Hexagon Transportation Consultants, Inc.

Memorandum

Date: November 4, 2013

To: Mr. Mike Tassano

From: Brett Walinski, P.E.
Matt Nelson

Subject: Traffic Impact Analysis for the Chick-fil-A Project

Introduction

Hexagon Transportation Consultants, Inc. has completed this traffic impact analysis for the proposed Chick-fil-A restaurant located in the Pleasanton Square Shopping Center just north of 6111 Johnson Court in Pleasanton, California. The proposed project would consist of a 5,399 square foot fast food restaurant with two drive-through lanes. The proposed hours of operation are from 6:00 AM to 10:00 PM Monday through Thursday, 6:00 AM to 11:00 PM Friday and Saturday, and closed on Sunday. Primary access to the project site would be provided through the Pleasanton Square Shopping Center, which has existing driveways on Johnson Court, Johnson Drive, and Owens Drive. . The project location and study intersections are shown on Figure 1, and the project site plan is shown on Figure 2.

Scope of Study

This study was conducted for the purpose of identifying the potential off-site traffic impacts and potential impacts to onsite access, circulation, and parking. The potential impacts of the project were evaluated in accordance with the standards set forth by the City of Pleasanton. Three signalized intersections and one unsignalized intersection were evaluated. The study intersections are identified below.

1. Hopyard Road and I-580 Eastbound Ramps (Signalized)
2. Hopyard Road and Owens Drive (Signalized)
3. Johnson Drive and Owens Drive South (Signalized)
4. Johnson Drive and Owens Drive North (Unsignalized)

Traffic conditions at the study intersections were analyzed for the weekday AM and PM peak hours of traffic. The AM peak hour is typically between 7:00 and 9:00 AM and the PM peak hour is typically between 4:00 and 6:00 PM. It is during these periods that the most congested traffic conditions occur on an average day. The operations of the study intersections were evaluated for the following scenarios:

Scenario 1: *Existing Conditions.* Existing traffic volumes are based on traffic counts from the year 2012 and obtained from the City of Pleasanton's Synchro database.

Scenario 2: *Existing Plus Project Conditions.* Existing plus project conditions were estimated by adding to existing traffic volumes the additional traffic generated by the project. Existing plus project conditions were evaluated relative to existing conditions in order to determine potential project impacts.

LEGEND

= Site Location

= Study Intersection

Figure 1
Site Location and Study Intersections

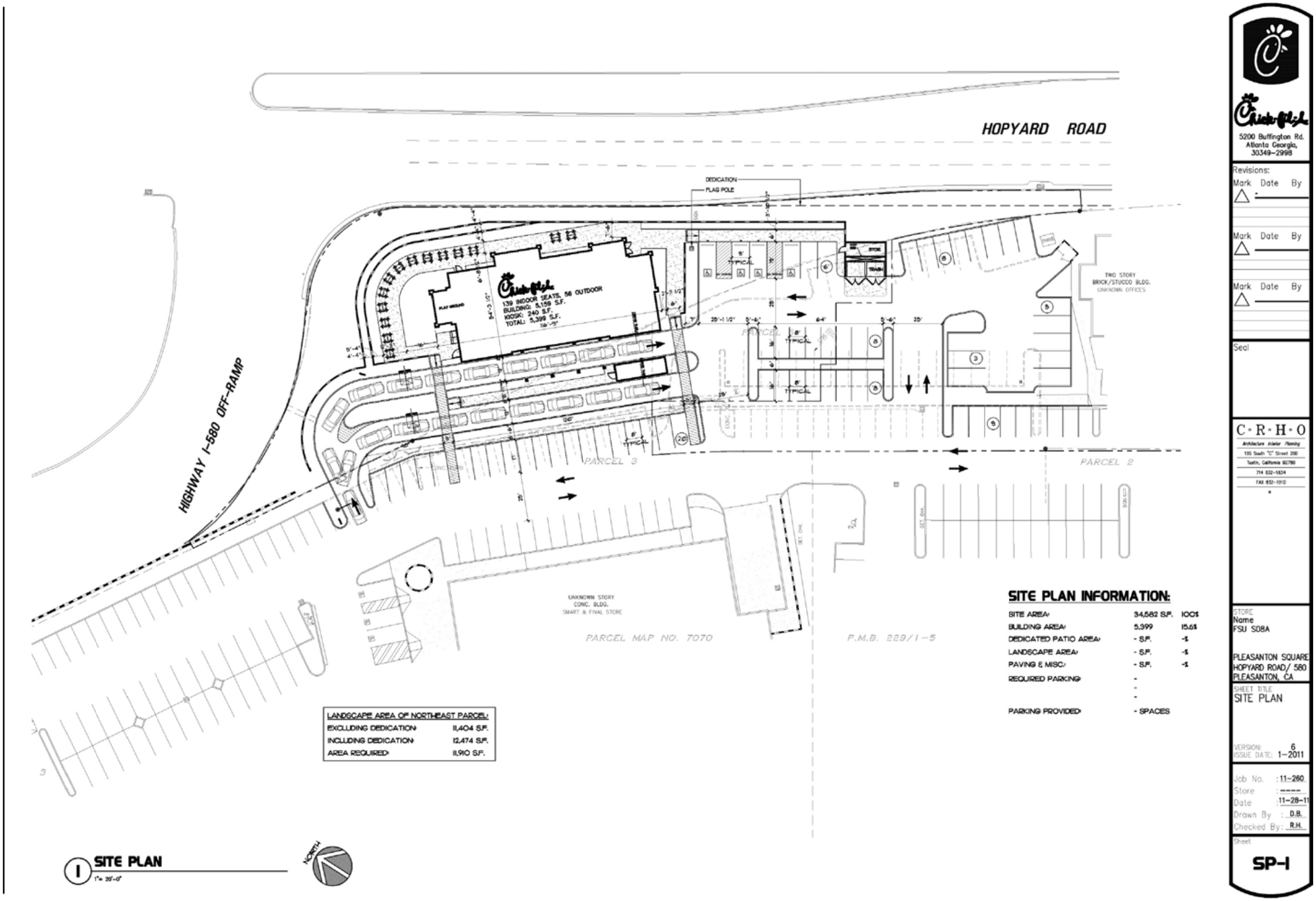


Figure 2
Site Plan

Scenario 3: *Existing Plus Approved Conditions*. Traffic volumes were obtained from the City of Pleasanton Synchro database. The City of Pleasanton Synchro database reflects all approved development in the city, including the Housing Element update. However, the existing plus approved database supplied by the City does not include the proposed project. The existing plus approved with project conditions were estimated by adding the traffic generated by the project to the existing plus approved traffic volumes. Existing plus approved with project conditions were evaluated relative to existing plus approved without project conditions in order to determine potential near-term project impacts.

Scenario 4: *Buildout Conditions*. Buildout conditions represent buildout of both the General Plan and the City's Housing Element. Traffic volumes were obtained from the City of Pleasanton Synchro database. The buildout traffic volumes supplied by the City also do not include the proposed project. The buildout with project conditions were estimated by adding the traffic generated by the project to the buildout traffic volumes. Buildout with project conditions were evaluated relative to buildout without project conditions in order to determine potential far-term project impacts.

Level of Service Standards and Analysis Methodologies

The study intersections were evaluated for each scenario using level of service (LOS). Level of service is a qualitative measure of traffic operations, ranging from LOS A (free-flow conditions) to LOS F (congested conditions). All of the study intersections are located in the City of Pleasanton and are therefore subject to the City of Pleasanton level of service standards. The various analysis methods are described below.

Signalized Intersections

The City of Pleasanton evaluates level of service at signalized intersections based on the 2000 Highway Capacity Manual (HCM) level of service methodology using the Synchro software. The 2000 HCM method evaluates signalized intersection operations on the basis of average control delay time for all vehicles at the intersection. The City of Pleasanton level of service standard for signalized intersections is LOS D. There are a few exceptions to the LOS standard within the Downtown Area and the City of Pleasanton gateway intersections. These intersections may have a level of service worse than the LOS D standard if no reasonable mitigation exists or if the necessary mitigation is contrary to other goals and policies of the City. The signalized study intersections of Hopyard Road/I-580 Eastbound Ramps and Hopyard Road/Owens Drive are considered gateway intersections. Table 1 shows the level of service definitions for signalized intersections.

The project is said to create a significant impact if 1) it would cause the signalized intersection LOS to degrade below its level of service standard or 2) it would add 10 or more project trips to a signalized intersection that is operating below its level of service standard under no project conditions.

