G. TRANSPORTATION AND CIRCULATION

This section describes the existing traffic and circulation system, including pedestrian and transit conditions at the project site and vicinity and provides an analysis of the potential impacts of the project. The proposed project is a master planned business park with approximately 857,000 square feet of commercial space and 4,443,000 square feet of industrial space. For the purposes of the required quantitative modeling that is part of this transportation analysis, it is assumed that the following development would be constructed as part of the proposed project: two hotels, 60,000 square feet of fitness club space, 60,000 square feet of movie theater space, 300,000 square feet of office space, 100,000 square feet of retail uses, 28,000 square feet of restaurant spaces, 50,000 square feet of research and development uses, 2,021,000 square feet of industrial/warehousing uses, and 2,423,000 of flex use business park space.[1] The total square footage of commercial and industrial uses that would be developed as part of the project has been rounded up to the nearest 1,000 to facilitate the calculation of expected trip generation.

This transportation impact assessment has been conducted in a manner consistent with the requirements and methodologies of the City of Benicia, Solano County, and applicable provisions of CEQA. The traffic analysis describes the operational characteristics of the existing study area circulation system, determines the circulation system needs based on future traffic demand, and summarizes the potential circulation impacts associated with the development of the proposed project. Appendix B contains the technical background information related to traffic.

1. Setting

This section describes the existing transportation system in the vicinity of the proposed Benicia Business Park, including the regional and local roadway networks, bicycle facilities, pedestrian facilities, and transit service. Existing roadway operations are described and an explanation of the methods used for the traffic analysis is provided. The location of the project in the context of regional transportation routes is shown in Figure IV.G-1.

a. Existing Roadway Network

(1) Regional Access. A brief description of the regional roadway network serving the project site is provided below:

- ***Interstate I-680 (I-680)*** is a north-south four-lane freeway facility on the eastern edge of Benicia, providing access to Interstate 80 and Sacramento to the north and Walnut Creek and the San Francisco East Bay to the south. Annual average daily traffic on I-680 south of Lake Herman Road was 62,000 vehicles during Caltrans' most recent monitoring counts in 2005.[2]
- ***Interstate I-780 (I-780)*** is an east-west four-lane freeway facility connecting I-680 in Benicia to I-80 in Vallejo. I-680 widens to six lanes as it crosses the Benicia-Martinez Bridge. Annual average daily traffic on I-780 west of East 2nd Street was 58,000 vehicles during Caltrans' most recent monitoring counts in 2005.[3]

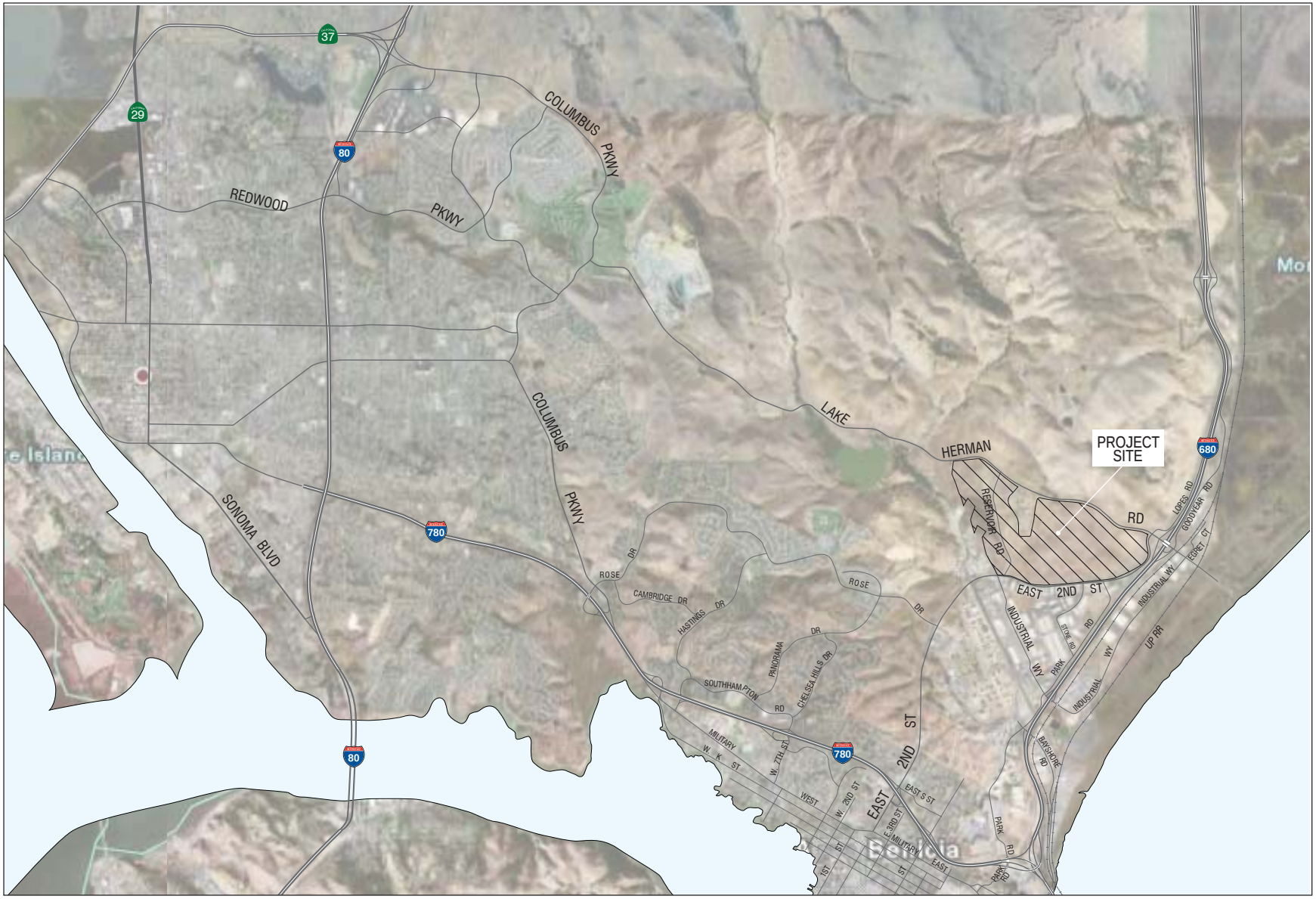
[1] These assumed levels of development are consistent with those used in the economic analysis of the proposed project prepared by ADE. It should be noted that the proposed project would not include stand-alone big box uses.

[2] Caltrans, Year 2005 Traffic Volumes on the State Highway System.

[3] Ibid.

(2) Local Access. A brief description of the local and arterial streets serving the project site is provided below:

- ***East 2nd Street*** is an arterial roadway that extends north and east from downtown Benicia to Lake Herman Road. It forms the southern boundary of the project site. Along this segment, the roadway has two travel lanes and a center turn lane, with a posted speed limit of 45 miles per hour (mph) north of I-780. No parking is allowed on either side of the roadway north of Military West. East 2nd Street between Industrial Way and I-780 widens to a four-lane facility with median/turn lanes and bicycle lanes. As it approaches downtown Benicia to the south, East 2nd Street has a speed limit of 35 mph.
- ***Lake Herman Road*** is a two-lane, east-west roadway that runs west from I-680, forming the northern boundary of the project site. In the vicinity of the project site, Lake Herman Road has a posted speed limit of 45 mph. The shoulder width is typically inadequate for on-street parking.
- ***Reservoir Road*** is a two-lane, north-south roadway that runs in the western portion of the project site and connects East 2nd Street to Lake Herman Road. Reservoir Road would be removed as part of the project and replaced by an extension of Industrial Way, which would provide the same connectivity approximately ¼- to ½-mile west of Reservoir Road. Reservoir Road is a narrow roadway with no shoulders and a posted speed limit of 40 mph.
- ***Industrial Way*** is a two-lane arterial roadway that connects I-680 to East 2nd Street. Currently the roadway does not connect to West Channel Road, which terminates a short distance north of East 2nd Street. The posted speed limit on Industrial Way is 40 mph. Near its southern end, between Oregon Street and Noyes Way, Industrial Way is a three-lane street, with two lanes in the southbound direction and one lane in the northbound direction. The roadway width is not sufficient to accommodate on-street parking.
- ***Park Road*** is a two-lane, north-south arterial roadway that parallels I-680 to the west, veering northwest before intersecting with East 2nd Street. Park Road serves as the connection between the split interchange ramps at Industrial Way (southbound off-ramp, northbound on-ramp) and Bayshore Road (southbound on-ramp, northbound off-ramp). South of Industrial Way, Park is posted at 35 mph and has a two-way left-turn lane. North of Industrial Way, Park Road is posted at 40 mph, and signs indicate that parking is prohibited between the hours of 7:00 PM and 6:00 AM. However, the shoulders are typically not wide enough to accommodate on-street parking.
- ***Bayshore Road*** in the vicinity of I-680 is a two-lane arterial roadway with a posted speed limit of 35 mph. No parking is allowed at any time along Bayshore Road.
- ***Rose Drive*** is a two-lane, east-west roadway that extends from East 2nd Street to the east to I-780 to the west.
- ***Military East*** extends from Jefferson Street to the east to First Street to the west, where Military East becomes Military West. East of East 2nd Street, Military East is a two-lane, east-west roadway. Between East 2nd Street and West 2nd Street, Military East is a four-lane facility with turn lanes and bicycle lanes.
- ***Columbus Parkway*** is a north-south roadway that extends from I-80 to the north to I-780 to the south. Columbus Parkway is a four-lane roadway between Redwood Parkway and Ascot Parkway, and a two-lane roadway elsewhere.



LSA

FIGURE IV.G-1

N

PROJECT LOCATION

Benicia Business Park EIR
Project Vicinity Map

SOURCE: KORVE ENGINEERING, 2006.
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- ***Goodyear Road*** is a two-lane frontage road that runs along the east side of I-680. It extends from Marshview Road to the north to Lake Herman Road to the south.

b. Study Intersections. The twenty existing intersections below were selected for analysis in this EIR because they are most likely to be significantly affected by project traffic. The locations of the study intersections are shown in Figure IV.G-2, and the intersection configuration, and control systems of these intersections are shown in Figure IV.G-3.

1. East 2nd Street / Park Road / New Access (One-Way Stop);
2. East 2nd Street / Industrial Way (Signal);
3. East 2nd Street / Rose Drive (Signal);
4. East 2nd Street / I-780 Westbound Ramps (Signal);
5. East 2nd Street / I-780 Eastbound Ramps (Signal);
6. East 2nd Street / Military ~~West~~ East Street (Signal);
7. Lake Herman Road / Columbus Parkway (Signal);
8. Lake Herman Road / Reservoir Road (One-Way Stop);
9. Lake Herman Road / East 2nd Street (Four-Way Stop);
10. Lake Herman Road / I-680 Southbound Ramps (One-Way Stop);
11. Lake Herman Road / I-680 Northbound Ramps /Goodyear Road (Four-Way Stop);
12. Lake Herman Road / Industrial Way (Two-Way Stop);
13. Park Road / Industrial Way (Four-Way Stop);
14. Industrial Way / I-680 Southbound Ramps (One-Way Stop);
15. Industrial Way / I-680 Northbound Ramps (One-Way Stop);
16. Park Road / Bayshore Road (Four-Way Stop);
17. Bayshore Road / I-680 Southbound Ramps (Westbound Left Yield);
18. Bayshore Road / I-680 Northbound Ramps (One-Way Stop);
19. Columbus Parkway / Rose Drive (Signal); and
20. Columbus Parkway / Admiral Callaghan Drive.

c. Existing Conditions Traffic Volumes. Weekday traffic counts for the morning (7:00-9:00 a.m.) and afternoon (4:00-6:00 p.m.) peak hours were collected on Thursday, January 19, 2006. The combination of cumulative and project-generated traffic is expected to be highest during these periods. Figure IV.G-4 shows morning and afternoon peak hour volumes at the 20 study intersections.

d. Level of Service Methodology. The operation of a local roadway network is commonly measured and described using a grading system called Level of Service (LOS). The LOS grading system qualitatively characterizes traffic conditions associated with varying levels of vehicle traffic, ranging from LOS A (indicating free-flow traffic conditions with little or no delay experienced by motorists) to LOS F (indicating congested conditions where traffic flows exceed design capacity and result in long queues and delays). This LOS grading system applies to both signalized and unsignalized intersections. LOS A, B, and C are generally considered satisfactory service levels, while the influence of congestion becomes more noticeable (though still considered acceptable) at LOS D. LOS E and F are generally considered to be unacceptable. The City of Benicia's General Plan Policy 2.20.1 identifies LOS D as the worst acceptable LOS on all roads, street segments, and intersections within the City's jurisdiction.

(1) Signalized Intersections. At the signalized study intersections, traffic conditions were evaluated using the *2000 Highway Capacity Manual* operations methodology. The operation analysis uses various intersection characteristics (e.g., traffic volumes, lane geometry, and signal phasing/timing) to estimate the average control delay experienced by motorists traveling through an intersection. Table IV.G-1 summarizes the relationship between delay and LOS for signalized intersections.

(2) Unsignalized Intersections. For the unsignalized (all-way stop-controlled and two-way stop-controlled) study intersections, traffic conditions were evaluated using the *2000 Highway Capacity Manual* (HCM) operations methodology. With this methodology, the LOS is related to the total delay per vehicle for the intersection as a whole (for all-way stop-controlled intersections), and for each stop-controlled movement or approach only (for two-way stop-controlled intersections). Total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line.

This time includes the time required for a vehicle to travel from the last-in-queue position to the first-in-queue position. Table IV.G-1 also summarizes the relationship between delay and LOS for unsignalized intersections.

