TRAFFIC IMPACT ANALYSIS

FOR

TOWNPLACE SUITES

Yuba City, CA

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4840-01

Yuba City TownPlace

TRAFFIC IMPACT STUDY FOR TOWNPLACE SUITES

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TRAFFIC IMPACT ANALYSIS FOR
TOWNPLACE SUITES
Yuba City, CA

INTRODUCTION / SUMMARY

Study Purpose and Project Description

Location. This traffic impact study presents an analysis of the traffic-related effects associated with the TownPlace Suites project proposed at the Gray Avenue / Louise Avenue intersection in the City of Yuba City. The project would occupy a 1½ acre in-fill site now home to an Enterprise Rent-A-Car facility. Figure 1 presents the regional location of the project site.

Access. Figure 2 presents the project site plan. Access to the site will be provided by new driveways on Louise Avenue and on Gray Avenue at the far ends of the project's frontage. These driveways replace existing access to Enterprise Rent-A-Car that are closer to the Gray Avenue / Louise Avenue traffic signal. Full access is proposed at each location. The Gray Avenue access is located about 135 feet south of the Louise Avenue intersection (crosswalk to driveway centerline), and the Louise Avenue driveway is about 265 feet from Gray Avenue.

Land Use. For the purpose of this analysis, the project is a 90 room hotel which will replace a car rental facility on a lot of roughly 48,000 sf.

Overall Analysis Approach

This traffic study presents an analysis of traffic operations under the following two (2) scenarios:

- Existing a.m. and p.m. peak hour conditions (with Enterprise Rent-A-Car on the site)
- Existing Plus TownPlace Suites Project conditions

Study Area Intersections. The quality of traffic flow is typically governed by the operation of intersections along an arterial street system. To quantitatively evaluate traffic conditions and to provide a basis for comparison of operating conditions with and without traffic generated by the proposed project, traffic operations at the following intersections were evaluated:

- Gray Avenue / Louise Avenue (traffic signal)
- Stafford Way / Louise Avenue – North leg (Side street stop)
- Stafford Way / Louise Avenue – South leg (Side street stop)

Summary Conclusions

Current Traffic Operating Conditions. With the existing Enterprise Rent-A-Car on the subject site, the Gray Avenue / Louise Avenue intersection operates at LOS B during peak hours. This satisfies the City General Plan's minimum LOS D standard. The two stop controlled Louise

Avenue intersections on Stafford Way east of the project operate at LOS A, and neither intersection carries traffic volumes that satisfy peak hour traffic signal warrants. No capacity improvements are required today.

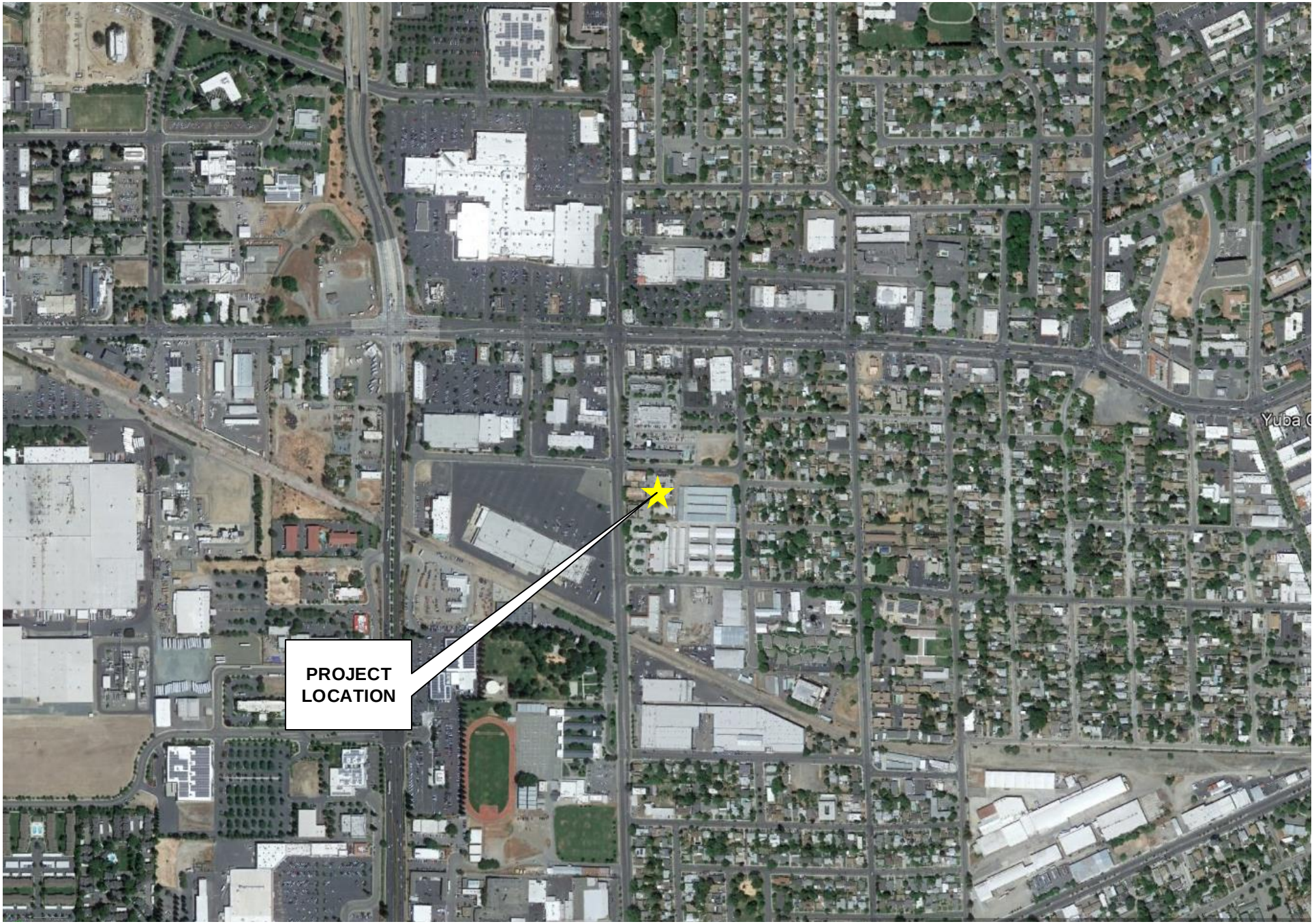
Sidewalks exist on the streets near the project, and Class 2 bicycle lanes are provided along the length of Gray Avenue. Crosswalks with push-button pedestrian activation are provided at the signalized Gray Avenue / Louise Avenue intersection. Yuba-Sutter Transit Route 1 (Yuba City to Yuba College) has stops at the Gray Avenue / Louise Avenue intersection and connects the site with the Alturas / Shasta terminal.

The project site with the Enterprise Rent-A-Car in operation has an existing driveway on Gray Avenue that is 60 feet south of the Louise Avenue intersection. Two driveways exist (inbound and outbound) on Louise Avenue roughly 100 feet east of Gray Avenue. As requested by City staff, all existing driveways will be closed and replaced with new driveways that are further from the Gray Avenue / Louise Avenue traffic signal.

Trip Generation. The proposed 90 room hotel project is projected to generate a total of 41 trips in the a.m. peak hour and 53 trips in the p.m. peak hour. As a comparison the existing Enterprise Rent-A-Car that will be eliminated is estimated to generate up to 66 trips during peak hours.

Project Traffic Operational Effects. The addition of project traffic will have a very minor effect on the length of delays at study intersections, but Level of Service will not change, and minimum City standards will continue to be satisfied. Resulting traffic volumes at the Louise Avenue intersections on Stafford Way would not satisfy peak hour traffic signal warrants. No capacity improvements are needed for this project.

Site Access. The project proposes access that is similar to that currently allowed without restriction to other businesses on Gray Avenue south of the Louise Avenue intersection. However, because the driveway is close to the Gray Avenue / Louise Avenue traffic signal, queueing is likely to periodically interfere with inbound project traffic and to block the view of exiting traffic. For that reason, it is recommended that the Gray Avenue driveway be limited to right turns only. A slightly longer throat depth is also recommended at the Gray Avenue driveway.



VICINITY MAP

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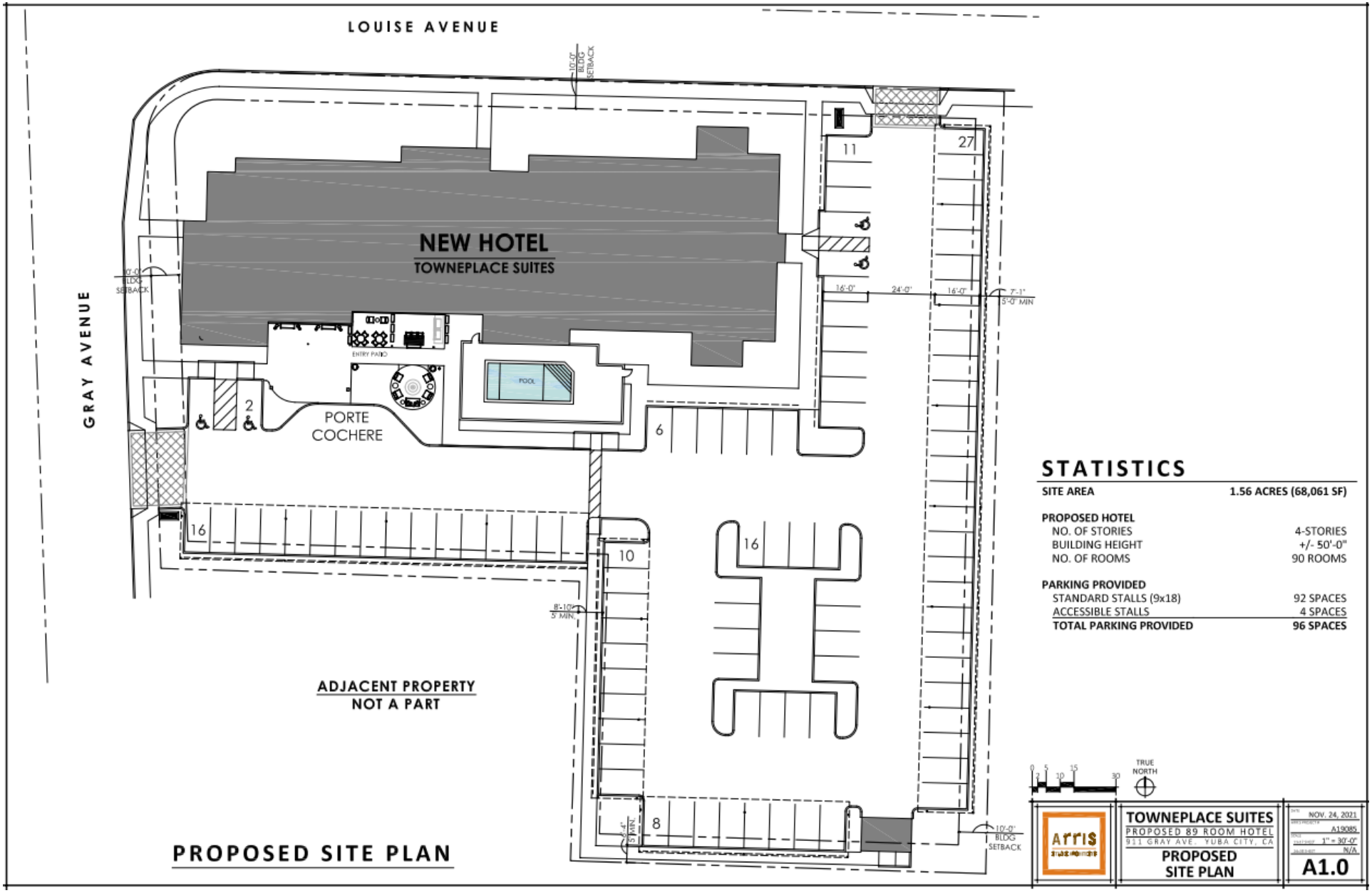
figure 1



