3.2 TRANSPORTATION

Introduction

The study area for transportation in this EIR includes the cities of Pittsburg and Antioch, as well as portions of Oakley and Brentwood and the unincorporated areas of east Contra Costa County. While the traffic analysis has only been performed for areas within the cities of Pittsburg and Antioch, surrounding areas, including the cities of Oakley and Brentwood, are part of the project catchment areas and thus contribute to transit ridership. This section describes the regional and local transportation network serving the study area. The transportation network is composed of roadways, transit routes, parking facilities as well as pedestrian and bicycle facilities. Projected transit ridership on the Proposed Project is estimated as 10,100 weekday trips in the year 2030 (see Table 3.2-13). This section also identifies the potential impacts associated with the implementation of the Proposed Project on the transportation system for both existing and future conditions. The following impacts are analyzed as part of this section:

- traffic on freeways, local roads, and at key intersections;
- transit operations for BART and Tri Delta Transit, the local bus operator;
- parking availability versus projected demand at the stations; and
- pedestrian and bicycle circulation.

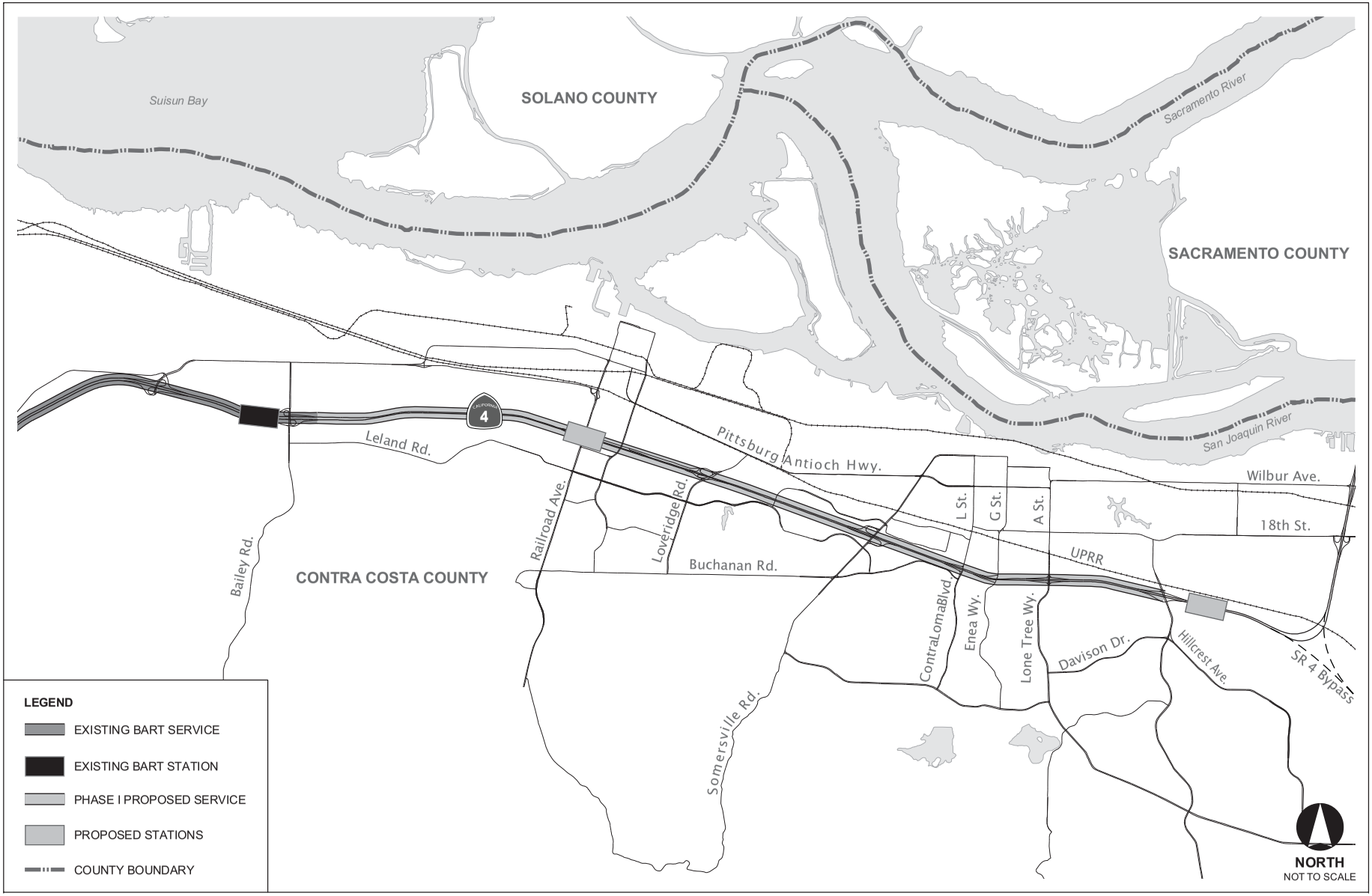
The traffic analysis was prepared in accordance with the *Technical Procedure Update – Final (July 19, 2006)* manual published by the Contra Costa Transportation Authority (CCTA).

Comments in response to the Notices of Preparation from 2005 and 2008 (see Appendix A) identified concerns about effects on intersections and traffic volumes on nearby roadways in the project corridor. Comments also identified concerns about parking capacity. These comments are addressed in this section.

Existing Conditions

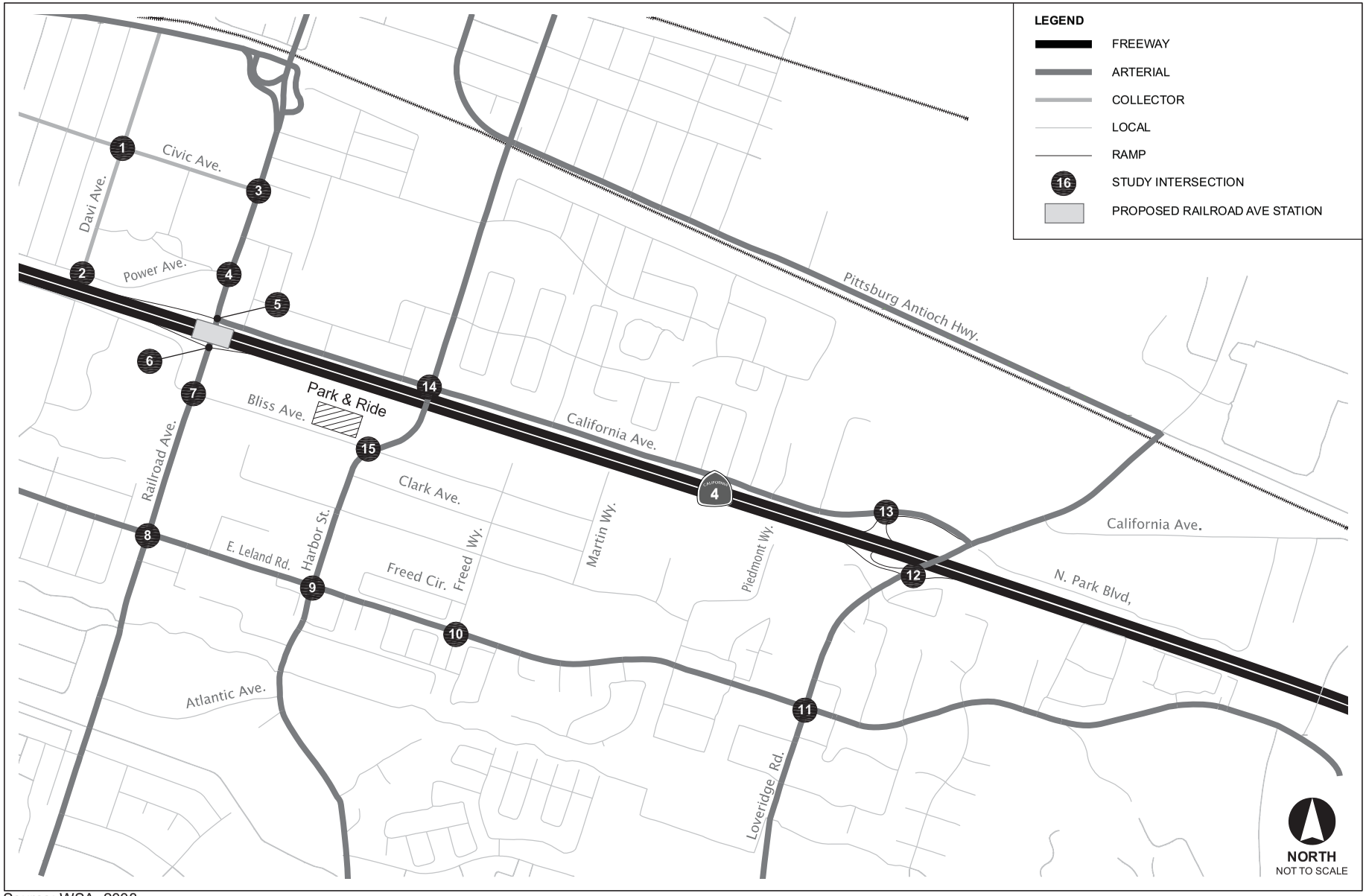
Study Area

Figure 3.2-1 illustrates the transportation study area in east Contra Costa County, generally extending from Bailey Road to the west, Pittsburg Antioch Highway to the north, Neroly Road/State Route 160 (SR 160) to the east, and Leland Road, Davison Drive, and Hillcrest Avenue to the south. Figure 3.2-2 and Figure 3.2-3 show the key intersections identified for the Railroad Avenue and Hillcrest Avenue Station areas, respectively.



Source: WSA, 2008.

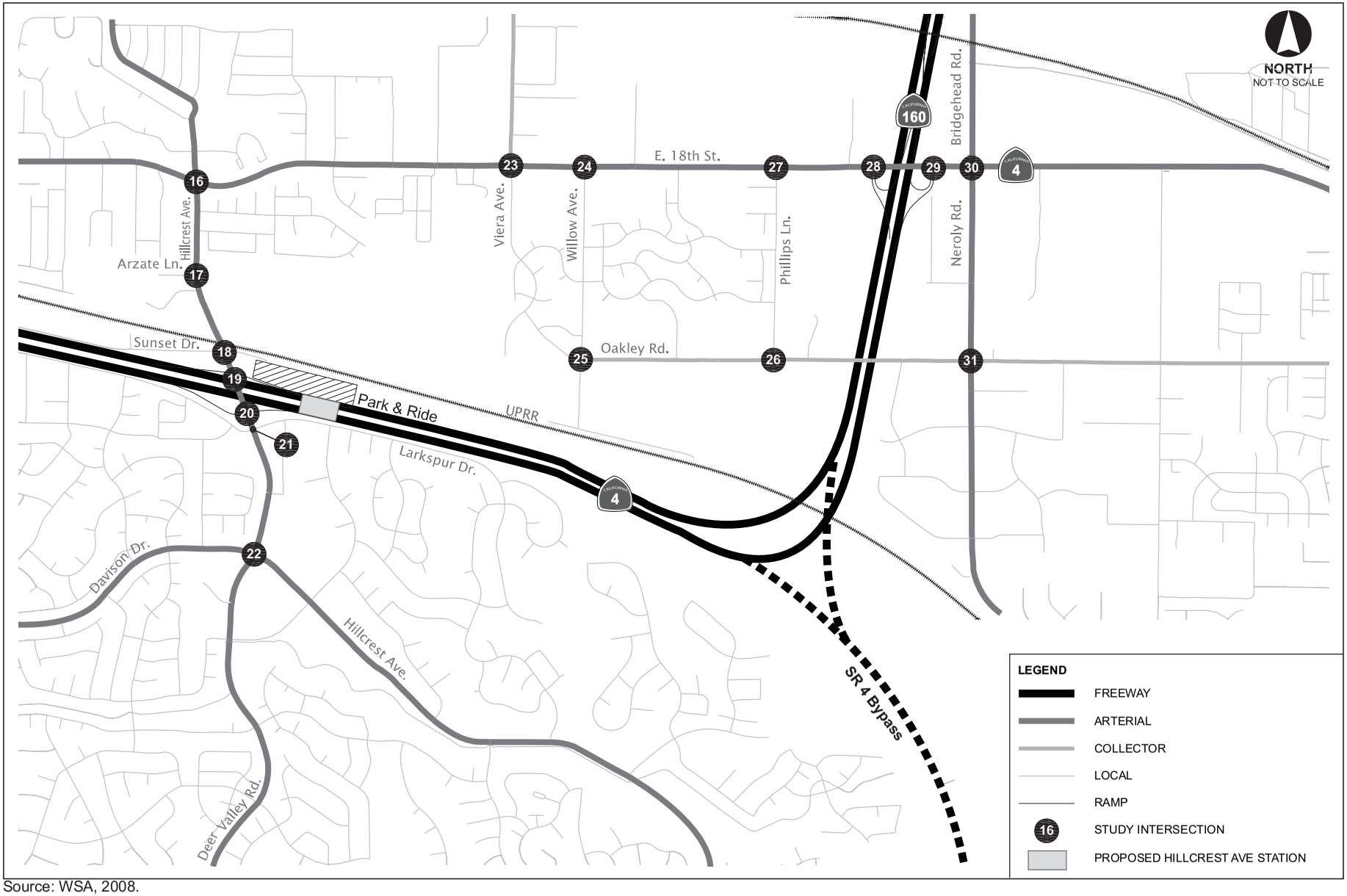
TRANSPORTATION STUDY AREA
FIGURE 3.2-1



Source: WSA, 2008.

RAILROAD AVENUE STATION AREA STUDY INTERSECTIONS

FIGURE 3.2-2



Source: WSA, 2008.

HILLCREST AVENUE STATION AREA STUDY INTERSECTIONS

FIGURE 3.2-3

A total of 31 key intersections were analyzed for this study. Study intersections were selected based on consultation with local jurisdictions and location along major travel routes to the stations. These intersections are grouped based on their proximity to the two planned stations and are identified below.

Railroad Avenue Station Area

1. Civic Avenue – W. 17th Street/Davi Avenue
2. Power Avenue/Davi Avenue
3. Railroad Avenue/Civic Avenue
4. Railroad Avenue/Center Drive
5. Railroad Avenue/SR 4 Westbound On-Ramp
6. Railroad Avenue/SR 4 Eastbound Ramps
7. Railroad Avenue/Bliss Avenue
8. Railroad Avenue/Leland Road
9. Leland Road/Harbor Street
10. Leland Road/Freed Avenue
11. Leland Road/Loveridge Road
12. Loveridge Road/SR 4 Eastbound Ramps
13. California Avenue/SR 4 Westbound Ramps
14. Harbor Street/California Avenue
15. Harbor Street/Bliss Avenue

Hillcrest Avenue Station Area

16. Hillcrest Avenue/E. 18th Street
17. Hillcrest Avenue/Arzate Lane – PG&E Service Center Driveway
18. Sunset Drive/Hillcrest Avenue
19. SR 4 Westbound Ramps/Hillcrest Avenue
20. SR 4 Eastbound Ramps/Hillcrest Avenue
21. Larkspur Drive/Hillcrest Avenue
22. Davison Drive/Hillcrest Avenue – Deer Valley Road
23. E. 18th Street/Viera Avenue
24. E. 18th Street/Willow Avenue
25. Oakley Road/Willow Avenue
26. Phillips Lane/Oakley Road
27. E. 18th Street/Phillips Lane – Dirt Driveway
28. SR 4 Westbound Ramps – K-Mart Driveway/Main Street
29. Main Street/SR 160 Northbound Ramps
30. Main Street/Neroly Road – Bridgehead Road
31. Oakley Road/Neroly Road

Traffic conditions on the freeways serving the project vicinity were also studied. The following mainline segments along SR 4 were analyzed for this project and are shown in Figure 3.2-4:

1. West of Bailey Road (Pittsburg/Bay Point BART)
2. Between Bailey Road and Railroad Avenue
3. Between Railroad Avenue and Loveridge Road
4. Between Loveridge Road and Somersville Road
5. Between Somersville Road and Contra Loma Boulevard/L Street
6. Between Contra Loma Boulevard/L Street and G Street
7. Between G Street and Lone Tree Way/A Street
8. Between Lone Tree Way/A Street and Hillcrest Avenue
9. Between Hillcrest Avenue and E. 18th Street/Main Street
10. East of E. 18th Street/Main Street

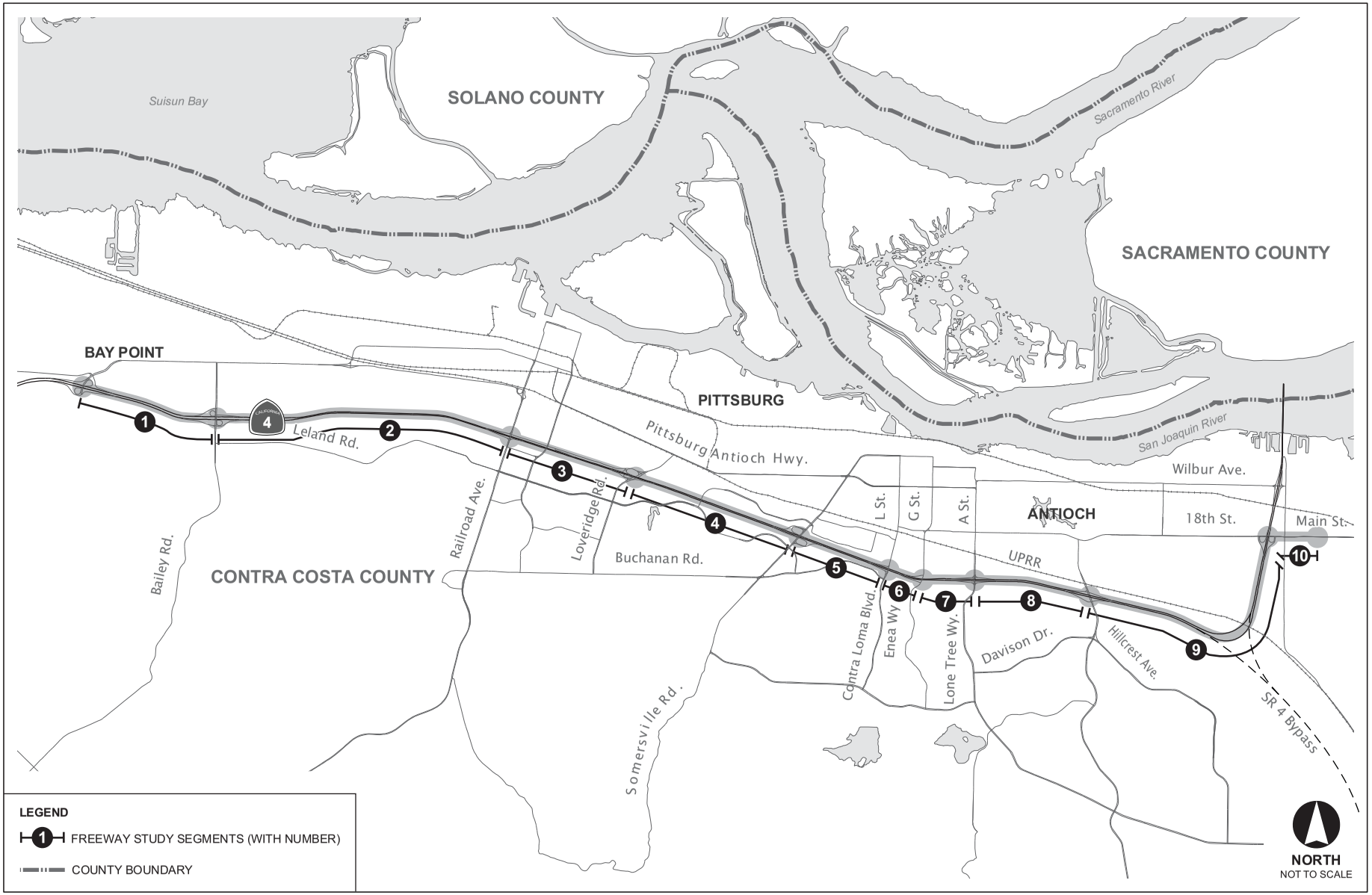
Methodology for Evaluating Traffic Operations

Traffic operations were evaluated based on methodologies in the 2000 Highway Capacity Manual (HCM 2000).

Intersection Analysis. Level of Service, or LOS, is a qualitative description of the performance of an intersection based on the average delay per vehicle. Intersection levels of service range from LOS A, which indicates free flow or excellent conditions with short delays, to LOS F, which indicates congested or overloaded conditions with extremely long delays. The HCM 2000 method calculates LOS values based on the average delay in seconds at the intersection, which is converted to an LOS value. The CCTA Technical Procedures' guidelines permit this approach to deriving LOS using HCM 2000 methodologies (and Synchro 7 traffic analysis software), and this approach has been used in this EIR analysis.

Signalized Intersections. The average delay for study area signalized intersections was calculated using the Synchro analysis software and is correlated to LOS as shown in Table 3.2-1.

Unsignalized Intersections. Unsignalized intersections were evaluated using the HCM 2000 methodology. In this case, the LOS is based on the "weighted average control delay" expressed in seconds per vehicle as illustrated in Table 3.2-2. Control delay includes the sum of all the individual movements that a vehicle might go through at an unsignalized intersection, including initial deceleration delay, queue move-up time, stopped delay, and final acceleration.



Source: WSA, 2008.

SR 4 FREEWAY SEGMENTS IN THE PROJECT CORRIDOR
FIGURE 3.2-4

Table 3.2-1
Level of Service Criteria – Signalized Intersections

Level of Service	Description of Operations	Average Delay (seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1–20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1–35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high volume/capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1–55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1–80.0
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	≥ 80.1

Source: Transportation Research Board, *Highway Capacity Manual*, 2000.

Table 3.2-2
Level of Service Criteria – Unsignalized Intersections

Level of Service	Description of Operations	Average Delay (seconds)
A	No Delay for stop-controlled approaches.	≤ 10.0
B	Operations with minor delays.	10.1–15.0
C	Operations with moderate delays.	15.1–25.0
D	Operations with some delays.	25.1–35.0
E	Operations with high delays, and long queues.	35.1–50.0
F	Operations with extreme congestion, with very high delays and long queues unacceptable to most drivers.	≥ 50.1

Source: Transportation Research Board, *Highway Capacity Manual*, 2000.

At two-way stop-controlled (TWSC) intersections, LOS is calculated for each controlled movement, as opposed to the intersection as a whole. For all-way stop-controlled (AWSC) locations, LOS is computed for the intersection as a whole.

Freeway Analysis. Freeway segment operating conditions were also evaluated using the HCM 2000 methodology. This methodology computes LOS for basic freeway segments using vehicle density as the measure of effectiveness, or degree of congestion. Table 3.2-3 presents the LOS criteria for freeway segments using density as the performance measure. Density is measured in vehicles per mile per lane.

Table 3.2-3
Level of Service Criteria – Basic Freeway Segments

Level of Service	Density (vehicles/mile/lane)
A	0.0–11.0
B	11.1–18.0
C	18.1–26.0
D	26.1–35.0
E	35.1–45.0
F	>45.0

Source: Transportation Research Board, *Highway Capacity Manual*, 2000.

Roadway Network and Operations

The project area includes a number of major roadways that serve regional trips within east Contra Costa County, as well as provide access to the commercial and residential areas adjacent to the project area. Several types of roadways serve the study area according to the Pittsburg and Antioch General Plans:

- *Freeways,* which include 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. These facilities are under Caltrans jurisdiction.
- *Arterials* are high-capacity local facilities that meet demand for longer, through trips in the community.
- *Collectors* are relatively moderate-speed, moderate-capacity streets that are designed for circulation within neighborhoods and connect arterials with local streets.
- *Local Streets* are generally low-speed facilities that provide direct access to abutting properties.

The regional roads within the study area are described below and shown in Figure 3.2-2 and Figure 3.2-3. Use of these regional roadways for access to the proposed stations is discussed later in this section under "Future Transportation Network."

Freeways. The primary freeways serving the study area include SR 4 and SR 160.

State Route 4 (SR 4) is the primary east-west transportation corridor in Contra Costa County, connecting Interstate 80 in the City of Hercules to the west with SR 160 and the cities of Oakley and Brentwood to the east. SR 4 is a divided freeway from Interstate 680 east through Concord, Pittsburg, and Antioch, and is currently a two-lane roadway through Oakley and Brentwood. SR 4 has been one of the more congested freeways in Contra Costa County, in particular, the segments between Lone Tree Way and Railroad Avenue in the morning and Bailey Road to Lone Tree Way in the afternoon. These segments are in the process of being widened. SR 4 has been widened to eight lanes, four in each direction including High Occupancy Vehicle (HOV) lanes from SR 242 to Railroad Avenue. Between Railroad Avenue and SR 160, SR 4 is a four-lane freeway. Interchanges along the study area include:

- Railroad Avenue
- Loveridge Road
- Somersville Road
- Contra Loma Boulevard/L Street
- Lone Tree Way/A Street
- Hillcrest Avenue
- 18th Street/Main Street

According to the 2006 Caltrans Report (the most current source available for average daily vehicle trips on Bay Area highways), average daily traffic (ADT) volumes were 125,000 west of the Railroad Avenue interchange and 113,000 east of the Railroad Avenue interchange. ADT volumes around Hillcrest Avenue were 81,000 west of the interchange and 38,000 east of the interchange. The reason for the large drop in traffic volume east of Hillcrest Avenue is due to the use of the Hillcrest Avenue and Lone Tree Way as a more direct access route than SR 4 to the eastern county. With the recent opening of the connection between SR 4 and the SR 4 Bypass (see description of the SR 4 Bypass below), the volume of traffic exiting the freeway to Hillcrest Avenue has declined.

State Route 160 (SR 160) begins at the 18th Street/SR 4 junction in Antioch, and continues north over the San Joaquin River via the Antioch Bridge to Rio Vista and Sacramento. Access to and from SR 160 and Antioch's local street network occurs at 18th Street/Main Street and Wilbur Avenue south of the Antioch Bridge.

Freeway Segment Operating Conditions. The freeway segments chosen for analysis, which extend from Bailey Road (Pittsburg/Bay Point BART Station) to 18th Street/Main Street, serve as the primary access facilities to the study area. The facility runs along the project corridor, connecting Bay Point to Pittsburg and Antioch. As SR 4 is also an important part of the regional roadway network, this roadway will be key in providing access to the park-and-ride lots near the proposed stations.

Existing AM and PM peak hour traffic volumes along SR 4 were obtained through Caltrans for the Year 2006. These counts were adjusted using on- and off-ramp counts conducted by Wilbur Smith Associates in 2007 for this EIR. The LOS results are shown in Table 3.2-4.

Table 3.2-4
SR 4 Operations within the Proposed Project Study Area – Existing Conditions, 2007

		Eastbound		Westbound	
Segment	**Peak Hour**	**Density (vehicles/mile/lane)**	**LOS**	**Density (vehicles/mile/lane)**	**LOS**
West of Bailey Road	AM	15.1	B	33.4	D
	PM	33.3	D	17.3	B
Bailey Road – Railroad Avenue	AM	19.3	C	35.6	E
	PM	38.3	E	21.9	C
Railroad Avenue – Loveridge Road	AM	28.9	D	38.7	E
	PM	**>45**	**F**	33.8	D
Loveridge Road – Somersville Road	AM	27.0	D	42.8	E
	PM	**>45**	**F**	34.1	D
Somersville Road – Contra Loma Boulevard/ L Street	AM	27.0	D	31.0	D
	PM	**>45**	**F**	35.9	E
Contra Loma Boulevard/ L Street – G Street	AM	27.0	D	31.0	D
	PM	**>45**	**F**	33.4	D
G Street – Lone Tree Way/A Street	AM	23.1	C	23.8	C
	PM	**>45**	**F**	30.7	D
Lone Tree Way/A Street – Hillcrest Avenue	AM	19.6	C	25.4	C
	PM	**>45**	**F**	25.4	C
Hillcrest Avenue – 18th Street	AM	10.1	A	17.8	B
	PM	30.4	D	13.1	B
East of 18th Street	AM	3.3	A	6.8	A
	PM	17.6	B	4.2	A

Source: Wilbur Smith Associates, 2007.

Note:

Boldfaced values exceed the desired LOS E standard.

The freeway segments within Pittsburg, especially west of L Street to the Pittsburg/Bay Point BART Station, tend to carry higher volumes of traffic and thus operate at worse levels of service than those in Antioch. Significantly better levels of service are observed near 18th Street, at the SR 160 interchange where SR 4 becomes Main Street.

The CCTA has set LOS E as the standard desired threshold for freeway segments in the Congestion Management Plan (CMP) network. The PM peak hour traffic traveling in the eastbound direction exhibits the worst levels of service on all segments compared to other peak periods and directions. All six freeway segments from Railroad Avenue to Hillcrest Avenue operate at LOS F during the eastbound PM peak hour. Thus, under the existing PM peak hour conditions, the following six freeway segments operate worse than the CCTA's LOS E standard in the eastbound direction:

- Railroad Avenue – Loveridge Road
- Loveridge Road – Somersville Road
- Somersville Road – Contra Loma Boulevard/L Street
- Contra Loma Boulevard/L Street – G Street
- G Street – Lone Tree Way/A Street
- Lone Tree Way/A Street – Hillcrest Avenue

While the CCTA has set LOS E as the desired operating threshold for freeway segments along the CMP network, the actual standards defined for individual freeway segments are based on the existing operating conditions when the standards were established. In this case, 1991 Caltrans data were used to establish these standards, and all 10 freeway segments included in this study were operating at LOS F according to these data. Thus, LOS F is the standard that will be used in the analysis of the Proposed Project, as described later under "Standards of Significance."

Railroad Avenue Station Area Roadways. Local roadways in the vicinity of the proposed Railroad Avenue Station are described below. Key features are summarized in Table 3.2-5.

Railroad Avenue is a north-south roadway that runs between W. 10th Street and Buchanan Road. In the vicinity of the study area, Railroad Avenue has two travel lanes in each direction, with a landscaped, tree-lined median north and south of SR 4 and left turn pockets at major intersections. Railroad Avenue has a 5-foot-wide sidewalk on the west side and a 10-foot-wide sidewalk on its east side, and many segments have landscaping buffers. The Pittsburg 2020 General Plan identifies Railroad Avenue as a Major Arterial in the roadway system.

