For example, if drivers are circling for extended periods of time or waiting for spaces to become available they create additional traffic congestion. In certain locations, the vehicular maneuvering while parking can be also an impediment to traffic flow.

Strategies

The horizontal axis of Table 1 shows a variety of on-street parking strategies that address the issues described above. They include:

Permit parking programs. Permit parking programs create a system where all-day or overnight parking is reserved for residents of some other designated group. These programs are used in many Bay Area communities. They are appropriate when parking demand from one land use affects the parking provided for another.

A permit parking program, for example, can prevent BART patrons from parking in residential neighborhoods around a station. Under a permit parking system, local residents and their guests would be able to use on-street parking, but cars parked for more than a defined number of hours without permits would be cited. Appendix B provides details on the implementation of permit parking districts. Most often, the permit parking district is established by the city at the request of a local neighborhood.

Permit parking can also be applied to on-street parking in commercial districts around stations. The concept provides unrestricted access to parking for residents (or employees) who have business in a parking district. Those without permits would be ticketed and/or towed if they parked longer than the permitted time. The design of permit programs should consider implementation costs for the city.

Enforcement of on-street parking regulations.

New enforcement programs can increase parking availability if regulations have not been enforced, or not consistently enforced. If a city is about to more stringently enforce time limits, however, sufficient notice should be provided to those who might be ticketed. Warnings, tickets, booting vehicles and towing can increase compliance. The public will support enforcement if it is consistently applied and tied to benefits such as increasing the availability of convenient spaces.

Merchant programs.

Merchants can provide programs to reduce parking demand, such as incentives for store employees to use alternative travel modes. If employees drive and park, merchant programs can encourage them to use underutilized off-street parking facilities.

Time limits and time-based use restrictions. Time limits are perhaps the simplest way to control the uses of on-street parking facilities. For example, parking use is effectively limited to customers by setting a two-hour limit in commercial areas. Even a four-hour time limit in a commercial area would discourage workers from using those spaces (whether riding BART or working locally). The time limit for spaces can be adjusted to reflect the particular purpose for the parking, ranging from a drop-off to longer-term parking. These time limits can be varied according to the convenience of the spaces to direct all-day parkers to underutilized spaces. If time limits are combined with parking charges, state-of-the-art parking meter systems offer flexibility in varying time limits and provide convenience to the parker.

Time-based parking restrictions prohibit parking for certain periods to preserve roadway capacity during peak commuting periods and to save parking resources for particular user groups. For example, early morning parking prohibitions reserve parking resources for mid-day parkers.

Urban design/signage/traffic calming. Urban design features can make more distant on-street parking spaces known to commuters and enhance pedestrian connections to those spaces. Good signage can direct parkers quickly and efficiently to available spaces. Sometimes the solution is as simple as providing information about space location and availability. Traffic calming, which includes strategies that moderate traffic speeds in order to improve the pedestrian environment, can also support parking management strategies. Traffic calming makes the pedestrian environment safer and more pleasant and increases parkers' willingness to walk from more distant parking spaces. Or, for those living or working nearby a station an improved pedestrian environment might reduce their use of a car to access BART.

Assignment of parking location. This strategy assigns particular parking users to specific locations to increase the efficiency with which spaces are used. For example, employer policy could require all-day parkers to parking in remote facilities to free up close-in on-street parking. Alternatively, the most convenient spaces could be devoted to pick up and drop off functions.

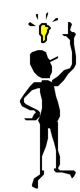
Charges for on-street parking. A system of differentiated parking meter rates is a key element in encouraging drivers to use parking efficiently, by directing long-term parking to less convenient spaces and gaining the most productivity from the most attractive on-street spaces. There are many alternatives for collecting on-street parking charges, ranging from traditional parking meters, to centralized parking machines, to debit card systems. Multi-space parking meters can be programmed to implement different parking charges by day of the week. They can also implement charges that differentiate between short- and long-term use, time of day, and the location of a particular parking space.

If implemented for on- and off-street facilities, parking charges reduce auto use and increase transit and pedestrian access. They provide more effective capacity from a given number of spaces because they encourage quicker turnover of spaces and increase the use of alternative modes of access (e.g., transit or carpool).

Parking charges make space availability more predictable for shoppers. The rates can be set so that there are always spaces available. Finally, parking charges create a revenue stream that can fund new parking or area improvements. Any parking charge system can include validation programs that reduce or eliminate parking charges for preferred user groups, such as shoppers.

