

5.0 Traffic and Circulation

EXISTING TRAFFIC VOLUMES

To determine the existing traffic conditions at critical locations throughout the City, daily roadway traffic volume counts and intersection turning movement counts were collected by Dowling Associates, Inc. as part of the General Plan Update. Roadway counts were conducted in February and March 2007. The average daily trips (ADTs) for regional arterials and arterials in the City are shown in **Table A.1** below.

**TABLE A.1:
DAILY ROADWAY TRAFFIC VOLUME –
EXISTING CONDITIONS**

Street Name	Location	Daily Volume (ADT)
Regional Arterials		
San Pablo Ave	West of Del Monte Dr/Belmont Wy	17,100
San Pablo Ave	West of Appian Wy	20,600
San Pablo Ave	East of Pinole Valley Rd	20,900
Appian Wy	South of Tara Hills Dr/Canyon Dr	34,300
Appian Wy	South of Michael Dr	27,500
Arterials		
Pinole Valley Rd	North of Henry Ave	14,100
Pinole Valley Rd	South of Estate Ave	19,000
Pinole Valley Rd	South of Wright Ave	3,200
Henry Ave	East of Ridgecrest Rd	1,700
Fitzgerald Dr	West of Appian Wy	18,100
Shea Dr	West of Pinole Valley Rd	3,500

Source: Dowling Associates, Inc., 2007.

5.0 Traffic and Circulation

Intersection counts were compiled from a number of sources¹. These counts were conducted between October and November 2006. The intersection traffic volumes are depicted in **Figure A.2**