Table 3.2-5
Key Features of Roadways in Project Study Area

Roadway	Type	Direction	Lanes	Median	Turn Pockets	Bicycle Lanes	Side-walks
Pittsburg							
Railroad Avenue	Arterial	N-S	4	X	X	—	X
Harbor Street	Arterial	N-S	4	X	X	X	X
Loveridge Road	Arterial	N-S	4	X	X	X	X
East Leland Road	Arterial	E-W	4	X	X	X	X
Davi Avenue	Collector	N-S	2	—	—	—	X
Civic Avenue	Collector	E-W	4	X	X	—	X
Power Avenue	Collector	E-W	2	—	—	—	X
Freed Way	Local	N-S	4	—	—	—	—
Martin Way	Local	N-S	4	—	—	—	X
Piedmont Way	Local	N-S	4	—	—	—	X
Bliss Avenue	Local	E-W	4	—	—	—	—
Clark Avenue	Local	E-W	4	—	—	—	—
Garcia Avenue	Local	E-W	4	—	—	—	—
Freed Circle	Local	E-W	4	—	—	—	X
Antioch							
Hillcrest Avenue	Arterial	N-S	4	X	X	X	X
East 18th Street	Arterial	E-W	4	—	X	—	X
Davison Drive	Arterial	E-W	4	X	X	X	X
Deer Valley Road	Arterial	N-S	4	X	—	X	X
Neroly Road/Bridgehead Road	Arterial	N-S	2	—	—	—	—
Viera Avenue	Collector	N-S	2	—	—	—	X
Oakley Road	Collector	E-W	2	—	—	—	X
Arzate Lane/PG&E Service Center Driveway	Local	E-W	2	—	—	—	X
Sunset Drive	Local	E-W	2	—	X	—	—
Larkspur Drive	Local	E-W	2	—	X	X	X
Willow Avenue	Local	N-S	2	—	—	—	X
Phillips Lane/Dirt Driveway	Local	N-S	2	—	—	—	X

Source: Wilbur Smith Associates, 2007.

Harbor Street is a north-south roadway that runs from 3rd Street to Buchanan Road. In the vicinity of the study area, Harbor Street has two travel lanes with left turn pockets, marked by incongruently spaced narrow and wide tree-lined medians. Six-foot-wide sidewalks are located along most of its length. The Pittsburg 2020 General Plan identifies Harbor Street as a Minor Arterial in the roadway system.

Loveridge Road is a north-south roadway that runs between East 3rd Street and Buchanan Road. In the vicinity of the study area, Loveridge Road has two travel lanes and bike lanes in each direction with narrow and wide tree-lined medians and left lane turning pockets at major intersections. Ten-foot-wide sidewalks are located along most of its length. The Pittsburg 2020 General Plan identifies Loveridge Road as a Major Arterial in the roadway system.

East Leland Road is an east-west roadway that runs between Century Boulevard and Bailey Road. In the vicinity of the study area, East Leland Road has two travel lanes and a bike lane in each direction with a large tree-lined median and left lane turning pockets at major intersections. Ten-foot-wide sidewalks are located along most of its length.

Davi Avenue is a north-south roadway that runs between Power Avenue and North Parkside Drive. In the vicinity of the study area, Davi Avenue has one travel lane in each direction. A six-foot-wide sidewalk is located along its eastern edge. The Pittsburg 2020 General Plan identifies Davi Avenue as a Collector in the roadway system.

Civic Avenue is an east-west roadway that runs between Railroad Avenue and Davi Avenue (becomes West 17th Street west of Davi Avenue). In the vicinity of the study area, Civic Avenue has two travel lanes in each direction with a large tree-lined median and a left lane turning pocket leading to the driveway entrance to City Hall. Six-foot-wide sidewalks are located along its length and two bus stops are located approximately 200 feet west of the Railroad Avenue on both sides of the street. The Pittsburg 2020 General Plan identifies Civic Avenue as a Collector in the roadway system.

Power Avenue is an east-west roadway that runs between Railroad Avenue and west of Davi Avenue. In the vicinity of the study area, Power Avenue has one travel lane in each direction. There is a six-foot-wide sidewalk located along its northern edge and parallel parking along both sides of the street. The Pittsburg 2020 General Plan identifies Power Avenue as a Collector in the roadway system.

Freed Way is a north-south roadway that runs from Bliss Avenue to East Leland Road. In the vicinity of the study area, Freed Way has two travel lanes in each direction with no paved sidewalks along most of its length. The Pittsburg 2020 General Plan identifies Freed Way as a Local Street/Minor Road in the roadway system.

Martin Way is a north-south roadway that runs from Bliss Avenue to Garcia Avenue. In the vicinity of the study area, Martin Way has two travel lanes in each direction with paved sidewalks on the east side of the street. The Pittsburg 2020 General Plan identifies Martin Way as a Local Street/Minor Road in the roadway system.

Piedmont Way is a north-south roadway that runs north of Garcia Avenue to south of East Leland Road. In the vicinity of the study area, Piedmont Way has two travel lanes in each direction with paved sidewalks at various locations on either side of the street. The Pittsburg 2020 General Plan identifies Piedmont Way as a Local Street/Minor Road in the roadway system.

Bliss Avenue is an east-west roadway that runs between Railroad Avenue and Martin Way. In the vicinity of the study area, Bliss Avenue has two travel lanes in each direction with no paved sidewalks along most of its length. The Pittsburg 2020 General Plan identifies Bliss Avenue as a Local Street/Minor Road in the roadway system.

Clark Avenue is an east-west roadway that runs between Harbor Street and Martin Way. In the vicinity of the study area, Clark Avenue has two travel lanes in each direction with no paved sidewalks. The Pittsburg 2020 General Plan identifies Clark Avenue as a Local Street/Minor Road in the roadway system.

Garcia Avenue is an east-west roadway that runs between Piedmont Way and ends west of Harbor Street. In the vicinity of the study area, Garcia Avenue has two travel lanes in each direction with paved sidewalks on the north side of the street along a portion of its length. The Pittsburg 2020 General Plan identifies Garcia Avenue as a Local Street/Minor Road in the roadway system.

Freed Circle is a rounded cul-de-sac that generally runs east-west with an entrance/exit at Freed Way. In the vicinity of the study area, Freed Circle has two travel lanes in each direction with paved sidewalks on one side of the street. Freed Circle serves an existing residential area. The Pittsburg 2020 General Plan identifies Freed Circle as a Local Street/Minor Road in the roadway system.

Hillcrest Avenue Station Area Roadways. Local roadways in the vicinity of the proposed Hillcrest Avenue Station are described below. Key features are summarized in Table 3.2-5.

Hillcrest Avenue is a major north-south arterial that is located in eastern Antioch on both sides of SR 4 linking the area north of E. 18th Street to Prewett Ranch Drive. This roadway would be the primary access road to the proposed Hillcrest Avenue Station. South of SR 4, there are bicycle lanes on both sides of the street, while north of SR 4, a bicycle lane is only on one side of the road. There are sidewalks on both sides of the street along most of its length, and many segments are landscaped.

East 18th Street is a four-lane east-west major arterial located north of and parallel to SR 4. It continues to the east as Main Street in the City of Oakley. A median runs through most segments, narrowing to provide left turn pockets. Sidewalks are on both sides of the road for most of its length.

Davison Drive is a four-lane major arterial with a landscaped median and turning pockets located south of SR 4 and serves as an east-west connection between Lone Tree Way and Hillcrest Avenue.

Deer Valley Road is a four-lane major arterial with a landscaped median that runs north-south beginning in the north at the Hillcrest Avenue/Davison Drive junction and ends in the south at Marsh Creek Road, south of the City's boundary in Contra Costa County.

Neroly Road/Bridgehead Road is a north-south two-lane road connecting Oakley to Brentwood. There are no sidewalks along this street within the study area.

Viera Avenue is a north-south two-lane collector which terminates south of E. 18th Street past Oakley Road and continues north to Wilbur Avenue. It primarily serves residences alongside the roadway. South of E. 18th Street, sidewalks exist on both sides of the road.

Oakley Road is an east-west two lane roadway that connects Oakley to Antioch, beginning at Viera Avenue and terminating at Empire Avenue. East of Live Oak Avenue, Oakley Road widens to add a median and turning lane. Sidewalks are provided on both sides of the street along the portion east of Willow Avenue.

Arzate Lane/PG&E Service Center Driveway is a private residential cul-de-sac street which intersects with Hillcrest Avenue across from the PG&E Service Center Driveway. Double yellow lane markings do not exist along either of these roadways.

Sunset Drive is an east-west street that runs parallel to and north of SR 4 from Bryan Avenue near A Street and terminates at a cul-de-sac slightly east of its intersection with Hillcrest Avenue.

Slatten Ranch Road is a planned new roadway identified in the City of Antioch's General Plan. As proposed, it would extend from the intersection of Hillcrest Avenue with Sunset Drive east following SR 4 and passing under SR 160. It would then continue southeast intersecting with the SR 4 Bypass at Laurel Avenue and then continuing to a connection with Lone Tree Way just west of the SR 4 Bypass.

Larkspur Drive is the east-west roadway running south of and parallel to SR 4. It is a continuation of E. Tregallas Road. At the intersection with Bluebell Circle, Larkspur Drive bends south away from SR 4 and terminates at a cul-de-sac. Bicycle lanes exist along a short segment of the road, connecting to the lanes along Hillcrest Avenue.

Willow Avenue is a two-lane, north-south residential street running between E. 18th Street and Oakley Road. There are sidewalks on both sides of the street.

Phillips Lane/Dirt Driveway is a north-south residential street running between E. 18th Street and Oakley Road in the City of Antioch. It runs parallel to Willow Avenue and continues past E. 18th Street as a dirt driveway. There are sidewalks along the southern half.

Other Roadways. The facilities described below provide access from neighboring cities to the study area.

State Route 4 Bypass is a large regional transportation project being constructed in three segments. Segment 2, which is currently completed and open to traffic, is a two-lane expressway between Lone Tree Way and Balfour Road (existing). There are plans to convert it to a full freeway with interchanges at Sand Creek Road and Balfour Road.

Brentwood Boulevard, also known in Brentwood as SR 4, is a north-south roadway that connects Balfour Road to Central Boulevard and runs essentially parallel to the existing SR 4 Bypass. Brentwood/SR 4 makes a series of right turns to maneuver through Brentwood downtown. The Brentwood Park-and-Ride Lot is located at Oak and Walnut directly off Brentwood Boulevard. Class II bicycle lanes are provided along much of this segment of Brentwood Boulevard, but are discontinuous in some areas.

Intersection Operating Conditions. Existing intersection operating conditions were evaluated for the morning peak hour (7:00 a.m. to 9:00 a.m.) and evening peak hour (4:00 p.m. to 6:00 p.m.) using Synchro software. Existing commute peak hour traffic volumes at key intersections were derived from counts of the various turning maneuvers possible at the intersection by Wilbur Smith Associates in January-March 2007. The traffic movements were counted and recorded by traffic surveyors in 15-minute intervals during the peak commute periods. These counts were then analyzed to determine the peak one-hour traffic volumes at each intersection.

A total of 31 intersections were analyzed, of which 20 are signalized, eight are Two-Way Stop-Controlled (TWSC) intersections, and three are All-Way Stop-Controlled (AWSC) intersections. Figure 3.2-5 and Figure 3.2-6 show the geometric configurations at the study intersections and exhibit the AM and PM peak hour turning movement volumes under existing conditions. The existing lane configurations and peak hour turning movement volumes were used to calculate the LOS (see Table 3.2-6), and the calculation worksheets to derive the LOS are included in the Transportation Technical Report, available for review at the BART Planning Office.

Table 3.2-6
Study Intersection Operations – Existing Conditions

#	Intersection	Threshold			AM Peak			PM Peak		
		Control	Jurisdiction	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue – W.17th Street/Davi Avenue	AWSC	City of Pittsburg	E		7.8	A		8.2	A
2	Power Avenue/Davi Avenue	TWSC	City of Pittsburg	E	0.05 (SB)	12.1 (SB)	B	0.11 (SB)	13.5 (SB)	B
3	Railroad Avenue/Civic Avenue	Signal	CCTA	D[b]	0.46	15.7	B	0.38	13.8	B
4	Railroad Avenue/Center Drive	TWSC	City of Pittsburg	E	0.59 (EB)	27.3 (EB)	D	0.87 (EB)	34.6 (EB)	D
5	Railroad Avenue/SR 4 Westbound On-Ramp	Signal	Caltrans	C/D[a]	**1.2**	**>80**	**F**	0.65	16.6	B
6	Railroad Avenue/SR 4 Eastbound Ramps	Signal	Caltrans	C/D[a]	0.66	17.3	B	**1.08**	**52.2**	**D**
7	Railroad Avenue/Bliss Avenue	Signal	CCTA CMP	E	0.55	15.3	B	0.73	18.1	B
8	Railroad Avenue/Leland Road	Signal	CCTA CMP	E	0.8	33.7	C	0.97	48.2	D
9	Leland Road/Harbor Street	Signal	CCTA	D[b]	0.76	33.6	C	0.88	42.8	D
10	Leland Road/Freed Avenue	TWSC	City of Pittsburg	E	0.31 (SB)	42.1 (SB)	E	**0.94 (NB)**	**>50 (NB)**	**F**
11	Leland Road/Loveridge Road	Signal	CCTA	D[b]	0.67	34.8	C	0.77	31.2	C
12	Loveridge Road/SR 4 Eastbound Ramps	Signal	Caltrans	C/D[a]	0.53	15	B	0.59	9.8	A
13	California Avenue/SR 4 Westbound Ramps	Signal	Caltrans	C/D[a]	0.56	27.3	C	**0.85**	**49.1**	**D**
14	Harbor Street/California Avenue	Signal	CCTA	D[b]	0.64	30.9	C	0.82	35.5	D
15	Harbor Street/Bliss Avenue	TWSC	City of Pittsburg	E	**2.04 (EB)**	**>50 (EB)**	**F**	**2.05 (EB)**	**>50 (EB)**	**F**
16	Hillcrest Avenue/E. 18th Street	Signal	CCTA	D[b]	0.8	43.8	D	0.87	49.6	D
17	Hillcrest Avenue/Arzate Lane – PG&E Service Center Driveway	TWSC	City of Antioch	D[c]	0.05 (WB)	17.4 (WB)	C	0.01 (EB)	16.9 (EB)	C
18	Sunset Drive/Hillcrest Avenue	Signal	CCTA	D[b]	0.5	21	C	0.51	24.5	C
19	SR 4 Westbound Ramps/Hillcrest Avenue	Signal	Caltrans	C/D[a]	0.96	32.3	C	0.88	16.7	B
20	SR 4 Eastbound Ramps/Hillcrest Avenue	Signal	Caltrans	C/D[a]	0.98	26.5	C	**1.17**	**68.3**	**E**

Table 3.2-6
Study Intersection Operations – Existing Conditions

#	Intersection	Threshold			AM Peak			PM Peak		
		Control	Jurisdiction	LOS	V/C	Delay	LOS	V/C	Delay	LOS
21	Larkspur Drive/Hillcrest Avenue	Signal	CCTA	D[b]	0.79	26.4	C	0.86	46.7	D
22	Davison Drive/Hillcrest Avenue – Deer Valley Road	Signal	CCTA	D[b]	0.89	43.7	D	0.86	45.4	D
23	E. 18th Street/Viera Avenue	Signal	CCTA	D[b]	**0.95**	**63.3**	**E**	0.54	18.4	B
24	E. 18th Street/Willow Avenue	TWSC	City of Antioch	D[c]	0.64 (NB)	32.7 (NB)	D	0.35 (NB)	25.5 (NB)	D
25	Oakley Road/Willow Avenue	AWSC	City of Antioch	D[c]		9.6	A		8.5	A
26	Phillips Lane/Oakley Road	TWSC	City of Antioch	D[c]	0.06 (SB)	11.7 (SB)	B	0.09 (SB)	11.6 (SB)	B
27	E. 18th Street/Phillips Lane – Dirt Driveway	TWSC	City of Antioch	D[c]	0.02 (NB)	12.5 (NB)	B	0.05 (NB)	11.4 (NB)	B
28	SR 4 Westbound Ramps– K-Mart Driveway/Main Street	Signal	Caltrans	C/D[a]	**0.88**	**76.5**	**E**	**0.84**	**38.3**	**D**
29	Main Street/SR 160 Northbound Ramps	Signal	Caltrans	C/D[a]	0.62	11.7	B	0.93	32.8	C
30	Main Street/Neroly Road – Bridgehead Road	Signal	CCTA CMP	E	0.86	36.6	D	**1.26**	**>80**	**F**
31	Oakley Road/Neroly Road	AWSC	City of Oakley[d]	D		**>50**	**F**		**>50**	**F**

Source: Wilbur Smith Associates, February 2007.

Notes:

AWSC – All-way Stop Control

TWSC – Two-way Stop Control

Signal – Traffic Signal

Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldface type indicates unacceptable values.

a. Represents a target LOS at the transition between LOS C and LOS D.

b. For an Urban Area V/C ratio must be between 0.85 and 0.89.

c. V/C ratio must be between 0.80 and 0.84.

d. This jurisdiction does not define standard for unsignalized intersections, LOS D threshold has been utilized.

Under the existing AM peak hour conditions, 26 of the 31 study intersections operate at acceptable conditions; i.e., at an LOS better or equal to the threshold defined by the applicable jurisdiction. The following five intersections operate at unacceptable conditions:

- Railroad Avenue/SR 4 Westbound On-Ramp
- Harbor Street/Bliss Avenue
- E. 18th Street/Viera Avenue
- SR 4 Westbound Ramps – K-Mart Driveway/Main Street
- Oakley Road/Neroly Road

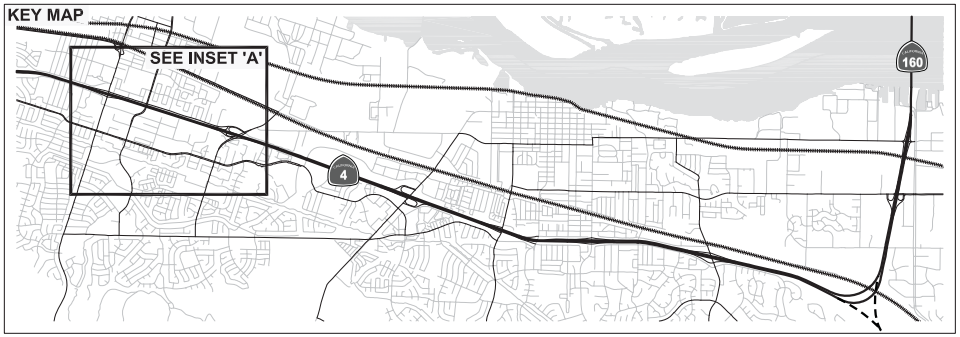
Under existing PM peak hour conditions, eight study intersections operate at unacceptable LOS. The remaining intersections operate at acceptable conditions. The intersections operating at unacceptable conditions are:

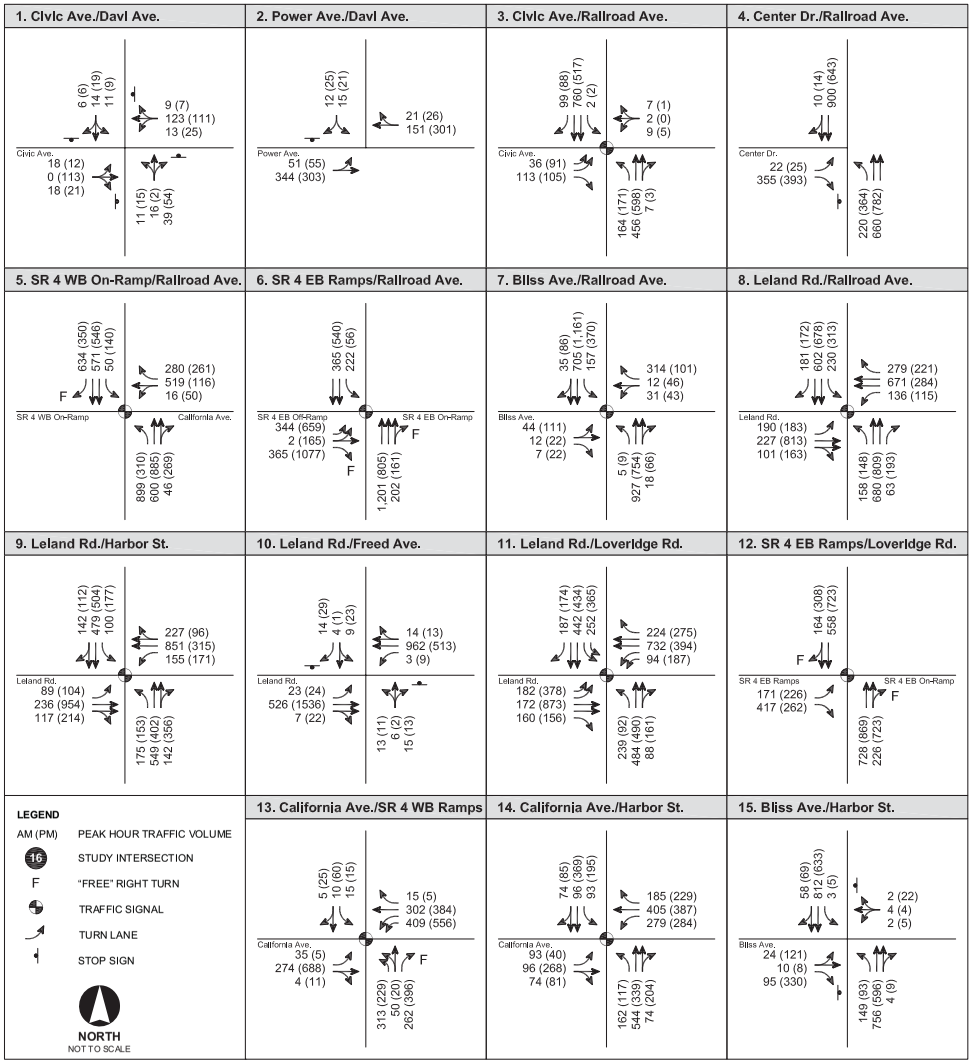
- Railroad Avenue/SR 4 Eastbound Ramps
- Leland Road/Freed Avenue
- California Avenue/SR 4 Westbound Ramps
- Harbor Street/Bliss Avenue
- SR 4 Eastbound Ramps/Hillcrest Avenue
- SR 4 Westbound Ramps – K-Mart Driveway/Main Street
- Main Street/Neroly Road – Bridgehead Road
- Oakley Road/Neroly Road

Public Transit Services

Two major public transit operators provide service within or adjacent to the study area, BART and the Eastern Contra Costa Transit Authority, or Tri Delta Transit. Limited services are also provided by other transit agencies that mainly serve areas further from the study area. Existing services provided by these operators are described below.

BART Service. The Pittsburg/Bay Point BART service terminates at the southwest quadrant of the SR 4/Bailey Road interchange. During weekdays, scheduled trains complete over 80 outbound trips from the Pittsburg/Bay Point BART Station to other Bay Area destinations. In FY 2007, the station had an average of 4,986 weekday patron exits. The SFO – Pittsburg/Bay Point line, also referred to as the Concord Line, provides direct service to and from San Francisco and runs from 4:00 a.m. to 12:00 a.m. daily. With the exception of three trains in the morning peak period, weekday service frequencies on trains originating from Pittsburg/Bay Point are at 15 minutes throughout the day. During peak periods, additional trains originating

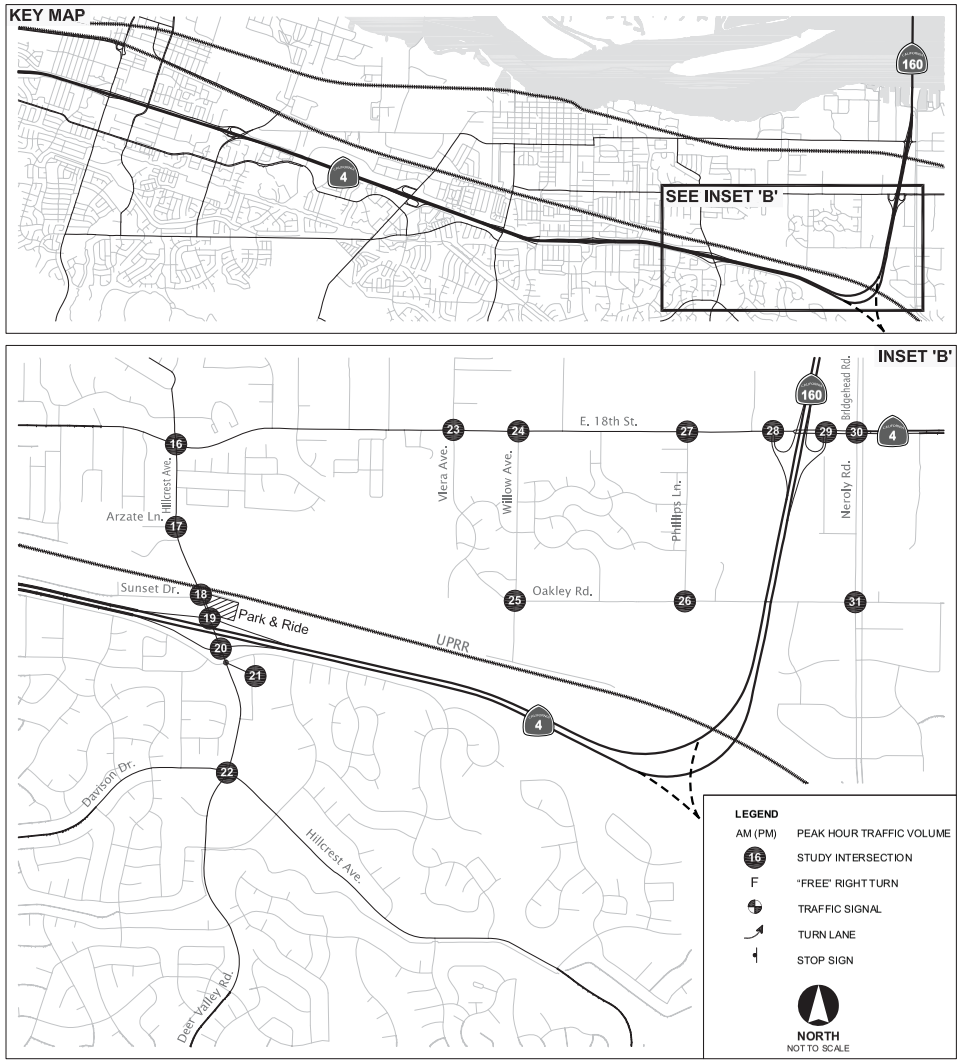


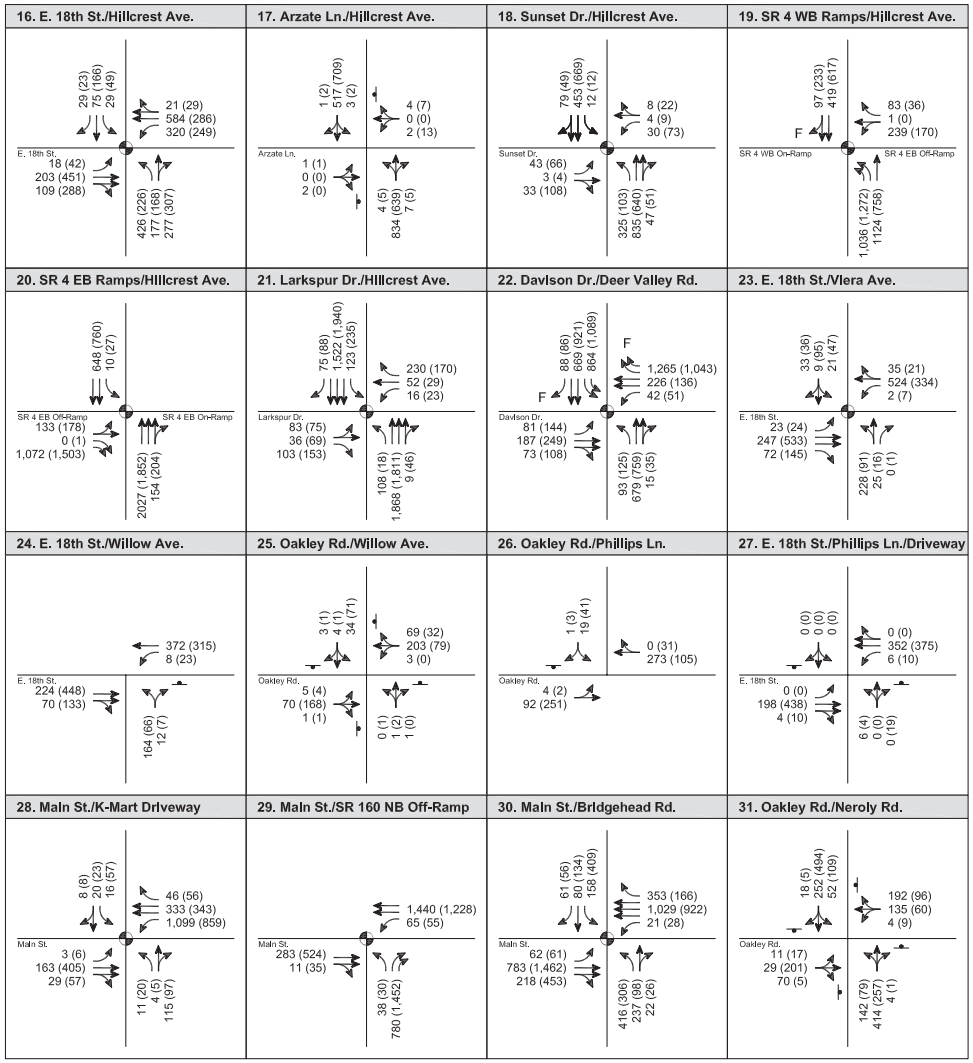


Source: WSA, 2008.

RAILROAD AVENUE STATION AREA - EXISTING INTERSECTION GEOMETRICS

FIGURE 3.2-5





Source: WSA, 2008.

HILLCREST AVENUE STATION AREA - EXISTING INTERSECTION GEOMETRICS

FIGURE 3.2-6

in Pleasant Hill and Concord run along the Pittsburg/Bay Point line. These trains do not serve the Pittsburg/Bay Point Station but increase the overall service frequency of the Pittsburg/Bay Point line to six minutes during peak periods in the Oakland-San Francisco area. Service frequencies are summarized in Table 3.2-7. The table also shows the average frequency of trains through the Transbay Tube between the West Oakland and Embarcadero Stations.

Table 3.2-7
Existing Weekday BART Frequency of Service

	Transbay Tube Frequency (min)		Concord Line Frequency (min) [a]	
	Westbound	**Eastbound**	**Westbound**	**Eastbound**
AM Peak	2.75	3.00	6.00	7.50
AM Shoulder[b]	4.00	5.00	7.50	7.50
PM Peak	5.00	2.75	7.50	6.00
PM Shoulder[b]	7.50	3.75	7.50	7.50
Midday	7.50	4.00	15.00	15.00
Weekday Average	6.00	4.25	11.42	11.42

Sources: BART, 2008; Arup, 2008.

Notes:

a. Frequency of service as measured at the Transbay Tube. Includes all trains on the Pittsburg/Bay Point line including trains originating in Pittsburg/Bay Point as well as those originating in North Concord, Concord, and Pleasant Hill.

b. The AM and PM shoulders are defined as the hour before and after the peak hour.

BART operates three main types of vehicles for its revenue service: 59 A-Cars, 380 B-Cars, and 230 C-Cars in the 669-car fleet.