Some residential areas might have excess on street parking, but prohibit non-residents from using it because no benefits flow back to the community from letting others use that parking. The parking benefit district concept is setting up a system in which residents parking free (using some type of residential permit system) but non residents would be charged the market price for parking. The revenues would be used for additional public services in the neighborhood where the revenue was collected, such as street cleaning, tree maintenance, sidewalk maintenance, or other improvements. The incentive of these improvements might cause neighborhoods to open up new on-street supply to other users.

Parking benefit districts for on-street parking. This concept is a variation of an on-street parking charge scheme for residential areas. Instead of prohibiting non-resident parking in neighborhoods, as occurs with a residential permit parking program, non resident parking could be allowed with an appropriate parking charge. The charge could be collected with meters, payboxes or monthly passes. Revenues from the charge would flow back to the community, for neighborhood or transportation improvements. Some neighborhoods might prefer to allow non-resident parking if it benefited local parks, landscaping or transportation facilities.



Increasing on-street parking supply through restriping/redesigning spaces. Additional curbside areas can be striped for on-street parking, including angle parking, if right-of-way and traffic conditions allow. In addition, on-street parking has a traffic calming effect and improves the pedestrian environment, by physically protecting pedestrians from moving traffic. City officials can also review the size of on-street parking spaces to see if their size could be reduced. Spaces do not have to be individually marked in locations that use central parking machines, enabling a greater density of parked cars. However, there is a tradeoff between smaller parking spaces and the traffic impact of cars maneuvering into parking spaces.

Development of off-street parking facilities. If existing parking facilities are being efficiently used (e.g., employees are parking in off-street lots and on-street spaces turn over frequently), then cities and property owners may consider adding *off-street* parking. Off-street parking can take the pressure off on-street supplies. Of course, provision of additional parking must take into account other potential community goals, such as reducing traffic congestion and auto dependency, improving environmental quality, and achieving livable communities.

Initiate new or enhanced alternatives to driving. This toolkit focuses on parking management strategies, not the larger group of transportation demand management measures. However, any on-street parking supply issue can be addressed by changing parking demand through incentives that convince parkers to use other modes, whether that be new shuttle bus services, bicycle lockers, or financial incentives. Furthermore, strategies that provide a mix of land uses in an area may reduce automobile ownership and use.

Notes:

Off-Street Parking

Off-street parking regulations and policy are under the purview of both public and private entities. Publicly owned facilities are subject to policies established by the government agency with responsibility, i.e., the city, BART or others. However, most off-street parking is owned and operated by private property owners. In those instances, the property owner or the tenant establishes policies for the use of the facilities based on the ownership or lease arrangements. The actual operation of much off-street parking is contracted to parking management companies.

The connection between public and private parking entities is established in the minimum parking requirements contained in the city's zoning ordinance. These requirements compel developers to provide a certain amount of parking when they build a project. Parking supply is also influenced by lender requirements and standard development practices. However, minimum parking requirements are not addressed here because parking requirements are primarily an issue for new development, whereas the focus of this toolkit is managing existing parking.

Issues

Table 2 summarizes a series of off-street parking issues that are elaborated further below:

1. *Convenient spaces are not available to shoppers in commercial areas.* This may be an issue if spaces are not used productively. For example, if an employee parks all-day in a desirable off-street space, many potential customers are prevented from using that space. Similarly, there may be parking shortages for shoppers or employees if parkers from adjacent areas "invade" free, uncontrolled commercial or workplace parking.

2. *Parking lots and structures are usually full.* When the off-street parking supply is less than the demand, uses compete for parking on a first-come, first-served basis. This could occur when a new land use has increased the parking demand without a commensurate increase in parking supply, or a new tenant has a high employee density or a high level of visitors. When these conditions exists, market prices for parking generally emerge to ration the scarce parking resource, and/or parking spills over to on-street and other off-street parking.

3. *Parking patterns are uneven--some lots are full and others underused.* Uneven use of parking may relate to the access policies of the owners of those facilities, differences in attractiveness, perceptions of safety, temporary factors relating to the occupancy of the buildings, and so on. The opportunity presented by such an uneven distribution is policies that shift parking location to change the perceived availability of parking.

4. *Parking "poaching" is occurring--parkers from one use occupy parking provided for another use.* Parking poaching can occur when off-street parking does not have regulations, enforcement programs or parking access control. Examples of poaching include circumstances where employees park in spaces provided for retail uses or where BART transit riders park in spaces provided for employees.

5. *Cars are parked for long periods of time, thereby excluding daily parkers.* Cars parked for more than 24 hours take away spaces from more productive short-term uses. In this instance, "productive" is measured in terms of length of time parked.

