
4.5 TRANSPORTATION AND CIRCULATION

4.5 TRANSPORTATION AND CIRCULATION

4.5.1 INTRODUCTION

This section describes existing traffic and circulation conditions in the Lower Lagoon Valley Specific Plan area and along Interstate 80 (I-80) in the vicinity of the Proposed Project, and evaluates the impacts to intersections, roadway and freeway segments, freeway ramps, and freeway merge/diverge operations from traffic generated by the Proposed Project and under cumulative conditions with assumed future growth to the year 2025. The section summarizes the results of the *Lower Lagoon Valley Mixed-Use Development Traffic Impact Analysis*, January 28, 2004, prepared for the project by Korve Engineering, which is incorporated by reference in the Draft EIR. A copy of the text of the *Traffic Impact Analysis* is found in Appendix D to this Draft EIR.

4.5.2 ENVIRONMENTAL SETTING

The project site is in Lagoon Valley, on the east side of Interstate 80 in the City of Vacaville. The major access point to the Lower Lagoon Valley site is the Lagoon Valley Road Interchange with I-80. Access is possible along Rivera Road (Vacaville) to the Cherry Glen/Peña Adobe interchange with I-80. Nelson Road (Fairfield) does not connect to North Texas Street, and does not provide through access from Fairfield. There are no fixed transit routes in Lagoon Valley; dial-a-ride paratransit service is available throughout Vacaville. There are bicycle and pedestrian trails in Lagoon Valley Regional Park; no bicycle or pedestrian facilities are located on the project site.

Existing Transportation Facilities

Roadways

Interstate 80 (I-80) is a major east-west freeway, and the central link between Sacramento and the Bay Area (see Figure 4.5-1). It is also a primary commuter route linking residents of Solano County and employment centers in the cities of Richmond, Oakland, and San Francisco and in Contra Costa County. I-80 is typically six to eight lanes wide, divided by a landscaped median 36 feet wide with 2-foot paved inside shoulders. The roadway has 10 foot wide outside shoulders. The posted speed limit is 65 miles per hour in the study area. In the morning peak hour, volumes in the project study area on I-80 eastbound are about 4,000 vehicles per hour and westbound volumes range from 5,000 to 6,500 vehicles per hour. Evening peak hour volumes are about 7,000 vehicles eastbound and 4,500-5,000 vehicles westbound. Weekend travel on I-80 tends to be heavier eastbound on Fridays and Saturdays and heavier westbound on Sundays in this area. Freeway mainline and ramp traffic volumes for existing conditions are taken from Caltrans counts dated March 1997 to January 2002.

Lagoon Valley Road is a two-lane east-west roadway connecting agricultural land in Lagoon Valley to I-80 and Cherry Glen Road. Lagoon Valley Road provides access to the Lagoon Valley Regional Park, including Lagoon Lake.

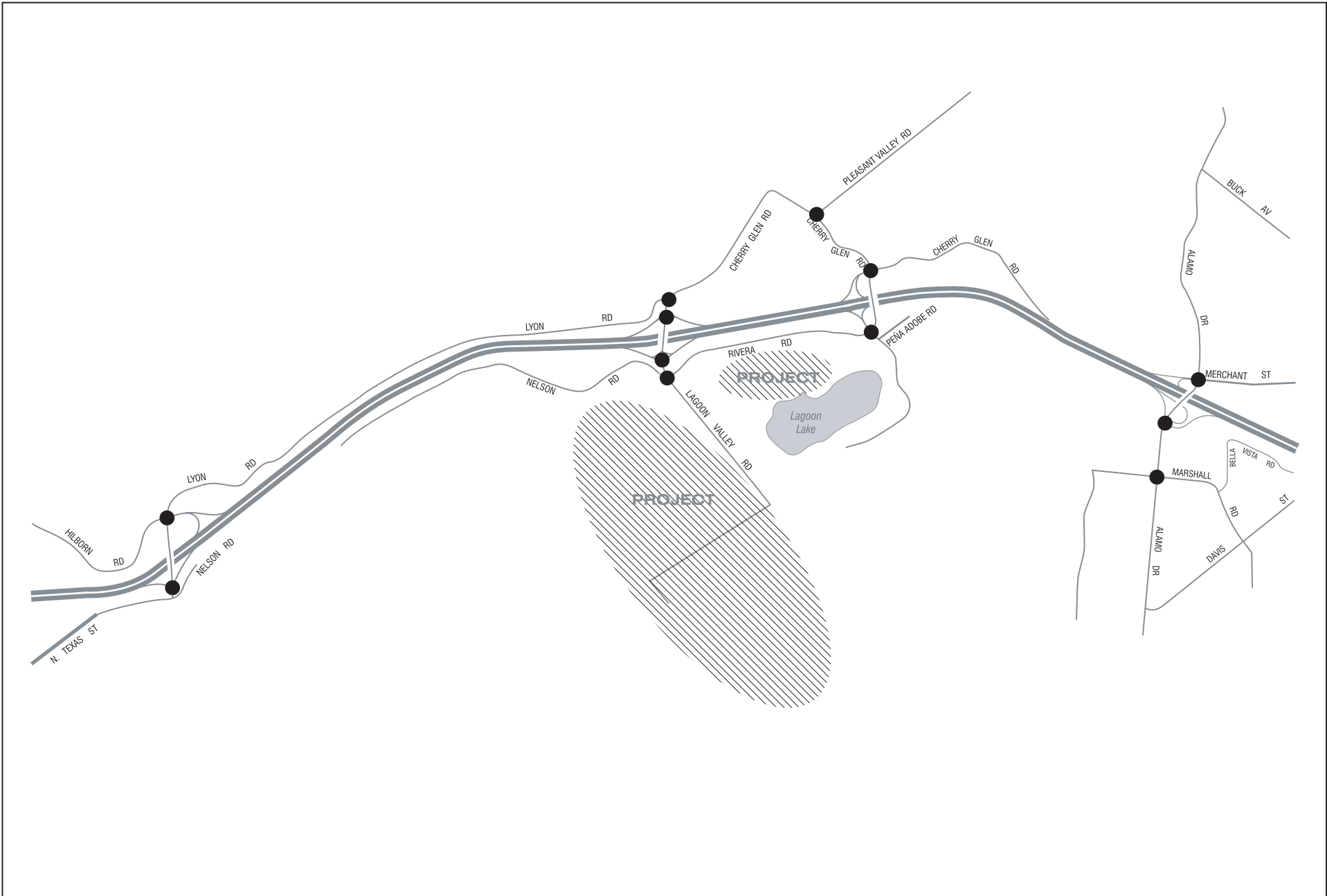


FIGURE 4.5-1
Project Area

10794-00

Source: Korve Engineering

Not to Scale



City of Vacaville

Cherry Glen Road is a north-south roadway that extends from Lyon Road in the Lagoon Valley to the I-80 westbound freeway off ramps on the south/east edge of Vacaville. Cherry Glen Road acts as a frontage road along I-80, also branching off to the hills in the northeast. The speed limit on Cherry Glen Road is 45 mph.

Alamo Drive is a major east-west arterial roadway running through the western edge of Vacaville and providing a connection to I-80. Alamo Drive has marked bike lanes in the vicinity of I-80. Alamo Drive provides two to three travel lanes in each direction with left turn pockets.

North Texas Street is a four-lane north-south arterial roadway as it runs from downtown Fairfield to I-80 at the northern end of the city. It provides access to Air Base Parkway (Travis Air Force Base) approximately two miles south of its junction with I-80.

Merchant Street is a four-lane north-south roadway, extending from Downtown Vacaville through the city to the I-80 westbound ramps in south/east Vacaville. Merchant Street connects with Alamo Drive in a large intersection adjacent to the I-80 on-/off-ramps.

Hilborn Road is a four-lane east-west residential roadway, divided by a landscaped median. Hilborn Road connects the City of Fairfield to Interstate 80 at North Texas Street and with new developments at Lyon Road.

Lyon Road is a four-lane residential roadway at North Texas Street/Hilborn Road that functions as a frontage road to I-80 extending north to Cherry Glen Road. Lyon Road narrows to two lanes approximately 1/2 mile north of the North Texas Street intersection. The speed limit on Lyon Road is 45 mph.

Nelson Road is a two-lane north-south discontinuous roadway which runs along eastbound I-80. The southern portion of the roadway terminates at North Texas Street; the longer segment of the road extends about 1.3 miles south from Lagoon Valley Road towards North Texas Street. The two roadway segments do not connect for automobile traffic; however, a short bicycle/pedestrian pathway joins the ends of both segments to allow through traffic for cyclists and hikers.

Rivera Road connects Nelson Road/Lagoon Valley Road to Cherry Glen Road/Peña Adobe at the northern end of Lagoon Valley Regional Park. It is a wide two-lane frontage roadway along eastbound I-80. The Ranchotel facility is located approximately halfway between the two intersections.

Peña Adobe is a two-lane north-south roadway connecting to Cherry Glen Road and Rivera Road, just north of and leading to Lagoon Valley Regional Park and Lake.

Pleasant Valley Road connects with Cherry Glen Road near I-80 and leads inland into the western hills of Vacaville. One lane of traffic runs in each direction, with no shoulder on either side of the roadway. A narrow bridge over Laguna Creek is located one-half mile from the intersection with Cherry Glen Road. Pleasant Valley Road is a “share the road” bicycle facility as well as a school bus route. The speed limit on Pleasant Valley Road is 45 mph. As Pleasant Valley Road is a two-lane road with no shoulder, an increase of traffic volume on this roadway could affect the relative safety of the area given the limited availability for improvements. A bridge crossing Laguna creek causes the roadway to narrow approximately one-half mile from Cherry Glen Road.

Transit System

The City of Vacaville contracts with Coach U.S.A. Transit Services, Inc. for City Coach fixed route and Dial-a-ride paratransit services within the City limits. There are three (two bi-directional and one uni-directional) local fixed-route bus routes and three regional bus routes. The area is also served by rail transit, with a train station in Suisun City. An additional train station is presently being planned in Fairfield near the southern border of Vacaville. Commuter bus service to the El Cerrito del Norte Bay Area Rapid Transit (BART) Station is provided on Vacaville Transit Route #91. This route begins and ends at the Davis Street Park-and-Ride Lot in Vacaville, and passes through Fairfield before traveling on I-80 to the BART station.

No fixed-route bus service is currently provided to the Proposed Project area. The vehicle by which provision of future transit services, would be this areas inclusion of this area in Short Range Transit Plan (SRTP) updates should area develop and citizen interest warrant. SRTP updates are required to be accomplished biennially.

Bicycle and Pedestrian Facilities

There are designated bicycle routes in the Specific Plan area and between Vacaville and Fairfield. There is a bike route north of I-80 along a segment of Cherry Glen Road. Pleasant Valley Road posts signs with “Share The Road” to inform both vehicles and cyclists. Class II bicycle lanes (designated “Bike Lanes” in the Transportation Element of the General Plan, are separate striped bicycle lanes in the roadway) run along Alamo Drive from Merchant Street to south of Marshall Road, and continue south as Class III lanes (“Bicycle Routes,” on-street signed bicycle lanes shared with automobile traffic) into the City. According to the *Solano Countywide Bicycle Plan*, Figure B, proposed Class III bicycle facilities would run eastbound along I-80 from Nelson Road in Fairfield to Rivera Road and Butcher Road in Vacaville. Proposed Class III bicycle facilities would also be located on Lyon Road adjacent to westbound I-80 from Cherry Glen Road to Hilborn Road in Fairfield.

There are existing pedestrian and bicycle trails in the Lagoon Valley Regional Park.

Existing Traffic Conditions

Existing traffic conditions were analyzed separately at local intersections, along local roadway and freeway segments, on freeway ramps, and in the areas along the freeway where traffic merges (enters the freeway from an on-ramp) and diverges (leaves the freeway via an off-ramp). In the study area, the largest traffic volumes are expected on adjacent streets during the midweek PM peak hour between 4:00 and 6:00 PM, which is the study analysis period. Because the project is located directly adjacent to Interstate 80, the morning commute movements may have an impact on local and regional roadways, so the AM peak hour, between 7:00 and 9:00 AM, is also analyzed at the freeway interchange intersections and on overcrossings.

Existing Intersection Operations

Twelve existing intersections have been identified as those where the Proposed Project may have an impact. These intersections were analyzed to describe existing conditions; four new intersections on the Proposed Project site are analyzed in the impacts discussion, as well as a new intersection planned in the City of Fairfield (see pp. 4.5-19 to 4.5-20, below). The existing study intersection locations are shown in Appendix D, Figure 2, p. 13. Following are the

intersections analyzed to establish existing traffic conditions at intersections (the control at the existing intersections is shown in parentheses):

1. North Texas Street / I-80 Eastbound Ramps (signalized);
2. North Texas Street / Hilborn Road / Lyon Road / I-80 Westbound Ramps (four-way STOP control);
3. Lagoon Valley Road / I-80 Eastbound Ramps (two-way STOP control);
4. Lagoon Valley Road / Nelson Road / Rivera Road (two-way STOP control);
5. Cherry Glen Road / I-80 Westbound Ramps (two-way STOP control);
6. Cherry Glen Road / Lyon Road (Tee intersection, STOP control on Lyon);
7. I-80 Eastbound Ramps / Pena Adobe / Rivera Road (two-way STOP control);
8. Cherry Glen Road / I-80 Westbound Ramps / North Cherry Glen Off Ramp (two-way STOP control);
9. Cherry Glen Road / Pleasant Valley Road (Tee intersection, two-way STOP control);
10. Alamo Drive / I-80 Eastbound Ramps (signalized);
11. Alamo Drive / Merchant Street (signalized); and
12. Alamo Drive / Marshall Road (signalized).

Traffic conditions are assessed through the evaluation of peak hour Levels of Service (LOS). The LOS concept qualitatively characterizes traffic conditions associated with varying levels of traffic. An LOS determination is a measure of congestion, which is the principle measure of roadway service. These range from LOS A, which indicates a free-flow condition, to LOS F, which indicates a jammed condition. LOS A, B and C are generally considered to be satisfactory service levels while LOS D is marginally acceptable; LOS E and LOS F conditions are unacceptable (see Table 4.5-1).

Traffic conditions at study intersections were evaluated for morning and evening peak hours using the methodology of the Transportation Research Board's Intersection Capacity Utilization (ICU) Method from Transportation Research Circular 212, 1980, analyzed through use of the City of Vacaville's approved LOS program. The program is used for both signalized and unsignalized intersections. With this methodology, a level of service is assigned based on the capacity of the intersection as a whole. The LOS corresponds to the ratio of total traffic volume on the facility to the maximum capacity of volume allowable on that facility. The volume-to-capacity (V/C) ratios are presented in Table 4.5-1, with the LOS values associated with each range of traffic congestion.

TABLE 4.5-1		
INTERSECTION LEVEL OF SERVICE DEFINITIONS		
Level of Service	Description	Volume-to-Capacity (V/C) Ratio
A	Very slight or no delay – Stable flow	≤ 0.60
B	Slight delay – Stable flow	> 0.61 and ≤ 0.70
C	Acceptable delay – Stable flow	> 0.71 and ≤ 0.80
D	Tolerable delay – Approaching unstable flow	> 0.81 and ≤ 0.90
E	Intolerable delay – Unstable flow	> 0.91 and ≤ 1.00
F	Excessive delay – Forced flow	> 1.00

Source: Korve Engineering, January 2004; Highway Capacity Manual, Special Report No. 209, Transportation Research Board, 1985.

The existing conditions analysis at study intersections is based on traffic counts conducted specifically for this study in summer 2003. The results of the intersection existing conditions

analysis are shown in Table 4.5-2. Traffic counts were conducted at each of the existing study intersections during the morning and evening peak hours on Tuesday-Wednesday June 3-4, 2003 and reviewed against counts on record with the City of Vacaville. Additional morning and evening traffic counts for the intersections of Alamo Drive/I-80 Eastbound Ramps and Alamo Drive/Merchant Street were taken on October 1, 2003.

Intersection	Peak Hour	Level of Service (Volume-to-Capacity Ratio) ²
1. ¹ North Texas St / I-80 Eastbound Ramps	AM	C (0.74)
	PM	E (0.94)
2. Hilborn Rd / Lyon Rd / North Texas St / I-80 Westbound Ramps	AM	C (0.78)
	PM	C (0.74)
3. Lagoon Valley Road/ I-80 Eastbound Ramps	AM	A (0.17)
	PM	A (0.27)
4. Lagoon Valley Road / Riviera Road / Nelson Road	PM	A (0.17)
5. Cherry Glen Road / I-80 Westbound Ramps	AM	A (0.23)
	PM	A (0.21)
6. Cherry Glen Rd / Lyon Rd	PM	A (0.24)
7. I-80 Eastbound Ramps / Cherry Glen / Pena Adobe / Riviera Road	AM	A (0.14)
	PM	A (0.16)
8. North Cherry Glen Road / I-80 Westbound Ramps/Cherry Glen	AM	A (0.14)
	PM	A (0.16)
9. Cherry Glen Road / Pleasant Valley Road	PM	A (0.28)
10. Alamo Drive / I-80 Eastbound Ramps	AM	B (0.69)
	PM	D (0.81)
11. Alamo Drive / Merchant St	AM	C (0.80)
	PM	C (0.77)
12. Alamo Drive / Marshall Rd	PM	B (0.70)

Notes:
1. See Figure 2, p. 13 in **Appendix D** for locations of intersections, identified by number.
2. Intersections with LOS E or LOS F are shown in bold.
Source: Korve Engineering, January 2004.