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SITE PLAN

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figure 2

EXISTING SETTING

Study Area

This traffic impact study presents analyses of traffic operating conditions at intersections within the area that may be affected by the proposed project. The limits of the study area were identified through discussions with Yuba City staff based on their knowledge of the community based on the results of previous traffic studies conducted for other development in southern Yuba City.

Roadways. The following information is a description of area roadways that provide vehicular access to the project site. These roadways are shown in Figure 3.

- **Gray Avenue** is a north-south minor arterial that extends north from Franklin Road across Colusa Avenue (SR 20) to Pease Road near the northern city limit. Gray Avenue is a 4-lane facility in the area of the proposed project. On-street parking is prohibited, and the posted speed limit is 35 mph.

- **Louise Avenue** is a two-lane east-west local street that originates in the commercial area near the SR 99 right of way and extends east for about 3,000 feet across Gray Avenue to Cooper Avenue. Along the project frontage the roadway is 40 feet wide (curb-to-curb) and on-street parking is allowed. A 25 mph commercial area prima facie speed limit is in effect.

- **Stafford Way** is a two-lane north-south local street that originates in the area south of Forbes Avenue and continues northerly for about a mile across Colusa Avenue to Queen Avenue. The roadway is 40 feet wide (curb-to-curb) and on-street parking is allowed. A 25 mph commercial area prima facie speed limit is in effect.

Intersections. The following information describes the study intersection.

The **Gray Avenue/ Louise Avenue intersection** is controlled by a traffic signal. Separate left turn lanes exist on each approach. The northbound left turn lane is 100 feet long but continues beyond that length along the project frontage as a Two-Way Left-Turn (TWLT) lane. The westbound left turn lane is 100 feet long and is preceded by a 60-foot bay taper. Crosswalks are striped across each leg of the intersection, and accessible ramps are provided.

Louise Avenue intersects Stafford Way at two "Tee" intersections that are offset by about 75 feet (centerline to centerline). Each Louise Avenue approach is controlled by a stop sign. There are no marked crosswalks at either location. Accessible ramps exist across the northern Louise Avenue approach. Streetlights exist at the intersection.

Existing Site access. The site has an existing driveway on Gray Avenue that is 60 feet south of the Louise Avenue intersection. Two driveways exist (inbound and outbound) on Louise Avenue roughly 100 feet east of Gray Avenue. All existing driveways will be closed and

preplaced with new driveways that are further from the Gray Avenue / Louise Avenue traffic signal.

Other Access. Access to the north side of Louise Avenue is available for the Travel Lodge roughly 390 feet beyond the Gray Avenue intersection. Measured centerline to centerline this driveway would be offset from the proposed project driveway by 135 feet. A full access driveway exists for a medical office building on the east side of Gray Avenue about 140 feet south of the proposed project's access (centerline-to-centerline).

Bicycle and Pedestrian Facilities, Transit

Class 2 bicycle lanes and sidewalks are provided along the length of Gray Avenue, and sidewalks exist on Louise Avenue. Crosswalks with push-button pedestrian activation are provided at the signalized Gray Avenue / Louise Avenue intersection.

Yuba-Sutter Transit provides fixed route bus service in the study area. Yuba-Sutter Transit Route 1 (Yuba City to Yuba College) has stops at the Gray Avenue / Louise venue intersection and connect the site with the Alturas / Shasta terminal.

Evaluation Methodology

The following is a description of the methods used in this impact study to analyze intersection operations.

Level of Service Analysis Procedures. Level of Service (LOS) analysis provides a basis for describing existing traffic conditions and for evaluating the significance of project-related traffic effects. Level of Service measures the quality of traffic flow and is represented by letter designations from A to F, with a grade of A referring to the best conditions, and F representing the worst conditions. The characteristics associated with the various LOS for intersections are presented in Table 1 and further discussed below.

Both signalized intersections and un-signalized stop sign controlled intersections have been analyzed using methods presented in the *Highway Capacity Manual, 6th Edition (HCM)*. "*Synchro*" traffic software has been used to calculate the levels of service at study intersections. The calculations utilize a 2% heavy vehicle component for all movements.

Un-signalized intersections with side street stop sign control have also been evaluated using HCM procedures. At side street stop-sign-controlled intersections, the LOS is presented for turning movements experiencing the most delay. This is typically a left turn made from the minor street stop-sign-controlled approach onto the major street.

TABLE 1 LEVEL OF SERVICE DEFINITIONS		
Level of Service	**Signalized Intersections**	**Unsignalized Intersection**
"A"	Uncongested operations, all queues clear in a single-signal cycle. Delay ≤ 10.0 sec	Little or no delay. Delay ≤ 10 sec/veh
"B"	Uncongested operations, all queues clear in a single cycle. Delay > 10.0 sec and ≤ 20.0 sec	Short traffic delays. Delay > 10 sec/veh and ≤ 15 sec/veh
"C"	Light congestion, occasional backups on critical approaches. Delay > 20.0 sec and ≤ 35.0 sec	Average traffic delays. Delay > 15 sec/veh and ≤ 25 sec/veh
"D"	Significant congestions of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. Delay > 35.0 sec and ≤ 55.0 sec	Long traffic delays. Delay > 25 sec/veh and ≤ 35 sec/veh
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). Delay > 55.0 sec and ≤ 80.0 sec	Very long traffic delays, failure, extreme congestion. Delay > 35 sec/veh and ≤ 50 sec/veh
"F"	Total breakdown, stop-and-go operation. Delay > 80.0 sec	Intersection blocked by external causes. Delay > 50 sec/veh
Source: *Highway Capacity Manual, 6th Edition*		

Standards of Significance / Level of Service Thresholds. In this traffic impact study, the significance of the proposed project's effects on traffic operating conditions is based on a determination of whether project generated traffic results in roadway or intersection operating conditions below acceptable standards as defined by the governing agency. A project's effect on traffic conditions is considered significant if implementation of the project would result in LOS changing from levels considered acceptable to levels considered unacceptable, or if the project would significantly worsen an already unacceptable LOS without the project. Relevant policies for the study area consist of the following:

Yuba City General Plan (Adopted April 2004)

Implementing Policy 5.2-1-12 *(Traffic Level of Service)* of the General Plan's Transportation section states the following:

- Develop and manage the roadway system to obtain LOS D or better for all major roadways and intersections in the City. This policy does not extend to residential streets (i.e., streets with direct driveway access to homes) or bridges across the Feather River nor does the policy apply to state highways and their intersections, where Caltrans policies apply. Exceptions to LOS D policy may be allowed by the City Council in areas, such as downtown or near bridge crossings, where allowing a lower LOS would result in clear public benefits. Specific exceptions granted by the Council shall be added to the list of exceptions below:

- SR 20 (SR 99 to Feather River Bridge) – LOS F is acceptable;
- SR 20 (Feather River Bridge) – LOS F is acceptable;
- Bridge Street (SR 99 to Twin Cities Bridge) – LOS F is acceptable;
- Lincoln Road (New Bridge across the Feather River) – LOS F is acceptable;
- Bridge Street from North Palora Avenue to Second Street – LOS F is acceptable.

No new development will be approved unless it can be shown that the required level of service can be maintained on the affected roadways.

Based upon the above, the following standards and significance criteria have been used for this analysis to identify a significant impact.

- Cause level of service at a study intersection to degrade from LOS D or better to LOS E or F.

- Exacerbate the no project level of service at a study intersection operating at LOS E or F. Based upon direction provided by City staff for past studies in this area, exacerbation of unacceptable operations at a City signalized intersection is considered an impact if the proposed project causes an increase in the average vehicle delay of 5 seconds or more.

Signal Warrants. Traffic signal warrants are a series of standards which provide guidelines for determining if a traffic signal is an appropriate control. Signal warrant analyses are typically conducted at intersections of uncontrolled major streets and stop sign-controlled minor streets. If one or more signal warrants are met, signalization of the intersection may be appropriate. However, a signal should typically not be installed if none of the warrants are met, since the installation of signals would increase delays on the previously uncontrolled major street and may increase the occurrence of particular types of accidents.

For this traffic impact study, available data is limited to peak hour volumes. Therefore, un-signalized intersections were evaluated using the Peak Hour Warrant (Warrant Number 3) from the *California Manual on Uniform Traffic Control Devices (2014)*. This warrant was applied where the minor street experiences long delays in entering or crossing the major street for at least one hour of the day. It should also be noted that even if the Peak Hour Warrant is met, a more detailed signal warrant study is typically recommended before a signal is installed. The more detailed study should consider volumes during the eight highest hours of the day, pedestrian traffic, and accident histories.

Existing Traffic Conditions and Levels of Service

The following is a description of existing traffic operating conditions in the study area.