Table IV.G-1: Intersection Level of Service Definitions

Level of Service	Description of Traffic Conditions	Average Delay Per Vehicle (Seconds)
Signalized Intersections		
A	Insignificant Delays: No approach phase is fully utilized and no vehicle waits longer than one red indication.	≤10.0
B	Minimal Delays: An occasional approach phase is fully utilized. Drivers begin to feel restricted.	>10.0 and ≤20.0
C	Acceptable Delays: Major approach phase may become fully utilized. Most drivers feel somewhat restricted.	>20.0 and ≤35.0
D	Tolerable Delays: Drivers may wait through more than one red indication. Queues may develop but dissipate rapidly, without excessive delays.	>35.0 and ≤55.0
E	Significant Delays: Volumes approaching capacity. Vehicles may wait through several signal cycles and long vehicle queues form upstream.	>55.0 and ≤80.0
F	Excessive Delays: Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections.	>80.0
Unsignalized Intersections		
A	No delay for stop-controlled approaches.	≤10.0
B	Operations with minor delay.	>10.0 and ≤15.0
C	Operations with moderate delays.	>15.0 and ≤25.0
D	Operations with some delays.	>25.0 and ≤35.0
E	Operations with high delays, and long queues.	>35.0 and ≤50.0
F	Operation with extreme congestion, with very high delays and long queues unacceptable to most drivers.	>50.0

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

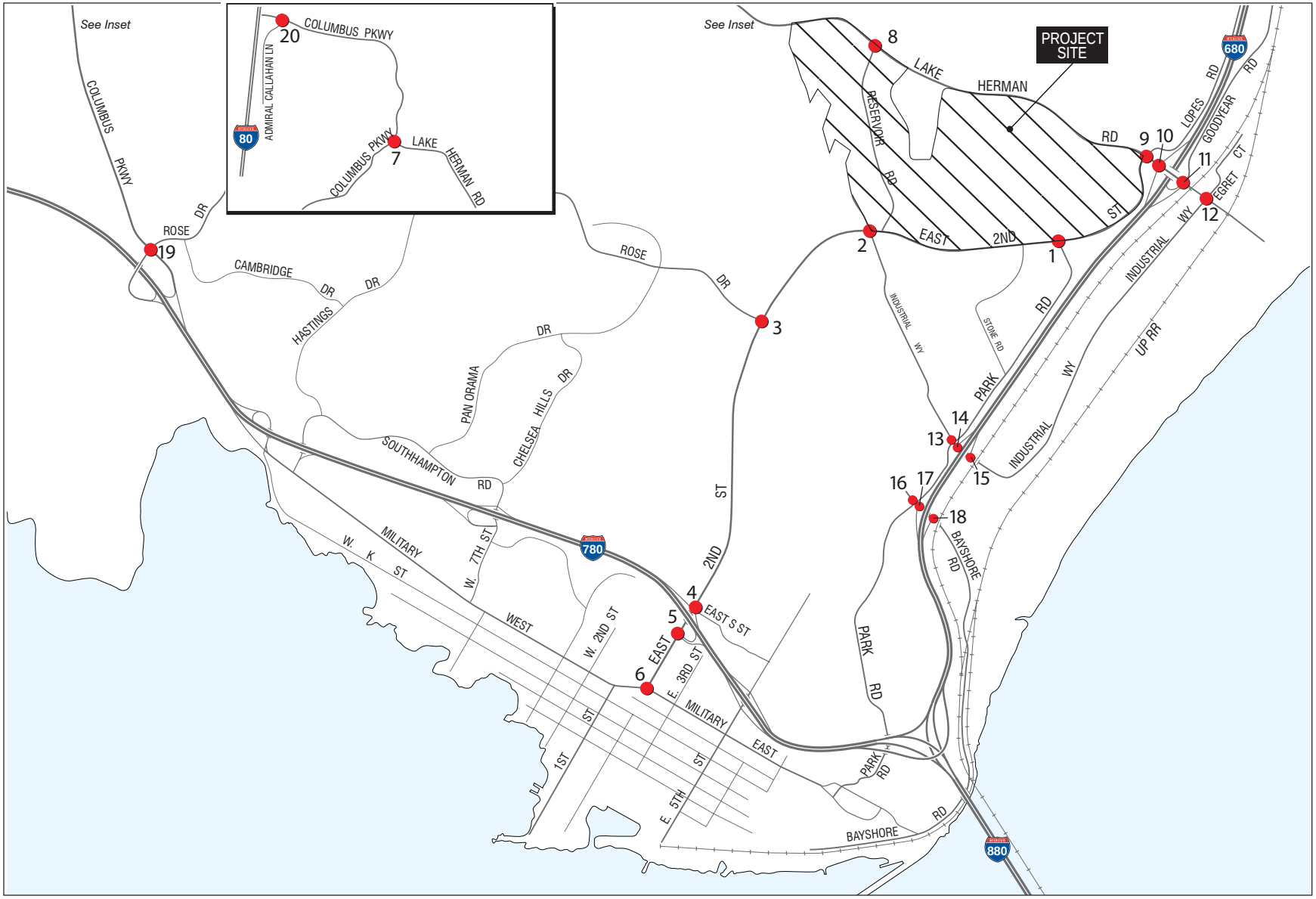

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FIGURE IV.G-2

PROJECT LOCATION

STUDY INTERSECTION

Benicia Business Park EIR

Study Intersections

SOURCE: KORVE ENGINEERING, 2006.

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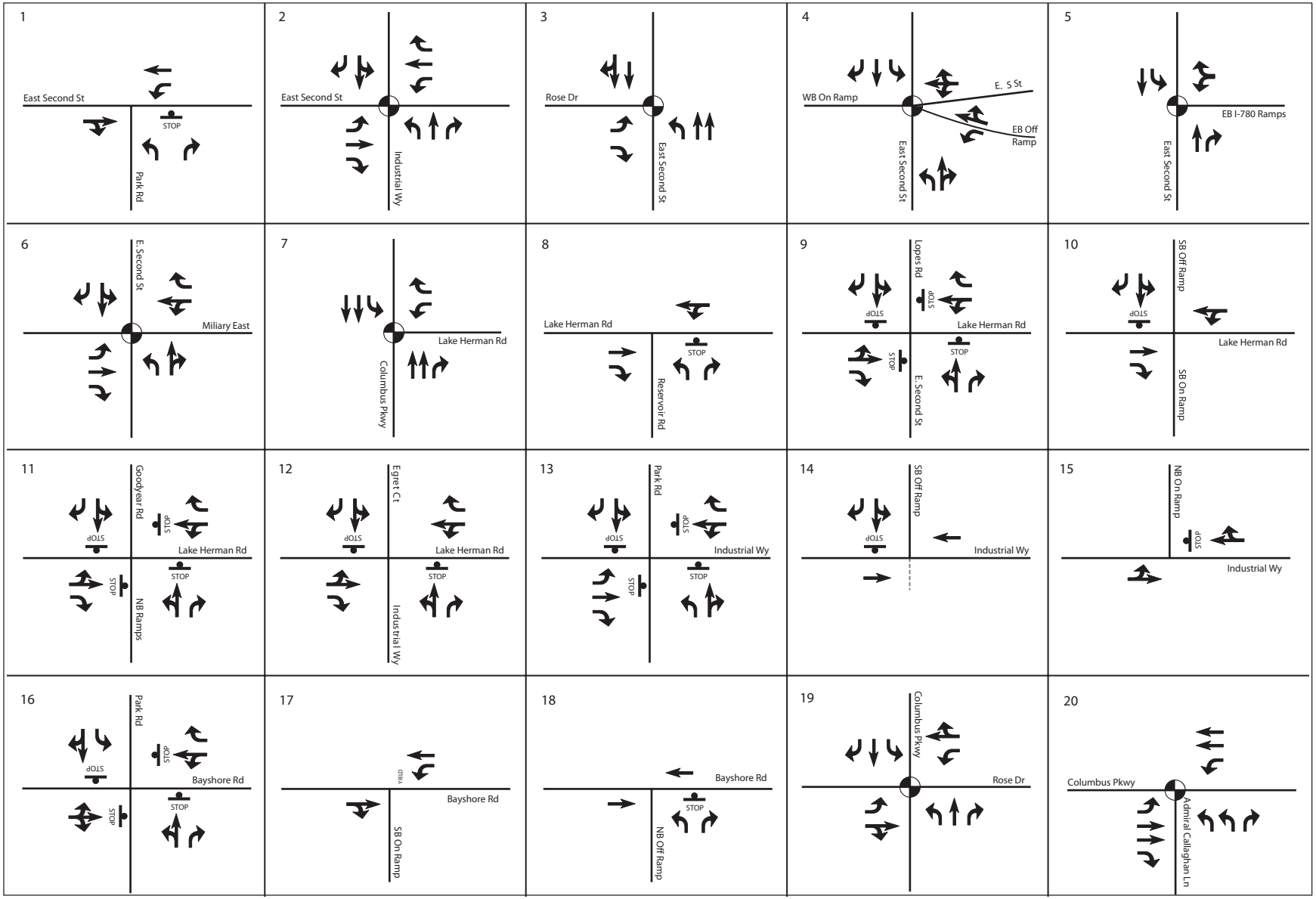

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FIGURE IV.G-3

N

Traffic Signal

Stop Sign

Benicia Business Park EIR

Existing Lane Geometry and Traffic Control

SOURCE: KORVE ENGINEERING, 2006.

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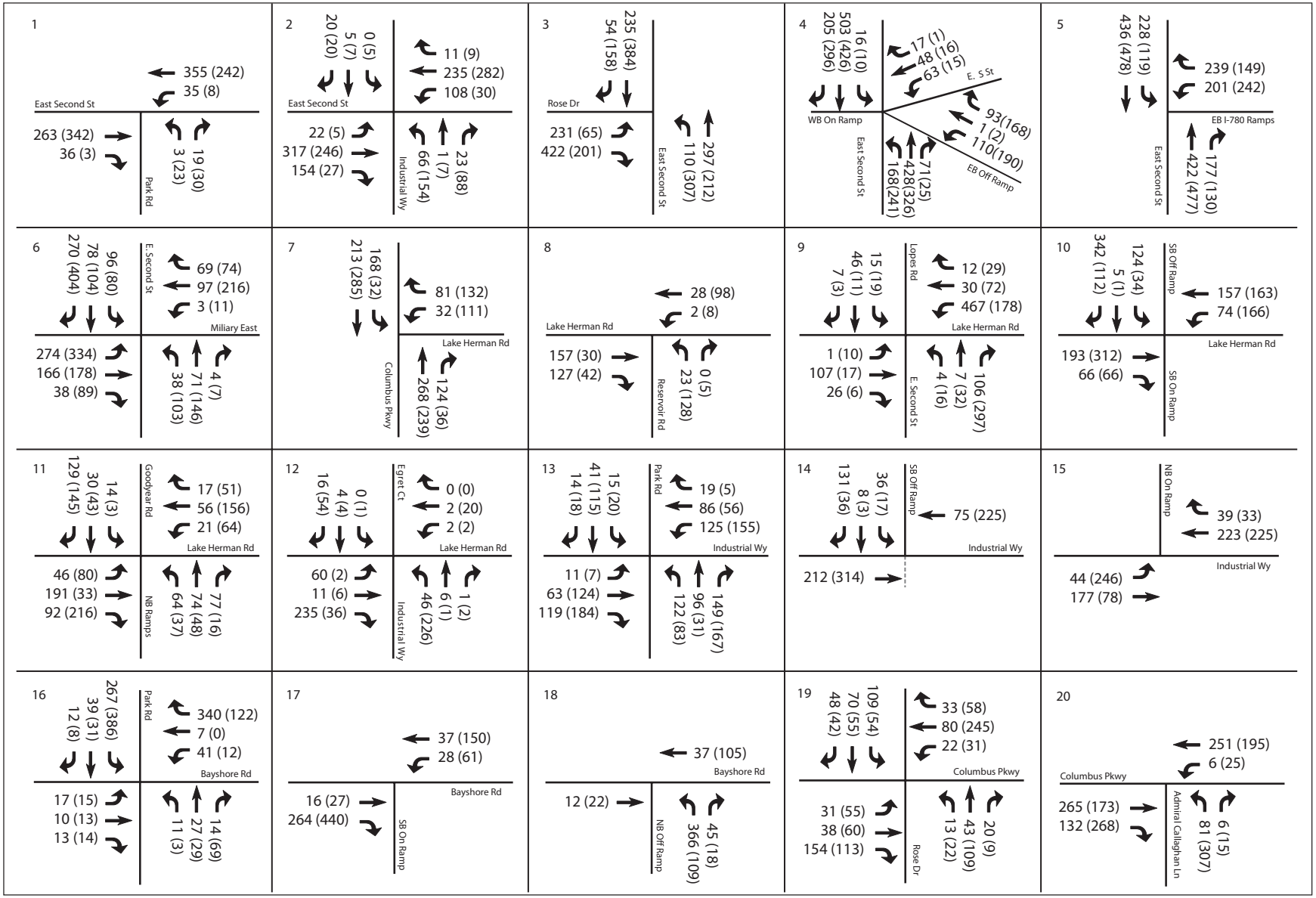

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FIGURE IV.G-4

AM (PM) Peak Hour

Benicia Business Park EIR

Existing Intersection Traffic Volumes

SOURCE: KORVE ENGINEERING, 2006.

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(4) Freeway Segments. Table IV.G-2 presents a description of freeway level of service based on vehicle density, as outlined in the *2000 Highway Capacity Manual*.

Table IV.G-2: Freeway Level of Service Definitions

Level of Service	Description of Traffic Conditions	Nominal Range of Volume to Capacity Ratio
Freeway Segments		
A	Low volumes; primarily free-flow operations. Density is low, and vehicles can freely maneuver within the traffic stream. Drivers can maintain their desired speeds with little or no delay.	0.00 - 0.60
B	Stable flow with potential for some restriction of operating speeds due to traffic conditions. Maneuvering is only slightly restricted. The stopped delays are not bothersome, and drives are not subject to appreciable tension.	0.61 - 0.70
C	Stable operations; however, the ability to maneuver is more restricted by the increase in traffic volumes. Relatively satisfactory operating speeds prevail, but adverse signal coordination or longer queues cause delays.	0.71 - 0.80
D	Approaching unstable traffic flow, where small increases in volume could cause substantial delays. Most drivers are restricted in their ability to maneuver and in their selection of travel speeds. Comfort and convenience are low but tolerable.	0.81 - 0.90
E	Operations characterized by significant approach delays and average travel speeds of one-half to one-third the free-flow speed. Flow is unstable and potential for stoppages of brief duration. High signal density, extensive queuing, or progression/timing are the typical causes of the delays.	0.91 - 1.00
F	Forced-flow operations with high approach delays at critical signalized intersections. Speeds are reduced substantially, and stoppages may occur for short or long periods of time because of downstream congestion.	1.010+

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

e. Existing Conditions Intersection Levels of Service. The study intersections were analyzed using the latest version of the Traffix software package, based on the methodologies outlined in the *2000 Highway Capacity Manual*. The existing AM and PM peak hour intersection service levels for the 20 study intersections are shown in Table IV.G-3.