As illustrated in Table 4.5-2, most of the study intersections were identified as operating at LOS A, B, or C. LOS A and B are indicative of good traffic conditions with low or moderate vehicular delay; LOS C shows average traffic delay remaining in a satisfactory condition. The intersection of Alamo Drive/I-80 Eastbound Ramps operates at LOS D in the PM peak hour, with a volume-to-capacity (V/C) ratio of 0.81. North Texas Street/I-80 Eastbound Ramps operates at LOS E (0.94) in the PM peak hour.

Existing Roadway Segments

Ten roadway segments were selected for analysis, based on an estimate of which segments the Proposed Project may cause a traffic impact. The roadway segment locations are shown by number in Appendix D in Figure 4, p. 17. The roadway segments analyzed are:

1. Lagoon Valley Road @ I-80 EB Ramps, Riviera Road;
2. Lagoon Valley Road @ I-80 Overcrossing;

3. Cherry Glen Road @ I-80 WB Off Ramp, North Cherry Glen Road;
4. Rivera Road @ Lagoon Valley Road, Cherry Glen Road;
5. Cherry Glen Road @ I-80 WB Ramps (W), Lyon Road;
6. Cherry Glen Road @ Pleasant Valley Road, Lyon Road;
7. Cherry Glen Road @ Pleasant Valley Road, I-80 WB Ramps (E);
8. Pleasant Valley Road north of Cherry Glen Road;
9. Cherry Glen Road @ I-80 Overcrossing; and
10. Alamo Drive @ I-80 Overcrossing.

Table 4.5-3 illustrates the Level of Service criteria for roadway segments, as well as for freeway segments and freeway ramps. As for intersections, service levels are assigned based on a ratio of traffic volume to total facility capacity, the volume-to-capacity (V/C) Ratio. A V/C ratio of 0.60 or less represents excellent traffic conditions while a V/C ratio equal to 1.0 represents a facility operating at capacity.

Level of Service	Description	Volume-to-Capacity Ratio (v/c)
A	Little or no delay	≤ 0.60
B	Short traffic delay	> 0.61 and ≤ 0.70
C	Average traffic delay	> 0.71 and ≤ 0.80
D	Long traffic delay	> 0.81 and ≤ 0.90
E	Very long traffic delay	> 0.91 and ≤ 1.0
F	Extreme traffic delay	> 1.0

Source: Korve Engineering, January 2004; Highway Capacity Manual, Special Report No. 209, Transportation Research Board, 1985.

Table 4.5-4 shows existing roadway segment LOS during the AM and PM peak hours (segments are listed from west to east in the table). In both the AM and PM peak hours, each roadway segment evaluated functions at a rating of LOS A.

Existing Freeway Segments

Five freeway segments along I-80 in the vicinity of the project site were selected for analysis, based on an estimate of which segments the Proposed Project may cause a traffic impact. I-80 has four travel lanes in each direction from Fairfield through Vacaville, allowing a capacity of approximately 8,000 vehicles per hour per direction. The predominant morning commute is westbound; the evening commute is in the eastbound direction. The five freeway segments analyzed are:

- Alamo Drive Overcrossing eastward, EB/WB;
- Alamo Drive Overcrossing to Cherry Glen/Peña Adobe Overcrossing, EB; North Cherry Glen Off-Ramp to Cherry Glen/Peña Adobe Overcrossing, WB;
- Alamo Drive Overcrossing to North Cherry Glen Off-Ramp, WB;
- Cherry Glen/Peña Adobe Overcrossing to C=Lagoon Valley Overcrossing EB/WB; and
- Lagoon Valley Overcrossing to North Texas Overcrossing, EB/WB.

TABLE 4.5-4					
EXISTING ROADWAY SEGMENT LEVELS OF SERVICE					
Segments		Peak Hour	Level of Service	Segment Volume	Volume-to-Capacity Ratio
1.	Lagoon Valley Road (I-80 EB Ramps to Rivera Road)	PM	A	113	0.06
2.	Lagoon Valley Road (I-80 Overcrossing)	AM	A	107	0.05
		PM	A	224	0.11
3.	North Cherry Glen Road (I-80 WB Off Ramp to Cherrv Glen Rd)	PM	A	89	0.07
4.	Rivera Road (Lagoon Valley to Cherrv Glen/Pena Adobe)	PM	A	16	0.01
5.	Cherry Glen Road (I-80 WB Ramps (W) to Lvon Road)	PM	A	249	0.12
6.	Cherry Glen Road (Lvon Road to Pleasant Valley Road)	PM	A	209	0.16
7.	Cherry Glen Road (Pleasant Valley Rd to I-80 WB Ramps(E))	PM	A	76	0.06
8.	Pleasant Valley Road (North of Cherrv Glen Road)	PM	A	239	0.12
9.	Cherry Glen / Pena Adobe (I-80 Overcrossing)	AM	A	55	0.03
		PM	A	95	0.05
10.	Alamo Drive (I-80 Overcrossing)	AM	A	2,372	0.47
		PM	A	2,445	0.49

Source: Korve Engineering, January 2004.

Table 4.5-5, presents existing freeway segment LOS during the AM and PM peak hours on I-80 near the project site. These existing conditions are based on most current Caltrans counts on record, performed between March 1997 and January 2002.

Level of Service criteria are the same as those for roadway segments, shown in Table 4.5-3. The LOS under existing conditions are satisfactory, ranging from LOS A to LOS D in both the AM and PM peak hours.

Existing Freeway Ramps

The Interstate 80 ramps in both directions are analyzed along the same portion of the freeway and the freeway segments analysis. The capacity for each of the ramps was assumed to be 1,500 vehicles for a one-lane ramp. Ramp capacity analyses were performed for the following ramps:

- Lagoon Valley I-80 Westbound On;
- Lagoon Valley I-80 Westbound Off;
- Lagoon Valley I-80 Eastbound On;
- Lagoon Valley I-80 Eastbound Off;
- Cherry Glen I-80 Westbound On;
- Cherry Glen I-80 Westbound Off;
- North Cherry Glen I-80 Westbound Off;
- Pena Adobe I-80 Eastbound On;
- Pena Adobe I-80 Eastbound Off;
- Alamo / Merchant I-80 Eastbound Off;
- Alamo / Merchant I-80 Westbound On;

TABLE 4.5-5				
EXISTING FREEWAY SEGMENT LEVELS OF SERVICE				
Interstate I-80 Freeway Segments		Peak Hour	Level of Service	Volume-to-Capacity Ratio
East of Alamo Drive Overcrossing	EB	AM	A	0.49
		PM	C	0.77
	WB	AM	B	0.62
		PM	A	0.54
Alamo Drive Overcrossing – Cherry Glen/Pena Adobe Overcrossing	EB	AM	A	0.52
		PM	D	0.87
North Cherry Glen Off Ramp – Cherry Glen/Pena Adobe Overcrossing	WB	AM	C	0.79
		PM	B	0.60
Alamo Drive Overcrossing – North Cherry Glen Off Ramp	WB	AM	D	0.80
		PM	B	0.61
Cherry Glen/Pena Adobe Overcrossing – Lagoon Valley Overcrossing	EB	AM	A	0.52
		PM	D	0.87
	WB	AM	C	0.80
		PM	A	0.60
Lagoon Valley Overcrossing – North Texas Overcrossing	EB	AM	A	0.52
		PM	D	0.89
	WB	AM	C	0.80
		PM	A	0.60

Source: Korve Engineering, January 2004

North Texas Street I-80 Eastbound Off;
 North Texas Street I-80 Eastbound On;
 North Texas Street I-80 Westbound Off; and
 North Texas Street I-80 Westbound On.

The analysis of the freeway ramps is based on a ratio of traffic volumes to the available capacity for each ramp (volume-to-capacity ratio, or V/C). The V/C ratios correspond to levels of service that represent congestion on the ramp. Table 4.5-6 presents freeway ramp LOS during the AM and PM peak hours for I-80 in both directions. Two locations were found to currently operate at unacceptable conditions: the Alamo/I-80 eastbound off ramp in the PM peak hour, and the Alamo/Merchant westbound on ramp in the AM peak hour. Congestion at both of these freeway ramps can be attributed to local commute traffic in the respective directions and peak hours. All other study ramps currently operate at LOS A or B.

Existing Freeway Ramp Merge/Diverge Conditions

The freeway ramp merge / diverge analysis was conducted using the Transportation Research Board’s *2000 Highway Capacity Manual* for ramp junction merge and diverge areas. The analysis was based on the typical weekday AM and PM peak hour traffic volumes. A ramp junction is formed when an on-ramp or off-ramp joins a freeway. The junction formed at this point is an area of turbulence due to the concentration of merging vehicles entering the freeway or diverging vehicles leaving the freeway. The level of service for ramp-freeway junctions is based on the density of the area affected by the ramp.

Freeway Ramps	Peak Hour	Level of Service	Volume-to-Capacity Ratio
Lagoon Valley I-80 Westbound On Ramp	AM	A	0.01
	PM	A	0.02
Lagoon Valley I-80 Westbound Off Ramp	AM	A	0.02
	PM	A	0.03
Lagoon Valley I-80 Eastbound On Ramp	AM	A	0.03
	PM	A	0.03
Lagoon Valley I-80 Eastbound Off Ramp	AM	A	0.04
	PM	A	0.16
Cherry Glen I-80 Westbound On Ramp	AM	A	0.01
	PM	A	0.01
Cherry Glen I-80 Westbound Off Ramp	AM	A	0.02
	PM	A	0.02
North Cherry Glen I-80 Westbound Off Ramp	AM	A	0.01
	PM	A	0.01
Pena Adobe I-80 Eastbound On Ramp	AM	A	0.01
	PM	A	0.03
Pena Adobe I-80 Eastbound Off Ramp	AM	A	0.01
	PM	A	0.02
Alamo I-80 Eastbound Off Ramp	AM	A	0.45
	PM	E	0.96
Alamo / Merchant Westbound On Ramp	AM	F	1.27
	PM	B	0.67
North Texas Street I-80 Eastbound Off Ramp	AM	A	0.31
	PM	A	0.37
North Texas Street I-80 Eastbound On Ramp	AM	A	0.12
	PM	A	0.31
North Texas Street I-80 Westbound Off Ramp	AM	A	0.28
	PM	A	0.14
North Texas Street I-80 Westbound On Ramp	AM	A	0.32
	PM	A	0.36

Note: Ramps with LOS E or LOS F shown in bold.
Source: Korve Engineering, January 2004.

Service levels in areas affected by merge and diverge activities are determined based on density of passenger cars per mile per lane (pc/mi/ln), as calculated using the freeway volumes and the merging or diverging ramp volumes at each study location. The performance rating for each location is represented by LOS A through E, with LOS F indicating a demand that exceeds the capacity at the analyzed merge or diverge area (see Table 4.5-7).

LOS	Density (pc/mi/ln)
A	≤ 10
B	> 10 - 20
C	> 20 - 28
D	> 28 - 35
E	> 35
F	Demand exceeds capacity

Source: Korve Engineering, January 2004; Exhibit 25-4: LOS Criteria for Merge and Diverge Areas, 2000 Highway Capacity Manual.

The merge / diverge locations analyzed are the same as the on and off ramps analyzed above. Table 4.5-8 presents the existing levels of service for the freeway merge and diverge study locations. The locations generally operate at LOS B or C for both the AM and PM peak periods of traffic on I-80. In the PM peak hour, four locations operate at LOS D. All four of these congested locations are in the eastbound direction. Corresponding to local commute patterns, westbound ramp / freeway junction areas are more congested in the morning hours. No merge / diverge locations operate at unacceptable LOS E or F under existing conditions in the AM or PM peak hours.

Freeway Merge-Diverge Locations	Peak Hour	Level of Service	Density
Lagoon Valley I-80 Westbound On (M)	AM	C	23
	PM	B	18
Lagoon Valley I-80 Westbound Off (D)	AM	C	24
	PM	B	17
Lagoon Valley I-80 Eastbound On (M)	AM	B	16
	PM	C	25
Lagoon Valley I-80 Eastbound Off (D)	AM	B	15
	PM	C	27
Cherry Glen I-80 Westbound On (M)	AM	B	19
	PM	B	15
Cherry Glen I-80 Westbound Off (D)	AM	C	28
	PM	C	22
North Cherry Glen I-80 Westbound Off (D)	AM	C	26
	PM	B	19
Pena Adobe I-80 Eastbound On (M)	AM	B	14
	PM	C	21
Pena Adobe I-80 Eastbound Off (D)	AM	B	17
	PM	D	29
Alamo / Merchant Eastbound Off (D)	AM	B	19
	PM	D	32
Alamo / Merchant Westbound On (M)	AM	C	20
	PM	B	17
North Texas Street I-80 Eastbound Off (D)	AM	B	18
	PM	D	32
North Texas Street I-80 Eastbound On (M)	AM	B	19
	PM	D	30
North Texas Street I-80 Westbound Off (D)	AM	C	23
	PM	B	17
North Texas Street I-80 Westbound On (M)	AM	C	22
	PM	B	17

Source: Korve Engineering, January 2004

4.5.3 REGULATORY SETTING

The City of Vacaville has ordinances and General Plan policies that govern traffic impact analyses, establish significance thresholds, and ensure that adequate circulation facilities are available to serve new development. The City’s Land Use and Development Code, Title 14 of

the Municipal Code, includes a division on traffic impact. The City's General Plan includes a Circulation Element in Chapter 6. Both have provisions relevant to the proposed Lower Lagoon Valley Specific Plan.

Local Ordinances

The City's Land Use and Development Code contains, in Division 14.13, the Traffic Impact Mitigation Ordinance. This ordinance establishes traffic impact analysis procedures and impact standards to be used in the City. The impact standards in Section 14.13.180.070 are applied when a traffic impact analysis is required by Section 14.13.180.040, as for the Proposed Project. Section 14.13.180.070, Traffic Impact Standards and Section 14.13.180.030 Definitions (particularly "Roadway Network Affected by Project) provides the basis for determining thresholds of significance for network under control of local jurisdiction. (Add reference to these and add to appendix?)

Local General Plan

The City's Transportation Element is in Chapter 6 of the Vacaville General Plan. This Element includes Guiding Policies and Implementing Policies that relate to traffic, transit and pedestrian/bicycle operations in the City. These policies establish acceptable Levels of Service for roadways in the City, recommend street improvements throughout the City, define and encourage "Transportation Systems Management" programs, establish bikeways throughout the City, and encourage development of safe and convenient pedestrian sidewalks and trails.

The Standards for Traffic Service and Street Improvements, in Guiding Policies 6.1-G1 through 6.1-G3 reflect the provisions of the Traffic Impacts Standards section of the Traffic Impact Mitigation Ordinance, and therefore are not repeated here. Implementing Policies for Traffic Service and Street Improvements include implementation of improvements summarized in Table 6-1 of the Element (policy 6.1-I 2); this table lists "Various roadways in the Lagoon Valley sector" and recommends two and four lanes as ultimate improvements. The Proposed Project would provide four-lane roadways on the major entrance roadway (Lagoon Valley Road) connecting to the Cherry Glen interchange with I-80 and on the commercial roadway connecting the main entrance road to Peña Adobe Road, consistent with the Transportation Element provisions for this area. Other relevant Implementing Policies include 6.1-I 3 and I 4 to maintain acceptable traffic levels of service and I 6 requiring all new development to provide appropriate right-of-way improvements. The Proposed Project would include appropriate right-of-way improvements for arterials and local streets, as well as bicycle and pedestrian walkways in conformity with Policies 6.5-I 1, 6.5-I 4 and 6.5-I 6. A General Plan amendment is proposed to modify the proposed transportation network identified in the City's General Plan. The project's effects on traffic levels of service are discussed below in Section 4.5.4, Impacts and Mitigation Measures.

The City has an adopted transportation impact fee. Development within the Specific Plan area would pay a Lower Lagoon Valley transportation impact fee that is proposed to be equivalent to the city's current transportation fee in accordance with the policies identified in the Specific Plan. The Specific Plan establishes this transportation mitigation fee for the purpose of funding the project's fair share of off-site area-wide improvements, as identified in the Traffic Impact Analysis (Appendix D) for this EIR, including fair share contributions toward improvements that are under the control of other jurisdictions, such as Caltrans.