Unsignalized Intersections

Level of service at unsignalized intersections was based on the *2000 Highway Capacity Manual* (2000 HCM) method. Synchro software is used to apply the 2000 HCM operations method for evaluation of conditions at unsignalized intersections. This method is applicable for one-way, two-way, and all-way stop-controlled intersections. The delay and corresponding level of service at unsignalized, stop-controlled intersections is presented in Table 2. For all-way stop controlled intersections, the reported LOS represents the average delay of all intersection movements. The City of Pleasanton level of service standard for unsignalized intersections is LOS E for any controlled movement.

The project is said to create a significant impact at an unsignalized intersection if any of the following occur:

- Deterioration of a controlled movement at an unsignalized intersection from LOS E or better to LOS F, or at intersections where a controlled movement already operates at LOS F, one of the following:

Table 1
Signalized Intersection Level of Service Definitions Based on Delay

Level of Service	Description	Average Control Delay Per Vehicle (sec.)
A	Signal progression is extremely favorable. Most vehicles arrive during the green phase and do not stop at all. Short cycle lengths may also contribute to the very low vehicle delay.	10.0 or less
B	Operations characterized by good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average vehicle delay.	10.1 to 20.0
C	Higher delays may result from fair signal progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though may still pass through the intersection without stopping.	20.1 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable signal progression, long cycle lenghts, or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	This is considered to be the limit of acceptable delay. These high delay values generally indicate poor signal progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Individual cycle failures occur frequently.	55.1 to 80.0
F	This level of delay is considered unacceptable by most drivers. This condition often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes of such delay levels.	greater than 80.0

Source: Transportation Research Board, *2000 Highway Capacity Manual* (Washington, D.C., 2000) p10-16.

Table 2
Unsignalized Intersection Level of Service Definitions Based on Delay

Level of Service	Description	Average Delay Per Vehicle (Sec.)
A	Little or no traffic delay	10.0 or less
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	Extreme traffic delays	greater than 50.0

Source: Transportation Research Board, *2000 Highway Capacity Manual* (Washington, D.C., 2000) p17-2.

- Project traffic results in satisfaction of the peak hour volume traffic signal warrant;
- Project traffic increases minor movement delay by more than 30 seconds; or
- Where the peak hour volume signal warrant is met without Project traffic and delay cannot be measured, Project increases traffic by 10 or more vehicles per lane on the controlled approach.

Existing Transportation Setting

Regional and local access to the site is provided by I-580, Hopyard Road, Owens Drive, Johnson Drive, Johnson Court, and Stoneridge Drive. These roadways are described below.

Interstate 580 (I-580) is an east-west freeway with four mixed-flow lanes and one HOV lane in the eastbound direction and four mixed-flow lanes in the westbound direction within the project vicinity. I-580 provides regional access from the East Bay cities to San Joaquin County, where it merges with I-5. Access to the project study area is provided via its interchange with Dougherty Road/Hopyard Road.

Hopyard Road is a major arterial that extends in a north-south direction from I-580 in the north to Fair Street, where it becomes Division Street and continues into downtown Pleasanton. It is six-lanes wide from I-580 to Valley Avenue, four-lanes wide from Valley Avenue to Black Avenue, and two lanes from Black Avenue to Fair Street.

Owens Drive is a arterial that extends in an east-west direction from West Las Positas Boulevard in the east to Johnson Drive in the west. West of Johnson Drive, Owens Drive is a collector street that extends west, then north, and then east back to Johnson Drive. It is six-lanes wide from West Las Positas Boulevard to Oracle Lane and from Willow Road to Hopyard Road, five-lanes wide (two lanes westbound and three lanes eastbound) from Oracle Lane to Willow Road, four lanes from Hopyard Road to Johnson Drive, and two lanes wide along the loop road west of Johnson Drive. Owens Drive provides access to the project site via its intersection with Johnson Court.

Johnson Drive is a arterial that extends north from Stoneridge Drive in the west to Franklin Drive in the east. It is two-lanes wide from Stoneridge Road to Franklin Drive. Johnson Drive provides access to the project site via its northern intersection with Owens Drive.

Johnson Court is a two-lane local street that extends north from Owens Drive into the Pleasanton Square Shopping Center. Johnson Court provides direct access to the project site.

Existing Intersection Analysis

The existing traffic volumes at the study intersections were obtained from the City of Pleasanton Synchro database. Traffic operations at the study intersections were evaluated using Synchro software to determine level of service for the AM and PM peak hours. The results show that, measured against City of Pleasanton standards, all of the signalized study intersections currently operate at acceptable levels of service during the AM and PM peak hours. The results of the intersection level of service analysis under existing conditions are summarized in Table 3. The existing intersection traffic volumes are shown on Figure 3. The levels of service calculation sheets are included in the Appendix.

Table 3
Existing Intersection Levels of Service

Study Number	Intersection	Traffic Control	Peak Hour	Existing Delay (in seconds)[1]	Existing LOS[1]
#1	Hopyard Road and I-580 Eastbound Ramps	Signal	AM	41.6	D
			PM	16.2	B
#2	Hopyard Road and Owens Drive[2]	Signal	AM	30.3	C
			PM	48.1	D
#3	Johonson Drive and Owens Drive (S)	Signal	AM	10.4	B
			PM	14.3	B
#4	Johnson Drive and Owens Drive (N)	AWSC[3]	AM	10.2	B
			PM	13.5	B

[1] Signalized and all-way stop controlled intersection levels of service and delays reported are for overall average delay.
[2] Run with existing lane configurations under existing scenarios.
[3] AWSC = All Way Stop Control.

Observed Existing Traffic Conditions

Traffic conditions in the field were observed in order to identify any existing operational deficiencies and to confirm the accuracy of calculated levels of service. The purpose of this effort was (1) to identify any existing traffic problems that may not be directly related to intersection level of service, and (2) to identify any locations where the level of service calculation does not accurately reflect level of service in the field.

Overall, the study intersections operate adequately during the weekday AM and PM peak hours, and the level of service analysis appears to accurately reflect actual existing traffic conditions. However, field observations showed that some operational problems currently occur at the following locations near the project site:

- ***Hopyard Road and I-580 Eastbound Ramps.*** During the PM peak hour, the queue from the metered eastbound on-ramp to I-580 occasionally extended back to the northbound through lane on Hopyard Road.
- ***Hopyard Road and Owens Drive.*** During the AM peak hour, the queues from the northbound and southbound left turn pockets occasionally spilled out into the through lanes. During the PM peak hour, the following conditions were noted:

    1) The queue from the westbound right turn lane on Owens Drive occasionally extends past Owens Court/Chabot Drive,

    2) The queue from the eastbound shared left-through lane on Owens Drive occasionally extends past the Larkspur Landing Driveway/Owens Drive intersection.

    3) The queue from the northbound left turn pocket occasionally spilled out into the through lane.

    However, in all situations described above, vehicles were generally able to clear the Hopyard Road/Owens Drive intersection in one signal cycle.

Figure 3
Existing Traffic Volumes

Project Traffic Estimates

The magnitude of traffic produced by a new development and the locations where that traffic would appear are estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. In determining project trip generation, the magnitude of traffic entering and exiting the site is estimated for the AM and PM peak hours. As part of the project trip distribution, an estimate is made of the directions to and from which the project trips would travel. In the project trip assignment, the project trips are assigned to specific streets and intersections. These procedures are described further in the following sections.

Through empirical research, data have been collected that correlate to common land uses their propensity for producing traffic. Thus, for the most common land uses there are standard trip generation rates that can be applied to help predict the future traffic increases that would result from a new development. The magnitude of traffic added to the roadway system by a particular development is estimated by multiplying the applicable trip generation rates to the size of the development. The standard trip generation rates are published in the Institute of Transportation Engineers (ITE) manual entitled *Trip Generation,* 9th Edition, 2012*.* Based on ITE's trip generation rates for Fast-Food Restaurant with Drive-Through (ITE 934), the project would generate 2,679 daily vehicle trips, with 246 trips occurring during the AM peak hour and 176 trips occurring during the PM peak hour.

A pass-by trip reduction of 25 percent (based on ITE and other local jurisdictions) was applied to the AM and PM peak hour trip generation. Pass-by trips are trips that would already be on the adjacent roadways (and are therefore already counted in the existing traffic), but would turn into the site while passing by. Justification for applying the pass-by trip reduction is founded on the observation that such traffic is not actually generated by the proposed development, but is already part of the ambient traffic levels. Pass-by trips were assigned at the site's driveways and at the intersection of Hopyard Road and Owens Drive. After applying the pass-by trip reductions, the project would generate 2,009 net new daily trips, with 185 net new trips occurring during the AM peak hour and 132 net new trips occurring during the PM peak hour. The trip generation estimates are shown in Table 4.