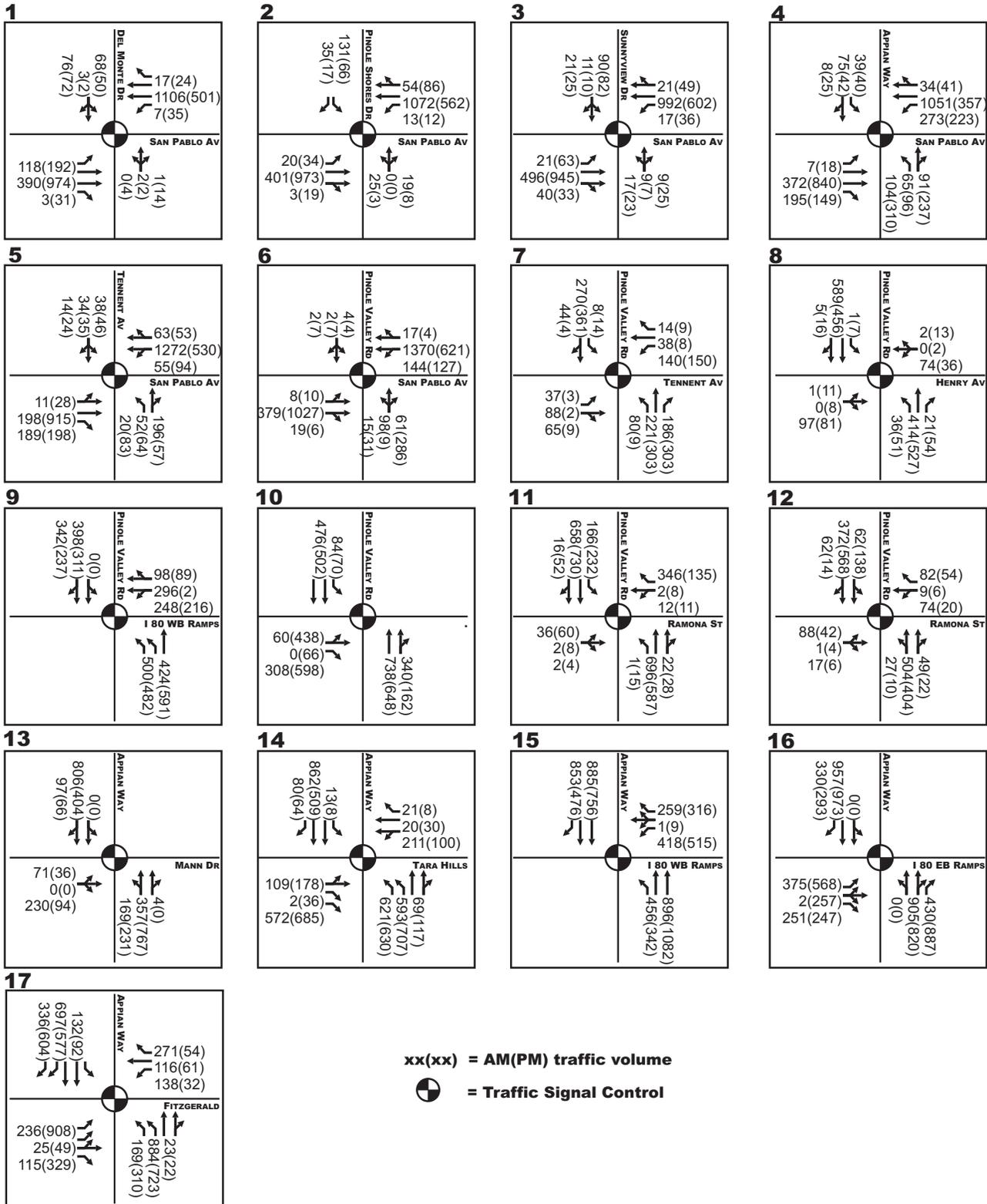
LEVEL OF SERVICE CRITERIA

The operating conditions experienced by motorists are described as “levels of service” (LOS). Level of service is a qualitative measure of the effect of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, driving comfort, and convenience. Levels of service are designated “A” through “F” from best to worst, which cover the entire range of traffic operations that might occur. Levels of service “A” through “E” generally represent traffic volumes at less than roadway capacity, while LOS “F” represents over capacity and/or forced flow conditions. The City’s Standard varies by roadway.

Levels of service for roadway links were estimated using a planning methodology that is based on *Highway Capacity Manual (HCM)*; this methodology uses daily traffic volumes to determine levels of service for general planning applications. The capacity of a roadway is based on the number of signalized intersections per mile, number of lanes, presence of left-turn lanes and medians, and other factors from the HCM method.

¹ The intersection counts were provided by the City from several sources. The ADT counts were conducted by Wiltec in February and March 2007.

Intersection Traffic Volume – Existing Conditions



5.0 Traffic and Circulation

At signalized intersections, the level of service is determined by the weighted average delay for all vehicles entering the intersection. The methodologies for these types of intersections calculate a single weighted average delay and LOS for the intersection. LOS is a convenient way to express the ratio between volume and capacity on a given link or at a given intersection, and is expressed as a letter grade ranging from LOS A through LOS F. Each level of service for signalized intersections is generally described as follows:

LOS A- Free-flowing travel with an excellent level of comfort and convenience and freedom to maneuver.

LOS B- Stable flow conditions, but the presence of other road users causes a noticeable, though slight, reduction in comfort, convenience and maneuvering freedom.

LOS C- Stable flow conditions, but the operation of individual users is substantially affected by the interaction with others in the traffic stream.

LOS D- High-density, but stable flow. Users experience severe restrictions in speed and freedom to maneuver, with poor levels of comfort and convenience.

LOS E- Operating conditions at or near capacity. Speeds are reduced to a low but relatively uniform value. Freedom to maneuver is difficult with users experiencing frustration and poor comfort and convenience. Unstable operation is frequent, and minor disturbances in traffic flow can cause breakdown conditions.

LOS F- Forced or breakdown conditions. This condition exists whenever the volume of traffic exceeds the capacity of the roadway. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse a point. Roadways store long queues behind such locations, with traffic advancing in stop-and-go "waves."

5.0 Traffic and Circulation

CITY THRESHOLDS

The City of Pinole has identified the following LOS and Volume to Capacity Ratios (V/C Ratios, as the minimum acceptable standards along its local, collector, and arterial roadways.

