Kenig, Lindgren, O'Hara, Aboona, Inc.

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MEMORANDUM TO: Moises Cukierman
Lexington Homes

FROM: William R. Woodward
Senior Consultant

Luay R. Aboona, PE
Principal

DATE: December 1, 2011

SUBJECT: Summary Traffic Evaluation
7th Street at IL 64 and State Street at IL 31
St Charles, Illinois

Based on instructions received from the City of St Charles, Illinois and at your direction, KLOA, Inc. further reviewed and analyzed the following two intersections in St. Charles.

- 7th Street and IL 64 (traffic signal)
- State Street and IL 31 (stop sign)

These intersections were originally included in the analysis provided as part of a traffic impact study prepared for the proposed The Lexington Club development dated June 16, 2011.

The City of St. Charles provided KLOA, Inc. with GIS aerials with the plat/right-of-way information overlaid. Using this information, KLOA, Inc. was able to further analyze these intersections to determine what, if any, roadway improvements could be implemented to improve traffic conditions at these intersections; specifically, the southbound approach on 7th Street and the eastbound approach on State Street. The findings are outlined below.

7th Street and IL 64

This intersection is under traffic signal control and provides a single lane on the southbound approach on 7th Street and a shared left-turn/through lane and a right-turn lane on the northbound approach. Capacity analyses were conducted to determine if adding a second southbound lane would improve capacity and overall operations at this intersection, primarily for the southbound traffic. Two scenarios were considered as follows.

- Adding a southbound right-turn lane as illustrated in **Exhibit 1**. This will also require the provision of an overlap phase for southbound right-turning movements.

- Adding a southbound left-turn lane which will require restriping the northbound approach as illustrated in **Exhibit 2**. This will also require the provision of protected/permissive left-turn phasing for north/south left-turning movements.

The results of the analysis, summarized in **Table 1**, show that the overall level of service is comparable to the projected future conditions stated in the traffic study report. The levels of service and average delays for both the southbound and northbound approaches will be improved with either improvement as shown in Table 1. These findings are applicable to both the weekday morning and weekday evening peak hours analyzed. Further, based on the GIS provided, widening this approach to provide a second lane would require additional right-of-way, mainly corner clips, to maintain the proper turning radius at this intersection. Furthermore, widening will require modification and/or relocation of existing signal equipment/utilities as shown in the Exhibits.

State Street and IL 31

State Street is under stop sign control at its intersection with IL 31 and provides a single eastbound lane allowing left, through, and right-turning movements. Opposite State Street is a parking lot access drive; however, the eastbound approach essentially operates as a T-intersection given the low volume of traffic generated by the parking lot on the east side of IL 31.

Capacity analyses were conducted of future conditions with the addition of an eastbound shared left-turn/through lane and a right-turn lane. **Exhibit 3** illustrates the proposed improvement. The results of these analyses, summarized in **Table 2**, show that the overall approach Level of Service will improve to E, but the eastbound left turns will still operate at a Level of Service F. It should be noted that the traffic volumes of both existing and future conditions do not meet the minimal volume thresholds to warrant a traffic signal at this intersection.

Based on a GIS aerial received by the City of St. Charles, it appears that there is sufficient right-of-way to widen the west leg of the intersection to provide one lane westbound and two lanes eastbound under stop sign control striped to provide a shared through/left-turn lane and a right-turn lane.

Conclusion

A preliminary review of existing right-of-way plans, as well as additional capacity analyses conducted at the intersections of 7th Street and IL 64 and State Street and IL 31 results in the following.

7th Street and IL 64

- Additional right-of-way is needed to widen the southbound approach to provide a right-turn lane or a left-turn lane

- Capacity analysis show that with the addition of a second southbound lane

    - The overall level of service of the intersection does not change
    - The average delays for southbound approach traffic will be reduced and level of service will be improved
    - Traffic signal modifications will be required to accommodate either a right-turn overlap phase or protective permissive left-turn phase for the 7th Street approach and to modify/relocate existing signal equipment/utilities.

State Street and IL 31

- There appears to be sufficient right-of-way under State Street to provide one lane westbound and two lanes eastbound striped to provide a shared through/left-turn lane and a right-turn lane.

- The outbound lanes will continue to be under stop sign control. Traffic volumes at this intersection do not meet minimum thresholds to warrant a traffic signal at this intersection.

- Capacity analyses assuming these geometric improvements show that the eastbound left-turning movements will still operate at a Level of Service F for both the weekday morning and weekday evening peak hours.

Appendix

Table 1
7TH STREET AND IL 64—LEVEL OF SERVICE SUMMARY

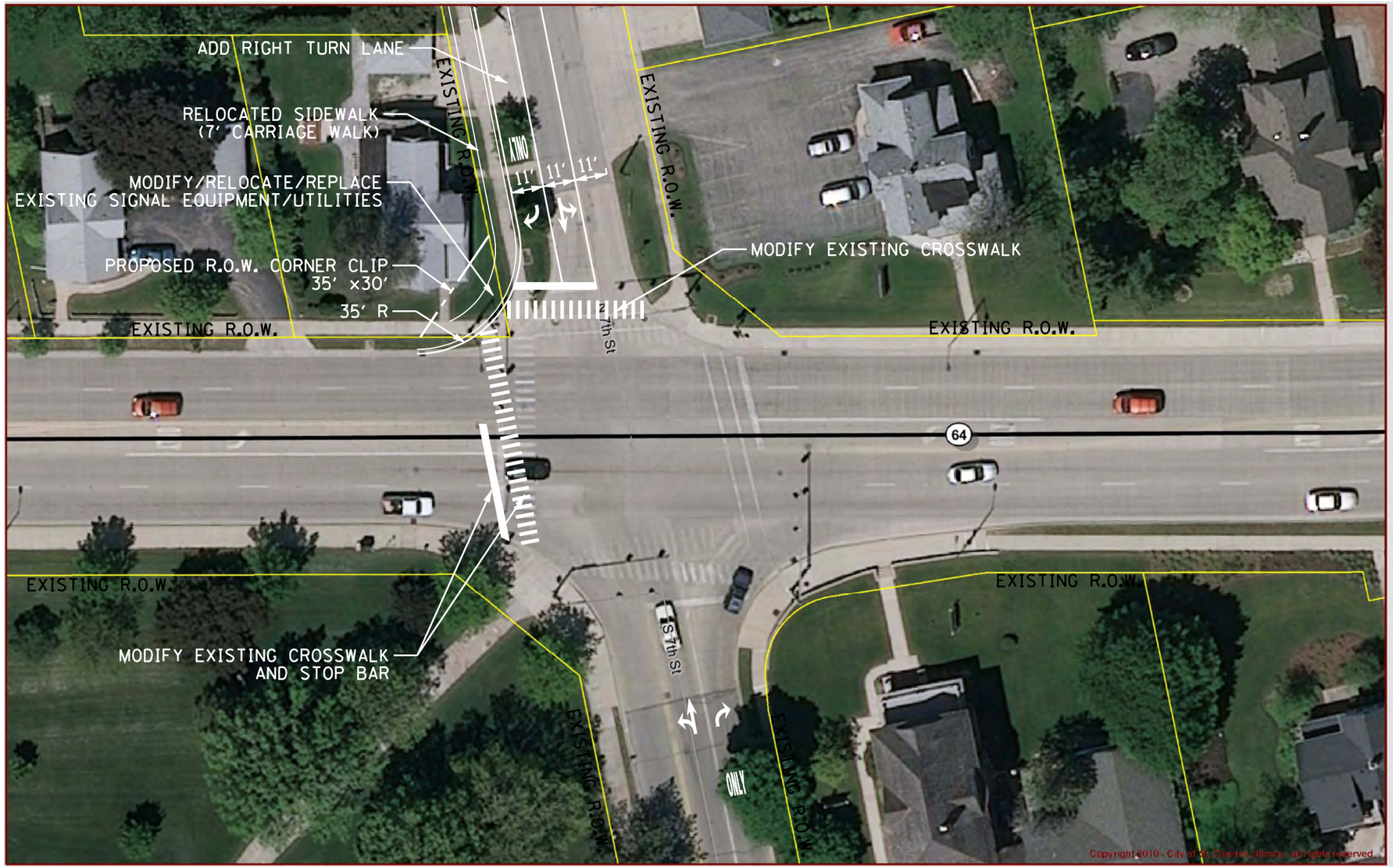
	Overall				Southbound Approach				Northbound Approach			
	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.	
Proposed Improvements	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
No Improvements	C	23.4	C	22.0	D	49.9	E	76.4	D	44.5	F	80.4
Southbound Right-Turn Lane	C	23.1	C	20.4	D	44.3	D	52.7	D	44.4	E	74.5
Southbound Left-Turn Lane	C	29.4	C	23.1	D	47.3	D	53.2	D	47.2	E	64.3

LOS = Level of Service
Delay is measured in seconds.

Table 2
STATE STREET AND IL 31—LEVEL OF SERVICE SUMMARY

	Eastbound Approach											
	Combined Movements				Left Turns				Right Turns			
	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.	
Proposed Improvements	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
No Improvements	F	58.3	F	51.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Eastbound Right-Turn Lane	E	47.1	E	45.7	F	72.8	F	59.3	B	12.5	B	10.3

LOS = Level of Service
Delay is measured in seconds.



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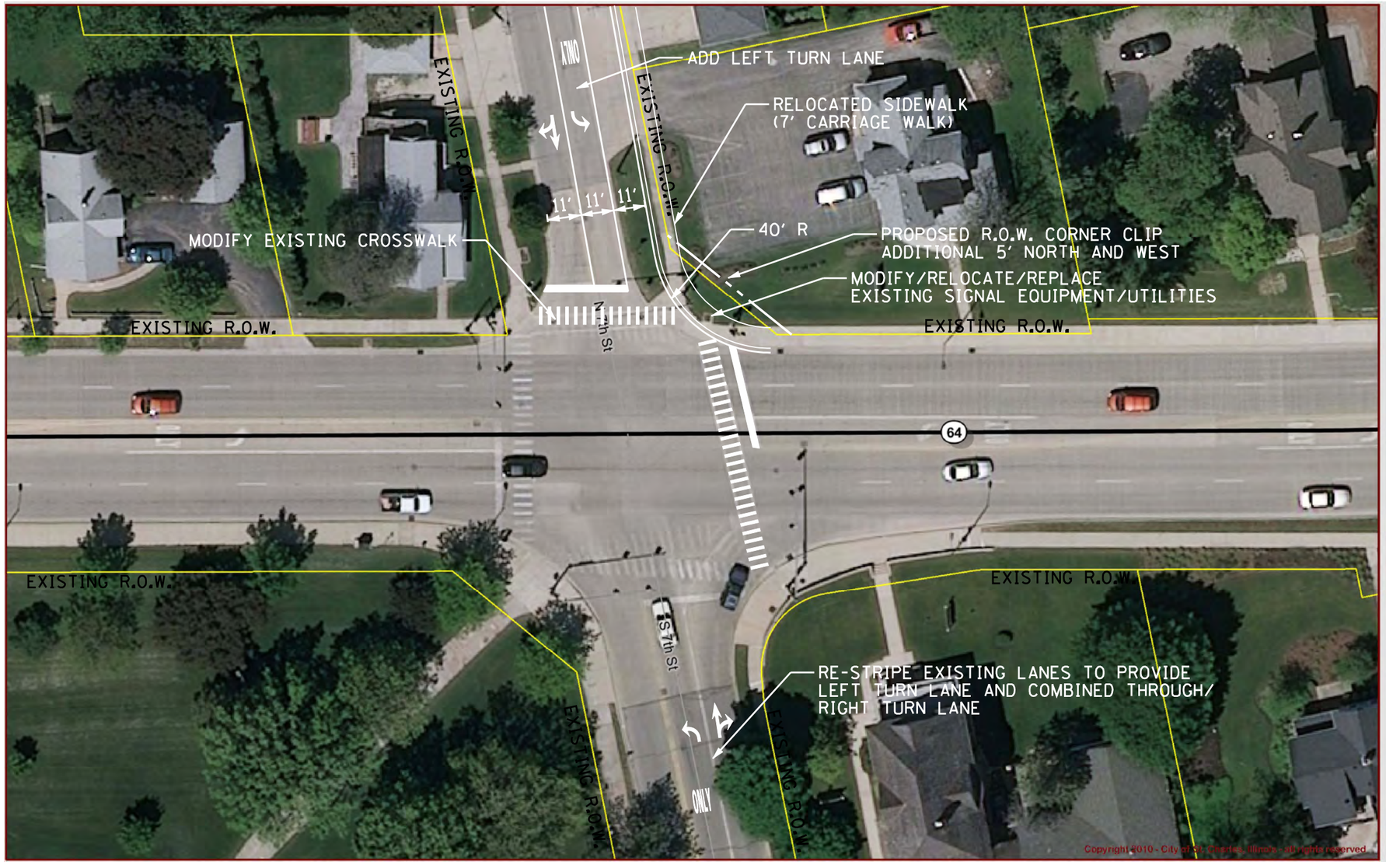
KLOA Kenig,Lindgren,O'Hara,Aboona,Inc. 9575 West Higgins Road, Suite 400 Rosemont, Illinois 60018 P: (847) 518-9990 F: (847) 518-9987 PROJECT # 09-169	DESIGNED - GJG DRAWN - GJG CHECKED - GJG DATE - 11/29/2011	**SCALE:** **11x17 PRINT: 1" = 40'** **22x34 PRINT: 1" = 20'**	**ST CHARLES, ILLINOIS**	**POTENTIAL GEOMETRIC IMPROVEMENTS – SOUTHBOUND RIGHT MAIN STREET (ILLINOIS ROUTE 64) AT 7TH STREET**	EXHIBIT NO. 1



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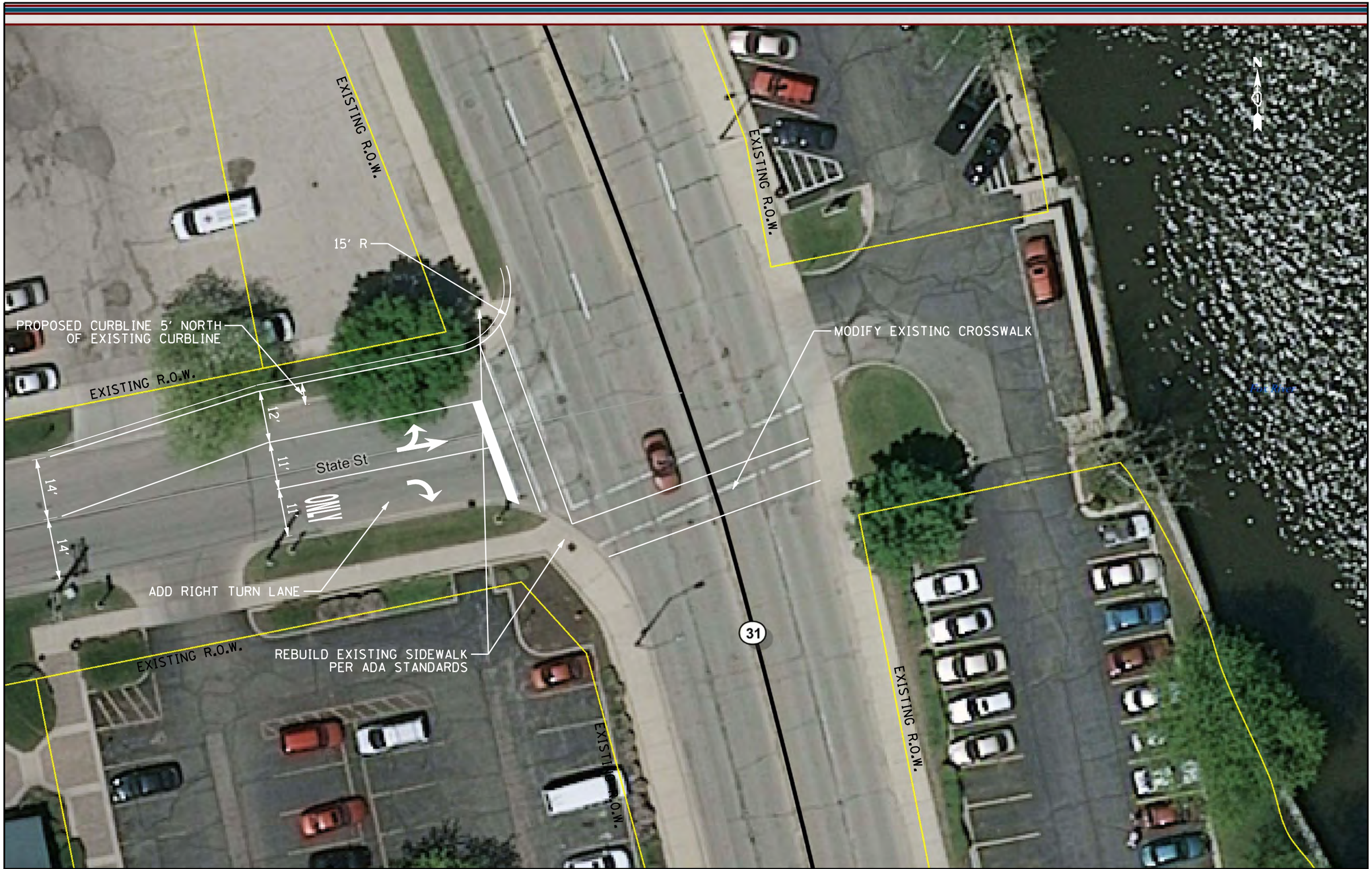
KLOA Kenig,Lindgren,O'Hara,Aboona,Inc. 9575 West Higgins Road, Suite 400 Rosemont, Illinois 60018 P: (847) 518-9990 F: (847) 518-9987 PROJECT # 09-189	DESIGNED - GJG DRAWN - GJG CHECKED - GJG DATE - 11/29/2011	**SCALE:** **11x17 PRINT: 1" = 40'** **22x34 PRINT: 1" = 20'**	**ST CHARLES, ILLINOIS**	**POTENTIAL GEOMETRIC IMPROVEMENTS – SOUTHBOUND LEFT** **MAIN STREET (ILLINOIS ROUTE 64) AT 7TH STREET**	EXHIBIT NO. 2



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PROJECT # 09-169

DESIGNED	-	GJG
DRAWN	-	GJG
CHECKED	-	GJG
DATE	-	11/29/2011

SCALE:
11x17 PRINT: 1" = 20'
22x34 PRINT: 1" = 10'

ST CHARLES, ILLINOIS

POTENTIAL GEOMETRIC IMPROVEMENTS
2ND STREET (ILLINOIS ROUTE 31) AT STATE STREET

EXHIBIT NO.
3

SHORT REPORT

General Information		Site Information	
Analyst	*WRW*	Intersection	*Main/7th St*
Agency or Co.	*KLOA*	Area Type	*All other areas*
Date Performed	*5/23/2011*	Jurisdiction	*IDOT*
Time Period	*Weekday AM*	Analysis Year	*Future*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*	*0*	*1*	*2*	*0*	*0*	*1*	*1*	*0*	*1*	*0*
Lane Group	*L*	*TR*		*L*	*TR*			*LT*	*R*		*LTR*	
Volume (vph)	*21*	*1567*	*210*	*110*	*973*	*31*	*95*	*16*	*115*	*55*	*98*	*20*
% Heavy Vehicles	*2*	*5*	*2*	*2*	*5*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*		*2.0*	*2.0*			*2.0*	*2.0*		*2.0*	
Extension of Effective Green	*2.0*	*2.0*		*2.0*	*2.0*			*2.0*	*2.0*		*2.0*	
Arrival Type	*4*	*4*		*4*	*4*			*3*	*3*		*3*	
Unit Extension	*3.0*	*3.0*		*3.0*	*3.0*			*3.0*	*3.0*		*3.0*	
Ped/Bike/RTOR Volume	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*
Lane Width	*12.0*	*12.0*		*12.0*	*12.0*			*12.0*	*12.0*		*12.0*	
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*		*0*	*0*			*0*	*0*		*0*	
Minimum Pedestrian Time		*3.7*			*3.7*			*3.7*			*3.7*	

Phasing	Excl. Left	EW Perm	03	04	NS Perm	06	07	08
Timing	G = *10.0*	G = *76.0*	G =	G =	G = *29.0*	G =	G =	G =
	Y = *3*	Y = *6*	Y =	Y =	Y = *6*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *130.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*22*	*1870*		*116*	*1057*			*117*	*121*		*182*	
Lane Group Capacity	*397*	*1985*		*193*	*2006*			*233*	*353*		*290*	
v/c Ratio	*0.06*	*0.94*		*0.60*	*0.53*			*0.50*	*0.34*		*0.63*	
Green Ratio	*0.71*	*0.58*		*0.71*	*0.58*			*0.22*	*0.22*		*0.22*	
Uniform Delay d_1	*6.5*	*25.0*		*31.3*	*16.2*			*44.2*	*42.5*		*45.6*	
Delay Factor k	*0.11*	*0.45*		*0.19*	*0.13*			*0.11*	*0.11*		*0.21*	
Incremental Delay d_2	*0.1*	*9.8*		*5.2*	*0.3*			*1.7*	*0.6*		*4.3*	
PF Factor	*1.000*	*0.610*		*1.000*	*0.610*			*1.000*	*1.000*		*1.000*	
Control Delay	*6.6*	*25.0*		*36.5*	*10.2*			*45.9*	*43.1*		*49.9*	
Lane Group LOS	*A*	*C*		*D*	*B*			*D*	*D*		*D*	
Approach Delay	*24.8*			*12.8*			*44.5*			*49.9*		
Approach LOS	*C*			*B*			*D*			*D*		
Intersection Delay	*23.4*			Intersection LOS						*C*		

SHORT REPORT

General Information		Site Information	
Analyst	*WRW*	Intersection	*Main/7th St*
Agency or Co.	*KLOA*	Area Type	*All other areas*
Date Performed	*12/1/2011*	Jurisdiction	*IDOT*
Time Period	*Weekday AM*	Analysis Year	*Future with SBR*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*	*0*	*1*	*2*	*0*	*0*	*1*	*1*	*0*	*1*	*1*
Lane Group	*L*	*TR*		*L*	*TR*			*LT*	*R*		*LT*	*R*
Volume (vph)	*21*	*1567*	*210*	*110*	*973*	*31*	*95*	*16*	*115*	*55*	*98*	*20*
% Heavy Vehicles	*2*	*5*	*2*	*2*	*5*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*		*2.0*	*2.0*			*2.0*	*2.0*		*2.0*	*2.0*
Extension of Effective Green	*2.0*	*2.0*		*2.0*	*2.0*			*2.0*	*2.0*		*2.0*	*2.0*
Arrival Type	*4*	*4*		*4*	*4*			*3*	*3*		*3*	*3*
Unit Extension	*3.0*	*3.0*		*3.0*	*3.0*			*3.0*	*3.0*		*3.0*	*3.0*
Ped/Bike/RTOR Volume	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*
Lane Width	*12.0*	*12.0*		*12.0*	*12.0*			*12.0*	*12.0*		*12.0*	*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*		*0*	*0*			*0*	*0*		*0*	*0*
Minimum Pedestrian Time		*3.7*			*3.7*			*3.7*			*3.7*	