Table 4
Project Trip Generation Estimates

				AM Peak Hour				PM Peak Hour			
Land Use	Size	Daily Rate[1]	Daily Trips	Rate[1]	Total Trips	In	Out	Rate[1]	Total Trips	In	Out
Fast-Food Restaurant	5.399 ksf	496.12	2,679	45.42	246	125	121	32.65	176	91	85
	Pass by[2]	25%	(670)		(61)	(31)	(30)		(44)	(23)	(21)
	Primary Trips		2,009		185	94	91		132	68	64

[1] Rates based on ITE *Trip Generation, 9th Edition* , 2012: average rates for Fast-Food Restaurant with Drive-Through (ITE 934).
[2] ITE *Trip Generation Handbook* calculates an average Fast Food Restaurant with Drive Through pass-by rate of 49% in the AM peak hour and 50% in the PM peak hour. Based on these pass-by rates, a more conservative pass-by trip reduction of 25% was used.

The trip distribution pattern for the proposed project was estimated based on a vehicle tracking survey conducted by Hexagon at the existing In-N-Out burger (a similar restaurant) located less than 400 feet from the proposed project site. The new peak-hour trips generated by the proposed project (the project trips) were added to the roadway network in accordance with the project trip generation and distribution described above. The project trip distribution and assignment are shown on Figure 4.

Chik-fil-A Restaurant

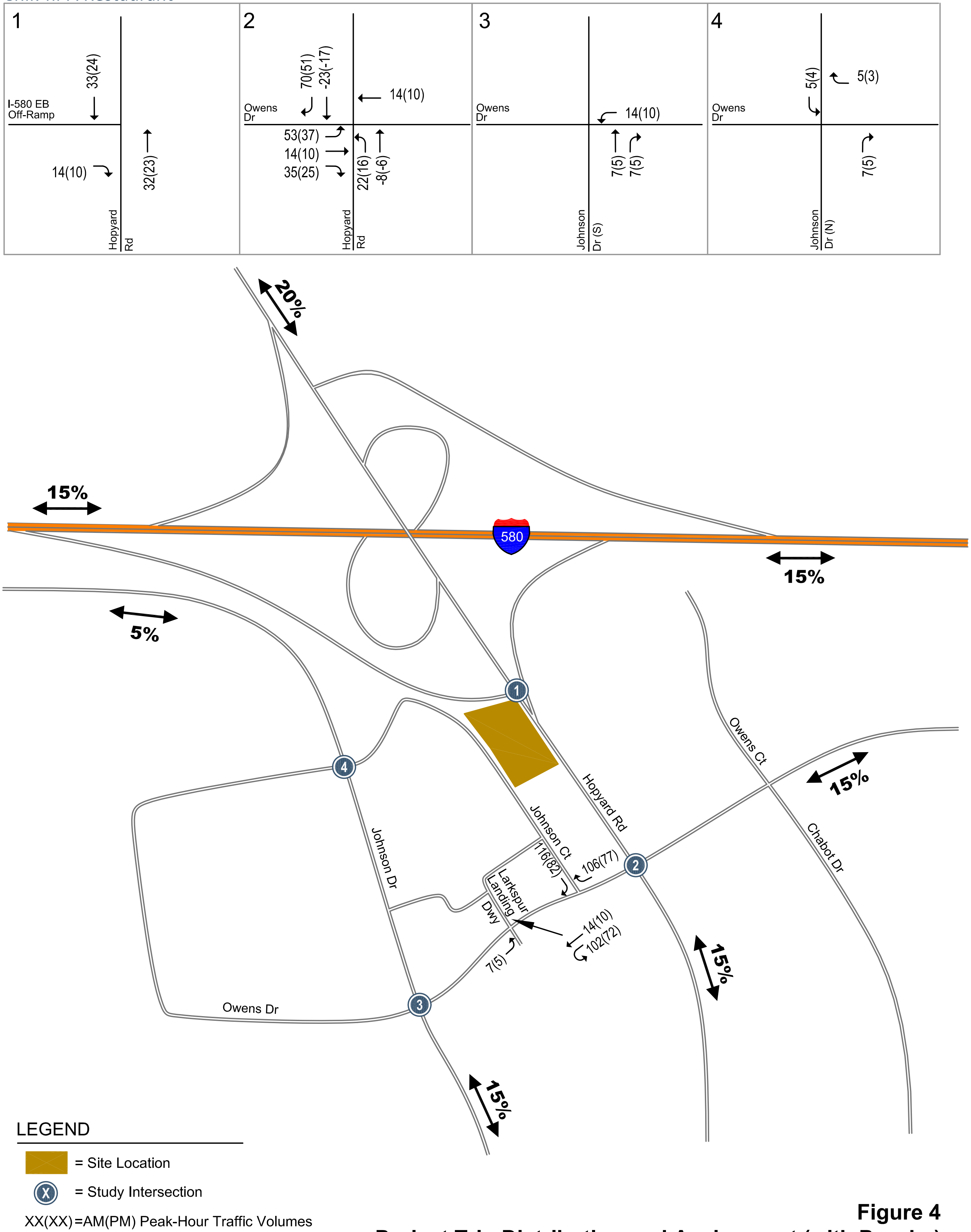


Figure 4
Project Trip Distribution and Assignment (with Passby)

Intersection Level of Service Analysis

Traffic operations at the study intersections were evaluated using Synchro software to determine level of service with and without the proposed project for the AM and PM peak hours under existing, existing plus approved, and buildout conditions. The Synchro calculation sheets are included in the attached appendix.

Existing Plus Project Conditions Intersection Analysis

Existing plus project conditions are defined as existing traffic volumes plus the addition of project traffic. The results show that, measured against City of Pleasanton standards, all of the study intersections would continue to operate at acceptable levels of service during the AM and PM peak hours under existing plus project conditions. The level of service results for the existing plus project scenario are summarized in Table 5. Figure 5 presents the existing plus project traffic volumes at the study intersections.

Table 5
Existing Plus Project Intersection Levels of Service Summary

				Existing		Existing + Project	
Study Number	Intersection	Traffic Control	Peak Hour	Delay (in seconds)[1]	LOS[1]	Delay (in seconds)[1]	LOS[1]
#1	Hopyard Road and I-580 Eastbound Ramps	Signal	AM	41.6	D	43.5	D
			PM	16.2	B	16.3	B
#2	Hopyard Road and Owens Drive[2]	Signal	AM	30.3	C	32.4	C
			PM	48.1	D	50.5	D
#3	Johonson Drive and Owens Drive (S)	Signal	AM	10.4	B	10.8	B
			PM	14.3	B	15.6	B
#4	Johnson Drive and Owens Drive (N)	AWSC[3]	AM	10.2	B	10.3	B
			PM	13.5	B	13.6	B

[1] Signalized and all-way stop controlled intersection levels of service and delays reported are for overall average delay.
[2] Run with existing lane configurations under existing and existing + approved scenarios.
[3] AWSC = All Way Stop Control.