Central Business District (E+ or better, V/C Ratio of 0.90 to 0.94)

Applicable roadways

- San Pablo Avenue from Oak Ridge Road to eastern city limits

Urban (D- or better, V/C Ratio of 0.85 to 0.89)

Applicable roadways

- San Pablo Avenue from Oak Ridge Road to western city limits
- Appian Way from San Pablo Avenue to southern city limits
- Pinole Valley Road from San Pablo Avenue to city limits
- Tennent Avenue from Pinole Valley Road to Railroad Avenue
- Fitzgerald Drive from Appian Way to 1,000 feet west of Appian Way
- Tara Hills Drive from Appian Way to 1,000 feet west of Appian Way

Suburban (D+ or better, V/C Ratio of 0.80 to 0.85)

Applicable roadways

- All roadways not listed above

EXISTING TRAFFIC OPERATIONS

ROADWAY SEGMENTS

Roadway levels of service were evaluated at 11 key roadway segments. The corresponding levels of service are shown in **Table A.2** (next page). Under existing conditions, all roadways are operating within City standards, with the exception of Appian Way south of Tara Hills Drive. At this location, the daily volumes result in LOS E conditions.

5.0 Traffic and Circulation

**TABLE A.2
ROADWAY LEVEL OF SERVICE –
EXISTING CONDITIONS**

Street Name	Location	Existing Conditions		
		LOS	V/C	Daily Volume (ADT)
Regional Arterials				
San Pablo Ave	West of Del Monte Dr/Belmont Wy	C	0.50	17,100
San Pablo Ave	West of Appian Wy	C	0.60	20,600
San Pablo Ave	East of Pinole Valley Rd	D	0.85	20,900
Appian Way	South of Tara Hills Dr/Canyon Dr	E	0.99	34,300
Appian Way	South of Michael Dr	D	0.84	27,500
Arterials				
Pinole Valley Rd	North of Henry Ave	D	0.91	14,100
Pinole Valley Rd	South of Estate Ave	C	0.58	19,000
Pinole Valley Rd	South of Wright Ave	C	0.21	3,200
Henry Ave	East of Ridgecrest Rd	C	0.13	1,700
Fitzgerald Dr	West of Appian Wy	C	0.52	18,100
Shea Dr	West of Pinole Valley Rd	C	0.27	3,500

Source: Dowling Associates, Inc. 2007

INTERSECTIONS

As part of this study, intersection levels of service were evaluated at 17 key signalized intersections in Pinole for the AM and PM peak hours. The corresponding levels of service at the intersections are shown in **Table A.3**.

5.0 Traffic and Circulation

Under the existing conditions, all study intersections operate at LOS B or better during the AM and PM peak hours. The capacities of these key intersections are more than adequate to meet the current peak hour traffic demands.

Operations at the I-80 interchanges of Appian Way and Pinole Valley Road were observed for 15-minute periods during a weekday morning commute time. There was one observed instance at southbound Appian Way where the queue from the traffic signal at the northern leg of the interchange reached the preceding intersection and caused vehicle backups for right-turning vehicles from Tara Hills Drive. I-80 westbound vehicles could not get around the queue to access the uncontrolled on-ramp. No spillovers onto city roadways were observed at the I-80 interchange of Pinole Valley Road but the majority of vehicles exiting using the I-80 westbound off-ramp proceeded through the intersection to re-enter I-80 to avoid this congested section of the freeway.

**TABLE A.3:
EXISTING INTERSECTION LEVEL OF SERVICE**

#	Intersection	Time Period	LOS	V/C Ratio
1	Del Monte Drive at San Pablo Avenue	AM	A	0.50
		PM	A	0.40
2	Pinole Shores Drive at San Pablo Avenue	AM	A	0.44
		PM	A	0.34
3	Sunnyview Drive at San Pablo Avenue	AM	A	0.39
		PM	A	0.39
4	Appian Way at San Pablo Avenue	AM	A	0.43
		PM	A	0.59
5	Tennent Avenue at San Pablo Avenue	AM	A	0.55
		PM	A	0.43
6	Pinole Valley Road at San Pablo Avenue	AM	A	0.57
		PM	A	0.55