4.5.4 IMPACTS AND MITIGATION MEASURES

Methods of Analysis

Traffic conditions are assessed for weekday morning and evening peak hours of travel. As explained in the Environmental Setting, existing conditions are based on existing traffic counts. Future scenarios analyzed include the following:

- Existing + Approved Projects, providing a baseline for the analysis
- Existing + Approved Projects with Proposed Project
- Year 2025 without Proposed Project (future baseline)
- Year 2025 with Proposed Project

The Existing + Approved Projects scenario is based on a list of 43 development projects in the City of Vacaville that have been approved but have not yet constructed and occupied as of spring 2003 (see Appendix D, Table 1, p. 5). This list includes approximately 1,500 residential units, plus new office and industrial space.

Traffic conditions for future year 2025 scenarios were assessed using forecasts from the City of Vacaville's MINUTP Travel Demand Forecast Model, which assumes the City's historical growth rates, including construction of approximately 500 new residential units per year, and is consistent with buildout of the City's General Plan and the City's land use database. The 20-year time horizon also corresponds to Caltrans specifications for future analyses. Various modifications were made to more accurately reflect traffic conditions, as described in the Traffic Impact Analysis in Appendix D, pp. 21-23. The Model was run for the PM peak hour condition and all analysis locations were studied in the PM peak hour. As explained above in the Environmental Setting under "Existing Traffic Conditions," morning peak hour conditions were studied for locations on and near I-80, because morning commute conditions on and near the freeway could affect local traffic. AM peak hour volumes were calculated as a percent of the PM peak hour Model volumes (approximately 89 percent). The Proposed Project would reduce overall development potential compared with existing General Plan and zoning designations for the project site.

Future Roadway Improvements

The City of Fairfield is planning to extend Manuel Campos Parkway from its current terminus to interchange with I-80. This interchange would replace the existing North Texas Street interchange, and North Texas Street would tee into Manuel Campos Parkway east of the freeway. The intersection of North Texas Street and Manuel Campos Parkway is assumed to be signalized. These facilities are located outside of the City of Vacaville and are not included in the City's travel demand model. The intersection of Manuel Campos Parkway and North Texas Street was analyzed based on information from the Solano County Travel Demand Model and future geometric plans for the new interchange. (The intersection of Manuel Campos Parkway and North Texas Street is identified in tables as Intersection 13, and is shown in Figure 2 in Appendix D.)

In addition, the Proposed Project would create new intersections throughout the Specific Plan area. Four of these new intersections were analyzed to determine impacts within the Specific Plan site (the type of traffic control proposed is shown in parentheses):

14. Lagoon Valley Road / Commercial Access Road (two-way STOP controlled)

15. Lagoon Valley Road / Arterial # 1 (two-way STOP controlled)
16. Lagoon Valley Road / Arterial # 2 (two-way STOP controlled)
17. Internal Collector Intersection (two-way STOP controlled)

As with the existing analysis intersections listed above, the numbers correspond to intersection locations shown on Figure 2 in Appendix D.

The Vacaville General Plan includes construction of an overcrossing of I-80 to connect California Drive to the North Cherry Glen Road westbound off-ramp as a planned roadway improvement. The Transportation portion of the Development Improvement Fee program provides the nexus and funding mechanism to provide for this improvement. Development projections consistent with those used to project the Year 2025 traffic conditions used in this study are part of the nexus that lead to the inclusion of California Drive Overcrossing in the Transportation portion of the Development Impact fee Program. Transportation portion of Development Impact Fees would generate the funding to accomplish this improvement. The California Drive Overcrossing was included as a variant, and is assumed in both a 2025 future baseline scenario without the Proposed Project and a 2025 future scenario with the project, to identify the change in impacts that would result with the project if the overcrossing is built in the future. By providing analysis without the California Drive Overcrossing provides for analysis of Project impacts prior to this improvement being in place, and validates the nexus for it.

Existing Plus Approved Projects Scenario

The Proposed Project was analyzed in the context of existing conditions that also account for approved projects that have not yet been constructed or are under construction but are not yet fully occupied. Providing Existing Plus Approved Project analysis allows the increment of traffic expected from approved projects over and above the existing traffic counts collected and discussed in the Environmental Setting to be analyzed with and without the Project. Therefore, traffic from the approved projects is added to existing conditions to provide an appropriate baseline against which to measure the proposed Specific Plan. The results of the Existing + Approved Projects baseline scenario are not presented separately in the EIR, but are evaluated as part of the discussion of project impacts for each traffic impact analysis, to provide the appropriate comparison. The Existing + Approved Projects baseline is separately identified in Appendix D.

Project Trip Generation and Distribution

The number of vehicle trips that would be generated by the Proposed Project was estimated through a trip generation analysis. Trip generation rates for the land uses under consideration were taken from the City of Vacaville's rates. The trip rates were developed in the 1995 calibration of the 1990 Citywide Traffic Model, and are summarized in Appendix D in Table 5 on p. 18.

The Proposed Project was found to generate approximately 3,118 PM peak hour trips in the analysis of Existing + Approved Projects + Project scenario and approximately 2,871 trips in the Year 2025 + Project scenario. The decrease in project-generated trips between the existing and future year 2025 scenarios occurs in part because of variations in the origin and destination assignments in the model runs drive variations in amounts and types of new development forecast to be present in the City of Vacaville for each of the scenario time periods and the traffic model balances resulting attractions against productions. A practical example of how this

occurs is larger mixed commercial developments in the future may generate proportionally fewer trips per residential unit because the resident is traveling to a variety of stores in a single trip rather than making several trips.

Vehicle trips generated by the Proposed Project were assigned to the surrounding transportation network using the City's Travel Demand Model. This pattern is based on existing traffic flows on I-80 and local streets, the locations of potential origins and destinations, and logical circulation patterns on the area's roadway network. The AM peak hour trip distribution projection was developed as a percentage of PM peak hour trip distribution from the model, assigned in the reverse direction.

Using the trip generation and trip distribution information described above, trips generated by Proposed Project land uses were assigned to the local roadway network for morning and evening peak hour conditions. Approximately 20 percent of project-generated trips would be internal to the project site, because residents would be able to shop at the commercial uses included in the project. Thus, the mixed-use nature of the project encourages travel among the residential and commercial uses in Lower Lagoon Valley. Travel is assigned in part based on whether a local roadway or freeway segment is shown to be congested. For example, under Existing + Approved Project + Project conditions, trips to Downtown Vacaville were assigned to I-80. In 2025 future scenarios, when freeways are expected to be more congested, some trips are redistributed in the model and approximately 17 percent of outbound project trips were assumed to travel northbound on Pleasant Valley Road to reach Vacaville without using the freeway. Trip distribution in 2025 is shown on Figure 5, p. 20 in Appendix D.

Thresholds of Significance

The City of Vacaville has adopted thresholds of significance for traffic impact analyses, identified in the General Plan Transportation Element and in the Land Use and Development Ordinance. Traffic impacts would be considered significant if:

- Levels of Service would be degraded from an acceptable LOS A, B, C, or D to unacceptable E or F by traffic from the project; or
- Volume to Capacity ratios at an intersection already operating at LOS E or F in the baseline condition would be reduced by 0.02 or greater by traffic from the project.

Effects Determined to Have Less-Than-Significant Impacts

The analysis of roadway segments in the project vicinity showed that the Proposed Project would not cause levels of service to degrade below LOS D, an acceptable level, under existing, Existing + Approved Projects, or future 2025 conditions. Therefore, although the segment on Rivera Road between Lagoon Valley Road and Cherry Glen/Peña Adobe would degrade from LOS A under both existing conditions scenarios to LOS D with project-generated traffic, this would be considered a less-than-significant impact and mitigation measures would not be needed.

The analysis of freeway segments in the project vicinity showed that the Proposed Project would not cause existing acceptable LOS to degrade to unacceptable levels or cause unacceptable V/C ratios to degrade by 0.02 or more compared with Existing + Approved Project conditions. The eastbound freeway segment between the Alamo Drive overcrossing and the Cherry Glen/Peña Adobe overcrossing would degrade from LOS D to LOS E in the PM peak hour with the addition of traffic from already approved projects. Traffic from the Proposed

Project would not cause LOS to degrade further and would cause the V/C to change from 0.95 to 0.96, a less-than-significant impact. Project impacts to freeway segments in 2025 are discussed below.

Freeway ramps at the Alamo Drive /Merchant Street interchange already operate at LOS E or F in the AM or PM, depending on the direction (the westbound on-ramp operates at LOS F in the morning, and the eastbound off-ramp operates at LOS E in the evening). With the addition of traffic from approved projects, both on- and off-ramps would operate at unacceptable LOS E or F in the AM and PM peak hours. With the addition of project-generated trips, the Model redistributed trips throughout the area, resulting in a different trip distribution than the baseline conditions. This trip balancing assigned fewer trips to the eastbound off-ramps and westbound on-ramps, thus indicating an improved V/C ratio with the Proposed Project, although LOS would remain E or F. The project, therefore would not cause significant traffic impacts at freeway ramps under Existing + Approved Projects + Project conditions. Project impacts to freeway ramps in 2025 are discussed below.

The freeway merge/diverge analysis showed that with traffic from approved projects, the Alamo Drive/Merchant Street eastbound off-ramp area would experience LOS E conditions in the PM peak hour. The project would contribute traffic to this diverge condition; however, as with the freeway ramp analysis, the model redistributed traffic and the project was not shown to result in worse levels of service at this location. Therefore the project would not cause significant impacts at freeway/ramp junctions. Project impacts in 2025 are discussed below.

Project Impacts and Mitigation Measures

4.5-1 Traffic generated by the Proposed Project would cause LOS to degrade to unacceptable levels at one intersection under Existing + Approved Projects + Project conditions.

The study intersections, including the 12 existing analysis intersections and the 4 new intersections that would be built as part of the project, were analyzed under Existing + Approved Project and Existing + Approved Project + Project conditions. The results of the analysis are shown in Table 4.5-9.

As shown in the table, the North Texas Street / I-80 eastbound ramps intersection already operates at LOS E (V/C 0.94) under existing conditions, and would remain at LOS E with a worse V/C ratio with traffic from the Approved Projects. Adding traffic from the Proposed Project would not result in further degradation in level of service, and would not cause a reduction in the V/C ratio compared with existing conditions. Note that the V/C ratio for the Existing + Approved Projects + Project scenario is slightly less than for the Existing + Approved Projects because the analysis model redistributes trips when different traffic generators and attractors are added. Thus, this would not be a significant environmental impact. The intersection of the I-80 eastbound ramps with Cherry Glen Road / Peña Adobe Road / Rivera Road would degrade from LOS A under existing conditions and existing conditions with Approved Projects to LOS E with project-generated traffic in both the AM and PM peak hours. The project would contribute a substantial proportion of the total traffic at this intersection and would result in a **significant impact**.

TABLE 4.5-9				
EXISTING + PROJECT INTERSECTION LOS				
Intersection	Peak Hour	Existing	Existing + Approved Projects	Existing + AP + PROJECT
		LOS (Volume to Capacity Ratio) ²		
1. ¹ North Texas Street / I-80 Eastbound Ramps	AM	C (0.74)	C (0.78)	D (0.85)
	PM	E (0.94)	E (0.96)	E (0.93)
2. Hilborn Rd / Lyon Rd / North Texas St / I-80 WB Ramps	AM	C (0.78)	C (0.80)	C (0.76)
	PM	C (0.74)	D (0.81)	D (0.83)
3. Lagoon Valley Road / I-80 Eastbound Ramps	AM	A (0.17)	A (0.12)	A (0.57)
	PM	A (0.27)	A (0.14)	A (0.55)
4. Lagoon Valley Road / Rivera Road / Nelson Road	PM	A (0.17)	A (0.11)	A (0.48)
5. Cherry Glen Road / I-80 Westbound Ramps	AM	A (0.23)	A (0.15)	A (0.42)
	PM	A (0.21)	A (0.14)	A (0.53)
6. Cherry Glen Rd / Lyon Rd	PM	A (0.24)	A (0.20)	A (0.17)
7. I-80 EB Ramps / Cherry Glen / Peña Adobe / Rivera Road	AM	A (0.14)	A (0.19)	E (0.92)
	PM	A (0.16)	A (0.19)	E (0.95)
8. North Cherry Glen Road / I-80 WB Ramps/Cherry Glen	AM	A (0.14)	A (0.16)	C (0.77)
	PM	A (0.16)	A (0.16)	A (0.37)
9. Cherry Glen Road / Pleasant Valley Road	PM	A (0.28)	A (0.20)	A (0.19)
10. Alamo Drive / I-80 Eastbound Ramps	AM	B (0.63)	B (0.67)	A (0.57)
	PM	A (0.53)	A (0.55)	A (0.54)
11. Alamo Drive / Merchant St	AM	C (0.80)	D (0.88)	D (0.82)
	PM	B (0.61)	C (0.76)	C (0.75)
12. Alamo Drive / Marshall Rd	PM	B (0.70)	C (0.76)	B (0.64)
14. Lagoon Valley Road / Commercial Access Road	PM	-	-	A (0.32)
15. Lagoon Valley Road / Arterial #1	PM	-	-	A (0.51)
16. Lagoon Valley Road / Arterial #2	PM	-	-	A (0.24)
17. Internal Collector Intersection	PM	-	-	A (0.11)

Notes:
1. Intersection numbers shown in **Appendix D** in Figure 2.
2. Intersections with LOS E or LOS F are shown in bold.

Source: Korve Engineering, January 2004.

Mitigation Measures

Implementation of either of the following mitigation measures would reduce traffic intersection impacts with the project to a *less-than-significant level*.

- 4.5-1 (a) *Convert the northbound approach at the intersection of I-80 eastbound ramps / Cherry Glen / Peña Adobe / Rivera Road to two left turn lanes and 1 shared-through-right turn lane, using a design approved by the City of Vacaville with review and approval of CALTRANS.*

The geometry at the intersection of I-80 eastbound ramps / Cherry Glen / Peña Adobe / Rivera Road is currently one approach lane in each direction with shared left-through-right operation. This mitigation measure would add two left turn lanes and convert the existing lane to a shared through-right turn lane. Level of service would improve to LOS D (V/C ratio 0.87) in the AM

peak hour with this mitigation. Level of service would improve to LOS C (V/C ratio 0.75) in the PM peak hour with this mitigation.

The existing width of Rivera Road at this intersection would need to be widened to accommodate the additional left turn lanes, as the roadway currently is one lane in each direction. Also, the eastbound I-80 on-ramp would need to be widened to accept the two turning lanes, and would merge into one lane as it reached the merge location. Right-of-way would need to be obtained from either side of Rivera Road.

An alternative, if right of way could not be obtained for Rivera Road or if the on-ramp could not be widened, would be the following mitigation measure. This measure would reduce the impact at the intersection to a less-than-significant level.

- (b) *Redesign project access intersections to shift motorists from the commercial portion of the Proposed Project from the Peña Adobe Road / Cherry Glen Road interchange to the Lagoon Valley Road access to I-80. The redesign shall include installation of traffic controls and design of circulation patterns to discourage travel to Peña Adobe Road. The redesign shall encourage visitors to the commercial portion of the Proposed Project to use Lagoon Valley Road by appropriate placement of parking lot entrances, using a loop road and/or other features. Convert the northbound shared through-right lane at the intersection of Lagoon Valley Road/I-80 eastbound ramps into two separate lanes, one through lane and one right turn lane. Implement Mitigation Measure 4.5-4(a) to add an auxiliary freeway lane between Lagoon Valley Road and Peña Adobe/Cherry Glen.*

Two freeway interchanges provide access to the project's residential and commercial areas – Lagoon Valley and Pena Adobe/Cherry Glen. With this mitigation measure, the commercial portion of the project site would be configured so as to focus the roadway access points and driveways and the vehicle parking lots to direct traffic to Lagoon Valley Road and away from Rivera Road and the I-80 / Cherry Glen / Peña Adobe interchange. The current traffic distribution assigns all commercial outbound project trips to the I-80 eastbound freeway on ramp at Pena Adobe. By redistributing a majority of the assigned commercial traffic (85 percent, or 867 vehicles) from this freeway interchange to the interchange at Lagoon Valley Road, the service level at Pena Adobe would improve to LOS A. In turn, the intersection of Lagoon Valley Road/Nelson Road/Rivera Road would operate at LOS C and the intersection of Lagoon Valley Road/I-80 eastbound ramps would operate at LOS F, resulting in a **secondary significant impact** without the additional mitigation feature to convert the northbound shared through-right lane into two separate lanes. The project intersection at Lagoon Valley Road/Commercial Access Road would operate at LOS A.

This change in trip assignment would also affect the study area roadways. The freeway segment between Lagoon Valley and Pena Adobe eastbound would operate at LOS E, resulting in a **secondary significant impact** without the additional measure feature to add an auxiliary lane, as in Mitigation Measure 4.5.4(a). The roadway segment on Lagoon Valley between the I-80 Eastbound Ramps and Rivera Road would operate at LOS A. The Rivera Road segment would operate at LOS A. The I-80 freeway ramps would operate at LOS B at the Lagoon Valley eastbound on ramp and at LOS A at the Pena Adobe eastbound on ramp. The corresponding freeway merge locations would both operate at LOS C.