- **A-Cars** have a fiberglass operator's cab, automatic train operating equipment, and a two-way communications system. The A-Car seats 72 passengers and carries up to 150 passengers in a crush load, which is the maximum total seating and standing capacity.
- **B-Cars** are located only in the middle of the train, and cannot control the operation of the train, as they do not have an operator's cab. They can, however, carry the same customer load as an A-Car.
- **C-Cars** are equipped with an operator's compartment, automatic train control equipment, and communications system, as in the A-Car, and can function as a lead, middle, or trailing car. They allow flexibility to change train size without rerouting to a storage yard. Seating capacity is 64 to 68, but 150 customers can be carried in a crush load.

The number and types of cars that constitute a train vary, but an A- or C-Car must be at each end of the train to provide the necessary automatic control equipment. The shortest BART

trains are three cars long, while the longest are ten. At BART, a train is called a "consist," and the two terms are used interchangeably. Table 3.2-8 shows the capacity according to car types and number of cars.

Table 3.2-8
BART Train Seated Capacity

		Capacity (number of passenger seats)		
Car Type	**# of Seats**	**8 Cars**	**9 Cars**	**10 Cars**
A, B	72	576	648	720
C	64-68	512-544	576-612	640-680

Source: BART, 2008.

In this analysis, the average seated capacity was assumed to be 67 seats per car and 10 cars per train, which is the longest train currently operating, giving a total seated capacity of 670 seats per train.

Current average load factors are determined based on existing train loads and average train capacity. Table 3.2-9 shows existing load factors for the AM and PM peak hour and peak direction along the Concord Line, which is the line expected to experience the largest increase in ridership as a result of the Proposed Project. BART's operations staff have determined that an average load of 112 passengers per car represents a realistic measure of practical train capacity. While loads higher than 112 passengers per car are possible and occur regularly, sustained loads above this level have been observed to result in serious delays in passenger boarding and alighting. These loading delays result in delays in train service which interfere with the on-time performance of the BART system and result in overcrowding and bunching of trains. An average load of 112 passengers per car represents a load factor of 1.67 passengers per seat. During the AM peak hour in the westbound direction, the highest average load factor experienced on the Concord Line is 1.32 passengers per seat, which occurs in downtown Oakland between the 19th Street and 12th Street Stations. In the PM peak hour eastbound direction, the highest observed load factor is 1.34, occurring in the Transbay Tube. Current peak hour load factors are below the 1.67 passengers per seat level which is equivalent to the average load threshold of 112 passengers per car.

Tri Delta Transit Service. Tri Delta Transit serves east Contra Costa County including the cities of Pittsburg, Antioch, Oakley, and Brentwood; and the unincorporated areas of East County, along with Bay Point. Tri Delta Transit operates 16 local bus routes from Monday to Friday, including four express services, and three local bus routes during weekends and holidays. Figure 3.2-7 presents the nearby bus routes and the nearest stops to the project corridor. Table 3.2-10 presents the service types and frequencies of the Tri Delta lines that operate in the vicinity of the study area. BART regional rail service can be accessed from the Tri Delta Transit local and express bus service. Paratransit ("Dial-A-Ride") service is also

provided by Tri Delta Transit. The Dial-A-Ride service utilizes a computerized dispatch system to match van routing with passenger trip requests.

Tri Delta Transit reports on its website that it has an annual fixed route ridership of over 2.5 million boardings. Route 380, a weekday local route from the Pittsburg/Bay Point BART Station through the Hillcrest Park-and-Ride Lot into Antioch, carried the largest volume of riders, and was one of the most productive routes in terms of passengers per revenue hour. Route 300, a service between Brentwood and the Pittsburg/Bay Point BART Station, which also passes through the Antioch Park-and-Ride Lot, had the highest ridership among the weekday express services.

Table 3.2-9
Existing Average BART Load Factor[a] on the Concord Line

	Westbound AM Peak	Eastbound PM Peak
Pittsburg/Bay Point[b]		0.37
North Concord/Martinez	0.43	0.49
Concord	0.24	0.82
Pleasant Hill	0.43	0.62
Walnut Creek	0.70	0.76
Lafayette	0.88	0.87
Orinda	0.99	0.97
Rockridge	1.09	1.10
MacArthur	1.20	1.12
19th Street/Oakland	1.32	1.07
12th Street/Oakland City Center	1.26	1.31
West Oakland	1.20	1.34
Embarcadero	1.25	0.91
Montgomery St.	0.77	0.51
Powell St.	0.37	0.37
Civic Center	0.28	0.17
16th Street Mission	0.13	0.13
24th Street Mission	0.11	0.09
Glen Park	0.09	0.07
Balboa Park	0.08	0.03
Daly City[b]	0.02	

Source: Wilbur Smith Associates, April 2008.
Notes:
a. Load Factor is defined as the ratio of passengers carried versus the total passenger seating capacity of the train.
b. The load factor represents the load of the trains arriving at the station. For this reason, there are no loads shown at Pittsburg/Bay Point westbound, and Daly City eastbound.

Table 3.2-10
Tri Delta Transit Bus Lines Near or Serving the Project Corridor

Route	Service Type	Service Frequency (minutes)		
		AM	Midday	PM
70 Pittsburg Marina/Buchanan	Weekday Local	40–80	40–80	40–80
200 Martinez/Pittsburg	Weekday/Express	60–75	60	60–75
201 Pittsburg BART/Concord BART	Weekday/Commute	30–60	60	30–60
300 Pittsburg BART/Brentwood	Weekday/Express	20	30	15–30
380 Pittsburg BART/Tri Delta Antioch	Weekday Local	20–60	5–75	20–60
383 Antioch Park & Ride/Oakley	Weekday Local	55–70	60	5–80
384 Antioch Park & Ride/Brentwood	Weekday Local	15–60	30–75	60
385 Antioch Park & Ride/Brentwood	Weekday Local	60	60–85	60
386 Brentwood/Discovery Bay/Byron	Weekday Local	120–210	1 bus	90–210
387 Pittsburg BART/Tri Delta Antioch	Weekday Local	50–80	50–70	60
388 Pittsburg BART/Kaiser Medical Clinic	Weekday Local	10-45	30–80	30–120
389 Pittsburg BART/Bay Point	Weekday Local	60	60	60
390 Pittsburg BART/Antioch Park & Ride	Weekday/Commute	5–30	N/A	15–30
391 Pittsburg BART/Brentwood Park & Ride	Weekday Local	30–60	60	15–75
392 Pittsburg BART/Antioch Park & Ride	Weekend/Holiday	60	60	60–90
393 Pittsburg BART/Brentwood Park & Ride	Weekend/Holiday	60	60	60–80
394 Pittsburg BART/Antioch Park & Ride	Weekend/Holiday	60	60	60
BDR Brentwood Dimes-a-Ride	Weekday Local	60	60	60
DX Antioch Park & Ride/Martinez	Weekday/Commute	1 bus	N/A	1 bus
DX Antioch Park & Ride/Livermore	Weekday/Express	60	N/A	60
DX Antioch Park & Ride/Dublin BART	Weekday/Express	30	N/A	75

Source: Tri Delta Transit Schedule, 2008.

County Connection Transit Service. The County Connection Transit Service, operated by the Contra Costa County Transit Authority (CCCTA), serves most Contra Costa County cities, with limited service to East County areas. County Connection operates Route 930 through Pittsburg, which originates in Walnut Creek and travels on Ygnacio Valley Road/Kirker Pass Road to Buchanan Road. Its terminus is at the Hillcrest Park-and-Ride Lot in Antioch. Westbound service operates weekday mornings, from 5:30 a.m. to 7:00 a.m., approximately every 30 minutes. Eastbound evening service runs from 3:00 a.m. to 7:00 p.m. at frequencies of 30 to 60 minutes. The County Connection Transit Service can be accessed through Tri Delta Transit Route 70, as well as routes that pass through the Hillcrest Park-and-Ride Lot.

INSET A: Railroad Avenue

INSET B: Hillcrest Avenue

Source: Tri Delta Transit, 2008.

TRI DELTA TRANSIT ROUTES
FIGURE 3.2-7

Other Transit Services. Rio Vista Delta Breeze Transit provides a deviated fixed route[1] bus service between the City of Rio Vista and adjacent areas, including Antioch and Pittsburg. Route 52, which is scheduled only once on Tuesday mornings, operates on SR 160 to the Antioch Park-and-Ride Lot and ends at the Pittsburg/Bay Point BART Station. Rio Vista Transit also provides various dial-a-ride and paratransit services.

The Sand Creek Dime-a-Ride has stops in the Downtown Brentwood area. The Sand Creek Dime-a-Ride line runs from 6:00 a.m. to 8:00 p.m. with 10- to 15-minute headways during the week, and runs from 10:00 a.m. to 3:00 p.m. with 15-minute headways on Saturday. The Sand Creek route does not run on Sundays.

Parking

Most of the available on-street parking within the study area is located along residential streets and minor roads. The city of Pittsburg has established a Residential Parking Permit program. This program allows residential areas to be designated as restricted parking areas in order to prevent long-term non-resident and commuter parking. The City of Pittsburg provides free permits to residents of these areas. However, at this time, the City of Pittsburg does not have a residential permit parking zone in the vicinity of the station sites associated with the Proposed Project. In general, off-street parking requirements are set to provide a sufficient number of spaces and prevent spillover onto neighboring residential streets.

Park-and-Ride Lots. Four main park-and-ride lots are located within or adjacent to the study area. These lots are generally well served by local transit and are owned by BART. All of the parking lots are free and lit.

- The Pittsburg Park-and-Ride Lot, located on Bliss Avenue between Harbor Street and Railroad Avenue, has about 185 parking spaces. Five of the Tri Delta Transit routes serve this location, including the Delta Express (DX) lines.
- The Hillcrest Park-and-Ride Lot in Antioch is located at the intersection of SR 4 and Hillcrest Avenue. The lot has 253 parking spaces. There are connections to 12 Tri Delta Transit routes, as well as County Connection service to and from Walnut Creek.
- The Brentwood Park-and-Ride Lot is located along Walnut Avenue and provides 78 parking spaces. Six of the Tri Delta Transit local routes serve this location, as well as the Brentwood Dime-a-Ride.

[1] Deviated fixed route service means that in addition to boarding at scheduled stops, passengers can make a reservation for direct pick-up.

- The Discovery Bay Park-and-Ride Lot is located on Bixler Road and has 43 parking spaces. This lot is served by Tri Delta Transit Route 386 and the Delta Express (DX).

BART Station Parking. The parking lot at the Pittsburg/Bay Point BART Station offers free parking and provides 2,036 patron spaces, including 117 designated carpool spaces, 35 ADA[2] spaces, and over 50 mid-day spaces, which are spaces that are available only after 10:00 a.m. According to the BART website, the estimated average time by which the lot reaches capacity is 7:25 a.m., and parking is limited to 24 hours.

Pedestrian Facilities

There are existing sidewalks along most of the roadways within the study area (see Table 3.2-5). The sidewalks range from 6 to 10 feet wide at various locations and are generally in good condition. Crosswalks are at most of the study intersections; however, at a majority of the intersections on major arterials, pedestrian crossings exist only along one approach each in the north-south and east-west directions to limit pedestrian crossing conflicts and exposure in high traffic areas. Gaps in the pedestrian network are summarized below.

Railroad Avenue Station Area. Sidewalks generally exist along the major thoroughfares around the proposed Railroad Avenue Station, except in the following locations:

- South side of Power Avenue, adjacent to SR 4
- East side of Davi Avenue, adjacent to the City Hall grounds
- West side of Loveridge Road, north of SR 4
- East side of Loveridge Road just north of SR 4 overpass
- East side of Harbor Street, north of School Street
- Bliss Avenue, entire length except segment along the park-and-ride lot
- Clark Avenue, entire length
- Portions of north side and all of south side of Garcia Avenue
- Freed Way, entire length
- West side of Martin Way
- Portions of Piedmont Way

[2] Accessible parking spaces are provided in compliance with the regulations specified in the Americans with Disabilities Act (ADA) of 1990.

Hillcrest Avenue Station Area. Sidewalks generally exist along the major thoroughfares around the proposed Hillcrest Avenue Station, except in the following locations:

- West side of Hillcrest Avenue from Sunset Drive to E. 18th Street
- North side of E. 18th Street along some segments
- Viera Avenue, north of E. 18th Street
- South side of Sunset Drive, west of Hillcrest Avenue
- Neroly Road, entire segment within study area
- Oakley Road, east of Willow Avenue

Regional Trails. The East Bay Regional Park District (EBRPD) operates the Delta De Anza Regional Trail, which traverses much of Contra Costa County from Willow Pass Road in the west to Marsh Creek in the east. The Delta De Anza Trail is a paved, multi-use trail accessible to hikers, bicyclists, and horses. The trail lies parallel to the project corridor to the south, and a portion of the trail, generally the portion east of Somersville Road, runs within the Contra Costa Canal right-of-way. To the west of Somersville Road, the trail has its own right-of-way and crosses the project corridor on Bailey Road. The EBRPD also operates a paved trail along the south side of SR 4 along Tregallas Road between Lone Tree Way and Hillcrest Park."

Bicycle Facilities

According to the Pittsburg and Antioch General Plans and the Contra Costa Countywide Bicycle and Pedestrian Plan, there are existing bike lanes along some of the roadways as well as an off-street bike path (Class I facility) close to the two proposed stations. Bicycle lanes are generally well-connected to one another, and most of the major roads in the vicinity of the proposed stations provide Class II or Class III bicycle facilities. These plans include existing facilities within the study area (see Table 3.2-11 and Figure 3.2-8). Proposed facilities, which were also identified in the plans, are described later in this section under "Future (No Project) Conditions."

A limited number of bicycle lockers are provided at all of the park-and-ride lots within the study area. The Pittsburg/Bay Point BART Station has racks for 24 bikes, as well as 20 bicycle lockers. BART is currently replacing its existing bicycle lockers with e-lockers, which are electronic lockers that can be rented by the hour instead of monthly, and expects to complete this change by 2012.

Table 3.2-11
Existing Bicycle Facilities Near or Serving the Project Corridor

Street	From:	To:	Class[a]
Harbor Street	Buchanan Road	East 10th Street	III/II[b]
Railroad Avenue	State Route 4	East 10th Street	III
E. Leland Road	Railroad Avenue	Antioch City Limit	II
Loveridge Road	Buchanan Road	Pittsburg Street	II
Hillcrest Avenue	Prewett Ranch Drive	State Route 4	II
Hillcrest Avenue	State Route 4	Circles Alhambra Lake	II
Deer Valley Road	Prewett Ranch Drive	Hillcrest Avenue	II
Davison Drive	Lone Tree Way	Hillcrest Avenue	II
Buchanan Road	Railroad Avenue	Contra Loma Blvd	II/III[c]
Delta de Anza Trail	Concord	Oakley	I

Source: Wilbur Smith Associates, 2008.

Notes:

a. Bicycle facility classifications:
Class I – Off-street bike path
Class II – Marked on-street bike lane
Class III – Shared bike route with designated right-of-way

b. Existing Class III facility, planned Class II.

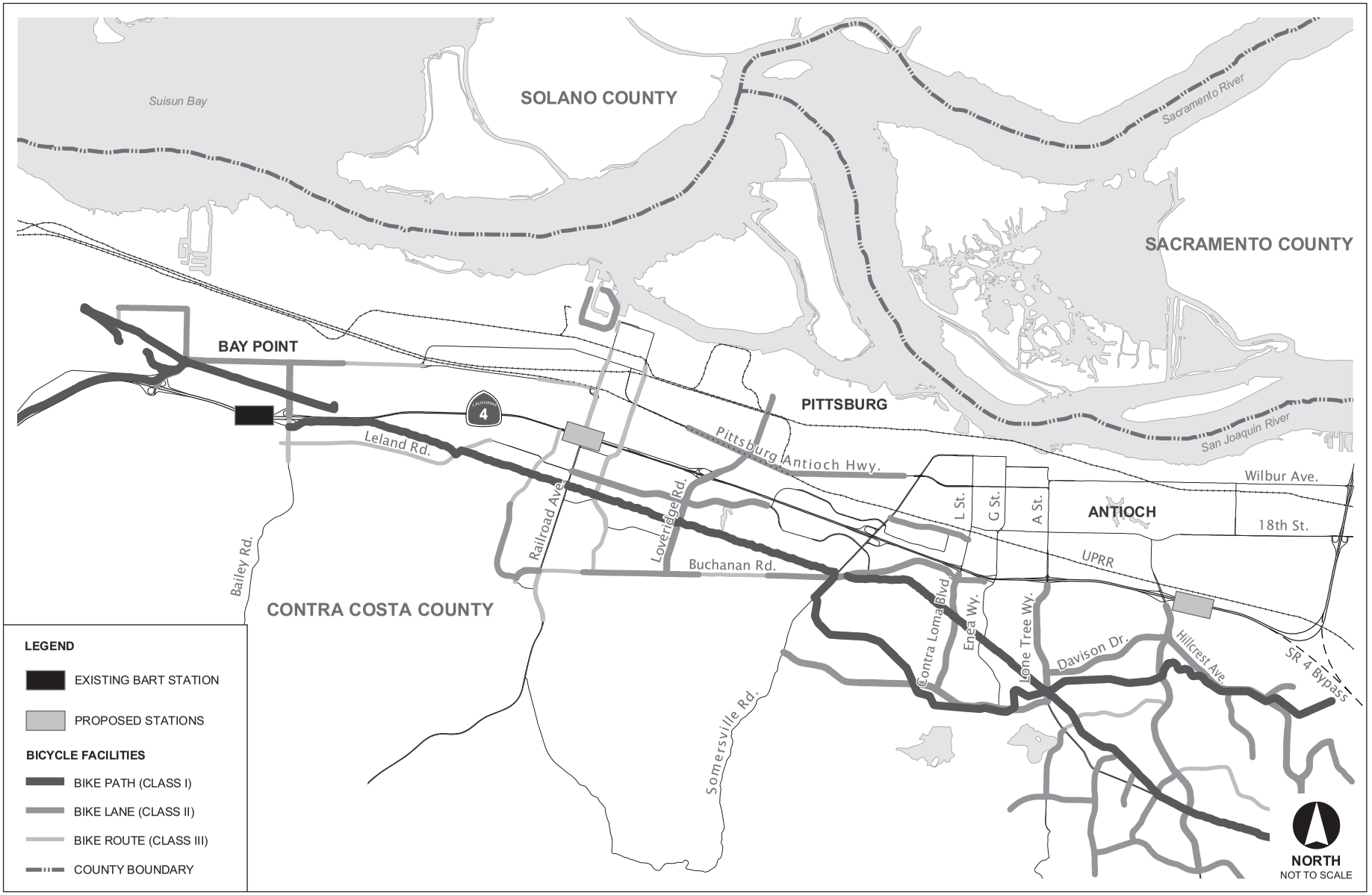
c. Alternating Class II and Class III facilities.

Impact Assessment and Mitigation Measures

This impact section is generally organized as described in Section 3.1, Introduction to Environmental Analysis; however, additional key information has been provided to offer a better understanding of the potential impacts from the Proposed Project and how those impacts were derived. To guide the reader, this impact section contains the following:

- **Standards of Significance** define the criteria used to classify an impact as significant or less than significant.

Methodology presents the approach to determining the impacts of the Proposed Project. Potential impacts were evaluated for two analysis years where relevant: the Opening Year (Year 2015) and a long-term Future Year (Year 2030). Both years were assessed with and without the Proposed Project. Although the analysis includes a comparison of the Proposed Project to existing conditions as required by CEQA, this assessment is not realistic; by the time the Proposed Project is ready for operation in about 2015, the existing transportation conditions would have changed significantly and would no longer serve as a reasonable benchmark against which to measure potential impacts. Thus, the future No Project scenarios provide a more reasonable baseline against which the Proposed Project's effects can be compared. These No Project scenarios in 2015 and 2030 take into account background growth and development anticipated by those time frames. As a result, the assessment of impacts in 2015 and



Source: WSA, 2008.

EXISTING BICYCLE FACILITIES IN THE STUDY AREA

FIGURE 3.2-8

2030 are cumulative analyses in that they take into account other foreseeable development plus the Proposed Project.

- **Future No Project Conditions** presents the Year 2015 and Year 2030 conditions *without* the Proposed Project. As noted above, these conditions serve as the future baselines against which to compare the Proposed Project and identify project impacts.
- **Proposed Project Ridership** presents the projected transit ridership and also offers information on the number of trips that are diverted from the roadway network.
- **Project-Specific Environmental Analysis** identifies the potential impacts on the transportation network, taking into account the future 2015 and 2030 No Project conditions and how those conditions change with the implementation of the Proposed Project.
- **Hillcrest Avenue Station Options Analysis** identifies the potential impacts on the transportation network if the Hillcrest Avenue Station were located at one of the three optional locations instead of in the SR 4 median at the location presented for the Proposed Project.

Standards of Significance

The analysis of potential project impacts relies on standards of significance established by the jurisdictions within the study area. These thresholds, which are based on LOS, are used to identify significant project-related impacts and to indicate a need for mitigation measures. This section describes the applicable policies and regulations that were included in the analysis. In the absence of established thresholds, alternate criteria are set that are consistent with the project and study purpose.

Freeways and Intersections. The CCTA criteria require that applicable jurisdiction criteria be followed for unsignalized intersections, the CMP network, and state routes. Table 3.2-6 (which was presented earlier) identifies the jurisdictions with authority for each intersection in the study area. In general, a project-related impact is considered significant if the Proposed Project is judged likely to result in any of the following:

- Deterioration of an intersection from LOS D or better to LOS E or F under project conditions, or cause a substantial increase in the V/C ratio at an intersection operating at LOS E or F;
- Deterioration of a freeway segment to LOS F, unless LOS F was measured when the Congestion Management Plan was established in 1991; or
- Deterioration of an intersection or freeway segment to an LOS below the threshold of its jurisdiction.

Contra Costa Transportation Authority (CCTA). All Contra Costa jurisdictions, including the cities of Pittsburg and Antioch, participate in the Measure C-1988 Growth Management Program. Measure C requires, among other things, that each jurisdiction adopt LOS standards for Basic Routes based on the General Plan land use designations adjoining the routes and adhere to Traffic Service Objectives for Routes of Regional Significance. Measure C specifies that the standards listed in Table 3.2-12 be applied to all signalized intersections on Non-regional Routes.

Table 3.2-12
Level of Service Standards for Signalized Intersections on Non-Regional Routes

Land Use Type	LOS Standard
Rural	LOS (low) C
Semi-Rural	LOS (high) C
Suburban	LOS (low) D
Urban	LOS (high) D
CBD[a]	LOS (low) E

Source: Contra Costa Transportation Authority, *Technical Procedures Update*, 2006.
Note:
a. Central Business District

The only Route of Regional Significance in the study area, which is evaluated according to different criteria than Basic Routes, is SR 4.

CCTA recognizes traffic impacts to be significant if the project-related traffic:

- Worsens intersection operating conditions by more than one degree of LOS; or
- Worsens intersection operating conditions to LOS E or F.

The CCTA is also the Congestion Management Agency (CMA) for the County, with the responsibility for preparing and monitoring the preparation of the CMP. The CMP is one part of an aggressive overall strategy to reduce congestion and improve mobility in the county. Within the study area, parts of Railroad Avenue (south of SR 4) and SR 4 (Main Street) east of its interchange with SR 160 are designated within the CMP network. CCTA has established a standard of LOS E for all parts of the CMP network except those that were already operating at worse levels of service in 1991. Along SR 4, all segments from Bailey Road to SR 160 have a standard of LOS F during peak periods in both the eastbound and westbound directions since they currently operate at this level of service.

In the absence of established local criteria to describe the operating conditions of intersections, freeway segments, and ramp-freeway junctions, LOS D or better is typically considered to be acceptable for peak hours, while LOS E or worse are considered undesirable conditions.

Caltrans. At the intersections located on State Highway facilities, the following guidelines serve as LOS thresholds for the intersection operating conditions:

- Caltrans recommends a target LOS at the transition between LOS C and LOS D.
- In case the recommended LOS is not achievable, Caltrans should be consulted in order to determine the target LOS.
- If the intersection under existing conditions operates worse than the appropriate target LOS, then the existing LOS should be maintained.

City of Pittsburg. The following guidelines are used by the City of Pittsburg to identify traffic impacts:

- LOS E or better (< 95 percent capacity) on Kirker Pass Road;
- LOS D or better (< 85 percent capacity) on intersections along Major Arterials, except for intersections on Bailey Road;
- LOS E or better at intersections along Bailey Road between West Leland Road and SR 4;
- Pre-existing unacceptable base case unsignalized intersection operations has an increase in the ratio of vehicles to capacity of 0.02 or greater or an increase in delay of 5 seconds or greater;
- Peak hour signal warrant criteria are met due to additions of project traffic; and
- Signal warrant criteria are met for a base case intersection condition and the project would contribute 25 or more trips to the intersection during a single peak traffic hour.

City of Antioch. The City of Antioch in its General Plan requires that where feasible, design arterial roadways, including routes of regional significance, to provide better service than the minimum standards set forth in Measure C and the Growth Management Element. Thus, where feasible, the City will strive to maintain a "High D" level of service within regional commercial areas and at intersections within 1,000 feet of a freeway interchange. The City will also strive where feasible to maintain low-range "D" in all other areas of the City, including freeway interchanges.

City of Oakley. Oakley has adopted LOS D, as the threshold of acceptability for signalized intersections. Any signalized intersection operating worse than LOS D would be considered inconsistent with this standard. The Main Street/Neroly Road – Bridgehead Road and the Oakley Road/Neroly Road Intersections are in Oakley.

Parking. There are no established criteria for the assessment of parking impacts. For the purposes of this EIR, a significant parking impact would result if the project substantially reduces parking supply more than it reduces the parking demand.

Transit. A significant transit impact would result if the project causes substantially increased transit demand that could not be accommodated by existing or planned transit capacity.

BART. The actual maximum passenger capacity of a BART car is estimated as 150 persons per car. However, well before passenger loads approach this level, passengers will experience uncomfortable conditions and the time required at stations to unload and load passengers will cause delays affecting the overall operation of the system. BART staff determined that when the average passenger loads per car during the peak hour exceed 112 passengers per car, passenger comfort and system operations is compromised. The threshold of 112 passengers per car represents a load factor of 1.67 passengers per seat.

Tri Delta Transit. In the Short Range Transit Plan issued in January 2008, Tri Delta Transit documents the adoption of transit objectives, performance indicators, and standards for the system. In terms of transit operations, the standards focus on service quality, reliability, productivity, and safety. A significant transit impact would result if the project causes sustained service performance which violates the adopted standards as noted below:

- Schedule adherence – late service: Greater than 90 percent within 5 minutes of schedule
- Schedule adherence – early service: No bus ahead of schedule
- Productivity (passengers per hour) – minimum 15

Pedestrian and Bicycles. There are no established criteria for the assessment of pedestrian or bicycle impacts. For purposes of this EIR, a significant pedestrian impact would result if the Proposed Project caused substantial overcrowding on public sidewalks, created hazardous conditions for pedestrians, or eliminated pedestrian access to adjoining areas. Similarly, the Proposed Project would have a significant effect if it creates particularly hazardous conditions for bicyclists or eliminates bicycle access to adjoining areas. Finally, a significant pedestrian or bicycle impact is identified if the Proposed Project conflicts with adopted policies supporting alternative transportation (e.g., bus turnouts, bicycle racks), or impedes or thwarts implementation of a planned pedestrian or bicycle pathway.

Construction. A significant impact would occur if construction activities were to create traffic hazards or create congestion that would stop general traffic flow in the project corridor by more than 40 seconds (equivalent to an intersection LOS E), or eliminate vehicular, pedestrian, or bicycle access to adjoining areas. Additionally, a significant impact would result if construction substantially diminished access to, or parking at, a business thereby reducing the ability of customers to patronize the business.

Impact Classification. For each transportation impact below, a level of significance is determined and reported in the italicized summary impact statement that precedes the analysis of each impact topic. Conclusions of significance are defined as follows: significant (S),

potentially significant (PS), less-than-significant (LTS), no impact (NI), and beneficial (B). If the mitigation measures would not diminish potentially significant or significant impacts to a less-than-significant level, the impacts are classified as "significant and unavoidable effects (SU)." For the purposes of this section, TR refers to Transportation.

Methodology

Travel Demand Model. Traffic projections and ridership forecasts were developed for the transportation study using a travel demand model. A travel demand model is one of the most common methods of forecasting future travel demand in a given area. The model is based on inputs such as projections of population, employment, observed travel behavior, and anticipated changes to the transportation network.

The projections for Year 2015 and 2030 were developed using the CCTA travel demand model. Changes to the transportation network are identified later in this section under "Future (No Project) Conditions" and were integrated into the model assumptions. The model was also adjusted to account for differences between the Base Year (Year 2000) outputs and actual counts, and balanced for the observed and forecast turning movements.

The Opening Year 2015 turning movements through each intersection were computed from Year 2007 traffic counts and Year 2020 forecasted volumes from the adjusted CCTA model. The Year 2015 volumes were interpolated through the application of a linear growth rate between the Years 2007 and 2020. The 2030 future volumes were generated similarly from Year 2007 counts and Year 2035 forecasted volumes obtained from the CCTA model.

Traffic Analysis Scenarios. The operations of the key intersections and freeway segments were evaluated during the weekday morning (AM) and evening (PM) peak traffic periods for the following scenarios:

Scenario 1: Existing Conditions (Year 2007) analyzes existing traffic volumes obtained from traffic counts.

Scenario 2: Opening Year without Project Conditions (Year 2015) includes the analysis of Year 2015 traffic volumes obtained by applying a linear growth factor to the results obtained from the Year 2020 CCTA model. This scenario does not include any traffic that would be associated with the Proposed Project.

Scenario 3: Opening Year with Project Conditions (Year 2015) includes the analysis of Year 2015 traffic volumes obtained by applying a linear growth factor to the results obtained from the Year 2020 CCTA models plus traffic volumes that would be generated due to the Proposed Project.

Scenario 4: Long-Term Future Year without Project Conditions (Year 2030) includes analysis of Year 2030 traffic volumes obtained by applying a linear growth factor to the results obtained from the Year 2035 CCTA models. This scenario does not include any traffic that would be associated with the Proposed Project.

Scenario 5: Long-Term Future Year with Project Conditions (Year 2030) includes analysis of Year 2030 traffic volumes obtained by applying a linear growth factor to the results obtained from the Year 2035 CCTA models plus traffic volumes that would be generated due to the Proposed Project.

Potential traffic impacts of the Proposed Project are assessed relative to existing and future No Project conditions in 2015 and 2030. Impacts are identified when the analyses indicate that future conditions with the Proposed Project are degraded as compared to the future baseline or future no project conditions. A summary of traffic operations for the No Project scenarios is presented later under "Future (No Project) Conditions."