5.0 Traffic and Circulation

7	Pinole Valley Road at Tennent Avenue	AM	A	0.42
		PM	A	0.32
8	Pinole Valley Road at Henry Avenue	AM	A	0.36
		PM	A	0.42
9	Pinole Valley Road at I-80 westbound ramps	AM	A	0.56
		PM	A	0.47
10	Pinole Valley Road at I-80 eastbound ramps	AM	A	0.54
		PM	B	0.62
11	Pinole Valley Road at Estates Avenue	AM	A	0.43
		PM	A	0.36
12	Pinole Valley Road at Ramona Street	AM	A	0.30
		PM	A	0.24
13	Appian Way at Mann Drive	AM	A	0.51
		PM	A	0.50
14	Appian Way at Tara Hills Drive-Canyon Drive	AM	B	0.67
		PM	A	0.56
15	Appian Way at I-80 westbound ramps	AM	B	0.67
		PM	A	0.60
16	Appian Way at I-80 eastbound ramps	AM	A	0.39
		PM	B	0.70
17	Appian Way at Fitzgerald Drive-Sara Drive	AM	A	0.50
		PM	A	0.54

Source: Dowling Associates, Inc. 2007

FUTURE TRAFFIC CONDITIONS

The future traffic conditions were forecast using the Contra Costa Transportation Authority (CCTA) Travel Demand Model. The model was used to forecast the daily roadway volumes as well as the AM and PM peak hour intersection turning movement data. Both base year and future year forecasts were extracted and used to estimate the growth, which was applied to the existing counts.

5.0 Traffic and Circulation

ROADWAY IMPROVEMENTS

The future baseline (2030) conditions assume that the following regional roadway improvements would occur by the Year 2030:

- Appian Way would be extended as a four-lane roadway north of San Pablo Avenue
- Appian Way between San Pablo Dam Road and Hilltop Drive outside the city limit would be widened from two lanes to four lanes

FUTURE TRAFFIC VOLUMES

The future (2030) roadway volumes were estimated by using the growth from the model based on daily volumes and applying that difference between the 2030 forecasts and the base year (2000) forecasts to the existing daily count. The results are shown in **Table A.4** as average daily trips (ADTs).

**TABLE A.4:
DAILY ROADWAY TRAFFIC VOLUME –
CUMULATIVE CONDITIONS**

Street Name	Location	Daily Volume (ADT)
Regional Arterials		
San Pablo Ave	West of Del Monte Dr/Belmont Wy	29,500
San Pablo Ave	West of Appian Wy	32,000
San Pablo Ave	East of Pinole Valley Rd	47,000
Appian Way	South of Tara Hills Dr/Canyon Dr	46,600
Appian Way	South of Michael Dr	41,000
Arterials		
Pinole Valley Rd	North of Henry Ave	18,800
Pinole Valley Rd	South of Estate Ave	19,900
Pinole Valley Rd	South of Wright Ave	6,600