Existing Traffic Volumes. Peak hour traffic volume data was collected at study intersections in February 2022. In each case data was collected in 15-minute increments from 7:00 – 9:00 a.m. and 4:00 – 6:00 p.m. The contiguous one-hour periods with the highest volumes within the two-hour data collection period were used in this traffic impact study as the a.m. and p.m. peak hour.

Figure 3 presents the existing lane configurations and existing peak hour traffic volumes at these study intersections.

Existing Intersection Levels of Service. Table 2 presents a summary of existing peak hour Levels of Service at the three intersections. Level of Service calculations are provided in the Appendix. As shown in Table 2, the intersection currently operates satisfactorily within the minimum standards for Level of Service established by the City of Yuba City.

TABLE 2
EXISTING CONDITIONS
INTERSECTION LEVELS OF SERVICE

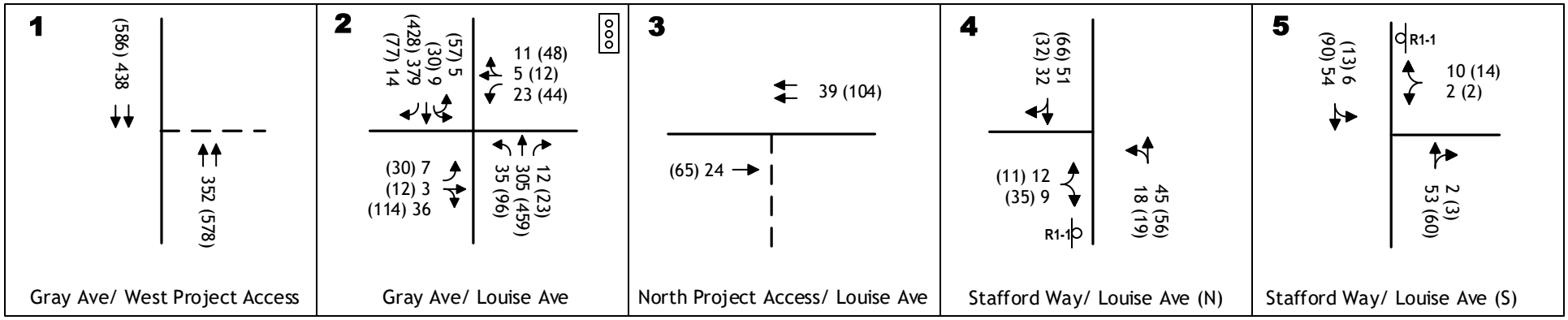
Intersection	Control	Existing			
		AM Peak Hour		PM Peak Hour	
		LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
Gray Avenue / Louise Avenue	Signal	B	11.9	B	15.4
Stafford Way / Louise Avenue (N)	EB Stop	A	9.3	A	9.2
Stafford Way / Louise Avenue (S)	WB Stop	A	8.8	A	8.8

Traffic Signal Warrants. The current traffic volumes at the Louise Avenue intersections on Stafford Way were compared to MUTCD peak hour warrants to determine whether a traffic signal might already be justified. As noted in the attached worksheets, current volumes fall below the level that would satisfy warrant requirements.

95th Percentile Queues. The length of peak hour queues in the left turn lanes adjoining the site were quantified as a byproduct of the HCM LOS through simulation analysis, and the results are presented in Table 3. The average queue length and 95th percentile queues are shown.

TABLE 3
EXISTING CONDITIONS
PEAK HOUR 95TH PERCENTILE QUEUES AT INTERSECTION

Intersection	Lane	Storage (feet)	Existing					
			AM Peak Hour			PM Peak Hour		
			Volume (vph)	Queue (feet)		Volume (vph)	Queue (feet)	
				Average	95th %		Average	95th %
Gray Avenue / Louise Avenue	WB left	100	23	<25	35	44	25	60
	WB thru	-	16	<25	30	60	30	55
	NB left	100	35	30	65	96	50	85
	NB thru (2)	-	317	30	65	482	65	105



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EXISTING TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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figure 3

PROJECT TRAFFIC OPERATIONAL EFFECTS

Development of the proposed project would attract additional traffic to the site. This section of the traffic impact study identifies the assumptions made regarding the travel characteristics of the project and describes the effects of project-related traffic relative to existing traffic conditions in the study area.

Project Characteristics

Parking. The 90 room hotel project provides 96 on-site parking spaces. City code requires one space per room plus 1 space for each 2 employees plus stalls as required for associated facilities.

Trip Generation. Development of the project would generate new vehicle trips and potentially affect traffic operations at the study intersections. The number of vehicle trips that are expected to be generated by development of the proposed project has been estimated using published trip generation data. The Institute of Transportation Engineers (ITE) publication *Trip Generation Manual, 11th Edition*, has been used where available.

The Trip Generation Manual was reviewed to identify the land use category that is most similar to the project. Rates are available for Hotels (Code 310) based on the number of rooms, and these rates have been employed, as noted in Table 4.

The identified trip generation rates have been applied and the resulting trip generation estimates are presented in Table 4. As shown, the proposed project is projected to generate a gross total of 719 daily trips with 41 trips in the a.m. peak hour and 53 trips in the p.m. peak hour.

TABLE 4
TRIP GENERATION RATES AND FORECAST

Land Use	Quantity	Trips per Unit						
			AM Peak Hour			PM Peak Hour		
		Daily	In	Out	Total	In	Out	Total
Proposed Project								
Hotel	room	7.99	56%	44%	0.46	51%	49%	0.59
TownPlace Suites	90 rooms	719	23	18	41	27	26	53
Estimate for Existing Use on Site								
Rental Car Lot[1]	1,000 sf of lot	12.7	55%	45%	0.50	50%	50%	1.00
Enterprise Rent-A-Car	48	610	13	11	24	24	24	48
Enterprise Rent-A-Car[2]	-	660	33	33	66	33	33	66

[1] Source: Crain & Associates, 2007

[2] J2 Engineering, Scottsdale, AZ Enterprise Rent-A-Car Transportation Impact and Mitigation Analysis, 1/30/2015

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No ITE rates are available for rental car facilities, and an on-line search was conducted for information relating to this type of use in a "non-airport" setting. A 2007 study conducted by Crain & Associates identified rates, and a 2015 study by J2 Engineering estimated rates based on the number of reported transactions at other facilities. As shown, forecasts derived from both sources result in estimates for the current site use that are similar to those associated with the TownPlace Suites project. Thus the proposed projects required traffic effects would be similar to those already occurring with Enterprise Rent-A-Car.

Trip Distribution. The geographic distribution of vehicle trips associated with the proposed development has been based on existing traffic patterns, the location of residences within the project's trade area and the location of similar competing uses. Table 5 presents the geographic trip distribution percentages for the project's primary and pass-by trips used for this analysis.

TABLE 5
TRIP DISTRIBUTION ASSUMPTIONS

Direction	Route	Percent of Total Trips
North	Gray Avenue	55%
	Stafford Way	5%
East	Louise Avenue beyond Stafford Way	5%
South	Stafford Way	5%
	Gray Avenue	25%
West	Louise Avenue beyond Gray Avenue	5%
	Total	100%

Trip Assignment. The trips associated with the project were directed to the study area circulation system via the project's two access points. This assignment assumes that both driveways are generally "recognizable" to guests and employees. Figure 4 displays the "project only" traffic volumes for each driveway and for the study intersections during the a.m. and p.m. peak hours.

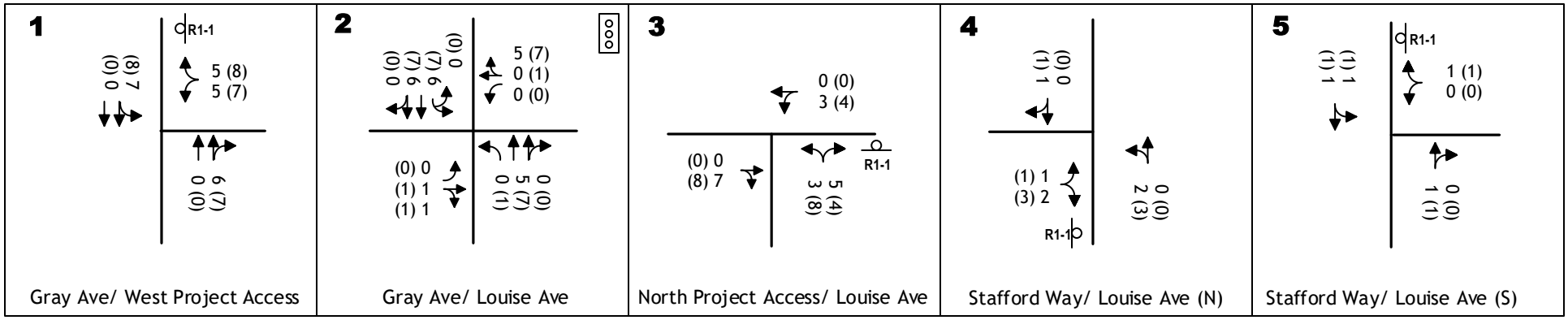
Existing plus Project Effects

Traffic Volumes. To evaluate traffic effects of the project its trips were superimposed onto current background traffic volumes and Figure 5 displays the resulting "Existing Plus Project" traffic volumes anticipated at each study intersection during the peak hours. This "worst case" method did not attempt to subtract the trips currently generated by Enterprise Rent-A-Car and already using each intersection. The resulting volumes were then employed to calculate operating Levels of Service, queueing and traffic signal warrants.

Level of Service. Table 6 displays the peak hour LOS at each study intersection under the Existing plus Project conditions. As shown, because the project's trip generation is relatively small, the addition of project generated traffic is projected to result in relatively minor increases in delay and no change in LOS. All intersections will continue to operate at LOS D or better. The project driveways would operate at LOS A or B. The effects of the project are consistent with the Circulation goals and policies of the Yuba City General Plan. LOS calculations were made for the project's driveways and are included in the appendix. The Gray Avenue driveway operates at LOS B and the Louise Avenue driveway operates at LOS A.

Project Effects on Peak Period Queues. Average and 95th percentile queue lengths have been determined on the approaches abutting the project at the Gray Avenue / Louise Avenue intersection as a byproduct of HCM Level of Service Analysis. The results are presented in Table 7 along with the peak hour traffic volumes in applicable lanes. As noted, no appreciable change results from the project, and with the addition of project traffic the 95th percentile queues in the westbound and northbound lanes do not reach the length that might interfere with use of the proposed site access.