Phasing	Excl. Left	EW Perm	03	04	NS Perm	06	07	08
Timing	G = *10.0*	G = *76.0*	G =	G =	G = *29.0*	G =	G =	G =
	Y = *3*	Y = *6*	Y =	Y =	Y = *6*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *130.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*22*	*1870*		*116*	*1057*			*117*	*121*		*161*	*21*
Lane Group Capacity	*397*	*1985*		*193*	*2006*			*234*	*353*		*341*	*353*
v/c Ratio	*0.06*	*0.94*		*0.60*	*0.53*			*0.50*	*0.34*		*0.47*	*0.06*
Green Ratio	*0.71*	*0.58*		*0.71*	*0.58*			*0.22*	*0.22*		*0.22*	*0.22*
Uniform Delay d_1	*6.5*	*25.0*		*31.3*	*16.2*			*44.2*	*42.5*		*43.9*	*39.8*
Delay Factor k	*0.11*	*0.45*		*0.19*	*0.13*			*0.11*	*0.11*		*0.11*	*0.11*
Incremental Delay d_2	*0.1*	*9.8*		*5.2*	*0.3*			*1.7*	*0.6*		*1.0*	*0.1*
PF Factor	*1.000*	*0.610*		*1.000*	*0.610*			*1.000*	*1.000*		*1.000*	*1.000*
Control Delay	*6.6*	*25.0*		*36.5*	*10.2*			*45.8*	*43.1*		*44.9*	*39.8*
Lane Group LOS	*A*	*C*		*D*	*B*			*D*	*D*		*D*	*D*
Approach Delay	*24.8*			*12.8*			*44.4*			*44.3*		
Approach LOS	*C*			*B*			*D*			*D*		
Intersection Delay	*23.1*			Intersection LOS						*C*		

SHORT REPORT

General Information		Site Information	
Analyst	*WRW*	Intersection	*Main/7th St*
Agency or Co.	*KLOA*	Area Type	*All other areas*
Date Performed	*12/1/2011*	Jurisdiction	*IDOT*
Time Period	*Weekday AM*	Analysis Year	*Future with SBL*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*	*0*	*1*	*2*	*0*	*1*	*1*	*0*	*1*	*1*	*0*
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*TR*	
Volume (vph)	*21*	*1567*	*210*	*110*	*973*	*31*	*95*	*16*	*115*	*55*	*98*	*20*
% Heavy Vehicles	*2*	*5*	*2*	*2*	*5*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Extension of Effective Green	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Arrival Type	*4*	*4*		*4*	*4*		*3*	*3*		*3*	*3*	
Unit Extension	*3.0*	*3.0*		*3.0*	*3.0*		*3.0*	*3.0*		*3.0*	*3.0*	
Ped/Bike/RTOR Volume	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*
Lane Width	*12.0*	*12.0*		*12.0*	*12.0*		*12.0*	*12.0*		*12.0*	*12.0*	
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*		*0*	*0*		*0*	*0*		*0*	*0*	
Minimum Pedestrian Time		*3.7*			*3.7*			*3.7*			*3.7*	

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = *10.0*	G = *76.0*	G =	G =	G = *6.0*	G = *22.0*	G = *0.0*	G = *0.0*
	Y = *3*	Y = *6*	Y =	Y =	Y = *3*	Y = *9*	Y = *0*	Y = *0*
Duration of Analysis (hrs) = *0.25*						Cycle Length C = *135.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*22*	*1870*		*116*	*1057*		*100*	*138*		*58*	*124*	
Lane Group Capacity	*372*	*1912*		*186*	*1932*		*291*	*264*		*279*	*296*	
v/c Ratio	*0.06*	*0.98*		*0.62*	*0.55*		*0.34*	*0.52*		*0.21*	*0.42*	
Green Ratio	*0.68*	*0.56*		*0.68*	*0.56*		*0.27*	*0.16*		*0.27*	*0.16*	
Uniform Delay d_1	*8.1*	*28.7*		*34.9*	*18.6*		*38.0*	*51.7*		*37.1*	*50.8*	
Delay Factor k	*0.11*	*0.48*		*0.21*	*0.15*		*0.11*	*0.13*		*0.11*	*0.11*	
Incremental Delay d_2	*0.1*	*15.7*		*6.4*	*0.3*		*0.7*	*1.9*		*0.4*	*1.0*	
PF Factor	*1.000*	*0.656*		*1.000*	*0.656*		*1.000*	*1.000*		*1.000*	*1.000*	
Control Delay	*8.2*	*34.5*		*41.2*	*12.6*		*38.7*	*53.6*		*37.5*	*51.7*	
Lane Group LOS	*A*	*C*		*D*	*B*		*D*	*D*		*D*	*D*	
Approach Delay	*34.2*			*15.4*			*47.3*			*47.2*		
Approach LOS	*C*			*B*			*D*			*D*		
Intersection Delay	*29.4*			Intersection LOS						*C*		

SHORT REPORT

General Information		Site Information	
Analyst	*WRW*	Intersection	*Main/7th St*
Agency or Co.	*KLOA*	Area Type	*All other areas*
Date Performed	*5/23/2011*	Jurisdiction	*IDOT*
Time Period	*Weekday PM*	Analysis Year	*Future*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*	*0*	*1*	*2*	*0*	*0*	*1*	*1*	*0*	*1*	*0*
Lane Group	*L*	*TR*		*L*	*TR*			*LT*	*R*		*LTR*	
Volume (vph)	*24*	*1060*	*105*	*115*	*1448*	*38*	*205*	*28*	*120*	*53*	*52*	*25*
% Heavy Vehicles	*2*	*5*	*2*	*2*	*5*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*		*2.0*	*2.0*			*2.0*	*2.0*		*2.0*	
Extension of Effective Green	*2.0*	*2.0*		*2.0*	*2.0*			*2.0*	*2.0*		*2.0*	
Arrival Type	*4*	*4*		*4*	*4*			*3*	*3*		*3*	
Unit Extension	*3.0*	*3.0*		*3.0*	*3.0*			*3.0*	*3.0*		*3.0*	
Ped/Bike/RTOR Volume	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*
Lane Width	*12.0*	*12.0*		*12.0*	*12.0*			*12.0*	*12.0*		*12.0*	
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*		*0*	*0*			*0*	*0*		*0*	
Minimum Pedestrian Time		*3.8*			*3.8*			*3.8*			*3.8*	

Phasing	Excl. Left	EW Perm	03	04	NS Perm	06	07	08
Timing	G = *10.0*	G = *91.0*	G =	G =	G = *34.0*	G =	G =	G =
	Y = *3*	Y = *6*	Y =	Y =	Y = *6*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *150.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*25*	*1227*		*121*	*1564*			*245*	*126*		*137*	
Lane Group Capacity	*247*	*2067*		*338*	*2084*			*261*	*359*		*173*	
v/c Ratio	*0.10*	*0.59*		*0.36*	*0.75*			*0.94*	*0.35*		*0.79*	
Green Ratio	*0.71*	*0.61*		*0.71*	*0.61*			*0.23*	*0.23*		*0.23*	
Uniform Delay d_1	*10.3*	*18.1*		*8.4*	*21.3*			*57.0*	*48.7*		*54.7*	
Delay Factor k	*0.11*	*0.18*		*0.11*	*0.31*			*0.45*	*0.11*		*0.34*	
Incremental Delay d_2	*0.2*	*0.5*		*0.7*	*1.6*			*39.4*	*0.6*		*21.7*	
PF Factor	*1.000*	*0.559*		*1.000*	*0.559*			*1.000*	*1.000*		*1.000*	
Control Delay	*10.5*	*10.6*		*9.1*	*13.5*			*96.3*	*49.3*		*76.4*	
Lane Group LOS	*B*	*B*		*A*	*B*			*F*	*D*		*E*	
Approach Delay	*10.6*			*13.2*			*80.4*			*76.4*		
Approach LOS	*B*			*B*			*F*			*E*		
Intersection Delay	*22.0*			Intersection LOS						*C*		

HCS+™ Version 5.5 Generated: 12/1/2011 4:07 PM

SHORT REPORT

General Information		Site Information	
Analyst	*WRW*	Intersection	*Main/7th St*
Agency or Co.	*KLOA*	Area Type	*All other areas*
Date Performed	*12/1/2011*	Jurisdiction	*IDOT*
Time Period	*Weekday PM*	Analysis Year	*Future with SBR*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*	*0*	*1*	*2*	*0*	*0*	*1*	*1*	*0*	*1*	*1*
Lane Group	*L*	*TR*		*L*	*TR*			*LT*	*R*		*LT*	*R*
Volume (vph)	*24*	*1060*	*105*	*115*	*1448*	*38*	*205*	*28*	*120*	*53*	*52*	*25*
% Heavy Vehicles	*2*	*5*	*2*	*2*	*5*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*		*2.0*	*2.0*			*2.0*	*2.0*		*2.0*	*2.0*
Extension of Effective Green	*2.0*	*2.0*		*2.0*	*2.0*			*2.0*	*2.0*		*2.0*	*2.0*
Arrival Type	*4*	*4*		*4*	*4*			*3*	*3*		*3*	*3*
Unit Extension	*3.0*	*3.0*		*3.0*	*3.0*			*3.0*	*3.0*		*3.0*	*3.0*
Ped/Bike/RTOR Volume	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*
Lane Width	*12.0*	*12.0*		*12.0*	*12.0*			*12.0*	*12.0*		*12.0*	*12.0*
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*		*0*	*0*			*0*	*0*		*0*	*0*
Minimum Pedestrian Time		*3.8*			*3.8*			*3.8*			*3.8*	

Phasing	Excl. Left	EW Perm	03	04	NS Perm	06	07	08
Timing	G = *10.0*	G = *91.0*	G =	G =	G = *34.0*	G =	G =	G =
	Y = *3*	Y = *6*	Y =	Y =	Y = *6*	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25* | Cycle Length C = *150.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*25*	*1227*		*121*	*1564*			*245*	*126*		*111*	*26*
Lane Group Capacity	*247*	*2067*		*338*	*2084*			*271*	*359*		*203*	*359*
v/c Ratio	*0.10*	*0.59*		*0.36*	*0.75*			*0.90*	*0.35*		*0.55*	*0.07*
Green Ratio	*0.71*	*0.61*		*0.71*	*0.61*			*0.23*	*0.23*		*0.23*	*0.23*
Uniform Delay d_1	*10.3*	*18.1*		*8.4*	*21.3*			*56.4*	*48.7*		*51.2*	*45.6*
Delay Factor k	*0.11*	*0.18*		*0.11*	*0.31*			*0.43*	*0.11*		*0.15*	*0.11*
Incremental Delay d_2	*0.2*	*0.5*		*0.7*	*1.6*			*31.0*	*0.6*		*3.1*	*0.1*
PF Factor	*1.000*	*0.559*		*1.000*	*0.559*			*1.000*	*1.000*		*1.000*	*1.000*
Control Delay	*10.5*	*10.6*		*9.1*	*13.5*			*87.4*	*49.3*		*54.3*	*45.7*
Lane Group LOS	*B*	*B*		*A*	*B*			*F*	*D*		*D*	*D*
Approach Delay	*10.6*			*13.2*			*74.5*			*52.7*		
Approach LOS	*B*			*B*			*E*			*D*		
Intersection Delay	*20.4*			Intersection LOS						*C*		

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SHORT REPORT

General Information		Site Information	
Analyst	*WRW*	Intersection	*Main/7th St*
Agency or Co.	*KLOA*	Area Type	*All other areas*
Date Performed	*12/1/2011*	Jurisdiction	*IDOT*
Time Period	*Weekday PM*	Analysis Year	*Future with SBL*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	*1*	*2*	*0*	*1*	*2*	*0*	*1*	*1*	*0*	*1*	*1*	*0*
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*TR*	
Volume (vph)	*24*	*1060*	*105*	*115*	*1448*	*38*	*205*	*28*	*120*	*53*	*52*	*25*
% Heavy Vehicles	*2*	*5*	*2*	*2*	*5*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed/Actuated (P/A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Startup Lost Time	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Extension of Effective Green	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Arrival Type	*4*	*4*		*4*	*4*		*3*	*3*		*3*	*3*	
Unit Extension	*3.0*	*3.0*		*3.0*	*3.0*		*3.0*	*3.0*		*3.0*	*3.0*	
Ped/Bike/RTOR Volume	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*	*50*	*0*	*0*
Lane Width	*12.0*	*12.0*		*12.0*	*12.0*		*12.0*	*12.0*		*12.0*	*12.0*	
Parking/Grade/Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking/Hour												
Bus Stops/Hour	*0*	*0*		*0*	*0*		*0*	*0*		*0*	*0*	
Minimum Pedestrian Time		*3.8*			*3.8*			*3.8*			*3.8*	

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = *10.0*	G = *91.0*	G =	G =	G = *10.0*	G = *21.0*	G = *0.0*	G = *0.0*
	Y = *3*	Y = *6*	Y =	Y =	Y = *3*	Y = *6*	Y = *0*	Y = *0*
Duration of Analysis (hrs) = *0.25*					Cycle Length C = *150.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adjusted Flow Rate	*25*	*1227*		*121*	*1564*		*216*	*155*		*56*	*81*	
Lane Group Capacity	*247*	*2067*		*338*	*2084*		*301*	*229*		*240*	*248*	
v/c Ratio	*0.10*	*0.59*		*0.36*	*0.75*		*0.72*	*0.68*		*0.23*	*0.33*	
Green Ratio	*0.71*	*0.61*		*0.71*	*0.61*		*0.25*	*0.14*		*0.25*	*0.14*	
Uniform Delay d_1	*10.3*	*18.1*		*8.4*	*21.3*		*53.0*	*61.3*		*44.5*	*58.1*	
Delay Factor k	*0.11*	*0.18*		*0.11*	*0.31*		*0.28*	*0.25*		*0.11*	*0.11*	
Incremental Delay d_2	*0.2*	*0.5*		*0.7*	*1.6*		*8.0*	*7.8*		*0.5*	*0.8*	
PF Factor	*1.000*	*0.559*		*1.000*	*0.559*		*1.000*	*1.000*		*1.000*	*1.000*	
Control Delay	*10.5*	*10.6*		*9.1*	*13.5*		*61.0*	*69.0*		*45.0*	*58.9*	
Lane Group LOS	*B*	*B*		*A*	*B*		*E*	*E*		*D*	*E*	
Approach Delay	*10.6*			*13.2*			*64.3*			*53.2*		
Approach LOS	*B*			*B*			*E*			*D*		
Intersection Delay	*19.3*			Intersection LOS						*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*5/23/2011*
Analysis Time Period	*Weekday AM*

Site Information

Intersection	*2nd/State*
Jurisdiction	*IDOT*
Analysis Year	*Future*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *2nd St (IL 31)*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*29*	*520*	*5*	*0*	*850*	*214*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*30*	*547*	*5*	*0*	*894*	*225*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*56*	*0*	*41*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*58*	*0*	*43*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*30*	*0*		*0*			*101*	
C (m) (veh/h)	*620*	*1014*					*162*	
v/c	*0.05*	*0.00*					*0.62*	
95% queue length	*0.15*	*0.00*					*3.43*	
Control Delay (s/veh)	*11.1*	*8.6*					*58.3*	
LOS	*B*	*A*					*F*	
Approach Delay (s/veh)	--	--				*58.3*		
Approach LOS	--	--				*F*		

HCS+™ Version 5.3 Generated: 6/16/2011 11:07 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*5/23/2011*
Analysis Time Period	*Weekday AM*

Site Information

Intersection	*2nd/State*
Jurisdiction	*IDOT*
Analysis Year	*Future with EBL*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *2nd St (IL 31)*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*29*	*520*	*5*	*0*	*850*	*214*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*30*	*547*	*5*	*0*	*894*	*225*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*56*	*0*	*41*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*58*	*0*	*43*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*		*LT*		*R*
v (veh/h)	*30*	*0*		*0*		*58*		*43*
C (m) (veh/h)	*620*	*1014*				*107*		*526*
v/c	*0.05*	*0.00*				*0.54*		*0.08*
95% queue length	*0.15*	*0.00*				*2.52*		*0.27*
Control Delay (s/veh)	*11.1*	*8.6*				*72.8*		*12.5*
LOS	*B*	*A*				*F*		*B*
Approach Delay (s/veh)	--	--				*47.1*		
Approach LOS	--	--				*E*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*WRW*	Intersection	*2nd/State*
Agency/Co.	*KLOA*	Jurisdiction	*IDOT*
Date Performed	*5/23/2011*	Analysis Year	*Future*
Analysis Time Period	*Weekday PM*		

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *2nd St (IL 31)*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*30*	*935*	*5*	*1*	*525*	*95*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*31*	*984*	*5*	*1*	*552*	*100*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*82*	*0*	*32*	*1*	*0*	*1*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*86*	*0*	*33*	*1*	*0*	*1*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*31*	*1*		*2*			*119*	
C (m) (veh/h)	*930*	*695*		*179*			*189*	
v/c	*0.03*	*0.00*		*0.01*			*0.63*	
95% queue length	*0.10*	*0.00*		*0.03*			*3.61*	
Control Delay (s/veh)	*9.0*	*10.2*		*25.3*			*51.8*	
LOS	*A*	*B*		*D*			*F*	
Approach Delay (s/veh)	--	--	*25.3*			*51.8*		
Approach LOS	--	--	*D*			*F*		

HCS+™ Version 5.3 Generated: 6/16/2011 11:08 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*5/23/2011*
Analysis Time Period	*Weekday PM*

Site Information

Intersection	*2nd/State*
Jurisdiction	*IDOT*
Analysis Year	*Future with EBL*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *2nd St (IL 31)*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*30*	*935*	*5*	*1*	*525*	*95*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*31*	*984*	*5*	*1*	*552*	*100*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*82*	*0*	*32*	*1*	*0*	*1*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*86*	*0*	*33*	*1*	*0*	*1*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*		*LT*		*R*
v (veh/h)	*31*	*1*		*2*		*86*		*33*
C (m) (veh/h)	*930*	*695*		*179*		*147*		*714*
v/c	*0.03*	*0.00*		*0.01*		*0.59*		*0.05*
95% queue length	*0.10*	*0.00*		*0.03*		*3.03*		*0.15*
Control Delay (s/veh)	*9.0*	*10.2*		*25.3*		*59.3*		*10.3*
LOS	*A*	*B*		*D*		*F*		*B*
Approach Delay (s/veh)	--	--	*25.3*			*45.7*		
Approach LOS	--	--	*D*			*E*		

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IL 31 & State Street
Year 2015

Standard:

04 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or

B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

06 *The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.*

Standard:

07 **The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and

B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

→ NO

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

→ YES – 8 HOURS

[a] Basic minimum hourly volume

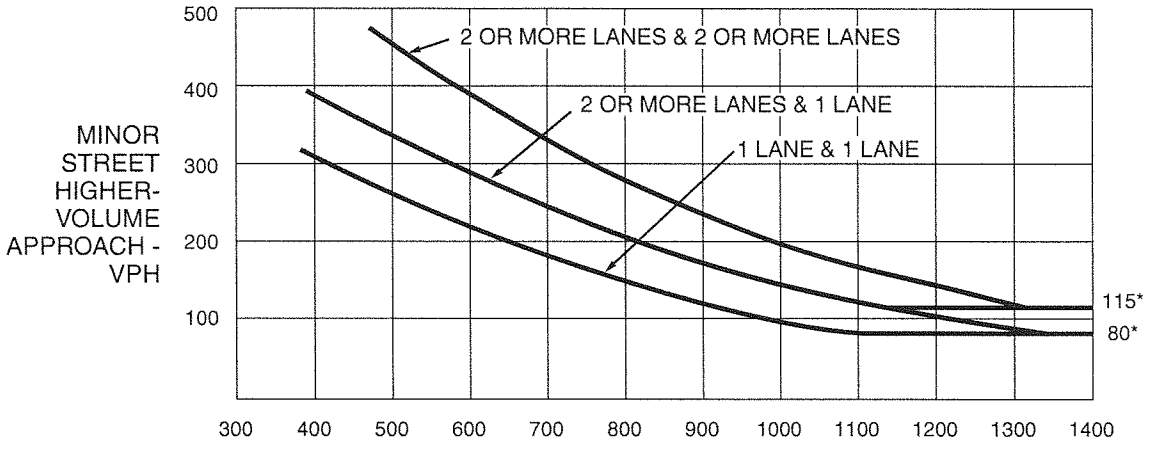
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

[d] May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

IL 31 AND STATE STREET
YEAR 2015

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

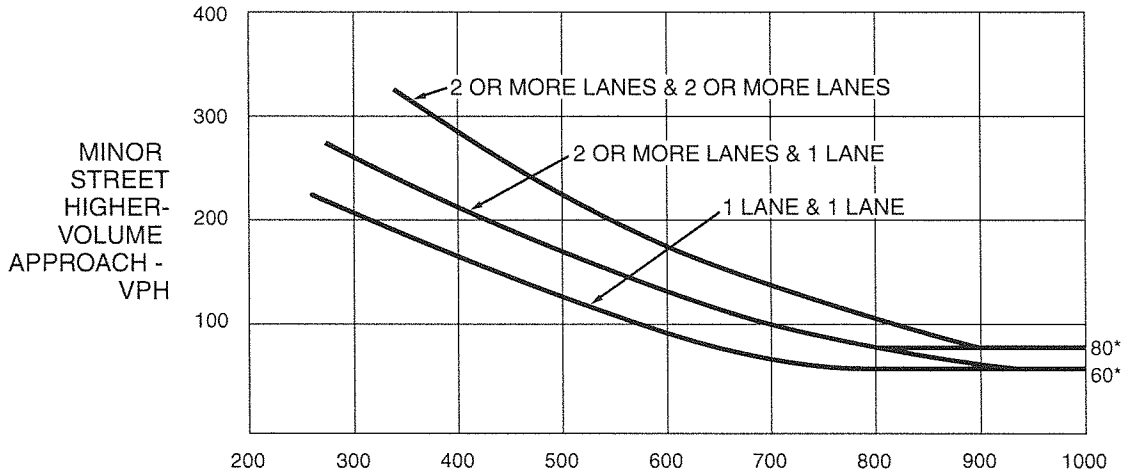


WKDY AM
WKDY PM
1500
1600

*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

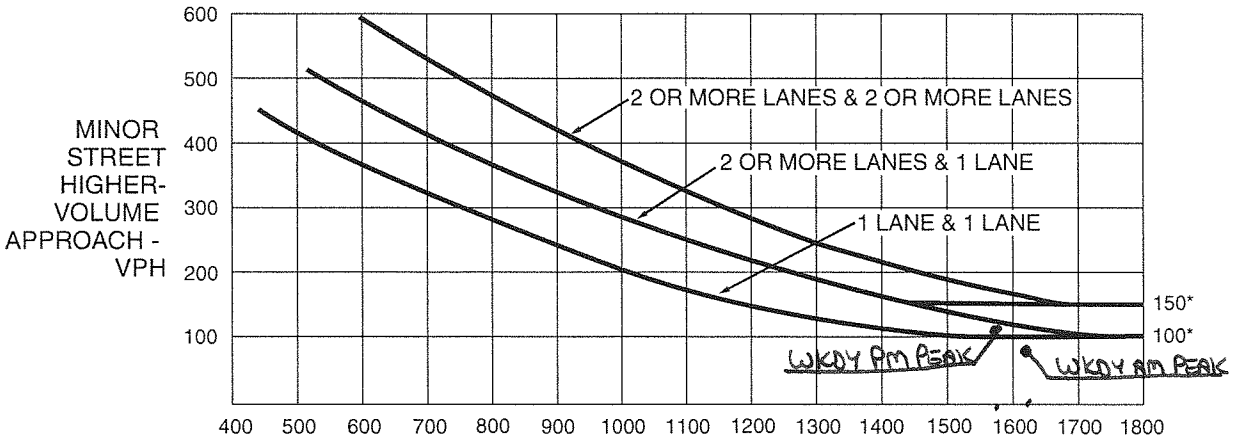
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

IL 31 and State Street
Year 2015

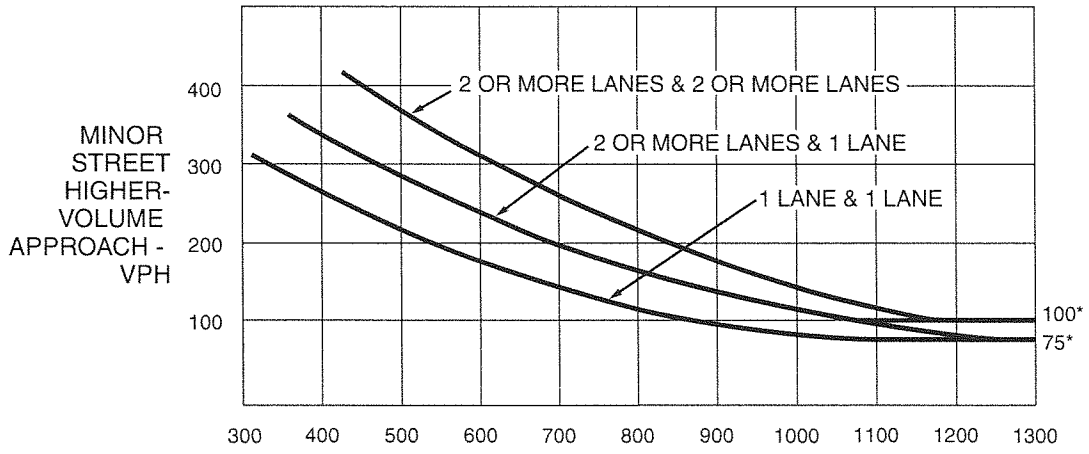
Figure 4C-3. Warrant 3, Peak Hour



*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.