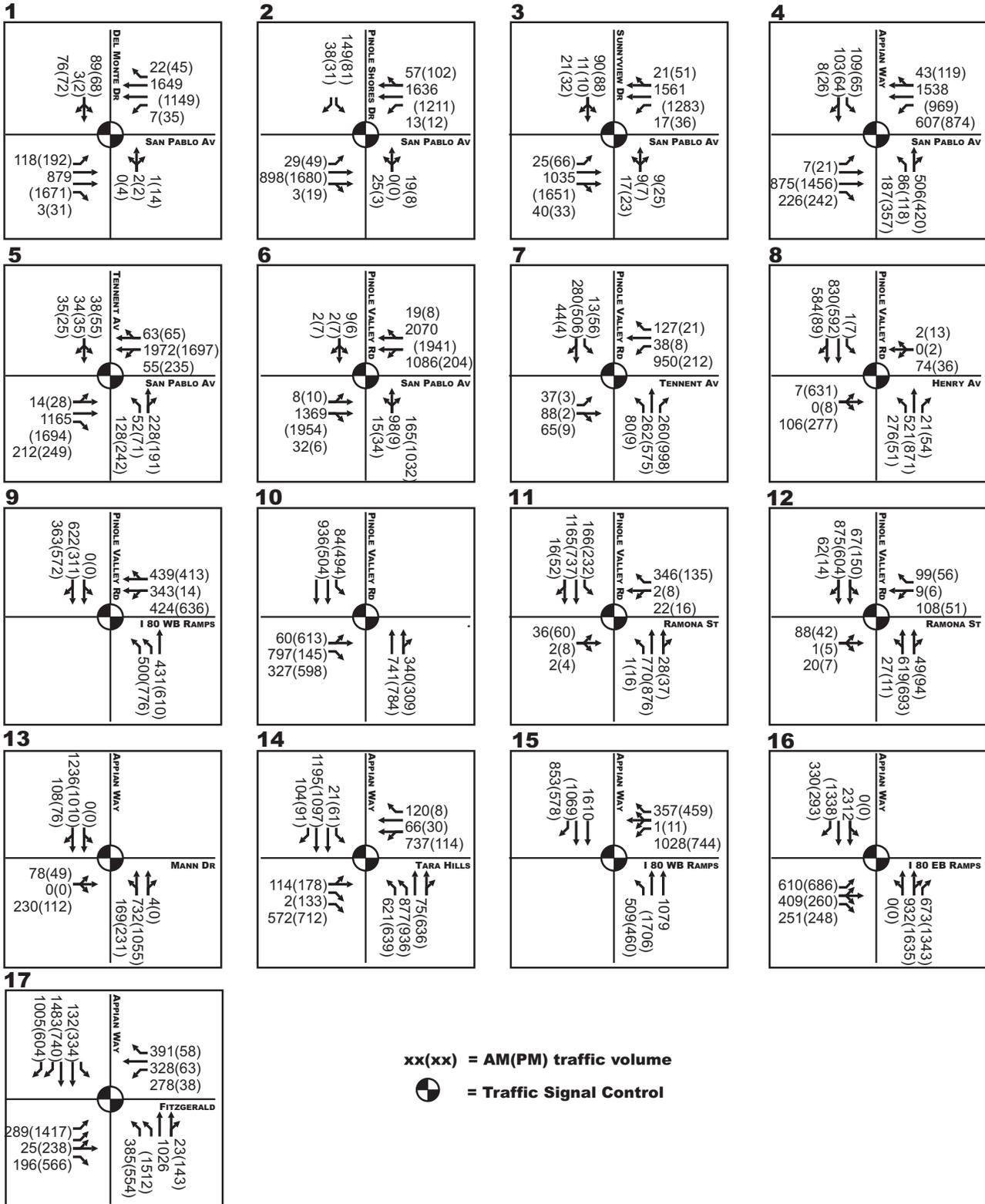
5.0 Traffic and Circulation

Street Name	Location	Daily Volume (ADT)
Henry Ave	East of Ridgecrest Rd	8,000
Fitzgerald Dr	West of Appian Wy	30,000
Shea Dr	West of Pinole Valley Rd	8,600

Source: Dowling Associates, Inc., 2007.

For the intersections, the future (2030) volumes were adjusted following the process established in the CCTA Technical Procedures, using the Furness method. The forecasted intersection traffic volume for Year 2030 is shown **Figure A.3**.

Intersection Traffic Volume – Cumulative Conditions



5.0 Traffic and Circulation

**TABLE A.5
ROADWAY LEVEL OF SERVICE –
CUMULATIVE CONDITIONS**

Street Name	Location	Cumulative Conditions		
		LOS	V/C	Daily Volume
Regional Arterials				
San Pablo Ave	West of Del Monte Dr/Belmont Way	D	0.86	29,500
San Pablo Ave	West of Appian Way	D	0.93	32,000
San Pablo Ave	East of Pinole Valley Rd	F	1.91	47,000
Appian Way	South of Tara Hills Dr/Canyon Dr	F	1.35	46,600
Appian Way	South of Michael Dr	F	1.25	41,000
Street Name	Location	Cumulative Conditions		
		LOS	V/C	Daily Volume
Arterials				
Pinole Valley Rd	North of Henry Ave	F	1.21	18,800
Pinole Valley Rd	South of Estate Ave	C	0.61	19,900
Pinole Valley Rd	South of Wright Ave	C	0.43	6,600
Henry Ave	East of Ridgecrest Rd	C	0.61	8,000
Fitzgerald Dr	West of Appian Way	D	0.87	30,000
Shea Dr	West of Pinole Valley Rd	C	0.66	8,600

Source: Dowling Associates, Inc. 2007

FUTURE TRAFFIC OPERATIONS

ROADWAY SEGMENTS

As shown in **Table A.5**, several roadways would operate at LOS F by year 2030. Increases in daily volumes along San Pablo Avenue, Appian Way, and Pinole Valley Road would exceed the capacity of the roadway. The increase in daily volumes can be attributed to growth in Pinole as well as the adjacent areas, such as Hercules, San Pablo, and the unincorporated county.