The secondary significant impacts at the intersection of Lagoon Valley Road / I-80 Eastbound Ramps would be mitigated by converting the northbound shared through-right lane into two separate lanes, one through lane and one right turn lane. With this mitigation, the intersection would operate at LOS D. The impact to the freeway segment between Lagoon Valley and Pena Adobe eastbound would be mitigated by the addition of an auxiliary lane between Lagoon Valley Road and Pena Adobe/Cherry Glen in the eastbound direction (see Mitigation Measure 4.5-4(a)).

4.5-2 Traffic generated by the Proposed Project would cause intersection LOS to degrade to unacceptable levels in 2025.

The 2025 baseline conditions were established using the City's MINUTP Travel Demand Model, assuming that the project site remains in park/open space and agricultural uses as it is now. Traffic generated by the Proposed Project was added to the 2025 baseline scenario to identify impacts resulting from project-generated traffic. Results of the intersection levels of service analysis are presented in Table 4.5-10. As shown there, about one-half of the intersections analyzed would operate at unacceptable levels of service in the future with the Proposed Project. The project would cause three (3) intersections to degrade from acceptable LOS under future baseline conditions to unacceptable levels. The intersections of Lagoon Valley Road / I-80 eastbound ramps, Cherry Glen Road/Peña Adobe Road/Rivera Road / I-80 eastbound ramps, and Alamo Drive / Marshall Road would degrade from acceptable levels of service to LOS E or F with traffic from the Proposed Project. This would be a **significant impact**. The project would also contribute to significant cumulative impacts, as discussed in Impact 5.1-5, in Chapter 5.1, Cumulative Impacts.

Mitigation Measures

Implementation of the following mitigation measures would reduce future project-specific intersection impacts to *less-than-significant* levels.

- 4.5-2 (a) *At the intersection of Lagoon Valley Road / I-80 eastbound ramps, signalize the intersection and add a northbound right-turn lane.*

Development of the Proposed Project would warrant installation of a traffic signal at this intersection in 2025. Adding a northbound right-turn lane would require acquiring right-of-way to widen Lagoon Valley Road at the base of the overcrossing. The eastbound I-80 on-ramp would also need to be widened to accept the additional turning lane, and then merged back into one lane before reaching the freeway merge location. Level of service would improve to LOS D (V/C 0.85 in the PM peak hour with this mitigation measure.

- (b.1) *At the intersection of the I-80 eastbound ramps with Cherry Glen Road / Peña Adobe Road / Rivera Road, convert northbound approach to two left-turn lanes and one shared through-right-turn lane.*

Level of service would improve to LOS D (V/C 0.86) in the PM peak hour with this mitigation measure. In the alternative, the following mitigation measure would also reduce impacts at the intersection of the I-80 eastbound ramps with Cherry Glen/Peña Adobe/Rivera.

- (b.2) *Implement Mitigation Measure 4.5-1(b).*

Intersection		Peak Hour	Future Baseline	Future Baseline with Project
			LOS (V/C ratio)	
1.	North Texas Street / I-80 Eastbound Ramps	AM	D (0.84)	D (0.85)
		PM	F (1.03)	F (1.02)
2.	Hilborn Rd / Lyon Rd / North Texas St / I-80 Westbound Ramps	AM	D (0.84)	D (0.84)
		PM	D (0.81)	D (0.84)
3.	Lagoon Valley Road / I-80 Eastbound Ramps	AM	A (0.13)	C (0.72)
		PM	A (0.14)	E (0.93)
4.	Lagoon Valley Road / Rivera Road / Nelson Road	PM	A (0.11)	A (0.54)
5.	Cherry Glen Road / I-80 Westbound Ramps	AM	A (0.17)	B (0.67)
		PM	A (0.14)	B (0.66)
6.	Cherry Glen Rd / Lyon Rd	PM	A (0.27)	A (0.47)
7.	I-80 Eastbound Ramps / Cherry Glen / Peña Adobe / Rivera Road	AM	A (0.21)	C (0.79)
		PM	A (0.22)	F (1.21)
8.	North Cherry Glen Road / I-80 Westbound Ramps/Cherry Glen	AM	A (0.17)	A (0.56)
		PM	A (0.18)	A (0.38)
9.	Cherry Glen Rd/Pleasant Valley Rd	PM	A (0.31)	A (0.51)
10.	Alamo Drive / I-80 Eastbound Ramps	AM	C (0.76)	C (0.78)
		PM	B (0.63)	B (0.66)
11.	Alamo Drive / Merchant St	AM	E (0.93)	E (0.96)
		PM	D (0.87)	D (0.90)
12.	Alamo Drive / Marshall Rd	PM	D (0.89)	E (0.91)
13.	North Texas St / Manuel Campos Parkway	AM	F (1.19)	F (1.21)
		PM	F (1.37)	F (1.40)
14.	Lagoon Valley Rd/Commercial Access Rd	PM	-	A (0.29)
15.	Lagoon Valley Road / Arterial #1	PM	-	A (0.51)
16.	Lagoon Valley Road / Arterial #2	PM	-	A (0.25)
17.	Internal Collector Intersection	PM	-	A (0.10)

Note: Intersections operating at LOS E or F shown in bold.
Source: Korve Engineering, January 2004.

This measure would involve redesigning project access intersections to shift focus to the Lagoon Valley Road ramps to I-80 eastbound, converting the northbound shared through-right lane at the ramp intersection into two separate lanes, and adding an auxiliary lane to the freeway between Lagoon Valley Road and Peña Adobe Road/Cherry Glen Road in the eastbound direction (Mitigation Measure 4.5-1(b)). With these measures the affected intersection at the Peña Adobe Road intersection with I-80 eastbound ramps would operate at LOS D; the project intersection at Lagoon Valley Road/ Commercial Access Road would operate at LOS A; the intersection of Lagoon Valley Road / I-80 eastbound ramps would operate at LOS D; and the freeway segment would operate at LOS C.

- (c) *Convert southbound right-turn lane to shared through-right-turn lane at the intersection of Alamo Drive / Marshall Road.*

This mitigation measure would allow for both through movements and right turns. Marshall Road would need to be widened at this intersection to provide for restriping on the north side of the intersection to redesignate the southbound right-turn lane and on the south side of the intersection to provide for a merge for the new through traffic. Level of service would improve to LOS C in the PM peak hour.

4.5-3 Project-generated traffic would cause freeway segment LOS to degrade to unacceptable levels on Interstate 80 in 2025.

Traffic from the Proposed Project would cause four freeway segments to degrade from LOS E under 2025 future baseline conditions to LOS F in the westbound direction in the AM peak hour, resulting in **significant impacts**. The affected segments are between the North Cherry Glen Road off-ramp and the Cherry Glen Road/Peña Adobe Road overcrossing; between the Alamo Drive overcrossing and the North Cherry Glen Road off-ramp; between the Cherry Glen Road/Peña Adobe Road overcrossing to the Lagoon Valley Road overcrossing; and between the Lagoon Valley Road overcrossing and the North Texas Street overcrossing. As shown on Table 4.5-11, the V/C ratios along these four freeway segments would increase by 0.02 or more as a result of project traffic. The project would contribute 10 percent or less of total traffic to these freeway segments. Cumulative contributions to segments operating at LOS F without the project are discussed in Impact 5.1-6, in Chapter 5.1, Cumulative Impacts.

TABLE 4.5-11						
YEAR 2025 FREEWAY SEGMENTS LOS						
Interstate 80 Freeway Segments		Peak Hour	2025 Future Baseline		2025 With Project	
			LOS (Volume/Capacity Ratio)			
East of Alamo Drive Overcrossing	EB	AM	A	(0.56)	B	(0.61)
		PM	C	(0.78)	D	(0.83)
	WB	AM	C	(0.77)	D	(0.87)
		PM	B	(0.63)	B	(0.68)
Alamo Drive Overcrossing – Cherry Glen/Pena Adobe Overcrossing	EB	AM	B	(0.68)	C	(0.76)
		PM	F	(1.11)	F	(1.19)
North Cherry Glen Off Ramp – Cherry Glen/Pena Adobe Overcrossing	WB	AM	E	(0.99)	F	(1.07)
		PM	C	(0.76)	D	(0.84)
Alamo Drive Overcrossing – North Cherry Glen Off Ramp	WB	AM	E	(1.00)	F	(1.10)
		PM	C	(0.76)	D	(0.84)
Cherry Glen/Pena Adobe Overcrossing – Lagoon Valley Overcrossing	EB	AM	B	(0.67)	C	(0.71)
		PM	F	(1.09)	F	(1.01)
	WB	AM	E	(0.98)	F	(1.02)
		PM	C	(0.75)	C	(0.80)
Lagoon Valley Overcrossing – North Texas Overcrossing	EB	AM	B	(0.67)	C	(0.73)
		PM	F	(1.10)	F	(1.09)
	WB	AM	E	(0.99)	F	(1.01)
		PM	C	(0.75)	D	(0.82)

Note: Segments with LOS E or LOS F shown in bold.
Source: Korve Engineering, January 2004

Mitigation Measures

Implementation of the following mitigation measures would reduce project impacts to less-than-significant levels. All measures would involve improvements to the I-80 freeway, which is under the jurisdiction of the California Department of Transportation (Caltrans). Because implementation is not within the jurisdiction of the City of Vacaville, the impacts would remain **significant and unavoidable**.

- 4.5-3 (a) *Widen the I-80 freeway by 12 feet on the west side to add a fifth westbound lane to I-80 from the North Cherry Glen off-ramp to Cherry Glen/Peña Adobe, relocating the shoulder and using the existing shoulder area for the new lane.*

Implementation of this measure would not require acquisition of new property for additional freeway right-of-way, and would improve the LOS along this segment from F to D (V/C 0.90).

- (b) *Widen the I-80 freeway by 12 feet and construct a retaining wall on the west side to add a fifth (auxiliary) westbound lane between the Alamo Drive overcrossing and the North Cherry Glen off-ramp, and construct a retaining wall west of the relocated shoulder.*

This measure would not require acquisition of property, and would improve the LOS along this segment from F to E (V/C 0.93).

- (c) *Widen the I-80 freeway by 12 feet on the west side to add a fifth westbound lane to I-80 from the Cherry Glen / Peña Adobe overcrossing to the Lagoon Valley Road overcrossing, relocating the shoulder and using the existing shoulder area for the new lane.*

This measure would not require acquisition of property, and would improve the LOS along this segment from F to D (V/C 0.86).

- (d) *Widen the I-80 freeway by 12 feet on the west side to add a fifth westbound lane between Lagoon Valley Road and North Texas Street, relocating the shoulder and using the existing shoulder area for the new lane. Install a retaining wall along the edge of the widened freeway.*

The retaining wall would be needed to retain the cut slope in the hill adjacent to the freeway. This measure would result in an acceptable LOS of D (V/C 0.85).

4.5-4 Project-generated traffic would cause one freeway ramp to degrade from acceptable to unacceptable LOS in 2025.

Project-generated traffic would cause the Peña Adobe I-80 eastbound on-ramp to degrade from LOS A under future 2025 baseline conditions to LOS E in the PM peak hour in 2025, as shown in Table 4.5-12. This would be a **significant impact**. Most other freeway ramps would continue to operate at acceptable LOS in the future with the addition of project traffic. The project's contribution to freeway ramps already operating at LOS F in 2025 is discussed under cumulative impacts, in Impact 5.1-7, in Chapter 5.1, Cumulative Impacts.

Mitigation Measures

Implementation of the following mitigation measures would reduce project impacts to less-than-significant levels. However, because implementation of these measures is not within the jurisdiction of the City of Vacaville, this impact would remain *significant and unavoidable*.

- 4.5-4 (a) *Widen the freeway by 12 feet on the east side to add a fifth eastbound lane on I-80 between Lagoon Valley Road and Cherry Glen Road / Peña Adobe Road, in coordination with Rivera Road reconstruction that is proposed as part of the project.*

TABLE 4.5-12					
YEAR 2025 FREEWAY RAMP LOS					
Freeway Ramps	Peak Hour	2025 Future Baseline		2025 With Project	
		LOS (Volume to Capacity)			
Lagoon Valley I-80 Westbound On Ramp	AM	A	(0.07)	A	(0.27)
	PM	A	(0.04)	A	(0.35)
Lagoon Valley I-80 Westbound Off Ramp	AM	A	(0.00)	A	(0.29)
	PM	A	(0.00)	A	(0.21)
Lagoon Valley I-80 Eastbound On Ramp	AM	A	(0.00)	A	(0.21)
	PM	A	(0.00)	A	(0.13)
Lagoon Valley I-80 Eastbound Off Ramp	AM	A	(0.02)	A	(0.30)
	PM	A	(0.03)	A	(0.56)
Cherry Glen I-80 Westbound On Ramp	AM	A	(0.00)	A	(0.00)
	PM	A	(0.00)	A	(0.00)
Cherry Glen I-80 Westbound Off Ramp	AM	A	(0.05)	A	(0.26)
	PM	A	(0.05)	A	(0.23)
North Cherry Glen I-80 Westbound Off Ramp	AM	A	(0.02)	A	(0.19)
	PM	A	(0.01)	A	(0.02)
Pena Adobe I-80 Eastbound On Ramp	AM	A	(0.06)	A	(0.24)
	PM	A	(0.07)	E	(0.96)
Pena Adobe I-80 Eastbound Off Ramp	AM	A	(0.01)	A	(0.00)
	PM	A	(0.00)	A	(0.00)
Alamo / Merchant Eastbound Off Ramp	AM	F	(1.11)	F	(1.26)
	PM	F	(2.26)	F	(2.40)
Alamo / Merchant Westbound On Ramp	AM	F	(1.52)	F	(1.57)
	PM	F	(1.12)	F	(1.26)
Manuel Campos Parkway I-80 Eastbound Off Ramp	AM	A	(0.12)	A	(0.12)
	PM	A	(0.31)	A	(0.31)
Manuel Campos Parkway I-80 Eastbound On Ramp	AM	A	(0.40)	A	(0.44)
	PM	A	(0.46)	A	(0.46)
Manuel Campos Parkway I-80 Westbound Off Ramp	AM	A	(0.40)	A	(0.41)
	PM	A	(0.45)	A	(0.50)
Manuel Campos Parkway I-80 Westbound On Ramp	AM	A	(0.28)	A	(0.28)
	PM	A	(0.14)	A	(0.14)

Note: Ramps operating at LOS E or LOS F shown in bold.
Source: Korve Engineering, January 2004.

This measure would construct a new auxiliary lane in the existing shoulder and relocate the shoulder into the adjacent right-of-way. Rivera Road is less than 50 feet from the existing shoulder of the freeway and serves as a frontage road. Rivera Road is proposed to be relocated to provide access to the commercial portion of the Proposed Project; construction of the additional eastbound land should be coordinated with relocation of the frontage road. Implementation of this measure would improve LOS from E to C (V/C 0.80) in the PM peak hour.

The freeway is under the jurisdiction of Caltrans. Therefore, while the City could cooperate with Caltrans and could require that the project sponsor cooperate with Caltrans in relocating Rivera Road, potentially retaining existing right-of-way for use by Caltrans as part of freeway widening,

implementation of the measure is outside the jurisdiction of the City. Therefore, the impact would remain significant and unavoidable.

- (b) *In the alternative, implement Mitigation Measure 4.5-1(b), to redesign project access intersections to shift traffic to the Lagoon Valley Road freeway interchange.*

Implementation of this measure would improve LOS on the Peña Adobe eastbound on-ramp from LOS E to LOS A. The measure alone would result in secondary significant impacts that could be mitigated by implementation of Mitigation Measure 4.5-4(a).

4.5-5 Traffic generated by the Proposed Project would cause LOS at diverge locations near freeway off-ramps to degrade to unacceptable levels in 2025.

The Proposed Project would result in additional traffic on the I-80 freeway that would affect freeway operations at three off-ramps in the vicinity of the project site. The diverge operations at these three locations would degrade from LOS D to LOS E with the project, as shown on Table 4.5-13. The affected locations are the Lagoon Valley Road/I-80 eastbound off-ramp in the AM peak hour, the Cherry Glen/I-80 westbound off-ramp in the PM peak hour, and the North Cherry Glen/I-80 westbound off-ramp in the AM peak hour. The project would contribute 80 percent or more to total traffic volumes at each location. This is a **significant impact**. Significant cumulative effects are discussed under Impact 5.1-8, in Chapter 5.1, Cumulative Impacts.

Mitigation Measures

Implementation of the following mitigation measures would reduce project impacts to less-than-significant levels. However, because implementation of these measures is not within the jurisdiction of the City of Vacaville, this impact would remain *significant and unavoidable*.

- 4.5-5 (a) *Widen the freeway by 12 feet on the east side to add a new eastbound lane along I-80 from North Texas Street to Lagoon Valley Road.*

This measure would eliminate merge/diverge conflicts near the Lagoon Valley Road off-ramp. It would be under the jurisdiction of Caltrans, and could not be implemented by the City of Vacaville. Therefore, the impact would remain significant and unavoidable.