Figure 5
Existing Plus Project Traffic Volumes

Existing Plus Approved Conditions Intersection Analysis

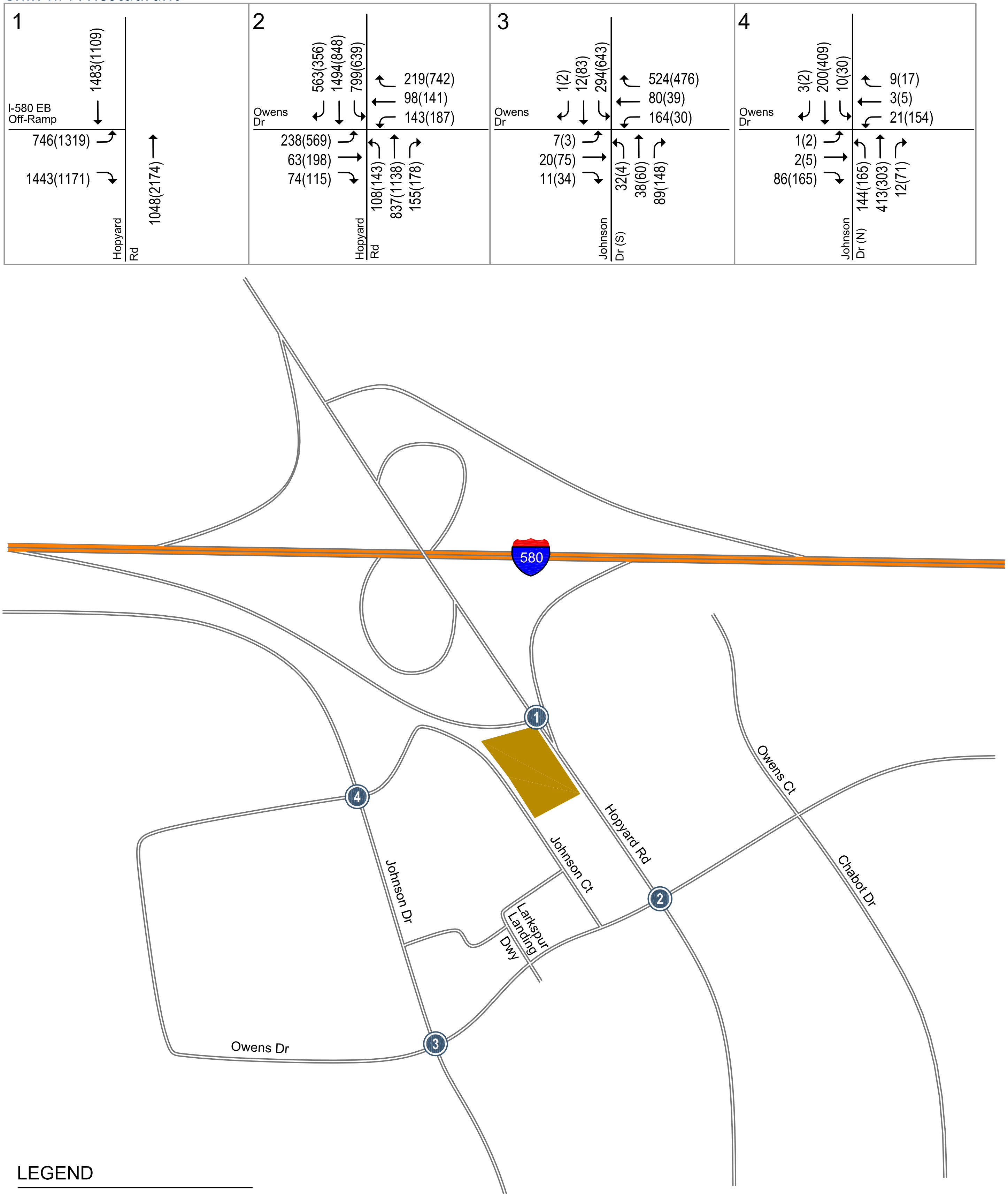
Existing plus approved traffic volumes were estimated using forecasts from the City of Pleasanton TDF model. The Pleasanton TDF model includes various local and regional improvements outside of the project area. The existing plus approved traffic volumes obtained from the City of Pleasanton's Synchro database include Housing Element traffic volumes. However, the traffic volumes do not include the proposed Chick-fil-A project. For this reason, the project trips were added to the existing plus approved (no project) traffic volumes to determine the existing plus approved with project traffic volumes. Existing plus approved plus project conditions were evaluated relative to existing plus approved no project conditions in order to determine potential near-term project impacts. The results show that, measured against City of Pleasanton standards, all of the study intersections would operate at acceptable levels of service during the AM and PM peak hours. The level of service results for the existing plus approved scenarios are summarized in Table 6. The existing plus approved and existing plus approved plus project traffic volumes at the study intersections are shown in Figures 6 and 7, respectively.

Table 6
Existing Plus Approved Plus Project Intersection Levels of Service Summary

				Existing + Approved			
				No Project		With Project	
Study Number	Intersection	Traffic Control	Peak Hour	Delay (in seconds)[1]	LOS[1]	Delay (in seconds)[1]	LOS[1]
#1	Hopyard Road and I-580 Eastbound Ramps	Signal	AM	36.5	D	37.9	D
			PM	28.5	C	29.3	C
#2	Hopyard Road and Owens Drive[2]	Signal	AM	31.2	C	33.3	C
			PM	45.6	D	47.5	D
#3	Johonson Drive and Owens Drive (S)	Signal	AM	12.9	B	13.1	B
			PM	13.9	B	14.9	B
#4	Johnson Drive and Owens Drive (N)	AWSC[3]	AM	13.6	B	13.9	B
			PM	21.2	C	21.5	C

[1] Signalized and all-way stop controlled intersection levels of service and delays reported are for overall average delay.
[2] Run with existing lane configurations under existing and existing + approved scenarios.
[3] AWSC = All Way Stop Control.

Chik-fil-A Restaurant



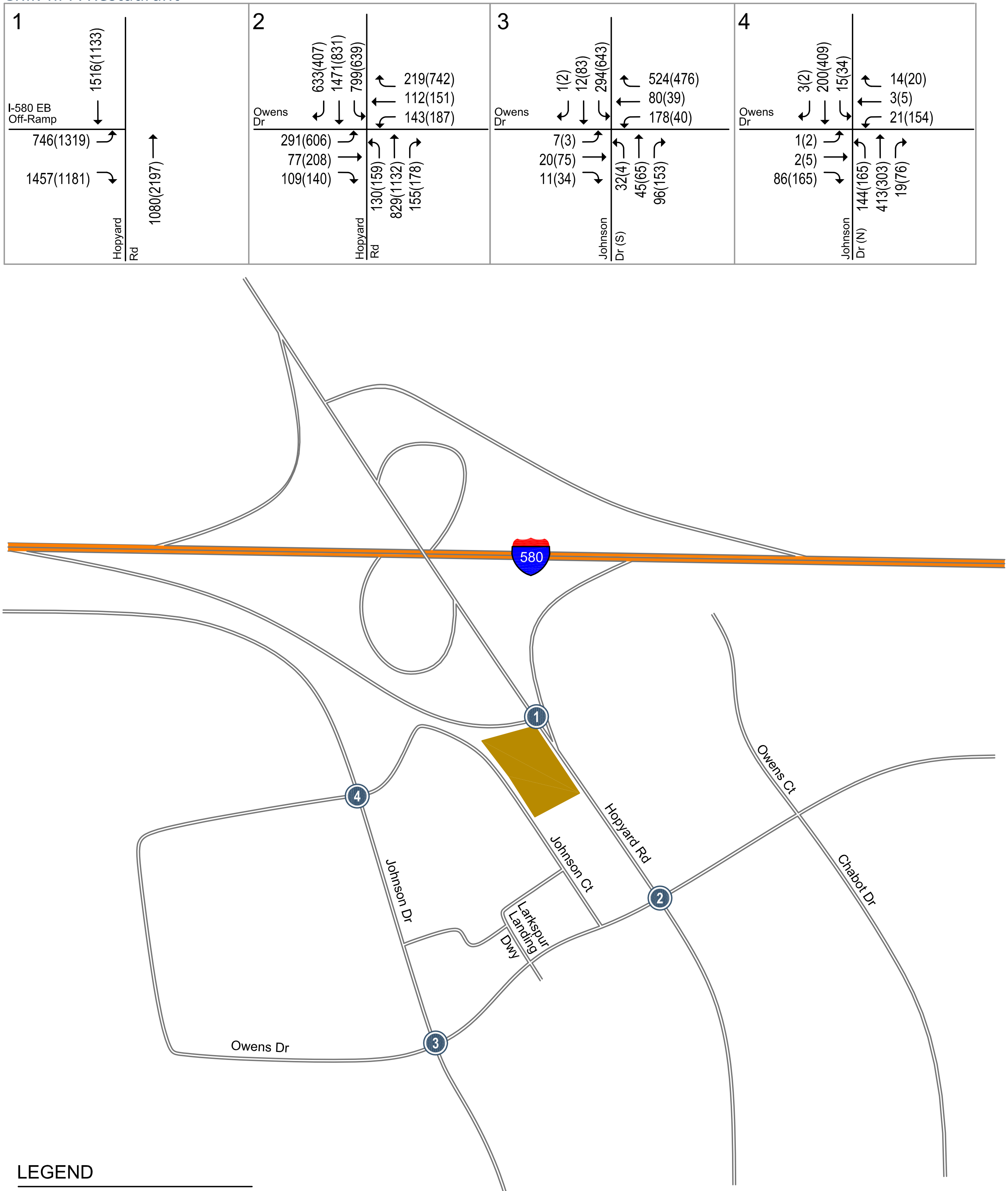
LEGEND

= Site Location

= Study Intersection

XX(XX)=AM(PM) Peak-Hour Traffic Volumes

Figure 6
Existing Plus Approved No Project
Traffic Volumes



LEGEND

= Site Location

= Study Intersection

XX(XX)=AM(PM) Peak-Hour Traffic Volumes

Figure 7
Existing Plus Approved Plus Project Traffic Volumes

Buildout Conditions Intersection Analysis

Buildout traffic volumes were estimated using forecasts from the City of Pleasanton TDF model. The Pleasanton TDF model includes various local and regional improvements outside of the project area. Per City staff, the planned Pleasanton Traffic Impact Fee (TIF) improvements at the Hopyard Road and Owens Drive intersection were included in the buildout scenarios. The TIF improvements would modify the Hopyard Road and Owens Drive approaches to the following geometries:

- **Northbound**: 2 left turn lanes, 3 through lanes, and 1 right turn lane
- **Southbound**: 3 left turn lanes, 3 through lanes, and 1 right turn lane
- **Eastbound**: 2 left turn lanes, 2 through lanes, and 1 right turn lane
- **Westbound**: 2 left turn lanes, 2 through lanes, and 1 right turn lane

In order to construct the proposed southbound right turn lane on Hopyard Road, the project would be required to dedicate right-of-way along its eastern border.