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M E M O R A N D U M

TO: Chris Tiedt, P.E. & Russell Colby, Planner

FROM: Alex Garbe, P.E. & Diane Lukas, P.E.

DATE: October 14, 2011

SUBJECT: Review of Lexington Club Traffic Impacts Analysis

In response to the concerns raised regarding the traffic study for the proposed Lexington Club residential development, the City asked HLR to review areas where additional analysis may be warranted. The following discussion highlights areas of particular concern as described by residents and commissioners in the public hearing.

In providing additional analysis, it would be useful to clarify the differences between the impacts of the development and what may be existing problem areas. In particular, there appear to be many concerns surrounding the intersection of Main Street and 7th Street.

Main Street & 7th Street – North leg (southbound approach)
The table below summarizes the results of the analyses performed by KLOA for the north leg of 7th Street at Main Street.

Period	Level of Service	Average Delay	Queue (cars)*	Queue (feet)
Existing AM	D	43.3 sec	9	225’
Future AM	D	49.2 sec	13	325’
Existing PM	D	49.2 sec	7	175’
Future PM	E	76.4 sec	13	325’

* Larger vehicles make the queue longer.

The existing 225’ queue extends back from Main Street to Cedar Street. The projected queue will extend 100’ beyond Cedar Street. We suggest an analysis be conducted for future traffic conditions with a proposed left turn lane on the north leg to check if this results in noticeable

benefits to traffic flow on the north leg. This will also entail changing the lane markings on the south leg to provide a left turn only lane plus a shared through/right turn lane. It appears from a cursory check of this intersection approach that existing right-of-way on the north leg is wide enough to add a left turn lane. The analysis results for the south leg of 7th Street show that, in the future conditions scenario, the volume of northbound traffic in the shared left turn / through lane will approach the capacity of that lane. Analysis of this scenario will provide an indication of whether the potential benefits warrant a more detailed evaluation of such an improvement.

If a left turn lane is added on the north leg, there will be other work required at the intersection, including revising pavement markings on the south leg, adding left turn arrow signals for the north and south approaches, and the relocation of some signal equipment, a street light and some above-ground utility items. Some of this work will be within the Main Street right-of-way, which will require a permit from IDOT. The permit process will require preparation and submittal of an Intersection Design Study for IDOT review and approval, followed by plans and specifications for issuance of the IDOT permit.

Main Street & 9th Street – North leg (southbound left turn movement)
The following table summarizes the results of the analyses performed by KLOA for the north leg of 9th Street at Main Street.

Period	Level of Service	Average Delay	Queue (cars)*	Queue (feet)
Existing AM	D	32.3 sec	2	50’
Future AM	E	45.7 sec	2	50’
Existing PM	F	57.4 sec	2	50’
Future PM	F	79.2 sec	3	75’

* Larger vehicles make the queue longer.

Future average delays for left turning drivers from 9th Street will increase. The difficulty of making this turn during peak periods probably suppresses traffic demand here. Vehicles are not anticipated to stack back to the Dean Street/9th Street/State Street intersection. Projected traffic volumes do not meet the minimum required to warrant traffic signals along a Strategic Regional Arterial (SRA) route. Additionally, this intersection is less than 800 feet west of the 7th Street intersection. IDOT will not allow a new traffic signal to be installed closer than 1,000 feet to an existing signal along an SRA route. We have no further suggestions for improvements to this intersection.

Second Street & State Street:
Capacity analysis finds that in the future analysis scenario, average delays on State Street will increase by 21 to 26 seconds during peak periods. The traffic study notes that traffic volumes are insufficient to warrant a signal. It will be helpful to see the chart showing the analysis of the

various 8-hour, 4-hour and peak hour warrants (and crash warrant, if applicable) to see if volumes are expected to be close to approaching one of the warrants.

IL 31 is not an SRA route. The intersection is about 650 feet north of the IL 64 signals, similar to the distance between IL 64 and Illinois Street. Although traffic signals are closely spaced within the central business district (CBD), this intersection would be a new signal on the fringe of the CBD, making it difficult to anticipate IDOT's response to such a request. We expect that IDOT will not concur with installing traffic signals here based on future warrants and will state that warrants must be supported with actual traffic counts. If and when traffic counts do satisfy a traffic signal warrant, coordination with IDOT, similar to that described for the Main Street / 7th Street intersection, will be required.

As noted before, additional analysis - as recommended herein - will help to clarify the differences between the impacts of the proposed development and existing traffic concerns.

Traffic Study
for
The Lexington Club

Submitted To:
Lexington Homes

Submitted By:

KLOA
Kenig, Lindgren, O'Hara, Aboona, Inc.

June 16, 2011
Revised: September 27, 2011

Introduction

This report summarizes the methodologies, results and findings of a site traffic analysis conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) for the proposed The Lexington Club residential development located north of State Street, between 6th Street and 12th Street in St. Charles, Illinois.

The site was formerly occupied by a light-industrial complex with approximately 220,500 square feet of building space. These buildings have since been razed and the site is cleared. The proposed The Lexington Club development proposes approximately 28 single-family homes, 102 townhomes, and 12 row homes. Access to the development will use the existing roadway system. The development proposes to improve and extend 9th Street, 7th Street, 6th Street, and Mark Street.

The purpose of this study includes the following.

- Determine the existing traffic conditions in the area to establish a base condition.
- Assess the impact that the proposed residential development will have on traffic conditions in the area.
- Determine if any roadway or traffic control improvements are necessary to accommodate the proposed residential development.

The following sections of this report present the following.

- Existing roadway conditions.
- A detailed description of the proposed The Lexington Club residential development.
- Directional distribution of development-generated traffic.
- Vehicle trip generation and comparison of the former light-industrial land use and the proposed residential land use.
- Future transportation conditions, including regional ambient growth in traffic and potential future developments.
- Traffic analyses for the weekday morning and evening peak hours for both the existing and future condition.
- Recommendations with respect to site access and circulation to the surrounding roadway network for the future condition.

Existing Conditions

Existing street conditions were documented based on field visits conducted by KLOA, Inc. The following provides a detailed description of the physical characteristics of the roadways including the existing geometry and traffic control, adjacent land uses and peak hour traffic volumes on area roadways.

Site Location

As noted, the site is roughly bound by railroad tracks to the north, State Street, Dean Street, and residential homes to the south, residential homes and 6th Street to the east, and industrial/12th Street to the west.

Adjacent land uses in the area include single-family residential homes and small light-industrial land uses. **Figure 1** illustrates the location of the proposed development with respect to the area roadway system. **Figure 2** shows an aerial view of the site and surrounding area.

Existing Roadway System Characteristics

The characteristics of the existing roadways that surround or are nearby the proposed development are illustrated in **Figure 3** and described below.

9th Street is a two-lane north-south local roadway that extends north from its southern T-intersection terminus with State Street. Also, that portion of roadway between Main Street and the Dean Street/State Street intersection also has the 9th Street designation. Parking is prohibited on the east side of the road and the posted speed limit is 25 mph. 9th Street is under stop sign control at its T-intersection with State Street and at its T-intersection with Main Street. At Main Street, a southbound left-turn lane and a southbound right-turn lane are provided. 9th Street is under the jurisdiction of the City of St. Charles and is classified as a collector roadway between Dean Street and Main Street. As part of the proposed development, 9th Street will be improved and extended north into The Lexington Club development.

7th Street is a two-lane north-south local roadway. At its signalized intersection with Main Street (IL 64), a single-lane is provided on the north approach, and a left-turn lane and a shared through/right-turn lane is provided on the south approach. Single-lane approaches are provided at its two-way stop controlled intersection with State Street. Parking is prohibited on the east side of the street and the posted speed limit is 25 mph. 7th Street is under the jurisdiction of the City of St. Charles and is classified as a collector roadway south of Main Street. As part of the proposed development, 7th Street will be improved and extended north into The Lexington Club development, where it will T-intersect the 9th Street extension from the east.

Site Location **Figure 1**

Aerial View of Site Location **Figure 2**

SITE

MARK ST

2ND ST (IL 31)

NOT TO SCALE

4TH ST

5TH ST

6TH ST

7TH ST

9TH ST

STATE ST

CEDAR ST

DEAN ST

MAIN ST (IL 64)

9TH ST

LEGEND

- TRAVEL LANE
- STOP SIGN
- TRAFFIC SIGNAL
- (P) - ON-STREET PARKING
- (R) - ON-STREET PARKING PROHIBITED

PROJECT:	TITLE:	PROJECT NO:
THE LEXINGTON CLUB ST CHARLES, ILLINOIS	EXISTING ROADWAY CHARACTERISTICS	09-169 KLOA FIGURE NO: 3

6th Street is a two-lane north-south local roadway. At its stop sign controlled intersection with Main Street, single-lanes are provided on both the north and south approaches allowing left, through, and right-turn movements. On the north approach at Main Street, signage prohibits southbound to eastbound left-turn movements. 6th Street is under freeflow conditions at its intersection with State Street (State Street is under stop sign control), providing single-lane approaches. The City of St. Charles is considering reversing this traffic control to have the north and south approaches on 6th Street under stop sign control and to allow free flow movements on State Street. Parking is prohibited on the west side of the roadway and the posted speed limit is 25 mph. 6th Street is under the jurisdiction of the City of St. Charles. As part of the proposed development, 6th Street will be improved from The Lexington Club's southern property line to its T-intersection with Mark Street.

State Street is a two-lane local roadway that extends from its western T-intersection terminus with Dean Street/9th Street to its eastern T-intersection terminus with 2nd Street (IL 31). State Street is under stop sign control at its intersections with Dean Street/9th Street, 6th Street, and 2nd Street, providing single-lane approaches at it each of these intersections. At 6th Street, the City of St. Charles is considering reversing this traffic control to allow free flow movements on State Street and the north and south approaches on 6th Street would be under stop sign control. Parking is prohibited on the south side of the roadway, and the posted speed is 25 mph. State Street is under the jurisdiction of the City of St. Charles and is classified as a collector roadway. No improvements are proposed to this roadway in conjunction with The Lexington Club development.

Mark Street is a two-lane east-west local roadway that connects 6th Street, 5th Street, and 4th Street. Mark Street has a posted speed limit is 25 mph and is under the jurisdiction of the City of St. Charles. As part of The Lexington Club development, Mark Street will be improved from 6th Street through the site's frontage.

Dean Street is a two-lane northwest/southeast roadway that remains freeflow at its intersection with State/9th Street. This roadway was recently improved and provides parking on the east/north side of the roadway. Dean Street is under the jurisdiction of the City of St. Charles and is classified as a collector roadway. No improvements are proposed to this roadway in conjunction with The Lexington Club development.

Main Street (IL 64) is a five-lane major arterial providing two through lanes in each direction and a center lane used for left-turn storage at minor roadway intersections. Parking is prohibited on both sides of the roadway, and the posted speed limit is 30 mph in the vicinity of the site. IL 64 is under the jurisdiction of the Illinois Department of Transportation (IDOT) and is designated as a Strategic Regional Arterial (SRA). No improvements are proposed to this arterial roadway in conjunction with The Lexington Club development.

2nd Street (IL 31) is a four-lane roadway north of IL 64, providing shared through/left-turn lanes and shared through/right-turn lanes at its respective minor roadway intersections. The posted speed limit is 30 mph, and parking is prohibited on both sides of the roadway. IL 31 is under the

jurisdiction of IDOT. No improvements are proposed to this roadway in conjunction with The Lexington Club development.

Existing Traffic Volumes

In order to determine current traffic conditions on the existing roadways, KLOA, Inc. conducted manual traffic counts on Wednesday, December 2, 2009 between 6:00 and 9:00 A.M. and between 4:00 and 7:00 P.M. at the following five intersections:

- 9th Street and State Street
- Dean Street/9th Street and State Street
- 9th Street and Main Street (IL 64)
- 7th Street and Main Street (IL 64)
- State Street and 2nd Street (IL 31)

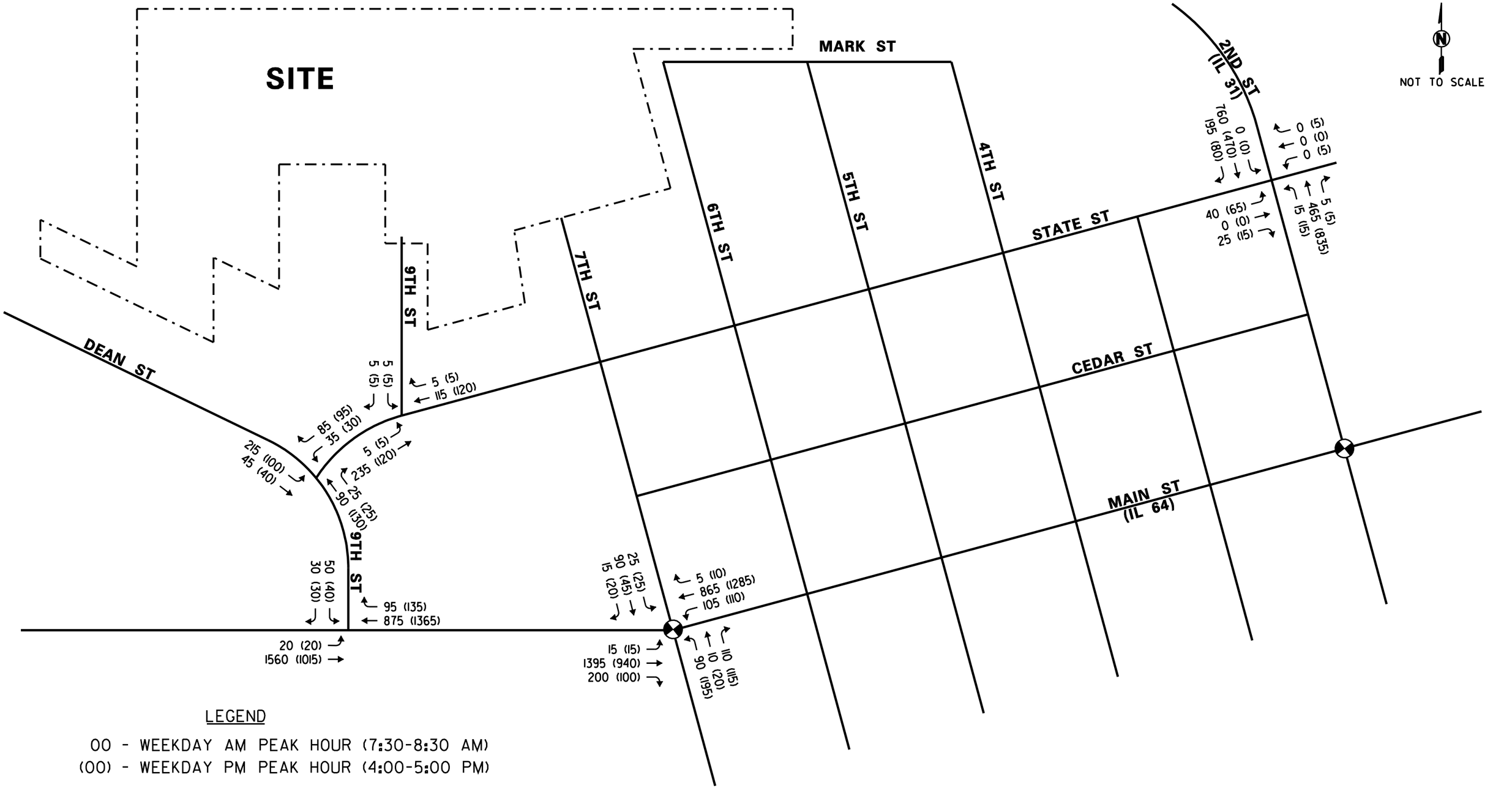
The results of the counts showed that the weekday morning peak hour occurs between 7:30 and 8:30 A.M. and the weekday evening peak hour occurs between 4:00 and 5:00 P.M.

Figure 4 illustrates the existing peak hour traffic volumes. The count data collected was tabulated into several reports that include the following:

- 15-Minute Counts: All Vehicles – By Movement – this report shows the vehicles counted per 15-minute segment.
- 15-Minute Counts: All Vehicles – Totals – this report shows the vehicles by approach (sum of left, through, and right-turn movements) per 15-minute segment.
- 15-Minute Flow Rates: By Movement – this report shows the rate of vehicles passing through the intersection per 15-minute segment (passenger car per hour per lane).
- 15-Minute Flow Rates: Approach/Exit Totals – this report shows the flow rate of vehicles approaching the intersection and exiting the intersection.
- 60-Minute Volumes: By Movement – this report shows the vehicles counted by movement on an hourly basis.
- 60-Minute Volumes: Approach/Exit Totals – this report shows the 60-minute volumes of vehicles approaching and exiting the intersection by direction.

The 60-Minute Volumes: By Movement report is the report used as the foundation to determine the existing peak hour traffic volumes, as displayed in Figure 4 of this report. This particular report is the industry's, City of St Charles', and IDOT's standard to determine the peak hour traffic volumes. All count data reports are included in the Appendix of this report.

Field observations noted free flow traffic conditions along State Street during these peak hours. In addition, the intersection of 9th Street and IL 64 operated with minimal southbound queuing on 9th Street waiting to turn onto IL 64. The queue did not extend to the State Street intersection.



LEGEND

00 - WEEKDAY AM PEAK HOUR (7:30-8:30 AM)
(00) - WEEKDAY PM PEAK HOUR (4:00-5:00 PM)

PROJECT:	TITLE:	PROJECT NO: 09-169
THE LEXINGTON CLUB ST CHARLES, ILLINOIS	EXISTING TRAFFIC VOLUMES	KLOA FIGURE NO: 4

Traffic Characteristics of The Lexington Club

To evaluate the impact of the proposed residential development on the area roadway system, it was necessary to quantify the number of vehicle trips the site will generate during the weekday morning and evening peak hours, compare it to the previous land use, and then determine the directions from which this traffic will approach and depart the site.

Proposed Site and Development Plan

The Lexington Club development proposes approximately 28 single-family homes, 102 townhomes, and 12 row homes (or 28 single-family units and 114 multi-family units). For the purposes of this study, it is assumed that this development will be completed in Year 2012.

The single-family homes will be located on the north and south sides of Mark Street, extended in the northeasterly portion of the development. The townhome units will be located in the easterly half and southeasterly portions of the development. The row homes will be located on the north side of Mark Street, east of 6th Street. A public park (approximately one-acre) will be provided on the north side of the Mark Street extension, in alignment with the 9th Street extension.

The Lexington Club proposed site plan dated May 11, 2011 is included in the Appendix of this report.

Site Access

Access to The Lexington Club development will be from planned extensions of existing roadways intersecting the site, specifically:

- 9th Street will be extended north to its T-intersection terminus with the Mark Street extension.
- 7th Street will be extended north and west, where it will T-intersect 9th Street from the east.
- 6th Street will be improved at its intersection with Mark Street
- Mark Street will be extended west of 6th Street through the site, and will also be improved along the site frontage east of 6th Street.

These proposed improvements are in conjunction with The Lexington Club development.

It should be noted that the site plan shows a potential future access to 12th Street; however, this future access is dependent on a redevelopment of the existing industrial space that currently resides on the adjoining parcel. As such, this study does not assume a cross-access connection between the site and 12th Street.

Directional Distribution of Site Traffic

The directional distribution of traffic accessing the proposed development was based on the background travel patterns near the site and the surrounding residential land uses. The anticipated directional distribution of site traffic is illustrated in **Figure 5.**

Site Traffic Generation

The estimates of traffic to be generated by the overall site are based upon the proposed land use type and size. The volume of traffic generated by the proposed residential development was estimated using trip rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 8th Edition.