- (b) *Implement Mitigation Measure 4.5-3(a) to add a westbound lane to I-80 between North Cherry Glen off-ramp and Cherry Glen/Peña Adobe.*

The addition of an auxiliary lane along I-80 westbound from the North Cherry Glen off-ramp to the Cherry Glen / Peña Adobe off-ramp would add capacity to the freeway, creating a fifth traffic lane and eliminating the merge/diverge conflict.

- (c) *Implement Mitigation Measure 4.5-3(b) to add a westbound lane between Alamo Drive and the North Cherry Glen off-ramp and construct a retaining wall adjacent to the freeway shoulder.*

Variant with California Drive Overcrossing

The Vacaville General Plan includes a series of recommended future roadway improvements in the Transportation Element, in Table 6-1. Among them is construction of an extension of

TABLE 4.5-13					
YEAR 2025 FREEWAY RAMP MERGE-DIVERGE LOS					
Freeway Merge – Diverge Locations	Peak Hour	2025 Future Baseline		2025 With Project	
		LOS (density in pc/mi/ln)			
Lagoon Valley I-80 Westbound On (M)	AM	D	28	C	28
	PM	C	22	C	23
Lagoon Valley I-80 Westbound Off (D)	AM	D	30	D	33
	PM	C	22	C	25
Lagoon Valley I-80 Eastbound On (M)	AM	B	19	C	20
	PM	D	29	D	28
Lagoon Valley I-80 Eastbound Off (D)	AM	B	20	C	24
	PM	D	34	E	37
Cherry Glen I-80 Westbound On (M)	AM	C	23	C	23
	PM	B	18	B	19
Cherry Glen I-80 Westbound Off (D)	AM	D	35	E	39
	PM	C	27	D	31
North Cherry Glen I-80 Westbound Off (D)	AM	D	32	E	37
	PM	C	24	C	27
Pena Adobe I-80 Eastbound On (M)	AM	B	17	B	18
	PM	C	25	C	23
Pena Adobe I-80 Eastbound Off (D)	AM	C	22	C	24
	PM	E	36	D	33
Alamo / Merchant Eastbound Off (D)	AM	D	30	D	34
	PM	F	53	F	57
Alamo / Merchant Westbound On (M)	AM	C	22	C	22
	PM	B	19	C	20
Manuel Campos Parkway I-80 Eastbound Off (D)	AM	C	23	C	25
	PM	E	39	E	38
Manuel Campos Parkway I-80 Eastbound On (M)	AM	C	24	C	26
	PM	E	37	E	36
Manuel Campos Parkway I-80 Westbound Off (D)	AM	D	30	D	31
	PM	C	23	C	25
Manuel Campos Parkway I-80 Westbound On (M)	AM	C	26	C	26
	PM	C	20	C	22

Note: Ramps operating at LOS E or LOS F shown in bold.
Source: Korve Engineering, January 2004.

California Drive between Marshall Road and Cherry Glen Road, including an overcrossing over the I-80 freeway. If this improvement were implemented, a number of the significant traffic impacts identified as resulting from the proposed development project in Lagoon Valley would be reduced or eliminated. Extending California Drive could result in new significant traffic impacts that would be different from those identified with the Proposed Project. Therefore, two scenarios including a new California Drive Overcrossing were developed and analyzed in the future 2025 context, without and with the Proposed Project. The results of the analysis of the California Drive Overcrossing with development of the Proposed Project are presented briefly in this section as the “California Drive Overcrossing Variant,” based on the detailed analysis

provided in the *Lower Lagoon Valley Mixed-Use Development Traffic Impact Analysis* prepared by Korve Engineering.

The California Drive Overcrossing Variant assumed that the overcrossing would be constructed as a two-lane roadway by 2025. The westbound off-ramp from I-80 at North Cherry Glen Road would be closed. The extension of Manuel Campos Parkway to North Texas Street and I-80 was assumed, as for the 2025 baseline and 2025 baseline plus project scenarios. The results of the analysis of the California Drive Overcrossing with the Proposed Project are presented together with the future baseline scenario and the 2025 baseline plus project scenario to provide a comparison. The California Drive Overcrossing would be funded with Transportation Portion of Development Impact Fees. Only initial planning has taken place to support the nexus that development is creating transportation demand that warrants the construction of this improvement, no mitigation measures have been identified for potentially significant impacts that could result from its construction. At the time further planning and design are initiated for this project, environmental review would need to be accomplished.

As shown in Table 4.5-14, the California Drive Overcrossing would reduce project-specific impacts at three intersections, but would result in similar or worse significant impacts at other study intersections. The Variant would cause the intersection of North Cherry Glen Road/I-80/WB Ramps/Cherry Glen Road to degrade from LOS A in 2025 with the project to LOS F with the project and the overcrossing, causing a new significant environmental impact that would not result with the Proposed Project. The Variant would also result in LOS F at the new intersection of California Drive with Butcher Road; resulting in a new significant impact. The subsequent design of these intersections, due to the impacts resulting from California Drive Overcrossing, would be addressed in the environmental assessment for this planned project. The Variant would result in the same significant impacts at the intersections of Alamo Drive with Marshall Road and North Texas Street with Manuel Campos Parkway. The Variant would improve LOS from E to B at the intersection of Lagoon Valley Road with the I-80 eastbound ramps, and would slightly improve V/C ratios in the PM peak hour at the intersections of North Texas Street with the I-80 eastbound ramp and Cherry Glen/Peña Adobe Drive/Rivera Road with the I-80 eastbound ramp, although both intersections would continue to operate at unacceptable levels.

The California Drive Overcrossing Variant would not cause substantial changes in the LOS on the roadway segments analyzed compared with the Proposed Project, but would result in LOS F in the PM peak hour on the newly-created roadway on the overcrossing, a new significant traffic impact based on the assumption overcrossing would be one lane in each direction. This analysis would provide evidence California Drive needs to be provided with two (2) lanes in each direction. Traffic analysis used for the design of this overcrossing should be the basis for the construction of overcrossing with two (2) or four (4) lanes.

The California Drive Overcrossing Variant would result in slight improvements along two of the freeway segments identified as operating at LOS F in 2025 with the Proposed Project: on the westbound segments between the North Cherry Glen off-ramp and the Cherry Glen/Peña Adobe overcrossing and between the Alamo Drive overcrossing and the North Cherry Glen off-ramp, the project would cause the LOS to degrade from LOS E to LOS F in the AM peak hour, while the Variant would return the segments to LOS E with an improved V/C ratio. Other segments would remain essentially the same in 2025 with or without the California Drive overcrossing, as shown in Table 4.5-15.

Two freeway ramps would improve from LOS E or F in 2025 with the Proposed Project to LOS A with the California Drive overcrossing in the PM peak hour: the eastbound on-ramp at Peña

Adobe Road and the westbound on-ramp at Alamo Drive and Merchant Street. Other freeway ramps would remain essentially the same with or without the new overcrossing. The California Drive overcrossing would not cause unacceptable LOS at any new freeway ramp locations in 2025 compared with the Proposed Project alone.

Intersection		Peak Hour	2025 Future Baseline	2025 with Project	California Dr Overcrossing w/ Project
			Level of Service (Volume-to-Capacity Ratio)		
1.	North Texas Street / I-80 Eastbound Ramps	AM	D (0.84)	D (0.85)	D (0.85)
		PM	F (1.03)	F (1.02)	E (1.00)
2.	Hilborn Rd / Lyon Rd / North Texas St / I-80 Westbound Ramps	AM	D (0.84)	D (0.84)	D (0.84)
		PM	D (0.81)	D (0.84)	D (0.83)
3.	Lagoon Valley Road / I-80 Eastbound Ramps	AM	A (0.13)	C (0.72)	C (0.73)
		PM	A (0.14)	E (0.93)	B (0.70)
4.	Lagoon Valley Road / Rivera Road / Nelson Road	PM	A (0.11)	A (0.54)	A (0.53)
5.	Cherry Glen Road / I-80 Westbound Ramps	AM	A (0.17)	B (0.67)	B (0.64)
		PM	A (0.14)	B (0.66)	B (0.64)
6.	Cherry Glen Rd / Lyon Rd	PM	A (0.27)	A (0.47)	C (0.78)
7.	I-80 Eastbound Ramps / Cherry Glen / Pena Adobe / Rivera Road	AM	A (0.21)	C (0.79)	C (0.79)
		PM	A (0.22)	F (1.21)	F (1.06)
8.	North Cherry Glen Road / I-80 Westbound Ramps/Cherry Glen	AM	A (0.17)	A (0.56)	F (1.06)
		PM	A (0.18)	A (0.38)	F (1.77)
9.	Cherry Glen Road / Pleasant Valley Road	PM	A (0.31)	A (0.51)	D (0.81)
10.	Alamo Drive / I-80 Eastbound Ramps	AM	C (0.76)	C (0.78)	A (0.55)
		PM	B (0.63)	B (0.66)	A (0.39)
11.	Alamo Drive / Merchant St	AM	E (0.93)	E (0.96)	D (0.84)
		PM	D (0.87)	D (0.90)	D (0.88)
12.	Alamo Drive / Marshall Rd	PM	D (0.89)	E (0.91)	E (0.92)
13.	North Texas St / Manuel Campos Parkway	AM	F (1.19)	F (1.21)	F (1.21)
		PM	F (1.37)	F (1.40)	F (1.39)
14.	Lagoon Valley Road/Commercial Access Road	PM	-	A (0.29)	A (0.31)
15.	Lagoon Valley Road / Arterial #1	PM	-	A (0.51)	A (0.52)
16.	Lagoon Valley Road / Arterial #2	PM	-	A (0.25)	A (0.25)
17.	Internal Collector Intersection	PM	-	A (0.10)	A (0.11)
21.	California / Marshall	PM	-	-	A (0.49)
22.	California / Butcher	PM	-	-	F (1.02)

Notes:
See Figure 2 in Appendix D for locations of intersections.
Intersections with LOS E or LOS F in bold.
Source: Korve Engineering, 2004

TABLE 4.5-15								
YEAR 2025 FREEWAY SEGMENTS LOS CA DRIVE OVERCROSSING VARIANT								
Interstate 80 Freeway Segments		Peak Hour	2025 future baseline		2025 baseline w/ Project		Project w/ CA Drive	
			Level of Service (V/C ratio)					
East of Alamo Drive Overcrossing	EB	AM	A	(0.56)	B	(0.61)	B	(0.61)
		PM	C	(0.78)	D	(0.83)	D	(0.81)
	WB	AM	C	(0.77)	D	(0.87)	C	(0.75)
		PM	B	(0.63)	B	(0.68)	B	(0.66)
Alamo Dr Overcrossing – Cherry Glen / Pena Adobe Overcrossing	EB	AM	B	(0.68)	C	(0.76)	C	(0.75)
		PM	F	(1.11)	F	(1.19)	F	(1.05)
North Cherry Glen Off Ramp – Cherry Glen / Pena Adobe Overcrossing	WB	AM	E	(0.99)	F	(1.07)	E	(0.92)
		PM	C	(0.76)	D	(0.84)	B	(0.69)
Alamo Dr Overcrossing – North Cherry Glen Off Ramp	WB	AM	E	(1.00)	F	(1.10)	E	(0.92)
		PM	C	(0.76)	D	(0.84)	B	(0.69)
Cherry Glen / Pena Adobe Overcrossing – Lagoon Valley Overcrossing	EB	AM	B	(0.67)	C	(0.71)	C	(0.71)
		PM	F	(1.09)	F	(1.01)	F	(1.01)
	WB	AM	E	(0.98)	F	(1.02)	F	(1.03)
		PM	C	(0.75)	C	(0.80)	C	(0.79)
Lagoon Valley Overcrossing – North Texas Overcrossing	EB	AM	B	(0.67)	C	(0.73)	C	(0.73)
		PM	F	(1.10)	F	(1.09)	F	(1.03)
	WB	AM	E	(0.99)	F	(1.01)	F	(1.02)
		PM	C	(0.75)	D	(0.82)	D	(0.82)

Note: Segments with LOS E or LOS F in bold.
Source: Korve Engineering, January 2004

Table 4.5-16 shows the freeway ramp merge-diverge operations in 2025 with the Proposed Project and with the California Drive overcrossing. Freeway ramp merge-diverge operations would change with the addition of the California Drive overcrossing in 2025. The locations at the Lagoon Valley eastbound off-ramp, the Alamo/Merchant eastbound off-ramp and the Manuel Campos Parkway eastbound on-ramp would improve from LOS E with the project to LOS D in the PM peak hour. The merge/diverge location at the Cherry Glen westbound off-ramp would improve from LOS E to LOS D in the AM peak hour. The North Cherry Glen westbound off-ramp would be closed, removing merge/diverge movements at that location. The Manuel Campos eastbound off-ramp would remain the same with or without the California Drive overcrossing, at LOS E in the PM peak hour. The Peña Adobe eastbound off-ramp would degrade from LOS D with the Proposed Project back to LOS E with the California Drive overcrossing, the same as the 2025 future baseline condition, in the PM peak hour.

TABLE 4.5-16							
YEAR 2025 FREEWAY RAMP MERGE-DIVERGE LOS WITH CA DRIVE OVERCROSSING							
Freeway Merge – Diverge Locations	Peak Hour	2025 future baseline		2025 baseline with Project		Project w/ CA Drive	
		Level of Service / Density (pc/mi/ln)					
Lagoon Valley I-80 Westbound On (M)	AM	D	28	C	28	C	28
	PM	C	22	C	23	C	23
Lagoon Valley I-80 Westbound Off (D)	AM	D	30	D	33	D	33
	PM	C	22	C	25	C	25
Lagoon Valley I-80 Eastbound On (M)	AM	B	19	C	20	C	20
	PM	D	29	D	28	D	28
Lagoon Valley I-80 Eastbound Off (D)	AM	B	20	C	24	C	24
	PM	D	34	E	37	D	33
Cherry Glen I-80 Westbound On (M)	AM	C	23	C	23	C	21
	PM	B	18	B	19	B	19
Cherry Glen I-80 Westbound Off (D)	AM	D	35	E	39	D	34
	PM	C	27	D	31	C	26
North Cherry Glen I-80 Westbound Off (D)	AM	D	32	E	37	NA	
	PM	C	24	C	27	NA	
Pena Adobe I-80 Eastbound On (M)	AM	B	17	B	18	B	18
	PM	C	25	C	23	C	22
Pena Adobe I-80 Eastbound Off (D)	AM	C	22	C	24	C	24
	PM	E	36	D	33	E	35
Alamo / Merchant Eastbound Off (D)	AM	D	30	D	34	D	34
	PM	F	53	F	57	E	50
Alamo / Merchant Westbound On (M)	AM	C	22	C	22	C	21
	PM	B	19	C	20	B	17
Manuel Campos Parkway I-80 Eastbound Off (D)	AM	C	23	C	25	C	25
	PM	E	39	E	38	E	36
Manuel Campos Parkway I-80 Eastbound On (M)	AM	C	24	C	26	C	25
	PM	E	37	E	36	D	35
Manuel Campos Parkway I-80 Westbound Off (D)	AM	D	30	D	31	D	31
	PM	C	23	C	25	C	25
Manuel Campos Parkway I-80 Westbound On (M)	AM	C	26	C	26	C	26
	PM	C	20	C	22	C	22

Notes: Locations with LOS E or LOS F shown in bold.
NA = North Cherry Glen Westbound Off Ramp would be closed with extension of the California Drive Overcrossing.
Source: Korve Engineers, January 2004.

4.6 AIR QUALITY

4.6 AIR QUALITY

4.6.1 INTRODUCTION

This section evaluates the potential impacts on air quality resulting from implementation of the Proposed Project. This includes the potential for the project to conflict with or obstruct implementation of the applicable air quality plan, to violate an air quality standard or contribute substantially to an existing or projected air quality violation, to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment, to expose sensitive receptors to substantial pollutant concentrations or result in the release of toxic air contaminants (TACs).

A comment letter was received in response to the NOP (see Appendix B) circulated for the project from the Yolo-Solano Air Quality Management District (YSAQMD). This comment letter outlined the topics for which this Air Quality section should analyze. Comments made at the public hearing raised concerns over air pollution and are also incorporated in this analysis.

4.6.2 ENVIRONMENTAL SETTING

Air quality is determined from a combination of weather, topography, and the quantity and type of pollutants released in an area. Air quality in the Vacaville area is affected by local and regional sources of pollution.

Regional Meteorology

The Specific Plan area is located west of the City of Vacaville in western Solano County, within the Sacramento Valley Air Basin (SVAB). The climate in the Sacramento Valley area is classified as Mediterranean, with mild, wet winters and warm dry summers. The major climatic controls are the Pacific High Pressure system over the eastern Pacific Ocean, the local topography, and the Pacific Ocean itself. The formation of a high-pressure area over the Great Basin Region to the east of the Sierra Nevada also affects the meteorology of the Sacramento Valley area, primarily during the winter months. The Pacific High is a semi-permanent, subtropical high-pressure system located off the Pacific Coast. The size and strength of the Pacific High varies seasonally. During the summer, the size and strength is at a maximum and the regional climate is dominated by its influence. As a result, clear skies with intense solar heating occur over California's interior, forming a thermal trough of low pressure. This low-pressure trough intensifies the prevailing northwesterly flow over the area. Very little precipitation occurs during summer because migrating the Pacific High blocks extra-tropical weather systems.