Transit Ridership. Estimated ridership for the Proposed Project was based on the modified CCTA model. The percentages of riders accessing eBART stations by different modes (i.e., walking, bicycling, driving, riding transit) used in the model were generated from projected total ridership, and the percentage splits reflect similar BART stations based on planned land use around the proposed stations. These percentages were applied to the total ridership forecasts to determine the impacts on different modes. It should be noted that parking demand at the Hillcrest Avenue Station was based on unconstrained projections (i.e., not constrained by a fixed number of available parking spaces), which allows a more realistic assessment of the potential parking demand. At the Railroad Avenue Station, the parking demand was purposely constrained to reflect the desire of the City to develop a transit village with limited parking in the vicinity of the station, and to acknowledge that parking would be available at the nearby Pittsburg/Bay Point BART Station once the Proposed Project was implemented.

BART System Capacity. Potential impacts to the operation of the BART system were based on estimates of future line loads and projections of new transit trips. Line loads were calculated across the existing BART network for the 2030 No Project and Proposed Project scenarios in the AM and PM peak periods. This forecasting model, known as the Dovetail Model, is used by BART to develop estimates of future peak hour passenger loadings on each segment of the BART system.

Future (No Project) Conditions

As required by CEQA, existing traffic conditions in the study area are described above. However, other projects and modifications to the roadway network are assumed to be in place before the Proposed Project is implemented, and further regional growth is anticipated during that period. Accordingly, the Proposed Project's impacts would not be accurately represented by comparison with conditions existing in 2007. Instead, in accordance with professional

standards for traffic impact analysis, the Proposed Project's impacts are compared to projected future conditions if the Proposed Project were not built (i.e., No Project conditions, or future conditions without the project). For purposes of this comparison, No Project conditions were examined for two future time periods, known as "horizon years." The horizon years selected for this analysis are Year 2015, when the Proposed Project would be operational, and Year 2030, a longer term examination that would capture impacts when the system has been fully operational for some time.

For use in future travel activity, information was provided by the cities of Pittsburg and Antioch about approved and proposed projects within the study area. Only those projects that would impact at least one study intersection 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. There are also several proposed changes to the roadway network within the transportation study area; some are roadway changes, such as widenings, while others are changes to the intersection geometry. These projects include those that are regionally funded through the CCTA and have already been incorporated in the CCTA travel forecasting model. No Project conditions for Year 2015 and 2030 are described below.

Roadway Network Changes. Under the future No Project conditions, changes are anticipated to both SR 4 and to local roads as described below.

State Route 4. There are plans to continue widening SR 4 from four mixed-flow lanes to eight lanes, including one HOV lane and three mixed flow lanes in each direction. The median will be widened as well to accommodate future public transit improvements. Within the study area, freeway widening has already been completed on the segment from Bailey Road to Loveridge Road. The next proposed segment for widening, from Loveridge Road to SR 160, is expected to be completed by 2015. Major freeway interchanges along this portion will also need to be expanded, namely at Hillcrest Avenue, where there are plans to construct a new westbound on-ramp and auxiliary eastbound off-ramp. However, the Hillcrest Avenue interchange reconstruction project is not yet fully funded, and for that reason, it is not included in the Year 2015 scenario. Also, an interchange at Range Road between Bailey Road and Railroad Avenue has been included in the Year 2030 model, while the interchange at G Street has been removed in both Year 2015 and 2030 scenarios.

State Route 4 Bypass. The State Route 4 Bypass is under construction and is expected to be completed by 2009. Segment 2 of the Bypass project has already been completed and is described in "Existing Conditions," while Segments 1 and 3 are under construction. Segment 1 will extend from just east of the SR 4/Hillcrest Avenue Interchange to Lone Tree Way in the City of Antioch and will consist of a 6-lane freeway between existing SR 4 and the Laurel Road Interchange and a 4-lane freeway from there to Lone Tree Way. Segment 3 will extend from Balfour Road south to Marsh Creek Road as a 2-lane expressway, then along Marsh Creek Road (East-West Connector) as a 2-lane conventional highway, connecting to existing

SR 4 (Byron Highway). The southerly limits of the project (now called the Vasco Road Extension) are from Marsh Creek Road to Vasco Road at Walnut Boulevard.

Local Roadways. A small number of intersection and lane configuration changes are expected to be in place by the Year of Opening (2015) and the Long-Term Future Year (2030). These changes to future intersection configurations, which were taken into account in the model, are shown for the Railroad Avenue Station area and the Hillcrest Avenue Station area in Figure 3.2-9 and Figure 3.2-10, respectively. The intersection of Harbor Street/Bliss Avenue will be signalized under future conditions.

Also, in both the Year 2015 and Year 2030 scenarios, the intersection at Railroad Avenue/Center Drive would no longer exist. In the Year 2030 scenario, the intersection at SR 4 Westbound Ramps/Hillcrest Avenue would no longer exist but would be replaced by the planned improvements to the Hillcrest/SR 4 interchange.

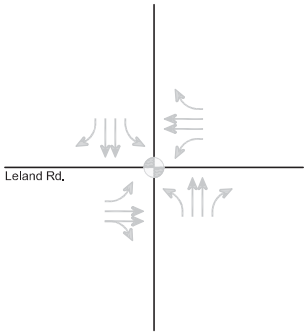
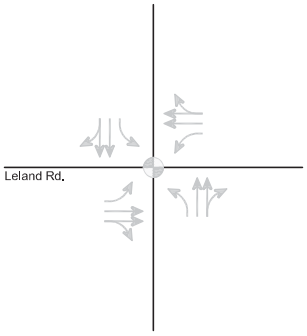
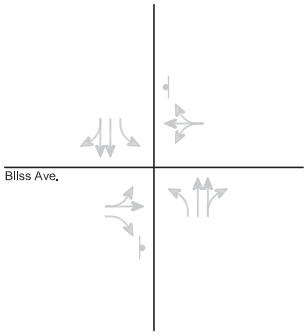
A small number of widening projects are planned along major arterials in the study area, including a portion of Hillcrest Avenue, south of SR 4, and E. 18th Street from Hillcrest Avenue into Oakley. These projects include the addition of lanes, turn lanes, medians, and bike lanes.

Slatten Ranch Road, as planned by the City of Antioch, will extend from Hillcrest Avenue, just north of SR 4, east to Lone Tree Way. It was also assumed that Willow Road would be extended south to Slatten Ranch Road connecting East 18th Street with Slatten Ranch Road. This project is being planned by the City of Antioch and has been included in its General Plan and the station area Ridership Development Plan.

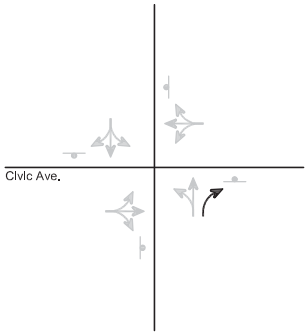
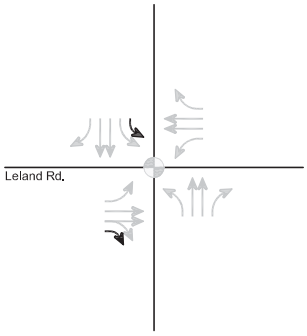
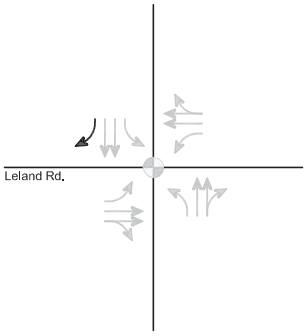
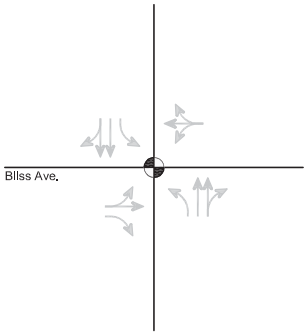
Intersection Operations in Year 2015. Under the Opening Year "No Project" AM peak hour conditions, 26 of the 30 study intersections operate at acceptable conditions; i.e., at an LOS better or equal to the thresholds for the applicable jurisdiction. The following four intersections operate at unacceptable levels (the number identifier refers to the intersection number in the intersection tables and figures in this section):

- #10 - Leland Road/Freed Avenue
- #16 - Hillcrest Avenue/E. 18th Street
- #19 - SR 4 Westbound Ramps/Hillcrest Avenue
- #22 - Davison Drive/Hillcrest Avenue – Deer Valley Road

EXISTING CONDITIONS

1. Civic Ave./Davi Ave.	8. Leland Rd./Railroad Ave.	9. Leland Rd./Harbor St.	15. Bliss Ave./Harbor St.
			

FUTURE CONDITIONS

1. Civic Ave./Davi Ave.	8. Leland Rd./Railroad Ave.	9. Leland Rd./Harbor St.	15. Bliss Ave./Harbor St.
			

LEGEND

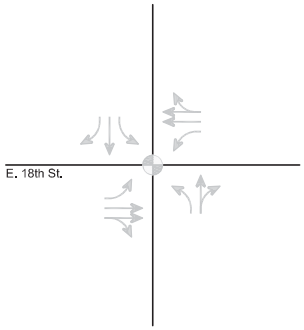
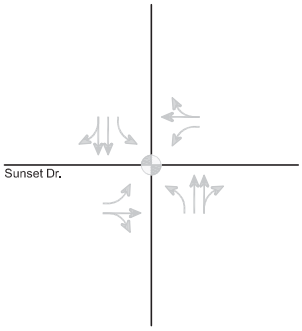
- Existing Traffic Signal
- Future Traffic Signal
- Existing Turn Lane
- Future Turn Lane
- Existing Stop Sign

Source: WSA, 2008.

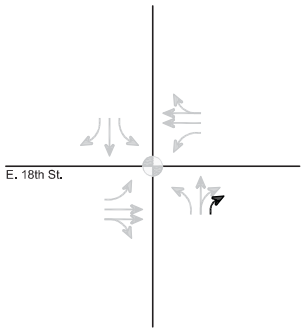
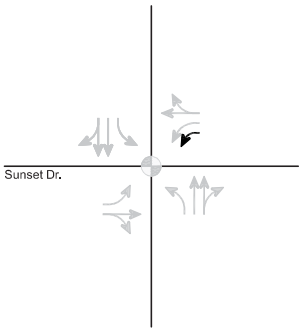
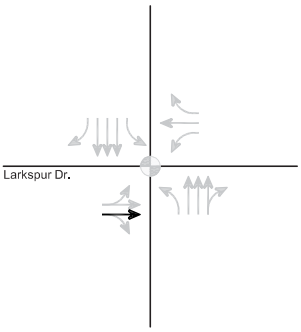
RAILROAD AVENUE STATION AREA -
FUTURE INTERSECTION GEOMETRICS (BY YEAR 2015)

FIGURE 3.2-9

EXISTING CONDITIONS

16. E. 18th St./Hillcrest Ave.	18. Sunset Dr./Hillcrest Ave.	20. SR 4 EB Ramps/Hillcrest Ave.	21. Larkspur Dr./Hillcrest Ave.
			

FUTURE CONDITIONS

16. E. 18th St./Hillcrest Ave.	18. Sunset Dr./Hillcrest Ave.	20. SR 4 EB Ramps/Hillcrest Ave.	21. Larkspur Dr./Hillcrest Ave.
			

LEGEND

- Existing Traffic Signal
- Future Traffic Signal
- Existing Turn Lane
- Future Turn Lane
- Existing Stop Sign

Source: WSA, 2008.

HILLCREST AVENUE STATION AREA -
FUTURE INTERSECTION GEOMETRICS (BY YEAR 2030)

FIGURE 3.2-10

Under the Year 2015 "No Project" PM peak hour conditions, seven study intersections operate at unacceptable levels (asterisked intersections operate at unacceptable levels under existing conditions):

- #10 - Leland Road/Freed Avenue*
- #13 - California Avenue/SR 4 Westbound Ramps*
- #16 - Hillcrest Avenue/E. 18th Street
- #19 - SR 4 Westbound Ramps/Hillcrest Avenue
- #20 - SR 4 Eastbound Ramps/Hillcrest Avenue*
- #30 - Main Street/Neroly Road – Bridgehead Road*
- #31 - Oakley Road/Neroly Road*

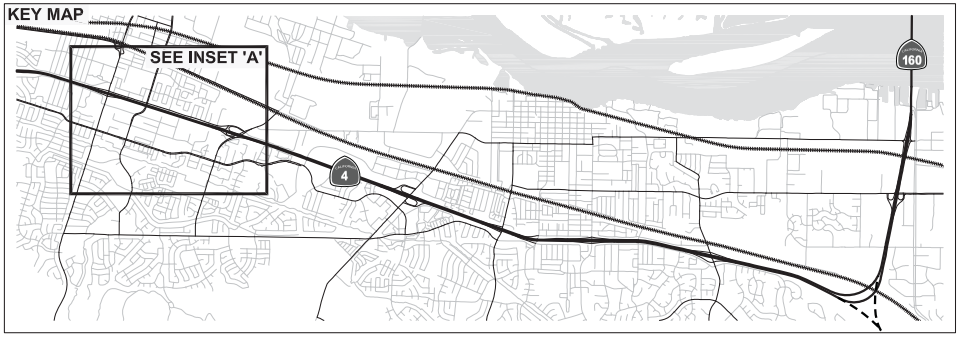
Intersection configurations and turning movement volumes are shown for the Railroad Avenue Station area and the Hillcrest Avenue Station area in Figure 3.2-11 and Figure 3.2-12, respectively. The above list of intersections operating at unacceptable levels of service is different than the list for 2007 existing conditions (see Table 3.2-6). This change occurs because of the assumed roadway and intersection improvements, and the location and intensity of anticipated development.

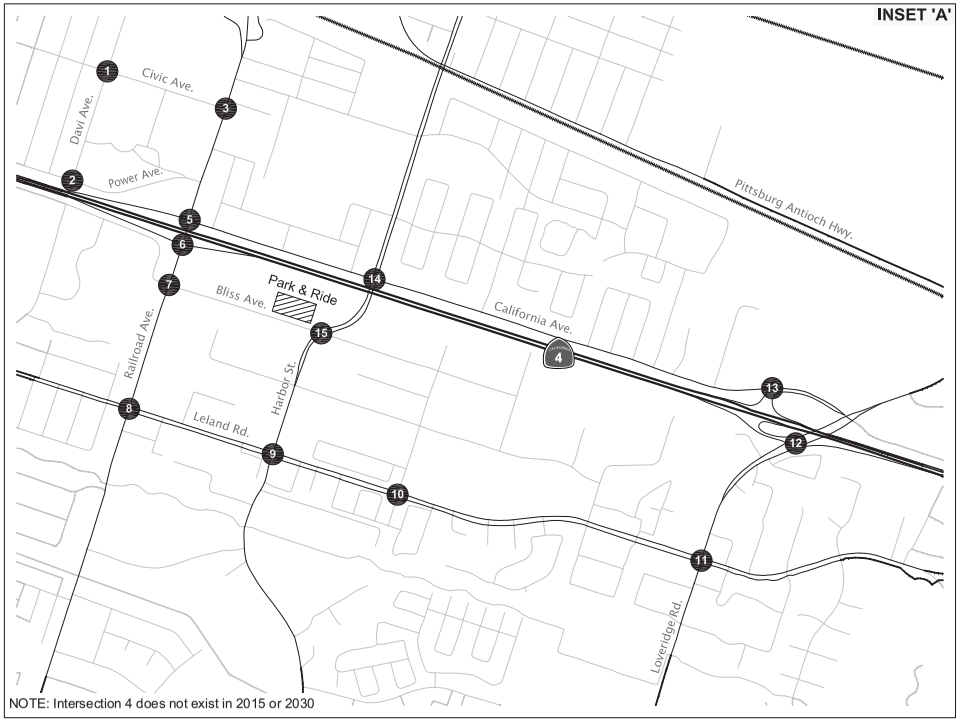
Intersection Operations in Year 2030. In Year 2030, intersection operations are expected to worsen with projected growth in the region. During the 2030 "No Project" AM peak hour, 22 of the 29 study intersections would operate at acceptable levels, while the following seven intersections would operate at unacceptable levels (asterisked intersections would operate at unacceptable levels in 2015):

- #5 - Railroad Avenue/SR 4 Westbound Ramp
- #9 - Leland Road/Harbor Street
- #10 - Leland Road/Freed Avenue*
- #14 - Harbor Street/California Avenue
- #16 - Hillcrest Avenue/E. 18th Street*
- #21 - Larkspur Drive/Hillcrest Avenue
- #22 - Davison Drive/Hillcrest Avenue – Deer Valley Road*

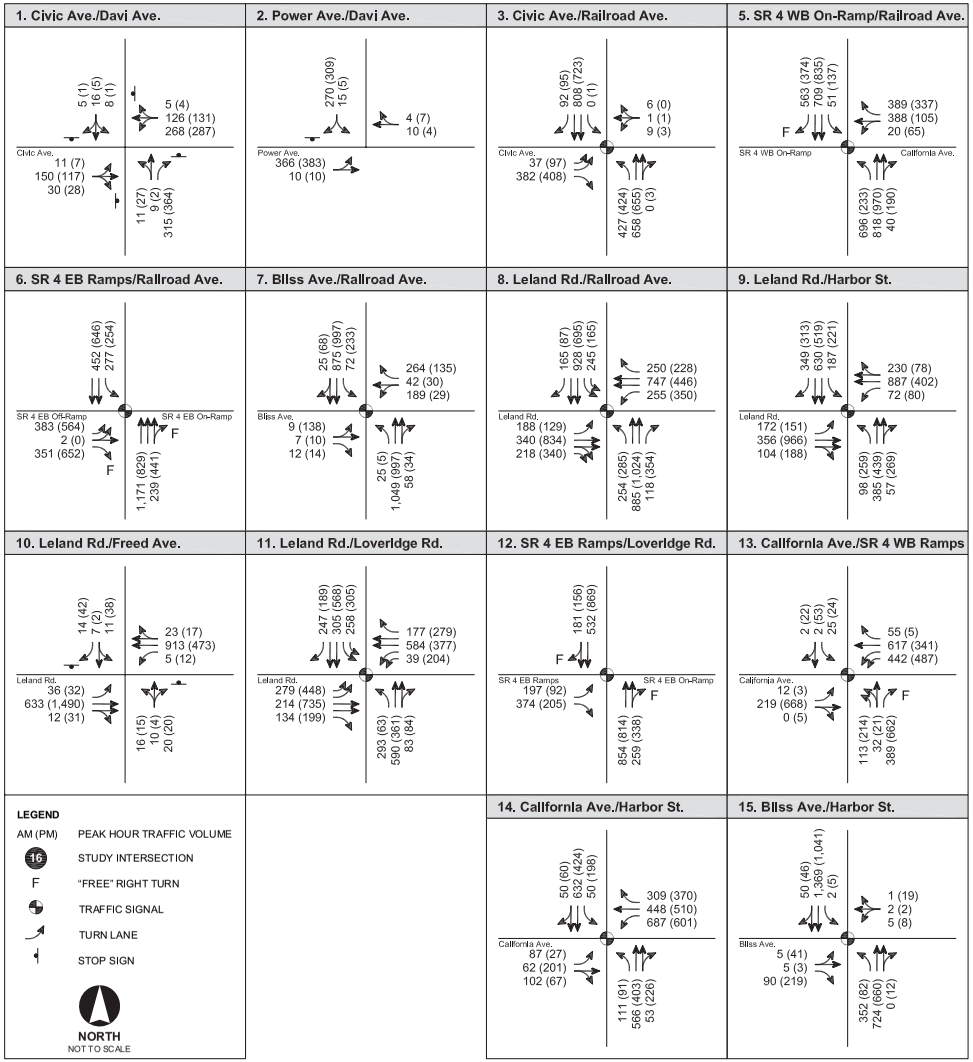
Under Year 2030 "No Project" PM peak hour conditions, 10 of the study intersections would operate at unacceptable levels (asterisked intersections would operate at unacceptable levels in 2015):

- #6 - Railroad Avenue/SR 4 Eastbound Ramp
- #8 - Railroad Avenue/Leland Road



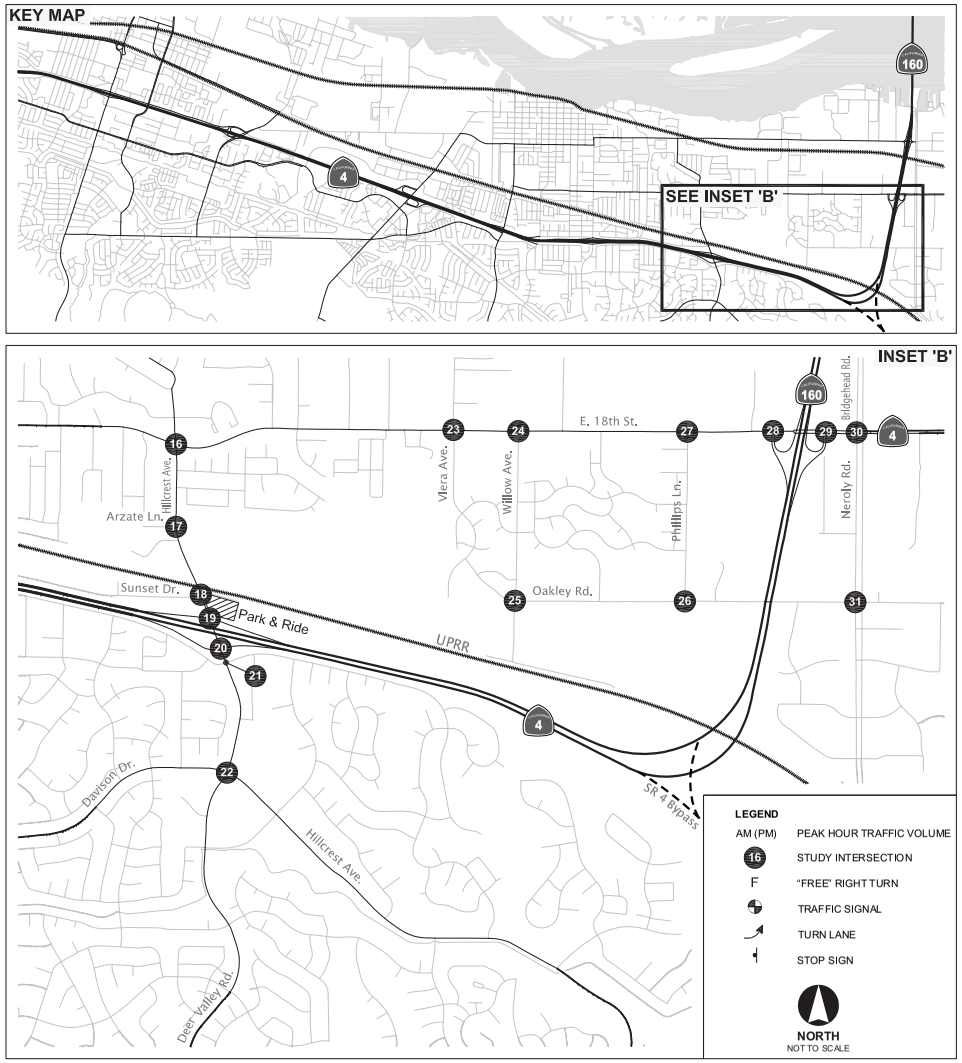


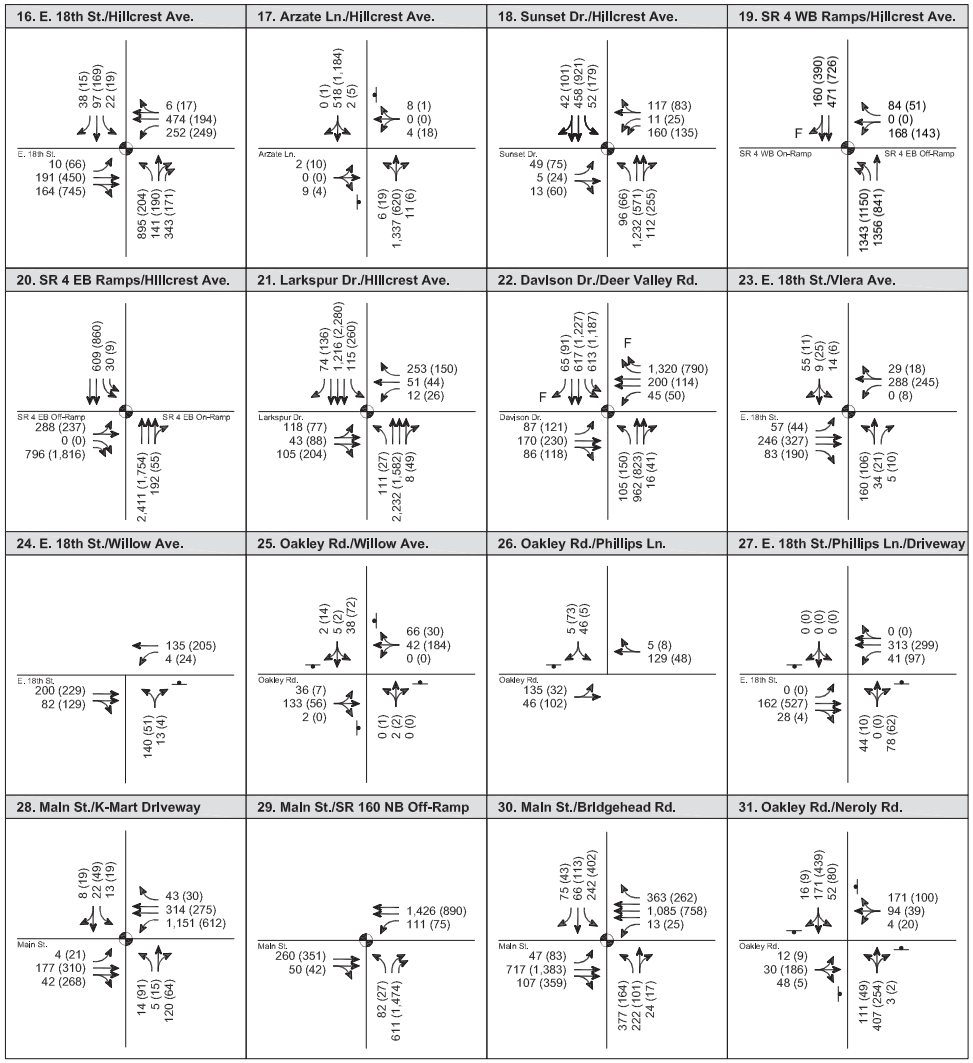
Source: WSA, 2008.



RAILROAD AVENUE STATION AREA INTERSECTIONS - 2015 NO PROJECT CONDITIONS

FIGURE 3.2-11





Source: WSA, 2008.

HILLCREST AVENUE STATION AREA INTERSECTIONS - 2015 NO PROJECT CONDITIONS

FIGURE 3.2-12

- #9 - Leland Road/Harbor Street
- #10 - Leland Road/Freed Avenue*
- #13 - California Avenue/SR 4 Westbound Ramps*
- #14 - Harbor Street/California Avenue
- #16 - Hillcrest Avenue/E. 18th Street*
- #17 - Hillcrest Avenue/Arzate Lane – PG&E Service Center Driveway
- #20 - SR 4 Eastbound Ramps/Hillcrest Avenue*
- #22 - Davison Drive/Hillcrest Avenue – Deer Valley Road

Intersection configurations and turning movement volumes are shown for the Railroad Avenue Station area and the Hillcrest Avenue Station area in Figure 3.2-13 and Figure 3.2-14, respectively.

Freeway Operations. Under the Opening Year "No Project" AM peak hour conditions, six of 11 freeway study segments would operate at unacceptable levels (i.e., worse than LOS E) in the westbound direction:

- West of Bailey Road
- Bailey Road – Railroad Avenue
- Railroad Avenue – Loveridge Road
- Loveridge Road – Somersville Road
- Somersville Road – Contra Loma Boulevard/L Street
- Contra Loma Boulevard/L Street – A Street

During the PM peak hour, only the segment west of Bailey Road would operate at unacceptable levels in the eastbound direction.

During the 2030 "No Project" AM peak hour, only four of the 12 freeway study segments would operate at acceptable conditions, while the following eight would operate at unacceptable levels in the westbound direction:

- West of Bailey Road
- Bailey Road – Range Road
- Range Road – Railroad Avenue
- Railroad Avenue – Loveridge Road
- Loveridge Road – Somersville Road
- Somersville Road – Contra Loma Boulevard/L Street
- Contra Loma Boulevard/L Street – A Street
- A Street – Hillcrest Avenue

During the PM peak hour, seven of the segments would operate at unacceptable levels:

- West of Bailey Road
- Bailey Road – Range Road
- Range Road – Railroad Avenue
- Railroad Avenue – Loveridge Road
- Loveridge Road – Somersville Road
- Somersville Road – Contra Loma Boulevard/L Street
- Contra Loma Boulevard/L Street – A Street

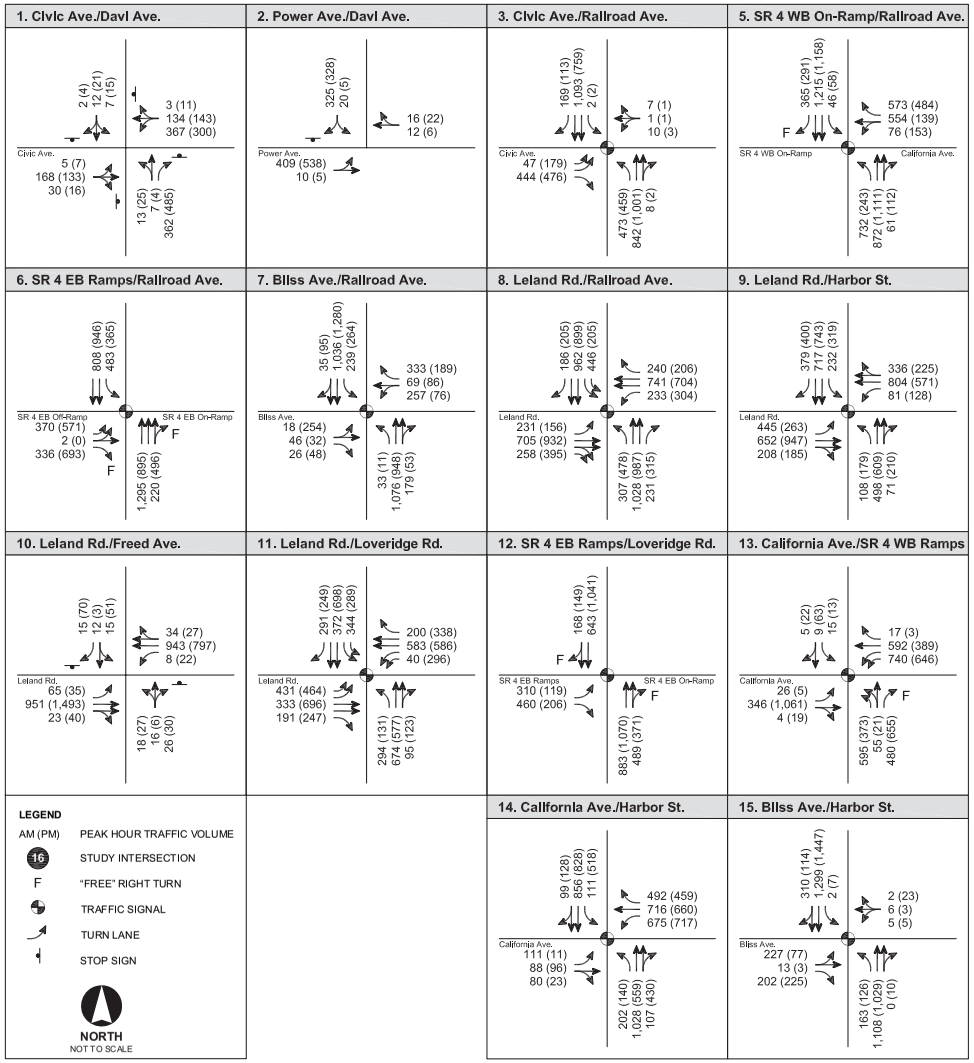
Parking. When the proposed Hillcrest Avenue/SR 4 interchange improvements are implemented, the site of the existing park-and-ride lot in Antioch will be displaced and this parking would need to be replaced either as part of a parking structure on the remaining land owned by BART or on a new parcel of land in the area of the current park-and-ride lot. At present, there is vacant property that would be suitable for a relocated park-and-ride lot. However, there is no certainty that this land would still be available when the proposed Hillcrest Avenue/SR 4 interchange improvements are implemented. If the lands were not available, then a parking structure would have to be built on the remaining land owned by BART.