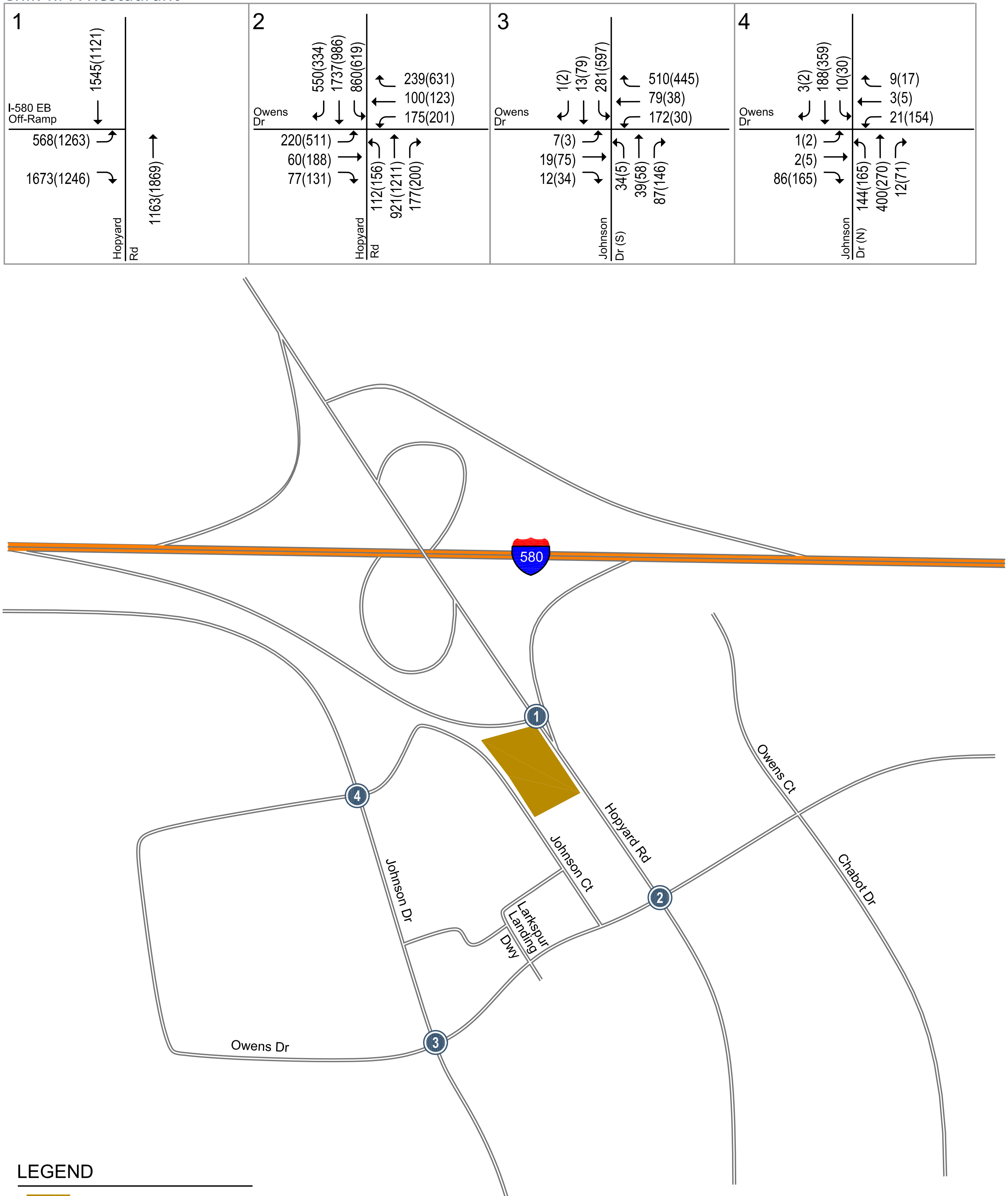
The buildout traffic volumes obtained from the City of Pleasanton's Synchro database include Housing Element traffic volumes. However, the traffic volumes do not include the proposed Chick-fil-A project. For this reason, the project trips were added to the buildout (no project) traffic volumes to determine the buildout with project traffic volumes. Buildout with project conditions were evaluated relative to buildout no project conditions in order to determine potential project impacts. The results show that all other study intersections would operate at acceptable levels of service under buildout conditions during both the AM and PM peak hours, with one exception. The intersection of Hopyard Road and I-580 Eastbound Ramps would operate at LOS E during the AM peak hour. This intersection is designated as a "Gateway Intersection," and per the General Plan, is exempt from the requirement to maintain LOS D if no reasonable mitigation exists or if the mitigation conflicts with other goals and policies of the City. While no specific mitigation is planned for this location, the project will participate in the City and Tri-Valley TIF programs, which include planned projects to improve traffic conditions on regional roadways. The level of service results for buildout conditions are summarized in Table 7. The buildout no project and buildout with project traffic volumes at the study intersections are shown in Figures 8 and 9, respectively.

Table 7
Buildout Intersection Levels of Service Summary

				Buildout			
				No Project		With Project	
Study Number	Intersection	Traffic Control	Peak Hour	Delay (in seconds)[1]	LOS[1]	Delay (in seconds)[1]	LOS[1]
#1	Hopyard Road and I-580 Eastbound Ramps	Signal	AM	66.4	E	67.9	E
			PM	31.5	C	32.4	C
#2	Hopyard Road and Owens Drive[2]	Signal	AM	26.1	C	27.1	C
			PM	38.3	D	39.2	D
#3	Johonson Drive and Owens Drive (S)	Signal	AM	13.0	B	13.2	B
			PM	13.7	B	14.7	B
#4	Johnson Drive and Owens Drive (N)	AWSC[3]	AM	13.0	B	13.3	B
			PM	16.8	C	17.0	C

[1] Signalized and all-way stop controlled intersection levels of service and delays reported are for overall average delay.
[2] Run with TIF improvements under buildout scenarios.
[3] AWSC = All Way Stop Control.

Chik-fil-A Restaurant



LEGEND

= Site Location

= Study Intersection

XX(XX)=AM(PM) Peak-Hour Traffic Volumes

Figure 8
Buildout No Project Traffic Volumes

Hexagon Transportation Consultants, Inc.

NORTH
Not to Scale

Figure 9
Buildout Plus Project Traffic Volumes

Vehicle Queuing Analysis

A vehicle queuing analysis was conducted for the left turn movements where the project would add traffic at the intersection of Hopyard Road and Owens Drive. Vehicle queues were estimated using a Poisson probability distribution. The basis of the analysis is as follows: (1) the Poisson probability distribution is used to estimate the 95th percentile maximum number of queued vehicles per signal cycle for a particular movement; (2) the estimated maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated maximum queue length is compared to the existing or planned available storage capacity for the movement. This analysis thus provides a basis for estimating future storage requirements at intersections. The vehicle queuing estimates and a tabulated summary of the findings for the study intersections are provided in Table 8. The analysis indicated that the estimated maximum vehicle queues for the northbound left turn lane would exceed the existing vehicle storage capacity under existing and existing plus approved without and with project conditions during the AM and PM peak hours. The estimated maximum vehicle queues for the eastbound left turn lanes would exceed the existing vehicle storage capacity under existing, existing plus approved, and buildout conditions during the PM peak hour.