Site Meteorology

Lower Lagoon Valley's climate includes primarily hot, dry summers and cool, rainy winters. Approximately 35 percent of the time winds are from the south, with calm winds occurring about 12 percent of the time. Atmospheric temperature inversions occur frequently in the region and

limit the vertical dispersion of pollutants. These inversions may result in high levels of carbon monoxide (CO) during the winter months and high ozone levels during summer and fall.

Proximity to the Pacific Ocean and the San Francisco Bay, as well as the local topography, are the greatest influences on temperature variability in the Valley. Average daytime temperatures are in the mid-70s with nighttime temperatures averaging 48 degrees Fahrenheit (F). The annual average monthly temperature is 61 degrees F. Hot spells can occur, with temperatures exceeding 100 degrees F, and is typically caused by airflow from sub-tropical high pressure area that brings light to nearly calm wind and humidity below 20 percent.

Annual average rainfall is approximately 17 inches with a majority of rain falling between the months of October and April. Rainfall during these months is primarily due to winter storms. Thunderstorms are few in number, usually mild in character, and occur mainly in the spring. An occasional thunderstorm may drift over the valley from the Sierra Nevada in the summer. Snow falls so rarely, and in such small amounts that its occurrence may be disregarded as a climatic feature. Heavy fog occurs mostly in midwinter, rarely in summer, and seldom in spring or fall. The fog may last several days if stagnant atmospheric conditions are present.

The prevailing wind in the Lower Lagoon Valley is southerly every month but November, when it is northerly. Topographic effects, the north-south alignment of the valley, the coast range, and the Sierra Nevada strongly influence the wind flow in the project area. A sea level gap in the Coast Range occasionally allows cool, oceanic air to flow into the valley during the summer season with a marked lowering of temperature. In the spring and fall, a large north to south pressure gradient develops over the northern part of the state.

Criteria Air Quality Standards

Much of the effort to improve air quality in the United States and California is directed toward the control of five "criteria" air pollutants: ozone (O₃), CO, particulate matter less than ten microns in diameter (PM₁₀), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂). Pollutants subject to federal ambient standards are referred to as "criteria" pollutants because the U.S. Environmental Protection Agency (U.S. EPA) publishes criteria documents to justify the choice of standards. Table 4.6-1 identifies the national and state ambient air quality standards for relevant air pollutants along with the ambient pollutant concentrations that have been measured at the Vacaville monitoring station through the period of 2000 to 2002.

Air quality standards have been created to protect people who are most sensitive to the adverse health effects of air pollution, termed "sensitive receptors." The term "sensitive receptors" refers to specific population groups as well as the land uses where they would reside for long periods. Children, the elderly, the acutely ill, and the chronically ill are commonly identified sensitive population groups. Residences, schools, playgrounds, childcare centers, retirement homes or convalescent homes, hospitals, and clinics are commonly identified sensitive land uses.

The criteria pollutants for which federal and State standards have been promulgated and that are most relevant to air quality planning and regulation in the SVAB are ozone, carbon monoxide, fine suspended particulate matter, and sulfur dioxide. In addition, toxic air contaminants are of concern in the SVAB. Each of these is briefly described below:

TABLE 4.6-1			
SUMMARY OF AMBIENT AIR QUALITY IN THE PROJECT VICINITY			
Air Pollutants Monitored Within the City of Vacaville	Year		
	2000	2001	2002
Ozone			
Maximum 1-hour concentration measured	0.100 ppm ²	0.104 ppm	0.100 ppm
Number of days exceeding national 0.12 ppm 1-hour standard	0	0	0
Number of days exceeding state 0.09 ppm 1-hour standard	2	2	1
Maximum 8-hour concentration measured	0.081 ppm	0.081 ppm	0.077 ppm
Number of days exceeding national 0.08 ppm 8-hour standard	0	0	0
Respirable Particulate Matter (PM₁₀)			
Maximum 24-hour concentration	47.0 ppm	77.0 ppm	63.0 ppm
Number of days exceeding national 150.0 ppm standard	0	2	1
Number of days exceeding state 50.0 ppm standard	0	0	0
1. Ambient concentrations of CO are not monitored within the project vicinity			
2. ppm = parts by volume per million of air.			
Source: ARB 2003			

- Ozone** is a gas that is formed when reactive organic gases (ROG) and nitrogen oxides (NO_x), both byproducts of internal combustion engine exhaust, undergo slow photochemical reactions in the presence of sunlight. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable to the formation of this pollutant.
- Carbon Monoxide (CO)** is a colorless, odorless gas produced by the incomplete combustion of fuels. CO concentrations tend to be the highest during the winter morning, with little to no wind, when surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines, unlike ozone; motor vehicles operating at slow speeds are the primary source of CO in the Basin. The highest ambient CO concentrations are generally found near congested transportation corridors and intersections.
- Respirable Particulate Matter (PM₁₀)** consists of extremely small, suspended particles or droplets 10 microns or smaller in diameter. Some sources of PM₁₀, like pollen and windstorms, occur naturally. However, in populated areas, most PM₁₀ is caused by road dust, diesel soot, combustion products, abrasion of tires and brakes, and construction activities.
- Sulfur dioxide (SO₂)** is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high sulfur-content fuel oils and coal and from chemical processes occurring at chemical plants and refineries. When sulfur dioxide oxidizes in the atmosphere, it forms sulfates (SO₄). Together, these pollutants are referred to as sulfur oxides (So_x).
- Toxic Air Contaminants** are known to be highly hazardous to health, even in small quantities. TACs are airborne substances capable of causing short-term (acute) and/or long-term (chronic or carcinogenic) adverse human health effects (i.e., injury or illness). Although there are hundreds of substances that can be toxic when inhaled, air quality standards have not been set for most of them. TACs can be emitted from a variety of common sources, including gasoline

stations, automobiles, dry cleaners, industrial operations, and painting operations. Natural source emissions include windblown dust and wildfires. TACs include both organic and inorganic chemical substances. Examples include certain chlorinated hydrocarbons such as solvents, certain metals, and asbestos. In 1998, the State identified particulate matter from diesel-fueled engines as a TAC. Compared to other air toxics the State has identified and controlled, diesel particulate emissions are estimated to be responsible for approximately 70 percent of the total ambient air toxics risk throughout California.

In addition to the criteria pollutant discussed above, odors are also considered when determining a project's impact. However, there are currently no federal or State guidelines or thresholds, which pertain to the emission or detectability of odors. However, air quality management districts generally keep a record of the number and type of complaint made concerning any one-particular odor emission source. In order to understand the analysis of odor emissions, four major elements are involved: deductibility, recognition, intensity, and hedonic tone. Deductibility is the lowest concentration of an odor emission that will elicit a sensory response; at this concentration there is an awareness of the presence of an added substance, but not necessarily an odor sensation. Recognition, however, is the minimum concentration that is recognized as having a characteristic odor quality noticeable to a segment of the population. Odor intensity refers to the perceived strength of the odor sensation, and odorant character is what the substance smells like (e.g. fishy, rancid, hay, sewer). Hedonic tone is a judgment of the relative pleasantness or unpleasantness of the odor, and is influenced by factors, such as subjective experience and frequency of occurrence. The apparent presence of an odor in ambient air depends on the properties of the substance emitted, its concentration in facility emissions, and the dilution of emission between the emission point and the receptor.

Existing Regional Air Quality

There are many types of air pollutant sources in the portion of Solano County located within the SVAB. These sources can be divided into two categories: mobile and stationary sources. The California Air Resources Board (ARB) maintains an emission inventory of air pollutants within the state's air basins and counties inside those air basins. Exhaust emissions from on-road motor vehicles are the primary source of reactive organic gases, nitrogen oxides, and carbon monoxide in the western portion of Solano County. Mobile sources account for high carbon monoxide concentrations at some congested traffic intersections. Area-wide sources -- particularly entrained road dust, agricultural activities, construction activities and demolition activities -- are the primary sources of particulate matter in western Solano County.

Existing Local Air Quality

The Specific Plan area is located west of the City of Vacaville. Adjacent land uses include sporadic residential units, limited commercial uses, as well as a significantly developed recreational area. Local emissions sources include stationary activities, such as space and water heating, landscape maintenance from leaf blowers and lawn mowers, consumer products, and mobile sources, primarily automobile and truck traffic. Motor vehicles are the primary source of pollutants in the local vicinity. A summary of ambient air quality in the project vicinity is summarized in Table 4.6-1.

Traffic-congested roadways and intersections have the potential to generate localized high levels of CO. Localized areas where ambient concentrations exceed federal and/or State standards for CO are termed CO "hotspots." The YSAQMD recommends the use of CALINE4,

a dispersion model for predicting CO concentrations, as the preferred method of estimating pollutant concentrations at sensitive receptors near congested roadways and intersections. For each intersection analyzed, CALINE4 adds roadway-specific CO emissions calculated from peak-hour turning volumes to the existing ambient CO air concentrations. For this analysis, CO concentrations were calculated based on a simplified CALINE4 screening procedure developed by the Bay Area Air Quality Management District. The simplified model is intended as a screening analysis in order to identify a potential CO hotspot. This methodology assumes worst-case conditions and provides a screening of maximum, worst-case CO concentrations.

Maximum existing CO concentrations were calculated for the intersections evaluated in the project traffic impact analysis (see Section 4.5) that have receptors in close proximity to the roadways. For the purpose of this analysis, receptors are any of the sensitive receptor types identified previously, as well as any location where people would be required (as in a work site) to be located for one to eight hours. The results of these calculations are presented in Table 4.6-2 for representative receptor locations at 25, 50, and 100 feet from each roadway. These distances were selected because they represent locations where a person may be living or working for one to eight hours at a time. The National 1-hour standard is 35.0 parts per million (ppm), and the State 1-hour standard is 20.0 ppm. The 8-hour National and State standards are 9.5 ppm and 9.1 ppm, respectively.

EXISTING LOCALIZED CARBON MONOXIDE CONCENTRATIONS						
Intersection	CO Concentrations in Parts per Million^{1,2}					
	25 Feet		50 Feet		100 Feet	
	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour
Lagoon Valley Rd. & Nelson Rd.	3.2	3.1	3.1	3.1	3.1	3.1
Cherry Glen Rd. & Lyon Rd.	3.3	3.2	3.2	3.1	3.2	3.1
Cherry Glen Rd. & Pleasant Valley Rd.	3.4	3.3	3.3	3.2	3.2	3.1
Cherry Glen Rd. & Little Cherry Glen Rd.	3.1	3.1	3.1	3.1	3.1	3.0
Rivera Rd. & Cherry Glen Rd.	3.1	3.1	3.1	3.1	3.1	3.0
Marshall Rd. & Alamo Dr.	6.5	5.1	5.6	4.6	4.9	4.1

1. National 1-hour standard is 35.0 parts per million. State 1-hour standard is 20.0 parts per million.
 2. National 8-hour standard is 9.5 parts per million. State 8-hour standard is 9.1 parts per million.
 Source: EIP Associates 2003. Calculation sheets are provided in AppendixE.

As shown, under worst-case conditions, existing CO concentrations near the study-area do not exceed national or State 1-hour and 8-hour ambient air quality standards. Therefore, CO hotspots do not exist near these intersections.

The land uses in the vicinity of the Specific Plan area are not sources of substantial TAC concentrations.

Existing Site Emissions

The Specific Plan area currently supports uses such as agriculture, residential, small commercial and a wholesale nursery facility. Low amounts of the criteria pollutants would be generated by these uses on a daily basis from stationary sources, such as landscape maintenance equipment, agricultural operations, and mobile sources, primarily automobile and truck traffic. In addition, agricultural uses generate a small amount of odors, but due to the

small size of the existing agricultural operations, odor emissions were not detected during a site visit. In addition, the existing uses at within the Specific Plan do not generate levels of TACs that are subject to the permitting authority of the YSAQMD.

4.6.3 REGULATORY SETTING

Federal

The U.S. Environmental Protection Agency (U.S. EPA) is responsible for setting and enforcing the federal ambient air quality standards for atmospheric pollutants with the Basin. It regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. The U.S. EPA also has jurisdiction over emissions sources outside state waters (outer continental shelf), and establishes various emissions standards for vehicles sold in states other than California.

As part of its enforcement responsibilities, the U.S. EPA requires each state with nonattainment areas to prepare and submit a state implementation plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, State, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the SIP.

Clean Air Act

The Federal Clean Air Act (FCAA), as amended, establishes air quality standards for several pollutants. These standards are divided into primary standards and secondary standards. Primary standards are designed to protect public health, and secondary standards are intended to protect public welfare from effects such as visibility reduction, soiling, nuisance, and other forms of damage. The FCAA requires that regional plans be prepared for non-attainment areas illustrating how the federal air quality standards could be met. The CARB approved the most recent revision of the State Implementation Plan in 1994, and submitted it to the U.S. EPA. The State Implementation Plan was approved by the U.S. EPA in 1996. The State Implementation Plan consists of a list of reactive organic gas and nitrogen oxide control measures for demonstrating future attainment of ozone standards. The steps to achieve attainment will continue to require significant emissions reductions in both stationary and mobile sources.

Eight-Hour Ozone Standard

The federal eight-hour ozone standard was established in response to human health studies indicating that longer ozone exposures at lower levels also resulted in adverse health effects, including coughing, increased asthma attacks, chronic lung inflammation, decreased lung function, and decreased lung defenses against bacterial infections. The eight-hour standard was established in order to complement, not replace, the existing one-hour standard. Both federal ozone standards now apply, along with California's own one-hour ozone standard.

Federal Ozone Attainment Plan

The SVAB is subject to a Federal Ozone Attainment Plan (Clean Air Plan). This plan was adopted by five air districts in the Sacramento area (including YSAQMD) in order to build upon existing state and local air quality programs and is a component of the SIP. The Clean Air Plan contains adopted measures, implementation and adoption schedules for new measures,

emission inventories, modeling results, contingency measures, and emissions reduction demonstrations that guide reduction of emissions in the Sacramento Region.

Toxic Air Contaminants

Air toxics have been regulated at the federal level since the CAA of 1977. Following the passage of this law, regulations for seven hazardous air pollutants (Haps) were promulgated as National Emission Standards for Hazardous Air Pollutants (NESHAPS) over a 13-year period. The federal Clean Air Act Amendments of 1990 revamped the NESHAPS program to offer a technology-based approach for reducing the emissions of a greater number of toxic air compounds. Under the 1990 CAAA, 189 substances were identified as HAPs and slated for regulation. The program requires certain facilities to control air toxic emissions by the installation of Maximum Achievable Control Technology (MACT), which is implemented and enforced in the YSAQMD through Rule 3.8, Federal Operating Permits, which administers the federal operating permits program established by the 1990 CAAA.

State

California Air Resources Board

The ARB, a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and State air pollution control programs within California. In this capacity, the ARB conducts research, sets California Ambient Air Quality Standards, compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the SIP. The ARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hair spray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

California Clean Air Act

The State of California air quality standards are generally more stringent than the corresponding federal standards for the criteria air pollutants. The California Clean Air Act (CCAA) requires non-attainment areas to plan for the eventual attainment of the standards. Areas have been designated as attainment or non-attainment with respect to the ambient air quality standards. The timeframe given to meet state air quality standards would depend upon the severity of air quality problems. California Health and Safety Code Section 40914(A) requires that air districts design a plan to achieve an annual reduction in district-wide emissions of five percent or more for each non-attainment criteria pollutant or its precursor, averaged every consecutive three-year period, beginning at base year 1987.

The ARB regulates mobile emissions sources, and oversees the activities of county air pollution control districts and regional air quality management districts. The ARB regulates local air quality indirectly by establishing vehicle emission standards, by conducting research activities, and through planning and coordination activities.

Toxic Air Contaminants

California's air toxics control program began in 1983 with the passage of the Toxic Air Contaminant Identification and Control Act, better known as Assembly Bill 1807 (AB 1807) or the Tanner Bill. The Tanner Bill established a regulatory process for the scientific and public

review of individual toxic compounds. When a compound becomes listed as a TAC under the Tanner process, the ARB normally establishes minimum statewide emission control measures to be adopted by local air districts. By 1992, 18 of the 189 federal HAPs had been listed by the ARB as state TACs. Later legislative amendments (AB 2728, Tanner 1992) required the ARB to incorporate all 189 federal HAPs into the state list of TACs. In April 1993, the ARB added 171 substances to the state program to make the state TAC list equivalent to the federal HAP list.

The second major component of California's air toxics program, supplementing the Tanner process, was provided by the passage of AB 2588, the Air Toxics "Hot Spots" Information and Assessment Act of 1987. AB 2588 currently regulates over 600 air compounds, including all of the Tanner-designated TACs. Under AB 2588, specified facilities must quantify emissions of regulated air toxics and report them to the local air district. If the air district determines that a potentially significant public health risk is posed by a given facility, the facility is required to perform a health risk assessment and notify the public in the affected area if the calculated risks exceed specified criteria. The YSAQMD's implementation of AB 2588 is discussed below.