5.0 Traffic and Circulation

INTERSECTIONS

The intersection level of service under cumulative conditions is summarized in **Table A.6**. As identified under the roadway impacts, the peak hour volumes at several intersections along key corridors serving Pinole, such as San Pablo Avenue, Appian Way, and Pinole Valley Road, would approach or exceed the capacity of the intersection, resulting in LOS E or F conditions as identified in **bold**.

**TABLE A.6:
CUMULATIVE INTERSECTION LEVEL OF SERVICE**

#	Intersection	Time Period	LOS	V/C Ratio
1	Del Monte Drive at San Pablo Avenue	AM	B	0.675
		PM	B	0.626
2	Pinole Shores Drive at San Pablo Avenue	AM	B	0.621
		PM	A	0.554
3	Sunnyview Drive at San Pablo Avenue	AM	A	0.555
		PM	A	0.599
4	Appian Way at San Pablo Avenue	AM	F	1.015
		PM	F	1.282
5	Tennent Avenue at San Pablo Avenue	AM	D	0.841
		PM	D	0.855
6	Pinole Valley Road at San Pablo Avenue	AM	F	1.165
		PM	F	1.275
7	Pinole Valley Road at Tennent Avenue	AM	E	0.913
		PM	B	0.645
8	Pinole Valley Road at Henry Avenue	AM	C	0.710
		PM	F	1.118
9	Pinole Valley Road at I-80 westbound ramps	AM	C	0.797
		PM	E	0.950
10	Pinole Valley Road at I-80 eastbound ramps	AM	D	0.861
		PM	F	1.046

5.0 Traffic and Circulation

#	Intersection	Time Period	LOS	V/C Ratio
11	Pinole Valley Road at Estates Avenue	AM	A	0.469
		PM	A	0.451
12	Pinole Valley Road at Ramona Street	AM	A	0.470
		PM	A	0.372
13	Appian Way at Mann Drive	AM	B	0.638
		PM	A	0.519
14	Appian Way at Tara Hills Drive-Canyon Drive	AM	F	1.093
		PM	D	0.803
15	Appian Way at I-80 westbound ramps	AM	F	1.094
		PM	D	0.837
16	Appian Way at I-80 eastbound ramps	AM	F	1.049
		PM	F	1.129
17	Appian Way at Fitzgerald Drive-Sara Drive	AM	D	0.849
		PM	F	1.126

Source: Dowling Associates, Inc. 2007

Under cumulative conditions, the following intersections along San Pablo Avenue, Pinole Valley Road and Appian Way would operate at below acceptable level of service standards:

- Appian Way at San Pablo Avenue would operate at LOS F during both AM and PM peak hours
- Pinole Valley Road at San Pablo Avenue would operate at LOS F during both AM and PM peak hours
- Pinole Valley Road at Tennant Avenue would operate at LOS E during the AM peak hour
- Pinole Valley Road at Henry Avenue would operate at LOS F during the PM peak hour
- Pinole Valley Road at I-80 westbound ramps would operate at LOS E during the PM peak hour
- Pinole Valley Road at I-80 eastbound ramps would operate at LOS F during the PM peak hour

5.0 Traffic and Circulation

- Appian Way at Tara Hills Drive-Canyon Drive would operate at LOS F during the AM peak hour
- Appian Way at I-80 westbound ramps would operate at LOS F during the AM peak hour
- Appian Way at I-80 eastbound ramps would operate at LOS F during both AM and PM peak hours

Appian Way at Fitzgerald Drive-Sara Drive would operate at LOS F during the PM peak hour