Strategies

Table 2 also summarizes potential responses to off-street parking issues. The paragraphs that follow describe them in greater detail:

Access control. A wide variety of devices are available to control the use of off-street parking. The following describes some examples, ranging from simple to more complex systems:

1) For retail locations, property owners can:

- post signs that limit who can use the parking facility and for what purposes. Existing security personnel give warnings, post notices, and if necessary arrange for towing. Closed circuit television and intelligent transportation systems (ITS) can support enforcement activities.
- chain off parking entrances until stores open in the later morning period. This prevents most journey-to-work transit commuters from poaching parking.
- use gate arm access controls (with validation systems for customers if free parking is provided). Such a system prevents non-shoppers from using the facility entirely or charges them a price.

2) For worksites, employees can:

- establish a hang tag or sticker system for employee parking. Existing security personnel give warnings, post notices, and if necessary arrange for towing.
- use a validation system that ensures that parkers are those intended to use facility. For example, workers enter their parking space number on a validation machine within their workplace.
- use gate arm access controls and access card systems for employees. Such a system prevents non-employees from using the facility entirely, or alternatively charges them for parking.

Enforcement. Simple information and enforcement programs can be surprisingly effective. Such regulations include time limits or restrictions on who can use the parking. Security and parking control officers can assist with enforcement.

Employer programs. Employers can provide incentives for employees to use rideshare, transit, or non-automobile travel modes. Incentives include use of *Commuter Choice* tax provisions, guaranteed ride home programs, providing vanpool start up costs, etc. Rideshare programs can also provide information on alternative travel modes and ridematching assistance. All these programs reduce the number of cars driven to work for each employee, thereby lowering parking demand. Employers can also create programs that relocate employee parking to remote parking locations that have excess capacity, e.g., employees of a shopping mall during the holiday peak shopping period.

Time limits and time-based use restrictions. Time limits are a simple way to control the use of off-street parking facilities. The time limit for spaces can be adjusted to reflect the particular purpose for the parking. These time limits can be established on a differential basis to direct all-day parkers to underutilized spaces (e.g., the top levels of a parking structure).

Time-based use restrictions can prohibit parking for certain periods to reserve parking resources for a user group. For example, early morning parking prohibitions reserve parking resources for mid-day parkers.

Signage/ITS/Design. Good signage directs parkers quickly and efficiently to available spaces. In the case of parking structures, the challenge is to get the upper stories of parking structure occupied. Sometimes the problem is as simple as providing information. Intelligent Transportation Systems (ITS) offer sophisticated ways of guiding drivers to available parking. Finally, parking structures designed with good passive safety and logical circulation are more likely to be fully used than those that appear unsafe.

Shared parking. If the time of peak parking demand varies among uses, shared parking strategies can use existing parking with greater efficiency. Shared parking reduces the need to add more parking by recognizing that each land use has a different peak parking utilization period. If those peak periods do not overlap, then at least a portion of the parking facility can be shared. For example, an office building has low parking demand in the evening, which is the peak demand period for a restaurant. These two uses could share a portion of the parking.

Shared parking is normally thought of for an individual mixed-use site. But uses on separate sites can share parking. For example, BART has an arrangement at the Colma station where BART users use a portion of a bowling alley's parking during the day. The concept can be further expanded to include the sharing of parking on a station area basis. Shared parking reduces the cost of development and increases convenience for parkers.

Shared parking is normally used as a strategy for new development, but existing uses can develop shared parking arrangements with nearby property owners. Such arrangements can be privately initiated and implemented or carried out in cooperation with a city.

Although parking requirements for new development are not a focus of this toolkit, the use of in-lieu programs (where a developer makes a cash payment instead of providing a parking space) can facilitate shared parking concepts.

Parking cash-out. Employers can cash-out parking charges. Under a parking cash-out program, the employer offers workers the cash value of the cost of the parking space that is provided. Many employees choose to trade their parking space for the cash and commute to work using another travel mode. The cash out offer costs the employer nothing because it reduces expenditures on employee parking.

Parking charges. Research shows that parking charges at workplaces are the most effective tool for encouraging travelers to use efficient travel modes. Parking charges increase the level of transit use and ridesharing. Greater transit use and ridesharing, in turn, reduces parking demand.

Parking charges at commercial locations increase the rate at which parking spaces turn over. This increases the effective capacity of a fixed number of parking spaces.

Provide more off-street parking. Increasing efficiency through restriping, stacked parking, and attended parking provides more off street parking spaces per acre. However, if lower cost parking management options have been implemented and there are still shortages of parking, consideration may be given to constructing additional off-street parking.