As shown in Table IV.G-3, all of the study intersections operate at LOS D or better during the AM and PM peak hours. The service level calculation sheets for all study intersections are provided in Appendix B.

f. Existing Conditions CMP Roadway Levels of Service. The Solano Transportation Authority is the designated Congestion Management Agency for Solano County. This agency develops the countywide Congestion Management Program (CMP) and updates it every 2 years. The latest revision was completed in 2005. The CMP identifies a system of State highways and regionally

Table IV.G-3: Existing AM and PM Peak Hour Intersection Levels of Service

No.	Intersection	Traffic Control	Peak Hour	Existing	
				LOS	Delay
1	East 2nd Street / Park Road	One-Way Stop	AM	B	10.7
			PM	B	12.1
2	East 2nd Street / Industrial Way	Signal	AM	A	9.8
			PM	B	10.9
3	East 2nd Street / Rose Drive	Signal	AM	A	10.0
			PM	A	9.9
4	East 2nd Street / I-780 Westbound Ramps	Signal	AM	C	22.3
			PM	C	26.3
5	East 2nd Street / I-780 Eastbound Ramps	Signal	AM	B	12.7
			PM	C	22.4
6	East 2nd Street / Military ~~West~~ East Street	Signal	AM	B	18.5
			PM	C	27.4
7	Lake Herman Road / Columbus Parkway	Signal	AM	B	11.2
			PM	B	12.0
8	Lake Herman Road / Reservoir Road	One-Way Stop	AM	A	9.8
			PM	B	10.2
9	Lake Herman Road / East 2nd Street	Four-Way Stop	AM	D	26.0
			PM	B	11.6
10	Lake Herman Road / I-680 Southbound Ramps	One-Way Stop	AM	B	13.5
			PM	B	13.7
11	Lake Herman Road / I-680 Northbound Ramps / Goodyear Road	Four-Way Stop	AM	B	10.7
			PM	B	10.8
12	Lake Herman Road / Industrial Way	Two-Way Stop	AM	B	10.1
			PM	B	10.8
13	Park Road / Industrial Way	Four-Way Stop	AM	B	11.7
			PM	B	12.3
14	Industrial Way / I-680 Southbound Ramps	One-Way Stop	AM	A	9.7
			PM	B	11.0
15	Industrial Way / I-680 Northbound Ramps	One-Way Stop	AM	B	11.3
			PM	B	14.0
16	Park Road / Bayshore Road	Four-Way Stop	AM	B	13.1
			PM	B	14.6
17	Bayshore Road / I-680 Southbound Ramps	Westbound Left Yield	AM	A	7.9
			PM	A	8.6
18	Bayshore Road / I-680 Northbound Ramps	One-Way Stop	AM	B	11.2
			PM	A	9.7
19	Columbus Parkway / Rose Drive	Signal	AM	B	13.4
			PM	B	13.8
20	Columbus Parkway / Admiral Callaghan Drive	Signal	AM	A	5.7
			PM	A	9.8

Source: Korve Engineering, 2006

significant principal arterials (known as the CMP system) and specifies the PM peak hour LOS standards for those roadways. This system is monitored regularly by the local jurisdictions where the facilities are located, and the PM peak hour LOS results are included in the biennial report produced by the Solano Transportation Authority. The minimum standard throughout the Solano County

system is LOS E, except at those locations where the initial LOS measurement at the inception of the program was LOS F. There are four CMP facilities within Benicia and their current operating levels in the PM peak hour are summarized in Table IV.G-4.

Table IV.G-4: PM Peak Hour LOS on CMP Routes in Benicia

Route	Location	LOS Standard	2005 LOS
I-680	North of Lake Herman Road	E	B
	South of Lake Herman Road	E	B
	South of Bayshore Road	E	B
I-780	West of East 2nd Street	E	C
	East of East 2nd Street	E	C
Military West Street	West of East 2nd Street	E	A
Military East Street	East of East 2nd Street	E	C

Source: 2005 Solano Congestion Management Program

As shown in Table IV.G-4, all of the CMP routes operate at or better than the STA standard of LOS E during the PM peak hour under Existing Conditions.

g. Bicycle and Pedestrian Facilities. In the study area, designated Class I Bikeways (paved path separated from automobile traffic) are provided at the following locations:

1. Along Rose Drive, extending through west Benicia;
2. North of Rose Drive, connecting Channel Road with Rose Drive; and
3. North of Rose Drive, connecting Rose Drive with Lake Herman Road.

Class II Bikeways (paved extension of a roadway designated exclusively for bicyclists) are provided at the following locations:

1. Along East 2nd Street between Industrial Way ~~Lake Herman Road~~ and Hillcrest Avenue (just north of I-780);
2. Along Southampton Road;
3. Along Military West Street (entire length);
4. Along Rose Drive, (East 2nd Street to Panorama Drive) ~~extending east from the existing Class I Bikeway to East 2nd Street~~; and
5. Along West 7th Street between Southampton Road and Military West Street.

Class III Bikeways (signed routes where bicycles share roadways with vehicular traffic; no separate right-of-way is provided) exist at the following locations:

1. Along Rose Drive, extending south from the existing Class I Bikeway; and
2. Along East 2nd Street between Hillcrest Avenue and Military East Street.

No pedestrian facilities, such as sidewalks or off-street paths, are currently provided in the project site vicinity.

h. Public Transit. Local public transit in Benicia is provided by the City, which operates six bus routes as part of the Benicia Breeze system: Routes 15, 16, 17, 18, 23, and 75. Route 15 travels to Benicia High School via Western Rose Drive and Solano Drive. Route 16 travels to Benicia Middle School via Western Rose Drive and Solano Drive. Route 17 travels to Benicia High School via Hastings Drive. Route 18 travels to Benicia Middle School via Hastings Drive. Route 23 connects Benicia to the Martinez Amtrak Station. Route 75 connects Benicia with the Pleasant Hill BART Station, and the Benicia-Vallejo Ferry Terminal. None of these routes currently serve the immediate project site vicinity.

i. Parking Facilities. No on-street parking is allowed along Lake Herman Road or East 2nd Street in the vicinity of the project site. On-street parking typically does not occur on Industrial Way, Bayshore Road, and the other local roadways, because sufficient off-street parking is provided, and shoulder widths are typically too narrow to accommodate parked vehicles.

j. Regulatory Setting. The regulatory setting of the proposed project as it relates to traffic and transportation is discussed below.

(1) Solano County. As previously noted, the Solano Transportation Authority (STA) serves as the Congestion Management Agency (CMA) for Solano County. One of the CMA's responsibilities is to analyze the impacts of local land use decisions on the regional transportation system (the CMP system). The STA will comment on any environmental impact report prepared for proposed land use development projects, and will require that an analysis of CMP system facilities be performed with the STA travel demand model. If a proposed project is projected to cause a segment of the CMP system to deteriorate below the adopted LOS standard, a deficiency plan must be prepared to provide mitigation for that impact. As noted above, the CMA's adopted LOS standard is E for roadways and freeways in the CMP system.

(2) City of Benicia General Plan. Applicable transportation and circulation policies from the Benicia General Plan are presented below.

Circulation

- *Circulation Policy 2.14.1:* Give priority to pedestrian safety, access and transit over automobile speed and volume.
- *Circulation Policy 2.14.2:* Discourage street widening and the removal of on-street parking to ease traffic flow.
- *Circulation Policy 2.15.2:* Encourage the development of pedestrian paths in hill areas as a way to link neighborhoods to schools, parks, employment centers and convenience commercial destinations.
- *Circulation Policy 2.20.1:* Maintain at least LOS D on all city roads, street segments and intersections.
- *Circulation Policy 2.20.2:* Seek alternatives to road widening.
- *Circulation Policy 2.20.3:* Maintain Lake Herman Road as a rural, two-lane, curving scenic route.
- *Circulation Policy 2.23.1:* Provide adequate on-street and off-street parking.
- *Circulation Policy 2.23.2:* Reduce the visibility of parking lots.
- *Circulation Policy 2.24.1:* Continue to ensure public access to private roads in the industrial and Port areas.

The LOS D standard established in Policy 2.20.1 has been incorporated into the thresholds of significance used in this analysis to determine whether the project would result in significant transportation-related impacts. The project's consistency with this threshold would constitute consistency with the General Plan. Other select policies also link with the thresholds and serve to determine impacts and consistency with the General Plan, but in more qualitative ways.

Benicia General Plan Circulation Policy 2.20.3 is particularly relevant to the proposed project. This policy states: "Maintain Lake Herman Road as a rural, two lane, curving scenic route." However, the portion of Lake Herman Road that extends approximately 1,600 feet west of East 2nd Street is not rural in character, unlike segments of the roadway to the west. In addition, this policy is qualified by others in the General Plan, including Circulation Policy 2.20.1, which identifies LOS D as the minimum level of service for Benicia roadways. The discussion on page 60 of the General Plan states:

> *The City's policy is to maintain intersection operation at LOS D or better, except where improvements would be infeasible or undesirable due to considerations of right-of-way, impacts of neighboring properties, aesthetics, or community character.*

The General Plan Land Use Diagram designates the project site for General Commercial and Limited Industrial land uses. Table 2-11 in the General Plan, Intersection LOS: Future Conditions with and without Intersection Improvements, shows that without improvements, Lake Herman Road at the intersections with East Second, I-680 SB On/Off ramp, and I-680 NB On/Off Ramps will operate at LOS F as a result of the development allowed by the General Plan through the year 2015.

Table 2-12 in the General Plan, Streets That May Exceed Existing (1997) Capacity with Future Growth Under this General Plan, identifies Lake Herman Road, east of the I-680 NB Ramps, as an arterial segment that may exceed capacity with development allowed in the Benicia General Plan (p.64). The Benicia Urban Limit Line as voted by the public is Lake Herman Road, except in the vicinity of the project site, where a site for a church is located on the north side of the road. The new church is designed to align with the future A Street access, which would be the appropriate start of the Lake Herman Road rural character. Additionally, this portion of Lake Herman Road is characterized by relatively intense development in close proximity to the I-680 interchange.

The reconciliation of these various General Plan policies could allow improvements to Lake Herman Road in the vicinity of I-680 to maintain the level of service standard in the General Plan. These improvements may be appropriate at the eastern end of Lake Herman Road but may not be appropriate farther to the west, where rural uses predominate. Decision-makers may consider the pros and cons of such improvements in the context of existing General Plan policies during discussions on the merits and environmental impacts of the proposed project.

2. Cumulative (Year 2030) Traffic Conditions

This section evaluates traffic operations and potential impacts at the study intersections in the Cumulative (Year 2030) Conditions without the proposed Benicia Business Park project. Mitigation Measures to improve the study intersections are provided where growth impacts are identified that would result in an unacceptable LOS in accordance with STA CMP and City of Benicia standards.

a. Future Year Projections. Cumulative Conditions traffic volumes were forecasted using the most recent version of the Solano / Napa County travel demand model developed by DKS Associates for the Counties of Solano and Napa. The Solano / Napa County travel demand model, which is maintained by the STA, was used as a tool to forecast future traffic conditions in Benicia. A model run was performed for the year 2030, capturing the traffic growth expected in Benicia due to land use changes, shifts in travel behavior, planned transportation improvements and other considerations.

Some of the highway improvements included in the 2030 model network are significant for the purposes of this analysis. These include a second Benicia-Martinez bridge span, resulting in five lanes of traffic capacity in each direction, and the expansion of Park Road between Bayshore Road and Industrial Way from two to four lanes. These improvements are assumed to be in place in the 2030 Solano / Napa County model.

The model was used to develop background growth in traffic volumes to the year 2030 Cumulative (No Project) Conditions. The background traffic volumes are described in the section below.

b. Cumulative Conditions Traffic Volumes. The traffic volumes under Cumulative Conditions were calculated by adding to the Existing Conditions traffic volumes with the appropriate growth rates obtained from the Solano / Napa County travel demand model. The resulting Cumulative Conditions AM and PM peak hour volumes at the 20 study intersections are shown in Figure IV.G-5. The roadway lane configurations and intersection control assumed for Cumulative Conditions are the same as those for the Existing Conditions, and are shown on Figure IV.G-3.

c. Planned Roadway Improvements. Intersection and roadway improvements are outlined in the Benicia General Plan (June 1999) and the Solano Congestion Management Plan (October 2005). The following improvements are included in the Benicia General Plan:

1. Second Benicia – Martinez Bridge span;
2. Public road connecting through the lower Arsenal and port areas to include Bayshore Road, Adams Street, and Oak Street;
3. Bayshore Road connection between Park Road and Industrial Way;
4. East-west connector roadway between East 2nd Street and Park Road; and
5. Extension of Industrial Way north to Lake Herman Road.

The following improvements are identified in the 2005 CMP Capital Improvement Program:

1. I-80 / I-680 / I-780 Corridor mid and long-term improvements;
2. I-80 / I-680 / SR12 Interchange improvements; and
3. Local interchange and arterial improvements.

As part of the project, the sponsor would develop the following roadway improvements:

1. East 2nd Street would be widened to four lanes with a median, and Class II Bikeway from Industrial Way to Lake Herman Road; and
2. A new Industrial Way extension between East 2nd Street and Lake Herman Road, with an adjacent 10-foot-wide Class I Bikeway would be constructed.

d. Planned Parking Facility Improvements. Neither the Benicia General Plan (June 1999) nor the Solano Congestion Management Plan (October 2005) identify any planned improvements to area parking facilities.

e. Planned Bicycle and Pedestrian Facility Improvements. Future bicycle improvements are outlined in the Benicia General Plan. The General Plan calls for the development of Class I Bikeway facilities at the following locations near the project site:

1. Along Rose Drive, extending east from the existing Class I Bikeway to East 2nd Street;
2. A connecting Class I Bikeway between Channel Road and East 2nd Street; and
3. A Class I Bikeway through the project site between East 2nd Street and Lake Herman Road.

The General Plan calls for Class II Bikeways at the following locations near the project site:

1. Along West 7th Street between Military West Street and West K Street; and
2. Along Military East Street extending from East 2nd Street to Park Road.

The General Plan calls for Class III Bikeways at the following locations near the project site:

1. Along Lake Herman Road;
2. Along Industrial Way between Park Road and Lake Herman Road;
3. Along Panorama Drive beginning at Rose Drive, continuing along Chelsea Hills Drive, ending at Southampton Road;
4. Along Warwick Drive beginning at Chelsea Hills Drive, continuing along Seaview Drive, ending at East 2nd Street; and
5. Along Park Road, between Military East Street/Adams Street and Industrial Way.

Although the Benicia General Plan lists Lake Herman Road as a Class III facility, the Solano County Bicycle Plan recently adopted by the City shows this as a Class II facility.