Traffic Signal Warrants. The small amount of traffic added by the project does not result in any unsignalized intersection carrying volumes that meet peak hour traffic signal warrants.



PROJECT ONLY TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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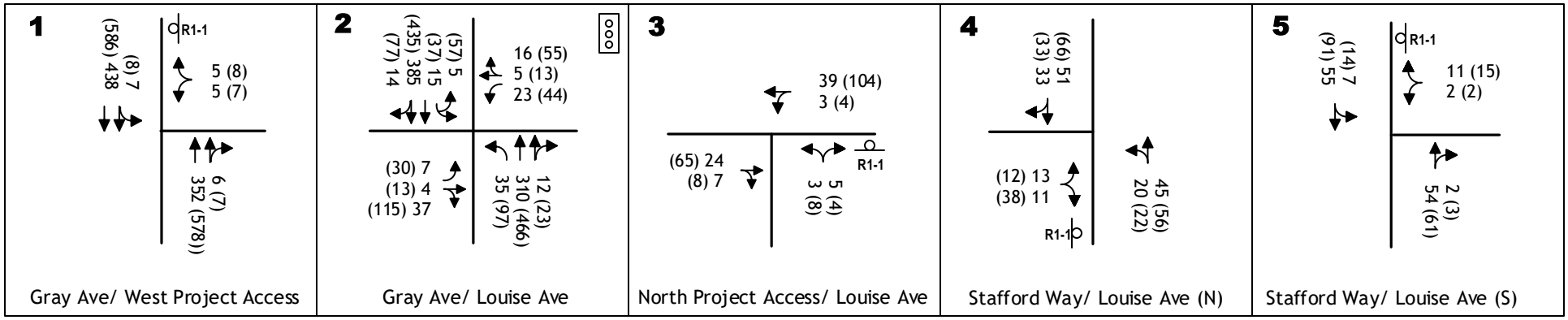
figure 4



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EXISTING PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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figure 5

TABLE 6
EXISTING PLUS PROJECT CONDITIONS
INTERSECTION LEVELS OF SERVICE

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Existing		Existing Plus Project		Existing		Existing Plus Project	
		LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
Gray Avenue / Louise Avenue	Signal	B	11.9	B	12.2	B	15.4	B	15.6
Stafford Way / Louise Avenue (N)	EB Stop	A	9.3	A	9.4	A	9.2	A	9.3
Stafford Way / Louise Avenue (S)	WB Stop	A	8.8	A	8.8	A	8.8	A	9.2

TABLE 7
EXISTING PLUS PROJECT CONDITIONS
PEAK HOUR 95TH PERCENTILE QUEUES AT INTERSECTIONS

Intersection	Lane	Storage (feet)	Existing											
			AM Peak Hour						PM Peak Hour					
			Existing			Existing Plus Project			Existing			Existing Plus Project		
			Volume (vph)	Queue (feet)		Volume (vph)	Queue (feet)		Volume (vph)	Queue (feet)		Volume (vph)	Queue (feet)	
				Ave	95th %		Ave	95th %		Ave	95th %		Ave	95th %
Gray Avenue / Louise Avenue	WB left	100	23	<25	35	23	<25	35	44	25	60	44	25	60
	WB thru	-	16	<25	30	21	25	35	60	30	55	68	35	60
	NB left	100	35	25	60	35	25	60	96	50	85	97	55	100
	NB thru (2)	-	317	30	65	322	25	65	482	65	105	489	65	105
Gray Avenue / Access	SB left		-	-	-	7	<25	25	-	-	-	8	<25	30
	WB	-	-	-	-		<25	30	-	-	-		<25	40

Site Access Evaluation

The feasibility of access to the site as proposed has been evaluated with regards to these key issues:

- Legality of Access
- Proximity to other driveways
- Interference from queues at the Gray Avenue / Louise Avenue intersection
- Adequacy of driveway throats for waiting vehicles
- Sight distance

The project proposes full access on Gray Avenue in the area south of the Louise Avenue intersection. While a raised median has been installed along Gray Avenue to the north between Colusa Avenue and Louise Avenue to limit left turns, full access is permitted south of Louise Avenue via the existing Two-Way Left-Turn (TWLT) lane. The feasibility full access for the project depends on the layout of the intersection striping for "legal access" and on the extent to which queues at the traffic signal interfere with access to the driveway.

Legal Access. Today the left turn lane on northbound Gray Avenue ends 100 feet out of the intersection, and from that point the opening for the turn lane continues for about 60 feet to the project's property line. The TWLT lane begins at that point. The proposed driveway lies within the left turn lane opening, and it is legal under the CVC to cross the yellow stripe at that location when turning left. The project's access is "legal".

Because a legal southbound left turn would need to begin in the southbound through lane, the City could consider restriping Gray Avenue to shorten the left turn lane, move the opening to the north and extend the TWLT striping to the north into the area of the driveway. However, it appears that during the p.m. peak hour knowledgeable locals use Louise Avenue to cut through to the Rocca Way signal on Colusa Avenue. As a result, nearly 100 vehicles turned left in the p.m. peak hour. With this volume, shortening the northbound left turn lane is not recommended.

The Louise Avenue access is within a section of the street with a center line stripe, and access is legal at this location.

Proximity to Other Driveways. The locations of existing driveways in the vicinity of the proposed project were reviewed to determine whether any safety concerns may be anticipated.

There are no driveways on Louise Avenue across from the project site, but full access to the north side of Louise Avenue is available for the Travel Lodge roughly 390 feet beyond the Gray Avenue intersection. Measured centerline to centerline this driveway would be offset from the proposed project's new driveway by 135 feet. The orientation of the offset is such that westbound left turns into the project and eastbound left turns into Travel Lodge would both occur in this area. However, this layout should work acceptably because the volume of vehicles turning left into the proposed project is low (i.e., < 3 to 4 vehicles per hour), the background traffic volume on Louise Avenue is low and such turns would originate on opposite sides of the roadway centerline and not within a common turn area.

The are no driveways on Gray Avenue across from the proposed project, but a driveway exists for a medical office building on the east side of Gray Avenue about 140 feet south of the proposed project's access (centerline to centerline). In this case a driver might be turning left out from the project when a driver is exiting the office driveway. However, this location provides adequate distance for turning motorists to notice each other and stop if necessary. Moving the project driveway to increase the distance between these locations would shorter the separation between the driveway and the Louise Avenue traffic signal, which would be undesirable. No changes are recommended.

Effects of Traffic Signal Queues. The effects of queues created at the Gray Avenue / Louise Avenue traffic signal on the project's Gray Avenue access is considered in this report section and in the subsequent evaluation of sight distance. As was noted in Table 7, queues in the northbound through lanes on Gray Avenue that extended to the project driveway and block access are unlikely. The frequency and duration of blockage would not indicate that access is not feasible at this location.

However, the length of the forecast queue in the northbound left turn lane would have an effect on southbound motorists maneuvering to turn left into the site. As the 95th percentile queue extends for 100 feet in the p.m. peak hour, only 30 feet remains for a motorist to complete the turn. Because this could result in vehicles interfering with through traffic, it is recommended that southbound left turns into the site be prohibited at this driveway.

Driveway Throat Depth. The area available for vehicles waiting to exit at each driveway was identified from the site plan in order to determine whether exiting traffic may delay entering vehicles and potentially create a safety issue on adjacent streets.

Both locations have perpendicular parking that begins just inside of the property line about 10 feet beyond the Gray Avenue sidewalk and somewhat closer to the sidewalk on Louise Avenue. Thus, one vehicle waiting behind the sidewalk would block access to the first parking spaces. This configuration is not appreciably different from that at the adjoining medical office building driveway.

Review of the queuing analysis results reveals that the 95th queue on the westbound approach at the Gray Avenue driveway would be 40 feet in the p.m. peak hour. This queue would block access to the accessible parking stalls, but as the turnover in the spaces is unlikely to be frequent, this is unlikely to become an issue.

Any movement into and out of the first few parking spaces along the Gray Avenue entrance would temporarily block access into the site. Ideally the site layout should provide space for at least one waiting vehicle (i.e., 20 feet) between the sidewalk and the first parking stall to provide space outside of the flow of traffic on Gray Avenue for an entering vehicle that was forced to wait by a parking maneuver.

Sight Distance at Driveways. The adequacy of sight distance at each driveway has been reviewed. The view in each direction was evaluated within the context of minimum stopping

sight distance requirements based on review of roadway alignment and the effects of vehicle queuing at the adjoining Gray Avenue / Louise Avenue intersection.

Minimum Stopping Sight Distance (MSSD) requirements are outlined in Table 201.1 of the Caltrans Highway Design Manual (HDM). The MSSD is 250 feet at the 35 mph speed limit on Gray Avenue and is 150 feet at the 25 mph speed on Louise Avenue.

At the Gray Avenue driveway a motorist looking south from the driveway would have an unobstructed view of northbound traffic, and sight distance requirements would be met. Looking to the north, southbound vehicles 250 feet from the driveway would be north of the limits of the Gray Avenue / Louise Avenue intersection, and the view of arriving vehicles from the driveway could be obstructed by vehicles queuing at the intersection. The queuing analysis indicated that normally that queue would be fifty feet (average queue), but when a pedestrian crosses Gray Avenue the queue could be up to 100 feet long. These queues will dissipate quickly, and most of the time the view would satisfy HDM standards. However, the City of Yuba City could consider prohibiting outbound left turns at the driveway.

Sight distance is not an issue at the Louise Avenue access because the view is clear in both directions and any westbound queues from the Gray Avenue signal are not in the line of sight.

Conclusions Regarding Access. The project proposes access that is similar to that currently allowed without restriction to other businesses on Gray Avenue south of the Louise Avenue intersection. However, because the driveway is very close to the Gray Avenue / Louise Avenue traffic signal, queueing is likely to periodically interfere with inbound traffic and block the view of exiting traffic. For that reason, it is recommended that the Gray Avenue driveway be limited to right turns only. In addition, space for one vehicle between the sidewalk and the first parking stall should be provided at the Gray Avenue driveway.