In addition to the above, Proposition 65 was passed by California voters in 1986, which required that a list of carcinogenic and reproductive toxicants found in the environment be compiled, the discharge of these toxicants into drinking water be prohibited, and warnings of public exposure by air, land, or water be posted if a potential public health risk is posed. The handling of any of these substances by a facility would require a public warning unless health risks could be demonstrated to be insignificant. For carcinogens, Proposition 65 defines the "no significant risk level" as the level of exposure that would result in an increased cancer risk of greater than 10 in one million over a 70-year lifetime. The Office of Environmental Health Hazard Assessment currently administers this program.

On August 27, 1998, the ARB formally identified particulate matter emitted by diesel-fueled engines as a TAC. Diesel engines emit TACs in both gaseous and particulate forms. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by the EPA as HAPs and by the ARB as TACs. Since by weight, the vast majority of diesel exhaust particles are very small (94 percent of their combined mass consists of particles less than 2.5 microns in diameter), both the particles and their coating of TACs are inhaled into the lung. While the gaseous portion of diesel exhaust also contains TACs, the ARB's August 1998 action was specific to diesel particulate emissions, which, according to supporting ARB studies, represent 50 to 90 percent of the mutagenicity of diesel exhaust (ARB 1998).

The ARB action was taken at the end of a lengthy process that considered dozens of health studies, extensive analysis of health effects and exposure data, and public input collected over the previous 9 years. ARB's Scientific Advisory Committee has recommended a unit risk factor of 300 in one million for diesel particulate. The ARB action will lead to additional control of diesel engine emissions in coming years by the ARB. The EPA has also begun an evaluation of both the cancer and no cancer health effects of diesel exhaust.

The ARB's 1998 ruling prompted the ARB to begin searching for means to reduce diesel particulate matter emissions. In September 2000, the ARB approved the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Diesel Risk Reduction Plan). The Diesel Risk Reduction Plan outlines a comprehensive and ambitious program that includes the development of numerous new control measures over the next several years aimed at substantially reducing emissions from new and existing on-road vehicles (e.g., heavy-duty trucks and buses), off-road equipment (e.g., graders, tractors, forklifts,

sweepers, and boats), portable equipment (e.g., pumps), and stationary engines (e.g., stand-by power generators).

Local

The project site is located in the SVAB portion of Solano County, which is currently designated “nonattainment” for state and national ozone standards and for the state PM₁₀ standard (Air Resources Board, 2000). The SVAB portion of Solano County forms part of a subregion within Sacramento Valley that is designated as a “severe” nonattainment area with respect to the national one-hour ozone standard; this subregion includes all or portions of Sacramento, Yolo, Solano, El Dorado, Placer, and Sutter counties. This area is also designated as a “serious” nonattainment area with respect to the state ozone standard. The project area is “attainment” or “unclassified” with respect to all other state and federal ambient air quality standards.

As noted earlier, the FCAA and the state CCAA require plans to be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the state PM₁₀ standard). Plans are also required under federal law for areas designated as “maintenance” for national standards. Such plans are to include strategies for attaining the standards. YSAQMD is part of the federal Sacramento Metropolitan Ozone Nonattainment Area. The 1994 Clean Air Plan, is the current federal ozone plan for the project area, and it predicts attainment of the national one-hour ozone standard by 2005 (Sacramento Metropolitan Air Quality Management District, 1994). To attain the standard by 2005, the 1994 Clean Air Plan relies heavily on local air district-administered, stationary-source control programs and on statewide mobile-source control programs. U.S. EPA defines the Sacramento ozone nonattainment area to include Sacramento, Yolo, Solano (northeastern portion that includes the project area), Placer and El Dorado Counties (except mountain portions), and part of Sutter County adjacent to Sacramento County.

In compliance with the requirements of the CCAA, the 1991 Air Quality Attainment Plan (State Plan) was adopted by the Yolo-Solano Air Quality Management District Board of Directors and approved by the ARB in 1992. The 1991 State Plan was designed to make expeditious progress towards attaining the state ozone standards. The CCAA requirement for the first triennial progress report and Plan revision of the State Plan was fulfilled with the preparation and adoption of the 1994 Clean Air Plan. This document was prepared to fulfill the requirements of the FCAA and construed by the ARB to also fulfill the 1994 requirements of the CCAA. The 1994 Clean Air Plan superseded the 1991 State Plan and predicted attainment of the federal ozone standards by the year 2005. The U.S. EPA approved the Clean Air Plan on September 26, 1996. The Clean Air Plan represents substantive progress toward the attainment of the state ozone standard through emission reductions. These reductions occurred from 1995 through 1997 and were primarily derived from statewide regulations such as consumer products, low emission vehicles programs and the regulation of the formulation of gasoline. Additionally, some of the control measures adopted by the District prior to the adoption of the Clean Air Plan were also starting to achieve emission reductions by 1997. The region committed to adopting and implementing all of the control measures by the end of 1999. The most recent, 1997 Triennial Progress Report was prepared and adopted by the YSAQMD Board in 1998.

Yolo–Solano Air Quality Management District

The YSAQMD has jurisdiction over air quality in the Davis area, including all of Yolo County and the northeastern portion of Solano County. The YSAQMD is one of five air districts located in

the SVAB. The YSAQMD regulates most air pollutant sources (stationary sources), with the exception of motor vehicles, aircraft, and agricultural equipment, which are regulated by the ARB or EPA. State and local government projects, as well as projects proposed by the private sector, are subject to requirements of the local air district and the state CCAA if the sources are regulated by the YSAQMD. In addition, the air districts located in the SVAB, along with the ARB, maintain ambient air quality monitoring stations at numerous locations throughout the SVAB. These stations are used to measure and monitor criteria and toxic air pollutant levels in the ambient air.

Before the passage of the CCAA, the YSAQMD's primary role was stationary source control of industrial processes and equipment. After passage of the CCAA and the CAAA, air districts were directed to implement transportation control measures and were encouraged to employ indirect source control programs to reduce mobile source emissions.

The YSAQMD and the four other air districts in the SVAB prepared the 1994 Clean Air Plan, which set the strategy for compliance with the federal ozone standard. The strategy includes numerous measures that require YSAQMD rulemaking and program development for their implementation. The Clean Air Plan is being updated by the five air districts in the SVAB. The update is not projected to be completed and adopted until late 2004.

The YSAQMD provides guidance for analysis of the impacts on air quality of land development projects. This guidance is the YSAQMD Air Quality Handbook (1996). This handbook contains thresholds of significance for criteria pollutant emissions.

Toxic Air Contaminants

In compliance with federal law, YSAQMD Rule 3.8, as described above, implements federal NESHAPS and MACT requirements through the federal operating permit program. The YSAQMD has also developed various rules for specific source categories pursuant to the Tanner process under YSAQMD Regulation IX, State Designated Toxics Sources. Among these rules, Rule 9.9, Asbestos, applies to UC Davis. This rule governs the airborne emissions of asbestos, including from demolition and renovation activities. Prior to any demolition and renovation, except for single-family residential dwellings and activities involving defined small amounts of regulated asbestos-containing material (RACM), the rule requires surveys for the presence of RACM. Then, during demolition, the rule requires wetting, physical barriers to outside air, signage, collection of RACM, proper waste handling and disposal of RACM, and record keeping. Other dust from construction and demolition activities is addressed by YSAQMD Rule 2.5, Nuisance, which states that sources cannot emit air contaminants that cause nuisances to "any considerable number of persons or the public."

The YSAQMD's permitting program also includes a "Best Available Control Technology for Toxics" (T-BACT) review under YSAQMD Rule 3.13, Toxics New Source Review. This rule covers proposed new or reconstructed major sources of federal HAPs. It implements Section 112(g) of the federal 1990 CAAA, which addresses new or reconstructed major sources of federal HAPs included in the specific source categories for which EPA promulgates MACT standards (as described above). If a source falls under this rule, a case-by-case T-BACT determination must be made, unless the source is specifically exempt (research and development activities as defined in 40 CFR 63.41). A major HAP source is one that emits 10 tons per year or more of a single federal HAP, or 25 tons per year or more of any combination of federal HAPs.

In compliance with state law, the YSAQMD also administers the AB 2588 Air Toxics “Hot Spots” Program. Facilities must report their TAC emissions and if the YSAQMD determines the facility poses a potential public health risk, the facility must perform a health risk assessment (HRA). An HRA includes an analysis of TAC emissions and characterizes human health risks as a result of the estimated TAC exposures. If the estimated health risks exceed threshold levels, the public in the affected area must be notified and steps taken to reduce emissions. For carcinogens, the YSAQMD uses a 70-year cancer risk level of 10 in one million as the AB 2588 public notification level, which matches the “no significant risk level” used by Proposition 65. For noncarcinogens, public health risk is assessed by the “hazard index” for both long-term (chronic) and short-term (acute) exposures. A “hazard index” is the sum of the ratios of each chemical’s actual exposures to acceptable exposures. Hazard index values less than 1.0 indicate an acceptable non-cancer health risk. The YSAQMD uses a hazard index threshold of 1.0 as the AB 2588 public notification level for non-cancer toxicants.

City of Vacaville

General Plan

Consistency of the Proposed Project with relevant City of Vacaville General Plan goals and policies is presented in Appendix C. As shown in Appendix C, the Proposed Project is consistent with applicable air quality goals and policies.

4.6.4 IMPACTS AND MITIGATION MEASURES

Methods of Analysis

The analysis in this section focuses on the nature and magnitude of the change in the air quality environment due to implementation of the Proposed Project. Air pollutant emissions associated with the Proposed Project would result from construction activities, increased building space, residential population, and increased traffic volumes. The net increase in Proposed Project area emissions generated by these activities and other secondary sources have been quantitatively estimated and compared to thresholds of significance recommended by the YSAQMD.

Construction Emissions

Construction emissions were calculated by estimating the types and number of pieces of equipment that would be used to clear the development area, excavate, and construct proposed uses and associated support facilities. The average daily emissions associated with these activities were estimated using emission factors from the URBEMIS 2002 emissions model developed for ARB.

Stationary Source Emissions

Stationary source emissions would be generated by the consumption of natural gas for space and water heating devices, and the operation of landscape maintenance equipment. The average daily emissions associated with these activities was estimated using emission factors from the URBEMIS 2002 emissions model developed for ARB.

Landscape Maintenance Emissions

The Proposed Project would increase the amount of landscape area over current conditions. This would increase the demand for landscape maintenance operations. The average daily emissions associated with these activities are estimated using emission factors from the URBEMIS 2002 emissions model.

Mobile Emissions

Changes in the amount of air pollutant emissions generated on a daily basis in association with the Proposed Project would primarily occur as a result of an increase in population and resulting changes in motor vehicle trips. The emissions associated with these motor vehicle trips are calculated using the URBEMIS 2002 emissions model and the traffic volumes predicted for the project in *Traffic Impact Analysis Report* summarized in Section 4.5, Transportation and Circulation.

Localized CO Concentrations

Localized CO concentrations are calculated based on a simplified CALINE4 screening procedure developed by the Bay Area Air Quality Management District. The simplified model is intended as a screening analysis, which identifies a potential CO hotspot. This methodology assumes worst-case conditions and provides a screening of maximum, worst-case CO concentrations. The resulting emissions were compared with adopted national and State ambient air quality standards.

Standards of Significance

For the purposes of this EIR, impacts to air quality are considered significant if the Proposed Project would:

- Conflict with or obstruct implementation of the 1994 Sacramento Area Regional Ozone Attainment Plan;
- Violate or contribute substantially to an existing or projected air quality violation;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

As the agency principally responsible for comprehensive air pollution control in the SVAB portion of Solano County, the YSAQMD recommends that projects should be evaluated in terms of air pollution impact significance thresholds established by the YSAQMD. These thresholds were developed by the YSAQMD to provide quantifiable levels that projects can be compared to. The City of Vacaville utilizes the YSAQMD's thresholds that are recommended at the time that development projects are proposed to assess the significance of quantifiable impacts. The following quantifiable thresholds are currently recommended by the YSAQMD and are used to determine the significance of air quality impacts associated with the Proposed Project.

Development projects are considered to be consistent with the 1994 Sacramento Area Regional Ozone Attainment Plan if they do not require a change in the existing land use designations (i.e., general plan and zoning) for the project site or if projected emissions for the Proposed Project are not greater than emissions anticipated for the site if developed under the existing land use designations. This same threshold is also used by the YSAQMD to determine the cumulative air quality impacts of new development projects.

The YSAQMD currently recommends that projects with construction-related or operational emissions that exceed any of the following thresholds be considered significant. These thresholds apply to individual projects only; they do not apply to cumulative development:

- 82 pounds per day of ROG
- 82 pounds per day of NO_x
- 150 pounds per day of PM₁₀

The YSAQMD also recommends that projects that could emit carcinogenic or toxic air contaminants that exceed the maximum individual cancer risk of 10 in one million be considered significant.

Project Impacts and Mitigation Measures

4.6-1 Construction activities associated with the Proposed Project could generate substantial air pollutant emissions.

During construction, two basic types of activities would be expected to occur and generate emissions. First, the development sites would be prepared, excavated, and graded to accommodate the new building foundations, the golf course, and related infrastructure. Second, the Proposed Project would be constructed.

Because of the construction time frame and the normal day-to-day variability in construction activities, it is difficult to precisely quantify the daily emissions associated with each phase of the proposed construction activities. Nonetheless, Table 4.6-3 identifies daily emissions that are estimated to occur on peak construction days, such as when the entire site is being graded and when residential and commercial construction is occurring simultaneously. As shown, construction related daily emissions would exceed YSAQMD significance thresholds for NO_x and PM₁₀ during the site excavation and grading phase, and ROG, NO_x, and PM₁₀ during the peak construction phase. Therefore, this impact would be ***short-term and significant***.

TABLE 4.6-3			
ESTIMATED PEAK DAILY CONSTRUCTION EMISSIONS			
Emissions Source	Peak Day Emissions in Pounds per Day		
	ROG	NO_x	PM₁₀
Site Excavation and Grading Phase			
Fugitive Dust	-	-	155.00
Off-Road Diesel	25.53	199.67	9.44
Worker Trips	0.51	0.85	0.05
Total Emissions	26.04	200.52	164.49
YSAQMD Thresholds	82.00	82.00	82.00
Significant Impact?	No	Yes	Yes
Construction Phase			
Building Construction Off-Road Diesel	32.23	271.59	12.96
Building Construction Worker Trips	2.23	1.30	0.48
Arch. Coatings Off-Gas	78.05	-	-
Arch. Coatings Worker Trips	2.23	1.30	0.48
Asphalt Off-Gas	0.10	-	-
Asphalt On-Road Diesel	0.04	0.75	0.02
Total Emissions	114.89	274.94	168.05
YSAQMD Thresholds	82.00	82.00	82.00
Significant Impact?	Yes	Yes	Yes
Source: EIP Associates, 2003. Calculation sheets are provided in Appendix E.			

Mitigation Measures

Implementation of the following mitigation measures would reduce the magnitude of this impact. At the present time, it is not possible to quantify the specific amount that these measures would reduce the construction-related emissions associated with the Proposed Project. The reduction potentials or efficiencies of these measures are not currently available. Because it is not possible to quantify the effectiveness of these measures, this analysis concludes that the impacts of the Proposed Project would remain *significant and unavoidable*.

4.6-1 (a) *Prior to all phases of project construction, the applicant and City shall ensure that construction contracts include the following specifications:*

- *After review and approval by the YSAQMD, the developer, if required, shall apply approved chemical soil stabilizers according to manufacturers specifications, to all inactive construction areas (previously graded areas which remain inactive for 96 hours), including the soil that would be used for construction of the earthen berm.*
- *Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less.*
- *Creation of a dust control plan for approval by YSAQMD*
- *No open burning of vegetation during project construction.*
- *Reestablishment of ground cover as soon as possible after construction.*
- *Suspension of grading activities when winds exceed 25 mph.*
- *Enclose, cover or water at least twice daily all soil piles and exposed surfaces.*
- *Keep all designated haul routes clean of any loose soil associated with soil transportation.*
- *Cover loads of all haul/dump trucks securely.*

(b) *Prior to all phases of project construction, the applicant and City shall ensure that construction contracts include the following specifications:*

- *The prime contractor shall submit to the YSAQMD a comprehensive inventory (i.e., make, model, year, emission rating) of all the heavy-duty off-road equipment (50 horsepower or greater) that will be used an aggregate of 40 or more hours for the construction project. District personnel, with assistance from the California Air Resources Board, will conduct initial Visible Emission Evaluations of all heavy-duty equipment on the inventory list.*
- *An enforcement plan shall be established to weekly evaluate project-related on-and-off- road heavy-duty vehicle engine emission opacities, using standards as defined in California Code of Regulations, Title 13, Sections 2180 - 2194. An Environmental Coordinator, CARB-certified to perform Visible Emissions Evaluations (VEE), shall routinely evaluate project related off-road and heavy-duty on-road equipment emissions for compliance with this requirement. Operators of vehicles and equipment found to exceed opacity limits will be notified and the equipment must be repaired within 72 hours.*
- *Contractors shall provide a plan for approval by the YSAQMD demonstrating that the heavy-duty (>50 horsepower) off-road vehicles to be used in the construction project, including owned, leased and*

subcontractor vehicles, would achieve a project-wide fleet average 30 percent NO_x reduction and 45 percent particulate reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.