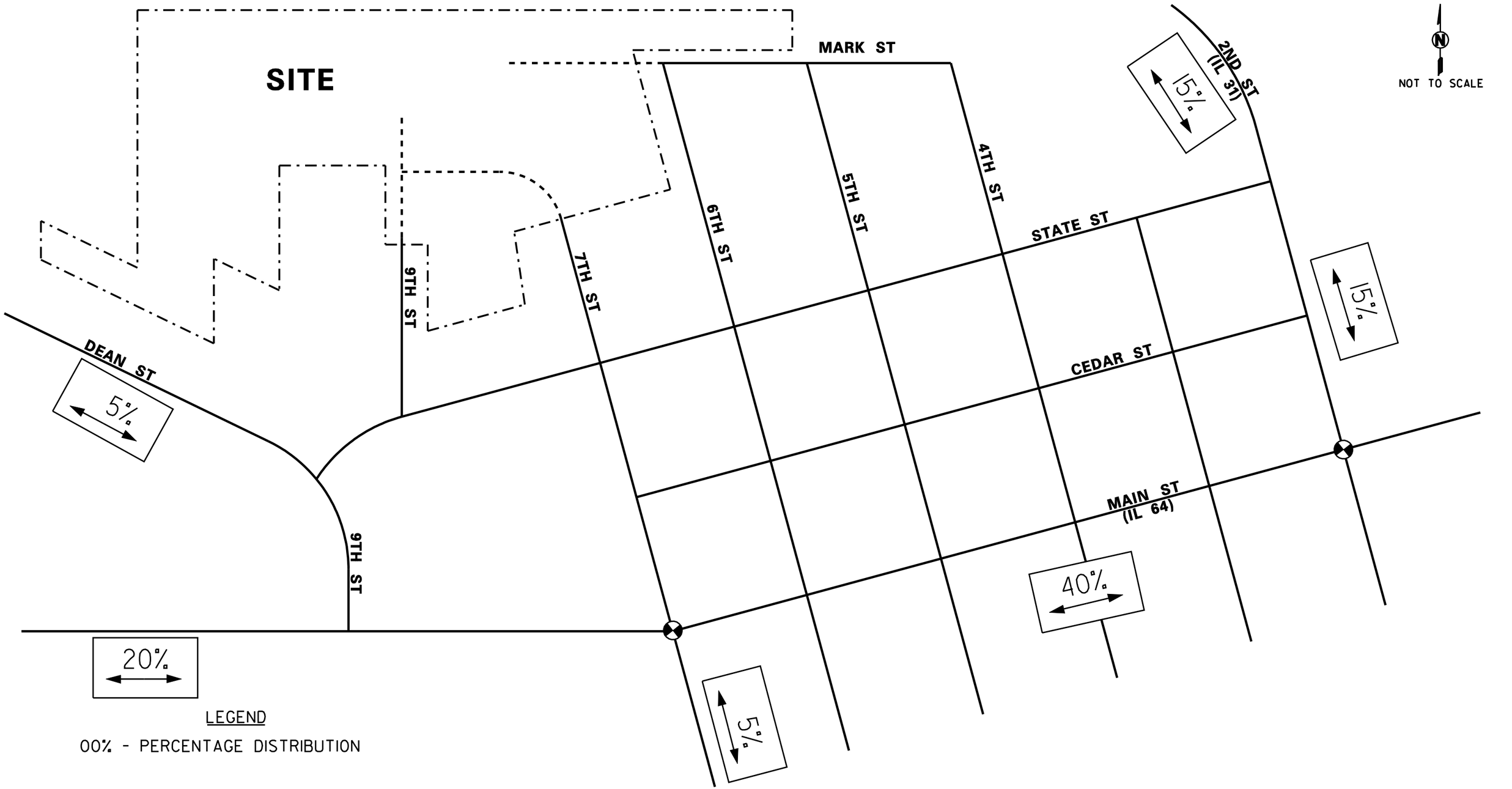
Table 1 tabulates the total trips anticipated with this site for the weekday morning and evening peak hours, as well as the total two-way weekday daily volume.

Table 1
SITE-GENERATED TRAFFIC VOLUMES

ITE Land-Use Code	Type/Size	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour			Daily
		In	Out	Total	In	Out	Total	
210	Single-Family – 28 units	7	22	29	21	12	33	322
230	Multi-Family – 114 units	9	48	57	45	22	67	721
	Total Trips:	**16**	**70**	**86**	**66**	**34**	**100**	**1,043**

Comparison of Site Traffic Generation to Former Light-Industrial Land Use

As noted, the site was formerly a light-industrial complex with approximately 220,500 square feet of building space. Using established ITE rates for light-industrial building space (ITE Land Use Code 110), a trip generation comparison was performed to show the amount of traffic that was potentially generated by the former light-industrial land use versus the amount of traffic to be potentially generated by the proposed residential land use. Table 2 shows this comparison of the total weekday morning and evening peak hours, as well as the total two-way weekday daily volumes.



PROJECT:	TITLE:	PROJECT NO: 09-169
THE LEXINGTON CLUB ST CHARLES, ILLINOIS	ESTIMATED DIRECTIONAL DISTRIBUTION	KLOA FIGURE NO: 5

Table 2
COMPARISON OF FORMER AND PROPOSED LAND USE TRAFFIC VOLUMES

ITE Land-Use Code	Type/Size	Weekday A.M. Peak Hour Total	Weekday P.M. Peak Hour Total	Daily
210/230	The Lexington Club	86	100	1,043
110	Light-Industrial (220,500 s.f.)	170	160	1,545
	Lexington Club Percentage of Light-Industrial Land Use:	51%	63%	68%

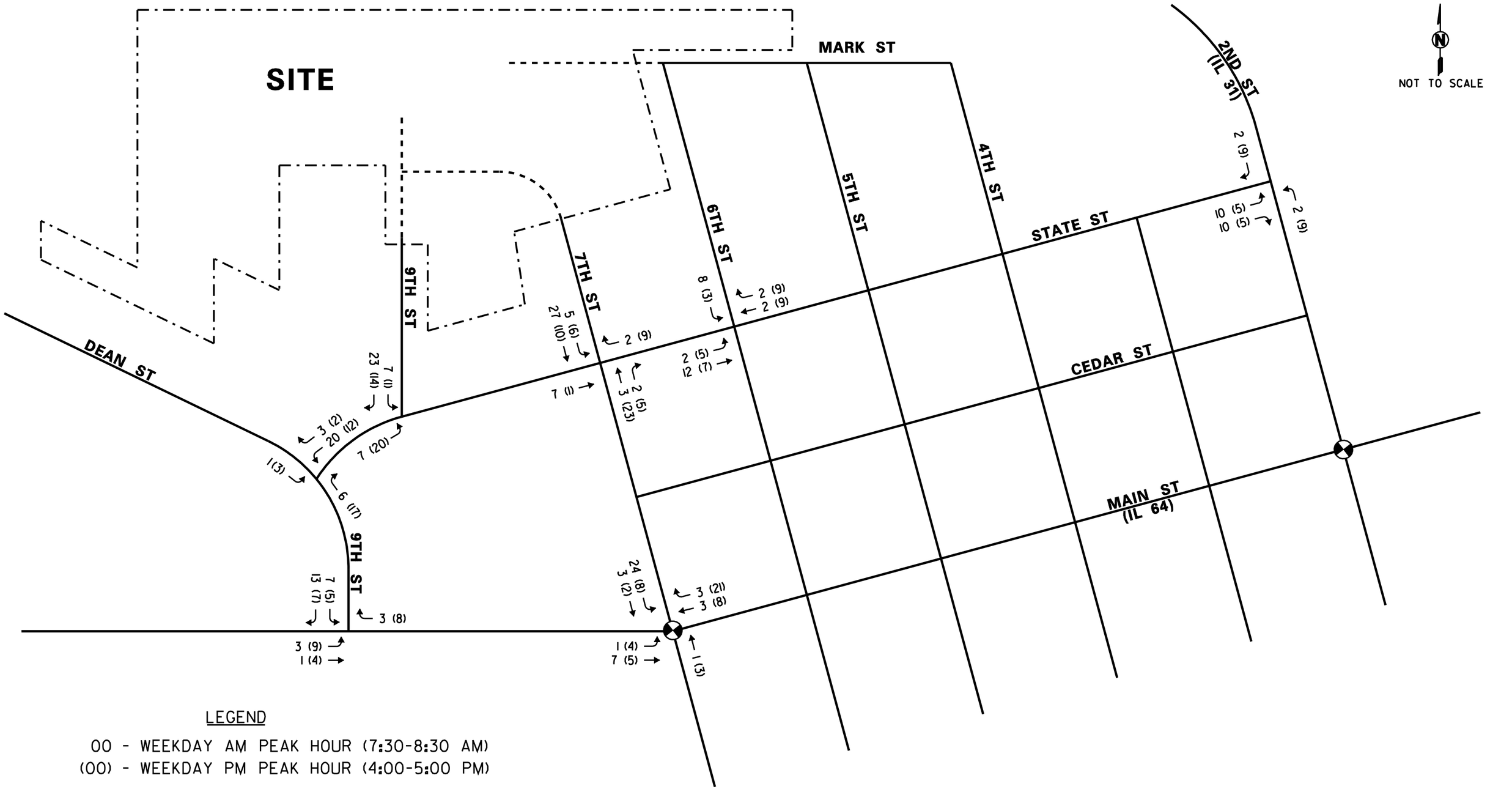
As shown in Table 2, the amount of traffic estimated to be generated by The Lexington Club development is considerably less than the total traffic that was potentially generated by the former land use. As such, The Lexington Club development will have a significantly lesser traffic impact on the surrounding roadway system than what was experienced from the former land use.

Site Traffic Assignment

The peak hour traffic volumes projected to be generated by the proposed development (refer to Table 1) were assigned to the area roadways based on the directional distribution analysis (Figure 5). **Figure 6** shows the assignment of the site-generated peak hour traffic volumes as tabulated in Table 1.

Planned Development

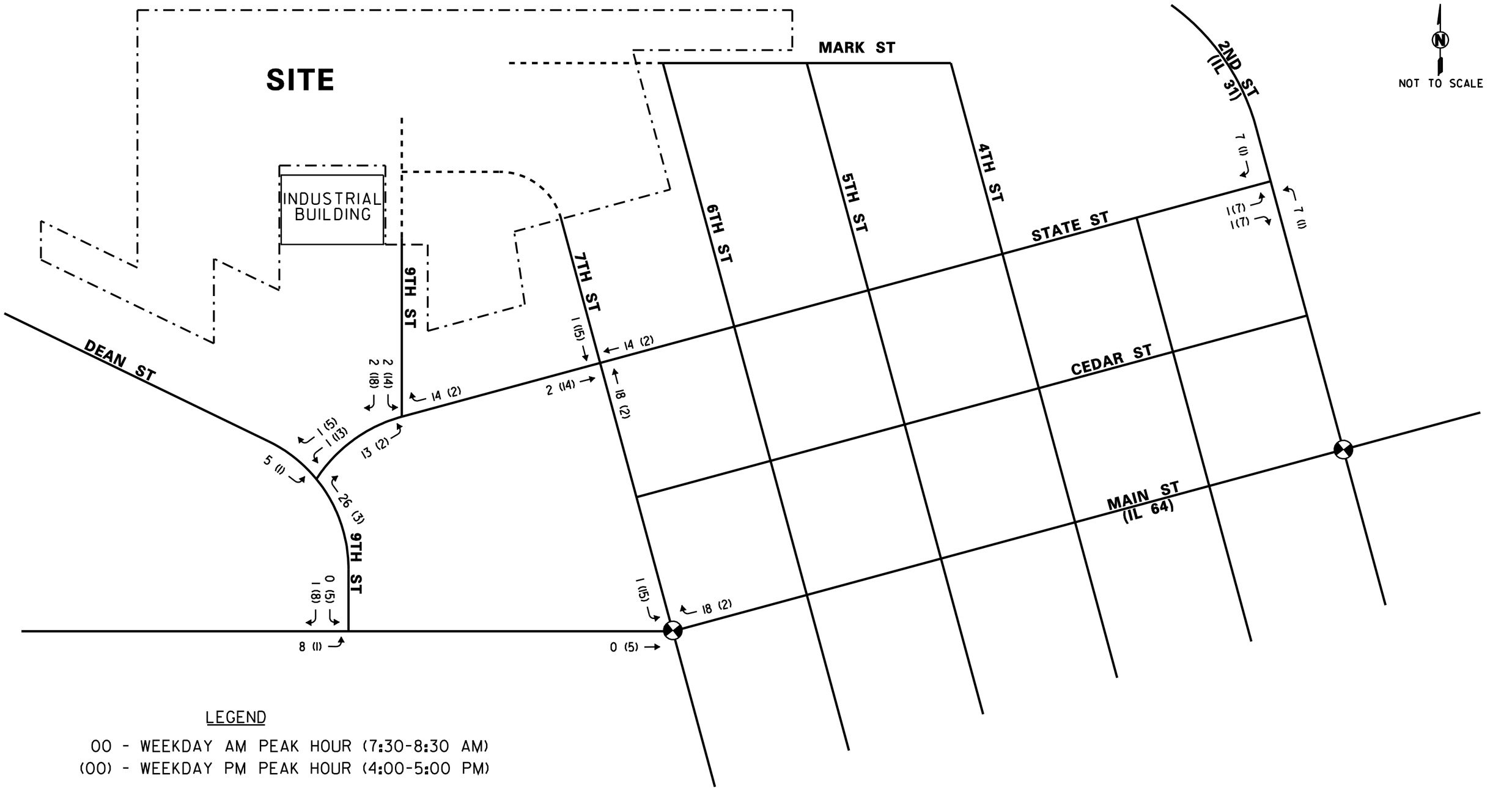
There are no particular planned developments in the nearby area. However, there is an unoccupied industrial building located on 9th Street, just south of the proposed The Lexington Club development. As such, trips were generated for this approximate 55,000 square feet building, assuming full occupation. **Table 3** shows the trip generation for the weekday morning, evening, and two-way daily traffic volumes. These trips were then assigned to the roadway system using the directional distribution that was established and shown in Figure 5. **Figure 7** shows the traffic assignment for the industrial building, assuming occupancy.



LEGEND

00 - WEEKDAY AM PEAK HOUR (7:30-8:30 AM)
(00) - WEEKDAY PM PEAK HOUR (4:00-5:00 PM)

PROJECT:	TITLE:	PROJECT NO: 09-169
THE LEXINGTON CLUB ST CHARLES, ILLINOIS	ESTIMATED SITE-GENERATED TRAFFIC VOLUMES	KLOA
		FIGURE NO: 6



LEGEND

00 - WEEKDAY AM PEAK HOUR (7:30-8:30 AM)
(00) - WEEKDAY PM PEAK HOUR (4:00-5:00 PM)

PROJECT:	TITLE:	PROJECT NO: 09-169
THE LEXINGTON CLUB ST CHARLES, ILLINOIS	PLANNED DEVELOPMENT TRAFFIC VOLUMES (OCCUPANCY OF EXISTING INDUSTRIAL BUILDING)	KLOA FIGURE NO: 7

Table 3
PLANNED DEVELOPMENT TRAFFIC VOLUMES (OCCUPANCY OF INDUSTRIAL BUILDING)

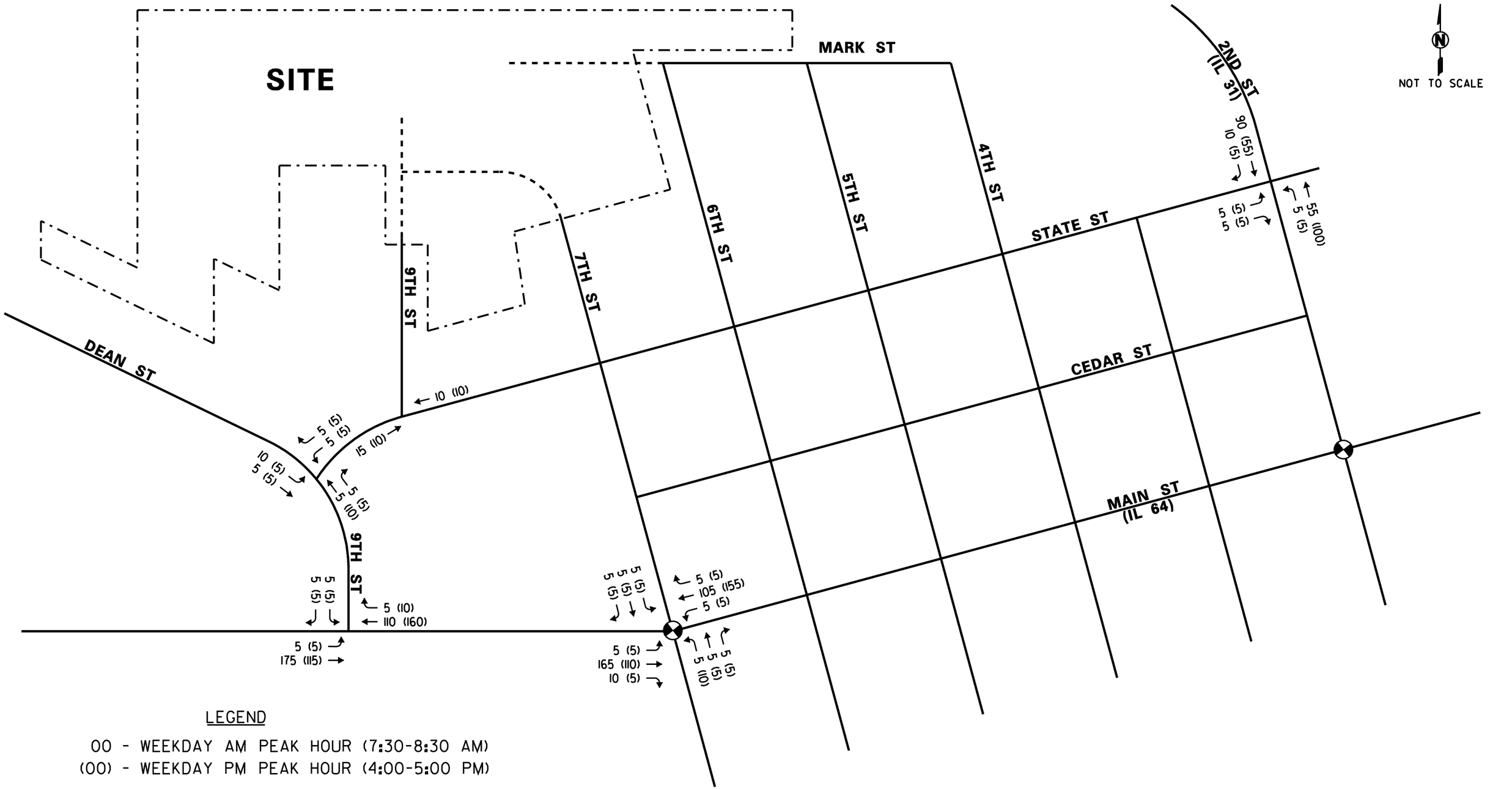
ITE Land-Use Code	Type/Size	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour			Daily
		In	Out	Total	In	Out	Total	
110	Light-Industrial – 55,000 s.f.	45	5	50	6	47	53	310

Regional Traffic Growth

The existing traffic volumes (Figure 4) were increased by a regional growth factor to account for regional ambient growth not attributable to any particular planned development. Because the surrounding area is essentially established, a growth rate of 12 percent (2 percent per year for 6 years) was applied to Main Street (IL 64) and 2nd Street (IL 31), and a growth rate of 6 percent (1 percent per year for 6 years) was applied to all of the local roadways. **Figure 8** shows the regional traffic volume growth for Year 2015 conditions.

Total Projected Traffic Conditions

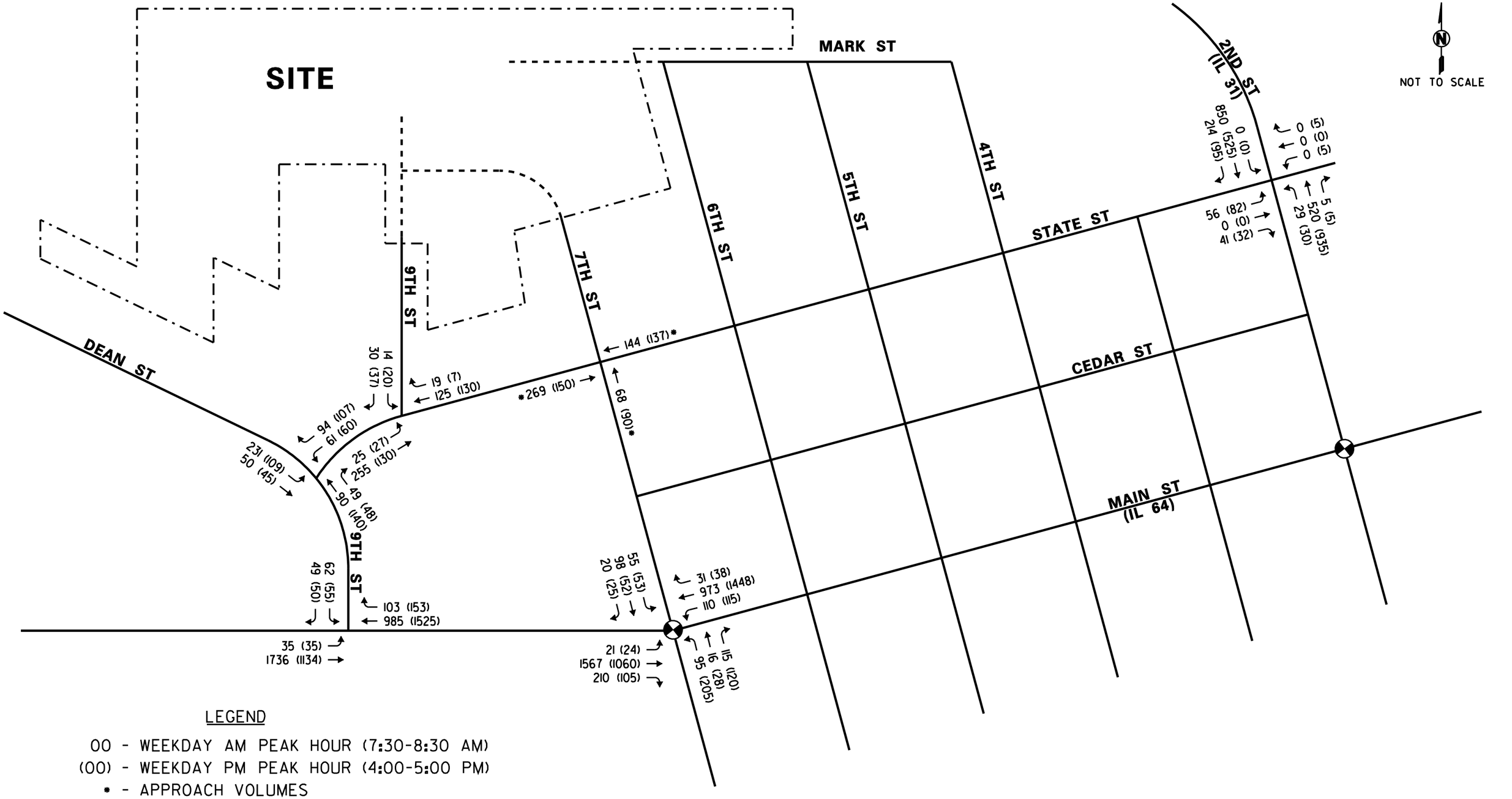
The peak hour traffic volumes that will be generated by the proposed development (Figure 6) were combined with the existing traffic volumes (Figure 4), the planned background development volumes (Figure 7) and the regional growth in traffic volumes (Figure 8) to determine the total projected Year 2015 peak hour traffic volumes, which are shown in **Figure 9**. The total projected traffic volumes shown in Figure 9, and the traffic analysis discussed in the next section will be indicative of traffic operations under Year 2015 conditions.