Transit. In response to a projected growth in future demand, especially along the SR 4 corridor between Pittsburg and Antioch, Tri Delta Transit would expand local and commuter transit service capacity. Peak period service frequencies of these routes would also be increased. Changes to services through central Pittsburg are also being planned for the near future in order to simplify routes and schedules and more efficiently allocate resources.

The analyses for Years 2015 and 2030 also incorporate the future extension of BART service from its existing South Bay terminus at Fremont to Warm Springs and Santa Clara County. BART expects the extension to Warm Springs to be completed by 2015, and the extension to Santa Clara County to be completed prior to 2030. This change would include direct service from Warm Springs and the Silicon Valley to the Richmond and Daly City BART Stations. Future analyses also assumed completion of the Oakland Airport Connector, which would provide transit service from the Oakland Coliseum BART Station to Oakland International Airport. Future BART service would provide reduced headways (that is, more frequently scheduled trains), first during peak hours and eventually systemwide, with trains scheduled at a maximum of 12 minutes apart versus the current 15 minutes.

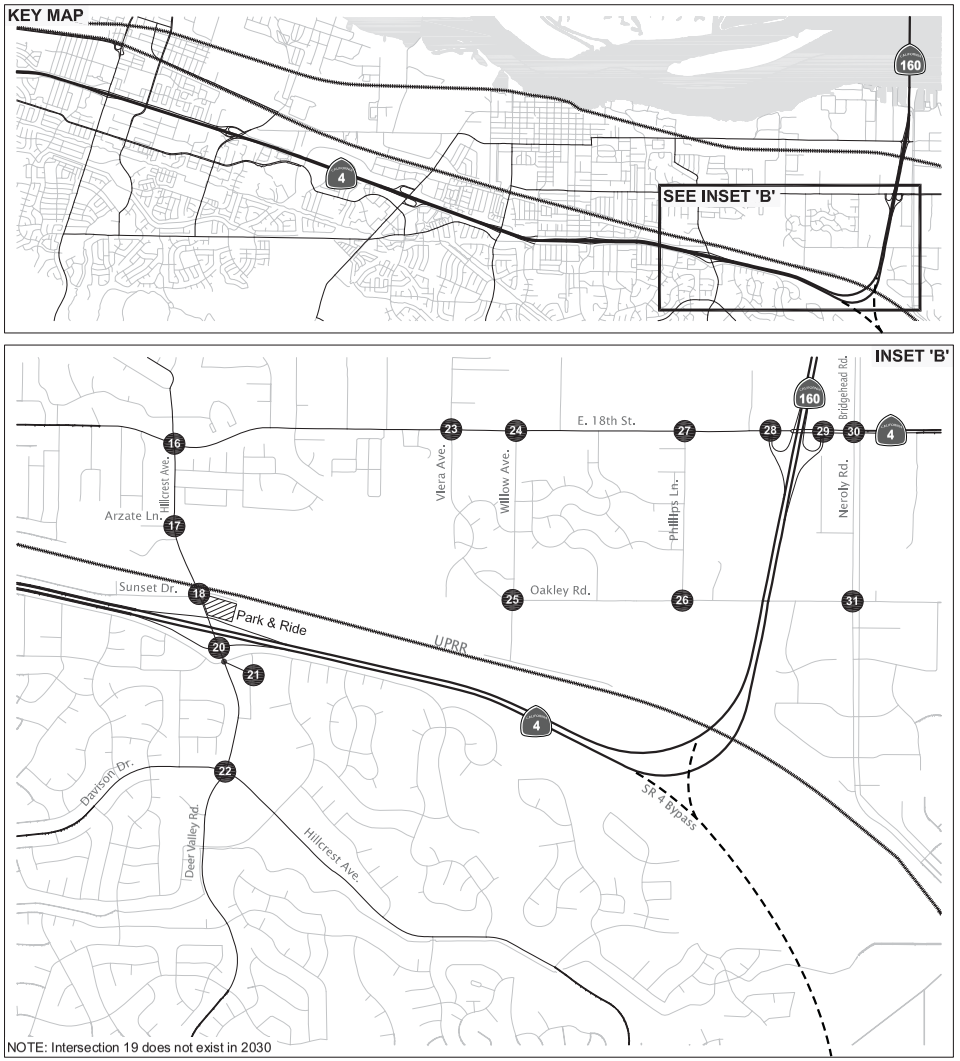
Pedestrian and Bicycle Facilities. The existing Class III bicycle facility along Harbor Street near the proposed Railroad Avenue Station is currently being converted into a Class II bicycle lane. Lanes already exist along the street adjacent to SR 4. The City of Pittsburg 2020

Source: WSA, 2008.

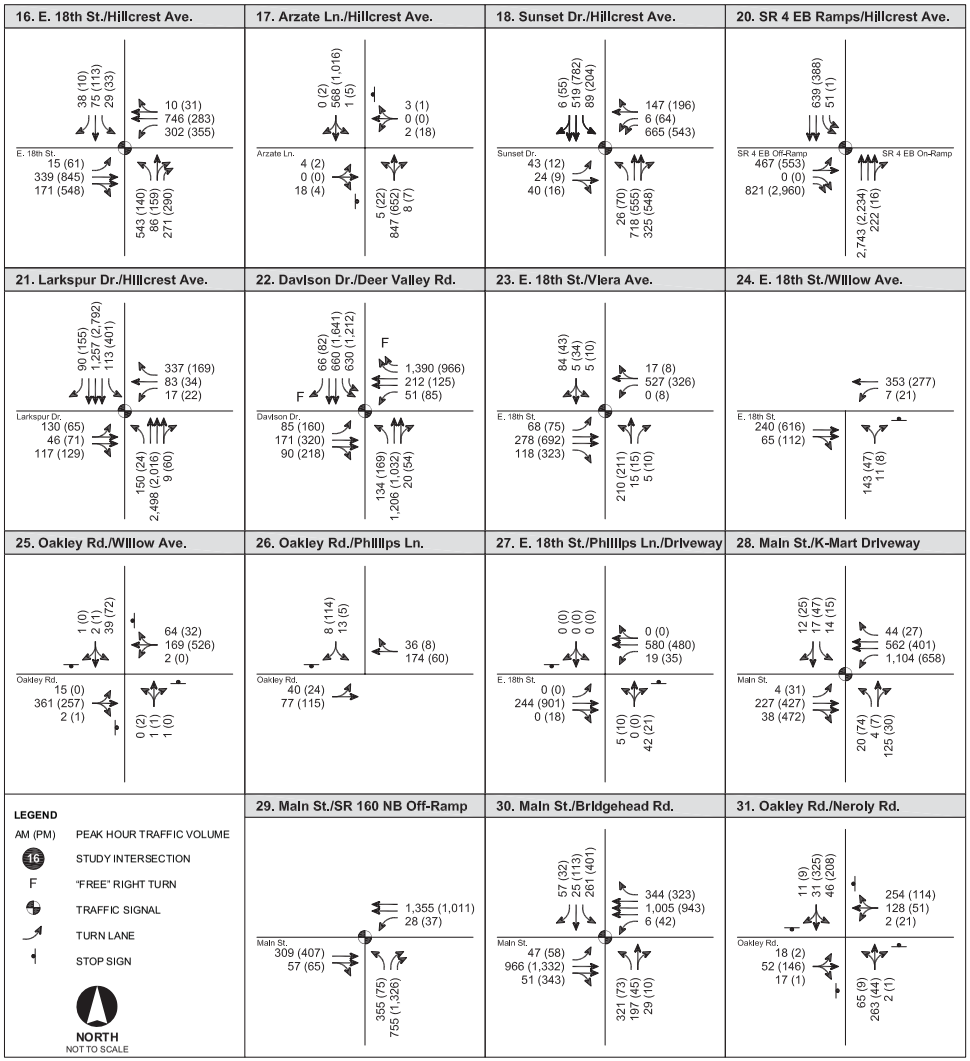


RAILROAD AVENUE STATION AREA INTERSECTIONS - 2030 NO PROJECT CONDITIONS

FIGURE 3.2-13



Source: WSA, 2008.



HILLCREST AVENUE STATION AREA INTERSECTIONS - 2030 NO PROJECT CONDITIONS

FIGURE 3.2-14

General Plan has also identified a planned bicycle lane along Power Avenue and a Class I bicycle path along Contra Costa Canal, east of Railroad Avenue. A southbound bicycle lane along Hillcrest Avenue north of SR 4 is being planned, as there is currently a Class II facility on only one side of the street.

Proposed Project Ridership

Ridership Forecasts. Table 3.2-13 provides a summary of forecasted ridership numbers for the two analysis years and represents bi-directional volumes. It is estimated that most of the Proposed Project passengers would be transferring directly to/from the BART system. The projected total weekday transit trips forecast as a result of the Proposed Project include transfers from/to the Proposed Project as shown in the table. Trips that do not involve transfers to or from BART are trips that occur totally on the Proposed Project, for example, trips from the Hillcrest Station to either the Railroad Avenue or Pittsburg/Bay Point Stations.

The new transit trips shown in the last row of Table 3.2-13 represent trips that would have been made by auto, and as such represent a decrease in auto travel. Based on the estimated corridor auto occupancy of 1.06 persons per vehicle, these new transit trips represent a reduction of 1,900 auto trips in the year 2015 and 5,100 auto trips in the year 2030.

Table 3.2-13
Proposed Project Daily Ridership, 2015 and 2030

	2015	2030
Proposed Project Weekday Trips	3,900	10,100
Transfers from/to the Proposed Project[a]	3,700	9,750
Entries and Exits[b]		
Railroad Avenue Station	750	1,900
Hillcrest Avenue Station	3,150	8,200
New Transit Trips[c]	2,050	5,400

Source: Wilbur Smith Associates, 2008.

Notes:

a. Daily passengers transferring between Proposed Project and BART at the Pittsburg/Bay Point Transfer Platform.

b. Daily passengers entering and exiting the new Proposed Project stations.

c. New transit riders are those who were not previous BART or Tri Delta Transit users in the SR 4 corridor.

The remaining transit trips, after deducting the new trips, represent existing and future transit users that are predicted to use BART with or without the Proposed Project. These individuals would take advantage of the improved accessibility offered by the Proposed Project and would no longer travel to the Pittsburg/Bay Point Station to access BART. As a result, the demand

for parking at Pittsburg/Bay Point Station would be reduced. However, because there is already unserved demand for parking at Pittsburg/Bay Point, the model forecasts suggest that the parking lot will continue to be highly utilized even with the Proposed Project. These new trips to the Pittsburg/Bay Point BART Station are part of the total ridership forecast for the Proposed Project.

BART System Ridership. The ridership forecasts provide a daily origin-destination passenger trip table for the BART system during the AM peak hour. PM peak hour ridership was assumed to be the reverse pattern of the AM peak hour. Passenger origin and destination data for the No Project scenario came from BART's Dovetail Model, which provided origin-destination information for both AM and PM peak hour periods. Table 3.2-14 highlights the estimated total peak period boardings for the BART system used in the 2030 ridership forecasts.

Table 3.2-14
BART System Peak Period Ridership
with and without the Proposed Project, 2030

	Total Trips	
Scenario	**AM Peak**	**PM Peak**
2030 No Project	59,100	59,800
2030 Proposed Project	59,900	60,600

Source: Arup, 2008.

Proposed Project Station Access. Potential impacts on parking, transit, and pedestrian and bicycle facilities were based on projected station access mode splits. The station access and egress mode split is shown in Table 3.2-15 for both analysis years. A large majority of riders originating from the Hillcrest Avenue Station would access the station by automobile. At the

Table 3.2-15
Access Mode Split by Station, 2015 and 2030

	Percentage of Riders Accessing the Station		2015		2030	
	Railroad Avenue	**Hillcrest Avenue**	**Railroad Avenue**	**Hillcrest Avenue**	**Railroad Avenue**	**Hillcrest Avenue**
Total Ridership[a]	—	—	750	3,150	1,900	8,200
Round Trips[b]	—	—	375	1,575	950	4,100
Car – Park & Ride	40%	62%	150	977	380	2,542
Car – Drop-off	20%	18%	75	284	190	738
Bus/Transit	10%	16%	38	252	95	656
Bicycle	2%	1%	8	16	19	41
Walk	28%	3%	105	47	266	123

Source: Wilbur Smith Associates, 2008.

Notes:

a. Total ridership defined as one-way person trips.

b. A round trip equals two one-way trips, representing a total trip which begins and ends at a given station.

Railroad Avenue Station, a significantly higher percentage is expected to walk to the station, while only 40 percent of riders would use the park-and-ride lot, partly due to the limited availability of parking. The proposed Transit Village envisioned by the City of Pittsburg Railroad Avenue Specific Plan (Ridership Development Plan) is also expected to result in greater amounts of bicycle and pedestrian activity.

Project-Specific Environmental Analysis

Operational Impacts

Impact TR-1 *Under 2015 Proposed Project conditions, five intersections would operate at unacceptable levels during one of the peak periods, and one intersection would operate at unacceptable levels during both the AM and PM peak periods. Compared to the No Project conditions, the Proposed Project would worsen the level of service at four of these intersections, a significant effect. (S)*

During the Opening Year with the Proposed Project, three out of the 31 study intersections operate at unacceptable levels during the AM peak hour. However, one of the intersections, Hillcrest Avenue/E. 18th Street, would operate better under the Proposed Project conditions compared to the No Project conditions. This is due to vehicle trips which are diverted to the transit system under the Proposed Project, representing reduced traffic in the SR 4 corridor compared to the No Project conditions. The remaining two intersections would experience operational conditions worse than No Project conditions:

- **SR 4 Westbound Ramps/Hillcrest Avenue** – Under 2015 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.14 and LOS E during the AM peak hour, which is worse than both existing and No Project conditions. About 6.0 percent of the volume at this intersection could be attributed to the Proposed Project.
- **Davison Drive/Hillcrest Avenue – Deer Valley Road** – Under 2015 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.04 and LOS E during the AM peak hour, which is worse than both existing and No Project conditions. About 1.7 percent of the volume at this intersection could be attributed to the Proposed Project.

During the PM peak hour, four study intersections would operate at unacceptable levels, but one of them, Leland Road/Freed Avenue would operate better under the Proposed Project conditions than under the No Project conditions. Two other intersections, California Avenue/SR 4 Westbound Ramps and Main Street/Neroly Road, would improve from unacceptable

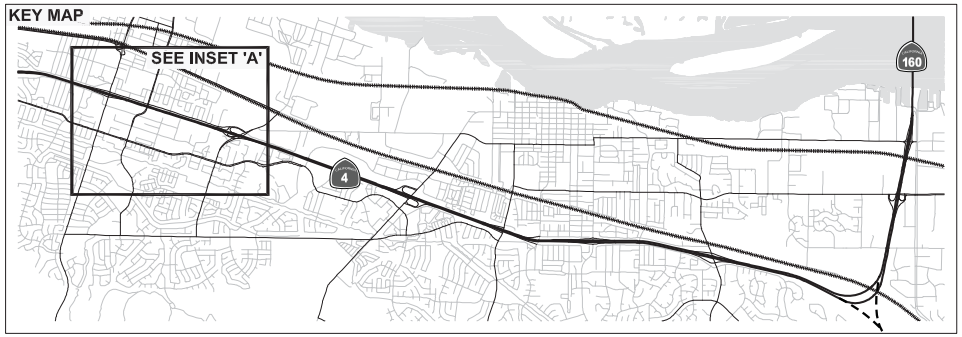
conditions under the No Project scenario to acceptable conditions under the Proposed Project. Significant impacts would occur at three intersections:

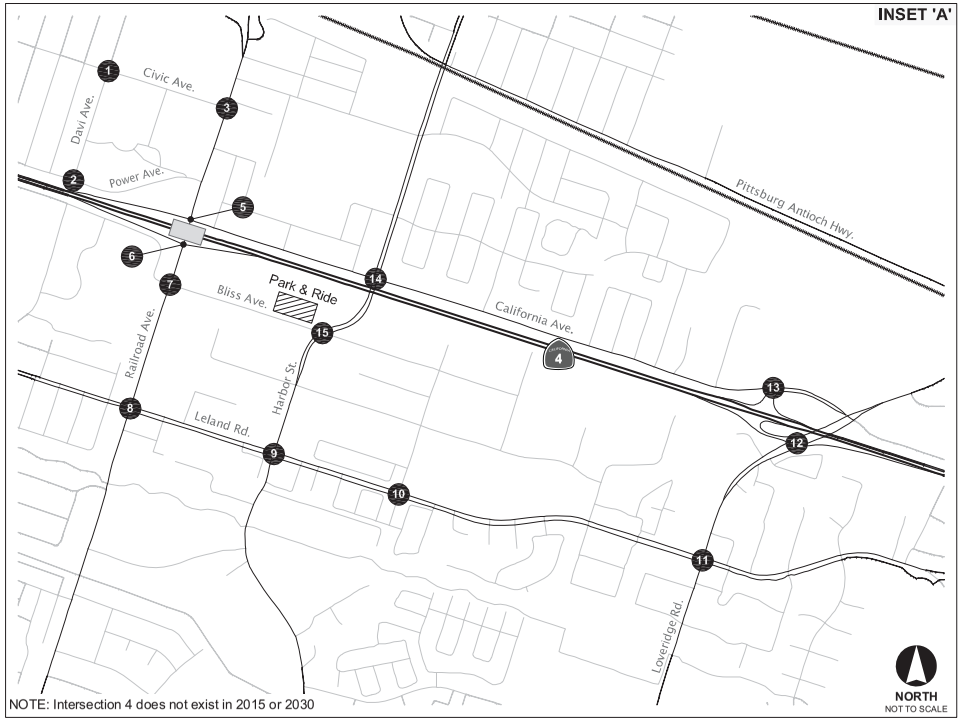
- **SR 4 Westbound Ramps/Hillcrest Avenue** – Under 2015 Proposed Project conditions, this intersection would operate at a V/C ratio of 0.95 and LOS D during the PM peak hour, which is worse than both existing and No Project conditions. About 12.2 percent of the volume at this intersection could be attributed to the Proposed Project.
- **SR 4 Eastbound Ramps/Hillcrest Avenue** – Under 2015 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.79 and LOS F during the PM peak hour, which is worse than both existing and No Project conditions. About 3.4 percent of the volume at this intersection could be attributed to the Proposed Project.
- **Oakley Road/Neroly Road** – Under 2015 Proposed Project conditions, this intersection would operate at LOS F during the PM peak hour, which is the same as existing conditions but worse than No Project conditions. About 6.4 percent of the volume at this intersection could be attributed to the Proposed Project.

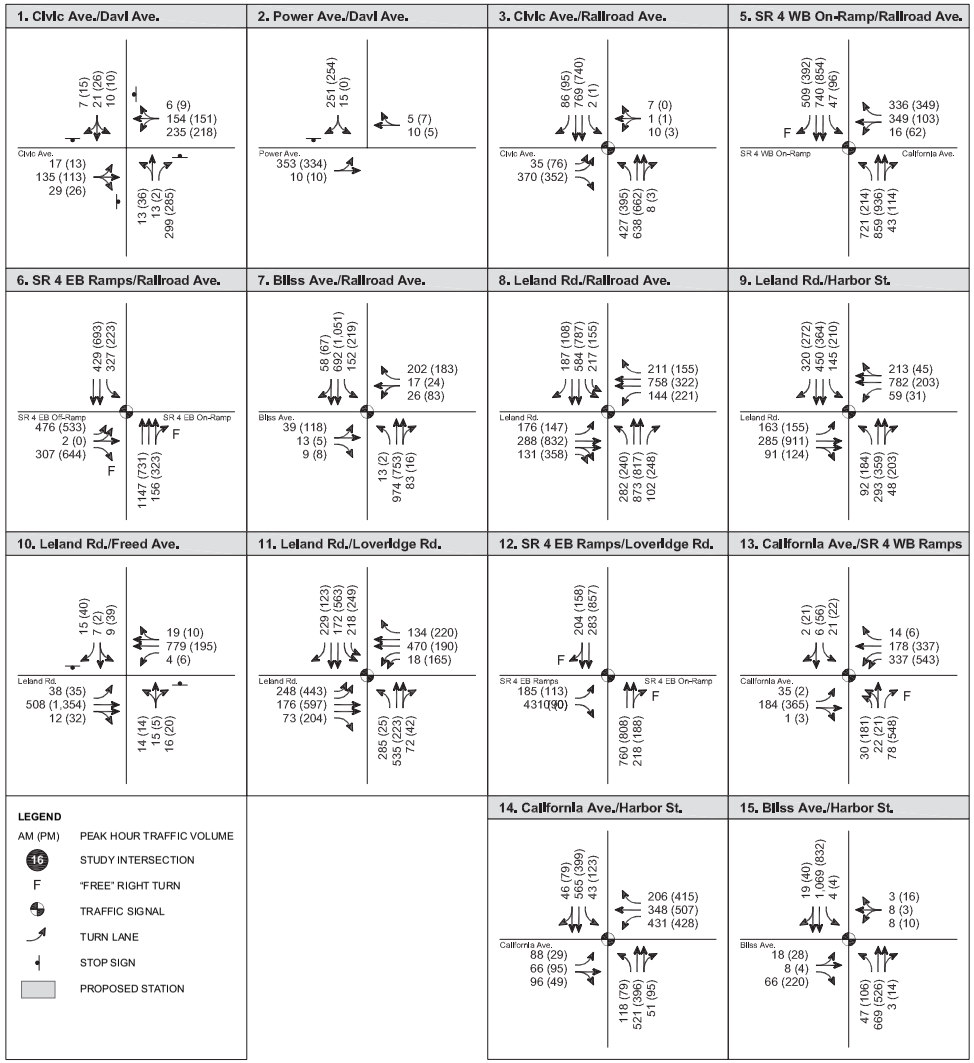
Intersection configurations and turning movement volumes with the Proposed Project are shown for the Railroad Avenue Station area and the Hillcrest Avenue Station area in Figure 3.2-15 and Figure 3.2-16, respectively.

A comparison of existing conditions and the Year 2015 Proposed Project and No Project scenarios is presented in Table 3.2-16 (AM Peak) and Table 3.2-17 (PM Peak). Based on the standards of significance and the approach to determining impacts, the Proposed Project would result in a significant intersection impact at four intersections: one intersection in the AM peak period (Davison Drive/Hillcrest Avenue – Deer Valley Road), two intersections in the PM peak period (SR 4 Eastbound Ramps/Hillcrest Avenue and Oakley Road/Neroly Road), and one intersection in both the AM and PM peak periods (SR 4 Westbound Ramps at Hillcrest Avenue).

MITIGATION MEASURES. The following measures would improve operations at two of the four impacted intersections to acceptable LOS. BART would need to participate and coordinate with local jurisdictions in implementing these improvements and, if necessary, contribute its fair share of funding. As a result, the impacts at Davison Drive/Hillcrest Avenue – Deer Valley Road and at Oakley Road/Neroly Road would be reduced to less than significant. (LTS)



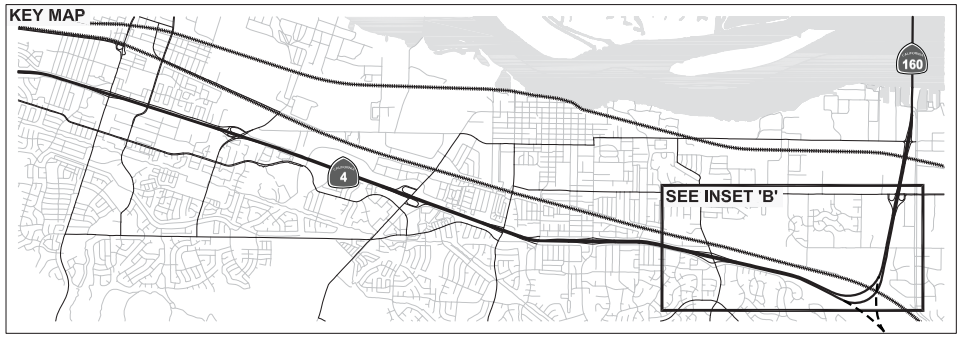


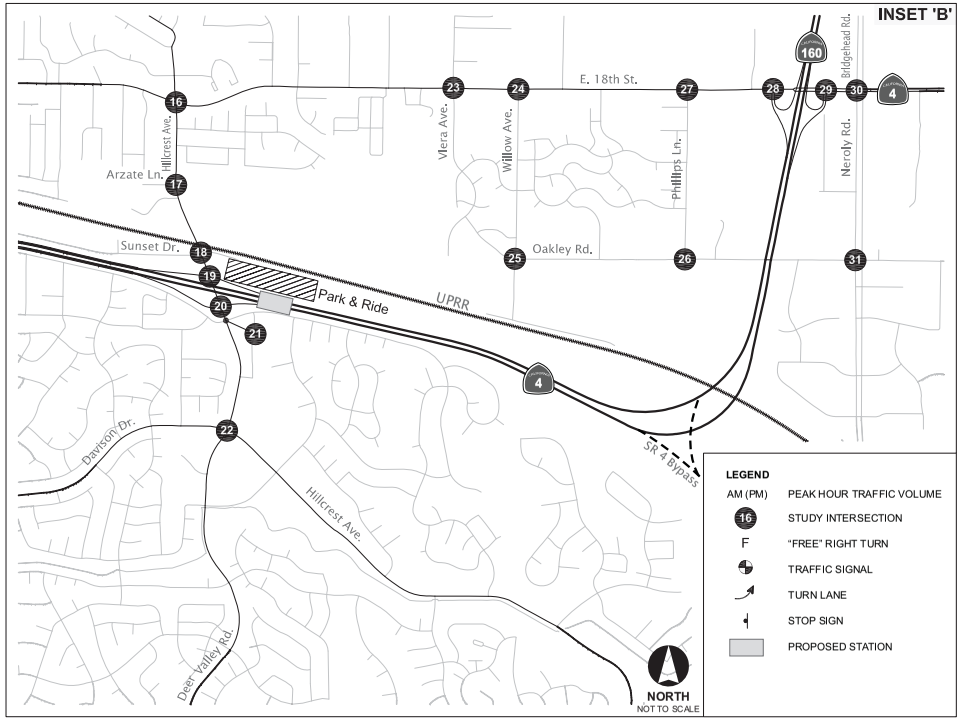


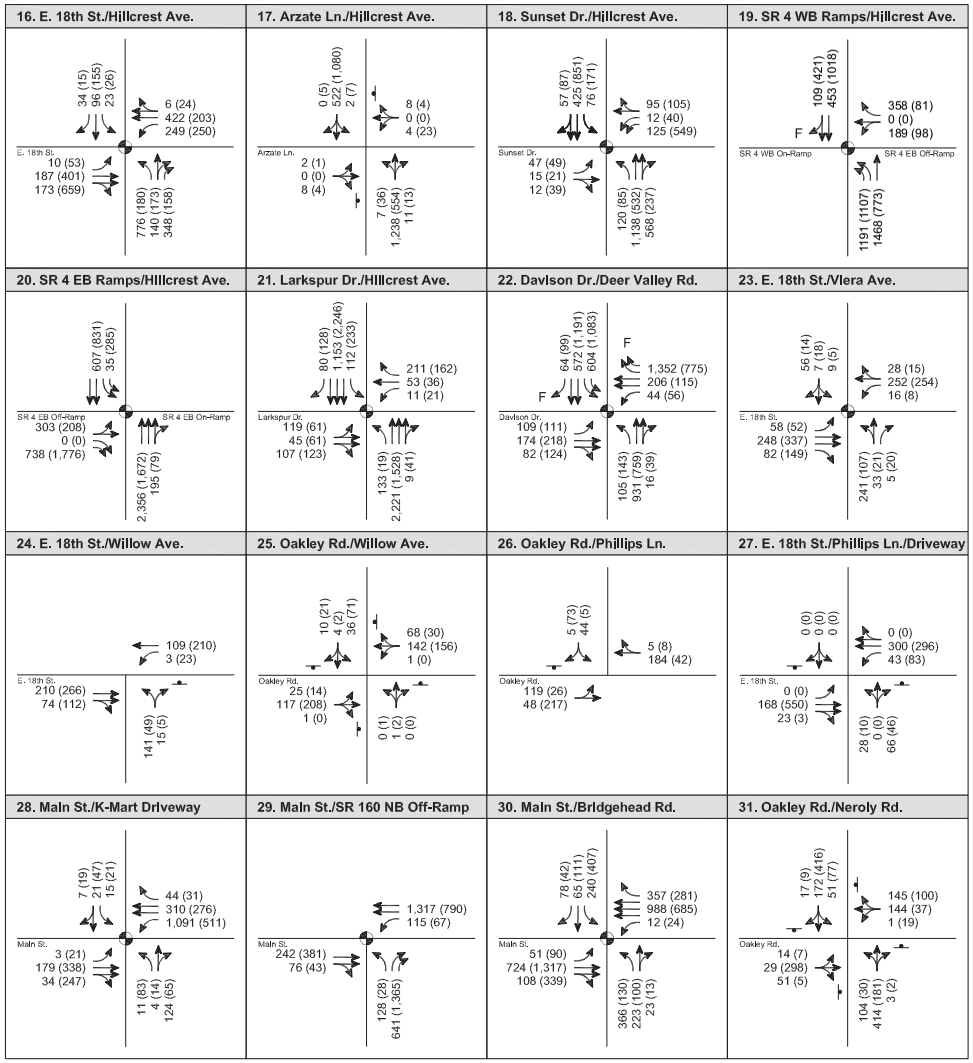
Source: WSA, 2008.

RAILROAD AVENUE STATION AREA INTERSECTIONS - 2015 PROPOSED PROJECT CONDITIONS

FIGURE 3.2-15







Source: WSA, 2008.