Hopyard Road and Owens Drive – Northbound Left turn

Under existing conditions, there is approximately 125 feet of storage capacity for the northbound left turn lane at the intersection of Hopyard Road and Owens Drive. The storage capacity is measured as the distance between the intersection crosswalk and the taper of the left turn pocket. Beyond this, vehicles would queue south into the through lane. Under buildout conditions, the City of Pleasanton TIF program shows the installation of a second northbound left turn lane, which would provide a total of 500 feet of storage. Under existing plus approved no project conditions, the calculated 95th percentile queue is 175 feet during the AM peak hour and 225 feet during the PM peak hour. Field observations also indicate that the vehicle queues for the subject movement are heavy under existing conditions. Traffic from the proposed project would add up to 25 feet (or one vehicle) to the 95th percentile queue relative to no project conditions during the AM and PM peak hours.

> **Recommendation:** In conjunction with the proposed development, it is recommended that the queuing storage for the northbound left turn movement at Hopyard Road and Owens Drive be increased to 250 feet to accommodate the anticipated queues. This would require (1) lengthening the existing northbound left turn pocket or (2) constructing a second northbound left turn pocket. Lengthening the existing left turn pocket would require removal of the landscaped median. Constructing a second left turn pocket would require removal of the landscaped median, modification of the median nose, restriping of lane lines, modifications to vehicle detection, and aligning the signal heads to the new lane geometry. According to the City of Pleasanton *Traffic Impact Fee and Nexus Report*, May 2010, addition of a second left turn lane for the northbound movement is planned for the intersection. This planned improvement should be constructed in conjunction with the project.

Hopyard Road and Owens Drive – Eastbound Left & Left/Through

Under existing conditions, there is approximately 750 feet of storage capacity for the eastbound left turn lane movements at the intersection of Hopyard Road and Owens Drive. The storage capacity is measured as the distance between the intersection crosswalk and the Larkspur Landing Driveway to the west. Beyond this, vehicles would queue west to the signalized cross street of Johnson Drive, which adds another 750 feet of available queuing space. Under buildout conditions, the City of Pleasanton TIF program shows the installation of a second eastbound left turn lane, which would provide a total of 600 feet of left turn storage. This improvement also would remove through traffic from the existing shared left/through lane. During the PM peak hour, under existing, existing plus approved, and buildout no project conditions, the calculated 95th percentile queue is 775 feet, 750 feet, and 600 feet, respectively. Field observations also indicate that the vehicle queues for the subject movement are heavy under existing conditions. Traffic from the proposed project would add 50 feet (or two vehicles) to the 95th percentile queue relative to no project conditions during the PM peak hour.

Table 8
Vehicle Queuing Analysis Summary

Measurement	Hopyard Rd. / Owens Dr. EBL & EBL/T* AM	Hopyard Rd. / Owens Dr. EBL & EBL/T* PM	Hopyard Rd. / Owens Dr. NBL AM	Hopyard Rd. / Owens Dr. NBL PM
Existing				
Cycle/Delay[1] (sec)	120	120	120	120
Volume (vph)	220	687	116	105
Avg. Queue (veh)	7.3	22.9	3.9	3.5
Avg. Queue[2] (ft.)	183	573	97	88
95th %. Queue (veh)	12	31	7	7
95th %. Queue (ft.)[2]	300	775	175	175
Storage (ft.)	750/1,500[3]	750/1,500[3]	125	125
Adequate (Y/N)	Y	**See Discussion**	**N**	**N**
Existing + Project				
Cycle/Delay[1] (sec)	120	120	120	120
Volume (vph)	280	729	138	121
Avg. Queue (veh)	9.3	24.3	4.6	4.0
Avg. Queue[2] (ft.)	233	608	115	101
95th %. Queue (veh)	15	33	8	8
95th %. Queue (ft.)[2]	375	825	200	200
Storage (ft.)	750/1,500[3]	750/1,500[3]	125	125
Adequate (Y/N)	Y	**See Discussion**	**N**	**N**
Existing + App				
Cycle/Delay[1] (sec)	120	120	120	120
Volume (vph)	270	668	108	143
Avg. Queue (veh)	9.0	22.3	3.6	4.8
Avg. Queue[2] (ft.)	225	557	90	119
95th %. Queue (veh)	14	30	7	9
95th %. Queue (ft.)[2]	350	750	175	225
Storage (ft.)	750/1,500[3]	750/1,500[3]	125	125
Adequate (Y/N)	Y	**See Discussion**	**N**	**N**
Existing + App + Project				
Cycle/Delay[1] (sec)	120	120	120	120
Volume (vph)	330	710	130	159
Avg. Queue (veh)	11.0	23.7	4.3	5.3
Avg. Queue[2] (ft.)	275	592	108	133
95th %. Queue (veh)	17	32	8	9
95th %. Queue (ft.)[2]	425	800	200	225
Storage (ft.)	750/1,500[3]	750/1,500[3]	125	125
Adequate (Y/N)	Y	**See Discussion**	**N**	**N**
Buildout No Proj				
Cycle/Delay[1] (sec)	120	120	120	120
Volume (vph)	220	511	112	156
Avg. Queue (veh)	7.3	17.0	3.7	5.2
Avg. Queue[2] (ft.)	183	426	93	130
95th %. Queue (veh)	12	24	7	9
95th %. Queue (ft.)[2]	300	600	175	225
Storage (ft.)	600/975[4]	600/975[4]	500	500
Adequate (Y/N)	Y	Y	Y	Y
Buildout + Project				
Cycle/Delay[1] (sec)	120	120	120	120
Volume (vph)	273	548	134	172
Avg. Queue (veh)	9.1	18.3	4.5	5.7
Avg. Queue[2] (ft.)	228	457	112	143
95th %. Queue (veh)	14	26	8	10
95th %. Queue (ft.)[2]	350	650	200	250
Storage (ft.)	600/975[4]	600/975[4]	500	500
Adequate (Y/N)	Y	**See Discussion**	Y	Y

* Assumes 1 EBL & 1 EBL/T lane under existing and existing + approved scenarios.
Assumes 2 EBL lanes under buildout scenarios.
[1] Vehicle queue calculations based on cycle length for signalized intersections.
[2] Assumes 25 Feet Per Vehicle Queued.
[3] The first number is existing storage capacity from the intersection to the Larkspur driveway to the west.
The second number is total storage capacity before and after the Larkspur driveway.
[4] The first number is storage capacity from the intersection to the Larkspur driveway to the west.
The second number is total storage capacity before and after the Larkspur driveway (Per TIF).

Recommendation: In conjunction with the proposed development, it is recommended that the queuing storage for the eastbound left turn movement at Hopyard Road and Owens Drive be increased to better accommodate the anticipated queues. This would require constructing an additional eastbound left turn pocket and converting the shared left-through lane to through only. Constructing a second left turn pocket may require removal of the landscaped median, modification to the median nose, restriping of lane lines, modifications to vehicle detection, and aligning the signal heads to the new lane geometry. These improvements are part of an overall improvement plan for the intersection in the City of Pleasanton *Traffic Impact Fee and Nexus Report*, May 2010. This planned improvement should be constructed in conjunction with the project.

Owens Drive U-Turn Analysis

During the existing AM and PM peak hours, Hexagon observed the westbound left turn pocket at the midblock intersection on Owens Drive between Hopyard Road and Johnson Drive (this location is also referred to as the Larkspur Landing driveway). The results showed that 47 vehicles entered the westbound left turn pocket during the AM peak hour and 47 vehicles entered the westbound left turn pocket during the PM peak hour. During the AM peak hour, 21 vehicles made u-turns and 26 vehicles made left turns. During the PM peak hour, 30 vehicles made u-turns and 17 vehicles made left turns. Under existing plus project conditions, it is projected that there would be 104 additional westbound u-turns during the AM peak hour and 83 additional westbound u-turns during the PM peak hour (the existing plus project estimates also include trips from the unoccupied portion of the existing office building at 6111 Johnson Court).

A vehicle queuing analysis was conducted for the westbound left turn/u-turn movement. Under existing conditions, the 95^{th} percentile queue for the subject movement was observed in the field to be 2 vehicles (or 50 feet) during the AM and PM peak hours. Most vehicles experienced an average delay of between 5 and 15 seconds in the turn pocket. Given that there were only 47 vehicles over a 60 minute study period in the turn pocket, and the delays were relatively brief, during most of the observation period there were no standing queues. To estimate the vehicle queues with the proposed project, a Poisson probability distribution formula was calibrated to match the existing observations and project traffic was added to the existing traffic volumes. Under existing plus project conditions, it is estimated that the 95^{th} percentile queue would be 75 feet (or 3 vehicles) during both the AM and PM peak hours. The westbound left turn pocket has an existing storage of 125 feet. Therefore, the westbound left turn pocket would provide adequate storage during the AM and PM peak hours under existing plus project conditions.