LEGEND

00 - WEEKDAY AM PEAK HOUR (7:30-8:30 AM)
(00) - WEEKDAY PM PEAK HOUR (4:00-5:00 PM)

PROJECT:	TITLE:	PROJECT NO: 09-169
THE LEXINGTON CLUB ST CHARLES, ILLINOIS	REGIONAL GROWTH TRAFFIC VOLUMES - YEAR 2015	KLOA FIGURE NO: 8



LEGEND

00 - WEEKDAY AM PEAK HOUR (7:30-8:30 AM)
(00) - WEEKDAY PM PEAK HOUR (4:00-5:00 PM)
* - APPROACH VOLUMES

PROJECT:	TITLE:	PROJECT NO: 09-169
THE LEXINGTON CLUB ST CHARLES, ILLINOIS	YEAR 2015 TOTAL TRAFFIC VOLUMES	KLOA FIGURE NO: 9

Evaluation

The following provides an evaluation conducted for the weekday morning and evening peak hours to determine the impact of the projected site traffic on the surrounding roadway network. The analysis includes conducting capacity analyses to provide an indication of how well the roadway facilities serve the anticipated traffic demands placed upon them for the future total traffic conditions.

It is important to note that the former land use, a light-industrial complex, was calculated at potentially generating considerably more traffic than what is estimated to be generated by the proposed The Lexington Club development. As such, no improvements to the external roadways surrounding the site are needed in direct connection with the proposed The Lexington Club residential development.

Traffic Analyses

Traffic analyses were performed for the external intersections to determine the operation of the existing roadway system, evaluate the impact of the proposed development, and determine the ability of the existing roadway system to accommodate projected traffic demands. Analyses were performed for the weekday morning and evening peak hours for both the existing traffic volumes (Figure 4) and the Year 2015 total projected traffic volumes (Figure 9).

The traffic analyses were performed using the methodologies outlined in the Transportation Research Board's *Highway Capacity Manual (HCM), 2000*. The ability of an intersection to accommodate traffic flow is expressed in terms of level of service, which is assigned a letter grade from A to F based on the average control delay experienced by vehicles passing through the intersection. Control delay is that portion of the total delay attributed to the traffic signal or stop sign control operation, and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Level of Service A is the highest grade (best traffic flow and least delay), Level of Service E represents saturated or at-capacity conditions, and Level of Service F is the lowest grade (oversaturated conditions, extensive delays).

The analyses for the traffic-signal controlled intersection (IL 64 and 7th Street) was completed using IDOT obtained signal timings (130 second cycle length for weekday AM; 150 second cycle length for weekday PM) and existing roadway characteristics to determine the average overall vehicle delay, volume-to-capacity ratios, and levels of service. For two-way stop controlled (TWSC) intersections, levels of service are only calculated for the approaches controlled by a stop sign (not for the intersection as a whole). The *Highway Capacity Manual* definitions for levels of service and the corresponding control delay for both signalized and unsignalized intersections are shown in **Table 4**. Summaries of the traffic analysis results are presented in **Table 5**.

Table 4
LEVEL OF SERVICE CRITERIA

Signalized Intersections

Level of Service	Interpretation	Average Control Delay (seconds per vehicle)
A	Very short delay, with extremely favorable progression. Most vehicles arrive during the green phase and do not stop at all.	≤ 10
B	Good progression, with more vehicles stopping than for Level of Service A, causing higher levels of average delay.	> 10 - 20
C	Light congestion, with individual cycle failures beginning to appear. Number of vehicles stopping is significant at this level.	> 20 - 35
D	Congestion is more noticeable, with longer delays resulting from combinations of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines.	> 35 - 55
E	High delays result from poor progression, high cycle lengths, and high V/C ratios.	> 55 - 80
F	Unacceptable delays occurring, with oversaturation.	> 80

Unsignalized Intersections

Level of Service	Average Control Delay (seconds per vehicle)
A	0 - 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

Source: *Highway Capacity Manual*, 2000.

Table 5
CAPACITY ANALYSIS RESULTS/SUMMARY

	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
Intersection	Existing	Year 2015	Existing	Year 2015
Main St (IL 64) and 7th St (signalized)	B – 17.9	C – 23.4	B – 17.9	C – 22.0
9th St and Main St (TWSC)	C – 24.8	D – 31.4	E – 40.2	F – 50.1
Dean St/9th St and State St (TWSC)	B – 11.6	B – 13.8	B – 10.5	B – 11.8
9th St and State St (TWSC)	A – 9.9	B – 10.1	A – 9.5	A – 9.9
2nd St (IL 31) and State St (TWSC)	D – 32.0	F – 58.3	D – 30.8	F – 51.8

TWSC = Two-way stop controlled
Delay is measured in seconds.
LOS (Level of Service) represents the intersection as a whole for signalized intersections; for TWSC, the LOS is the minor approach under stop control.

7th Street and Main Street (IL 64)

This signalized intersection will continue to operate at an overall acceptable level of service under Year 2015 conditions. The amount of delay and the queue will increase for the southbound approach; however, the queue analysis for Year 2015 conditions shows that this southbound queue on 7th Street will not spillback to State Street. Further, these types of delays and queuing are typical for minor approaches at major arterial signalized intersections. 7th Street receives only 40 seconds of the total 150 second cycle length during the weekday evening peak hour. As noted, the former land use potentially generated higher volumes of traffic than the current proposed plan for The Lexington Club. Therefore, based on the combination of the above, no roadway or traffic control improvements are recommended in conjunction with this proposed development.

9th Street and Main Street (IL 64)

9th Street T-intersects Main Street from the north and provides a left-turn lane and a right-turn lane at its stop sign controlled intersection with Main Street. The capacity analyses show that 9th Street will operate at an unacceptable level of service for the future condition. However, an unacceptable level of service for a minor approach intersecting a major arterial is typical. Field observations have noted gaps in traffic along Main Street, allowing vehicles to turn from 9th Street onto Main Street.

A review of the peak hour traffic volumes shows that there are insufficient exiting volumes on 9th Street to warrant a traffic signal. Because Main Street is classified as a SRA, only Warrant 1 (the 8-hour signal warrant) can be used to justify the need for a signal. As such, this intersection should remain under stop sign control.

The queue analysis shows that the southbound exiting vehicles will not spillback to State Street during either of the weekday peak hours.

Based on these analyses, no roadway or traffic control improvements are needed at this intersection in direct connection with the proposed residential development.

Dean Street/9th Street and State Street

This intersection will continue to operate at an acceptable level of service under Year 2015 conditions. Therefore, no roadway or traffic control improvements are needed at this intersection.

9th Street and State Street

This intersection will continue to operate at an acceptable level of service under Year 2015 conditions. Therefore, no roadway or traffic control improvements are needed at this intersection with respect to traffic capacity. Field observations were conducted at this intersection to determine sight distance conditions; 9th Street slopes upward as it approaches State Street (from the north). The observations noted that it is difficult for a vehicle on 9th Street to view a vehicle travelling westbound on State Street, particularly when vehicles are parked on the north side of State Street. However, the observations also noted that there is sufficient sight distance/time for the stopped vehicle to make a decision as to whether to advance onto State Street with respect to avoiding State Street through traffic.

State Street and 2nd Street (IL 31)

The capacity analyses show that State Street will operate at an unacceptable level of service for the future condition. However, an unacceptable level of service for a minor approach intersecting an arterial is typical.

A review of the peak hour traffic volumes shows that there are insufficient exiting volumes on State Street to warrant a traffic signal. As such, this intersection should remain under stop sign control.

The queue analysis shows that the eastbound exiting vehicles will not spillback to 3rd Street during either of the weekday peak hours.

Based on these analyses, no roadway or traffic control improvements are needed at this intersection in direct connection with the proposed residential development.

State Street and 7th Street

7th Street is currently under stop sign control at its intersection with State Street (State Street traffic is free flow through this intersection). This intersection was reviewed to determine if an all-way stop control (AWSC) intersection is warranted. According to the Manual of Uniform Traffic Control Devices (MUTCD 2009), a multi-way stop application should be considered if the total volume of both major approaches (State Street) is at least 300 vehicles per hour for any 8 hours of an average day and the combined total volume for both minor approaches (7th Street) of vehicles, pedestrians, and bicycles is at least 200 units per hour for the same 8 hours as the major approach. A cursory review of the projected traffic volumes that are projected to approach this intersection during the weekday morning and evening peak hour shows that neither peak hour qualifies given the low volume of traffic on 7th Street. As such, an all-way stop control at this intersection is not warranted based on MUTCD guidelines.

Conclusion

- The Lexington Club development proposes approximately 28 single-family homes, 102 townhomes, and 12 row homes.

- Access to The Lexington Club development will be from extensions/improvements of existing roadways intersecting the site, specifically:

    - 9th Street will be extended north to its T-intersection terminus with the Mark Street extension.
    - 7th Street will be extended north and west, where it will T-intersect 9th Street from the east.
    - 6th Street will be improved at its intersection with Mark Street.
    - Mark Street will be extended west of 6th Street through the site, and will also be improved along the site frontage east of 6th Street.
    - These improvements will be done by the development.

- The development is expected to generate 86 two-way vehicle trips during the weekday morning peak hour and 100 two-way vehicle trips during the weekday evening peak hour.

- The site was formerly occupied by a light-industrial complex, with approximately 220,500 square feet of building space. A trip generation comparison of the calculated trips potentially generated by the former land use compared to the proposed residential land use shows that The Lexington Club development will generate considerably less vehicle traffic that what was potentially generated by the former land use. As such, the proposed development will have a minimal impact on the surrounding roadway network.

- Traffic volumes were projected to Year 2015, which includes the existing traffic volumes increased by a regional growth factor, the site-generated traffic estimated for The Lexington Club development, and the traffic from the currently vacant light-industrial building located on 9th Street, immediately south of the site.

- Traffic capacity analyses were conducted for both existing and future traffic conditions at the following five intersections:

    - 7th Street at Main Street (IL 64)
    - 9th Street at Main Street (IL 64)
    - Dean Street/9th Street at State Street
    - 9th Street at State Street
    - 2nd Street (IL 31) at State Street

- The Year 2015 traffic capacity analyses show that no roadway or traffic control improvements are needed at the five study intersections in direct connection with the proposed The Lexington Club development.

- It is important to note that The Lexington Club site is located within an established residential neighborhood that has numerous access points to adjoining arterials (e.g. Main Street or 2nd Street), thereby dispersing the traffic over a larger area. Therefore, the additional traffic generated by The Lexington Club will be imperceptible to the traveling motorist in the neighborhood.

- A signal warrant analysis review conducted at the intersections of 9th Street and Main Street and 2nd Street and State Street show that traffic signals are not warranted at either intersection.

- A multi-way stop warrant evaluation conducted at the intersection of State Street and 7th Street shows that the peak hour volumes do not meet the minimum volume thresholds needed to be sustained for an 8-hour period to warrant stop sign control on all four approaches.

Appendix

- **Existing Traffic Counts**
- **Traffic Signal Timings**
- **Capacity Analyses**

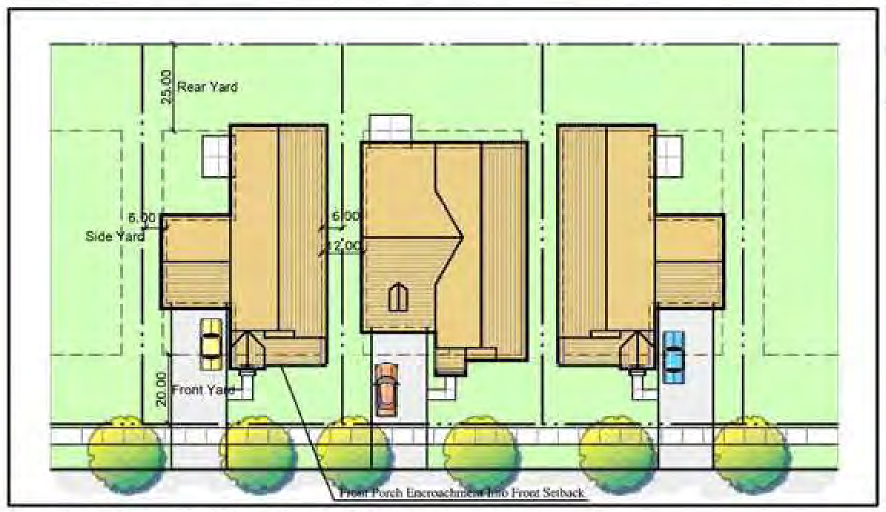
SITE INFORMATION

26.95 acres -Gross Total

20.05 acres -Net Residential
6.90 acres -Storm Water/Open Space

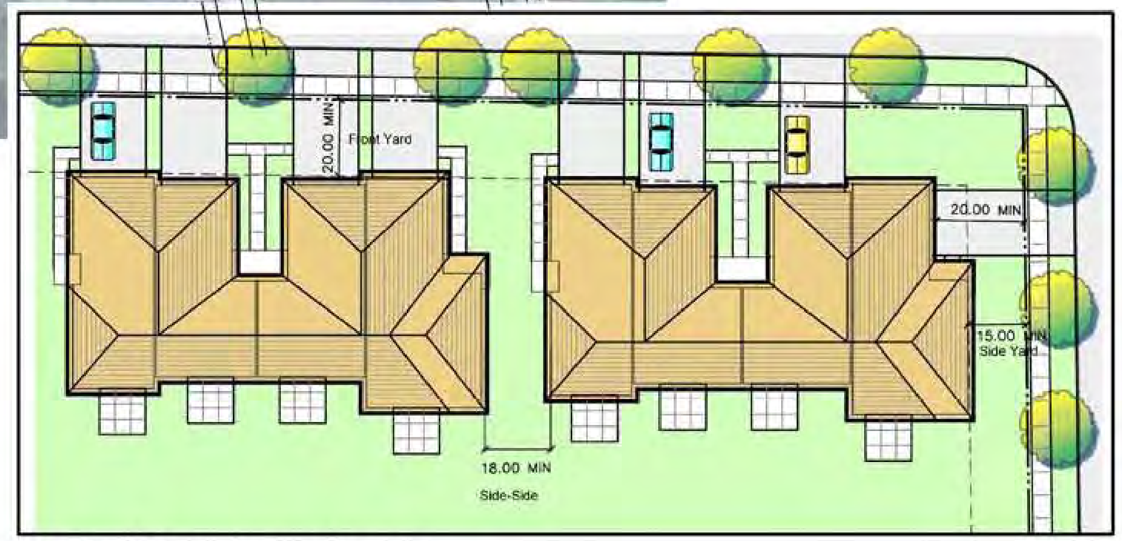
Residential Data
- 28 - Single Family Lots (56', 58' x 110')
- 102 - Townhomes
- 12 - Row Homes
- 142 Total Units

Total Parking
- 260 Off-Street Guest Spaces
- 284 Garage Spaces (2 Garages Spaces per Unit)
- 544 Total Spaces (3.82:1)



Typical Single Family Lot Layout

Scale: 1"=20'



Typical Townhome Layout

Scale: 1"=20'

North

Scale: 1" = 80'

0 40 80 160 320

Concept Site Plan

The Lexington Club

St. Charles, Illinois

Date: May 11, 2011

Lexington Homes
1731 North Marcey Suite 200
Chicago, IL 60614
312-280-0980

Existing Traffic Counts

St. Charles, IL 12/03/09
7th St and IL64 (Main St) 09:50:29
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - by Mvmt

Intersection # 1 7/64

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	1	1	0	50	4	14	0	6	6	202	0	284
615	0	0	2	0	62	4	20	0	15	17	233	0	353
630	0	3	4	1	90	3	22	0	9	10	309	0	451
645	2	11	4	0	129	15	27	2	9	18	310	2	529
700	1	7	2	0	139	12	35	2	19	34	306	1	558
715	3	10	2	0	167	15	25	1	26	27	324	1	601
730	5	21	6	0	192	20	35	3	15	28	392	2	719
745	2	35	7	0	210	32	25	1	17	71	358	5	763
800	1	21	7	0	241	21	24	2	31	61	284	3	696
815	8	13	6	0	219	30	24	3	27	41	359	5	735
830	6	15	7	2	201	17	20	2	40	36	315	2	663
845	0	2	3	3	214	9	23	0	23	29	254	0	560
1600	5	21	13	5	314	18	25	6	34	27	278	5	751
1615	3	6	9	1	323	34	29	3	31	24	227	4	694
1630	3	9	2	2	305	27	32	6	39	27	218	1	671
1645	7	7	2	3	343	31	27	6	89	22	215	2	754
1700	3	15	14	2	302	17	17	4	21	33	223	2	653
1715	3	6	2	1	359	30	18	6	62	20	208	5	720
1730	2	9	9	2	286	31	18	3	26	14	206	1	607
1745	3	2	0	5	328	15	29	6	40	13	221	1	663
1800	3	7	6	1	308	27	11	3	49	17	194	1	627
1815	2	7	7	2	279	19	15	2	34	60	221	5	653
1830	1	5	6	1	194	17	19	2	21	36	209	4	515
1845	2	2	3	3	248	21	13	0	13	23	186	3	517
Total	65	235	124	34	5503	469	547	63	696	694	6252	55	14737

St. Charles, IL 12/03/09
7th St and IL64 (Main St) 09:50:29
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - Totals

Intersection # 1 7/64

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	2	54	20	208	0	217	11	56	284
615	2	66	35	250	0	255	21	77	353
630	7	94	31	319	1	335	16	99	451
645	17	144	38	330	4	341	44	140	529
700	10	151	56	341	3	343	53	159	558
715	15	182	52	352	2	351	52	196	601
730	32	212	53	422	5	433	69	212	719
745	44	242	43	434	6	390	138	229	763
800	29	262	57	348	5	315	103	273	696
815	27	249	54	405	8	389	84	254	735
830	28	220	62	353	6	342	68	247	663
845	5	226	46	283	3	280	40	237	560
1600	39	337	65	310	16	316	66	353	751
1615	18	358	63	255	8	265	64	357	694
1630	14	334	77	246	9	252	63	347	671
1645	16	377	122	239	11	244	60	439	754
1700	32	321	42	258	8	254	65	326	653
1715	11	390	86	233	12	228	56	424	720
1730	20	319	47	221	6	233	54	314	607
1745	5	348	75	235	12	250	30	371	663
1800	16	336	63	212	5	211	51	360	627
1815	16	300	51	286	9	243	86	315	653
1830	12	212	42	249	7	234	58	216	515
1845	7	272	26	212	6	202	46	263	517
Total	424	6006	1306	7001	152	6923	1398	6264	14737

St. Charles, IL 12/03/09
7th St and IL64 (Main St) 09:50:29
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: by Movement

Intersection # 1 7/64

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	4	4	0	200	16	56	0	24	24	808	0	1136
615	0	0	8	0	248	16	80	0	60	68	932	0	1412
630	0	12	16	4	360	12	88	0	36	40	1236	0	1804
645	8	44	16	0	516	60	108	8	36	72	1240	8	2116
700	4	28	8	0	556	48	140	8	76	136	1224	4	2232
715	12	40	8	0	668	60	100	4	104	108	1296	4	2404
730	20	84	24	0	768	80	140	12	60	112	1568	8	2876
745	8	140	28	0	840	128	100	4	68	284	1432	20	3052
800	4	84	28	0	964	84	96	8	124	244	1136	12	2784
815	32	52	24	0	876	120	96	12	108	164	1436	20	2940
830	24	60	28	8	804	68	80	8	160	144	1260	8	2652
845	0	8	12	12	856	36	92	0	92	116	1016	0	2240
1600	20	84	52	20	1256	72	100	24	136	108	1112	20	3004
1615	12	24	36	4	1292	136	116	12	124	96	908	16	2776
1630	12	36	8	8	1220	108	128	24	156	108	872	4	2684
1645	28	28	8	12	1372	124	108	24	356	88	860	8	3016
1700	12	60	56	8	1208	68	68	16	84	132	892	8	2612
1715	12	24	8	4	1436	120	72	24	248	80	832	20	2880
1730	8	36	36	8	1144	124	72	12	104	56	824	4	2428
1745	12	8	0	20	1312	60	116	24	160	52	884	4	2652
1800	12	28	24	4	1232	108	44	12	196	68	776	4	2508
1815	8	28	28	8	1116	76	60	8	136	240	884	20	2612
1830	4	20	24	4	776	68	76	8	84	144	836	16	2060
1845	8	8	12	12	992	84	52	0	52	92	744	12	2068

St. Charles, IL 12/03/09
7th St and IL64 (Main St) 09:50:29
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: Appr/Exit Totals

Intersection # 1 7/64

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	8	216	80	832	0	868	44	224	1136
615	8	264	140	1000	0	1020	84	308	1412
630	28	376	124	1276	4	1340	64	396	1804
645	68	576	152	1320	16	1364	176	560	2116
700	40	604	224	1364	12	1372	212	636	2232
715	60	728	208	1408	8	1404	208	784	2404
730	128	848	212	1688	20	1732	276	848	2876
745	176	968	172	1736	24	1560	552	916	3052
800	116	1048	228	1392	20	1260	412	1092	2784
815	108	996	216	1620	32	1556	336	1016	2940
830	112	880	248	1412	24	1368	272	988	2652
845	20	904	184	1132	12	1120	160	948	2240
1600	156	1348	260	1240	64	1264	264	1412	3004
1615	72	1432	252	1020	32	1060	256	1428	2776
1630	56	1336	308	984	36	1008	252	1388	2684
1645	64	1508	488	956	44	976	240	1756	3016
1700	128	1284	168	1032	32	1016	260	1304	2612
1715	44	1560	344	932	48	912	224	1696	2880
1730	80	1276	188	884	24	932	216	1256	2428
1745	20	1392	300	940	48	1000	120	1484	2652
1800	64	1344	252	848	20	844	204	1440	2508
1815	64	1200	204	1144	36	972	344	1260	2612
1830	48	848	168	996	28	936	232	864	2060
1845	28	1088	104	848	24	808	184	1052	2068

St. Charles, IL 12/03/09
7th St and IL64 (Main St) 09:50:29
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: by Movement

Intersection # 1 7/64

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	2	15	11	1	331	26	83	2	39	51	1054	2	1617
615	3	21	12	1	420	34	104	4	52	79	1158	3	1891
630	6	31	12	1	525	45	109	5	63	89	1249	4	2139
645	11	49	14	0	627	62	122	8	69	107	1332	6	2407
700	11	73	17	0	708	79	120	7	77	160	1380	9	2641
715	11	87	22	0	810	88	109	7	89	187	1358	11	2779
730	16	90	26	0	862	103	108	9	90	201	1393	15	2913
745	17	84	27	2	871	100	93	8	115	209	1316	15	2857
800	15	51	23	5	875	77	91	7	121	167	1212	10	2654
815	14	30	16	5	634	56	67	5	90	106	928	7	1958*
830	6	17	10	5	415	26	43	2	63	65	569	2	1223*
845	0	2	3	3	214	9	23	0	23	29	254	0	560*
1600	18	43	26	11	1285	110	113	21	193	100	938	12	2870
1615	16	37	27	8	1273	109	105	19	180	106	883	9	2772
1630	16	37	20	8	1309	105	94	22	211	102	864	10	2798
1645	15	37	27	8	1290	109	80	19	198	89	852	10	2734
1700	11	32	25	10	1275	93	82	19	149	80	858	9	2643
1715	11	24	17	9	1281	103	76	18	177	64	829	8	2617
1730	10	25	22	10	1201	92	73	14	149	104	842	8	2550
1745	9	21	19	9	1109	78	74	13	144	126	845	11	2458
1800	8	21	22	7	1029	84	58	7	117	136	810	13	2312
1815	5	14	16	6	721	57	47	4	68	119	616	12	1685*
1830	3	7	9	4	442	38	32	2	34	59	395	7	1032*
1845	2	2	3	3	248	21	13	0	13	23	186	3	517*