APPENDICES

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	50	29	20	44	401	18	498
v/c Ratio	0.01	0.06	0.04	0.02	0.06	0.16	0.02	0.22
Control Delay	25.1	6.7	23.7	9.9	22.7	8.4	24.5	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	6.7	23.7	9.9	22.7	8.4	24.5	10.1
Queue Length 50th (ft)	0	0	0	0	0	0	1	0
Queue Length 95th (ft)	17	19	38	14	51	111	28	137
Internal Link Dist (ft)		1058		217		129		2112
Turn Bay Length (ft)	100		100				180	
Base Capacity (vph)	754	804	754	818	754	2750	754	2628
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.06	0.04	0.02	0.06	0.15	0.02	0.19

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	3	36	23	5	11	35	305	12	14	379	14
Future Volume (veh/h)	7	3	36	23	5	11	35	305	12	14	379	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	9	4	46	29	6	14	44	386	15	18	480	18
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	23	11	126	68	55	128	97	965	37	44	862	32
Arrive On Green	0.01	0.09	0.09	0.04	0.11	0.11	0.05	0.28	0.28	0.02	0.25	0.25
Sat Flow, veh/h	1781	128	1476	1781	498	1163	1781	3488	135	1781	3493	131
Grp Volume(v), veh/h	9	0	50	29	0	20	44	196	205	18	244	254
Grp Sat Flow(s),veh/h/ln	1781	0	1605	1781	0	1661	1781	1777	1846	1781	1777	1847
Q Serve(g_s), s	0.2	0.0	0.9	0.5	0.0	0.3	0.8	2.9	2.9	0.3	3.8	3.8
Cycle Q Clear(g_c), s	0.2	0.0	0.9	0.5	0.0	0.3	0.8	2.9	2.9	0.3	3.8	3.8
Prop In Lane	1.00		0.92	1.00		0.70	1.00		0.07	1.00		0.07
Lane Grp Cap(c), veh/h	23	0	137	68	0	184	97	491	511	44	439	456
V/C Ratio(X)	0.39	0.00	0.37	0.42	0.00	0.11	0.45	0.40	0.40	0.40	0.56	0.56
Avail Cap(c_a), veh/h	301	0	271	301	0	280	301	855	888	301	855	889
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.7	0.0	13.8	15.0	0.0	12.8	14.7	9.4	9.4	15.4	10.5	10.5
Incr Delay (d2), s/veh	10.3	0.0	1.6	4.1	0.0	0.3	3.3	0.5	0.5	5.8	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.3	0.2	0.0	0.1	0.3	0.9	0.9	0.2	1.2	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.0	0.0	15.5	19.2	0.0	13.1	17.9	9.9	9.9	21.2	11.6	11.6
LnGrp LOS	C	A	B	B	A	B	B	A	A	C	B	B
Approach Vol, veh/h		59			49			445			516	
Approach Delay, s/veh		17.1			16.7			10.7			11.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	13.5	5.8	7.3	6.3	12.5	5.0	8.1
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	5.4	15.4	5.4	5.4	5.4	15.4	5.4	5.4
Max Q Clear Time (g_c+I1), s	2.3	4.9	2.5	2.9	2.8	5.8	2.2	2.3
Green Ext Time (p_c), s	0.0	1.7	0.0	0.0	0.0	2.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	9	18	45	51	32
Future Vol, veh/h	12	9	18	45	51	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	12	23	58	65	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	190	86	106	0	-	0
Stage 1	86	-	-	-	-	-
Stage 2	104	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	799	973	1485	-	-	-
Stage 1	937	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	786	973	1485	-	-	-
Mov Cap-2 Maneuver	786	-	-	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	920	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	2.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1485	-	857	-	-
HCM Lane V/C Ratio	0.016	-	0.031	-	-
HCM Control Delay (s)	7.5	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	10	53	2	6	54
Future Vol, veh/h	2	10	53	2	6	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	13	68	3	8	69

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	155	70	0	0	71	0
Stage 1	70	-	-	-	-	-
Stage 2	85	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	836	993	-	-	1529	-
Stage 1	953	-	-	-	-	-
Stage 2	938	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	832	993	-	-	1529	-
Mov Cap-2 Maneuver	832	-	-	-	-	-
Stage 1	953	-	-	-	-	-
Stage 2	933	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	962	1529	-
HCM Lane V/C Ratio	-	-	0.016	0.005	-
HCM Control Delay (s)	-	-	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

1: PROJ DWY & GRAY AVE Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.0
Total Del/Veh (s)	0.5	0.9	0.7

2: GRAY AVE & LOUISE AVE Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.6	0.1	0.0	0.2	0.1
Total Del/Veh (s)	6.3	10.1	5.7	6.3	6.2

3: PROJ DWY & LOUISE AVE/LOUISE AVE (N) Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.8	0.1	0.4

4: STAFFORD WAY & LOUISE AVE (N) Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1
Total Del/Veh (s)	2.7	0.5	0.4	0.8

5: LOUISE AVE (S) & STAFFORD WAY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.6	0.5	0.1	0.6

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	7.4

Intersection: 1: PROJ DWY & GRAY AVE

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 2: GRAY AVE & LOUISE AVE

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	29	54	29	49	71	85	96	30	117	158
Average Queue (ft)	6	22	13	8	24	30	26	13	36	37
95th Queue (ft)	24	52	35	30	61	66	63	37	84	93
Link Distance (ft)		1084		207	139	139	139		2156	2156
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100		100					180		
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 3: PROJ DWY & LOUISE AVE/LOUISE AVE (N)

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: STAFFORD WAY & LOUISE AVE (N)

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	30	30
Average Queue (ft)	12	1
95th Queue (ft)	35	10
Link Distance (ft)	337	51
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: LOUISE AVE (S) & STAFFORD WAY

Movement	WB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	11
95th Queue (ft)	33
Link Distance (ft)	1066
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	31	130	45	61	99	497	90	520
v/c Ratio	0.08	0.25	0.11	0.13	0.22	0.31	0.20	0.33
Control Delay	31.2	7.9	29.8	10.2	26.8	16.6	27.6	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	7.9	29.8	10.2	26.8	16.6	27.6	16.8
Queue Length 50th (ft)	7	3	9	3	20	45	18	46
Queue Length 95th (ft)	48	46	62	33	108	181	102	190
Internal Link Dist (ft)		1058		217		129		2112
Turn Bay Length (ft)	100		100				180	
Base Capacity (vph)	484	838	549	847	791	2424	726	2321
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.16	0.08	0.07	0.13	0.21	0.12	0.22

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	12	114	44	12	48	96	459	23	87	428	77
Future Volume (veh/h)	30	12	114	44	12	48	96	459	23	87	428	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	31	12	118	45	12	49	99	473	24	90	441	79
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	19	184	95	45	184	162	904	46	154	777	138
Arrive On Green	0.04	0.13	0.13	0.05	0.14	0.14	0.09	0.26	0.26	0.09	0.26	0.26
Sat Flow, veh/h	1781	148	1459	1781	321	1313	1781	3442	174	1781	3014	536
Grp Volume(v), veh/h	31	0	130	45	0	61	99	244	253	90	259	261
Grp Sat Flow(s),veh/h/ln	1781	0	1608	1781	0	1634	1781	1777	1839	1781	1777	1774
Q Serve(g_s), s	0.7	0.0	3.0	1.0	0.0	1.3	2.1	4.6	4.6	1.9	4.9	5.0
Cycle Q Clear(g_c), s	0.7	0.0	3.0	1.0	0.0	1.3	2.1	4.6	4.6	1.9	4.9	5.0
Prop In Lane	1.00		0.91	1.00		0.80	1.00		0.09	1.00		0.30
Lane Grp Cap(c), veh/h	70	0	202	95	0	229	162	467	483	154	458	457
V/C Ratio(X)	0.44	0.00	0.64	0.47	0.00	0.27	0.61	0.52	0.52	0.59	0.56	0.57
Avail Cap(c_a), veh/h	338	0	552	384	0	603	612	1294	1339	521	1203	1200
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	16.2	17.9	0.0	15.0	17.1	12.3	12.3	17.2	12.6	12.6
Incr Delay (d2), s/veh	4.3	0.0	3.4	3.6	0.0	0.6	3.7	0.9	0.9	3.5	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.1	0.4	0.0	0.4	0.9	1.6	1.6	0.8	1.7	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	19.6	21.5	0.0	15.6	20.7	13.2	13.2	20.7	13.7	13.7
LnGrp LOS	C	A	B	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		161			106			596			610	
Approach Delay, s/veh		20.2			18.1			14.4			14.7	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	14.8	6.7	9.5	8.2	14.7	6.1	10.1
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	11.4	28.4	8.4	13.4	13.4	26.4	7.4	14.4
Max Q Clear Time (g_c+I1), s	3.9	6.6	3.0	5.0	4.1	7.0	2.7	3.3
Green Ext Time (p_c), s	0.1	3.0	0.0	0.4	0.1	3.1	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	35	19	56	66	32
Future Vol, veh/h	11	35	19	56	66	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	40	22	64	75	36

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	201	93	111	0	-	0
Stage 1	93	-	-	-	-	-
Stage 2	108	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	788	964	1479	-	-	-
Stage 1	931	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	776	964	1479	-	-	-
Mov Cap-2 Maneuver	776	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	916	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1479	-	911	-	-
HCM Lane V/C Ratio	0.015	-	0.057	-	-
HCM Control Delay (s)	7.5	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	14	60	3	13	90
Future Vol, veh/h	2	14	60	3	13	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	16	68	3	15	102

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	202	70	0	0	71	0
Stage 1	70	-	-	-	-	-
Stage 2	132	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	787	993	-	-	1529	-
Stage 1	953	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	779	993	-	-	1529	-
Mov Cap-2 Maneuver	779	-	-	-	-	-
Stage 1	953	-	-	-	-	-
Stage 2	885	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	960	1529	-
HCM Lane V/C Ratio	-	-	0.019	0.01	-
HCM Control Delay (s)	-	-	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

1: PROJ DWY & GRAY AVE Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.1
Total Del/Veh (s)	0.9	1.2	1.0

2: GRAY AVE & LOUISE AVE Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.9	0.0	0.0	0.3	0.2
Total Del/Veh (s)	11.1	14.5	9.9	11.4	11.0

3: PROJ DWY & LOUISE AVE/LOUISE AVE (N) Performance by approach

Approach	EB	WB	All
Denied Del/Veh (s)	0.0	0.1	0.0
Total Del/Veh (s)	0.8	0.2	0.5

4: STAFFORD WAY & LOUISE AVE (N) Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	2.7	0.4	0.4	1.1