Future pedestrian improvements are outlined in the Solano Countywide Pedestrian Plan. These enhancement projects include:

1. Park Road Bike Lanes and Sidewalks Project – would improve the connection from the new multi-use path on the Benicia-Martinez Bridge;
2. First Street Streetscape and Parking Enhancements Project – part of an ongoing effort to improve pedestrian amenities in the downtown area;
3. Benicia High School Access Improvement Project – would install a traffic signal on Military West Street at West 11th Street; and
4. State Park Road Bicycle and Pedestrian Bridge – would provide a safer over crossing of I-780 at the west end of the City.

LSA

FIGURE IV.G-5

N

AM (PM) Peak Hour

Benicia Business Park EIR

Cumulative Intersection Traffic Volumes

SOURCE: KORVE ENGINEERING, 2006.

I:\CIB530 Benicia Bus Park\figures\Fig_IVG5.ai (6/22/07)

f. Planned Transit Facility Improvements. Future transit improvements are outlined in the Benicia Short Range Transit Plan. These improvements include:

1. Restructure existing Route 1 to reduce onboard travel time and provide a more direct service to Vallejo and the Pleasant Hill BART Station; re-number as Route 100;
2. Replace general public Dial-a-Ride service in Benicia with a more structured local flexroute service;
3. Replace Benicia Dial-a-Ride service with an Americans with Disabilities Act (ADA) Complementary Paratransit service restricted to persons with disabilities and the elderly who have difficulty accessing fixed or flexroute services;
4. Develop a computer-assisted paratransit scheduling/dispatch capability;
5. Adopt revised paratransit scheduling and dispatch procedures; and
6. Establish a supplemental Taxi Service Contract for ADA Complementary Paratransit Service.

g. Cumulative Conditions Intersection Level of Service. The study intersections were analyzed using the latest version of the Traffix software package, based on the methodologies outlined in the *2000 Highway Capacity Manual*. Cumulative intersection LOS calculations assumed Existing Conditions intersection geometries and control, presented in Figure IV-G.3. The Cumulative Conditions AM and PM peak hour intersection service levels for the 20 study intersections are shown in Table IV.G-5.

Table IV.G-5: Cumulative (Year 2030) Conditions Intersection Levels of Service

No.	Intersection	Traffic Control	Peak Hour	Cumulative Conditions	
				LOS	Delay
1	East 2nd Street / Park Road / New Access	One-Way Stop	AM	B	11.6
			PM	B	13.6
2	East 2nd Street / Industrial Way	Signal	AM	B	10.3
			PM	B	11.4
3	East 2nd Street / Rose Drive	Signal	AM	B	10.8
			PM	B	11.0
4	East 2nd Street / I-780 Westbound Ramps	Signal	AM	C	30.5
			PM	D	43.9
5	East 2nd Street / I-780 Eastbound Ramps	Signal	AM	C	26.4
			PM	B	15.2
6	East 2nd Street / Military ~~West~~ East Street	Signal	AM	C	20.7
			PM	D	53.3
7	Lake Herman Road / Columbus Parkway	Signal	AM	B	13.2
			PM	B	12.0
8	Lake Herman Road / Reservoir Road	One-Way Stop	AM	B	10.2
			PM	B	10.9
9	Lake Herman Road / East 2nd Street	Four-Way Stop	**AM**	**F**	**>50.0**
			PM	C	15.8
10	Lake Herman Road / I-680 Southbound Ramps	One-Way Stop	AM	C	18.7
			PM	C	22.3
11	Lake Herman Road / I-680 Northbound Ramps / Goodyear Road	Four-Way Stop	AM	B	13.3
			PM	B	13.8
12	Lake Herman Road / Industrial Way (east of I-680)	Two-Way Stop	AM	B	10.8
			PM	B	12.1
13	Park Road / Industrial Way	Four-Way Stop	AM	C	15.2
			PM	C	16.8

Table IV.G-5 *Continued*

No.	Intersection	Traffic Control	Peak Hour	Cumulative Conditions	
				LOS	Delay
14	Industrial Way / I-680 Southbound Ramps	One-Way Stop	AM	B	10.2
			PM	B	12.2
15	Industrial Way / I-680 Northbound Ramps	One-Way Stop	AM	B	13.1
			PM	C	19.3
16	Park Road / Bayshore Road	Four-Way Stop	AM	C	19.0
			PM	C	24.4
17	Bayshore Road / I-680 Southbound Ramps	Westbound Left Yield	AM	A	8.2
			PM	A	9.2
18	Bayshore Road / I-680 Northbound Ramps	One-Way Stop	AM	B	12.7
			PM	B	10.1
19	Columbus Parkway / Rose Dr.	Signal	AM	B	14.0
			PM	B	14.4
20	Columbus Parkway / Admiral Callaghan Drive	Signal	AM	A	6.0
			PM	B	10.5

Note: **Bolding** indicates unsatisfactory level of service.
Source: Korve Engineering, 2006

As shown in Table IV.G-5, the Lake Herman Road / East 2nd Street intersection is projected to operate at unacceptable LOS F during the AM peak hour in the Cumulative Conditions.

h. Cumulative Conditions Recommended Intersection Improvements. Improvements are required to maintain LOS D or better operating conditions at the Lake Herman Road / East 2nd Street intersection under Cumulative Conditions. **These are not the impacts of the proposed project.**

The recommended improvement is listed in Table IV.G-6 and the resulting improved intersection levels of service after implementing the recommended improvements are presented in Table IV.G-7.

Table IV.G-6: Cumulative Conditions Recommended Intersection Improvements

Cumulative Conditions Impacts	Level of Significance	Cumulative Conditions Recommended Improvements
Unacceptable LOS at the intersection of **Lake Herman Road / East 2nd Street**. The effect of cumulative growth traffic would result in the intersection operating at LOS F with a delay of over 50.0 seconds for both the AM and PM peak hours.	Significant	The following improvement is recommended in the Benicia General Plan: signalize intersection as it meets Signal Warrant 11, Peak Hour Volumes for the AM and PM peak hours. Implementation of the identified improvement would result in this intersection operating at an acceptable LOS B during both the AM and PM peak hours.

Source: Korve Engineering, 2006

Table IV.G-7: Cumulative Conditions Mitigated Intersection LOS

No.	Intersection	Traffic Control	Peak Hour	Prior to Mitigation Cumulative Conditions		Mitigated Cumulative Conditions	
				LOS	Delay	LOS	Delay
9	Lake Herman Road / East 2nd Street	4-Way Stop*	AM	**F**	**>50.0**	B	12.6
			PM	C	15.8	B	12.5

* Mitigation includes signalizing intersection
Source: Korve Engineering, 2006

i. Cumulative Conditions Freeway Segment Level of Service. The CMP facilities within Benicia, and their current operating levels in the PM peak hour, are summarized in Table IV.G-8.

Table IV.G-8: Future Freeway Level of Service by Segment, PM Peak Hour

Freeway Segment	Planned Lanes	Future Volume, No Project	Volume to Capacity Ratio	LOS
NB[a] I-680, South of Benicia Bridge	5	5,912	0.451	A
NB I-680, Benicia Bridge to Bayshore Road	3	3,245	0.470	A
NB I-680, Bayshore Road to Industrial Way	3	3,223	0.467	A
NB I-680, Industrial Way to Lake Herman Road	3	4,189	0.607	A
NB I-680, North of Lake Herman Road	3	5,324	0.772	C
SB[b] I-680, North of Lake Herman Road	3	3,086	0.447	A
SB I-680, Lake Herman Road to Industrial Way	3	3,172	0.460	A
SB I-680, Industrial Way to Bayshore Road	3	2,802	0.406	A
SB I-680, Bayshore Road to Benicia Bridge	3	3,502	0.508	A
SB I-680, South of Benicia Bridge	5	7,173	0.624	B
WB[c] I-780, Benicia Bridge to East 2nd Street	2	3,181	0.723	C
WB I-780, West of East 2nd Street	2	3,572	0.812	D
EB[d] I-780, West of East 2nd Street	2	3,491	0.793	C
EB I-780, East 2nd Street to Benicia Bridge	2	4,184	0.951	E

Note: Based on information taken from the *2000 Highway Capacity Manual* (Chapter 21 – Multilane Highways), the analysis assumes freeway capacity of 2,200 vehicles/lane/hour for 2-lane segments (lanes per direction), 2,300 vehicles/lane/hour for 3-lane segments and above .
[a] NB = northbound [b] SB = southbound [c] WB = westbound [d] EB = eastbound
Source: 2000 Highway Capacity Manual; STA Travel Demand Model; Korve Engineering, 2006.

As shown in Table IV.G-8, all of the CMP routes are projected to operate at LOS E or better during the PM peak hour under Cumulative Conditions.

3. Impacts and Mitigation Measures

This section evaluates transportation related impacts of the proposed project. It focuses on traffic operations and potential traffic impacts at study intersections in the vicinity of the project site under both the Existing Conditions and Cumulative Conditions background traffic volumes. Mitigation measures to improve the study intersections are provided where project impacts are identified that would result in unacceptable levels of service. This section concludes by addressing potential impacts to transit and pedestrian and bike facilities. Construction period impacts are also addressed.

a. Project Description. As previously noted, the project site is located east of I-680, south of Lake Herman Road, and north of East 2nd Street.

As summarized in Table IV.G-9, the traffic analysis assumed the following specific levels of development the project site: two hotels; 60,000 square feet of fitness club space; 60,000 square feet of movie theater space; 300,000 square feet of office space, 100,000 square feet of retail uses; 28,000 square feet of restaurant uses; a gas station; a bank; 50,000 square feet of research and development

Table IV.G-9: Project Land Use Details Assumed for Traffic Model

Land Use	Size	Unit of Measurement
Hotel/Conference Center	105	Employees
Hotel (3 stories)	87	Employees
Fitness Club	60,000	Square feet
Movie	60,000	Square feet
Office (4 stories)	200,000	Square feet
Office (2 stories)	100,000	Square feet
Retail	100,000	Square feet
Restaurant	20,000	Square feet
Fast Food	8,000	Square feet
Gas Station	7,000	Square feet
Bank	12,000	Square feet
Research and Development	50,000	Square feet
Industrial/Warehouse	2,021,000	Square feet
Flex Use	2,423,000	Square feet

Source: Korve Engineering, 2006

uses; 2,021,000 square feet of industrial / warehousing uses; and 2,423,000 of flex use business park space.

b. Project Trip Generation. Trip generation estimates are based on rates from the *Trip Generation Manual, 7th Edition* (Institute of Transportation Engineers, 2004). The 7th Edition is the latest in the series providing the most up-to-date database of land use based trip rates. Rates presented are average rates based on trip generation survey counts conducted at existing facilities. Table IV.G-10 provides the trip generation rates for proposed uses. Table IV.G-11 provides the project's expected trip generation.

Table IV.G-10: Trip Generation Rates and Equations

ITE Land Use Code	Daily	AM Peak Hour	PM Peak Hour
Warehousing (150)	3.68*X+350.27	Ln(T)=0.71*Ln(X)+1.15	Ln(T)=0.79*Ln(X)+0.54
Hotel (310)	14.34*X	0.69*X	0.80*X
Movie Theatre with Matinee (444)	38.00*X	0.00*X	3.80*X
Health/Fitness Club (492)	32.93~~26.30~~*X	1.21*X	4.05*X
General Office Building (710)	11.01*X	1.55*X	1.49*X
Research and Development Center (760)	8.11*X	1.24*X	1.08*X
Business Park (770)	12.76*X	1.43*X	1.29*X
Specialty Retail (814)[a]	44.32*X	0.00*X	2.71*X
Drive-in Bank (912)	246.49*X	12.34*X	45.74*X
High-Turnover (Sit-Down) Restaurant (932)	127.15*X	11.52*X	10.92*X
Fast-Food Restaurant with Drive-Through Window (934)	496.12*X	53.11*X	34.64*X
Gasoline/Service Station with Convenience Market (945)	1,208.70~~870.25~~*X	77.68*X	96.37*X

X = Units of land use, as defined in Table IV.G-9.

[a] Specialty retail centers are generally small strip shopping centers that contain a variety of retail shops and specialize in quality apparel; hard goods; and services, such as real estate offices, dance studios, florists, and small restaurants. Source: ITE, *Trip Generation Manual, 7th Edition*

It should be noted that the *Trip Generation Manual* provides both a weighted average rate and a regression equation with which to calculate trip generation for each land use. Generally, in cases where ITE studied at least 20 sites for a particular land use and where the coefficient of determination[4] is greater or equal to 0.75, the regression equation is used to determine that land use's trip generation. In cases where ITE studied fewer than 20 sites and where the coefficient of determination is lesser than 0.75, the weighted average is used to determine the land use's trip generation.

Table IV.G-11: Project Trip Generation

Land Use	ITE Land Use Code	Size	Unit	ADT	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Hotel/ Conference Center	Hotel (310)	105	Employees	1,506	43	29	72	45	39	84
Hotel (3 Stories)	Hotel (310)	87	Employees	1,248	36	24	60	38	32	70
Fitness Club	Health/Fitness Club (492)	60	KSF	1,976 ~~1,578~~	31	42	73	124	119	243
Office (4 Stories)	General Office Building (710)	200	KSF	2,202	273	37	310	51	247	298
Movie	Movie Theatre with Matinee (444)	60	KSF	2,280	-	-	-	91	137	228
Office (2 Stories)	General Office Building (710)	100	KSF	1,101	136	19	155	25	124	149
Retail	Specialty Retail (814)	100	KSF	4,432	-	-	-	119	152	271
Restaurant	High-Turnover (Sit-Down) Restaurant (932)	20	KSF	2,543	120	110	230	133	85	218
Fast Food	Fast-Food Restaurant with Drive-Through Window (934)	8	KSF	3,969	217	208	425	144	133	277
Gas Station	Gasoline/Service Station with Convenience Market (945)	7	KSF	8,461 ~~6,092~~	277	267	544	338	338	675
Bank	Drive-in Bank (912)	12	KSF	2,958	83	65	148	275	275	549
R&D	Research and Development Center (760)	50	KSF	406	51	11	62	8	46	54
Industrial/ Warehouse	Warehousing (150)	2,021	KSF	7,788	414	288	702	56	645	701
Flex Use	Business Park (770)	2,423	KSF	30,916	2,911	554	3,465	719	2,406	3,125
Total				**71,786** ~~**69,017**~~	**4,592**	**1,654**	**6,246**	**2,165**	**4,777**	**6,942**

KSF = 1,000 square feet.
Source: Korve Engineering, 2006

[4] The coefficient of determination (R^2) is an estimate of the accuracy of the fit of the regression equation.