St. Charles, IL 12/03/09
7th St and IL64 (Main St) 09:50:29
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: Appr/Exit Totals

Intersection # 1 7/64

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	28	358	124	1107	5	1148	92	372	1617
615	36	455	160	1240	8	1274	134	475	1891
630	49	571	177	1342	10	1370	165	594	2139
645	74	689	199	1445	14	1468	218	707	2407
700	101	787	204	1549	16	1517	312	796	2641
715	120	898	205	1556	18	1489	362	910	2779
730	132	965	207	1609	24	1527	394	968	2913
745	128	973	216	1540	25	1436	393	1003	2857
800	89	957	219	1389	22	1326	295	1011	2654
815	60	695	162	1041	17	1011	192	738	1958*
830	33	446	108	636	9	622	108	484	1223*
845	5	226	46	283	3	280	40	237	560*
1600	87	1406	327	1050	44	1077	253	1496	2870
1615	80	1390	304	998	36	1015	252	1469	2772
1630	73	1422	327	976	40	978	244	1536	2798
1645	79	1407	297	951	37	959	235	1503	2734
1700	68	1378	250	947	38	965	205	1435	2643
1715	52	1393	271	901	35	922	191	1469	2617
1730	57	1303	236	954	32	937	221	1360	2550
1745	49	1196	231	982	33	938	225	1262	2458
1800	51	1120	182	959	27	890	241	1154	2312
1815	35	784	119	747	22	679	190	794	1685*
1830	19	484	68	461	13	436	104	479	1032*
1845	7	272	26	212	6	202	46	263	517*

St. Charles, IL 12/03/09
9th St and IL RT64 (Main St) 09:54:05
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - by Mvmt

Intersection # 2 9/64

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	0	4	3	0	0	0	0	0	0	0	0	7
615	1	0	15	9	0	0	0	0	0	0	0	1	26
630	2	0	10	11	0	0	0	0	0	0	0	1	24
645	3	0	9	19	0	0	0	0	0	0	0	0	31
700	3	0	10	15	0	0	0	0	0	0	0	2	30
715	3	0	11	20	0	0	0	0	0	0	0	6	40
730	3	0	17	23	0	0	0	0	0	0	0	4	47
745	5	0	7	28	0	0	0	0	0	0	0	3	43
800	9	0	15	31	0	0	0	0	0	0	0	4	59
815	14	0	12	13	0	0	0	0	0	0	0	7	46
830	9	0	13	23	0	0	0	0	0	0	0	2	47
845	8	0	10	27	0	0	0	0	0	0	0	4	49
1600	6	0	12	20	0	0	0	0	0	0	0	3	41
1615	11	0	7	31	0	0	0	0	0	0	0	9	58
1630	5	0	10	30	0	0	0	0	0	0	0	4	49
1645	9	0	8	55	0	0	0	0	0	0	0	5	77
1700	10	0	15	38	0	0	0	0	0	0	0	6	69
1715	4	0	8	43	0	0	0	0	0	0	0	8	63
1730	9	0	13	31	0	0	0	0	0	0	0	2	55
1745	4	0	8	45	0	0	0	0	0	0	0	2	59
1800	5	0	9	34	0	0	0	0	0	0	0	4	52
1815	4	0	9	17	0	0	0	0	0	0	0	6	36
1830	6	0	6	26	0	0	0	0	0	0	0	5	43
1845	6	0	7	29	0	0	0	0	0	0	0	4	46
Total	139	0	245	621	0	0	0	0	0	0	0	92	1097

St. Charles, IL 12/03/09
9th St and IL RT64 (Main St) 09:54:05
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - Totals

Intersection # 2 9/64

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	4	3	0	0	3	4	0	0	7
615	16	9	0	1	10	15	0	1	26
630	12	11	0	1	12	10	0	2	24
645	12	19	0	0	19	9	0	3	31
700	13	15	0	2	17	10	0	3	30
715	14	20	0	6	26	11	0	3	40
730	20	23	0	4	27	17	0	3	47
745	12	28	0	3	31	7	0	5	43
800	24	31	0	4	35	15	0	9	59
815	26	13	0	7	20	12	0	14	46
830	22	23	0	2	25	13	0	9	47
845	18	27	0	4	31	10	0	8	49
1600	18	20	0	3	23	12	0	6	41
1615	18	31	0	9	40	7	0	11	58
1630	15	30	0	4	34	10	0	5	49
1645	17	55	0	5	60	8	0	9	77
1700	25	38	0	6	44	15	0	10	69
1715	12	43	0	8	51	8	0	4	63
1730	22	31	0	2	33	13	0	9	55
1745	12	45	0	2	47	8	0	4	59
1800	14	34	0	4	38	9	0	5	52
1815	13	17	0	6	23	9	0	4	36
1830	12	26	0	5	31	6	0	6	43
1845	13	29	0	4	33	7	0	6	46
Total	384	621	0	92	713	245	0	139	1097

St. Charles, IL 12/03/09
9th St and IL RT64 (Main St) 09:54:05
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: by Movement

Intersection # 2 9/64

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	0	16	12	0	0	0	0	0	0	0	0	28
615	4	0	60	36	0	0	0	0	0	0	0	4	104
630	8	0	40	44	0	0	0	0	0	0	0	4	96
645	12	0	36	76	0	0	0	0	0	0	0	0	124
700	12	0	40	60	0	0	0	0	0	0	0	8	120
715	12	0	44	80	0	0	0	0	0	0	0	24	160
730	12	0	68	92	0	0	0	0	0	0	0	16	188
745	20	0	28	112	0	0	0	0	0	0	0	12	172
800	36	0	60	124	0	0	0	0	0	0	0	16	236
815	56	0	48	52	0	0	0	0	0	0	0	28	184
830	36	0	52	92	0	0	0	0	0	0	0	8	188
845	32	0	40	108	0	0	0	0	0	0	0	16	196
1600	24	0	48	80	0	0	0	0	0	0	0	12	164
1615	44	0	28	124	0	0	0	0	0	0	0	36	232
1630	20	0	40	120	0	0	0	0	0	0	0	16	196
1645	36	0	32	220	0	0	0	0	0	0	0	20	308
1700	40	0	60	152	0	0	0	0	0	0	0	24	276
1715	16	0	32	172	0	0	0	0	0	0	0	32	252
1730	36	0	52	124	0	0	0	0	0	0	0	8	220
1745	16	0	32	180	0	0	0	0	0	0	0	8	236
1800	20	0	36	136	0	0	0	0	0	0	0	16	208
1815	16	0	36	68	0	0	0	0	0	0	0	24	144
1830	24	0	24	104	0	0	0	0	0	0	0	20	172
1845	24	0	28	116	0	0	0	0	0	0	0	16	184

St. Charles, IL 12/03/09
9th St and IL RT64 (Main St) 09:54:05
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: Appr/Exit Totals

Intersection # 2 9/64

Begin Time	Approach Totals N	E	S	W	Exit Totals N	E	S	W	Int Total
600	16	12	0	0	12	16	0	0	28
615	64	36	0	4	40	60	0	4	104
630	48	44	0	4	48	40	0	8	96
645	48	76	0	0	76	36	0	12	124
700	52	60	0	8	68	40	0	12	120
715	56	80	0	24	104	44	0	12	160
730	80	92	0	16	108	68	0	12	188
745	48	112	0	12	124	28	0	20	172
800	96	124	0	16	140	60	0	36	236
815	104	52	0	28	80	48	0	56	184
830	88	92	0	8	100	52	0	36	188
845	72	108	0	16	124	40	0	32	196
1600	72	80	0	12	92	48	0	24	164
1615	72	124	0	36	160	28	0	44	232
1630	60	120	0	16	136	40	0	20	196
1645	68	220	0	20	240	32	0	36	308
1700	100	152	0	24	176	60	0	40	276
1715	48	172	0	32	204	32	0	16	252
1730	88	124	0	8	132	52	0	36	220
1745	48	180	0	8	188	32	0	16	236
1800	56	136	0	16	152	36	0	20	208
1815	52	68	0	24	92	36	0	16	144
1830	48	104	0	20	124	24	0	24	172
1845	52	116	0	16	132	28	0	24	184

St. Charles, IL 12/03/09
9th St and IL RT64 (Main St) 09:54:05
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: by Movement

Intersection # 2 9/64

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	6	0	38	42	0	0	0	0	0	0	0	2	88
615	9	0	44	54	0	0	0	0	0	0	0	4	111
630	11	0	40	65	0	0	0	0	0	0	0	9	125
645	12	0	47	77	0	0	0	0	0	0	0	12	148
700	14	0	45	86	0	0	0	0	0	0	0	15	160
715	20	0	50	102	0	0	0	0	0	0	0	17	189
730	31	0	51	95	0	0	0	0	0	0	0	18	195
745	37	0	47	95	0	0	0	0	0	0	0	16	195
800	40	0	50	94	0	0	0	0	0	0	0	17	201
815	31	0	35	63	0	0	0	0	0	0	0	13	142*
830	17	0	23	50	0	0	0	0	0	0	0	6	96*
845	8	0	10	27	0	0	0	0	0	0	0	4	49*
1600	31	0	37	136	0	0	0	0	0	0	0	21	225
1615	35	0	40	154	0	0	0	0	0	0	0	24	253
1630	28	0	41	166	0	0	0	0	0	0	0	23	258
1645	32	0	44	167	0	0	0	0	0	0	0	21	264
1700	27	0	44	157	0	0	0	0	0	0	0	18	246
1715	22	0	38	153	0	0	0	0	0	0	0	16	229
1730	22	0	39	127	0	0	0	0	0	0	0	14	202
1745	19	0	32	122	0	0	0	0	0	0	0	17	190
1800	21	0	31	106	0	0	0	0	0	0	0	19	177
1815	16	0	22	72	0	0	0	0	0	0	0	15	125*
1830	12	0	13	55	0	0	0	0	0	0	0	9	89*
1845	6	0	7	29	0	0	0	0	0	0	0	4	46*

St. Charles, IL 12/03/09
9th St and IL RT64 (Main St) 09:54:05
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: Appr/Exit Totals

Intersection # 2 9/64

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	44	42	0	2	44	38	0	6	88
615	53	54	0	4	58	44	0	9	111
630	51	65	0	9	74	40	0	11	125
645	59	77	0	12	89	47	0	12	148
700	59	86	0	15	101	45	0	14	160
715	70	102	0	17	119	50	0	20	189
730	82	95	0	18	113	51	0	31	195
745	84	95	0	16	111	47	0	37	195
800	90	94	0	17	111	50	0	40	201
815	66	63	0	13	76	35	0	31	142*
830	40	50	0	6	56	23	0	17	96*
845	18	27	0	4	31	10	0	8	49*
1600	68	136	0	21	157	37	0	31	225
1615	75	154	0	24	178	40	0	35	253
1630	69	166	0	23	189	41	0	28	258
1645	76	167	0	21	188	44	0	32	264
1700	71	157	0	18	175	44	0	27	246
1715	60	153	0	16	169	38	0	22	229
1730	61	127	0	14	141	39	0	22	202
1745	51	122	0	17	139	32	0	19	190
1800	52	106	0	19	125	31	0	21	177
1815	38	72	0	15	87	22	0	16	125*
1830	25	55	0	9	64	13	0	12	89*
1845	13	29	0	4	33	7	0	6	46*

St. Charles, IL 12/03/09
Dean St and State St 10:05:17
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - by Mvmt

Intersection # 5 dean/state

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	0	7	8	0	2	2	0	0	0	0	0	19
615	0	0	8	10	0	3	3	0	0	0	0	0	24
630	0	0	12	8	0	3	2	0	0	0	0	0	25
645	0	0	16	9	0	3	2	0	0	0	0	0	30
700	0	0	10	8	0	2	3	0	0	0	0	0	23
715	0	0	24	8	0	3	5	0	0	0	0	0	40
730	0	0	31	9	0	4	6	0	0	0	0	0	50
745	0	0	60	14	0	5	8	0	0	0	0	0	87
800	0	0	43	16	0	7	7	0	0	0	0	0	73
815	0	0	83	47	0	17	5	0	0	0	0	0	152
830	0	0	25	28	0	5	7	0	0	0	0	0	65
845	0	0	15	10	0	8	5	0	0	0	0	0	38
1600	0	0	33	24	0	7	8	0	0	0	0	0	72
1615	0	0	28	20	0	8	9	0	0	0	0	0	65
1630	0	0	16	27	0	6	6	0	0	0	0	0	55
1645	0	0	24	21	0	7	5	0	0	0	0	0	57
1700	0	0	38	26	0	8	6	0	0	0	0	0	78
1715	0	0	19	16	0	9	8	0	0	0	0	0	52
1730	0	0	18	15	0	1	2	0	0	0	0	0	36
1745	0	0	10	13	0	4	1	0	0	0	0	0	28
1800	0	0	23	13	0	4	6	0	0	0	0	0	46
1815	0	0	21	13	0	7	4	0	0	0	0	0	45
1830	0	0	8	21	0	3	5	0	0	0	0	0	37
1845	0	0	18	13	0	4	4	0	0	0	0	0	39
Total	0	0	590	397	0	130	119	0	0	0	0	0	1236

St. Charles, IL 12/03/09
Dean St and State St 10:05:17
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - Totals

Intersection # 5 dean/state

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	7	10	2	0	8	9	2	0	19
615	8	13	3	0	10	11	3	0	24
630	12	11	2	0	8	14	3	0	25
645	16	12	2	0	9	18	3	0	30
700	10	10	3	0	8	13	2	0	23
715	24	11	5	0	8	29	3	0	40
730	31	13	6	0	9	37	4	0	50
745	60	19	8	0	14	68	5	0	87
800	43	23	7	0	16	50	7	0	73
815	83	64	5	0	47	88	17	0	152
830	25	33	7	0	28	32	5	0	65
845	15	18	5	0	10	20	8	0	38
1600	33	31	8	0	24	41	7	0	72
1615	28	28	9	0	20	37	8	0	65
1630	16	33	6	0	27	22	6	0	55
1645	24	28	5	0	21	29	7	0	57
1700	38	34	6	0	26	44	8	0	78
1715	19	25	8	0	16	27	9	0	52
1730	18	16	2	0	15	20	1	0	36
1745	10	17	1	0	13	11	4	0	28
1800	23	17	6	0	13	29	4	0	46
1815	21	20	4	0	13	25	7	0	45
1830	8	24	5	0	21	13	3	0	37
1845	18	17	4	0	13	22	4	0	39
Total	590	527	119	0	397	709	130	0	1236

St. Charles, IL 12/03/09
Dean St and State St 10:05:17
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: by Movement

Intersection # 5 dean/state

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	0	28	32	0	8	8	0	0	0	0	0	76
615	0	0	32	40	0	12	12	0	0	0	0	0	96
630	0	0	48	32	0	12	8	0	0	0	0	0	100
645	0	0	64	36	0	12	8	0	0	0	0	0	120
700	0	0	40	32	0	8	12	0	0	0	0	0	92
715	0	0	96	32	0	12	20	0	0	0	0	0	160
730	0	0	124	36	0	16	24	0	0	0	0	0	200
745	0	0	240	56	0	20	32	0	0	0	0	0	348
800	0	0	172	64	0	28	28	0	0	0	0	0	292
815	0	0	332	188	0	68	20	0	0	0	0	0	608
830	0	0	100	112	0	20	28	0	0	0	0	0	260
845	0	0	60	40	0	32	20	0	0	0	0	0	152
1600	0	0	132	96	0	28	32	0	0	0	0	0	288
1615	0	0	112	80	0	32	36	0	0	0	0	0	260
1630	0	0	64	108	0	24	24	0	0	0	0	0	220
1645	0	0	96	84	0	28	20	0	0	0	0	0	228
1700	0	0	152	104	0	32	24	0	0	0	0	0	312
1715	0	0	76	64	0	36	32	0	0	0	0	0	208
1730	0	0	72	60	0	4	8	0	0	0	0	0	144
1745	0	0	40	52	0	16	4	0	0	0	0	0	112
1800	0	0	92	52	0	16	24	0	0	0	0	0	184
1815	0	0	84	52	0	28	16	0	0	0	0	0	180
1830	0	0	32	84	0	12	20	0	0	0	0	0	148
1845	0	0	72	52	0	16	16	0	0	0	0	0	156

St. Charles, IL 12/03/09
Dean St and State St 10:05:17
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: Appr/Exit Totals

Intersection # 5 dean/state

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	28	40	8	0	32	36	8	0	76
615	32	52	12	0	40	44	12	0	96
630	48	44	8	0	32	56	12	0	100
645	64	48	8	0	36	72	12	0	120
700	40	40	12	0	32	52	8	0	92
715	96	44	20	0	32	116	12	0	160
730	124	52	24	0	36	148	16	0	200
745	240	76	32	0	56	272	20	0	348
800	172	92	28	0	64	200	28	0	292
815	332	256	20	0	188	352	68	0	608
830	100	132	28	0	112	128	20	0	260
845	60	72	20	0	40	80	32	0	152
1600	132	124	32	0	96	164	28	0	288
1615	112	112	36	0	80	148	32	0	260
1630	64	132	24	0	108	88	24	0	220
1645	96	112	20	0	84	116	28	0	228
1700	152	136	24	0	104	176	32	0	312
1715	76	100	32	0	64	108	36	0	208
1730	72	64	8	0	60	80	4	0	144
1745	40	68	4	0	52	44	16	0	112
1800	92	68	24	0	52	116	16	0	184
1815	84	80	16	0	52	100	28	0	180
1830	32	96	20	0	84	52	12	0	148
1845	72	68	16	0	52	88	16	0	156

St. Charles, IL 12/03/09
Dean St and State St 10:05:17
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: by Movement

Intersection # 5 dean/state

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	0	43	35	0	11	9	0	0	0	0	0	98
615	0	0	46	35	0	11	10	0	0	0	0	0	102
630	0	0	62	33	0	11	12	0	0	0	0	0	118
645	0	0	81	34	0	12	16	0	0	0	0	0	143
700	0	0	125	39	0	14	22	0	0	0	0	0	200
715	0	0	158	47	0	19	26	0	0	0	0	0	250
730	0	0	217	86	0	33	26	0	0	0	0	0	362
745	0	0	211	105	0	34	27	0	0	0	0	0	377
800	0	0	166	101	0	37	24	0	0	0	0	0	328
815	0	0	123	85	0	30	17	0	0	0	0	0	255*
830	0	0	40	38	0	13	12	0	0	0	0	0	103*
845	0	0	15	10	0	8	5	0	0	0	0	0	38*
1600	0	0	101	92	0	28	28	0	0	0	0	0	249
1615	0	0	106	94	0	29	26	0	0	0	0	0	255
1630	0	0	97	90	0	30	25	0	0	0	0	0	242
1645	0	0	99	78	0	25	21	0	0	0	0	0	223
1700	0	0	85	70	0	22	17	0	0	0	0	0	194
1715	0	0	70	57	0	18	17	0	0	0	0	0	162
1730	0	0	72	54	0	16	13	0	0	0	0	0	155
1745	0	0	62	60	0	18	16	0	0	0	0	0	156
1800	0	0	70	60	0	18	19	0	0	0	0	0	167
1815	0	0	47	47	0	14	13	0	0	0	0	0	121*
1830	0	0	26	34	0	7	9	0	0	0	0	0	76*
1845	0	0	18	13	0	4	4	0	0	0	0	0	39*

St. Charles, IL 12/03/09
Dean St and State St 10:05:17
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: Appr/Exit Totals

Intersection # 5 dean/state

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	43	46	9	0	35	52	11	0	98
615	46	46	10	0	35	56	11	0	102
630	62	44	12	0	33	74	11	0	118
645	81	46	16	0	34	97	12	0	143
700	125	53	22	0	39	147	14	0	200
715	158	66	26	0	47	184	19	0	250
730	217	119	26	0	86	243	33	0	362
745	211	139	27	0	105	238	34	0	377
800	166	138	24	0	101	190	37	0	328
815	123	115	17	0	85	140	30	0	255*
830	40	51	12	0	38	52	13	0	103*
845	15	18	5	0	10	20	8	0	38*
1600	101	120	28	0	92	129	28	0	249
1615	106	123	26	0	94	132	29	0	255
1630	97	120	25	0	90	122	30	0	242
1645	99	103	21	0	78	120	25	0	223
1700	85	92	17	0	70	102	22	0	194
1715	70	75	17	0	57	87	18	0	162
1730	72	70	13	0	54	85	16	0	155
1745	62	78	16	0	60	78	18	0	156
1800	70	78	19	0	60	89	18	0	167
1815	47	61	13	0	47	60	14	0	121*
1830	26	41	9	0	34	35	7	0	76*
1845	18	17	4	0	13	22	4	0	39*

St. Charles, IL 12/03/09
State St and 9th St 10:07:15
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - by Mvmt

Intersection # 6 state/9

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	0	0	0	0	0	0	0	0	0	0	0	0
615	0	0	0	0	0	0	0	0	0	0	0	0	0
630	0	0	0	0	0	0	0	0	0	0	0	0	0
645	0	0	0	0	0	0	0	0	0	0	0	0	0
700	0	0	0	0	0	0	0	0	0	0	0	0	0
715	0	0	0	0	0	0	0	0	0	0	0	0	0
730	0	0	0	0	0	0	0	0	0	0	0	0	0
745	1	0	0	0	0	0	0	0	0	0	0	0	1
800	0	0	0	0	0	0	0	0	0	0	0	0	0
815	0	0	0	0	0	0	0	0	0	0	0	0	0
830	0	0	0	0	0	0	0	0	0	0	0	0	0
845	1	0	0	0	0	0	0	0	0	0	0	0	1
1600	0	0	1	1	0	0	0	0	0	0	0	1	3
1615	1	0	0	0	0	0	0	0	0	0	0	0	1
1630	0	0	0	0	0	0	0	0	0	0	0	1	1
1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	1	2	0	0	0	0	0	0	0	1	4
1715	1	0	1	0	0	0	0	0	0	0	0	0	2
1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1800	0	0	0	0	0	0	0	0	0	0	0	1	1
1815	0	0	1	0	0	0	0	0	0	0	0	1	2
1830	0	0	0	1	0	0	0	0	0	0	0	0	1
1845	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	4	0	4	4	0	0	0	0	0	0	0	6	18

St. Charles, IL 12/03/09
State St and 9th St 10:07:15
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - Totals

Intersection # 6 state/9

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	0	0	0	0	0	0	0	0	0
615	0	0	0	0	0	0	0	0	0
630	0	0	0	0	0	0	0	0	0
645	0	0	0	0	0	0	0	0	0
700	0	0	0	0	0	0	0	0	0
715	0	0	0	0	0	0	0	0	0
730	0	0	0	0	0	0	0	0	0
745	1	0	0	0	0	0	0	1	1
800	0	0	0	0	0	0	0	0	0
815	0	0	0	0	0	0	0	0	0
830	0	0	0	0	0	0	0	0	0
845	1	0	0	0	0	0	0	1	1
1600	1	1	0	1	2	1	0	0	3
1615	1	0	0	0	0	0	0	1	1
1630	0	0	0	1	1	0	0	0	1
1645	0	0	0	0	0	0	0	0	0
1700	1	2	0	1	3	1	0	0	4
1715	2	0	0	0	0	1	0	1	2
1730	0	0	0	0	0	0	0	0	0
1745	0	0	0	0	0	0	0	0	0
1800	0	0	0	1	1	0	0	0	1
1815	1	0	0	1	1	1	0	0	2
1830	0	1	0	0	1	0	0	0	1
1845	0	0	0	1	1	0	0	0	1
Total	8	4	0	6	10	4	0	4	18