- *Minimize idling time to 10 minutes.*
- *Use low sulfur fuel for stationary construction equipment, if feasible.*
- *Utilize existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.*
- *Use low emission on-site stationary equipment.*

4.6-2 Daily operation of the project could generate substantial air pollutant emissions.

Operational emissions generated by both stationary and mobile sources would result from normal day-to-day activities on the project site after occupation. Stationary area source emissions would be generated by the consumption of natural gas for space and water heating devices, the operation of landscape maintenance equipment, and the use of consumer products. Mobile emissions would be generated by the motor vehicles traveling to and from the project site.

The Specific Plan incorporates a number of design characteristics that would help to reduce the operational emissions that would otherwise be generated by the project. These characteristics of the Proposed Project include the following:

- Provide a mix of residential and nonresidential uses that encourage pedestrian and bicycle activity between the uses and surrounding environment;
- Provide wide sidewalks and/or pedestrian paths, and pedestrian facilities such as benches and attractive settings;
- Provide direct pedestrian connections;
- Provide a safe pedestrian and bicycling environment;
- Provide street lighting to provide safety along pedestrian and bicycle paths;
- Provide shade trees to shade sidewalks to encourage pedestrian activity on hot days;
- Provide pedestrian signalization and safety at street and driveway crossings;
- Provide bicycle lanes/paths that connect to an existing bikeway system;
- Design business village and commercial development to accommodate employee-service commercial uses;
- Provide an “orchards” style of tree planting to create a well-shaded, canopy effect in parking lots to help shade buildings and parked cars and, therefore, reduce energy demand and ozone generation; and
- Maximize landscaping with native, drought-resistant species (plants, trees and bushes) to reduce the demand for gas powered landscape maintenance equipment.

The analysis of daily operational emissions has been prepared utilizing the URBEMIS 2002 computer model recommended by the YSAQMD. The results of these calculations, and associated YSAQMD thresholds, are presented in Table 4.6-4 and take into consideration the

TABLE 4.6-4			
PROJECT DAILY OPERATIONAL EMISSIONS			
Emissions Source	Emissions in Pounds per Day		
	ROG	NO_x	PM₁₀
Water and Space Heating	1.69	22.35	0.04
Landscape Maintenance	0.67	0.16	0.01
Consumer Products	64.82	-	-
Motor Vehicles	220.92	245.04	361.79
Total Emissions	288.11	267.55	361.83
Thresholds (lb/day)	82.00	82.00	82.00
Significant Impact	Yes	Yes	Yes
Source: EIP Associates 2003. Computer sheets are provided in Appendix E.			

internal trip reduction and mode-shift reduction characteristics of the mixed-use interaction of the Proposed Project and the surrounding land uses, and the design features of the Proposed Project discussed above. As shown, the Proposed Project would generate daily emissions of ROG, NO_x, and PM₁₀ that exceed the thresholds of significance recommended by the YSAQMD (emissions in pounds per day). Therefore, this is considered a **significant impact**.

Mitigation Measures

Implementation of the following mitigation measures would reduce the magnitude of this impact. At the present time, it is not possible to quantify the specific amount that these measures would reduce the operational emissions associated with the Proposed Project. The reduction potentials or efficiencies of these measures are not currently available. Most are expected to have very little overall effect, although the comprehensive use of these measures would reduce the daily emissions that would otherwise be generated after buildout of the Proposed Project. Because it is not possible to quantify the effectiveness of these measures, this analysis concludes that the impacts of the Proposed Project would remain *significant and unavoidable*.

4.6-2 *Prior to building permit, the applicant shall implement these, or equally effective measures, in consultation with the YSAQMD.*

- *Improve the thermal integrity of nonresidential buildings, and reduce the thermal load with automated time clocks or automated sensors.*
- *Provide efficient heating and other appliances, such as water heaters, cooking equipment, refrigerators, furnaces, and boiler units.*
- *Electrical outlets shall be installed on the exterior walls of both the front and back of a residence or all commercial buildings to promote the use of electric landscape maintenance equipment.*
- *Install a gas outlet in the backyard of residential buildings for use with outdoor cooking appliances, such as gas burning barbeques.*
- *If feasible, install a gas outlet with ceramic logs in any proposed fireplaces, including outdoor recreational fireplaces or pits.*
- *Install low nitrogen oxide (NO_x) hot water heaters. (Beyond YSAQMD Rule Requirements)*
- *HVAC units shall be equipped with PremAir (or other manufacturer) catalyst system if available and economically feasible at the time building permits are issued. The PremAir catalyst can convert up to 70 percent of ground level ozone*

that passes over the condenser coils into oxygen. The PremAir system is considered feasible if the additional cost is less than 10 percent of the base HVAC unit cost.

- *Require all flat roofs in the nonresidential land use areas to have a white or silver cap sheet to reduce energy demand.*
- *If feasible, purchase battery powered or electric landscape maintenance equipment for new residences.*
- *Configure parking to minimize traffic interference and delays.*
- *Include wide parking spaces or vanpool only spaces to accommodate vanpool vehicles in employment areas (e.g., community commercial, business-professional, industrial) as determined by YSAQMD.*
- *Provide preferential parking for carpools and vanpools in employment areas (e.g., community commercial, business-professional, and industrial areas).*
- *Equip all truck loading and unloading docks with one 110/208 volt power outlet for every two dock doors. Diesel trucks shall be prohibited from idling more than five minutes and shall be required to connect to the 110/208 volt power to run any auxiliary equipment. Signage addressing these requirements shall be provided at the loading docks.*
- *Vehicle and bicycle all day parking lots near transit stops, and freeway access points.*
- *Permit park & ride lots in business village area.*
- *Provide ridesharing information in a homeowners association package.*
- *Contribute to an area transit fund to help build, maintain, and enhance transit services/facilities/amenities.*
- *Subsidized school bus service.*
- *A subsidy for added transit services.*
- *Class II and III on-street bikeway system.*
- *Class I bikeway system that connects residential, commercial and park uses of the Specific Plan.*
- *Design streets to maximize pedestrian access to transit stops.*
- *Site design to maximize access to transit lines.*
- *Site design to accommodate bus travel.*
- *Site design to provide lighted shelters at transit access points.*
- *Preparation of a Transportation System Management Plan for employers with 50 or more employees.*
- *Provide secure bicycle storage at public parking facilities.*
- *Only U.S. EPA Phase II certified woodburning devices should be allowed in single-family residences. The emission potential from each residence shall not exceed 7.5 grams per hour.*
- *Woodburning or Pellet appliances shall not be permitted in multi-family developments. Only natural gas or propane fired fireplace appliances are permitted.*

4.6-3 The Proposed Project would generate increased local traffic volumes that could expose sensitive receptors near roadway intersections to substantial pollutant concentrations.

As was done to assess existing localized CO concentrations, the simplified CALINE4 screening procedure was used to predict future CO concentrations at the study-area intersections in 2025 when the project is expected to be completed. The results of these calculations are presented in Table 4.6-5. As shown, future CO concentrations near these intersections would not exceed national or State ambient air quality standards. Therefore, CO hotspots would not occur near these intersections in the future, no sensitive receptors would be exposed to substantial pollutant concentrations, and the contribution of project traffic-related CO at these intersections would be *less than significant*.

Intersection	CO Concentrations in Parts per Million ^{1, 2}					
	25 Feet		50 Feet		100 Feet	
	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour
Lagoon Valley Rd. & Nelson Rd.	4.7	4.0	4.3	3.8	3.9	3.6
Cherry Glen Rd. & Lyon Rd.	3.6	3.4	3.5	3.3	3.3	3.2
Cherry Glen Rd. & Pleasant Valley Rd.	3.7	3.4	3.5	3.3	3.4	3.2
Cherry Glen Rd. & Little Cherry Glen Rd.	3.4	3.4	3.3	3.3	3.2	3.2
Rivera Rd. & Cherry Glen Rd.	4.9	4.1	4.5	3.9	4.0	3.6
Marshall Rd. & Alamo Dr.	6.9	5.3	5.9	4.7	5.0	4.2
Lagoon Valley Rd. & Arterial #1	3.9	3.6	3.7	3.4	3.5	3.3
Lagoon Valley Rd. & Arterial #2	3.3	3.2	3.2	3.1	3.2	3.1

1. National 1-hour standard is 35.0 parts per million. State 1-hour standard is 20.0 parts per million.
2. National 8-hour standard is 9.5 parts per million. State 8-hour standard is 9.1 parts per million.
Source: EIP Associates 2003. Calculation sheets are provided in Appendix E.

Mitigation Measure

4.6-3 *None required.*

4.6-4 Implementation of the Proposed Project would result in new sources of air emissions that could impair implementation of the Clean Air Plan.

The 1994 Clean Air Plan, discussed previously, was prepared to accommodate growth, to reduce the high levels of pollutants within the areas under the jurisdiction of YSAQMD, to return clean air to the region, and to minimize the impact on the economy. Projects that are considered to be consistent with the Clean Air Plan would not interfere with attainment, because this growth is included in the projections used to formulate the Clean Air Plan. In the case of the YSAQMD, development projects are considered to be consistent with the Clean Air Plan if they do not require a change in the existing land use designations (i.e., general plan and zoning) for the project site or if projected emissions for the Proposed Project are not greater than emissions anticipated for the site if developed under the existing land use designations. Therefore, projects, uses, and activities that are consistent with the applicable assumptions used in the development of the Clean Air Plan would not jeopardize attainment of the air quality levels identified in the Clean Air Plan, even if they exceed the YSAQMD's recommended thresholds of significance for daily operational emissions.

The General Plan for the City of Vacaville currently designates the Specific Plan area as a mix of uses, including Highway Commercial, Office Business Park, Golf Course Residential, Public

Park, and Urban Open Space. Under the existing land use designations, fewer residential dwelling units (595) and over 3 million more sf of office/business village/commercial highway uses would be developed in comparison to the Proposed Project. These land uses would generate more motor vehicle trips and, therefore, air pollutant emissions, than would occur under the Proposed Project. Therefore, the Proposed Project has been accommodated in Clean Air Plan growth projections and it would not impair implementation of the Clean Air Plan. This impact would be ***less than significant***.

Mitigation Measures

4.6-4 *None Required.*

4.6-5 Implementation of the Proposed Project could expose sensitive receptors on or off site to substantial pollutant concentrations due to project-generated toxic air contaminants.

TACs can be emitted from a variety of common sources, including gasoline stations, automobiles, dry cleaners, and painting operations. Sources such as these would likely be developed in the Proposed Project area. Another primary source of TACs would be industrial and R & D sources that could be developed within the Proposed Project area. Because no specific land uses or types of uses have been identified for the industrial areas, it is not possible to determine or assess the level of risk that could be generated.

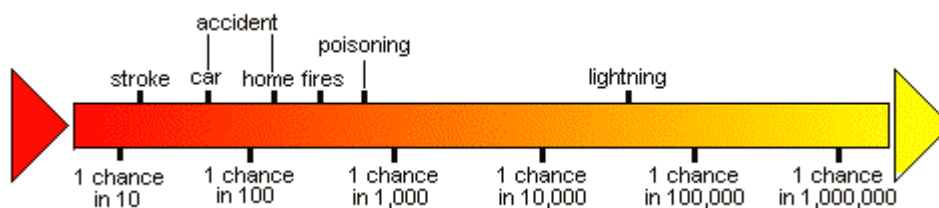
Risk characterization of TACs combines the results of the exposure and dose-response assessments to estimate the potential for adverse health effects as represented by the probability for an individual to contract cancer beyond the normal background likelihood. Risk analysts describe risks numerically in scientific notation; for example 1×10^{-6} means that there is one chance in 1,000,000 of an event occurring. The California Air Pollution Control Officers Association (CAPCOA) Risk Assessment Guidelines establish an upper threshold of 10 in one million for acceptable cancer health risk. The YSAQMD also recommends the use of this threshold to determine acceptable cancer health risk for individual sources of toxic air pollutants. Cancer risk is defined as the worst-case probability of an individual developing cancer over a lifetime as a result of an exposure to potential carcinogens. The cancer risk level is intended to ensure a sufficient safety margin to prevent a single facility or source from causing a substantial contribution to the overall number of cancer cases in an area. It is not intended or designed to serve as a means to evaluate cumulative risk associated with multiple sources or activities not associated with the facility in question or to assess risk posed by ambient background conditions.

The conclusions of health risk assessments must be considered in context. As a general matter, the background probability of an individual contracting cancer in one's lifetime is 333,000 in one million; that is, one in three people will contract cancer in their lifetime. This overall probability of contracting cancer can be influenced by diet, smoking, heredity, chemicals in the environment and the workplace, and other factors. An individual source of TACs that would result in less than 10 excess cancer cases in one million is unlikely to cause a substantial increase in the overall number of cancer cases that would otherwise occur.

It should be recognized that when small populations are exposed, population risk estimates may be very small. For example, if 100 people are exposed to an individual lifetime cancer risk of one in 100,000 or 1×10^{-5} , the expected number of cases is 0.001. For risk assessment purposes, a lifetime of exposure is considered to be 70 years, 365 days a year, 24 hours per

day. It should further be recognized that health risk assessments do not calculate the exact risk for all individuals, but a hypothetical risk assuming that all of a series of “worst-case scenario” exposure assumptions apply, such as the maximally exposed individual does not move from the specific worst-case location and worst-case wind conditions do not change. The chance that an individual would be exposed to any one of these exposure assumptions is small, and is even smaller for all assumptions to occur simultaneously (e.g., 70 years of continuously breathing air at the location of maximum impact). Thus, an individual’s actual risk is likely to be substantially over-estimated by the recommended methodology for health risk assessments.

It is also important to place health risk and the assessment of probability in the context of daily activity. To provide an idea of the size of risks from environmental hazards, the continuum below provides risk statistics for some familiar events (U.S. EPA 1991).



Comparative Risk Probabilities

Health risk evaluations will be conducted for each individual source of toxic air contaminants that is subject to the permitting authority of the YSAQMD. Depending on the source of emissions, the YSAQMD may use a screening analysis to determine that the potential risks are less than significant. Other sources of emissions will require detailed health risk assessments in order to evaluate the potential impact and obtain a permit to operate from the YSAQMD. It is necessary to know the exact model of equipment, its exact location, and its intended operating characteristics to conduct the health risk evaluation. Because none of this information is known along with the exact uses that would occupy the proposed buildings and the details of how each business would operate, it is completely speculative to evaluate the potential toxic air contaminant risks associated with development under the proposed Specific Plan. The permitting procedures of the YSAQMD would ensure that facilities within the Specific Plan area do not exceed the risk standard of 10 in one million and, therefore, expose sensitive receptors on or off site to substantial pollutant concentrations due to project-generated TACs. Therefore, this impact would be ***less than significant***.

Mitigation Measure

4.6-5 *None required.*

4.6-6 Implementation of the Proposed Project could release objectionable odors at the proposed manholes along the sewer main downstream of the pump station.

The Lagoon Valley area does not currently have a sanitary sewer connection point to the City of Vacaville sanitary sewer system. However, two alternative alignments to convey wastewater from the project site to an existing off-site point of connection have been identified. One alternative would require constructing a pump station at the north end of the valley near Pena

Adobe Road, and a force main to the top of the ridge. Wastewater would be held in the pump station wet well where biological activity would tend to produce odor-causing compounds. This pump station would be completely enclosed using concrete building techniques and therefore would not emit odors. However, due to the slope of the ground surface, the gravity sewer portion of this line may require about six drop manholes. In this case, odors are likely to be generated due to increased turbulence. The proposed route for this sewer follows an existing bicycle/pedestrian trail. The presence of slow moving pedestrian traffic and a relatively natural environment increase the risk of odor detection. This is considered a ***potentially significant impact***.

Mitigation Measures

Implementation of the following mitigation measures would reduce the magnitude of this impact but it would remain *significant and unavoidable* because odors levels are difficult to quantify due to the fact that odor detection is highly subjective from person to person.

- 4.6-6 (a) *The Applicant shall include odor and corrosion control features in the manhole design where turbulence is anticipated. These may include vortex tube manhole inserts; manhole seals and ventilation tubes vented at least 20 feet from pedestrian path with carbon filters; or some other system. All proposed odor control systems (including those listed herein) shall be demonstrated to be effective to the satisfaction of the City Utilities Division and Community Services Department through pilot testing or other means prior to design approval.*
- (b) *The Applicant shall include in the manhole design where turbulence is anticipated, corrosion protection features approved by the City Utilities Division.*
- (c) *Separate the trail and any vents from each other, to the maximum feasible distance needed to reduce odor detection by pedestrians, based on final analysis of specific facility.*