Consideration of this strategy depends on the broader goals of the city concerning traffic congestion and auto dependency, improving environmental quality, and achieving livable communities.

If adding parking is consistent with community goals and there is available roadway capacity to serve the parking facility, existing surface parking lots can be converted to higher intensity uses by decking and the construction of multi-story structures. However, substantial parking demand and a high willingness to pay must be present to generate enough revenues to cover the costs of providing additional parking.

Initiate new or enhanced alternatives to driving. This toolkit focuses on parking management strategies, not the larger group of transportation demand management measures. However, any off-street parking supply issue can be addressed by changing parking demand through incentives that convince parkers to use other modes, whether that be new shuttle bus services, bicycle lockers, financial incentives. Furthermore, strategies that provide a mix of land uses in an area may reduce automobile ownership and use.

Step 3: Design and Implement Parking Programs

Parking is important to many members of a community. It affects the convenience with which they use the transportation system, the cost of travel and feelings they have about their neighborhoods and communities. Because parking is so important to many different people, parking policy should be developed and implemented in a collaborative manner. In addition, it should support broader community objectives laid out in community visions, general plans, specific plans, redevelopment strategies and other initiatives.

Since parking is under the control of many stakeholders--the city, private property owners, merchants and employers--it is important to involve key stakeholders and find policies that can help each group achieve their goals. Stakeholders include those who own or control parking and community members who are affected by parking policies.

Many groups can take the lead in bringing stakeholders together. The city could convene such an effort, but equally could a neighborhood group or merchant group.

Many Bay Area cities have implemented parking management strategies, so there is a substantial body of experience that can be shared. Appendix C lists some of the approaches used in BART station areas.

The key steps in designing and implementing a parking program are as follows:

1) Collect background information on the issue and complete the "what-when-where-who-why" analysis (see Step 1, page 3). Consult existing parking utilization studies and conduct any field studies that are required. Assemble relevant policy statements from general plans and other city policies.

2) Review alternative strategies from Tables 1 and 2 (see Step 2, page 7). Assess the most suitable approaches, based on the strengths and weaknesses of each approach and their respective fit with local conditions and local policy. Develop new approaches if those listed do not respond to local conditions.

One the most significant questions that must be answered is whether parking issues will be addressed by managing existing supplies (in combination, perhaps, with incentives for alternative travel modes) or whether additions to parking will be considered. The answer to this question rests, in turn, with the community's general plan policies, environmental policies, resources available for new programs and its philosophy about sustainability, quality of life and other questions.

Once the general direction of parking policy is established, more specific criteria can be developed, including:

- effectiveness in addressing the parking problem,
- community acceptability,
- compatibility with local plans,
- cost and financing feasibility,
- time frame for implementation, and
- implications for congestion and air quality.

3) Create a process to identify and work with stakeholders. Develop formal and informal processes to discuss the issue, the potential approaches and implementation issues. Identify local supporters of the process who can explain the issues to the community.

4) Take alternative approaches to the community to gain further feedback. Build consensus on the preferred approaches.

5) Develop implementation plan(s), including estimates of costs and revenues associated with the strategies. For projects where there is joint responsibility for the problem, develop agreements on cost

sharing and implementation responsibility. Present the plan to the appropriate body or bodies for adoption and implementation.

Secure funding and assign organizational responsibility for carrying out programs. Create institutional structures (e.g., parking authorities, oversight bodies) and hire or assign staff to work on the project.

Develop marketing and public information programs to inform residents, the business community and commuters of the changes that are planned.

6) Implement the strategy and monitor its success, considering conditions before and after its implementation. Make adjustments after the initial period of implementation to make sure that the programs are working as intended.

Notes:

Parking Resources

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Appendix A: Worksheets

The blank worksheets that follow are for use in community meetings and workshops. Public officials and community members can explore issues and strategies by filling the appropriate boxes.

The worksheets can be used in a number of ways. They can be filled out by individuals and then tallied for the group to indicate areas of commonality. Alternatively, small groups can discuss the issues raised in the worksheets and develop a consensus around the issues and strategies.

The worksheets include the following:

- The What-When-Where-Who-Why of Parking Management
- On-Street Parking Issues and Responses
- Off-Street Parking Issues and Responses

Notes:

Appendix B: Permit Parking Programs

Residential parking permit parking programs are designed to provide reasonably available and convenient on-street parking for residents when parking demand from nearby uses would otherwise occupy that parking. Cities generally establish permit parking districts that are designated on a map and for which specific parking regulations apply. Many of the communities around BART stations have implemented residential permit parking programs (See Appendix C)

Permit parking districts regulate time aspects of parking for non-residents. For example, a district may restrict parking for non-residents to 2 hours, allowing for visitors but not all-day parking. Residents of the district are entitled to a permit that releases them from the particular parking restrictions. Residents may also request guest permits for visitors. Residents must provide proof of residency, complete an application, and in most cases pay a small fee, which pays for the administrative costs of operating the program. The ordinance establishing such a program should include provisions for appeals.