HILLCREST AVENUE STATION AREA INTERSECTIONS - 2015 PROPOSED PROJECT CONDITIONS

FIGURE 3.2-16

Table 3.2-16
2015 AM Peak Hour Intersection Operations with and without the Proposed Project

		Existing Conditions			2015 No Project			2015 Proposed Project		
#	Intersection	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue – W.17th Street/Davi Avenue		7.8	A		15.4	C		14.8	B
2	Power Avenue/Davi Avenue	0.05 (SB)	12.1 (SB)	B	0.34	10.9	B	0.32 (SB)	10.7 (SB)	B
3	Railroad Avenue/Civic Avenue	0.46	19.5	B	0.71	31.7	C	0.68	30.6	C
4	Railroad Avenue/Center Drive	0.59 (EB)	27.3 (EB)	D	Not present in future			Not present in future		
5	Railroad Avenue/SR 4 Westbound On-Ramp	**1.2**	**>80**	**F**	0.99	29.5	C	0.97	31.4	C
6	Railroad Avenue/SR 4 Eastbound Ramps	0.66	17.2	B	0.7	20.2	C	0.73	25.5	C
7	Railroad Avenue/Bliss Avenue	0.55	15.4	B	0.67	9.2	A	0.56	18.7	B
8	Railroad Avenue/Leland Road	0.8	33.7	C	0.92	40.5	D	0.82	31.9	C
9	Leland Road/Harbor Street	0.76	33.6	C	0.81	29.2	C	0.78	28.2	C
10	Leland Road/Freed Avenue	0.31 (SB)	42.1 (SB)	E	**0.54 (SB)**	**>50 (SB)**	**F**	0.42 (NB)	44.4 (NB)	E
11	Leland Road/Loveridge Road	0.67	34.8	C	0.65	37.8	D	0.64	28.7	C
12	Loveridge Road/SR 4 Eastbound Ramps	0.53	15	B	0.57	8.2	A	0.51	7.9	A
13	California Avenue/SR 4 Westbound Ramps	0.56	27.3	C	0.60	16.9	B	0.38	17.6	B
14	Harbor Street/California Avenue	0.64	30.9	C	0.87	43.9	D	0.75	32	C
15	Harbor Street/Bliss Avenue	**2.04 (EB)**	**>50 (EB)**	**F**	0.90	23.5	C	0.55	6.0	A
16	Hillcrest Avenue/E. 18th Street	0.8	43.8	D	**1.10**	**>80.0**	**F**	**1.00**	**69.1**	**E**
17	Hillcrest Avenue/Arzate Lane – PG&E Service Center Driveway	0.05 (WB)	17.4 (WB)	C	0.10 (WB)	15.6 (WB)	C	0.08 (WB)	13.4 (WB)	B
18	Sunset Drive/Hillcrest Avenue	0.5	21	C	0.62	23.4	C	0.78	22.9	C
19	SR 4 Westbound Ramps/Hillcrest Avenue	0.96	32.3	C	**0.94**	**39.3**	**D**	**1.14**	**59.6**	**E**
20	SR 4 Eastbound Ramps/Hillcrest Avenue	0.98	26.5	C	0.96	29.2	C	0.94	22.2	C
21	Larkspur Drive/Hillcrest Avenue	0.79	26.4	C	0.88	32.9	C	0.84	23.8	C

Table 3.2-16
2015 AM Peak Hour Intersection Operations with and without the Proposed Project

#	Intersection	Existing Conditions			2015 No Project			2015 Proposed Project		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
22	Davison Drive/Hillcrest Avenue – Deer Valley Road	0.89	43.7	D	**1.01**	**74.2**	**E**	**1.04**	**79.0**	**E**
23	E. 18th Street/Viera Avenue	**0.95**	**63.3**	**E**	0.73	27.7	C	0.84	42.2	D
24	E. 18th Street/Willow Avenue	0.64 (NB)	32.7 (NB)	D	0.36 (NB)	15.5 (NB)	C	0.35 (NB)	15.0 (NB)	B
25	Oakley Road/Willow Avenue		9.6	A		8.6	A		9.1	A
26	Phillips Lane/Oakley Road	0.06 (SB)	11.7 (SB)	B	0.17 (SB)	14.1 (SB)	B	0.17 (SB)	14.4 (SB)	B
27	E. 18th Street/Phillips Lane – Dirt Driveway	0.02 (NB)	12.5 (NB)	B	0.27 (NB)	12.5 (NB)	B	0.20 (NB)	11.5 (NB)	B
28	SR 4 Westbound Ramps– K-Mart Driveway/Main Street	**0.88**	**76.5**	**E**	0.84	28.7	C	0.81	28.2	C
29	Main Street/SR 160 NB Ramps	0.62	11.7	B	0.55	22.9	C	0.55	18.6	B
30	Main Street/Neroly Road – Bridgehead Road	0.86	36.6	D	0.75	52.1	D	0.75	43.1	D
31	Oakley Road/Neroly Road		**>50**	**F**		29.1	D		33.4	D

Source: Wilbur Smith Associates, April 2008.

Notes:

Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldfaced type indicates unacceptable values.

Table 3.2-17
2015 PM Peak Hour Intersection Operations with and without the Proposed Project

#	Intersection	Existing Conditions			2015 No Project			2015 Proposed Project		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue – W.17th Street/Davi Avenue		8.2	A		17.2	C		13.7	B
2	Power Avenue/Davi Avenue	0.11 (SB)	13.5 (SB)	B	0.33	10.3	B	0.26 (SB)	9.5 (SB)	A
3	Railroad Avenue/Civic Avenue	0.38	13.8	B	0.77	24.8	C	0.67	24	C
4	Railroad Avenue/Center Drive	0.87 (EB)	34.6 (EB)	D	Not present in future			Not present in future		
5	Railroad Avenue/SR 4 Westbound On-Ramp	0.65	16.6	B	0.64	14.8	B	0.57	11.7	B
6	Railroad Avenue/SR 4 Eastbound Ramps	**1.08**	**52.2**	**D**	1.04	47.1	D	0.89	26.7	C
7	Railroad Avenue/Bliss Avenue	0.73	18.1	B	0.77	23.9	C	0.63	20.4	C
8	Railroad Avenue/Leland Road	0.97	48.2	D	1.07	63.5	E	0.96	42.3	D
9	Leland Road/Harbor Street	0.88	42.8	D	0.89	37.6	D	0.75	31.3	C
10	Leland Road/Freed Avenue	**0.94 (NB)**	**>50 (NB)**	**F**	**1.45**	**>50 (NB)**	**F**	**0.75 (NB)**	**>50 (NB)**	**F**
11	Leland Road/Loveridge Road	0.77	31.2	C	0.60	25.2	C	0.53	36.1	D
12	Loveridge Road/SR 4 Eastbound Ramps	0.59	9.8	A	0.48	6.8	A	0.43	6.0	A
13	California Avenue/SR 4 Westbound Ramps	**0.85**	**49.1**	**D**	**0.96**	**40.8**	**D**	0.74	21.2	C
14	Harbor Street/California Avenue	0.82	35.5	D	1.00	52.7	D	0.64	33.3	C
15	Harbor Street/Bliss Avenue	**2.05 (EB)**	**>50 (EB)**	**F**	0.59	10.7	B	0.51	13.2	B
16	Hillcrest Avenue/E. 18th Street	0.87	49.6	D	**0.97**	**64.8**	**E**	0.88	48.2	D
17	Hillcrest Avenue/Arzate Lane – PG&E Service Center Driveway	0.01 (EB)	16.9 (EB)	C	0.20 (EB)	28.6 (EB)	D	0.26 (WB)	20.6 (WB)	C
18	Sunset Drive/Hillcrest Avenue	0.51	24.5	C	0.57	23.7	C	0.78	31.5	C
19	SR 4 Westbound Ramps/Hillcrest Avenue	0.88	16.7	B	**0.88**	**37.8**	**D**	**0.95**	**53.2**	**D**
20	SR 4 Eastbound Ramps/Hillcrest Avenue	**1.17**	**68.3**	**E**	**1.34**	**>80**	**F**	**1.58**	**>80**	**F**

Table 3.2-17
2015 PM Peak Hour Intersection Operations with and without the Proposed Project

		Existing Conditions			2015 No Project			2015 Proposed Project		
#	Intersection	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
21	Larkspur Drive/Hillcrest Avenue	0.86	46.7	D	0.75	27.7	C	0.70	24.0	C
22	Davison Drive/Hillcrest Avenue – Deer Valley Road	0.86	45.4	D	0.91	54.0	D	0.84	47.4	D
23	E. 18th Street/Viera Avenue	0.54	18.4	B	0.59	22.2	C	0.57	20.6	C
24	E. 18th Street/Willow Avenue	0.35 (NB)	25.5 (NB)	D	0.17 (NB)	16.0 (NB)	C	0.18 (NB)	16.6 (NB)	C
25	Oakley Road/Willow Avenue		8.5	A		9.3	A		10.4	B
26	Phillips Lane/Oakley Road	0.09 (SB)	11.6 (SB)	B	0.13 (SB)	9.2 (SB)	A	0.13 (SB)	9.2 (SB)	A
27	E. 18th Street/Phillips Lane – Dirt Driveway	0.05 (NB)	11.4 (NB)	B	0.23 (NB)	15.0 (NB)	B	0.19 (NB)	15.4 (NB)	C
28	SR 4 Westbound Ramps– K-Mart Driveway/Main Street	**0.84**	**37.5**	**D**	0.70	21.6	C	0.62	25.9	C
29	Main Street/SR 160 Northbound Ramps	0.93	32.8	C	0.87	27.4	C	0.78	27.2	C
30	Main Street/Neroly Road – Bridgehead Road	**1.26**	**>80**	**F**	**1.15**	**>80**	**F**	1.05	77.8	E
31	Oakley Road/Neroly Road		**>50**	**F**		**44**	**E**		**>50**	**F**

Source: Wilbur Smith Associates, April 2008.

Notes:

Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldfaced type indicates unacceptable values.

TR-1.1 *Improve Davison Drive/Hillcrest Avenue – Deer Valley Road.* The intersection operations could be improved to a V/C ratio of 0.78 and LOS D during the AM peak hour through the coordination of the intersection, optimization of signal timing plans, and overlapping of westbound right turning movements. BART would contribute its fair share to upgrade intersection operations to acceptable levels, reducing the impacts to less than significant.

TR-1.2 *Oakley Road/Neroly Road.* The intersection operations could be improved to a V/C ratio of 0.68 and LOS B during the PM peak hour through the signalization of the intersection. BART would contribute its fair share to upgrade intersection operations to acceptable levels. It should be noted that traffic volumes at this intersection are expected to decline by the Year 2030, reducing the impacts to less than significant.

The CCTA and Caltrans have plans to improve the Hillcrest Avenue interchange as a part of the SR 4 widening project. These plans eliminate the intersection of SR 4 Westbound Ramps/Hillcrest Avenue by providing a new northbound to westbound loop on-ramp and improve and widen the approaches to the SR 4 Eastbound Ramps/Hillcrest Avenue intersections. These improvements would mitigate the impacts at the SR 4 Westbound Ramps/Hillcrest Avenue intersections but would not mitigate the impacts at the SR 4 Eastbound Ramps/Hillcrest Avenue intersection. These improvements are prohibitively costly and there is no identified funding that would allow this project to be completed by the Year 2015. It is expected, however, that these improvements would be funded and in place by the Year 2030. Further improvements to address the conditions at the SR 4 Eastbound Ramps/Hillcrest Avenue intersection have been studied by the City of Antioch but have been determined by the City to be infeasible due the potential displacement of homes and commercial property. Thus, the impact at these two intersections is assumed to remain significant and unavoidable in the Year 2015. (SU)

Impact TR-2 *With the Proposed Project in Year 2030, eight intersections would operate at unacceptable levels during one of the peak periods, and three intersections would operate at unacceptable levels during both the AM and PM peak periods. Compared to the No Project conditions, the Proposed Project would worsen the level of service at three of these intersections, a significant effect. (S)*

During the Year 2030 AM peak hour, future conditions with the Proposed Project would result in unacceptable levels of service at four of the study area intersections. However, three of the intersections, Leland Road/Freed Avenue,

Larkspur Drive/Hillcrest Avenue, and Davison Drive/Hillcrest Avenue – Deer Valley Road, would operate better under the Proposed Project conditions than under the No Project conditions. Three other intersections, Railroad Avenue/SR 4 Westbound Ramps, Hillcrest Avenue/E. 18th Street, and Harbor Street/California Avenue, would improve from unacceptable conditions under the No Project scenario to acceptable conditions under the Proposed Project. A significant impact would occur at the following intersection:

- **SR 4 Eastbound Ramps/Hillcrest Avenue** – Under 2030 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.12 and LOS E during the AM peak hour, worse than both existing and 2030 No Project conditions. About 4.2 percent of the volume at this intersection could be attributed to the Proposed Project.

  During the PM peak hour, the Proposed Project in 2030 would result in unacceptable levels of service at seven of the study area intersections. However, four of the intersections, Leland Road/Freed Avenue, California Avenue/SR 4 Westbound Ramps, Harbor Street/California Avenue, and Davison Drive/Hillcrest Avenue – Deer Valley Road, would operate better under the Proposed Project conditions than under the No Project conditions. Two other intersections, Railroad Avenue/SR 4 Eastbound Ramps and Leland Road/Harbor Street, would improve from unacceptable conditions under the No Project scenario to acceptable conditions under the Proposed Project. Significant impacts would occur at three intersections:

- **Hillcrest Avenue/E. 18th Street** – Under 2030 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.00 and LOS E during the PM peak hour. The intersection would operate worse than both existing and 2030 No Project conditions. About 0.6 percent of the volume at this intersection could be attributed to the Proposed Project.

- **Sunset Drive/Hillcrest Avenue** – Under 2030 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.11 and LOS F during the PM peak hour. This intersection would operate worse than both existing and 2030 No Project conditions. About 17.2 percent of the volume at this intersection could be attributed to the Proposed Project.

- **SR 4 Eastbound Ramps/Hillcrest Avenue** – Under 2030 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.72 and LOS F during the PM peak hour. This intersection would operate worse than both existing and 2030 No Project conditions. About 7.9 percent of the volume at this intersection could be attributed to the Proposed Project.

Only one of these intersections, Sunset Drive/Hillcrest Avenue, would operate significantly worse (i.e., a degradation of one or more levels of service) than under No Project conditions and deteriorate from existing conditions. The intersections of Hillcrest Avenue/E. 18th Street and SR 4 Eastbound Ramps/Hillcrest Avenue would also operate worse under the Proposed Project compared to the No Project conditions. Intersection configurations and turning movement volumes are shown in Figure 3.2-17 and Figure 3.2-18 for the Railroad Avenue and Hillcrest Avenue area intersections, respectively. A comparison of existing conditions and the Year 2030 with and without project scenarios is presented in Table 3.2-18 (AM Peak) and Table 3.2-19 (PM Peak).

MITIGATION MEASURES. The following measures would improve operations at two of the three congested intersections to acceptable LOS. BART would need to participate and coordinate with local jurisdictions in implementing these improvements and, if necessary, contribute its fair share of funding. As a result, impacts at Hillcrest Avenue/E. 18th Street and Sunset Drive/Hillcrest Avenue would be reduced to less than significant. (LTS)

TR-2.1 *Improve Hillcrest Avenue/E. 18th Street*. The intersection operations could be improved to a V/C ratio of 0.87 and LOS D during the PM peak hour through the provision of an exclusive right turn lane along the eastbound approach. BART would contribute its fair share to upgrade intersection operations to acceptable levels.

TR-2.2 *Improve Sunset Drive/Hillcrest Avenue*. The intersection operations could be improved to a V/C ratio of 0.81 and LOS D during the PM peak hour through the provision of an exclusive right turn lane at the northbound approach and an additional exclusive left turn lane at the westbound approach. BART would contribute its fair share to upgrade intersection operations to acceptable levels.

For the reasons identified in the mitigation discussion for Impact TR-1, improvements to reduce impacts at the intersection of SR 4 Eastbound Ramps/Hillcrest Avenue are considered infeasible. As a result, the impact at this intersection would remain significant and unavoidable. (SU)

Impact TR-3 *Under 2015 Proposed Project conditions, two of the freeway study segments would operate worse than LOS E during the westbound AM peak hour. However, all segments would operate at an LOS equal to or better than 2015 No Project conditions. Consequently, the Proposed Project would have a beneficial impact on the future baseline freeway conditions in 2015. (B)*

Freeway segment operating conditions in Year 2015 with and without the Proposed Project are summarized in Table 3.2-20 for the AM peak hour and in Table 3.2-21 for the PM peak hour. During the Opening Year with the Proposed Project, two of the study segments in the westbound direction would operate at unacceptable levels during the AM peak hour:

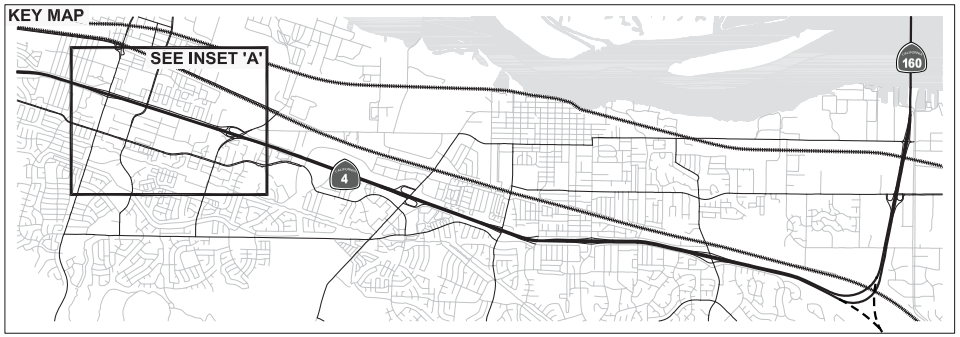
- West of Bailey Road
- Bailey Road – Railroad Avenue

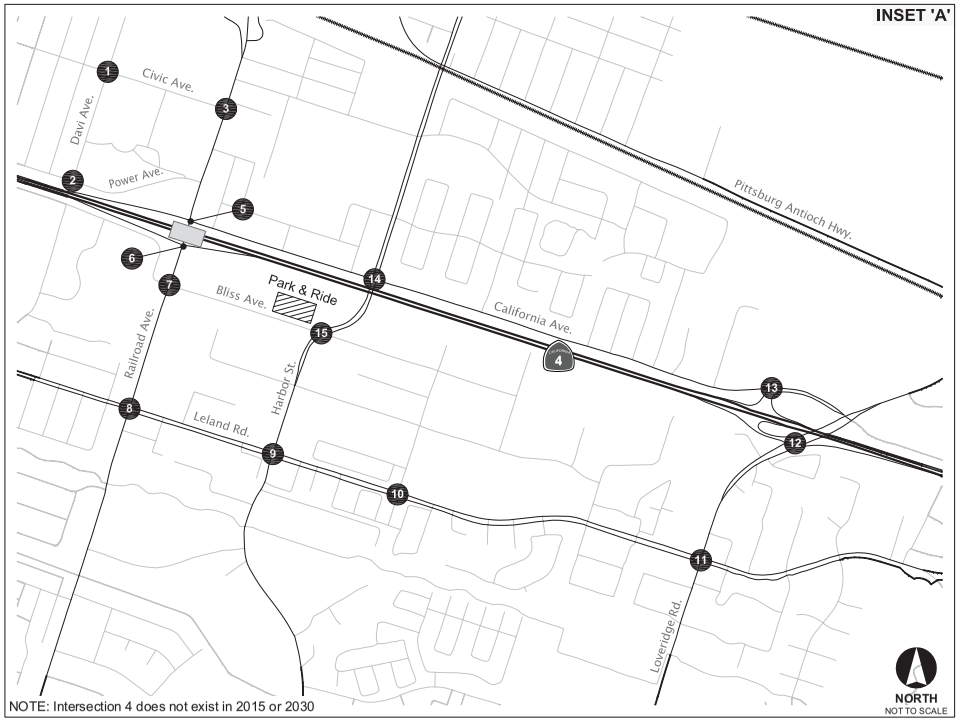
However, these segments operate no worse under Proposed Project conditions than under the No Project scenario. The remaining segments show an improvement in LOS compared to No Project conditions. The improvement in LOS would occur due to trips on SR 4 that would be diverted to the new transit service offered by the Proposed Project. This diversion would be the result of the new transit trips associated with the Proposed Project, as well as trips by existing BART users that would opt to use the Hillcrest Avenue or Railroad Avenue Stations instead of driving to the Pittsburg/Bay Point Station.

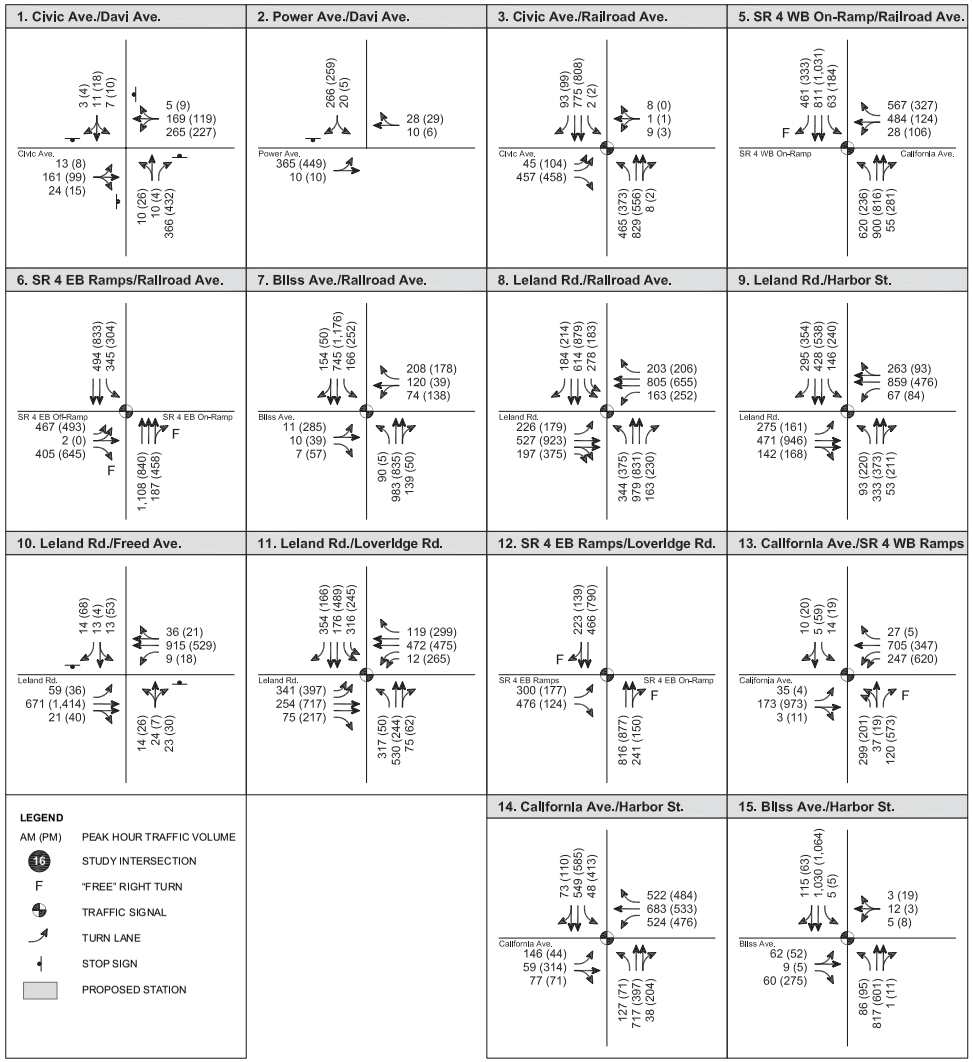
During the PM peak hour, no segments would operate at unacceptable levels. In the Proposed Project scenario, all segments would perform better than under the No Project scenario. As a result, during the PM peak hour, the Proposed Project would have a beneficial effect on freeway operations.

Impact TR-4 *Under 2030 Proposed Project conditions, eight of the freeway study segments would operate worse than LOS E during the westbound AM peak hour, and six segments would operate worse than LOS E during the eastbound PM peak hour. However, all segments would operate at an LOS equal to or better than 2030 No Project conditions. As a result, the Proposed Project would have a beneficial impact on freeway operations compared to the No Project conditions in 2030. (B)*

Under Proposed Project conditions in Year 2030, the same eight segments that operate at unacceptable LOS in the No Project scenario also operate at unacceptable LOS with the Proposed Project in the AM peak hour. During the PM peak hour, six of the segments operate at unacceptable levels under Proposed Project conditions in Year 2030. However, these same six segments would also operate at unacceptable levels under No Project conditions. Most of the remaining segments show improvement in operating LOS compared to No Project conditions for both AM and PM peak hours. The freeway segment operating conditions are summarized in Table 3.2-22 (AM peak) and Table 3.2-23 (PM peak). Based on the standards of significance, the Proposed Project would not result in freeway impacts in the Year 2030, since freeway operations would be the same or better compared to No Project conditions. In



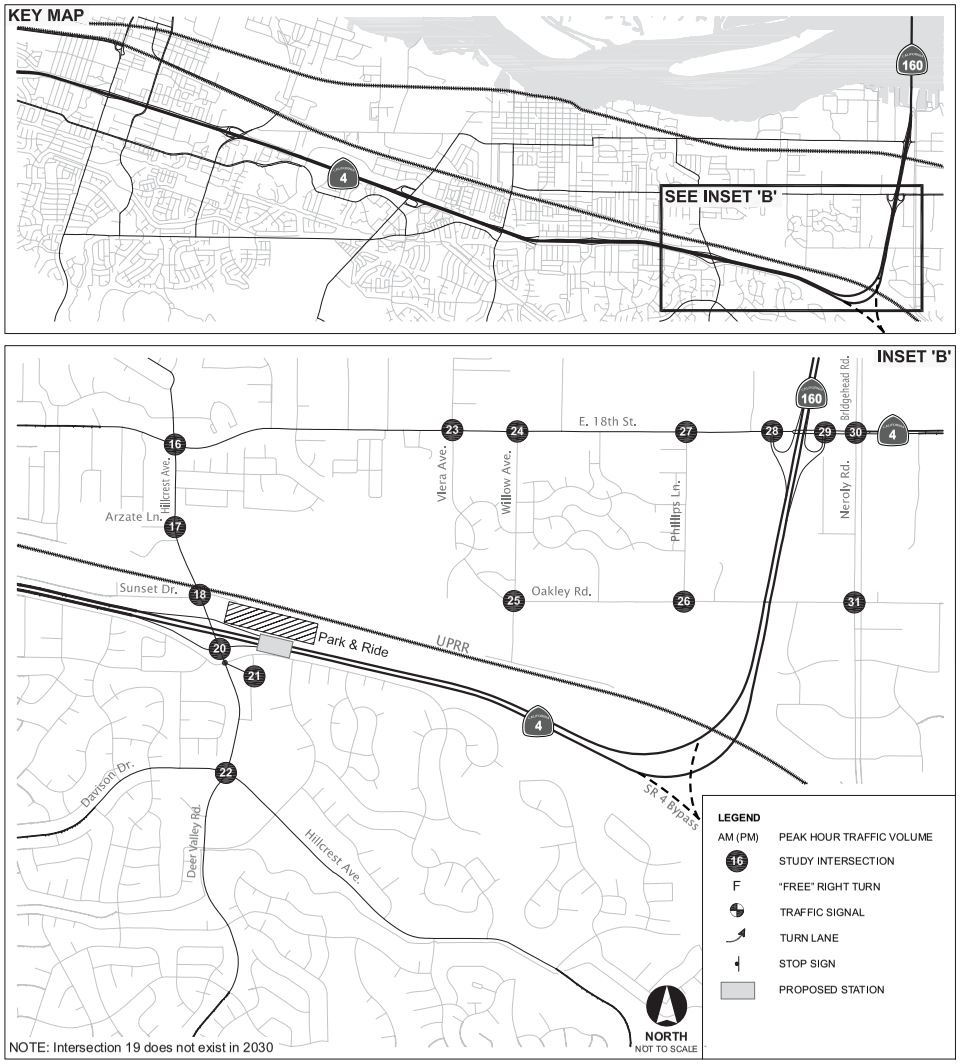




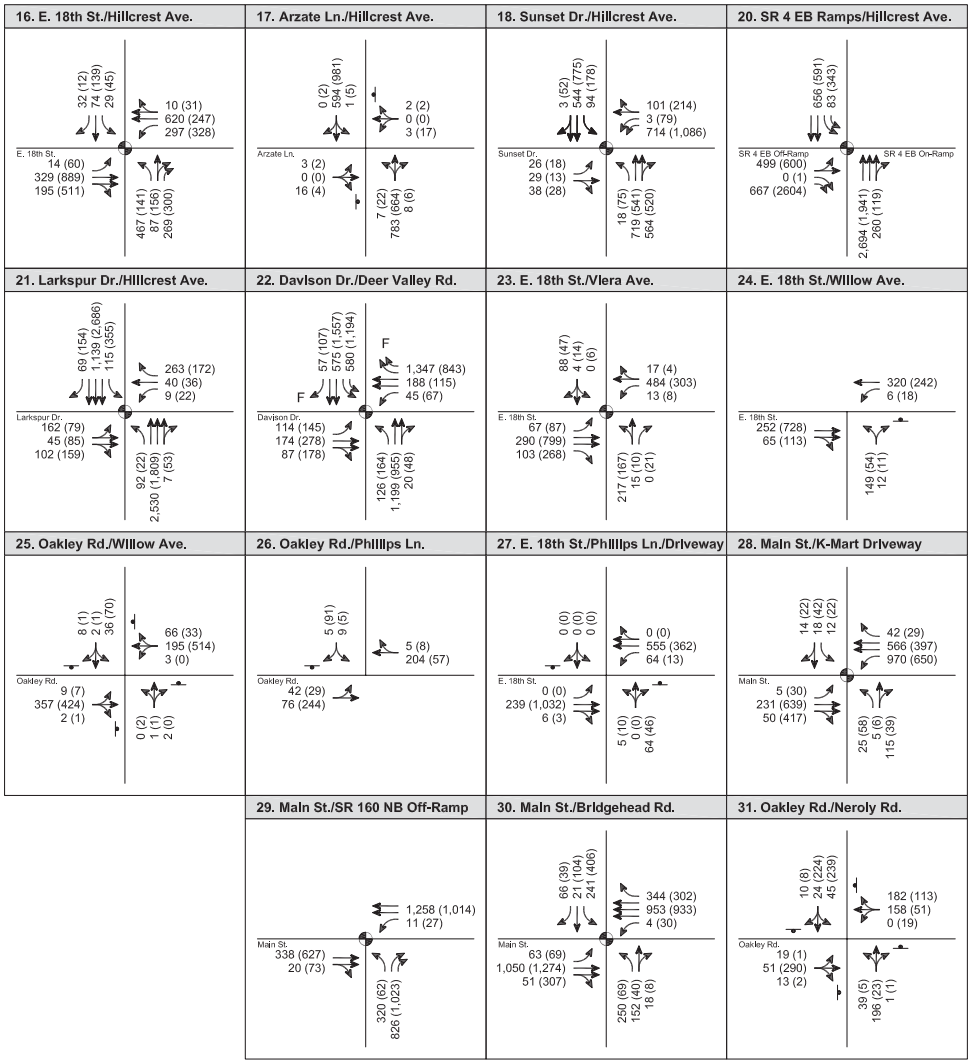
Source: WSA, 2008.