St. Charles, IL 12/03/09
State St and 9th St 10:07:15
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: by Movement

Intersection # 6 state/9

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	0	0	0	0	0	0	0	0	0	0	0	0
615	0	0	0	0	0	0	0	0	0	0	0	0	0
630	0	0	0	0	0	0	0	0	0	0	0	0	0
645	0	0	0	0	0	0	0	0	0	0	0	0	0
700	0	0	0	0	0	0	0	0	0	0	0	0	0
715	0	0	0	0	0	0	0	0	0	0	0	0	0
730	0	0	0	0	0	0	0	0	0	0	0	0	0
745	4	0	0	0	0	0	0	0	0	0	0	0	4
800	0	0	0	0	0	0	0	0	0	0	0	0	0
815	0	0	0	0	0	0	0	0	0	0	0	0	0
830	0	0	0	0	0	0	0	0	0	0	0	0	0
845	4	0	0	0	0	0	0	0	0	0	0	0	4
1600	0	0	4	4	0	0	0	0	0	0	0	4	12
1615	4	0	0	0	0	0	0	0	0	0	0	0	4
1630	0	0	0	0	0	0	0	0	0	0	0	4	4
1645	0	0	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	4	8	0	0	0	0	0	0	0	4	16
1715	4	0	4	0	0	0	0	0	0	0	0	0	8
1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1745	0	0	0	0	0	0	0	0	0	0	0	0	0
1800	0	0	0	0	0	0	0	0	0	0	0	4	4
1815	0	0	4	0	0	0	0	0	0	0	0	4	8
1830	0	0	0	4	0	0	0	0	0	0	0	0	4
1845	0	0	0	0	0	0	0	0	0	0	0	4	4

St. Charles, IL 12/03/09
State St and 9th St 10:07:15
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: Appr/Exit Totals

Intersection # 6 state/9

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	0	0	0	0	0	0	0	0	0
615	0	0	0	0	0	0	0	0	0
630	0	0	0	0	0	0	0	0	0
645	0	0	0	0	0	0	0	0	0
700	0	0	0	0	0	0	0	0	0
715	0	0	0	0	0	0	0	0	0
730	0	0	0	0	0	0	0	0	0
745	4	0	0	0	0	0	0	4	4
800	0	0	0	0	0	0	0	0	0
815	0	0	0	0	0	0	0	0	0
830	0	0	0	0	0	0	0	0	0
845	4	0	0	0	0	0	0	4	4
1600	4	4	0	4	8	4	0	0	12
1615	4	0	0	0	0	0	0	4	4
1630	0	0	0	4	4	0	0	0	4
1645	0	0	0	0	0	0	0	0	0
1700	4	8	0	4	12	4	0	0	16
1715	8	0	0	0	0	4	0	4	8
1730	0	0	0	0	0	0	0	0	0
1745	0	0	0	0	0	0	0	0	0
1800	0	0	0	4	4	0	0	0	4
1815	4	0	0	4	4	4	0	0	8
1830	0	4	0	0	4	0	0	0	4
1845	0	0	0	4	4	0	0	0	4

St. Charles, IL 12/03/09
State St and 9th St 10:07:15
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: by Movement

Intersection # 6 state/9

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	0	0	0	0	0	0	0	0	0	0	0	0	0
615	0	0	0	0	0	0	0	0	0	0	0	0	0
630	0	0	0	0	0	0	0	0	0	0	0	0	0
645	0	0	0	0	0	0	0	0	0	0	0	0	0
700	1	0	0	0	0	0	0	0	0	0	0	0	1
715	1	0	0	0	0	0	0	0	0	0	0	0	1
730	1	0	0	0	0	0	0	0	0	0	0	0	1
745	1	0	0	0	0	0	0	0	0	0	0	0	1
800	1	0	0	0	0	0	0	0	0	0	0	0	1
815	1	0	0	0	0	0	0	0	0	0	0	0	1*
830	1	0	0	0	0	0	0	0	0	0	0	0	1*
845	1	0	0	0	0	0	0	0	0	0	0	0	1*
1600	1	0	1	1	0	0	0	0	0	0	0	2	5
1615	1	0	1	2	0	0	0	0	0	0	0	2	6
1630	1	0	2	2	0	0	0	0	0	0	0	2	7
1645	1	0	2	2	0	0	0	0	0	0	0	1	6
1700	1	0	2	2	0	0	0	0	0	0	0	1	6
1715	1	0	1	0	0	0	0	0	0	0	0	1	3
1730	0	0	1	0	0	0	0	0	0	0	0	2	3
1745	0	0	1	1	0	0	0	0	0	0	0	2	4
1800	0	0	1	1	0	0	0	0	0	0	0	3	5
1815	0	0	1	1	0	0	0	0	0	0	0	2	4*
1830	0	0	0	1	0	0	0	0	0	0	0	1	2*
1845	0	0	0	0	0	0	0	0	0	0	0	1	1*

St. Charles, IL 12/03/09
State St and 9th St 10:07:15
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: Appr/Exit Totals

Intersection # 6 state/9

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	0	0	0	0	0	0	0	0	0
615	0	0	0	0	0	0	0	0	0
630	0	0	0	0	0	0	0	0	0
645	0	0	0	0	0	0	0	0	0
700	1	0	0	0	0	0	0	1	1
715	1	0	0	0	0	0	0	1	1
730	1	0	0	0	0	0	0	1	1
745	1	0	0	0	0	0	0	1	1
800	1	0	0	0	0	0	0	1	1
815	1	0	0	0	0	0	0	1	1*
830	1	0	0	0	0	0	0	1	1*
845	1	0	0	0	0	0	0	1	1*
1600	2	1	0	2	3	1	0	1	5
1615	2	2	0	2	4	1	0	1	6
1630	3	2	0	2	4	2	0	1	7
1645	3	2	0	1	3	2	0	1	6
1700	3	2	0	1	3	2	0	1	6
1715	2	0	0	1	1	1	0	1	3
1730	1	0	0	2	2	1	0	0	3
1745	1	1	0	2	3	1	0	0	4
1800	1	1	0	3	4	1	0	0	5
1815	1	1	0	2	3	1	0	0	4*
1830	0	1	0	1	2	0	0	0	2*
1845	0	0	0	1	1	0	0	0	1*

St. Charles, IL 12/03/09
IL 31 and State St 10:00:20
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - by Mvmt

Intersection # 3 31/state

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	3	99	0	0	0	0	0	31	0	3	0	1	137
615	5	138	0	0	0	0	0	80	0	1	0	0	224
630	8	177	0	0	0	0	0	70	1	1	0	2	259
645	24	158	0	0	0	0	0	88	3	4	0	2	279
700	21	196	0	0	0	0	0	109	0	1	0	9	336
715	23	189	0	0	0	0	0	115	3	3	0	4	337
730	30	186	0	0	0	0	0	112	2	6	0	5	341
745	55	195	0	0	0	0	0	139	3	9	0	9	410
800	37	183	0	0	0	0	0	131	1	3	0	9	364
815	74	198	0	0	0	0	0	88	8	4	0	15	387
830	24	185	0	0	0	0	0	106	4	13	0	13	345
845	24	163	0	0	0	0	0	105	3	5	0	6	306
1600	14	101	0	0	0	0	0	218	4	4	0	19	360
1615	22	135	0	0	0	0	0	185	5	7	0	15	369
1630	20	106	0	0	0	0	0	220	4	4	0	12	366
1645	25	125	0	0	0	0	0	211	2	2	0	18	383
1700	21	86	0	0	0	0	0	231	5	7	0	16	366
1715	28	160	0	0	0	0	0	227	5	13	0	9	442
1730	8	127	0	0	0	0	0	209	3	9	0	12	368
1745	15	110	0	0	0	0	0	207	5	5	0	10	352
1800	20	85	0	0	0	0	0	161	10	13	0	11	300
1815	18	103	0	0	0	0	0	171	13	7	0	14	326
1830	16	119	0	0	0	0	0	177	3	7	0	13	335
1845	9	99	0	0	0	0	0	124	6	8	0	11	257
Total	544	3423	0	0	0	0	0	3515	93	139	0	235	7949

St. Charles, IL 12/03/09
IL 31 and State St 10:00:20
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - Totals

Intersection # 3 31/state

Begin Time	Approach Totals N	E	S	W	Exit Totals N	E	S	W	Int Total
600	102	0	31	4	32	0	102	3	137
615	143	0	80	1	80	0	139	5	224
630	185	0	71	3	72	0	178	9	259
645	182	0	91	6	90	0	162	27	279
700	217	0	109	10	118	0	197	21	336
715	212	0	118	7	119	0	192	26	337
730	216	0	114	11	117	0	192	32	341
745	250	0	142	18	148	0	204	58	410
800	220	0	132	12	140	0	186	38	364
815	272	0	96	19	103	0	202	82	387
830	209	0	110	26	119	0	198	28	345
845	187	0	108	11	111	0	168	27	306
1600	115	0	222	23	237	0	105	18	360
1615	157	0	190	22	200	0	142	27	369
1630	126	0	224	16	232	0	110	24	366
1645	150	0	213	20	229	0	127	27	383
1700	107	0	236	23	247	0	93	26	366
1715	188	0	232	22	236	0	173	33	442
1730	135	0	212	21	221	0	136	11	368
1745	125	0	212	15	217	0	115	20	352
1800	105	0	171	24	172	0	98	30	300
1815	121	0	184	21	185	0	110	31	326
1830	135	0	180	20	190	0	126	19	335
1845	108	0	130	19	135	0	107	15	257
Total	3967	0	3608	374	3750	0	3562	637	7949

St. Charles, IL 12/03/09
IL 31 and State St 10:00:20
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: by Movement

Intersection # 3 31/state

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	12	396	0	0	0	0	0	124	0	12	0	4	548
615	20	552	0	0	0	0	0	320	0	4	0	0	896
630	32	708	0	0	0	0	0	280	4	4	0	8	1036
645	96	632	0	0	0	0	0	352	12	16	0	8	1116
700	84	784	0	0	0	0	0	436	0	4	0	36	1344
715	92	756	0	0	0	0	0	460	12	12	0	16	1348
730	120	744	0	0	0	0	0	448	8	24	0	20	1364
745	220	780	0	0	0	0	0	556	12	36	0	36	1640
800	148	732	0	0	0	0	0	524	4	12	0	36	1456
815	296	792	0	0	0	0	0	352	32	16	0	60	1548
830	96	740	0	0	0	0	0	424	16	52	0	52	1380
845	96	652	0	0	0	0	0	420	12	20	0	24	1224
1600	56	404	0	0	0	0	0	872	16	16	0	76	1440
1615	88	540	0	0	0	0	0	740	20	28	0	60	1476
1630	80	424	0	0	0	0	0	880	16	16	0	48	1464
1645	100	500	0	0	0	0	0	844	8	8	0	72	1532
1700	84	344	0	0	0	0	0	924	20	28	0	64	1464
1715	112	640	0	0	0	0	0	908	20	52	0	36	1768
1730	32	508	0	0	0	0	0	836	12	36	0	48	1472
1745	60	440	0	0	0	0	0	828	20	20	0	40	1408
1800	80	340	0	0	0	0	0	644	40	52	0	44	1200
1815	72	412	0	0	0	0	0	684	52	28	0	56	1304
1830	64	476	0	0	0	0	0	708	12	28	0	52	1340
1845	36	396	0	0	0	0	0	496	24	32	0	44	1028

St. Charles, IL 12/03/09
IL 31 and State St 10:00:20
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: Appr/Exit Totals

Intersection # 3 31/state

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	408	0	124	16	128	0	408	12	548
615	572	0	320	4	320	0	556	20	896
630	740	0	284	12	288	0	712	36	1036
645	728	0	364	24	360	0	648	108	1116
700	868	0	436	40	472	0	788	84	1344
715	848	0	472	28	476	0	768	104	1348
730	864	0	456	44	468	0	768	128	1364
745	1000	0	568	72	592	0	816	232	1640
800	880	0	528	48	560	0	744	152	1456
815	1088	0	384	76	412	0	808	328	1548
830	836	0	440	104	476	0	792	112	1380
845	748	0	432	44	444	0	672	108	1224
1600	460	0	888	92	948	0	420	72	1440
1615	628	0	760	88	800	0	568	108	1476
1630	504	0	896	64	928	0	440	96	1464
1645	600	0	852	80	916	0	508	108	1532
1700	428	0	944	92	988	0	372	104	1464
1715	752	0	928	88	944	0	692	132	1768
1730	540	0	848	84	884	0	544	44	1472
1745	500	0	848	60	868	0	460	80	1408
1800	420	0	684	96	688	0	392	120	1200
1815	484	0	736	84	740	0	440	124	1304
1830	540	0	720	80	760	0	504	76	1340
1845	432	0	520	76	540	0	428	60	1028

St. Charles, IL 12/03/09
IL 31 and State St 10:00:20
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: by Movement

Intersection # 3 31/state

Begin	N-Approach			E-Approach			S-Approach			W-Approach			Int
Time	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	Total
600	40	572	0	0	0	0	0	269	4	9	0	5	899
615	58	669	0	0	0	0	0	347	4	7	0	13	1098
630	76	720	0	0	0	0	0	382	7	9	0	17	1211
645	98	729	0	0	0	0	0	424	8	14	0	20	1293
700	129	766	0	0	0	0	0	475	8	19	0	27	1424
715	145	753	0	0	0	0	0	497	9	21	0	27	1452
730	196	762	0	0	0	0	0	470	14	22	0	38	1502
745	190	761	0	0	0	0	0	464	16	29	0	46	1506
800	159	729	0	0	0	0	0	430	16	25	0	43	1402
815	122	546	0	0	0	0	0	299	15	22	0	34	1038*
830	48	348	0	0	0	0	0	211	7	18	0	19	651*
845	24	163	0	0	0	0	0	105	3	5	0	6	306*
1600	81	467	0	0	0	0	0	834	15	17	0	64	1478
1615	88	452	0	0	0	0	0	847	16	20	0	61	1484
1630	94	477	0	0	0	0	0	889	16	26	0	55	1557
1645	82	498	0	0	0	0	0	878	15	31	0	55	1559
1700	72	483	0	0	0	0	0	874	18	34	0	47	1528
1715	71	482	0	0	0	0	0	804	23	40	0	42	1462
1730	61	425	0	0	0	0	0	748	31	34	0	47	1346
1745	69	417	0	0	0	0	0	716	31	32	0	48	1313
1800	63	406	0	0	0	0	0	633	32	35	0	49	1218
1815	43	321	0	0	0	0	0	472	22	22	0	38	918*
1830	25	218	0	0	0	0	0	301	9	15	0	24	592*
1845	9	99	0	0	0	0	0	124	6	8	0	11	257*

St. Charles, IL 12/03/09
IL 31 and State St 10:00:20
Wednesday December2, 2009

TURNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: Appr/Exit Totals

Intersection # 3 31/state

Begin	Approach Totals				Exit Totals				Int
Time	N	E	S	W	N	E	S	W	Total
600	612	0	273	14	274	0	581	44	899
615	727	0	351	20	360	0	676	62	1098
630	796	0	389	26	399	0	729	83	1211
645	827	0	432	34	444	0	743	106	1293
700	895	0	483	46	502	0	785	137	1424
715	898	0	506	48	524	0	774	154	1452
730	958	0	484	60	508	0	784	210	1502
745	951	0	480	75	510	0	790	206	1506
800	888	0	446	68	473	0	754	175	1402
815	668	0	314	56	333	0	568	137	1038*
830	396	0	218	37	230	0	366	55	651*
845	187	0	108	11	111	0	168	27	306*
1600	548	0	849	81	898	0	484	96	1478
1615	540	0	863	81	908	0	472	104	1484
1630	571	0	905	81	944	0	503	110	1557
1645	580	0	893	86	933	0	529	97	1559
1700	555	0	892	81	921	0	517	90	1528
1715	553	0	827	82	846	0	522	94	1462
1730	486	0	779	81	795	0	459	92	1346
1745	486	0	747	80	764	0	449	100	1313
1800	469	0	665	84	682	0	441	95	1218
1815	364	0	494	60	510	0	343	65	918*
1830	243	0	310	39	325	0	233	34	592*
1845	108	0	130	19	135	0	107	15	257*

Traffic Signal Timings

MASTER: IL 64 (NORTH/MAIN) & 7TH AV
LOCAL DATABASE ... For: #04 - IL RTE. 64 @ IL 31(2ND STREET)

PHASE DATA - VEHICLE TIMINGS

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Grn:	3	15	0	8	3	15	3	8	0	0	0	0	0	0	0	0
Pass/10:	15	70	0	40	15	70	30	40	0	0	0	0	0	0	0	0
Max # 1:	15	50	0	30	15	50	30	30	0	0	0	0	0	0	0	0
Max # 2:	15	50	0	30	15	50	30	30	0	0	0	0	0	0	0	0
Yel/10 :	30	45	30	45	30	45	30	45	40	40	40	40	40	40	40	40
Red/10 :	0	15	0	15	0	15	0	15	20	20	20	20	20	20	20	20
AIni/10:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Ini:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4:	3	0	0	10	3	0	5	10	0	0	0	0	0	0	0	0
Cars B4:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time To:	3	0	0	10	3	0	4	10	0	0	0	0	0	0	0	0
MGap/10:	15	0	0	15	15	0	15	15	0	0	0	0	0	0	0	0

PHASE DATA - PEDESTRIAN & VEHICLE CONTROL DATA

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Walk .:	0	15	0	7	0	15	0	7	0	0	0	0	0	0	0	0
P Clr :	0	14	0	15	0	14	0	15	0	0	0	0	0	0	0	0

LOCAL DATABASE ... For: #04 - IL RTE. 64 @ IL 31(2ND STREET)

COORDINATION DATA - DIAL / SPLIT

TIMING PLAN 00 (Dial 1 / Split 1) Cycle Length..: 120

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Time .:	13	62	0	45	13	62	13	32	0	0	0	0	0	0	0	0
Mode .:	0	1	6	0	0	1	0	0	0	0	0	0	0	0	0	0

Offset	Time	PM	AS	R2L	R3L	R4L
1	101	0	00	0	0	0
2	0	0	00	0	0	0
3	0	0	00	0	0	0

TIMING PLAN 01 (Dial 1 / Split 2) Cycle Length..: 150

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Time .:	13	93	0	44	11	95	15	29	0	0	0	0	0	0	0	0
Mode .:	0	1	6	0	0	1	0	0	0	0	0	0	0	0	0	0

Offset	Time	PM	AS	R2L	R3L	R4L
1	0	0	00	0	0	0
2	34	0	00	0	0	0
3	0	0	00	0	0	0

TIMING PLAN 02 (Dial 1 / Split 3) Cycle Length..: 130

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Time .:	13	67	0	50	13	67	24	26	0	0	0	0	0	0	0	0
Mode .:	0	1	6	0	0	1	0	0	0	0	0	0	0	0	0	0

Offset	Time	PM	AS	R2L	R3L	R4L
1	0	0	00	0	0	0

```
       2    0  0  00    0    0    0
       3  124  0  00    0    0    0
********************************************************************************

         LOCAL DATABASE ... For: #02 - IL RTE. 64 @ 7TH STREET

PHASE DATA - VEHICLE TIMINGS
================================================================================
PHASE.......1...2...3...4...5...6...7...8...9..10..11..12..13..14..15..16.
 Min Grn:   3  15   0   8   3  15   0   8   0   0   0   0   0   0   0   0
 Pass/10:  30  70   0  50  30  70   0  50   0   0   0   0   0   0   0   0
 Max # 1:  15  50   0  30  15  50   0  30   0   0   0   0   0   0   0   0
 Max # 2:  15  50   0  30  15  50   0  30   0   0   0   0   0   0   0   0
 Yel/10 :  30  40  30  40  30  40  30  40  30  30  30  30  30  30  30  30
 Red/10 :   0  20   0  20   0  20   0  20   0   0   0   0   0   0   0   0

 AIni/10:   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 Max Ini:   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 Time B4:   0  20   0  10   0  20   0  10   0   0   0   0   0   0   0   0
 Cars B4:   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 Time To:   0  15   0   9   0  15   0   9   0   0   0   0   0   0   0   0
 MGap/10:   0  40   0  30   0  40   0  30   0   0   0   0   0   0   0   0


PHASE DATA - PEDESTRIAN & VEHICLE CONTROL DATA
================================================================================
PHASE.......1...2...3...4...5...6...7...8...9..10..11..12..13..14..15..16.
 Walk .:    0  10   0  10   0  10   0  10   0   0   0   0   0   0   0   0
 P Clr :    0  20   0  20   0  10   0  20   0   0   0   0   0   0   0   0

         LOCAL DATABASE ... For: #02 - IL RTE. 64 @ 7TH STREET

COORDINATION DATA - DIAL  / SPLIT
================================================================================
TIMING PLAN 00 (Dial 1 / Split 1)   Cycle Length..: 120
---------------------------------
  Phase.....1...2...3...4...5...6...7...8...9..10..11..12..13..14..15..16.
  Time .:  13  77   0  30  13  77   0  30   0   0   0   0   0   0   0   0
  Mode .:   0   1   6   0   0   1   6   0   0   0   0   0   0   0   0   0

  Offset Time PM  AS  R2L  R3L  R4L
       1   53  0  00    0    0    0
       2    0  0  00    0    0    0
       3    0  0  00    0    0    0

TIMING PLAN 01 (Dial 1 / Split 2)   Cycle Length..: 150
---------------------------------
  Phase.....1...2...3...4...5...6...7...8...9..10..11..12..13..14..15..16.
  Time .:  13  97   0  40  13  97   0  40   0   0   0   0   0   0   0   0
  Mode .:   0   1   6   0   0   1   6   0   0   0   0   0   0   0   0   0

  Offset Time PM  AS  R2L  R3L  R4L
       1    0  0  00    0    0    0
       2   82  0  00    0    0    0
       3    0  0  00    0    0    0

TIMING PLAN 02 (Dial 1 / Split 3)   Cycle Length..: 130
---------------------------------
  Phase.....1...2...3...4...5...6...7...8...9..10..11..12..13..14..15..16.
  Time .:  13  82   0  35  13  82   0  35   0   0   0   0   0   0   0   0
  Mode .:   0   1   6   0   0   1   6   0   0   0   0   0   0   0   0   0

  Offset Time PM  AS  R2L  R3L  R4L
```

1	0	0	00	0	0	0
2	0	0	00	0	0	0
3	57	0	00	0	0	0

Capacity Analyses

HCS+: Signalized Intersections Release 5.3

Analyst: WRW
Agency: KLOA
Date: 5/23/2011
Period: Weekday AM
Project ID: 09-169; St Charles, IL
E/W St: Main St (IL 64)