Site Access, On-Site Circulation and Parking

This section describes the site access, on-site circulation, and parking for the proposed project. This review is based on the project site plan provided by CRHO Architecture, Interior, and Planning dated November 28, 2011 (See Figure 2).

Site Access & Circulation

The proposed project's access would be shared with the surrounding retail and commercial uses. The project site and the other uses within the Pleasanton Square Shopping Center have a reciprocal easement agreement allowing vehicular access over and across the roads and driveways of each parcel. Primary access to the project site would be provided via (1) Johnson Court, (2) an existing driveway that forms the east leg of the Owens Drive/Johnson Drive (north) intersection, and (3) the north leg of the Larkspur Landing driveway/Owens Drive intersection. Johnson Court is a two lane roadway that intersects with Owens Drive in the south (as a right turn only intersection) and continues north to the project site, where it becomes a drive aisle within the Pleasanton Square Shopping Center. The Larkspur Landing driveway is stop controlled on the north and south driveway approaches, has one inbound and one outbound lane, and is a full-access driveway. The Johnson Drive driveway is the fourth leg of the all-way stop controlled intersection of Johnson Drive/Owens Drive (north) (see Tables 4-7 for LOS at the Johnson Drive driveway).

At the Johnson Court and Owens Drive intersection, under existing plus project conditions during the AM peak hour, the level of service for the right-turn movement would be LOS B (13.4 seconds of delay) and the 95th percentile queue would be two vehicles. Under existing plus project conditions during the PM peak hour, the level of service for the right-turn movement would be LOS B (12.0 seconds of delay) and the 95th percentile queue would be two vehicles. The storage provided would be approximately 50 feet before the Denny's driveway, which would accommodate 2 vehicles (assuming 25 feet per vehicle). The sight distance at this driveway was also observed in the field and determined to be adequate.

At the Owens Drive and Larkspur Landing driveway intersection, under existing plus project conditions during the AM peak hour, the level of service for the southbound all-movement lane would be LOS D (32.1 seconds of delay) and the 95th percentile queue would be one vehicle. Under existing plus project conditions during the PM peak hour, the level of service for the southbound all-movement lane would be LOS D (25.8 seconds of delay) and the 95th percentile queue would be one vehicle. The storage provided would be approximately 35 feet before it intersects with an east/west drive aisle, which would accommodate 1 vehicle (assuming 25 feet per vehicle). The sight distance at this driveway was also observed in the field and determined to be adequate.

The onsite circulation was reviewed in accordance with generally accepted traffic engineering standards. As part of the project, the existing parking lot north of the 6111 Johnson Court office building will be reconfigured, with a portion of the parking lot becoming part of the Chick-fil-A parcel. Onsite, parking would be provided at 90 degrees to the drive aisles and the parking areas on each parcel would connect to each other. The site would include one dead end aisle approximately 40 feet in length. Dead end aisles are undesirable because drivers can enter the aisle, and upon discovering that there is no available parking, must be able to back out or conduct three-point turns. The site plan does not include designated loading areas for truck access for the site. Trucks would most likely load and unload in the drive aisle adjacent to the project, which would block access to parking stalls and restrict drive aisle operation to one-way. While this is generally undesirable, deliveries and garbage collection occur relatively infrequently, and most often during off peak hours. The site plan does not show pedestrian access to the site from the public sidewalk network. Crosswalks across the two drive-through aisles would connect the western parking to the Chick-fil-A building. To improve the site circulation, the following recommendations should be considered:

> **Recommendation:** The dead-end aisle shown should be dedicated and signed for office use (office uses have lower parking turnover), or a turn around area should be provided.
>
> **Recommendation:** A detailed description of the proposed landscaping is not shown on the current site plan. Prior to final design, the landscaping should be checked by City staff to ensure that pedestrians entering the planned crosswalks are not obscured by landscaping and are visible to drivers.

An analysis using truck turning templates was conducted to determine the adequacy of on-site circulation for the truck category SU 30. Based on the analysis, the new parking lot design would be sufficiently wide to serve these types of trucks. However, during activities such as garbage collection, large vehicles may have some off tracking into oncoming travel lanes. However, traffic volumes on site would be relatively low, and encroachment of heavy vehicles on opposing traffic lanes would not create operational problems. In addition, the garbage bins on the Chick-fil-A parcel would need to be moved out of the storage location in order for the garbage trucks to access them.

Drive-Through Analysis

A queuing analysis was conducted to determine the appropriate storage requirements of the onsite drive-through windows. Hexagon conducted queuing observations in September 2013 for a Chick-fil-A drive-through in San Jose, California. Observations were conducted during peak lunch and dinner periods from 12:00 PM to 1:00 PM and 5:30 PM to 6:30 PM on a typical weekday, and 12:00 PM to 1:00 PM on a typical Saturday. The queues at the driveway window were recorded every minute. The average storage length per vehicle was observed to be 20 feet.

The surveys measured the vehicle queues in two ways: (1) total queues in the drive-through and (2) queues from the ordering board back. The maximum queue length observed during the surveys was 14 vehicles. This occurred around 12:15 PM and 1:00 PM on a typical Saturday and around 12:25 PM on a typical weekday. Assuming a length of 20 feet per vehicle, the queuing storage space required to accommodate 14 vehicles is 280 feet. The site plan for the proposed Chick-fil-A development shows that the current design will incorporate two drive-through lanes with a total storage of approximately 425 feet, after which queued vehicles would block the adjacent drive aisle and access to parking stalls. Therefore, the overall queuing storage space provided by the project would be adequate to accommodate the expected demand.

According to the surveys, the maximum vehicle queue length observed from the ordering board back was 11 vehicles. During many periods, the longest delay for queued vehicles occurred at the ordering board as opposed to the pickup window. There were large gaps observed in queued vehicles between the ordering board and pickup window. Assuming a length of 20 feet per vehicle, the queuing storage space required to accommodate 11 vehicles from the ordering boards back is 220 feet. The site plan for the proposed Chick-fil-A development shows that the two drive-through lanes would have a total storage of approximately 160 feet from the ordering boards back, after which queued vehicles would block the drive aisle and access to parking stalls. Therefore, with the current design, there may be a drive-through queue overflow of up to 3 vehicles during peak periods. Although an overflow queue into the drive aisle would generally be undesirable, the queue would not spill back onto the public street network.

> **Recommendation:** The project should consider moving the ordering boards forward approximately 20 feet. This would allow for an additional 40 feet (or 2 vehicles) of storage before the ordering window. This would minimize the duration of the queuing overflow into the adjacent drive aisle.

> **Recommendation:** The project should provide pavement arrows and signage at both the entrance and exit of the planned drive-through. This is necessary so that drivers do not enter the drive-through in the wrong direction and are aware that the aisle is for drive-through users only.

Parking

The proposed Chick-fil-A would be located in the vacant parcel immediately north of 6111 Johnson Court. The parking area for the project would be on the proposed modified parcel and also shared with the existing retail/commercial uses in the Pleasanton Square Shopping Center adjacent to the project site (per the CC&R's parking easement agreement). The existing uses currently within the retail/commercial center are a Denny's restaurant, Larkspur Landing Hotel, La-Z-Boy furniture store, Smart & Final grocery store, Beverages & More, Cycle Gear, In-N-Out Burger, and an office building immediately south of the project. The existing office building was 75% (approximately 10,470 s.f.) vacant at the time of this analysis. To quantify the existing parking demand around the site, parking surveys were conducted between 12:00 PM and 4:00 PM on Saturday, September 7th and between 12:00 PM and 6:00 PM on Tuesday, September 10th. The parking areas were divided into 4 zones (see Figure 10). Zone 1 is located between the proposed project and the existing office building at 6111 Johnson Court. Zone 2 is located southwest of the proposed project and is part of the Larkspur Landing Hotel parking lot. Zone 3 is located adjacent and northwest of the proposed project near Smart & Final, and Zone 4 is located northwest of the proposed project adjacent to the Beverages & More and Cycle Gear stores. According to the project applicant, 15 stalls in Zone 1 and all stalls within Zones 3 and 4 will be available for project use.