5: LOUISE AVE (S) & STAFFORD WAY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.4	0.3	0.3	0.4

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	12.6

Intersection: 1: PROJ DWY & GRAY AVE

Movement	NB
Directions Served	T
Maximum Queue (ft)	32
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	1778
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: GRAY AVE & LOUISE AVE

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	51	75	67	52	93	139	116	95	99	160
Average Queue (ft)	23	41	26	31	47	62	55	51	56	76
95th Queue (ft)	52	71	57	53	85	105	98	88	89	132
Link Distance (ft)		1084		207	139	139	139		2156	2156
Upstream Blk Time (%)						0				
Queuing Penalty (veh)						0				
Storage Bay Dist (ft)	100		100					180		
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 3: PROJ DWY & LOUISE AVE/LOUISE AVE (N)

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: STAFFORD WAY & LOUISE AVE (N)

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	54	31
Average Queue (ft)	24	3
95th Queue (ft)	51	19
Link Distance (ft)	337	51
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: LOUISE AVE (S) & STAFFORD WAY

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	30	31
Average Queue (ft)	13	2
95th Queue (ft)	35	15
Link Distance (ft)	1066	51
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	352	6	7	438
Future Vol, veh/h	5	5	352	6	7	438
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	383	7	8	476

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	641	195	0	0	390	0
Stage 1	387	-	-	-	-	-
Stage 2	254	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	407	814	-	-	1165	-
Stage 1	656	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	403	814	-	-	1165	-
Mov Cap-2 Maneuver	403	-	-	-	-	-
Stage 1	656	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	403	814	1165	-
HCM Lane V/C Ratio	-	-	0.013	0.007	0.007	-
HCM Control Delay (s)	-	-	14.1	9.5	8.1	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	0	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	52	29	26	44	407	25	505
v/c Ratio	0.01	0.07	0.04	0.03	0.06	0.16	0.03	0.22
Control Delay	25.3	6.8	23.9	9.1	22.9	8.4	24.3	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	6.8	23.9	9.1	22.9	8.4	24.3	10.2
Queue Length 50th (ft)	1	0	1	0	1	0	0	0
Queue Length 95th (ft)	17	19	38	15	51	112	34	139
Internal Link Dist (ft)		1058		217		129		2112
Turn Bay Length (ft)	100		100				180	
Base Capacity (vph)	737	792	737	797	737	2751	737	2627
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.07	0.04	0.03	0.06	0.15	0.03	0.19

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	4	37	23	5	16	35	310	12	20	385	14
Future Volume (veh/h)	7	4	37	23	5	16	35	310	12	20	385	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	9	5	47	29	6	20	44	392	15	25	487	18
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	23	14	132	68	44	146	97	938	36	60	866	32
Arrive On Green	0.01	0.09	0.09	0.04	0.12	0.12	0.05	0.27	0.27	0.03	0.25	0.25
Sat Flow, veh/h	1781	155	1454	1781	379	1264	1781	3490	133	1781	3495	129
Grp Volume(v), veh/h	9	0	52	29	0	26	44	199	208	25	247	258
Grp Sat Flow(s),veh/h/ln	1781	0	1609	1781	0	1643	1781	1777	1846	1781	1777	1847
Q Serve(g_s), s	0.2	0.0	1.0	0.5	0.0	0.5	0.8	3.0	3.0	0.4	3.9	3.9
Cycle Q Clear(g_c), s	0.2	0.0	1.0	0.5	0.0	0.5	0.8	3.0	3.0	0.4	3.9	3.9
Prop In Lane	1.00		0.90	1.00		0.77	1.00		0.07	1.00		0.07
Lane Grp Cap(c), veh/h	23	0	146	68	0	190	97	478	496	60	441	458
V/C Ratio(X)	0.39	0.00	0.36	0.43	0.00	0.14	0.45	0.42	0.42	0.42	0.56	0.56
Avail Cap(c_a), veh/h	297	0	269	297	0	274	297	846	879	297	846	879
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.8	0.0	13.8	15.2	0.0	12.8	14.8	9.7	9.7	15.3	10.6	10.6
Incr Delay (d2), s/veh	10.4	0.0	1.5	4.2	0.0	0.3	3.3	0.6	0.6	4.6	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.3	0.2	0.0	0.2	0.3	0.9	0.9	0.2	1.2	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.2	0.0	15.3	19.4	0.0	13.2	18.1	10.3	10.3	19.9	11.8	11.7
LnGrp LOS	C	A	B	B	A	B	B	B	B	B	B	B
Approach Vol, veh/h		61			55			451			530	
Approach Delay, s/veh		16.9			16.4			11.1			12.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	13.3	5.8	7.5	6.4	12.6	5.0	8.3
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	5.4	15.4	5.4	5.4	5.4	15.4	5.4	5.4
Max Q Clear Time (g_c+I1), s	2.4	5.0	2.5	3.0	2.8	5.9	2.2	2.5
Green Ext Time (p_c), s	0.0	1.7	0.0	0.0	0.0	2.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	24	7	3	39	5	3
Future Vol, veh/h	24	7	3	39	5	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	8	3	42	5	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	34	0	78	30
Stage 1	-	-	-	-	30	-
Stage 2	-	-	-	-	48	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1578	-	925	1044
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	974	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1578	-	923	1044
Mov Cap-2 Maneuver	-	-	-	-	923	-
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	972	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	965	-	-	1578	-
HCM Lane V/C Ratio	0.009	-	-	0.002	-
HCM Control Delay (s)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	11	20	45	51	33
Future Vol, veh/h	13	11	20	45	51	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	14	26	58	65	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	196	86	107	0	-	0
Stage 1	86	-	-	-	-	-
Stage 2	110	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	793	973	1484	-	-	-
Stage 1	937	-	-	-	-	-
Stage 2	915	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	779	973	1484	-	-	-
Mov Cap-2 Maneuver	779	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	915	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	2.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1484	-	857	-	-
HCM Lane V/C Ratio	0.017	-	0.036	-	-
HCM Control Delay (s)	7.5	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	11	54	2	7	55
Future Vol, veh/h	2	11	54	2	7	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	14	69	3	9	71

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	160	71	0	0	72	0
Stage 1	71	-	-	-	-	-
Stage 2	89	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	831	991	-	-	1528	-
Stage 1	952	-	-	-	-	-
Stage 2	934	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	826	991	-	-	1528	-
Mov Cap-2 Maneuver	826	-	-	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	928	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	961	1528	-
HCM Lane V/C Ratio	-	-	0.017	0.006	-
HCM Control Delay (s)	-	-	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

1: PROJ DWY & GRAY AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	5.7	0.7	0.8	0.8

2: GRAY AVE & LOUISE AVE Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.2	0.0	0.1	0.1
Total Del/Veh (s)	4.5	7.8	3.3	4.5	4.1

3: PROJ DWY & LOUISE AVE/LOUISE AVE (N) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.8	0.2	3.5	0.7

4: STAFFORD WAY & LOUISE AVE (N) Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1
Total Del/Veh (s)	2.6	0.5	0.6	0.9

5: LOUISE AVE (S) & STAFFORD WAY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.4	0.5	0.3	0.5

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	5.5

Intersection: 1: PROJ DWY & GRAY AVE

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	46	31
Average Queue (ft)	8	4
95th Queue (ft)	30	22
Link Distance (ft)	457	139
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: GRAY AVE & LOUISE AVE

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	30	50	48	35	71	70	90	53	74	142
Average Queue (ft)	3	16	11	13	26	25	22	18	32	30
95th Queue (ft)	18	41	35	35	51	55	67	45	60	82
Link Distance (ft)		1090		213	139	139	139		2156	2156
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100		100					180		
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 3: PROJ DWY & LOUISE AVE/LOUISE AVE (N)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	7
95th Queue (ft)	29
Link Distance (ft)	475
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: STAFFORD WAY & LOUISE AVE (N)

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	30	31
Average Queue (ft)	18	2
95th Queue (ft)	40	15
Link Distance (ft)	337	51
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: LOUISE AVE (S) & STAFFORD WAY

Movement	WB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	11
95th Queue (ft)	33
Link Distance (ft)	1066
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	8	578	7	8	586
Future Vol, veh/h	7	8	578	7	8	586
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	9	628	8	9	637

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	969	318	0	0	636	0
Stage 1	632	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	251	678	-	-	943	-
Stage 1	492	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	247	678	-	-	943	-
Mov Cap-2 Maneuver	247	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	374	943	-
HCM Lane V/C Ratio	-	-	0.044	0.009	-
HCM Control Delay (s)	-	-	15.1	8.9	0.1
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	31	132	45	70	100	504	97	527
v/c Ratio	0.08	0.26	0.11	0.15	0.22	0.31	0.22	0.33
Control Delay	31.3	8.0	30.0	9.8	26.9	16.8	27.7	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	8.0	30.0	9.8	26.9	16.8	27.7	16.8
Queue Length 50th (ft)	7	3	9	3	20	46	20	47
Queue Length 95th (ft)	48	46	62	36	109	184	109	193
Internal Link Dist (ft)		1058		217		129		2112
Turn Bay Length (ft)	100		100				180	
Base Capacity (vph)	483	838	548	847	789	2419	724	2319
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.16	0.08	0.08	0.13	0.21	0.13	0.23