As shown, at build-out, the proposed project would generate approximately 69,017 daily trips, including 6,246 trips in the AM peak hour (4,592 inbound and 1,654 outbound), and 6,942 trips in the PM peak hour (2,165 inbound and 4,777 outbound).

c. Project Trip Distribution and Assignment. Once the number of trips generated by the proposed project is known, the trips must be generally distributed to and from the site, and then specifically assigned to roadways in the vicinity of the site. The distribution of project traffic was determined based on a select link analysis using the latest available Solano/Napa County Travel Demand Model. The project trip distribution patterns are presented in Figure IV.G-6. The project trips were assigned to the roadways by applying the trip distribution percentages to the project trip generation.

The analysis assumed four primary access points to the project site:

- East 2nd Street / Park Road / New Access (Study Intersection 1);
- East 2nd Street / Industrial Way (Study Intersection 2);
- Lake Herman Road / extension of Industrial Way (the project would remove Reservoir Road and complete the extension of Industrial Way) (Study Intersection 8); and
- Lake Herman Road / Boulevard "A" (Not analyzed).

The distribution of traffic to and from the Benicia Business Park was based on the assumptions in the Benicia General Plan for trips generated by commercial and industrial uses, with one key adjustment. The General Plan states that, on a City-wide average basis, commercial and industrial trips are roughly evenly split between internal/and external trips; that is, half of the trips generated stay within the City, and half travel to or from external origins or destinations. For the project's trip distribution, a larger percentage of trips was assumed to travel externally, due to the large size of the project and proximity to the freeway. Thus, the project trip generation was assumed to be 25 percent internal (traveling wholly within the city) and 75 percent external (traveling to or from external destinations). The directional proportions (north/south/west) shown in the General Plan were maintained. The AM and PM peak hour project volumes at each of the 20 study intersections are shown on Figure IV.G-7.

d. Existing Plus Project Conditions Traffic Volumes. The traffic generated by the proposed project was subsequently added to the Existing Conditions traffic volumes to derive the Existing Plus Project Conditions traffic volumes. Figure IV.G-8 presents lane configurations and intersection control for the Existing Plus Project Conditions. The Existing Plus Project Conditions AM and PM peak hour turning movement volumes at the 20 study intersections are shown on Figure IV.G-9.

e. Thresholds of Significance. For the purposes of this EIR, the proposed project would result in significant transportation impacts if it would:

- Create direct transportation or circulation impacts associated with inconsistencies with General Plan policies;
- Cause a signalized intersection to fall below LOS D; cause the need for a signal at an unsignalized intersection; or cause queuing which exceeds the lane capacity at any intersection;
- Contribute to future cumulative demand that exceeds on-site project roadway capacity;

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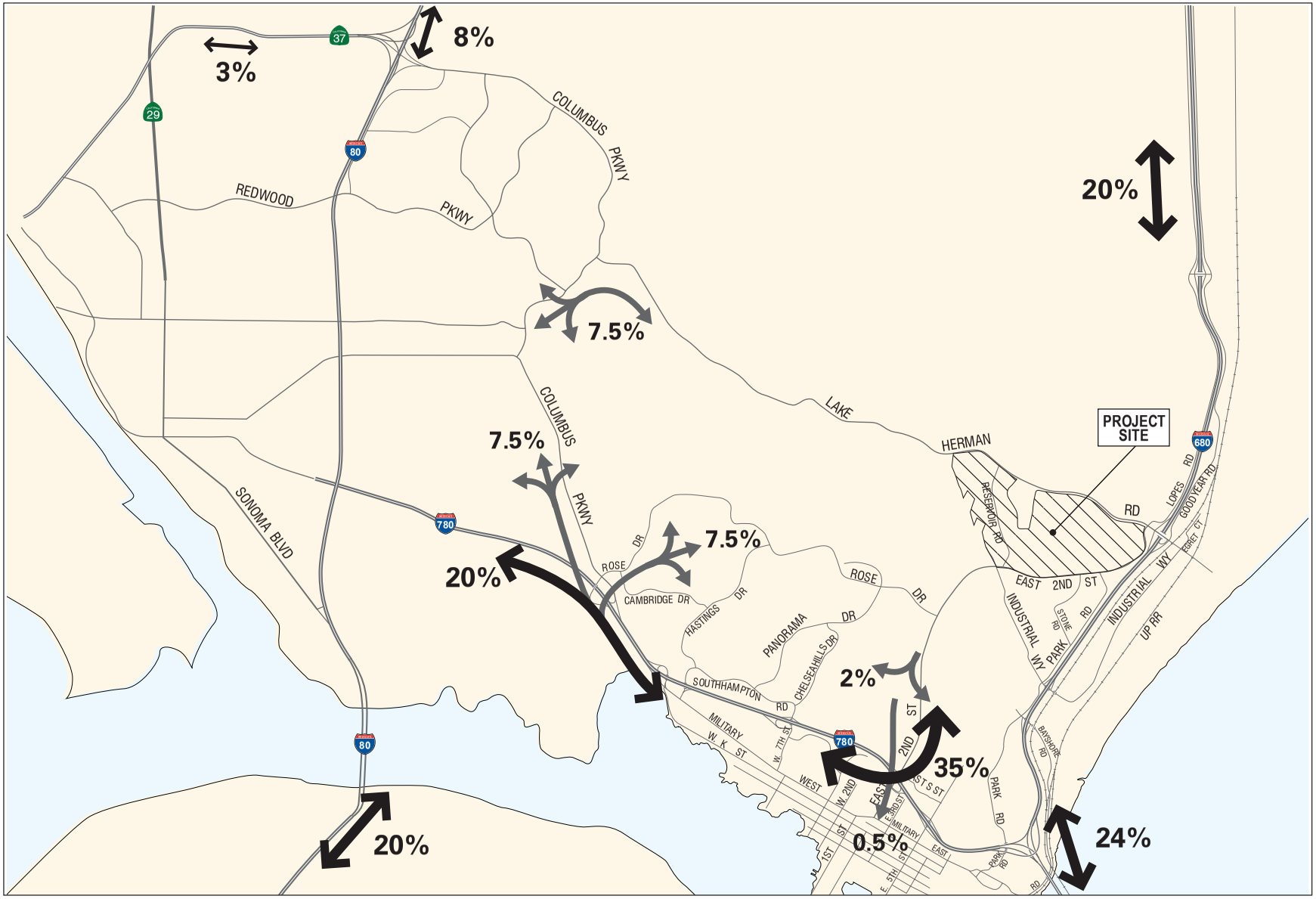

LSA

FIGURE IV.G-6

Benicia Business Park EIR

Project Trip Distribution

SOURCE: KORVE ENGINEERING, 2006.

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LSA

AM (PM) Peak Hour

Benicia Business Park EIR
Project Intersection Traffic Volumes

FIGURE IV.G-7

SOURCE: KORVE ENGINEERING, 2006.

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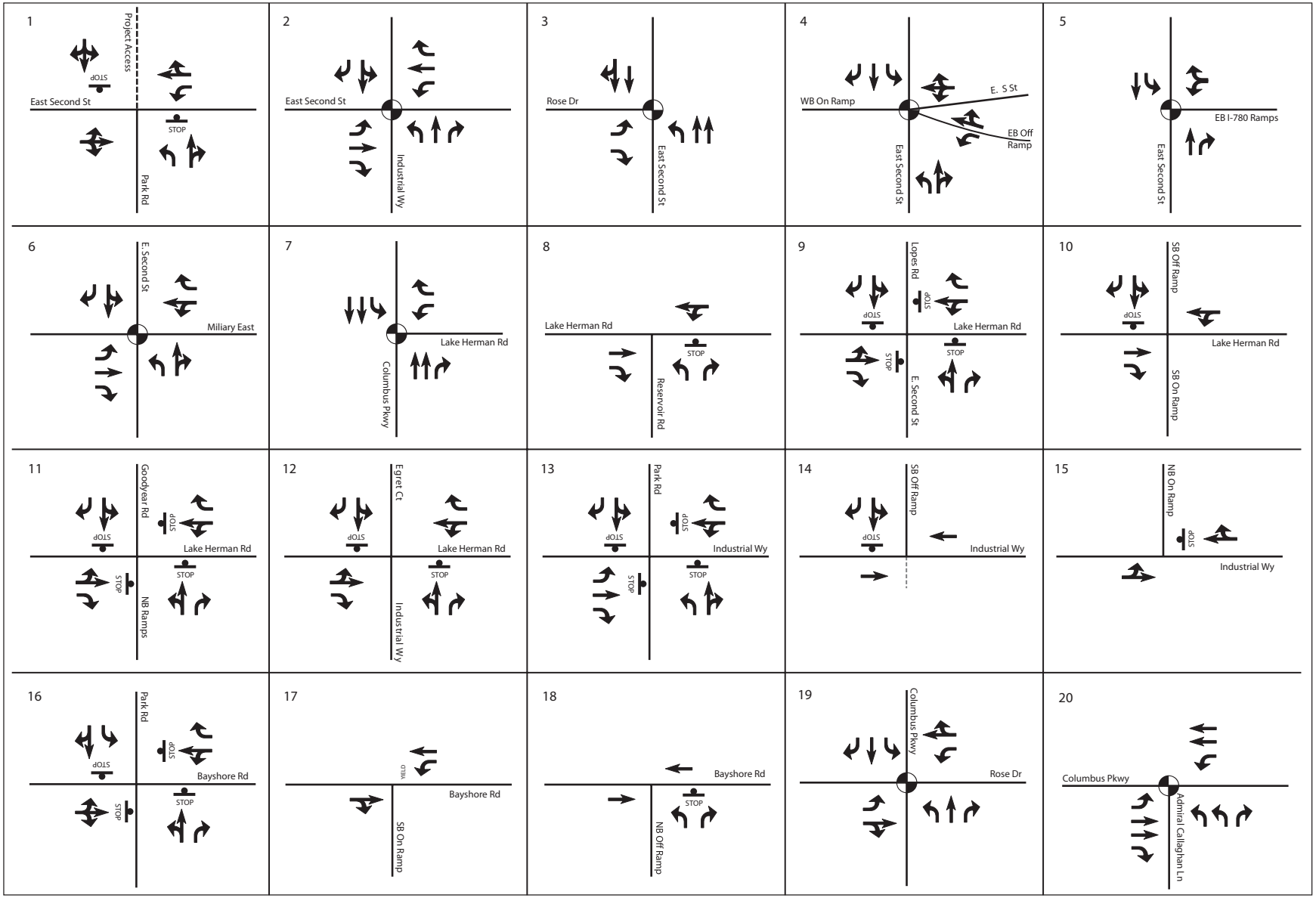

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FIGURE IV.G-8

N

Traffic Signal

Stop Sign

Benicia Business Park EIR

Existing Plus Project Lane Geometry and Traffic Control

SOURCE: KORVE ENGINEERING, 2006.

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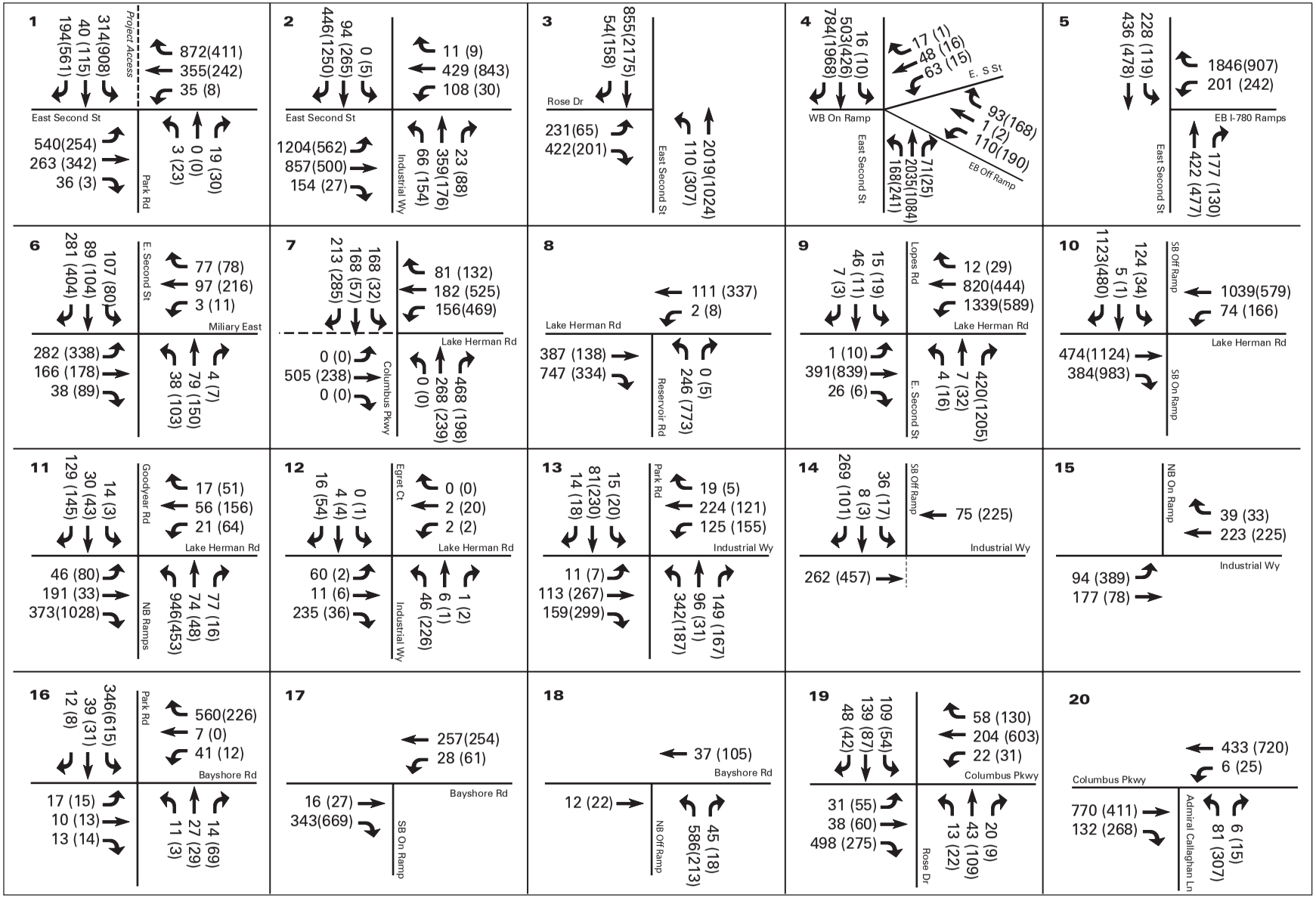

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FIGURE IV.G-9

Benicia Business Park EIR

Existing Plus Project Intersection Traffic Volumes

SOURCE: KORVE ENGINEERING, 2006.