Because the proposed project would combine portions of three existing parcels to create the new Chick-fil-A parcel, Zone 1 would be reconfigured to serve both the existing office building and the proposed project. Zone 1 currently has 52 parking stalls. With the proposed project, the number of parking stalls in Zone 1 would remain at approximately 52, with 15 stalls within the Chick-fil-A parcel and the remaining stalls within the existing office parcel. Zone 2 currently has 96 parking stalls and no changes would occur to this zone with the addition of the project. Zone 3 currently has 148 parking stalls. With the proposed project, the number of parking stalls along the western border of the project site may decrease by up to 5 stalls (depending on final design). Zone 4 currently has 76 parking stalls and no changes would occur to this zone with the addition of the project.

According to the City of Pleasanton Municipal Code (18.88.030 – C.8), the proposed project would require a parking ratio of 1 space/3 seats or 1 space/200 square feet, whichever is greater. The project is proposing a 5,399 s.f. building with 195 total seats (139 indoor seats and 56 outdoor seats). Based on square footage, the proposed project would require 27 parking stalls (5,399 sf/200). Based on number of seats, the proposed project would require 65 parking stalls (195 seats/3). Therefore, according to City code, the proposed project would be required to provide 65 parking stalls.

With the assumption the proposed project would provide 15 onsite parking stalls within Zone 1, the remaining 50 parking stalls would need to be accommodated within Zones 3 and 4. Table 9 shows the projected parking demand and supply in parking Zones 3 and 4 with the (1) existing demand and (2) proposed project less the 15 stalls assumed in Zone 1. It was assumed for this calculation that 5 stalls would be lost in Zone 3 due to the reconfiguration of the parking area. The results show that the maximum projected parking demand in Zones 3 and 4 would be 132 vehicles on a typical weekday and 153 vehicles on a typical Saturday. The parking supply in Zones 3 and 4 would be 219 spaces. Therefore, the parking supply proposed by the project would be sufficient to accommodate the anticipated demand.

In addition to the parking analysis for the proposed project, Hexagon analyzed the parking available at the existing office building at 6111 Johnson Court to determine if adequate parking remained for the site due to the loss of the 15 stalls in the northern parking lot. According to the City of Pleasanton Municipal Code (18.88.030 – C.6), the fully occupied 13,900 s.f. office building would require a parking ratio of 1 space/300 square feet. Based on the City code, the existing office building would require approximately 47 parking stalls (13,900 sf/300). Based on the reconfigured northern parking lot, the existing office building would provide a total of 60 parking stalls (23 in the northern lot, 18 in the southern lot, 4 parallel stalls on Johnson Court, and 15 90-degree stalls on the drive aisle north of Johnson Court). Therefore, the parking supply for the existing office building would be sufficient to accommodate the anticipated demand.

Table 9
Proposed On-site Parking Supply and Demand

	Zone 3		Zone 4			Total	
Time	Demand (veh)	Supply (stalls)[1]	Demand (veh)	Supply (stalls)	Proposed Project[2]	Demand (veh)	Supply (stalls)
Weekday							
12:00 PM	22	143	25	76	50	97	219
1:00 PM	45	143	37	76	50	132	219
2:00 PM	37	143	21	76	50	108	219
3:00 PM	23	143	30	76	50	103	219
4:00 PM	27	143	25	76	50	102	219
5:00 PM	20	143	19	76	50	89	219
6:00 PM	24	143	35	76	50	109	219
Saturday							
12:00 PM	36	143	46	76	50	132	219
1:00 PM	57	143	46	76	50	153	219
2:00 PM	50	143	47	76	50	147	219
3:00 PM	49	143	45	76	50	144	219
4:00 PM	24	143	28	76	50	102	219

[1] Zone 3 parking supply was reduced by 5 stalls due to the reconfiguration of the parking area. of the parking area.
[2] Project has a seating capacity of 195. Demand assumes parking ratio of 1 space/3 seats minus 15 seats allocated to Zone 1.

Figure 10
Parking Areas on Existing Site

Other Transportation Modes

According to the U.S. Census, pedestrian trips comprise approximately 3% of the total commute mode share in the City of Pleasanton. For the proposed project, this would equate to approximately 7 or 8 new pedestrian trips during the AM peak hour and approximately 5 or 6 new pedestrian trips during the PM peak hour. In addition, the project would generate some pedestrian trips to/from transit stops (see further discussion below). Overall, the volume of pedestrian trips generated by the project would not exceed the carrying capacity of the existing sidewalks and crosswalks on streets surrounding the site. All of the streets in the project vicinity have sidewalks and crosswalks at signalized intersections. The project site plan does not show pedestrian links to the site from the public sidewalk network.

> **Recommendation:** Prior to final design, the project should consider adding pedestrian links to the existing sidewalks (1) in front of Smart & Final to the west and (2) adjacent to the existing office development to the south.

According to the U.S. Census, approximately 1% percent of the proposed project's users could be expected to ride bikes to and from the project site. For the proposed project, this would equate to approximately 2 or 3 new bike trips during the AM peak hour and approximately 1 to 2 new bike trips during the PM peak hour. The low volume of bicycle trips generated by the project would not exceed the bicycle-carrying capacity of streets surrounding the site, and the increase in bicycle trips would not by itself require new off-site bicycle facilities. Johnson Drive has striped bike lanes along both sides of the street near the project site. Stoneridge Drive has striped bike lanes along the eastbound and westbound travelled way between Johnson Drive and Gibraltar Drive. Hopyard Road has striped bike lanes along both sides of the street near the project site. Owens Drive has striped bike lanes along both sides of the street between its intersection with Johnson Drive and east of Chabot Drive.

Provisions for bike parking are not shown on the current site plan.

> **Recommendation:** According to the City of Pleasanton *Pedestrian and Bicycle Master Plan, Appendix G - 2,* bicycle parking should be required of non-residential projects. The cited example ratio is one bicycle parking space for each 20 vehicle parking stalls or per each 5,000 square feet of commercial space. Prior to final design, City staff should review the project site plan to ensure that adequate accommodations for bike parking are provided.

The Livermore-Amador Valley Transit Authority (LAVTA) currently provides bus service in the project vicinity, including routes 3, 8, and 70XV. There are existing bus stops with no duckouts located on each side of Johnson Drive north and south of the signalized intersection with Owens Drive. According to the LAVTA Short Range Transit Plan (FY 2012 to 2021), most vehicles in the fleet have a seating capacity of 39 riders with an additional capacity of 21 standees. The bus routes that serve the project area average between 8.0 and 10.3 passengers per hour. According to the U.S. Census, bus trips comprise approximately 3% of the total commute mode share in the City of Pleasanton. For the proposed project, a 3% mode share would equate to approximately 7 or 8 new transit trips during the AM peak hour and approximately 5 or 6 new transit trips during the PM peak hour. This volume of riders would not exceed the carrying capacity of the existing bus service near the project site. Therefore, no improvements to the existing transit facilities would be necessary in conjunction with the proposed project.

Conclusions

The proposed project would not result in any significant LOS impacts at the study intersections under existing, existing plus approved, or buildout conditions during the AM and PM peak hours. In addition, the proposed plan generally would provide adequate connectivity through the site. However, the following recommendations should be considered:

- Due to increases in left turn vehicle queues on the northbound and eastbound approaches to the Hopyard Road at Owens Drive intersection, the improvements identified in the Traffic Impact Fee Program should be constructed in conjunction with the project. An additional left turn lane should be constructed on the northbound approach to the intersection and an additional left turn lane should be constructed on the eastbound approach to the intersection. The dead-end aisle shown should be dedicated and signed for office use, or a turnaround area should be provided.

- A detailed description of the proposed landscaping is not shown on the current site plan. Prior to final design, the landscaping should be checked by City staff to ensure that pedestrians entering the planned crosswalks are not obscured by landscaping and are visible to drivers.
- The project should consider moving the ordering boards forward approximately 20 feet. This would allow for an additional 40 feet (or 2 vehicles) of storage before the ordering window. This would minimize the duration of the queuing overflow into the adjacent drive aisle.
- The project should provide pavement arrows and signage at both the entrance and exit of the planned drive-through. This is necessary so that drivers do not enter the drive-through in the wrong direction and are aware that the aisle is for drive-through users only.
- According to the City of Pleasanton *Pedestrian and Bicycle Master Plan,* bicycle parking should be required of non-residential projects. The cited example ratio is one bicycle parking space for each 20 vehicle parking stalls or per each 5,000 square feet of commercial space. Prior to final design, City staff should review the project site plan to ensure that adequate accommodations for bike parking are provided.
- Prior to final design, the project should consider adding pedestrian links to the existing sidewalks (1) in front of Smart & Final to the west and (2) adjacent to the existing office development to the south.