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	13	115	44	13	55	97	466	23	94	435	77
Future Volume (veh/h)	30	13	115	44	13	55	97	466	23	94	435	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	31	13	119	45	13	57	100	480	24	97	448	79
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	20	186	95	43	188	163	899	45	160	784	137
Arrive On Green	0.04	0.13	0.13	0.05	0.14	0.14	0.09	0.26	0.26	0.09	0.26	0.26
Sat Flow, veh/h	1781	158	1451	1781	303	1328	1781	3444	172	1781	3022	530
Grp Volume(v), veh/h	31	0	132	45	0	70	100	247	257	97	262	265
Grp Sat Flow(s),veh/h/ln	1781	0	1609	1781	0	1631	1781	1777	1839	1781	1777	1775
Q Serve(g_s), s	0.7	0.0	3.1	1.0	0.0	1.5	2.1	4.7	4.7	2.1	5.0	5.1
Cycle Q Clear(g_c), s	0.7	0.0	3.1	1.0	0.0	1.5	2.1	4.7	4.7	2.1	5.0	5.1
Prop In Lane	1.00		0.90	1.00		0.81	1.00		0.09	1.00		0.30
Lane Grp Cap(c), veh/h	70	0	206	95	0	231	163	464	480	160	461	461
V/C Ratio(X)	0.44	0.00	0.64	0.47	0.00	0.30	0.62	0.53	0.53	0.61	0.57	0.57
Avail Cap(c_a), veh/h	335	0	548	381	0	597	607	1283	1329	516	1193	1192
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	0.0	16.3	18.1	0.0	15.1	17.2	12.5	12.5	17.2	12.6	12.7
Incr Delay (d2), s/veh	4.3	0.0	3.3	3.6	0.0	0.7	3.7	1.0	0.9	3.7	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.1	0.4	0.0	0.5	0.9	1.6	1.7	0.9	1.7	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.8	0.0	19.6	21.7	0.0	15.9	20.9	13.4	13.4	20.9	13.7	13.8
LnGrp LOS	C	A	B	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		163			115			604			624	
Approach Delay, s/veh		20.2			18.1			14.7			14.9	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	14.9	6.7	9.6	8.2	14.8	6.2	10.2
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	11.4	28.4	8.4	13.4	13.4	26.4	7.4	14.4
Max Q Clear Time (g_c+I1), s	4.1	6.7	3.0	5.1	4.1	7.1	2.7	3.5
Green Ext Time (p_c), s	0.1	3.0	0.0	0.4	0.1	3.1	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	65	8	4	104	8	4
Future Vol, veh/h	65	8	4	104	8	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	9	4	113	9	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	80	0	197	76
Stage 1	-	-	-	-	76	-
Stage 2	-	-	-	-	121	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1518	-	792	985
Stage 1	-	-	-	-	947	-
Stage 2	-	-	-	-	904	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1518	-	790	985
Mov Cap-2 Maneuver	-	-	-	-	790	-
Stage 1	-	-	-	-	947	-
Stage 2	-	-	-	-	901	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	846	-	-	1518	-
HCM Lane V/C Ratio	0.015	-	-	0.003	-
HCM Control Delay (s)	9.3	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	38	22	56	66	33
Future Vol, veh/h	12	38	22	56	66	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	43	25	64	75	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	208	94	113	0	-	0
Stage 1	94	-	-	-	-	-
Stage 2	114	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	780	963	1476	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	911	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	766	963	1476	-	-	-
Mov Cap-2 Maneuver	766	-	-	-	-	-
Stage 1	913	-	-	-	-	-
Stage 2	911	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	2.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1476	-	907	-	-
HCM Lane V/C Ratio	0.017	-	0.063	-	-
HCM Control Delay (s)	7.5	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	15	61	3	14	91
Future Vol, veh/h	2	15	61	3	14	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	17	69	3	16	103

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	206	71	0	0	72	0
Stage 1	71	-	-	-	-	-
Stage 2	135	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	782	991	-	-	1528	-
Stage 1	952	-	-	-	-	-
Stage 2	891	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	773	991	-	-	1528	-
Mov Cap-2 Maneuver	773	-	-	-	-	-
Stage 1	952	-	-	-	-	-
Stage 2	881	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	959	1528	-
HCM Lane V/C Ratio	-	-	0.02	0.01	-
HCM Control Delay (s)	-	-	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

1: PROJ DWY & GRAY AVE Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.1
Total Del/Veh (s)	6.5	1.3	1.5	1.5

2: GRAY AVE & LOUISE AVE Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.8	0.0	0.0	0.3	0.2
Total Del/Veh (s)	11.8	13.4	10.1	13.0	11.7

3: PROJ DWY & LOUISE AVE/LOUISE AVE (N) Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.9	0.3	4.4	0.8

4: STAFFORD WAY & LOUISE AVE (N) Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1
Total Del/Veh (s)	2.5	0.4	0.6	1.0

5: LOUISE AVE (S) & STAFFORD WAY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.9	0.2	0.4	0.5

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	13.3

Intersection: 1: PROJ DWY & GRAY AVE

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	51	31
Average Queue (ft)	14	7
95th Queue (ft)	40	28
Link Distance (ft)	455	151
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: GRAY AVE & LOUISE AVE

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	52	108	88	69	137	117	114	108	178	204
Average Queue (ft)	18	51	24	32	52	54	63	53	71	88
95th Queue (ft)	46	92	57	61	101	95	105	94	131	153
Link Distance (ft)		1090		213	151	151	151		2156	2156
Upstream Blk Time (%)					0					
Queuing Penalty (veh)					0					
Storage Bay Dist (ft)	100		100					180		
Storage Blk Time (%)		0	0						0	
Queuing Penalty (veh)		0	0						0	

Intersection: 3: PROJ DWY & LOUISE AVE/LOUISE AVE (N)

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	9
95th Queue (ft)	32
Link Distance (ft)	475
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: STAFFORD WAY & LOUISE AVE (N)

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	54	30
Average Queue (ft)	28	2
95th Queue (ft)	47	15
Link Distance (ft)	337	51
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: LOUISE AVE (S) & STAFFORD WAY

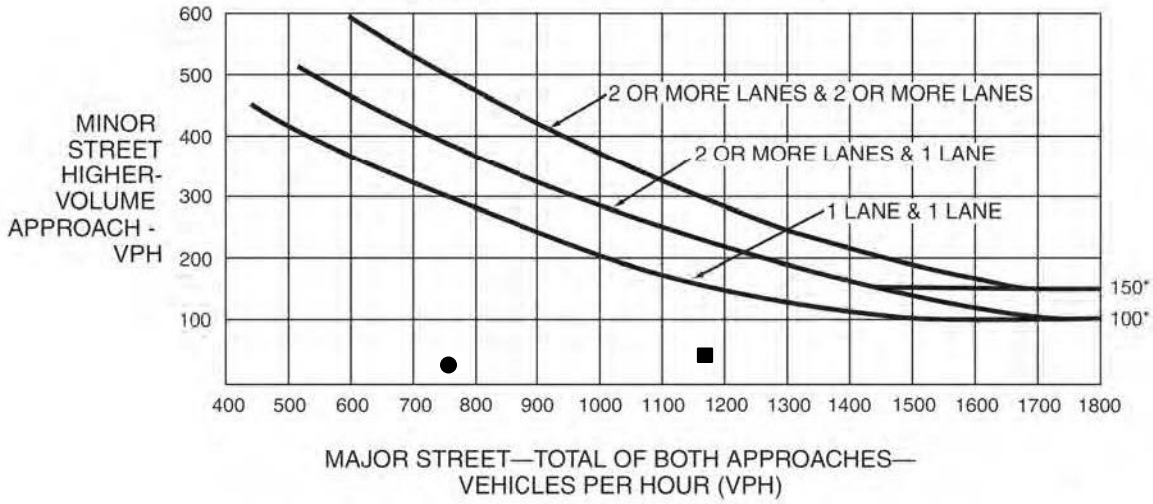
Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	30	31
Average Queue (ft)	11	1
95th Queue (ft)	34	11
Link Distance (ft)	1066	51
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

KDA

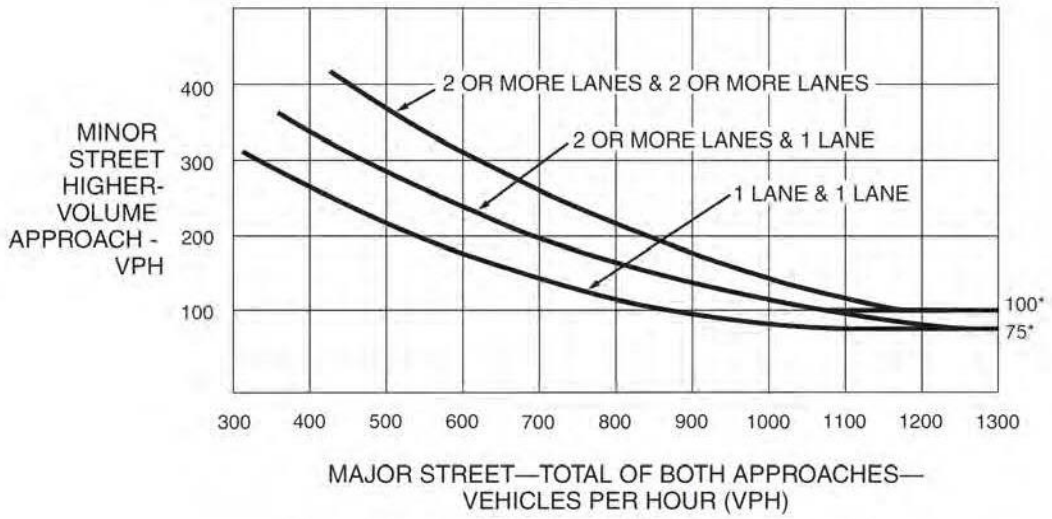
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

GRAY AVE – LOUISE AVE : EXISTING

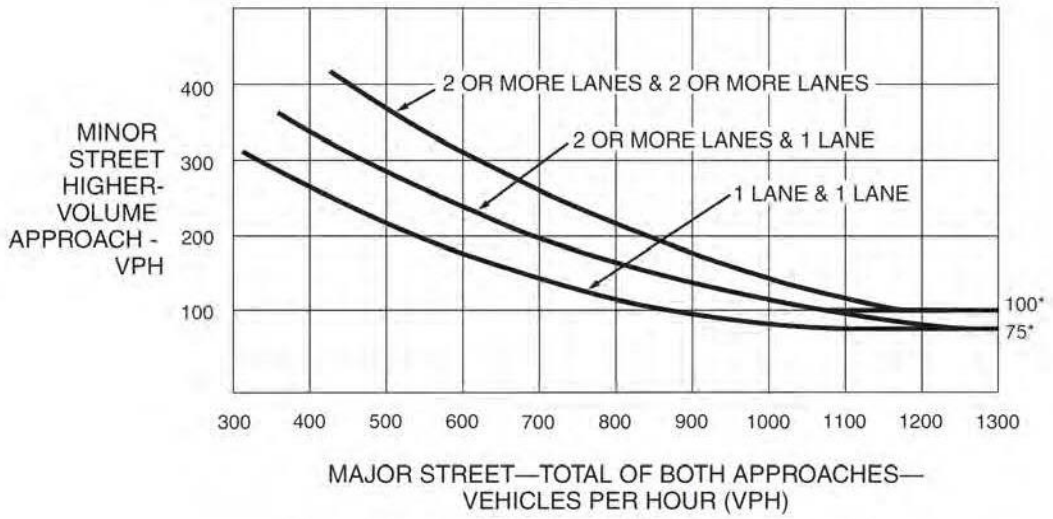
AM (●) : MAJOR 759 MINOR 23
PM (■) : MAJOR 1170 MINOR 44