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- Contribute 1 percent or more of the total future volume to an external roadway or freeway with inadequate capacity to meet future cumulative demand;
- Result in projected parking demand that would exceed the proposed parking supply on a regular and frequent basis;
- Result in potential conflicts for pedestrians or bicyclists, or fail to provide adequate bicycle and pedestrian access; or
- Increase transit demand above the levels provided by local transit operators or agencies.

f. **Existing Plus Project Conditions Intersection Level of Service.** The Existing Plus Project Conditions AM and PM peak hour intersection service levels for the 20 study intersections are shown in Table IV.G-12.

Table IV.G-12: Existing Plus Project Conditions Levels of Service

No.	Intersection	Traffic Control	Peak Hour	Existing		Existing Plus Project	
				LOS	Delay	LOS	Delay
1	East 2nd Street / Park Road / New Access	One-Way Stop	AM	B	10.7	**F**	**>50.0**
			PM	B	12.1	**F**	**>50.0**
2	East 2nd Street / Industrial Way	Signal	AM	A	9.8	**F**	**>80.0**
			PM	B	10.9	**F**	**>80.0**
3	East 2nd Street / Rose Drive	Signal	AM	A	10.0	C	32.6
			PM	A	9.9	**E**	**74.1**
4	East 2nd Street / I-780 Westbound Ramps	Signal	AM	C	22.3	**F**	**>80.0**
			PM	C	26.3	D	48.2
5	East 2nd Street / I-780 Eastbound Ramps	Signal	AM	B	12.7	**F**	**>80.0**
			PM	C	22.4	**F**	**>80.0**
6	East 2nd Street / Military ~~West~~ East Street	Signal	AM	B	18.5	B	~~18.5~~ 18.8
			PM	C	27.4	C	~~27.4~~ 28.1
7	Lake Herman Road / Columbus Parkway	Signal	AM	B	11.2	D	39.9
			PM	B	12.0	C	24.0
8	Lake Herman Road / Industrial Way extension *	One-Way Stop	AM	A	9.8	C	21.0
			PM	B	10.2	**F**	**>50.0**
9	Lake Herman Road / East 2nd Street	Four-Way Stop	AM	D	26.0	**F**	**>50.0**
			PM	B	11.6	**F**	**>50.0**
10	Lake Herman Road / I-680 Southbound Ramps	One-Way Stop	AM	B	13.5	**F**	**>50.0**
			PM	B	13.7	**F**	**>50.0**
11	Lake Herman Road / I-680 Northbound Ramps / Goodyear	Four-Way Stop	AM	B	10.7	**F**	**>50.0**
			PM	B	10.8	**F**	**>50.0**
12	Lake Herman Road / Industrial Way (east of I-680)	Two-Way Stop	AM	B	10.1	B	10.1
			PM	B	10.8	B	10.8
13	Park Road / Industrial Way	Four-Way Stop	AM	B	11.7	D	25.1
			PM	B	12.3	C	24.4
14	Industrial Way / I-680 Southbound Ramps	One-Way Stop	AM	A	9.7	B	10.4
			PM	B	11.0	B	11.1
15	Industrial Way / I-680 Northbound Ramps	One-Way Stop	AM	B	11.3	B	12.1
			PM	B	14.0	C	18.1

Table IV.G-12 *Continued*

No.	Intersection	Traffic Control	Peak Hour	Existing		Existing Plus Project	
				LOS	Delay	LOS	Delay
16	Park Road / Bayshore Road	Four-Way Stop	AM	B	13.1	D	35.0
			PM	B	14.6	**F**	**>50.0**
17	Bayshore Road / I-680 Southbound Ramps	Westbound Left Yield	AM	A	7.9	A	8.1
			PM	A	8.6	A	9.6
18	Bayshore Road / I-680 Northbound Ramps	One-Way Stop	AM	B	11.2	C	15.8
			PM	A	9.7	B	10.6
19	Columbus Parkway / Rose Drive	Signal	AM	B	13.4	B	12.1
			PM	B	13.8	B	11.4
20	Columbus Parkway / Admiral Callaghan Drive	Signal	AM	A	5.7	A	3.8
			PM	A	9.8	A	9.0

Note: **Bolding** indicates unsatisfactory level of service.
* The proposed project includes the removal of Reservoir Road and completion of the Industrial Way extension to Lake Herman Road.
Source: Korve Engineering, 2006

As shown in Table IV.G-12, the addition of project-related trips to the roadway network is expected to cause the following intersections to operate at unacceptable LOS E or worse in the Existing Plus Project Conditions:

- East 2nd Street / Park Road / New Access: LOS F in both the AM and PM peak hours;
- East 2nd Street / Industrial Way: LOS F in both the AM and PM peak hours;
- East 2nd Street / Rose Drive: LOS E in the PM peak hour;
- East 2nd Street / I-780 Westbound Ramps: LOS F in the AM peak hour;
- East 2nd Street / I-780 Eastbound Ramps: LOS F in both the AM and PM peak hours;
- Lake Herman Road / extension of Industrial Way LOS F in the PM peak hour;
- Lake Herman Road / East 2nd Street: LOS F in both the AM and PM peak hours;
- Lake Herman Road / I-680 Southbound Ramps: LOS F in both the AM and PM peak hours;
- Lake Herman Road / I-680 Northbound Ramps / Goodyear Road: LOS F in both the AM and PM peak hours; and
- Park Road / Bayshore Road: LOS F in the PM peak hour.

g. Existing Plus Project Conditions Intersection Impacts and Mitigations Measures. Table IV.G-13 includes a description of the intersections that would operate at unacceptable LOS under Existing Plus Project Conditions. When significant impacts are identified, mitigation measures needed to reduce these impacts to less-than-significant levels are also described. The resulting intersection LOS after the mitigation measures for the listed intersections is presented in Table IV.G-14.

Table IV.G-13:Existing Plus Project Conditions Intersection Impacts and Mitigation Measures

Existing Plus Project Conditions Impacts	Level of Significance	Existing Plus Projects Conditions Mitigation Measures	Significance After Mitigation
Impact TRANS-1: Unacceptable LOS at the intersection of **East 2nd Street / Park Road / New Access**. The effect of project traffic would result in the intersection operating at LOS F with a delay of over 50.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-1: The project sponsor shall install and pay for the following improvement. Signalize intersection: this intersection meets Signal Warrant 11, Peak Hour Volumes for both the AM and PM peak hours. Reconfigure NB approach to provide one shared through-left lane, and one exclusive right-turn lane. Configure SB approach to provide one shared through-right lane and one exclusive left-turn lane. Reconfigure EB approach to provide one shared through-right lane, and one exclusive left-turn lane. Reconfigure WB approach to provide one exclusive right-turn lane, and one shared through-right lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS C and LOS D with delays of 26.4 and 39.5 seconds for the AM and PM peak hours, respectively.	Less Than Significant
Impact TRANS-2: Unacceptable LOS at the intersection of **East 2nd Street / Industrial Way**. The effect of project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-2: The project sponsor shall install and pay for the following improvement. Reconfigure SB approach to provide one exclusive left-turn lane, one through lane, and two exclusive right-turn lanes. Reconfigure EB approach to provide two exclusive left-turn lanes, one through lane, and one exclusive right-turn lane. Reconfigure WB approach to provide one exclusive left-turn lanes, two through lanes, and one exclusive right-turn lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS C and LOS D with delays of 31.6 and 43.5 seconds for the AM and PM peak hour, respectively.	Less Than Significant
Impact TRANS-3: Unacceptable LOS at the intersection of **East 2nd Street / Rose Drive**. The effect of project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-3: The project sponsor shall install and pay for the following improvement. Reconfigure SB approach to provide two through lanes, and one exclusive right-turn lane. Reconfigure EB approach to provide one exclusive left-turn lane, one shared left-right turn lane, and one exclusive right-turn lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS B and LOS C with a delay of 14.8 and 34.6 seconds for the AM and PM peak hours, respectively.	Less Than Significant

Table IV.G-13 *Continued*

Existing Plus Project Conditions Impacts	Level of Significance	Existing Plus Projects Conditions Mitigation Measures	Significance After Mitigation
Impact TRANS-4: Unacceptable LOS at the intersection of **East 2nd Street / 1-780 Westbound Ramps**. The effect of project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-4: The project sponsor shall install and pay for the following improvement. Reconfigure NB approach to provide one exclusive left-turn lane, one through lane, and one exclusive through-right lane. Reconfigure SB approach to provide one exclusive left-turn lane, one shared through-right lane, and one exclusive right-turn lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS C and LOS D with delays of 30.2 and 36.5 seconds for the AM and PM peak hours, respectively.	Less Than Significant
Impact TRANS-5: Unacceptable LOS at the intersection of **East 2nd Street / 1-780 Eastbound Ramps**. The effect of project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for AM peak hour.	Significant	Mitigation Measure TRANS-5: The project sponsor shall install and pay for the following improvement. Reconfigure WB approach to provide one ~~shared~~ left-turn ~~right~~ lane, and one free~~two exclusive~~ right-turn lane~~s~~. Implementation of the identified improvement would result in this intersection operating at an acceptable LOS C~~D~~ and LOS B~~C~~ ~~with a delay of 37.8 and 21.8~~ for the AM and PM peak hours, respectively.	Less Than Significant
Impact TRANS-6: Unacceptable LOS at the intersection of **Lake Herman Road / extension of Industrial Way.** The effect of project traffic would result in the intersection operating at LOS F with a delay of over 50.0 seconds for the PM peak hour.	Significant	Mitigation Measure TRANS-6: The project sponsor shall install and pay for the following improvement. Signalize intersection: this intersection meets Signal Warrant 11, Peak Hour Volumes for both the AM and PM peak hours. Implementation of the identified improvement would result in this intersection operating at an acceptable LOS C with delays of 28.1 seconds for the PM peak hour.	Less Than Significant
Impact TRANS-7: Unacceptable LOS at the intersection of **Lake Herman Road / East 2nd Street**. The effect of project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-7: The project sponsor shall install and pay for the following improvement. Widen Lake Herman Road from the intersection of A Street/Lake Herman Road to the intersection of Lake Herman Road/I-680 . Reconfigure the NB approach to provide one shared through-left lane, and two right-turn lanes. Reconfigure the EB approach to provide one exclusive left-turn lane, one through lane, and one through-right lane. Reconfigure the WB approach to provide two exclusive left-turn lanes, one through lane, and one through-right lane. Implementation of the identified improvement would result in this intersection operating at an acceptable LOS B and LOS C with delays of 16.6 and 34.4 seconds for the AM and PM peak hours, respectively.	Less Than Significant

Table IV.G-13 *Continued*

Existing Plus Project Conditions Impacts	Level of Significance	Existing Plus Projects Conditions Mitigation Measures	Significance After Mitigation
Impact TRANS-8: Unacceptable LOS at the intersection of **Lake Herman Road / I-680 Southbound Ramps**. The effect of project traffic would result in the intersection operating at LOS F with a delay of over 50.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-8: The project sponsor shall install and pay for the following improvement. Signalize intersection: this intersection meets Signal Warrant 11, Peak Hour Volumes for both the AM and PM peak hours. Reconfigure WB approach to provide one exclusive left-turn lane, and one through lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS B with delays of 11.9 and 13.1 seconds for the AM and PM peak hours, respectively. This improvement shall be included in a comprehensive plan to improve the operation of I-680 between Industrial Way and East 2nd Street.	Less Than Significant
Impact TRANS-9: Unacceptable LOS at the intersection of **Lake Herman Road / I-680 Northbound Ramps / Goodyear Road**. The effect of project traffic would result in the intersection operating at LOS F with a delay of over 50.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-9: The project sponsor shall install and pay for the following improvement. Signalize intersection: this intersection meets Signal Warrant 11, Peak Hour Volumes for both the AM and PM peak hours. Reconfigure NB approach to provide one exclusive left-turn lane, and one shared through-right lane. Reconfigure EB approach to provide one exclusive left-turn lane, one shared through-right lane, and one exclusive right-turn lane. Reconfigure WB approach to provide one exclusive left-turn lane, and one shared through-right lane. Implementation of the identified improvement would result in this intersection operating at an acceptable LOS D and LOS C with delays of 42.2 and 28.4 seconds for the AM and PM peak hours, respectively. This improvement shall be included in a comprehensive plan to improve the operation of I-680 between Industrial Way and East 2nd Street.	Less Than Significant
Impact TRANS-10: Unacceptable LOS at the intersection of **Park Road / Bayshore Road**. The effect of project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-10: The project sponsor shall install and pay for the following improvement. Reconfigure SB approach to provide two exclusive left-turn lanes, and one shared through-right lane. Reconfigure WB approach to provide one shared through-left lane, and two exclusive right-turn lanes. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS B with delays of 12.4 and 14.4 seconds for the AM and PM peak hours, respectively.	Less Than Significant

Source: Korve Engineering, 2006.

The Benicia Business Park project is projected to cause 10 out of the 20 study intersections to operate at unacceptable LOS E or worse under Existing Plus Project Conditions. All of these intersections were shown to operate acceptably at LOS D or better under the Existing Conditions. As a mitigation for these impacts, the project sponsor shall install and pay for all the improvements identified above.

Table IV.G-14 reiterates service levels prior to mitigation and then reports on the LOS and traffic delay once mitigation measures have been implemented.