RAILROAD AVENUE STATION AREA INTERSECTIONS - 2030 PROPOSED PROJECT CONDITIONS

FIGURE 3.2-17



Source: WSA, 2008.



HILLCREST AVENUE STATION AREA INTERSECTIONS - 2030 PROPOSED PROJECT CONDITIONS

FIGURE 3.2-18

Table 3.2-18
2030 AM Peak Hour Intersection Operations with and without the Proposed Project

		Existing Conditions			2030 No Project			2030 Proposed Project		
#	Intersection	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue – W.17th Street/Davi Avenue		7.8	A		27.2	D		19.7	C
2	Power Avenue/Davi Avenue	0.05 (SB)	12.1 (SB)	B	0.44	12.4	B		11.5	B
3	Railroad Avenue/Civic Avenue	0.46	15.7	B	0.85	43.2	D	0.74	31.9	C
4	Railroad Avenue/Center Drive	0.59 (EB)	27.3 (EB)	D	Not present in future			Not present in future		
5	Railroad Avenue/SR 4 Westbound On-Ramp	**1.2**	**>80**	**F**	**1.33**	**>80**	**F**	1.05	45	D
6	Railroad Avenue/SR 4 Eastbound Ramps	0.66	17.3	B	0.85	21.4	C	0.75	21.3	C
7	Railroad Avenue/Bliss Avenue	0.55	15.3	B	0.94	23.7	C	0.69	18.7	B
8	Railroad Avenue/Leland Road	0.8	33.7	C	0.93	55.6	E	0.9	45	D
9	Leland Road/Harbor Street	0.76	33.6	C	**1.15**	**>80**	**F**	0.91	40.8	D
10	Leland Road/Freed Avenue	0.31 (SB)	42.1 (SB)	E	**3.18**	**>50 (SB)**	**F**	**1.41 (SB)**	**>50 (SB)**	**F**
11	Leland Road/Loveridge Road	0.67	34.8	C	0.75	42.6	D	0.7	40.6	D
12	Loveridge Road/SR 4 Eastbound Ramps	0.53	15	B	0.77	13.2	B	0.64	10.2	B
13	California Avenue/SR 4 Westbound Ramps	0.56	27.3	C	0.81	36.1	D	0.71	20.5	C
14	Harbor Street/California Avenue	0.64	30.9	C	**1.09**	**>80**	**F**	0.83	41.4	D
15	Harbor Street/Bliss Avenue	**2.04 (EB)**	**>50 (EB)**	**F**	1.05	47.1	D	0.63	9.6	A
16	Hillcrest Avenue/E. 18th Street	0.8	43.8	D	**0.93**	**60.2**	**E**	0.9	47.7	D
17	Hillcrest Avenue/Arzate Lane – PG&E Service Center Driveway.	0.05 (WB)	17.4 (WB)	C	0.03 (WB)	12.4 (WB)	B	0.09 (EB)	11.7 (EB)	B
18	Sunset Drive/Hillcrest Avenue	0.5	21	C	0.78	31.7	C	0.87	32.3	C

Table 3.2-18
2030 AM Peak Hour Intersection Operations with and without the Proposed Project

		Existing Conditions			2030 No Project			2030 Proposed Project		
#	Intersection	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
19	SR 4 Westbound Ramps/Hillcrest Avenue	0.96	32.3	C	Not present in future			Not present in future		
20	SR 4 Eastbound Ramps/Hillcrest Avenue	0.98	26.5	C	1.04	52.8	D	**1.12**	**56**	**E**
21	Larkspur Drive/Hillcrest Avenue	0.79	26.4	C	**1.09**	**67.1**	**E**	**1.04**	**63.4**	**E**
22	Davison Drive/Hillcrest Avenue – Deer Valley Road	0.89	43.7	D	**1.15**	**>80**	**F**	**1.15**	**>80**	**F**
23	E. 18th Street/Viera Avenue	**0.95**	**63.3**	**E**	0.85	47.1	D	0.85	44.9	D
24	E. 18th Street/Willow Avenue	0.64 (NB)	32.7 (NB)	D	0.54 (NB)	26.1 (NB)	D	0.54 (NB)	25.1 (NB)	D
25	Oakley Road/Willow Avenue		9.6	A		14.2	B		14.3	B
26	Phillips Lane/Oakley Road	0.06 (SB)	11.7 (SB)	B	0.05 (SB)	10.9 (SB)	B	0.04 (SB)	11.0 (SB)	B
27	E. 18th Street/Phillips Lane – Dirt Driveway	0.02 (NB)	12.5 (NB)	B	0.09 (NB)	10.4 (NB)	B	0.14 (NB)	10.5 (NB)	B
28	SR 4 WB Ramps– K-Mart Driveway/Main Street	**0.88**	**76.5**	**E**	0.84	26	C	0.76	18.8	B
29	Main Street/SR 160 Northbound Ramps	0.62	11.7	B	0.73	19.3	B	0.67	21.8	C
30	Main Street/Neroly Road – Bridgehead Road	0.86	36.6	D	0.79	42	D	0.77	36.4	D
31	Oakley Road/Neroly Road		**>50**	**F**		15.6	C		12.1	B

Source: Wilbur Smith Associates, December 2007.

Notes:

Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldfaced type indicates unacceptable values.

Table 3.2-19
2030 PM Peak Hour Intersection Operations with and without the Proposed Project

#	Intersection	Existing Conditions			2030 No Project			2030 Proposed Project		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue – W.17th Street/Davi Avenue		8.2	A		32.4	D		17	C
2	Power Avenue/Davi Avenue	0.11 (SB)	13.5 (SB)	B	0.38	11	B		10.3	B
3	Railroad Avenue/Civic Avenue	0.38	13.8	B	0.74	26.4	C	0.62	25.3	C
4	Railroad Avenue/Center Drive	0.87 (EB)	34.6 (EB)	D	Not present in future			Not present in future		
5	Railroad Avenue/SR 4 Westbound On-Ramp	0.65	16.6	B	0.9	24.2	C	0.7	18.5	B
6	Railroad Avenue/SR 4 Eastbound Ramps	**1.08**	**52.2**	**D**	**1.11**	**56.4**	**E**	0.99	32	C
7	Railroad Avenue/Bliss Avenue	0.73	18.1	B	0.93	30.1	C	0.93	33.1	C
8	Railroad Avenue/Leland Road	0.97	48.2	D	**1.27**	**>80**	**F**	1.15	67.8	E
9	Leland Road/Harbor Street	0.88	42.8	D	**1.03**	**71.7**	**E**	0.91	41	D
10	Leland Road/Freed Avenue	**0.94 (NB)**	**>50 (NB)**	**F**	**7.38**	**>50 (NB)**	**F**	**2.65 (NB)**	**>50 (NB)**	**F**
11	Leland Road/Loveridge Road	0.77	31.2	C	0.71	32.8	C	0.59	26.7	C
12	Loveridge Road/SR 4 Eastbound Ramps	0.59	9.8	A	0.71	7.2	A	0.47	8.9	A
13	California Avenue/SR 4 Westbound Ramps	**0.85**	**49.1**	**D**	**1.24**	**>80**	**F**	**1.10**	**77.9**	**E**
14	Harbor Street/California Avenue	0.82	35.5	D	**1.3**	**>80**	**F**	**1.09**	**73.9**	**E**
15	Harbor Street/Bliss Avenue	**2.05 (EB)**	**>50 (EB)**	**F**	0.7	17.3	B	0.51	15.3	B
16	Hillcrest Avenue/E. 18th Street	0.87	49.6	D	**0.99**	**72.9**	**E**	**1.00**	**73.7**	**E**
17	Hillcrest Avenue/Arzate Lane – PG&E Service Center Driveway.	0.01 (EB)	16.9 (EB)	C	**0.19**	**19.5 (WB)**	**C**	0.18 (WB)	19.0 (WB)	C
18	Sunset Drive/Hillcrest Avenue	0.51	24.5	C	0.88	40.6	D	**1.11**	**>80**	**F**
19	SR 4 Westbound Ramps/Hillcrest Avenue	0.88	16.7	B	Not present in future			Not present in future		
20	SR 4 Eastbound Ramps/Hillcrest Avenue	**1.17**	**68.3**	**E**	**1.64**	**>80**	**F**	**1.72**	**>80**	**F**
21	Larkspur Drive/Hillcrest Avenue	0.86	46.7	D	0.9	38.4	D	0.85	33.5	C

Table 3.2-19
2030 PM Peak Hour Intersection Operations with and without the Proposed Project

#	Intersection	Existing Conditions			2030 No Project			2030 Proposed Project		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
22	Davison Drive/Hillcrest Avenue – Deer Valley Road	0.86	45.4	D	**0.98**	**67**	**E**	**0.92**	**55.6**	**E**
23	E. 18th Street/Viera Avenue	0.54	18.4	B	0.57	18.2	B	0.57	17.2	B
24	E. 18th Street/Willow Avenue	0.35 (NB)	25.5 (NB)	D	0.25	22.0 (NB)	C	0.29 (NB)	23.0 (NB)	C
25	Oakley Road/Willow Avenue		8.5	A		29.6	D		34.8	D
26	Phillips Lane/Oakley Road	0.09 (SB)	11.6 (SB)	B	0.15 (SB)	9.4 (SB)	A	0.13 (SB)	9.3 (SB)	A
27	E. 18th Street/Phillips Lane – Dirt Driveway.	0.05 (NB)	11.4 (NB)	B	0.20 (NB)	26.4 (NB)	D	0.29 (NB)	23.6 (NB)	C
28	SR 4 Westbound Ramps– K-Mart Driveway/Main Street	**0.84**	**38.3**	**D**	0.8	36.7	D	0.85	32.2	C
29	Main Street/SR 160 Northbound Ramps	0.93	32.8	C	0.76	35.7	D	0.66	18.4	B
30	Main Street/Neroly Road – Bridgehead Road	**1.26**	**>80**	**F**	0.93	50.6	D	0.88	48.8	D
31	Oakley Road/Neroly Road		**>50**	**F**		24.6	C		23.2	C

Source: Wilbur Smith Associates, December 2007.

Notes::

Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldfaced type indicates unacceptable values.

Table 3.2-20
2015 AM Peak Freeway Segment Operations with and without the Proposed Project

Segment	Existing				No Project				Proposed Project			
	Eastbound		Westbound		Eastbound		Westbound		Eastbound		Westbound	
	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS
West of Bailey Road	15.1	B	33.4	D	19.7	C	**> 45**	**F**	19.5	C	**> 45**	**F**
Bailey Road – Railroad Avenue	19.3	C	35.6	E	22.5	C	**> 45**	**F**	22.5	C	**> 45**	**F**
Railroad Avenue – Loveridge Road	28.9	D	38.7	E	20.4	C	**> 45**	**F**	20.0	C	40.0	E
Loveridge Road – Somersville Road	27.0	D	42.8	E	20.1	C	**> 45**	**F**	19.5	C	39.3	E
Somersville Road – L Street	27.0	D	31.0	D	20.6	C	**> 45**	**F**	19.3	C	42.7	E
L Street – A Street[a]	27.0 23.1	D C	31.0 23.8	D C	20.6	C	**> 45**	**F**	19.1	C	38.0	E
A Street – Hillcrest Avenue	19.6	C	25.4	C	16.7	B	30.3	D	16.0	B	27.4	D
Hillcrest Avenue – SR 160	Not Present in Existing Conditions				12.7	B	25.1	C	12.0	B	23.5	C
SR 160 – Laurel Road[b]					13.4	B	21.5	C	12.8	B	20.0	C
Laurel Road – Lone Tree Way[b]					13.9	B	22.9	C	13.0	B	21.6	C
SR 4 Ramp – 18th Street					8.8	A	19.4	C	8.3	A	18.7	C

Source: Wilbur Smith Associates, April 2008.

Notes:

Boldfaced type indicates unacceptable values

a. G Street Ramp not present in future

b. HOV lane not present

Table 3.2-21
2015 PM Peak Freeway Segment Operations with and without the Proposed Project

Segment	Existing				No Project				Proposed Project			
	Eastbound		Westbound		Eastbound		Westbound		Eastbound		Westbound	
	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS
West of Bailey Road	33.3	D	17.3	B	**> 45**	**F**	22.2	C	43.0	E	22.2	C
Bailey Road – Railroad Avenue	38.3	E	21.9	C	44.6	E	23.7	C	34.7	D	23.7	C
Railroad Avenue – Loveridge Road	**> 45**	**F**	33.8	D	37.7	E	26.8	D	30.4	D	26.7	D
Loveridge Road – Somersville Road	**> 45**	**F**	34.1	D	41.3	E	28.6	D	32.6	D	28.0	D
Somersville Road – L Street	**> 45**	**F**	35.9	E	39.0	E	27.5	D	32.7	D	26.7	D
L Street – A Street[a]	**> 45**	**F**	33.4	D	36.6	E	28.5	D	31.3	D	27.7	D
	> 45	**F**	30.7	D								
A Street – Hillcrest Avenue	**> 45**	**F**	25.4	C	25.8	C	24.0	C	23.8	C	23.5	C
Hillcrest Avenue – SR 160	Not Present in Existing Conditions				16.0	B	16.8	B	15.7	B	16.7	B
SR 160 – Laurel Road[b]					12.0	B	15.2	B	11.8	B	14.9	B
Laurel Road – Lone Tree Way[b]					13.1	B	15.0	B	13.0	B	14.8	B
SR 4 Ramp – 18th Street					15.6	B	13.3	B	15.3	B	12.7	B

Source: Wilbur Smith Associates, April 2008.

Notes:

Boldfaced type indicates unacceptable values

a. G Street Ramp not present in future

b. HOV lane not present

Table 3.2-22
2030 AM Peak Freeway Segment Operations with and without the Proposed Project

Segment	Existing				No Project				Proposed Project			
	Eastbound		Westbound		Eastbound		Westbound		Eastbound		Westbound	
	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS
West of Bailey Road	15.1	B	33.4	D	22.9	C	**> 45**	**F**	22.8	C	**> 45**	**F**
Bailey Road – Range Road	19.3	C	35.6	E	26.7	D	**> 45**	**F**	26.6	D	**> 45**	**F**
Range Road – Railroad Avenue					26.7	D	**> 45**	**F**	26.4	D	**> 45**	**F**
Railroad Avenue – Loveridge Road	28.9	D	38.7	E	25.4	C	**> 45**	**F**	24.6	C	**> 45**	**F**
Loveridge Road – Somersville Road	27.0	D	42.8	E	25.4	C	**> 45**	**F**	23.7	C	**> 45**	**F**
Somersville Road – L Street	27.0	D	31.0	D	25.9	C	**> 45**	**F**	24.1	C	**> 45**	**F**
L Street – A Street[a]	27.0 23.1	D C	31.0 23.8	D C	26.1	D	**> 45**	**F**	24.1	C	**> 45**	**F**
A Street – Hillcrest Avenue	19.6	C	25.4	C	21.0	C	**> 45**	**F**	19.6	C	**> 45**	**F**
Hillcrest Avenue – SR 160	Not Present in Existing Conditions				16.3	B	32.6	D	15.7	B	29.7	D
SR 160 – Laurel Road[b]					17.5	B	33.5	D	17.1	B	32.4	D
Laurel Road – Lone Tree Way[b]					17.4	B	37.0	E	16.9	B	35.1	E
SR 4 Ramp – 18th Street					24.5	C	21.7	C	23.1	C	19.2	C

Source: Wilbur Smith Associates, March 2008.

Notes:

Boldfaced type indicates unacceptable values

a. G Street Ramp not present in future

b. HOV lane not present

Table 3.2-23
2030 PM Peak Freeway Segment Operations with and without the Proposed Project

Segment	Existing				No Project				Proposed Project			
	Eastbound		Westbound		Eastbound		Westbound		Eastbound		Westbound	
	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS
West of Bailey Road	33.3	D	17.3	B	**> 45**	**F**	24.7	C	**> 45**	**F**	24.2	C
Bailey Road – Range Road	38.3	E	21.9	C	**> 45**	**F**	27.1	D	**> 45**	**F**	27.0	D
Range Road – Railroad Avenue	**> 45**	**F**	33.8	D	**> 45**	**F**	26.6	D	**> 45**	**F**	26.3	D
Railroad Avenue – Loveridge Road	**> 45**	**F**	34.1	D	**> 45**	**F**	30.8	D	**> 45**	**F**	29.5	D
Loveridge Road – Somersville Road	**> 45**	**F**	35.9	E	**> 45**	**F**	32.8	D	**> 45**	**F**	31.4	D
Somersville Road – L Street	**> 45**	**F**	33.4	D	**> 45**	**F**	32.4	D	41.6	E	30.2	D
L Street – A Street[a]	**> 45** **> 45**	**F** **F**	30.7 25.4	D C	**> 45**	**F**	36.4	E	**> 45**	**F**	35.6	E
A Street – Hillcrest Avenue	33.3	D	17.3	B	37.6	E	30.5	D	30.9	D	29.5	D
Hillcrest Avenue – SR 160	Not Present in Existing Conditions				14.2	B	18.4	C	16.9	B	18.8	C
SR 160 – Laurel Road[b]					19.3	C	21.0	C	18.8	C	19.8	C
Laurel Road – Lone Tree Way[b]					21.1	C	19.5	C	20.7	C	19.4	C
SR 4 Ramp – 18th Street					21.3	C	27.2	D	19.0	C	25.3	C

Source: Wilbur Smith Associates, March 2008.

Notes:

Boldfaced type indicates unacceptable values

a. G Street Ramp not present in future

b. HOV lane not present

fact, because some segments would operate better than under No Project conditions, the Proposed Project would have a beneficial effect on freeway operations in 2030. The improvement in LOS would occur because trips on SR 4 would be diverted to the new transit service offered by the Proposed Project.

Impact TR-5 *The projected 2030 BART ridership with the Proposed Project would not exceed the practical capacity of the Concord Line, between Pittsburg/Bay Point and SFO, which is expected to carry the greatest number of riders from the Proposed Project. (LTS)*

To estimate future demands on BART capacity, the number of passengers on a given train at specific points in time (known as line loads) were calculated using system ridership projections without the Proposed Project. Line loads refer to the number of passengers on a given train at specific points in time. Table 3.2-24 presents trips during the AM peak hour along the Concord Line in the westbound direction, which runs from Pittsburg/Bay Point to Daly City; Table 3.2-25 shows the PM peak hour trips in the opposite direction (from Daly City to Pittsburg/Bay Point). It should be noted that as of January 2008, the Concord Line runs past Daly City to SFO. Both tables show the future condition of the system in 2030 and compare the ridership levels for the No Project and Proposed Project scenarios. In the year 2030 it was assumed that there would be ten trains, each ten cars in length, during the peak hour in the peak direction on the Concord Line. This assumption is based on a system total of 31 trains per hour in the peak direction in the Transbay Tube which is considered the current maximum number of trains that the Transbay Tube can accommodate.

According to Table 3.2-24, the maximum load point for the morning commute would be between the 19th and 12th Street/Oakland Stations, while Table 3.2-25 shows the segment between West Oakland Station and the 12th Street/Oakland Station as the highest load point for the afternoon commute. The Proposed Project would increase the ridership by 557 passengers during the AM peak hour in Downtown Oakland, or a roughly 5 percent increase in total ridership during peak hour. Figure 3.2-19 and Figure 3.2-20 show the difference between No Project and Proposed Project scenarios in the average train load and the number of passengers boarding/alighting at each station. These figures reflect the additional passengers that would result from the Proposed Project.

Additionally, these figures show that most of the new riders would board and/or alight in the Downtown Oakland area, including the MacArthur, 19th Street/Oakland, and 12th Street/Oakland City Center Stations, and in the San Francisco Financial District, including the Embarcadero and Montgomery Street Stations. As expected, the average train load would be higher at the

Table 3.2-24
2030 Westbound AM Peak BART Line Load with and without the Proposed Project

	2030 No Project					2030 Proposed Project				
Station	Hourly Boarding	Arriving Train Load	Hourly Alighting	Headway (min)	Average Load per Train[a]	Hourly Boarding	Arriving Train Load	Hourly Alighting	Headway (min)	Average Load per Train[a]
Pittsburg/Bay Point	1,934	0	0	10.0	0	2,627	0	0	10.0	0
North Concord/Martinez	639	1,934	18	10.0	322	639	2,627	26	10.0	438
Concord	1,639	2,556	153	10.0	426	1,639	3,239	187	10.0	540
Pleasant Hill	2,319	4,041	80	6.0	404	2,319	4,691	87	6.0	469
Walnut Creek	1,567	6,280	197	6.0	628	1,567	6,923	217	6.0	692
Lafayette	785	7,649	81	6.0	765	785	8,272	82	6.0	827
Orinda	806	8,353	51	6.0	835	806	8,975	52	6.0	898
Rockridge	1,191	9,107	109	6.0	911	1,191	9,729	110	6.0	973
MacArthur	1,299	10,188	769	6.0	1019	1,299	10,810	834	6.0	1081
19th Street/Oakland	**362**	**10,718**	**791**	6.0	1072	**362**	**11,275**	**864**	6.0	1128
12th Street/Oakland City Center	366	10,289	935	6.0	1029	366	10,774	1,012	6.0	1077
West Oakland	458	9,720	21	6.0	972	458	10,128	21	6.0	1013
Embarcadero	75	10,158	3,821	6.0	1016	75	10,565	3,929	6.0	1056
Montgomery St.	68	6,413	3,113	6.0	641	68	6,711	3,294	6.0	671
Powell St.	123	3,368	892	9.2	518	123	3,485	919	9.2	536
Civic Center	103	2,599	1,305	9.2	400	103	2,689	1,347	9.2	414
16th Street Mission	44	1,397	294	9.2	215	44	1,445	303	9.2	222
24th Street Mission	57	1,147	228	9.2	176	57	1,186	229	9.2	182
Glen Park	11	977	72	9.2	150	11	1,015	73	9.2	156
Balboa Park	2	915	701	9.2	141	2	953	732	9.2	147
Daly City	0	217	217	9.2	33	0	224	224	9.2	34

Source: Wilbur Smith Associates, February 2008.
Notes:
Boldfaced type indicates unacceptable values
a. The average train loads decrease west of the Concord Station because additional trains are put into service here.

Table 3.2-25
2030 Eastbound PM Peak BART Line Load with and without the Proposed Project

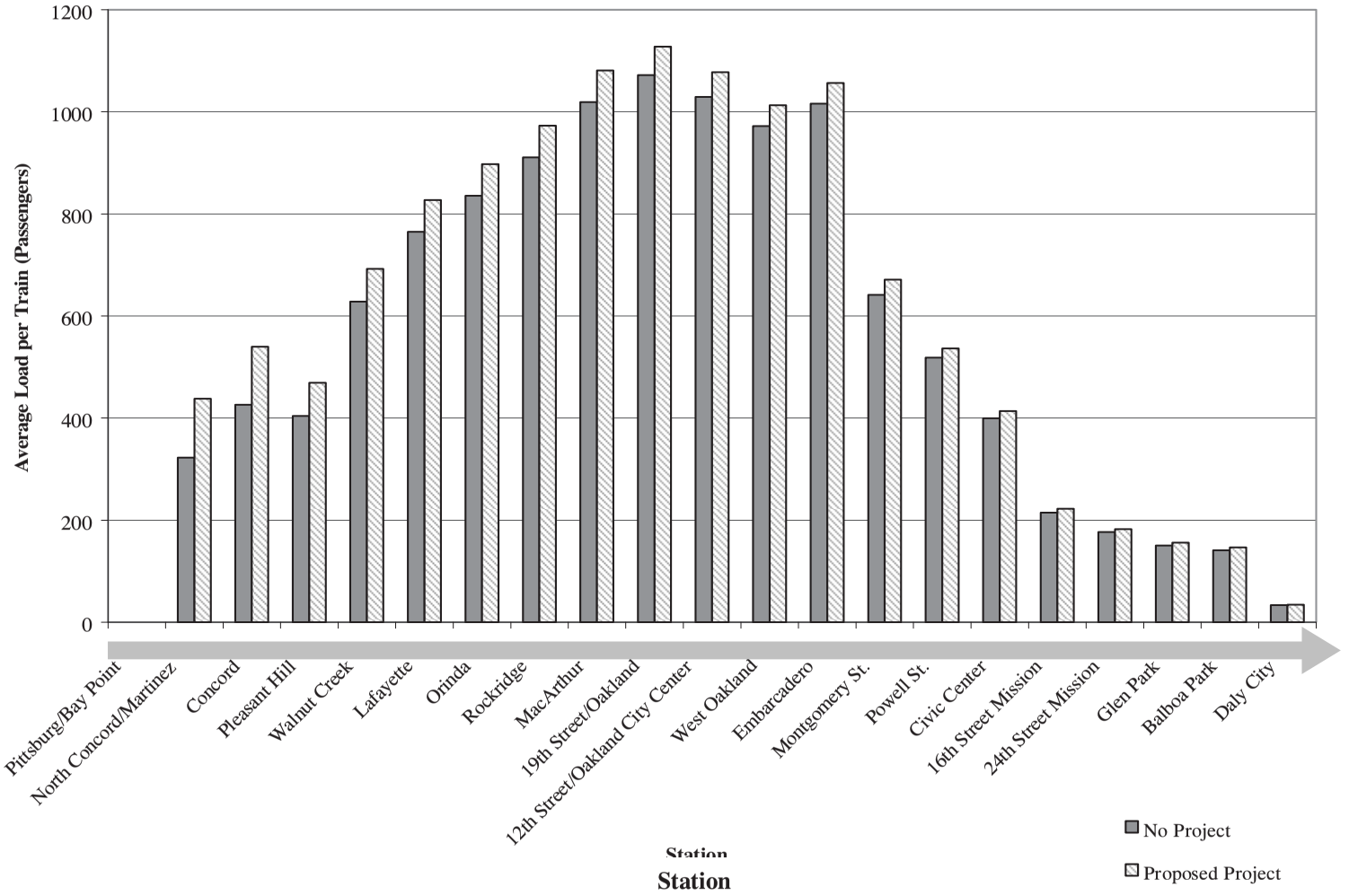
	2030 No Project					2030 Proposed Project				
Station	Hourly Boarding	Arriving Train Load	Hourly Alighting	Headway (min)	Average Load per Train[a]	Hourly Boarding	Arriving Train Load	Hourly Alighting	Headway (min)	Average Load per Train[a]
Pittsburg/Bay Point	0	2,022	2,022	10.0	337	0	2,714	2,714	10.0	452
North Concord/Martinez	25	2,564	568	10.0	427	34	3,248	568	10.0	541
Concord	120	3,931	1,487	10.0	655	153	4,581	1,487	10.0	764
Pleasant Hill	78	5,881	2,028	6.0	588	86	6,524	2,028	6.0	652
Walnut Creek	182	7,121	1,422	6.0	712	202	7,743	1,422	6.0	774
Lafayette	52	7,942	874	6.0	794	53	8,564	874	6.0	856
Orinda	41	8,734	833	6.0	873	41	9,356	833	6.0	936
Rockridge	112	10,058	1,436	6.0	1006	112	10,680	1,436	6.0	1068
MacArthur	469	10,123	534	6.0	1012	510	10,704	534	6.0	1070
19th Street/Oakland	669	9,783	329	6.0	978	742	10,291	329	6.0	1029
12th Street/Oakland City Center	1,118	11,206	2,542	6.0	1121	1,228	11,604	2,542	6.0	1160
West Oakland	**38**	**11,519**	**351**	6.0	1152	**39**	**11,916**	**351**	6.0	1192
Embarcadero	3,852	7,732	65	6.0	773	3,960	8,021	65	6.0	802
Montgomery St.	3,815	4,023	106	6.0	402	3,997	4,130	106	6.0	413
Powell St.	1,352	2,812	141	9.2	433	1,379	2,892	141	9.2	445
Civic Center	1,503	1,398	89	9.2	215	1,545	1,436	89	9.2	221
16th Street Mission	357	1,079	37	9.2	166	365	1,108	37	9.2	171
24th Street Mission	321	799	41	9.2	123	322	827	41	9.2	127
Glen Park	116	690	7	9.2	106	116	719	7	9.2	111
Balboa Park	483	210	2	9.2	32	504	217	2	9.2	33
Daly City	210	0	0	9.2	0	217	0	0	9.2	0

Source: Wilbur Smith Associates, February 2008.
Notes:

Boldfaced type indicates unacceptable values

a. The average train loads decrease west of the Concord station because additional trains are put into service here.

Figure 3.2-19 2030 Westbound AM Peak BART Ridership on Concord Line (Arriving Train Load)[a]

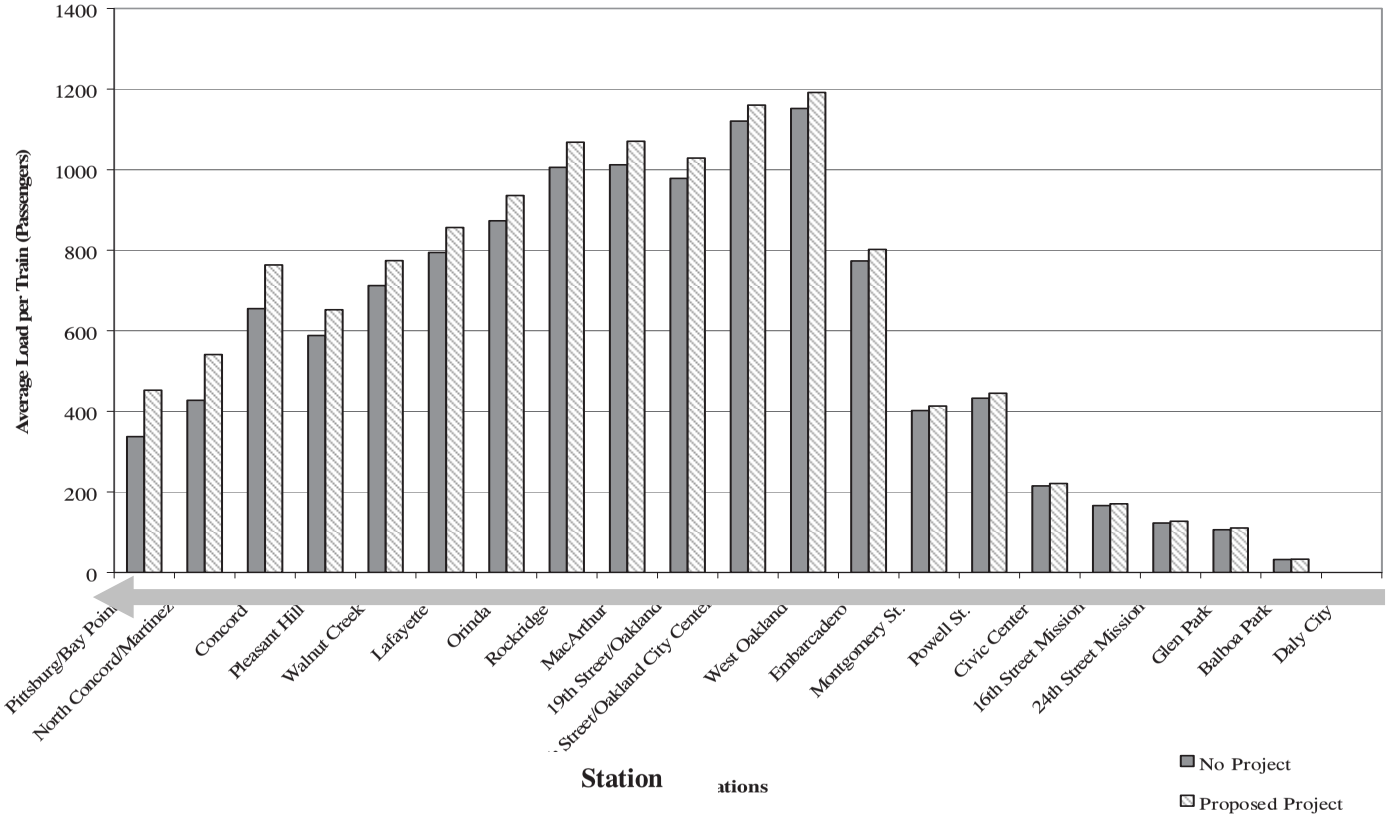


Source: Wilbur Smith Associates, 2008.