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

STAFFORD WAY – LOUISE AVE (N) : EXISTING

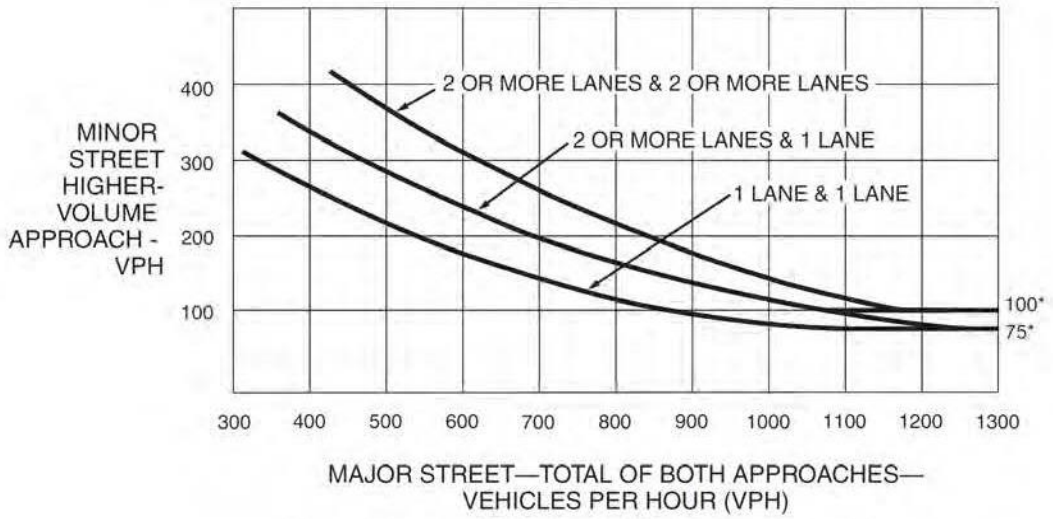
AM (●) : MAJOR 146 MINOR 21
PM (■) : MAJOR 177 MINOR 50

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

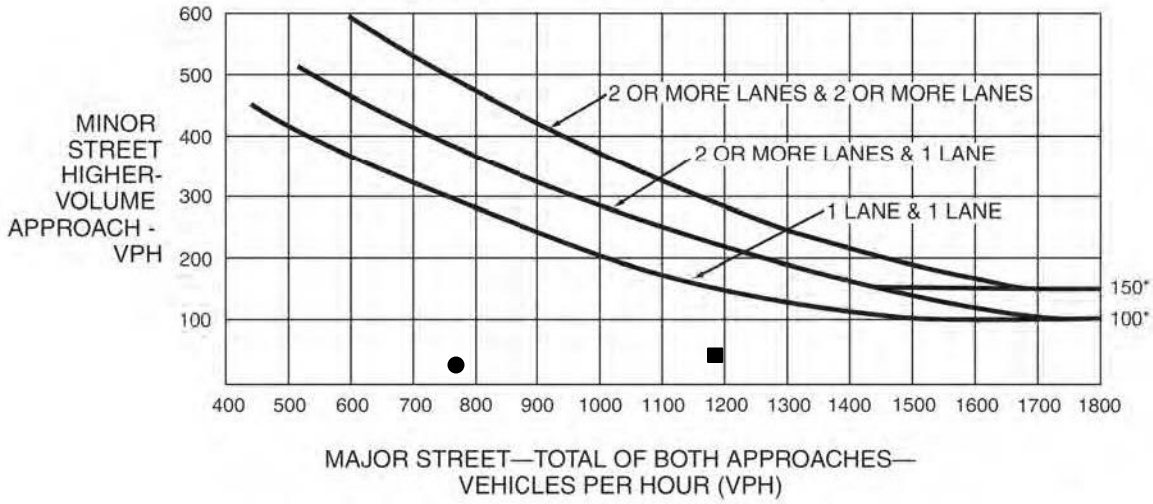


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

STAFFORD WAY – LOUISE AVE (S) : EXISTING

AM (●) : MAJOR 115 MINOR 12
PM (■) : MAJOR 169 MINOR 17

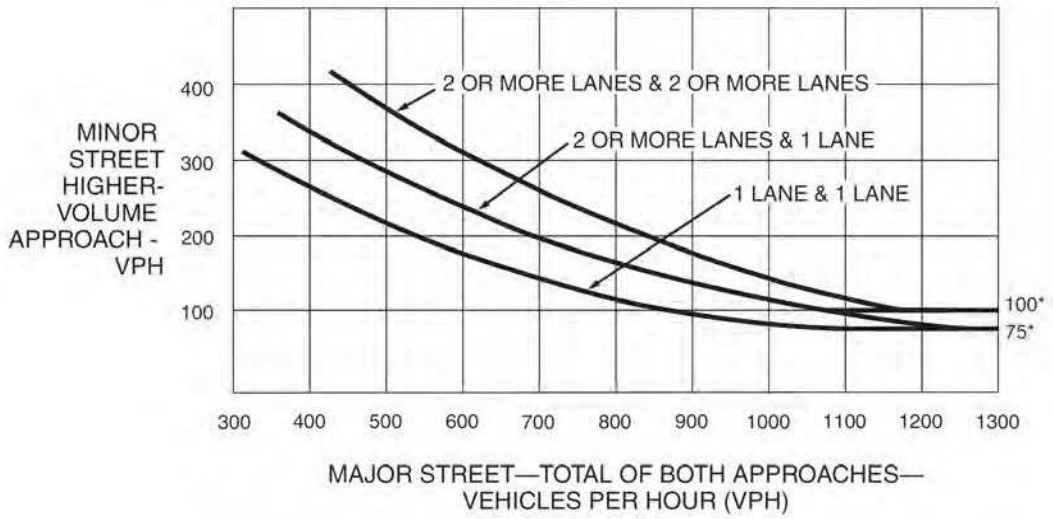
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

GRAY AVE – LOUISE AVE : EXISTING PLUS PROJECT

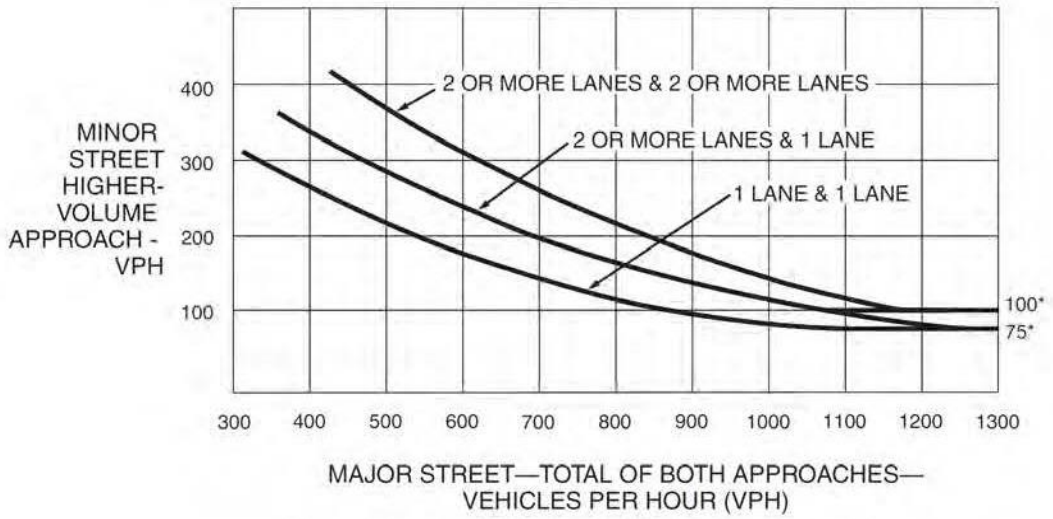
AM (●) : MAJOR 776 MINOR 23
PM (■) : MAJOR 1192 MINOR 44

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

STAFFORD WAY – LOUISE AVE (N) : EXISTING PLUS PROJECT

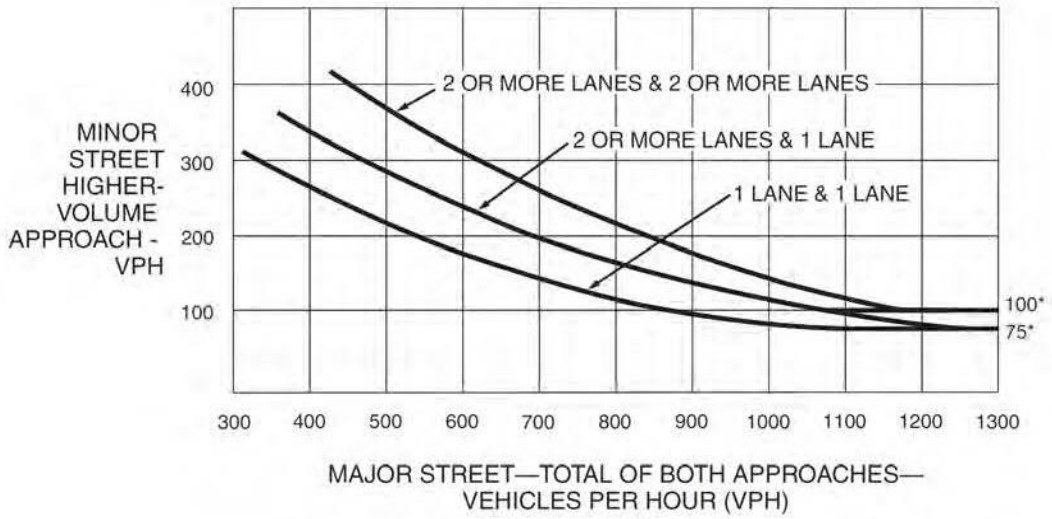
AM (●) : MAJOR 149 MINOR 24
PM (■) : MAJOR 177 MINOR 50

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

STAFFORD WAY – LOUISE AVE (S) : EXISTING PLUS PROJECT

AM (●) : MAJOR 118 MINOR 13
PM (■) : MAJOR 169 MINOR 17