Cities usually set thresholds for the creation of a permit parking programs. For example, the establishment of a program could require a petition signed by a certain percentage of residents residing within the zone, or could be based on the initiative of the city. Most cities then require a study by the City traffic engineer or planner, followed by a recommendation to the City Council.

Many programs include policies regarding the number of parking permits to be issued to guests. The rules prohibit the sale, rent or lease of any permit to any other individual. Generally, permits are not transferable between areas.

In the case of BART, it would be prudent to involve the community in the planning process before BART SFO Extension begins revenue service. Permit parking is a substantial change from normal parking policies, so community buy-in is a must.

Effective enforcement and appropriate fines must accompany permit parking programs. That is a key to maintaining the credibility of the program. Police support is a must.

Finally, the parking district must be sized so that spillover effects on other neighborhoods are limited. Too small an area will displace parkers. Too large an area will undermine the need for the program. Threshold criteria should be established for determining areas that are eligible.

Notes:

Appendix C: Bay Area Experience with Transit-Related Parking Management

The table on the following page summarizes the experience of a series of BART and Caltrain station areas in the Bay Area where parking management has been an issue, as compiled by BART staff. These stations tend to be those with high parking demand. Since parking policies are subject to change, please contact the relevant local jurisdiction for the most current information.

The following are some specific examples of innovative parking programs in the Bay Area:

- The City of Lafayette has developed a program to charge BART users for available on-street parking on three streets in the vicinity of the stations. Parking on the two streets closest to the station is $3 per day. Signs indicate the restrictions on parking. Each space is numbered and payment boxes are provided at the entrance to the station. These are spaces that were not previously used by residents. The program benefits BART riders and provides about $35,000 in revenue to the city.

- Private off-street lots are providing parking for BART users on a paid basis in the West Oakland and El Cerrito del Norte stations. BART patrons pay up to $5 per day for this parking.

- Shared parking is used for overflow BART parking at the Colma station. In this case, SamTrans pays the property owner for the right of BART to use a portion of the Sierra Bowl parking lot. The parking is provided free to BART riders.

- Spillover parking from the Oakland Coliseum is allowed to use BART station parking on a paid basis.

- Many cities institute various forms of on-street parking control systems in the vicinity of BART stations, ranging from parking meters, to time limits, to permit programs. Examples BART stations with permit parking programs include Daly City, Balboa Park, Concord, Pleasant Hill, Rockridge, West Oakland, El Cerrito Del Norte, El Cerrito Plaza, North Berkeley, Downtown Berkeley and Ashby.

- Caltrain uses a $1 per day parking charge in many of its commuter rail stations.

- Numerous owners of private parking lots use parking signage, validation programs, management and enforcement to ensure that parking is available for their customers. Strategies range from posting signs, to chaining off the parking facility before the stores open, to enforcement activities. Examples include the Hillsdale Shopping Center (Caltrain), the El Cerrito Plaza, the Embassy Suites in Pleasant Hill, and others.

Appendix Table C-1: Example Bay Area Parking Management Strategies

	Signage for private off-street lots	Parking meters	On-street parking time limitations	Enforcement	Residential parking permit program	Validation systems
BART San Francisco Stations	Yes	Yes	Yes--varies	City police	Yes	Varies
BART Bay Fair Station	Yes		Yes--four hour limit	BART police, shopping center security, city police		
BART Colma Station	Yes		Yes--four hour limit	BART police, city police		
BART Lafayette		Yes--for BART users	Yes	BART police, city police		
BART Concord Station			Yes--four hour limit	BART police, city police		
BART Daly City Station			Yes--four hour limit	BART police, city police	Yes	
BART El Cerrito Plaza Station	Yes		Yes--four hour limit	BART police, shopping center security, city police		
BART Pleasant Hill Station	Yes		Yes--two hour limit	BART police, city police		Embassy Suites
BART Rockridge Station		Yes	Yes--four hour limit	BART police, city police		
BART West Oakland Station			Yes--four hour limit	BART police, Caltrans personnel, city police	Yes	
Caltrain Hillsdale Station				Parking lot personnel, city police		Yes
Caltrain Millbrae Station			Yes, various			

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