Table IV.G-14: Existing Plus Project Conditions Mitigated Intersection Levels of Service

No.	Intersection	Traffic Control	Peak Hour	Prior to Mitigation Existing Plus Project Conditions		Mitigated ** Existing Plus Project Conditions	
				LOS	Delay	LOS	Delay
1	East 2nd Street / Park Road / New Access	One-Way Stop*	AM	**F**	**>50.0**	C	26.4
			PM	**F**	**>50.0**	D	39.5
2	East 2nd Street / Industrial Way	Signal	AM	**F**	**>80.0**	C	31.6
			PM	**F**	**>80.0**	D	43.5
3	East 2nd Street / Rose Drive	Signal	AM	C	32.6	B	14.8
			PM	**E**	**74.1**	C	34.6
4	East 2nd Street / I-780 Westbound Ramps	Signal	AM	**F**	**>80.0**	C	32.6
			PM	D	48.2	C	25.1
5	East 2nd Street / I-780 Eastbound Ramps	Signal	AM	**F**	**>80.0**	D	37.8
			PM	**F**	**>80.0**	C	21.8
8	Lake Herman Road / Extension of Industrial Way	One-Way Stop*	AM	C	21.0	B	12.2
			PM	**F**	**>50.0**	C	28.1
9	Lake Herman Road / East 2nd Street	Four-Way Stop	AM	**F**	**>50.0**	B	16.6
			PM	**F**	**>50.0**	C	34.4
10	Lake Herman Road / I-680 Southbound Ramps	One-Way Stop*	AM	**F**	**>50.0**	B	11.9
			PM	**F**	**>50.0**	B	13.1
11	Lake Herman Road / I-680 Northbound Ramps /	Four-Way Stop*	AM	**F**	**>50.0**	D	42.2
			PM	**F**	**>50.0**	C	28.4
16	Park Road / Bayshore Road	Four-Way Stop	AM	D	35.0	B	15.8
			PM	**F**	**>50.0**	B	12.7

* Mitigation includes signalization of intersection
** Some intersections may have unavoidable impacts, and therefore cannot be mitigated.
Note: **Bolding** indicates unsatisfactory level of service.
Source: Korve Engineering, 2006

h. Cumulative Plus Project Conditions Traffic Volumes. The traffic generated by the proposed project was added to the Cumulative Conditions traffic volumes to derive the Cumulative Plus Project Conditions traffic volumes. Figure IV.G-8 presents turning movement volumes for the Cumulative Plus Project Conditions in the AM and PM peak hours at the 20 study intersections. The roadway lane configurations and intersection control assumed for Cumulative Plus Project Conditions are the same as those for the Existing Plus Project Conditions. Figure IV.G-10 shows the Cumulative Plus Project Intersection travel volumes.

i. Cumulative Plus Project Conditions Intersection Level of Service. The Cumulative Plus Project Conditions AM and PM peak hour intersection level of service results for the 20 study intersections are shown in Table IV.G-15.

As shown in Table IV.G-15, the addition of project-related trips to the roadway network would be expected to worsen conditions or contribute to unacceptable operating conditions at the following intersections in the Cumulative Plus Project Condition. The LOS in this condition is listed after each affected intersection.

LSA

AM (PM) Peak Hour

Benicia Business Park EIR
Cumulative Plus Project Intersection
Traffic Volumes

FIGURE IV.G-10

SOURCE: KORVE ENGINEERING, 2006.

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- East 2nd Street / Park Road / New Access: LOS F in both the AM and PM peak hours;
- East 2nd Street / Industrial Way: LOS F in both the AM and PM peak hours;
- East 2nd Street / Rose Drive: LOS F in the PM peak hour;
- East 2nd Street / I-780 Westbound Ramps: LOS F in both the AM and PM peak hours;
- East 2nd Street / I-780 Eastbound Ramps: LOS F in both the AM and PM peak hours;
- Lake Herman Road / extension of Industrial Way: LOS F in the PM peak hour;
- Lake Herman Road / East 2nd Street: LOS F in both the AM and PM peak hours;
- Lake Herman Road / I-680 Southbound Ramps: LOS F in both the AM and PM peak hours;
- Lake Herman Road / I-680 Northbound Ramps: LOS F in both the AM and PM peak hours;
- Park Road / Industrial Way: LOS E in both the AM and PM peak hours; and
- Park Road / Bayshore Road: LOS F in both the AM and PM peak hours.

Table IV.G-15: Cumulative Plus Project Conditions AM and PM Peak Hour Intersection Levels of Service

No.	Intersection	Traffic Control	Peak Hour	2030		2030 plus Project	
				LOS	Delay	LOS	Delay
1	East 2nd Street / Park Road / New Access	One-Way Stop	AM	B	11.6	**F**	**>50.0**
			PM	B	13.6	**F**	**>50.0**
2	East 2nd Street / Industrial Way	Signal	AM	B	10.3	**F**	**>80.0**
			PM	B	11.4	**F**	**>80.0**
3	East 2nd Street / Rose Drive	Signal	AM	B	10.8	D	37.8
			PM	B	11.0	**F**	**>80.0**
4	East 2nd Street / I-780 Westbound Ramps	Signal	AM	C	30.5	**F**	**>80.0**
			PM	D	43.9	**F**	**>80.0**
5	East 2nd Street / I-780 Eastbound Ramps	Signal	AM	C	26.4	**F**	**>80.0**
			PM	B	15.2	**F**	**>80.0**
6	East 2nd Street / Military ~~West~~ East Street	Signal	AM	C	20.7	C	~~20.7~~ 21.2
			PM	D	53.3	D	~~53.3~~ 54.9
7	Lake Herman Road / Columbus Parkway	Signal	AM	B	13.2	D	41.3
			PM	B	12.0	B	19.7
8	Lake Herman Road / Extension of Industrial Way	One-Way Stop	AM	B	10.2	C	21.0
			PM	B	10.9	**F**	**>50.0**
9	Lake Herman Road / East 2nd Street	Four-Way Stop	AM	**F**	**>50.0**	**F**	**>50.0**
			PM	C	15.8	**F**	**>50.0**
10	Lake Herman Road / I-680 Southbound Ramps	One-Way Stop	AM	C	18.7	**F**	**>50.0**
			PM	C	22.3	**F**	**>50.0**
11	Lake Herman Road / I-680 Northbound Ramps / Goodyear Road	Four-Way Stop	AM	B	13.3	**F**	**>50.0**
			PM	B	13.8	**F**	**>50.0**
12	Lake Herman Road / Industrial Way (east of I-680)	Two-Way Stop	AM	B	10.8	B	10.8
			PM	B	12.1	B	12.1
13	Park Road / Industrial Way	Four-Way Stop	AM	C	15.2	**E**	**37.3**
			PM	C	16.8	**E**	**39.9**
14	Industrial Way / I-680 Southbound Ramps	One-Way Stop	AM	B	10.2	B	11.0
			PM	B	12.2	B	12.3
15	Industrial Way / I-680 Northbound Ramps	One-Way Stop	AM	B	13.1	B	14.2
			PM	C	19.3	D	28.7

TableIV.G-15 *Continued*

No.	Intersection	Traffic Control	Peak Hour	2030		2030 plus Project	
				LOS	Delay	LOS	Delay
16	Park Road / Bayshore Road	Four-Way Stop	AM	C	19.0	**F**	**>50.0**
			PM	C	24.4	**F**	**>50.0**
17	Bayshore Road / I-680 Southbound Ramps	Westbound Left Yield	AM	A	8.2	A	8.4
			PM	A	9.2	B	10.2
18	Bayshore Road / I-680 Northbound Ramps	One-Way Stop	AM	B	12.7	C	19.6
			PM	B	10.1	B	11.1
19	Columbus Parkway / Rose Dr.	Signal	AM	B	14.0	B	14.9
			PM	B	14.4	B	14.3
20	Columbus Parkway / Admiral Callaghan Drive	Signal	AM	A	6.0	A	4.1
			PM	B	10.5	B	10.5

Note: **Bolding** indicates unsatisfactory level of service.
Source: Korve Engineering, 2006

j. Cumulative Plus Project Conditions Intersection Impacts and Mitigation Measures. The following is a description of the intersections that would operate at unacceptable LOS under Cumulative Plus Project Conditions. When significant impacts are identified, mitigation measures needed to reduce the impacts to less-than-significant levels are also described.

Table IV.G-16 details project-related impacts in the Cumulative Plus Project Condition, and recommends mitigation measures to reduce these impacts and achieve acceptable operating conditions. Table IV.G-17 details the LOS of affected intersections after mitigation.

The Benicia Business Park is projected to cause 11 out of the 20 study intersections to operate at unacceptable LOS E or worse under Cumulative Plus Project Conditions. The Lake Herman Road / East 2nd Street intersection was also projected to operate at unacceptable LOS F under the Cumulative Conditions without the addition of the project. Thus, the project sponsor is fully responsible for the mitigation measures required at the remaining ten intersections.

It should be noted that mitigation measures for some intersections will require right-of-way acquisition. However, this will not prevent moving forward with the improvements.

k. Cumulative Plus Project Conditions Freeway Segment Level of Service. The CMP facilities within Benicia, and their current operating levels in the PM peak hour, are summarized in Table IV.G-18.

As shown in Table IV.G-18, all of the CMP routes are projected to operate at LOS E or better during the PM peak hour under Cumulative Plus Project Conditions, except Westbound I-780, West of East 2nd Street, which would operate at LOS F in the PM peak hour.

l. Cumulative Plus Project Conditions Freeway Segment Impacts and Mitigation Measures. Table IV.G-19 includes a description of the freeway segment that would operate at unacceptable LOS under Cumulative Plus Project Conditions. A mitigation measure to reduce this impact is also identified.

Table IV.G-16: Cumulative Plus Project Conditions Intersection Impacts and Mitigation Measures

Cumulative Plus Project Conditions Impacts	Level of Significance	Cumulative Plus Project Conditions Mitigation Measures	Significance After Mitigation
Impact TRANS-11: Unacceptable LOS at the intersection of **East 2nd Street / Park Road / New Access**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with a delay of over 50.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-11: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Signalize intersection: this intersection meets Signal Warrant 11, Peak Hour Volumes for both the AM and PM peak hours. Reconfigure NB approach to provide two exclusive left-turn lanes, and one through-right lane. Reconfigure SB approach to provide two exclusive left-turn lanes and one through-right lane. Reconfigure EB approach to provide one shared through-right lane, and one exclusive left-turn lane. Reconfigure WB approach to provide one shared through-left lane, and one exclusive right-turn lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS C with delays of 26.4 and 36.2 seconds for the AM and PM peak hours, respectively.	Less Than Significant
Impact TRANS-12: Unacceptable LOS at the intersection of **East 2nd Street / Industrial Way**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-12: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Reconfigure SB approach to provide one exclusive left-turn lane, one through lane, and two exclusive right-turn lanes. Reconfigure EB approach to provide two exclusive left-turn lanes, one through lane, and one exclusive right-turn lane. Reconfigure WB approach to provide one exclusive left-turn lane, two through lanes, and one exclusive right-turn lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS C and LOS D with delays of 31.7 and 45.2 seconds for the AM and PM peak hours, respectively.	Less Than Significant

Table IV.G-16 *Continued*

Cumulative Plus Project Conditions Impacts	Level of Significance	Cumulative Plus Project Conditions Mitigation Measures	Significance After Mitigation
Impact TRANS-13: Unacceptable LOS at the intersection of **East 2nd Street / Rose Drive**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-13: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Reconfigure SB approach to provide two through lanes, and one exclusive right-turn lane. Reconfigure NB approach to provide two exclusive left-turn lanes, and two through lanes. Reconfigure EB approach to provide one exclusive left-turn lane, one shared left-right lane, and one exclusive right-turn lane. Implementation of the identified improvement would result in this intersection operating at an acceptable LOS B and LOS D with delays of 16.6 and 43.1 seconds for the AM and PM peak hours, respectively.	Less Than Significant
Impact TRANS-14: Unacceptable LOS at the intersection of **East 2nd Street / 1-780 Westbound Ramps**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-14: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Reconfigure NB approach to provide one exclusive left-turn lane, one through lane, and one exclusive through-right lane. Reconfigure SB approach to provide one exclusive left-turn lane, one shared through-right lane, and one exclusive right-turn lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS D with delays of 40.7 and 35.8 seconds for the AM and PM peak hours, respectively.	Less Than Significant
Impact TRANS-15: Unacceptable LOS at the intersection of **East 2nd Street / 1-780 Eastbound Ramps**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-15: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Reconfigure WB approach to provide one ~~shared~~ left-turn ~~right~~ lane, and one free~~two exclusive~~ right-turn lane~~s~~. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS C~~D~~ and LOS B~~C with delays of 52.9 and 29.6 seconds for~~ the AM and PM peak hours, respectively.	Less Than Significant

Table IV.G-16 *Continued*

Cumulative Plus Project Conditions Impacts	Level of Significance	Cumulative Plus Project Conditions Mitigation Measures	Significance After Mitigation
Impact TRANS-16: Unacceptable LOS at the intersection of **Lake Herman Road / extension of Industrial Way** . The effect of cumulative growth and project traffic would result in the intersection operating at LOS E and LOS F with delays of 38.7 and over 50.0 seconds for the AM and PM peak hours, respectively.	Significant	Mitigation Measure TRANS-16: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Signalize intersection: this intersection meets Signal Warrant 11, Peak Hour Volumes for both the AM and PM peak hours. Implementation of the identified improvement would result in this intersection operating at an acceptable LOS B and LOS C with delays of 13.8 and 39.3 seconds for the AM and PM peak hours, respectively.	Less Than Significant
Impact TRANS-17: Unacceptable LOS at the intersection of **Lake Herman Road / East 2nd Street**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with a delay of over 50.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-17: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits (although signalization improvements may be eligible for a Transportation Impact Fee credit): The following improvement was recommended for Cumulative Conditions: Signalize intersection as it meets Signal Warrant 11, Peak Hour Volumes for the AM and PM peak hours. In addition, the following improvement is recommended for Cumulative Plus Project Conditions: Widen Lake Herman Road from the intersection of A Street/Lake Herman Road to the intersection of Lake Herman Road/I-680. Reconfigure the NB approach to provide one shared through-left lane, and two right-turn lanes. Reconfigure the EB approach to provide one exclusive left-turn lane, one through lane, and one through-right lane. Reconfigure the WB approach to provide two exclusive left-turn lanes, one through lane, and one through-right lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS B and LOS D with delays of 19.3 and 36.4 seconds for the AM and PM peak hours, respectively. This improvement shall be included in a comprehensive plan to improve the operation of the I-680/Industrial Way/Lake Herman Road interchange complex, consistent with the goals and policies of the City's General Plan.	Less Than Significant