Note:

a. The average train loads decrease west of the Concord station because additional trains are put into service here.

Figure 3.2-20 2030 Eastbound PM Peak BART Ridership on Concord Line (Arriving Train Load)[a]



Source: Wilbur Smith Associates, 2008.

Note:
a. The average train loads decrease west of the Concord station because additional trains are put into service here.

Pittsburg/Bay Point Transfer Platform, because it is at the beginning of the Concord Line.

In order to compute the load factor on the trains, the peak hour average passenger load per train was compared to the peak hour seated capacity. BART's operations staff have determined that an average load of 112 passengers per car represents a realistic measure of practical train capacity. While loads higher than 112 passengers per car are possible and are a regular occurrence on BART, sustained loads above this level have been observed to result in serious delays in passenger boarding and alighting. These loading delays affect overall train schedule adherence by interfering with the on-time performance of the BART system and result in overcrowding and bunching of trains. An average load of 112 passengers per car represents a load factor of 1.67 passengers per seat assuming an average of 67 seats per car.

Table 3.2-26 presents the load factors computed for the AM and PM peak directions with and without the Proposed Project. These estimates assume some improvements in BART system capacity over current service levels. BART is implementing a number of long-term system improvements as outlined below that would reduce the average load factor and improve passenger comfort.

- **Increased Vehicle Fleet** – BART currently does not run full 10 car trains on the Concord Line during the peak periods. Many trains are 8 or 9 cars in length. BART is planning to augment its current fleet with the additional cars needed to provide full 10-car trains. The new vehicle program is underway, and the first vehicles will be delivered in 2016, and the last vehicles will be delivered by 2024. BART currently has 669 vehicles. The new vehicle program will provide 700 vehicles.

  Increased Vehicle Capacity – The new vehicles that will be purchased as part of the above fleet replacement program will be designed to provide increased passenger capacity and reduced passenger boarding and alighting delays. BART is envisioning that the new vehicles will have three sets of doors instead of the current two sets, and that the number of seats will be reduced and the width of the remaining seats will be narrowed to increase passenger capacity and entry/exit flow rates. The actual capacity increase has not been determined yet. However, it is possible to conservatively estimate the increase in vehicle capacity.

- On average, the current BART vehicles have 67 seats and the practical vehicle capacity is considered to be 112 persons per vehicle. Placing a new set of doors on the vehicle will require at a minimum that four seats on

Table 3.2-26
2030 Average Load Factor[a] on BART with and without the Proposed Project

	Westbound AM Peak		Eastbound PM Peak	
	2030 No Project	2030 Proposed Project	2030 No Project	2030 Proposed Project
Pittsburg/Bay Point[b]			0.50	0.68
North Concord/Martinez	0.48	0.65	0.64	0.81
Concord	0.64	0.81	0.98	1.14
Pleasant Hill	0.60	0.70	0.88	0.97
Walnut Creek	0.94	1.03	1.06	1.16
Lafayette	1.14	1.23	1.19	1.28
Orinda	1.25	1.34	1.30	1.40
Rockridge	1.36	1.45	1.50	1.59
MacArthur	1.52	1.61	1.51	1.60
19th Street/Oakland	1.60	1.68	1.46	1.54
12th Street/Oakland City Center	1.54	1.61	1.67	1.73
West Oakland	1.45	1.51	1.72	1.78
Embarcadero	1.52	1.58	1.15	1.20
Montgomery St.	0.96	1.00	0.60	0.62
Powell St.	0.77	0.80	0.65	0.66
Civic Center	0.60	0.62	0.32	0.33
16th Street Mission	0.32	0.33	0.25	0.25
24th Street Mission	0.26	0.27	0.18	0.19
Glen Park	0.22	0.23	0.16	0.17
Balboa Park	0.21	0.22	0.05	0.05
Daly City[b]	0.05	0.05		

Source: Wilbur Smith Associates, April 2008.

Notes:

a. Load Factor is defined as the ratio of passengers carried versus the total passenger seating capacity of the train.

b. The load factor represents the load of the trains arriving at the station. For this reason, there are no loads shown at Pittsburg/Bay Point westbound, and Daly City eastbound.

each side of the car next to the new doors be removed for a total reduction of eight seats per vehicle, resulting in a total of 59 seats in each vehicle. The new open area, including the area vacated by the removed seats, and the more efficient use of the contiguous aisle area would increase the number of passengers that could be accommodated. As a result, a net increase of 12 additional persons per vehicle could be accommodated, increasing the practical capacity of each vehicle to 124 persons. This increases the acceptable load factor to 2.10.

- **Increased Train Frequencies –** The ability to move trains through the Transbay Tube in large part determines the overall capacity of the BART system. Currently, BART is able to move 21 – 22 trains per hour through the tube in the peak direction. Efforts are underway at BART to increase this volume to 31 trains per hour.

As shown in Table 3.2-26, during the AM peak hour, the system would not exceed the practical capacity load factor of 2.10 with a load factor of 1.91 with the proposed project. The highest load factor would occur in the PM peak hour traveling eastbound, when trains departing the Embarcadero under the Proposed Project condition would have an estimated load factor of 2.02, compared to 1.95 for the No Project condition. Thus, the forecast load conditions in the year 2030 would not exceed the load factor of 2.10 which represents practical system capacity and impacts on BART system capacity would be less than significant.

Impact TR-6 Local transit services would not experience decreased service quality or productivity as a result of the Proposed Project. (LTS)

Ridership on buses along or near the project corridor, particularly on express services between the Pittsburg/Bay Point BART Station and the Pittsburg and Antioch Park-and-Ride Lots, are expected to decline as riders shift to the Proposed Project. On the other hand, ridership on feeder routes to the Proposed Project stations is expected to increase. Tri Delta Transit is planning to reconfigure existing routes to provide increased service to the proposed eBART stations in response to this demand. These changes would involve the elimination of existing express bus services on SR 4 between the Pittsburg/Bay Point BART Station and the new Hillcrest Avenue Station. Tri Delta plans to use the buses removed from SR 4 express services to improve bus service to the Railroad Avenue and Hillcrest Avenue Stations, as well as to improve other local transit services. As a result, local transit services, including those routes operated by Tri Delta Transit, would not experience increased ridership exceeding system capacity.

Tri Delta may experience decreased ridership and productivity on those routes which use local streets to provide service in the east-west direction along the SR 4 corridor, due to the higher speed and frequency of the transit service provided by the Proposed Project. This decrease should be offset by increased ridership on those routes which provide access to the Proposed Project and BART. Today many Tri Delta transit routes traverse long distances to provide access to the Pittsburg/Bay Point BART Station. The extension of rail service eastward to Hillcrest Avenue would allow some of these routes to be shortened and simplified. This should result in improved service reliability and schedule adherence. In summary, the changes in Tri Delta Transit operations and utilization with the Proposed Project should not affect the ability of the system to meet it adopted service standards as listed below:

- Schedule Adherence - late service: + 90 percent within 5 minutes of schedule
- Schedule adherence - early service: No bus ahead of schedule
- Productivity (passengers per hour) – minimum 15

The other transit operators providing service in the study area, County Connection and the Rio Vista Delta Breeze Transit, may experience some increases in ridership due to the increased number of transit riders that would be generated by the Proposed Project. These increases should be beneficial to the viability of these services. The Sand Creek Dime-a-Ride Service in Brentwood is not likely to experience any changes in ridership due to the Proposed Project.

Impact TR-7 *Under Proposed Project conditions, a parking shortfall of 65 spaces at the Railroad Avenue Station in Year 2030 would result in a significant impact. (S)*

The parking demand for the Proposed Project was estimated using the projected number of park-and-ride passengers (see Table 3.2-15) and average auto occupancy rates for access to the two stations at Railroad Avenue and Hillcrest Avenue. Table 3.2-27 shows the estimated parking demand for the Proposed Project, along with the planned number of parking spaces at the stations. This parking demand estimate is based on unconstrained travel demand forecasts, without consideration of the number of proposed spaces.

Table 3.2-27
Proposed Project Station Parking Demand, 2015 and 2030

	2015		2030	
	Railroad Avenue	Hillcrest Avenue	Railroad Avenue	Hillcrest Avenue
Park-and-Ride Station Entries	150	977	380	2,542
Auto Occupancy	1.04	1.06	1.04	1.06
Parking Demand	144	922	365	2,398
Parking Supply	300	1,025	300	2,600
Occupancy	48%	89%	122%	92%
Excess Demand	—	—	65	—

Source: Wilbur Smith Associates, 2008.

In Year 2015, when the Proposed Project is planned to open, the parking demand would be satisfied by the proposed number of spaces. The existing park-and-ride lot at Railroad Avenue has 185 spaces but is not fully utilized. In the year of opening, the lot would be configured to provide 300 spaces. The 300 parking spaces at Railroad Avenue are projected to be less than half occupied; whereas the spaces at the Hillcrest Avenue Station would be 89 percent occupied. By Year 2030, parking demand at each station would have grown considerably. There would be a projected shortfall of 65 spaces at the Railroad Avenue Station. This parking deficit would be a significant impact, as motorists who could not find parking spaces in the proposed parking lots would spillover into the neighboring area and increase competition for the parking supply surrounding the station. Other motorists may opt to park at the Pittsburg/Bay Point BART Station rather than compete for the limited available parking in the Railroad Avenue Station area.

The relatively low parking demand at the Railroad Avenue Station is a result of the planned Transit Village proposed by the City of Pittsburg in its Specific Plan for the area, which is expected to generate a smaller proportion of park-and-ride trips to and from the station. The ridership modeling results indicate that the close proximity of the Railroad Avenue Station to the existing Pittsburg/Bay Point BART Station would result in many park-and-ride users deciding to park in the large facilities available at the Pittsburg/Bay Point BART Station and directly board BART. This would be more convenient than attempting to find parking at Railroad Avenue and then boarding the Proposed Project and making a three-minute transfer to BART. The transit-oriented development proposed around the Hillcrest Avenue Station would also reduce parking demand because of the high accessibility to the transit services; however, as the eastern terminus station, the Hillcrest Avenue Station would attract passengers from Antioch, Oakley, Brentwood, and unincorporated areas.

MITIGATION MEASURE. The following measure would reduce the parking shortfall at the Railroad Avenue Station to a less-than-significant level. (LTS)

TR-7.1 Implement parking monitoring program and institute appropriate parking controls if necessary. BART shall institute an annual monitoring program on streets adjacent to the Railroad Avenue Station. A baseline survey of parking conditions in the vicinity of the station will be conducted prior to commencement of Proposed Project operations. The baseline survey will establish parking conditions in the vicinity of the station during the first six months of operation 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. A follow-up survey will occur once a year. BART Community Relations staff will respond to parking complaints and BART would investigate such complaints to verify parking concerns.

If a parking spillover problem is confirmed by this monitoring program, BART staff will assist the City of Pittsburg in implementing a parking management program. The program would incorporate appropriate parking control measures based on BART's Parking Management Toolkit, which is included as Appendix C to this EIR. This 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, all of which have proven effective at existing BART stations. The residents of the area could also utilize the process that is already in place in the City to request implementation of a Residential Permit Parking Zone. The parking management program would be implemented by the City of Pittsburg. BART staff will assist 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.

Impact TR-8 *The Proposed Project would generally not affect existing or planned pedestrian or bicycle circulation or accessibility in the project corridor; however, sidewalks and bicycle lanes at the Hillcrest Avenue/Sunset Drive intersection could be impacted. Accordingly, the Proposed Project would have a potentially significant effect on pedestrians and bicyclists. (PS)*

The Proposed Project alignment, station locations, parking, and maintenance facilities would neither disrupt existing pedestrian or bicycle pathways nor impede the planned improvements identified in Table 3.2-11 and Figure 3.2-8 (Proposed Bicycle Facilities). This includes the Delta De Anza Regional Trail, which crosses the project corridor west of the Proposed Project, and other EBRPD facilities. As a result, the Proposed Project would not adversely affect pedestrian or bicycle travel.

The Proposed Project is expected to generate a significant number of walking and biking trips to and from the stations (see Table 3.2-15). These modes of access to the station are especially notable at the proposed Railroad Avenue Station, which is expected to have 30 percent of the Proposed Project passengers arriving and departing by non-motorized modes. The design of the Railroad Avenue Station recognizes that the sidewalk along the east side of the Railroad Avenue overcrossing of SR 4 is only 5 feet in width. The proposed station design provides additional sidewalk width in the vicinity of the station and avoids construction of physical elements that would reduce the effective width of the existing sidewalk.

The Proposed Project along with the cities of Pittsburg and Antioch that will adopt transit-oriented development plans that specifically call for strong linkages between the surrounding development and the stations are expected to enhance the network of pedestrian and bicycle facilities.

MITIGATION MEASURE. The following measure to be implemented along with Mitigation Measure TR-2.2, which calls for improvements at the Hillcrest Avenue/Sunset Drive intersection, would reduce the pedestrian and bicycle impact at the Hillcrest Avenue Station to a less-than-significant level. (LTS)

TR-8.1 *Construct sidewalks and bicycles lanes along Hillcrest Avenue and Slatten Ranch Road.* For the Hillcrest Avenue Station, the Hillcrest Avenue/Sunset Drive intersection will be improved as required in Mitigation Measure TR-2.2. In addition to the improvements required by TR-2.2, improvements shall include a sidewalk along the east side of Hillcrest Avenue and a southbound bicycle lane in the areas affected by the construction of the other required intersection

improvements. The portion of Slatten Ranch Road to be constructed by BART shall include sidewalks and bicycle lanes.

Construction Impacts

Impact TR-9 *Construction of the Proposed Project would potentially result in significant temporary impacts on SR 4, local streets, and circulation around the proposed station areas. (S)*

Construction activities, duration, and sequencing, as summarized in Section 2.8, Project Description – Construction Scenario, would result in temporary, construction-related traffic impacts, as well as possible impacts to the existing BART system. Construction vehicles and equipment would use SR 4 and local roadways to access construction sites along the project alignment. Trucks and equipment traffic could temporarily disrupt existing local traffic patterns during the construction of the project. Construction traffic would include heavy equipment such as bulldozers, dump trucks, cranes, and excavators. Workers driving to the construction site would also represent additional traffic to the local and regional network.

Construction of station areas would require staging areas that are located on local streets. Four potential construction yards and staging areas have been identified that might be used during project construction. The western yard is on currently vacant land near the Bailey Road overpass. The central yard near Railroad Avenue would be located at a site south of SR 4, in a vacant lot owned by CCTA. The eastern yard would be located at Hillcrest Avenue near the existing parking lot. An additional staging area would be located south of SR 4 adjacent to the east side of Pittsburg/Bay Point BART Station parking lot, in a vacant lot. During Construction Phase 1a, the first two construction staging areas mentioned above would be used for approximately a 24-month period. About 7,620 truckloads of ballast, sub-ballast, and cast-in-concrete concrete are projected to be transported during this construction phase. During Construction Phase 1b, the central and eastern yards would be used for approximately a 24-month period. About 13,400 truckloads are estimated for this phase. These trucks would use SR 4 and local streets to access the staging areas, adding to existing congestion and vehicular delays.

The project alignment would allow much of the construction activity to occur within the SR 4 median, with direct access to the construction site provided by the westbound and eastbound interior lanes through openings made in the concrete traffic barriers. However, temporary lane closures would be required for delivery and haul truck access. Depending on the locations and times of day of lane closures, disruption to regular traffic circulation could be significant. Lane closures may also be necessary along Railroad Avenue and

Hillcrest Avenue for certain construction activities and material deliveries. The overpass walkway along Railroad Avenue would need to be closed occasionally during station construction, although this would be done on only one side at a time and for brief periods of time.

MITIGATION MEASURE. The following measure would reduce construction-related traffic impacts to less than significant. (LTS)

TR-9.1 Develop and implement a Construction Phasing and Traffic Management Plan. BART will ensure that a Construction Phasing and Traffic Management Plan is developed and implemented by the contractor. The plan shall define how traffic operations, including construction equipment and worker traffic, are managed and maintained during each phase of construction. The plan shall be developed in consultation with the cities of Pittsburg and Antioch, BART, Caltrans, CCTA, and local transit providers, including Tri Delta Transit. The contractor shall also consult with Caltrans and the highway patrol in the development of the plan in order to address any issues and minimize disruption to the flow of traffic along SR 4. This plan shall also be coordinated with plans to maintain access and parking for adjacent businesses and residences that may be affected. To the maximum practical extent, the plan shall include the following measures:

a) Specify predetermined haul routes from staging areas to construction sites and disposal areas by agreement with the cities of Pittsburg and Antioch prior to construction. The routes shall follow streets and highways that provide the safest route and have the least possible impact on traffic.

b) Identify construction activities that, due to concerns regarding traffic safety or congestion, must take place during off-peak hours.

c) Provide a plan for lane closures along Railroad Avenue, Hillcrest Avenue, and SR 4, and require information be provided to the public on lane closures using signs, press releases, and other media tools.

d) Identify a telephone number that the public can call for information on construction scheduling, phasing, and duration, as well as for complaints. Such information shall also be posted on BART's website.

e) Provide safe access and circulation routes for vehicles, bicycles, pedestrians, and emergency response vehicles during construction of the Pittsburg/Bay Point Transfer Platform and the Railroad Avenue and Hillcrest Avenue Stations.

f) Provide parking replacement where construction results in temporary displacement of parking.

Impact TR-10 Construction of the Proposed Project would potentially result in significant impacts on Tri Delta Transit services around the proposed station areas. (S)

Construction activities as described in Impact TR-9 above could interfere with Tri Delta Transit bus routes, as local streets used by Tri Delta Transit buses may be closed temporarily; delivery trucks and construction crews would increase traffic volumes on local roads that could disrupt bus service frequency and scheduling; and bus stops may need to be temporarily relocated. The impacts would have a potentially significant temporary effect on Tri Delta Transit service and ridership.

MITIGATION MEASURE. The following measure would reduce construction-related impacts on local transit to less than significant. (LTS)

TR-10.1 Plan, schedule, and coordinate construction activities to reduce effects on local transit bus lines. BART shall ensure that the Construction Phasing and Traffic Management Plan, developed under Mitigation Measure TR-9.1, includes consultation with Tri Delta Transit. The Plan shall include specific measures to minimize possible detour and other impacts on Tri Delta Transit service resulting from Proposed Project construction-related activities. These measures shall limit, to the maximum extent possible, rerouting of bus routes and changes to bus stops. Any proposed changes to routes, service, and other operations shall be announced to the public using signs, press releases, on-bus posters, and other media tools.

Impact TR-11 Construction of the Proposed Project would result in less-than-significant impacts on the existing BART system. (LTS)

Construction of the Pittsburg/Bay Point Transfer Platform has been designed to avoid interference with current BART operations. However, the existing tailtracks at the station, which provide train storage and maintenance space, would not be available for use during construction. BART would temporarily move these operations to the Concord Maintenance Yard until the construction of the station has been completed. No new storage facilities would be required.

Hillcrest Avenue Station Options Analysis

The operational and construction impacts of the Hillcrest Avenue Station options would be the same as described for the Proposed Project. The projected transit ridership and the mode of access would not vary substantially by station option, since assumptions and inputs to the regional travel demand model would not be different. Additionally, the impacts on Tri Delta Transit, pedestrian and bicyclists, and the BART system would be the same as described for the Proposed Project.

The primary difference from the Proposed Project lies in the amount of development anticipated in the station area and thus the traffic-related impacts on streets and intersections in the vicinity of the Hillcrest Avenue Station. The traffic impact analysis performed for the Median Station (the Proposed Project) was based upon maximum projected development in the Hillcrest Avenue Station area using ABAG Projections 2003 for the Year 2030 with adjustments that have been approved by the local jurisdictions to better represent actual development plans. Table 3.2-28 shows the amount of new housing and employment expected for each of the Hillcrest Avenue Station options based on preliminary forecasts developed by the City of Antioch as part of the Ridership Development Plan. Future development in 2030 for the Median Station, the Northside West Station option, and the Median Station East option is expected to be similar, so that the transportation impacts identified for the Median Station would be applicable for these two station options. In contrast, more development is anticipated with the Northside East Station option, which would result in greater transportation impacts if the road network were to remain the same as assumed for the Median Station, the Northside West Station option, and the Median Station East option.

Table 3.2-28
Estimated 2030 New Development for Hillcrest Avenue Station Options

	Proposed Project	Northside West Option and Median Station East	Northside East Option
Housing Units[a]	650	1,200	2,500
Employment[a]	4,460	5,710	5,010
Net Additional Daily Ridership[b]	440	970	1,680

Source: Dyett & Bhatia, 2008.

Notes:

a. Numbers shown are net new housing/employment.

b. Net Additional Daily Ridership – added one-way transit trips due to new housing/employment in excess of ABAG Projections 2003 estimates.

The Hillcrest Avenue Station area land use assumptions used in the CCTA regional travel demand model to estimate the traffic projections for the Proposed Project are less than the estimated maximum development shown in Table 3.2-28 for the Northside East Station, Northside West Station, and Median Station East options. Thus, based on these estimates, the

traffic impacts for the Median Station, Northside West Station, and Median Station East would be more than those estimated using the CCTA model land use assumptions.

For all three station area option plans, BART predicts more development within one-half mile of the station than was forecast in the ABAG Projections 2003 for the Year 2030. Table 3.2-28 shows how much additional daily ridership, in excess of the base forecast of 8,200 daily trips, would result from the increased development intensity that is being considered. The greatest increase in ridership, 1,680 daily one-way trips would result from the Northside East Station option.

Impact TR-12 *The Northside West, Northside East, and Median East Station options would substantially worsen operations at two intersections in the vicinity of the station compared to the Proposed Project. (S)*

Table 3.2-29 provides a comparison of the traffic operations impacts at the critical Hillcrest Avenue interchange intersections for the Median Station and the other station option land use assumptions. This analysis assumes that the Phillips Lane interchange is not built but that the Hillcrest Avenue interchange improvements are in place along with the completion of Slatten Ranch Road between Hillcrest Avenue and Lone Tree Way. As shown, the higher level of development that would be associated with the each of the three station options would substantially worsen conditions at the intersections of Hillcrest Avenue/Sunset Drive and Hillcrest Avenue/SR 4 Eastbound Ramps, compared to the Median Station of the Proposed Project.

Table 3.2-29
2030 AM/PM Peak Hour Intersection Operations Comparison under the Hillcrest Station Avenue Options

#	Intersection	Proposed Project			Northwest and Median East Station Options			Northeast Station Option		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
18	Sunset Dr./ Hillcrest Ave.	0.87 **(1.11)**	32.3 **(>80.0)**	C **(F)**	**0.99** **(1.14)**	**56.2** **(>80.0)**	**E** **(F)**	**0.95** **(1.12)**	**55.7** **(>80.0)**	**E** **(F)**
20	SR 4 Eastbound Ramps/Hillcrest Ave.	**1.12** **(1.72)**	**56.0** **(>80.0)**	**E** **(F)**	**1.23** **(1.74)**	**>80.0** **(>80.0)**	**F** **(F)**	**1.25** **(1.72)**	**>80.0** **(>80.0)**	**F** **(F)**

Source: Wilbur Smith Associates, August 2008.
Notes:
Delay presented in seconds per vehicle.
Boldfaced type indicates unacceptable values.
0.5 (0.65) = AM (PM)

MITIGATION MEASURE. While the impact at the Hillcrest Avenue/Sunset Drive intersection could be mitigated with implementation of Mitigation Measure TR-2.2 to less than significant (LTS), no feasible mitigation has been identified for the Hillcrest Avenue/SR 4 Eastbound Ramps. (SU)

Opening Year Impacts without Slatten Ranch Road

In the Year 2015 when the Proposed Project initiates service, it is possible that Slatten Ranch Road and the planned connection to Slatten Ranch Road from E. 18th Street would not be completed. In that case, the portion of Slatten Ranch Road between Hillcrest Avenue and the entrance to the Hillcrest Avenue Station would be constructed and would provide the only access to the station. This would mean that all station traffic would flow through the Hillcrest Avenue/Sunset Drive intersection. It would also mean that development that was assumed to occur in the station area by the Year 2015 could not occur, because there would be no street access to the parcels along Slatten Ranch Road.

Impact TR-13 *If Slatten Ranch Road has not been completed in accordance with the Antioch General Plan by the time the Proposed Project commences operation in Year 2015, the intersections of Hillcrest Avenue and the SR 4 westbound and eastbound ramps would operate at unacceptable levels of congestion. (S)*

Table 3.2-30 provides information on the impacts of the Proposed Project in the Year 2015 with and without the completion of Slatten Ranch Road.

Table 3.2-30
Comparison of 2015 AM/PM Peak Hour Intersection Operations –
With and Without Slatten Ranch Road

		With Slatten Ranch Road			Without Slatten Ranch Road		
No.	**Intersection**	**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**
18	Sunset Drive/ Hillcrest Ave.	0.78 (0.78)	22.9 (31.5)	C (C)	0.66 (0.67)	17.3 (28.7)	C (C)
19	SR 4 Westbound Ramps/ Hillcrest Ave.	**1.14 (0.95)**	**59.6 (53.2)**	**E (D)**	**1.02 (0.84)**	**43.7 (31.9)**	**D (D)**
20	SR 4 Eastbound Ramps/ Hillcrest Ave.	**0.94 (1.58)**	**22.2 (>80.0)**	**C (F)**	**1.03 (1.59)**	**69.1 (>80.0)**	**D (F)**

Source: Wilbur Smith Associates, June 2008.
Notes:
Boldfaced type indicates unacceptable values.
0.5 (0.65) = AM (PM)

As shown in the table, conditions would improve for the scenario where Slatten Ranch Road was not completed at the Sunset Drive/Hillcrest Avenue and SR 4 Westbound Ramps/Hillcrest Avenue intersections. This result occurs because the non-project related through traffic that would be attracted to Slatten Ranch Road could not occur if the road were not complete, and this traffic more than offsets the increased traffic from the Hillcrest Avenue Station that would occur if Slatten Ranch Road is not available for use east of the station. The absence of Slatten Ranch Road would have an impact at the SR 4 Eastbound Ramps/Hillcrest Avenue intersection, slightly worsening conditions at this already impacted intersection.

MITIGATION MEASURE. As noted under Impact TR-2, no feasible mitigation has been identified for the SR 4 Eastbound Ramps/Hillcrest Avenue intersection. (SU)

Impact of Railroad Operations

The Union Pacific Railroad's Mococo Line parallels the SR 4 corridor and is located immediately north of the Hillcrest Avenue Station. This line has not seen any significant use in many years, and currently there are only a few train operations each year. Recently, representatives of the Union Pacific Railroad have contacted the City of Antioch and indicated that it is their intent to resume train operation on a regular basis in the next one to two years.[3] They indicated that there could be as many as 10-15 trains per day initially and that in the long term as many as 25-40 trains per day. There remains substantial uncertainty about when train traffic might resume and how many trains per day would be operated. It is also unclear whether the existing tracks, which have not been maintained for many years, would be upgraded to allow higher speeds through the area.

Impact TR-14 *The resumption of freight traffic on the Mococo Line at the level of frequency indicated by the Union Pacific Railroad would cause significant new traffic impacts beyond those anticipated in either the No Project or the Proposed Project Conditions. (S)*

To provide some information regarding the potential impacts on train operations, a traffic simulation was done for Year 2030 with Proposed Project conditions. The analysis assumed operation of a single mile-long train through the area during the peak hour. The analysis indicated that the closing of the railroad crossing gates, which are located just north of the Hillcrest Avenue/Sunset Drive intersection, would cause substantial increases in the queuing of traffic. The most critical queuing would occur south of the intersection on Hillcrest Avenue where the queues would extend well into the

[3] Contra Costa Times, "East County train back on track," August, 18, 2008.

SR 4 interchange complex. Average delays at the Hillcrest Avenue/Sunset Drive intersection during the AM peak hour would increase from 15.9 seconds per vehicle to 28.6 seconds per vehicle. During the PM peak hour, delays would also increase substantially.

MITIGATION MEASURE. While the precise extent of the increase of UP train operations and the magnitude of the impact is speculative at this time, the potential cumulative traffic impact that would result is nevertheless being conservatively identified here as significant and unavoidable. In order to avoid this cumulative impact, a grade separation could be constructed at Hillcrest Avenue (e.g., the train tracks could be elevated over the road or lowered under the road, or Hillcrest Avenue could be elevated over the train tracks or lowered to pass under) to eliminate the projected traffic queuing that would result if the tracks and Hillcrest Avenue continued to cross one another. However, UP would be the primary source of such a cumulative impact, to which the Proposed Project would add only a minor contribution. Therefore, construction of a grade separation is not included as part of the Proposed Project or as a mitigation measure. Since no grade separation is now proposed, and the implementation of a grade separation by others at some future date is uncertain, the cumulative impact to traffic remains significant and unavoidable. (SU)

Cumulative Analysis

The transportation projections for the Proposed Project were based on the CCTA travel demand model. Inputs to the model include local and regional government projections of land use and employment intensities and locations, along with programmed highway, street, and transit improvements. As noted before, the CCTA model output for Year 2015 and 2030 conditions was adjusted to reflect roadway improvements in the immediate study area that were not included in the original model.

Since the transportation impact analyses are based upon the adopted regional land use forecasts for the Years 2015 and 2030, the 2015 and 2030 transportation assessments include cumulative development and identify the combined effects of future background growth in conjunction with the Proposed Project.