Table IV.G-16 *Continued*

Cumulative Plus Project Conditions Impacts	Level of Significance	Cumulative Plus Project Conditions Mitigation Measures	Significance After Mitigation
Impact TRANS-18: Unacceptable LOS at the intersection of **Lake Herman Road / I-680 Southbound Ramps**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with a delay of over 50.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-18: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Signalize intersection as it meets Signal Warrant 11, Peak Hour Volumes for the AM and PM peak hours. Widen Lake Herman Road from the intersection of A Street/Lake Herman Road to the intersection of Lake Herman Road/I-680. Reconfigure WB approach to provide one exclusive left-turn lane, and one through lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS B and LOS C with delays of 17.2 and 25.9 seconds for the AM and PM peak hours, respectively. This improvement shall be included in a comprehensive plan to improve the operation of the I-680/Industrial Way/Lake Herman Road interchange complex, consistent with the goals and policies of the City's General Plan.	Less Than Significant
Impact TRANS-19: Unacceptable LOS at the intersection of **Lake Herman Road / I-680 Northbound Ramps / Goodyear Road**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with a delay of over 50.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-19: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Signalize intersection as it meets Signal Warrant 11, Peak Hour Volumes for the AM and PM peak hours. Widen Lake Herman Road from the intersection of A Street/Lake Herman Road to the intersection of Lake Herman Road/I-680. Reconfigure NB approach to provide one exclusive left-turn lane, and one shared through-right lane. Reconfigure EB approach to provide one exclusive left-turn lane, one shared through-right lane, and one exclusive right-turn lane. Reconfigure WB approach to provide one exclusive left-turn lane, and one shared through-right lane. Implementation of the identified improvements would result in this intersection operating at an acceptable LOS D with delays of 52.0 and 35.3 seconds for the AM and PM peak hours, respectively. This improvement shall be included in a comprehensive plan to improve the operation of the I-680/Industrial Way/Lake Herman Road interchange complex, consistent with the goals and policies of the City's General Plan.	Less Than Significant

Table IV.G-16 *Continued*

Cumulative Plus Project Conditions Impacts	Level of Significance	Cumulative Plus Project Conditions Mitigation Measures	Significance After Mitigation
Impact TRANS-20: Unacceptable LOS at the intersection of **Park Road / Industrial Way**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with delays of over 50.0 seconds for the AM and PM peak hours.	Significant	Mitigation Measure TRANS-20: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Signalize intersection as it meets Signal Warrant 11, Peak Hour Volumes for the AM and PM peak hours. Implementation of the identified improvement would result in this intersection operating at an acceptable LOS B with delays of 13.0 and 12.8 seconds for the AM and PM peak hours, respectively.	Less Than Significant
Impact TRANS-21: Unacceptable LOS at the intersection of **Park Road / Bayshore Road**. The effect of cumulative growth and project traffic would result in the intersection operating at LOS F with a delay of over 80.0 seconds for both the AM and PM peak hours.	Significant	Mitigation Measure TRANS-21: The project sponsor shall install and pay for the following improvement without Transportation Impact Fee credits: Reconfigure SB approach to provide two exclusive left-turn lanes, and one shared through-right lane. Reconfigure WB approach to provide one shared through-left lane, and two exclusive right-turn lanes. Implementation of the identified improvement would result in this intersection operating at an acceptable LOS B and LOS C with delays of 14.4 and 17.3 seconds for the AM and PM peak hours, respectively.	Less Than Significant

m. Transit Facility Impacts. The project includes no provisions for transit, and would conflict with City and regional policies supporting alternative transportation. Transit routes connecting the project site and Benicia with regional transportation centers are required to ensure adequate transit service for commuters to and from the proposed project. Such transit connections are necessary even in early development stages of the proposed project so that potential business owners and employees can factor transit availability into their decision to relocate to the proposed business park. The mitigation measure required to reduce transit facility impacts to a less- than-significant level is presented in Table IV.G-20.

n. Pedestrian and Bicycle Facility Impacts. No pedestrian or bicycle facilities, such as sidewalks or off-street paths, are proposed as part of the project. This lack of bicycle and pedestrian facilities would conflict with City policies promoting alternative transportation and would increase the amount of traffic generated by the project. The mitigation measure required to reduce bicycle and pedestrian impacts to a less- than-significant level is presented in Table IV.G-21.

Table IV.G-17: Cumulative Plus Project Conditions Mitigated Intersection Levels of Service

No.	Intersection	Traffic Control	Peak Hour	Non Mitigated Cumulative Plus Project Conditions		Mitigated** Cumulative Plus Project Conditions	
				LOS	Delay	LOS	Delay
1	East 2nd Street / Park Road / New Access	1-Way Stop*	AM	**F**	**>50.0**	C	26.4
			PM	**F**	**>50.0**	C	36.2
2	East 2nd Street / Industrial Way	Signal	AM	**F**	**>80.0**	C	31.7
			PM	**F**	**>80.0**	D	45.2
3	East 2nd Street / Rose Drive	Signal	AM	D	37.8	B	16.6
			PM	**F**	**>80.0**	D	43.1
4	East 2nd Street / I-780 Westbound Ramps	Signal	AM	**F**	**>80.0**	D	40.7
			PM	**F**	**>80.0**	D	35.8
5	East 2nd Street / I-780 Eastbound Ramps	Signal	AM	**F**	**>80.0**	D	52.9
			PM	**F**	**>80.0**	C	29.6
8	Lake Herman Road / Extension of Industrial Way	1-Way Stop*	AM	C	21.0	B	13.8
			PM	**F**	**>50.0**	D	39.3
9	Lake Herman Road / East 2nd Street	4-Way Stop	AM	**F**	**>50.0**	B	19.3
			PM	**F**	**>50.0**	D	36.4
10	Lake Herman Road / I-680 Southbound Ramps	1-Way Stop	AM	**F**	**>50.0**	B	17.2
			PM	**F**	**>50.0**	C	25.9
11	Lake Herman Road / I-680 Northbound Ramps /	4-Way Stop	AM	**F**	**>50.0**	D	52.0
			PM	**F**	**>50.0**	D	35.3
13	Park Road / Industrial Way	4-Way Stop*	AM	**E**	**37.3**	B	13.0
			PM	**E**	**39.9**	B	12.8
16	Park Road / Bayshore Road	4-Way Stop*	AM	**F**	**>50.0**	C	20.7
			PM	**F**	**>50.0**	B	15.5

* Mitigation includes signalizing intersection
Note: **Bolding** indicates unsatisfactory level of service.
Source: Korve Engineering, 2006

o. Construction Period Impacts. During the construction period, temporary transportation impacts would result from truck movements as well as construction worker vehicles traveling to and from the project site. The construction-related traffic would result in a temporary reduction in the capacities of project area streets because of the slower movements and larger turning radii of construction trucks compared to passenger vehicles. Truck traffic that occurs during the peak commute hours (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.) could result in reduced levels of service and higher delays at local intersections than during off-peak hours. Additionally, parking of construction workers' vehicles would temporarily increase parking occupancy levels in the area.

In addition, high volumes of heavily laden trucks are expected to have an adverse impact on the condition of streets and highways. Heavy trucks create a disproportionate impact to roadway structural sections, particularly at intersections where acceleration/deceleration is concentrated.

The mitigation measures required to reduce construction-related impacts to a less-than-significant level are presented below in Table IV.G-22.

Table IV.G-18: Cumulative Plus Project Conditions Freeway Level of Service by Segment, PM Peak Hour

Freeway Segment	Planned Lanes	Future Volume With Project	Volume to Capacity Ratio	LOS
NB[a] I-680, South of Benicia Bridge	5	5,322	0.463	A
NB I-680, Benicia Bridge to Bayshore Road	3	3,245	0.470	A
NB I-680, Bayshore Road to Industrial Way	3	3,223	0.467	A
NB I-680, Industrial Way to Lake Herman Road	3	4,189	0.607	A
NB I-680, North of Lake Herman Road	3	6,279	0.910	E
SB[b] I-680, North of Lake Herman Road	3	3,519	0.510	A
SB I-680, Lake Herman Road to Industrial Way	3	3,745	0.543	A
SB I-680, Industrial Way to Bayshore Road	3	2,802	0.406	A
SB I-680, Bayshore Road to Benicia Bridge	3	3,789	0.549	A
SB I-680, South of Benicia Bridge	5	7,460	0.649	B
WB[c] I-780, Benicia Bridge to East 2nd Street	2	3,181	0.723	C
WB I-780, West of East 2nd Street	2	4,527	**1.029**	**F**
EB[d] I-780, West of East 2nd Street	2	3,924	0.892	D
EB I-780, East 2nd Street to Benicia Bridge	2	4,184	0.921	E

Note: **Bolding** indicates unsatisfactory level of service.
Note: Assumes freeway capacity of 2,200 vehicles/lane/hour for 2-lane segments, 2,300 vehicles/lane/hour for 3-lane segments and above (lanes per direction).
[a] NB = northbound [b] SB = southbound [c] WB = westbound [d] EB = eastbound
Source: STA Travel Demand Model / Korve Engineering, 2006.

Table IV.G-19: Cumulative Plus Project Conditions Freeway Segment Impacts and Mitigation Measures

Cumulative Plus Project Conditions Impact	Level of Significance	Cumulative Plus Projects Conditions Mitigation Measure	Significance After Mitigation
Impact TRANS-22: Unacceptable LOS at the freeway segment of **Westbound I-780, West of East 2nd Street.** The effect of project traffic would result in the freeway segment operating at LOS F with a volume to capacity ratio of 1.029 for PM peak hour.	Significant	Mitigation Measure TRANS-22: The project sponsor shall contribute a pro-rata share to the following improvement, which is identified in the Solano County CMP 2005 Capital Improvement Program: I-80 / I-680 / I-780 Corridor mid and long-term improvements. Widen the freeway segment to three lanes, or provide an auxiliary lane for all or portions of I-780 between East 2nd Street and Columbus Parkway, subject to review and approval by Caltrans. Implementation of the identified improvement would result in this freeway segment operating at an acceptable LOS B with volume to capacity ratio of 0.656 in the PM peak hour.	Less Than Significant

Source: Korve Engineering, 2006.

Table IV.G-20: Transit Facility Impacts

Impact	Level of Significance	Mitigation Measure	Significance After Mitigation
Impact TRANS-23: The project would be inadequately served by transit facilities.	Significant	Mitigation Measure TRANS-23: The project sponsor shall be responsible for the cost to extend Benicia Transit (Benicia Breeze) to the project site. Current routes which connect Benicia with Pleasant Hill BART Station, Baylink Ferry Terminal, and other destinations in Solano County do not currently serve the project site. These costs shall include all capital costs (i.e., buses, transit shelters, and signage) associated with build-out of the Benicia Business Park. In addition, the project sponsor shall provide transit stops with covered shelters at multiple locations throughout the project site, at all major retail and employment areas, as identified by the City's Public Works Department.	Less Than Significant

Source: Korve Engineering, 2006.

Table IV.G-21: Bicycle and Pedestrian Facility Impacts

Impact	Level of Significance	Mitigation Measures	Significance After Mitigation
Impact TRANS-24: The project would not include bicycle and pedestrian facilities.	Significant	Mitigation Measure TRANS-24: The project sponsor shall incorporate the following design elements and services into the proposed development plans to minimize potential pedestrian and bicycle facility impacts. Bicycle facilities would be developed along East 2nd Street and Industrial Way as part of the project. • Pedestrian sidewalks connecting all major buildings and parking areas within the project site; • Pedestrian routes between cul-de-sacs and adjacent parcels; • Crosswalks at all areas were there may be potential pedestrian/vehicular conflicts; • Bicycle racks at all building entrances; and • Incentives for individual buildings to contain showers and lockers, and secure indoor bicycle lockers; • Sidewalks along East 2nd Street, A Street, and Industrial Way; • Sidewalks along Lake Herman Road (between A Street and East 2nd Street); ~~and~~ • Class I/II Bikeway along Lake Herman Road (between A Street and I-680) • Class II/III Bikeway along Lake Herman Road (between Industrial Way and A Street);	Less Than Significant

Table IV.G-21 *Continued*

Impact	Level of Significance	Mitigation Measures	Significance After Mitigation
TRANS-24 *Continued*		• Class I Bikeway between East 2nd Street and Lake Herman Road in the project site; • Class I Bikeway between Channel Road and East 2nd Street; and • Parking and building leases at the Business Park shall be "unbundled" (i.e., rents for building space and parking lots shall be separate). Businesses at the Business Park that have 50 or more employees and provide employee parking on a free or subsidized basis shall provide financial compensation to those employees who commute by means other than private automobile, in accordance with CA Health and Safety Code §43845.	

Source: Korve Engineering, 2006.

Table IV.G-22: Construction Period Impacts

Impacts	Level of Significance	Mitigation Measures	Significance After Mitigation
Impact TRANS-25: Temporary transportation impacts would result from truck movements and construction worker vehicles traveling to and from the project site.	Significant	Mitigation Measure TRANS-25: Prior to the issuance of each building permit, the project sponsor and construction contractor shall meet with the Benicia Public Works Department and other appropriate City of Benicia agencies to determine traffic management strategies to reduce, to the maximum extent feasible, traffic congestion and the effects of parking demand by construction workers during construction of the project. The project sponsor shall develop a construction management plan for review and approval by the City Public Works Department. The plan shall include at least the following items and requirements: • A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, provisions for truck queuing, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes. • Identification of any transit stop relocations. • Provisions for parking management and spaces for all construction workers to ensure that construction workers do not park in on-street spaces. • Identification of parking space removal and any relocation of parking for employees, and public parking during construction. • Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur.	Less Than Significant

Table IV.G-22 *Continued*

Impacts	Level of Significance	Mitigation Measures	Significance After Mitigation
TRANS-25 *Continued*		• Provisions for accommodation of pedestrian flow. • No construction traffic shall be allowed on East 2nd Street south of Industrial Way, and on Lake Herman Road and Reservoir Road. • Location of construction staging areas for materials, equipment, and vehicles. Identification of haul routes for movement of construction vehicles that would minimize impacts on vehicular and pedestrian traffic, circulation and safety; and provisions for monitoring surface streets used for haul routes so that any damage and debris attributable to the haul trucks can be identified and corrected by the project sponsor. • A process for responding to, and tracking, complaints pertaining to construction activity, including identification of an onsite complaint manager.	
Impact TRANS-26: High volumes of heavily laden trucks have an incremental impact on the condition of streets and highways.	Significant	Mitigation Measure TRANS-26: The project sponsor shall prepare an overall construction traffic management plan to limit the effects of trucks and other construction traffic on surface conditions of area roads and intersections. This plan shall be prepared in coordination with the City of Benicia, and shall include the following provisions: • Prior to implementation of the proposed project, the project sponsor shall survey the condition of truck access route roadways and prepare an existing conditions report to document roadway baseline conditions. • During the construction of the project, or periodically throughout the project's construction period, the project sponsor shall make periodic improvements to area roadways to maintain minimum standards, including clean-up of construction debris (e.g., sand and gravel) and spot repaving of potholes or other pavement section damage. • Upon completion of all or most of project construction activities, the project sponsor shall identify any impacts to roadway conditions. The project sponsor shall install improvements and/or pay an impact fee to mitigate any damage to the existing street pavements on East 2nd Street, Industrial Way, and Lake Herman Road to/from the project site caused by heavy construction traffic accessing the project site, as determined by the City Engineer.	Less Than Significant

Source: Korve Engineering, 2006.