Inter.: Main/7th St
Area Type: All other areas
Jurisd: IDOT
Year : Existing
N/S St: 7th St

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
LGConfig	L	TR		L	TR			LT	R		LTR	
Volume	15	1395	200	105	865	5	90	10	110	25	90	15
Lane Width	12.0	12.0		12.0	12.0			12.0	12.0		12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A	A			NB Left	A		
Thru		A			Thru	A		
Right		A			Right	A		
Peds					Peds			
WB Left	A	A			SB Left	A		
Thru		A			Thru	A		
Right		A			Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	10.0	76.0				29.0		
Yellow	3.0	4.0				4.0		
All Red	0.0	2.0				2.0		

Cycle Length: 130.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	449	1770	0.04	0.71	6.2	A		
TR	1984	3393	0.85	0.58	17.2	B	17.1	B
Westbound								
L	222	1770	0.50	0.71	18.4	B		
TR	2013	3443	0.46	0.58	9.5	A	10.5	B
Northbound								
LT	247	1106	0.43	0.22	44.6	D	43.7	D
R	353	1583	0.33	0.22	42.9	D		
Southbound								
LTR	379	1701	0.36	0.22	43.3	D	43.3	D

Intersection Delay = 17.9 (sec/veh) Intersection LOS = B

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: WRW
Agency/Co.: KLOA
Date Performed: 5/23/2011
Analysis Time Period: Weekday AM
Intersection: Main/7th St
Area Type: All other areas
Jurisdiction: IDOT
Analysis Year: Existing
Project ID: 09-169; St Charles, IL
E/W St: Main St (IL 64) N/S St: 7th St

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	15	1395	200	105	865	5	90	10	110	25	90	15
% Heavy Veh	2	5	2	2	5	2	2	2	2	2	2	2
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PK 15 Vol	4	367	53	28	228	2	24	3	29	7	24	4
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900			1900	1900		1900	
ParkExist												
NumPark												
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
LGConfig	L	TR		L	TR			LT	R		LTR	
Lane Width	12.0	12.0		12.0	12.0			12.0	12.0		12.0	
RTOR Vol			0			0			0			0
Adj Flow	16	1679		111	916			106	116		137	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000			0.896			0.190	
Prop RTs		0.126			0.005			0.000	1.000		0.117	
Peds Bikes		50			50			50			50	
Buses	0	0		0	0			0	0		0	
%InProtPhase	0.0			0.0								

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Arriv. Type	4	4		4	4			3	3		3	
Unit Ext.	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Ext of g	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Ped Min g		3.7			3.7			3.7			3.7	

PHASE DATA

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	A	A			NB Left	A		
	Thru		A			Thru	A		
	Right		A			Right	A		
	Peds					Peds			
WB	Left	A	A			SB Left	A		
	Thru		A			Thru	A		
	Right		A			Right	A		
	Peds					Peds			
NB	Right					EB Right			
SB	Right					WB Right			
Green		10.0	76.0			29.0			
Yellow		3.0	4.0			4.0			
All Red		0.0	2.0			2.0			

Cycle Length: 130.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	15	1395	200	105	865	5	90	10	110	25	90	15
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj flow	16	1468	211	111	911	5	95	11	116	26	95	16
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Lane group	L	TR		L	TR			LT	R		LTR	
Adj flow	16	1679		111	916			106	116		137	
Prop LTs	1.000	0.000		1.000	0.000			0.896			0.190	
Prop RTs	0.126			0.005			0.000	1.000		0.117		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		LT	R		LTR		
So	1900	1900		1900	1900		1900	1900		1900		
Lanes	1	2	0	1	2	0	0 1	1	0	1	0	
fW	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fHV	0.980	0.956		0.980	0.953		0.980	0.980		0.980		
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fBB	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fLU	1.000	0.952		1.000	0.952		1.000	1.000		1.000		
fRT		0.981			0.999		1.000	0.850		0.984		
fLT	0.950	1.000		0.950	1.000		0.594			0.928		
Sec.	0.267			0.073								
fLpb	1.000	1.000		1.000	1.000		1.000			1.000		
fRpb		1.000			1.000		1.000	1.000		1.000		
S	1770	3393		1770	3443		1106	1583		1701		
Sec.	497			137								

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)		Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound								
Prot		16	1770		0.01	0.077	136	0.12
Perm		0	497		0.00	0.631	313	0.00
Left	L	16				0.71	449	0.04
Prot								
Perm								
Thru	TR	1679	3393	#	0.49	0.58	1984	0.85
Right								
Westbound								
Prot		111	1770	#	0.06	0.077	136	0.82
Perm		0	137		0.00	0.631	86	0.00
Left	L	111				0.71	222	0.50
Prot								
Perm								
Thru	TR	916	3443		0.27	0.58	2013	0.46
Right								
Northbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LT	106	1106	#	0.10	0.22	247	0.43
Right	R	116	1583		0.07	0.22	353	0.33
Southbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	137	1701		0.08	0.22	379	0.36
Right								

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.65
Total lost time per cycle, L = 18.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.76

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Del d2	Res Del d3	Lane Group Delay	LOS	Approach Delay	LOS
Eastbound												
L	0.04	0.71	6.2	1.000	449	0.11	0.0	0.0	6.2	A		
TR	0.85	0.58	22.2	0.610	1984	0.38	3.6	0.0	17.2	B	17.1	B
Westbound												
L	0.50	0.71	16.6	1.000	222	0.11	1.8	0.0	18.4	B		
TR	0.46	0.58	15.3	0.610	2013	0.11	0.2	0.0	9.5	A	10.5	B
Northbound												
LT	0.43	0.22	43.4	1.000	247	0.11	1.2	0.0	44.6	D	43.7	D
R	0.33	0.22	42.3	1.000	353	0.11	0.5	0.0	42.9	D		
Southbound												
LTR	0.36	0.22	42.7	1.000	379	0.11	0.6	0.0	43.3	D	43.3	D

Intersection delay = 17.9 (sec/veh) Intersection LOS = B

SUPPLEMENTAL PERMITTED LT WORKSHEET for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	130.0 sec				
Total actual green time for LT lane group, G (s)		89.0	89.0		
Effective permitted green time for LT lane group, g(s)		82.0	82.0		
Opposing effective green time, go (s)		76.0	76.0		
Number of lanes in LT lane group, N		1	1		
Number of lanes in opposing approach, No		2	2		
Adjusted LT flow rate, VLT (veh/h)		16	111		
Proportion of LT in LT lane group, PLT		1.000	1.000		
Proportion of LT in opposing flow, PLTo		0.00	0.00		
Adjusted opposing flow rate, Vo (veh/h)		916	1679		
Lost time for LT lane group, tL		6.00	6.00		
Computation					
LT volume per cycle, LTC=VLTC/3600		0.58	4.01		
Opposing lane util. factor, fLUo		0.952	0.952	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		17.37	31.84		
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g		0.0	0.0		
Opposing platoon ratio, Rpo (refer Exhibit 16-11)		1.33	1.33		
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]		0.22	0.22		
gq, (see Exhibit C16-4,5,6,7,8)		11.90	40.50		
gu=g-gq if gq>=gf, or = g-gf if gq<gf		70.10	41.50		
n=Max(gq-gf)/2,0)		5.95	20.25		
PTHo=1-PLTo		1.00	1.00		
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]		1.00	1.00		
EL1 (refer to Exhibit C16-3)		3.20	6.90		
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g		0.05	0.05		
gdiff=max(gq-gf,0)		0.00	0.00		
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)		0.27	0.07		
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT		0.267	0.073		

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	130.0 sec				
Total actual green time for LT lane group, G (s)				29.0	29.0
Effective permitted green time for LT lane group, g(s)				29.0	29.0
Opposing effective green time, go (s)				29.0	29.0
Number of lanes in LT lane group, N				1	1

Number of lanes in opposing approach, No			1	1
Adjusted LT flow rate, VLT (veh/h)			95	26
Proportion of LT in LT lane group, PLT	0.000	0.000	0.896	0.190
Proportion of LT in opposing flow, PLTo			0.19	0.90
Adjusted opposing flow rate, Vo (veh/h)			137	106
Lost time for LT lane group, tL			6.00	6.00
Computation				
LT volume per cycle, LTC=VLTC/3600			3.43	0.94
Opposing lane util. factor, fLUo	0.952	0.952	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)			4.95	3.83
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g			0.0	6.5
Opposing platoon ratio, Rpo (refer Exhibit 16-11)			1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]			0.78	0.78
gq, (see Exhibit C16-4,5,6,7,8)			6.79	4.52
gu=g-gq if gq>=gf, or = g-gf if gq<gf			22.21	22.52
n=Max(gq-gf)/2,0)			3.39	0.00
PTHo=1-PLTo			0.81	0.10
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]			0.90	0.19
EL1 (refer to Exhibit C16-3)			1.59	1.54
EL2=Max((1-Ptho**n)/Plto, 1.0)			2.69	1.00
fmin=2(1+PL)/g or fmin=2(1+Pl)/g			0.13	0.08
gdiff=max(gq-gf,0)			6.79	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)			0.59	0.93
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT			0.594	0.928

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

OCCbicg
OCCr
Number of cross-street receiving lanes, Nrec
Number of turning lanes, Nturn
ApbT
Proportion right-turns, PRT
Proportion right-turns using protected phase, PRTA
Right turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

		EBLT	WBLT	NBLT	SBLT
Cycle length, C	130.0 sec				
Adj. LT vol from Vol Adjustment Worksheet, v		16	111		
v/c ratio from Capacity Worksheet, X		0.04	0.50		
Protected phase effective green interval, g (s)		10.0	10.0		
Opposing queue effective green interval, gq		11.90	40.50		
Unopposed green interval, gu		70.10	41.50		
Red time r=(C-g-gq-gu)		38.0	38.0		
Arrival rate, qa=v/(3600(max[X,1.0]))		0.00	0.03		
Protected ph. departure rate, Sp=s/3600		0.492	0.492		
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)		0.16	0.08		
XPerm		0.03	0.81		
XProt		0.04	0.30		
Case		1	1		
Queue at beginning of green arrow, Qa		0.17	1.17		
Queue at beginning of unsaturated green, Qu		0.05	1.25		
Residual queue, Qr		0.00	0.00		
Uniform Delay, d1		6.2	16.6		

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00		6.2	0.00	0.0	0.0	6.2
TR	0.0	0.00	27.0	22.2	0.00	0.0	0.0	17.2
	0.0						0.0	
Westbound								
L	0.0	0.00		16.6	0.00	0.0	0.0	18.4
TR	0.0	0.00	27.0	15.3	0.00	0.0	0.0	9.5
	0.0						0.0	
Northbound								
	0.0						0.0	
LT	0.0	0.00	50.5	43.4	0.00	0.0	0.0	44.6
R	0.0	0.00	50.5	42.3	0.00	0.0	0.0	42.9
Southbound								
	0.0						0.0	
LTR	0.0	0.00	50.5	42.7	0.00	0.0	0.0	43.3
	0.0						0.0	

Intersection Delay 17.9 sec/veh Intersection LOS B

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		LT	R		LTR		
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0		
Flow Rate	16	881		111	481		106	116		137		
So	1900	1900		1900	1900		1900	1900		1900		
No.Lanes	1	2	0	1	2	0	0 1	1		0 1	0	
SL	635	1782		314	1808		1106	1583		1701		
LnCapacity	449	1042		222	1057		247	353		379		
Flow Ratio	0.0	0.5		0.4	0.3		0.1	0.1		0.1		
v/c Ratio	0.04	0.85		0.50	0.46		0.43	0.33		0.36		
Grn Ratio	0.71	0.58		0.71	0.58		0.22	0.22		0.22		
I Factor		1.000			1.000		1.000			1.000		
AT or PVG	4	4		4	4		3	3		3		
Pltn Ratio	1.33	1.33		1.33	1.33		1.00	1.00		1.00		
PF2	0.19	0.79		0.24	0.60		1.00	1.00		1.00		
Q1	0.0	20.6		0.3	5.9		3.3	3.5		4.2		
kB	0.5	0.9		0.3	0.9		0.4	0.5		0.5		
Q2	0.0	4.0		0.3	0.7		0.3	0.2		0.3		
Q Average	0.1	24.6		0.6	6.7		3.6	3.7		4.5		
Q Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0		
Q Storage	0	0		0	0		0	0		0		
Q S Ratio												
70th Percentile Output:												
fB%	1.2	1.2		1.2	1.2		1.2	1.2		1.2		
BOQ	0.1	28.4		0.7	7.9		4.2	4.4		5.3		
QSRatio												
85th Percentile Output:												
fB%	1.6	1.4		1.6	1.5		1.6	1.6		1.6		
BOQ	0.1	35.2		1.0	10.3		5.6	5.8		6.9		
QSRatio												
90th Percentile Output:												
fB%	1.8	1.5		1.8	1.7		1.7	1.7		1.7		
BOQ	0.1	37.3		1.1	11.3		6.2	6.5		7.7		
QSRatio												
95th Percentile Output:												
fB%	2.1	1.7		2.1	1.9		2.0	2.0		2.0		
BOQ	0.1	40.7		1.3	12.8		7.1	7.4		8.8		
QSRatio												
98th Percentile Output:												
fB%	2.7	1.9		2.7	2.3		2.5	2.5		2.4		
BOQ	0.1	45.5		1.6	15.3		8.8	9.2		10.7		
QSRatio												

ERROR MESSAGES

No errors to report.

HCS+: Signalized Intersections Release 5.3

Analyst: WRW
Agency: KLOA
Date: 5/23/2011
Period: Weekday AM
Project ID: 09-169; St Charles, IL
E/W St: Main St (IL 64)

Inter.: Main/7th St
Area Type: All other areas
Jurisd: IDOT
Year : Future
N/S St: 7th St

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
LGConfig	L	TR		L	TR			LT	R		LTR	
Volume	21	1567	210	110	973	31	95	16	115	55	98	20
Lane Width	12.0	12.0		12.0	12.0			12.0	12.0		12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A	A			NB Left	A		
Thru		A			Thru	A		
Right		A			Right	A		
Peds					Peds			
WB Left	A	A			SB Left	A		
Thru		A			Thru	A		
Right		A			Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	10.0	76.0				29.0		
Yellow	3.0	4.0				4.0		
All Red	0.0	2.0				2.0		

Cycle Length: 130.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	397	1770	0.06	0.71	6.6	A		
TR	1985	3396	0.94	0.58	25.0	C	24.8	C
Westbound								
L	193	1770	0.60	0.71	36.5	D		
TR	2006	3432	0.53	0.58	10.2	B	12.8	B
Northbound								
LT	233	1044	0.50	0.22	45.9	D	44.5	D
R	353	1583	0.34	0.22	43.1	D		
Southbound								
LTR	290	1301	0.63	0.22	49.9	D	49.9	D

Intersection Delay = 23.4 (sec/veh) Intersection LOS = C

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: WRW
Agency/Co.: KLOA
Date Performed: 5/23/2011
Analysis Time Period: Weekday AM
Intersection: Main/7th St
Area Type: All other areas
Jurisdiction: IDOT
Analysis Year: Future
Project ID: 09-169; St Charles, IL
E/W St: Main St (IL 64) N/S St: 7th St

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	21	1567	210	110	973	31	95	16	115	55	98	20
% Heavy Veh	2	5	2	2	5	2	2	2	2	2	2	2
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PK 15 Vol	6	412	55	29	256	8	25	4	30	14	26	5
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900			1900	1900		1900	
ParkExist												
NumPark												
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
LGConfig	L	TR		L	TR			LT	R		LTR	
Lane Width	12.0	12.0		12.0	12.0			12.0	12.0		12.0	
RTOR Vol		0			0			0			0	
Adj Flow	22	1870		116	1057			117	121		182	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000			0.855			0.319	
Prop RTs	0.118			0.031			0.000	1.000		0.115		
Peds Bikes	50			50			50			50		
Buses	0	0		0	0			0	0		0	
%InProtPhase	0.0			0.0								

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Arriv. Type	4	4		4	4			3	3		3	
Unit Ext.	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Ext of g	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Ped Min g		3.7			3.7			3.7			3.7	

PHASE DATA

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	A	A			NB Left	A		
	Thru		A			Thru	A		
	Right		A			Right	A		
	Peds					Peds			
WB	Left	A	A			SB Left	A		
	Thru		A			Thru	A		
	Right		A			Right	A		
	Peds					Peds			
NB	Right					EB Right			
SB	Right					WB Right			
Green		10.0	76.0			29.0			
Yellow		3.0	4.0			4.0			
All Red		0.0	2.0			2.0			

Cycle Length: 130.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	21	1567	210	110	973	31	95	16	115	55	98	20
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj flow	22	1649	221	116	1024	33	100	17	121	58	103	21
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Lane group	L	TR		L	TR			LT	R		LTR	
Adj flow	22	1870		116	1057			117	121		182	
Prop LTs	1.000	0.000		1.000	0.000			0.855			0.319	
Prop RTs		0.118			0.031			0.000	1.000		0.115	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		LT	R		LTR		
So	1900	1900		1900	1900		1900	1900		1900		
Lanes	1	2	0	1	2	0	0 1	1	0	1	0	
fW	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fHV	0.980	0.956		0.980	0.953		0.980	0.980		0.980		
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fBB	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fLU	1.000	0.952		1.000	0.952		1.000	1.000		1.000		
fRT		0.982			0.995		1.000	0.850		0.984		
fLT	0.950	1.000		0.950	1.000		0.561			0.709		
Sec.	0.222			0.049								
fLpb	1.000	1.000		1.000	1.000		1.000			1.000		
fRpb		1.000			1.000		1.000	1.000		1.000		
S	1770	3396		1770	3432		1044	1583		1301		
Sec.	413			91								

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)		Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound								
Prot		22	1770		0.01	0.077	136	0.16
Perm		0	413		0.00	0.631	261	0.00
Left	L	22				0.71	397	0.06
Prot								
Perm								
Thru	TR	1870	3396	#	0.55	0.58	1985	0.94
Right								
Westbound								
Prot		116	1770	#	0.07	0.077	136	0.85
Perm		0	91		0.00	0.631	57	0.00
Left	L	116				0.71	193	0.60
Prot								
Perm								
Thru	TR	1057	3432		0.31	0.58	2006	0.53
Right								
Northbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LT	117	1044		0.11	0.22	233	0.50
Right	R	121	1583		0.08	0.22	353	0.34
Southbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	182	1301	#	0.14	0.22	290	0.63
Right								

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.76
Total lost time per cycle, L = 18.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.88

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Del d2	Res Del d3	Lane Group Delay	LOS	Approach Delay	LOS
Eastbound												
L	0.06	0.71	6.5	1.000	397	0.11	0.1	0.0	6.6	A		
TR	0.94	0.58	25.0	0.610	1985	0.45	9.8	0.0	25.0	C	24.8	C
Westbound												
L	0.60	0.71	31.3	1.000	193	0.19	5.2	0.0	36.5	D		
TR	0.53	0.58	16.2	0.610	2006	0.13	0.3	0.0	10.2	B	12.8	B
Northbound												
LT	0.50	0.22	44.2	1.000	233	0.11	1.7	0.0	45.9	D	44.5	D
R	0.34	0.22	42.5	1.000	353	0.11	0.6	0.0	43.1	D		
Southbound												
LTR	0.63	0.22	45.6	1.000	290	0.21	4.3	0.0	49.9	D	49.9	D

Intersection delay = 23.4 (sec/veh) Intersection LOS = C

SUPPLEMENTAL PERMITTED LT WORKSHEET for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	130.0 sec				
Total actual green time for LT lane group, G (s)		89.0	89.0		
Effective permitted green time for LT lane group, g(s)		82.0	82.0		
Opposing effective green time, go (s)		76.0	76.0		
Number of lanes in LT lane group, N		1	1		
Number of lanes in opposing approach, No		2	2		
Adjusted LT flow rate, VLT (veh/h)		22	116		
Proportion of LT in LT lane group, PLT		1.000	1.000		
Proportion of LT in opposing flow, PLTo		0.00	0.00		
Adjusted opposing flow rate, Vo (veh/h)		1057	1870		
Lost time for LT lane group, tL		6.00	6.00		
Computation					
LT volume per cycle, LTC=VLTC/3600		0.79	4.19		
Opposing lane util. factor, fLUo		0.952	0.952	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		20.05	35.47		
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g		0.0	0.0		
Opposing platoon ratio, Rpo (refer Exhibit 16-11)		1.33	1.33		
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]		0.22	0.22		
gq, (see Exhibit C16-4,5,6,7,8)		15.02	57.40		
gu=g-gq if gq>=gf, or = g-gf if gq<gf		66.98	24.60		
n=Max(gq-gf)/2,0)		7.51	28.70		
PTHo=1-PLTo		1.00	1.00		
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]		1.00	1.00		
EL1 (refer to Exhibit C16-3)		3.68	8.39		
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g		0.05	0.05		
gdiff=max(gq-gf,0)		0.00	0.00		
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)		0.22	0.05		
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT		0.222	0.049		

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.

For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	130.0 sec				
Total actual green time for LT lane group, G (s)				29.0	29.0
Effective permitted green time for LT lane group, g(s)				29.0	29.0
Opposing effective green time, go (s)				29.0	29.0
Number of lanes in LT lane group, N				1	1

Number of lanes in opposing approach, No			1	1
Adjusted LT flow rate, VLT (veh/h)			100	58
Proportion of LT in LT lane group, PLT	0.000	0.000	0.855	0.319
Proportion of LT in opposing flow, PLTo			0.32	0.85
Adjusted opposing flow rate, Vo (veh/h)			182	117
Lost time for LT lane group, tL			6.00	6.00
Computation				
LT volume per cycle, LTC=VLTC/3600			3.61	2.09
Opposing lane util. factor, fLUo	0.952	0.952	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)			6.57	4.22
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g			0.0	0.5
Opposing platoon ratio, Rpo (refer Exhibit 16-11)			1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]			0.78	0.78
gq, (see Exhibit C16-4,5,6,7,8)			9.88	5.34
gu=g-gq if gq>=gf, or = g-gf if gq<gf			19.12	23.66
n=Max(gq-gf)/2,0)			4.94	2.43
PTHo=1-PLTo			0.68	0.15
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]			0.85	0.32
EL1 (refer to Exhibit C16-3)			1.67	1.56
EL2=Max((1-Ptho**n)/Plto, 1.0)			2.67	1.16
fmin=2(1+PL)/g or fmin=2(1+Pl)/g			0.13	0.09
gdiff=max(gq-gf,0)			9.88	4.86
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)			0.56	0.71
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT			0.561	0.709

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

OCCbicg
OCCr
Number of cross-street receiving lanes, Nrec
Number of turning lanes, Nturn
ApbT
Proportion right-turns, PRT
Proportion right-turns using protected phase, PRTA
Right turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

		EBLT	WBLT	NBLT	SBLT
Cycle length, C	130.0 sec				
Adj. LT vol from Vol Adjustment Worksheet, v		22	116		
v/c ratio from Capacity Worksheet, X		0.06	0.60		
Protected phase effective green interval, g (s)		10.0	10.0		
Opposing queue effective green interval, gq		15.02	57.40		
Unopposed green interval, gu		66.98	24.60		
Red time r=(C-g-gq-gu)		38.0	38.0		
Arrival rate, qa=v/(3600(max[X,1.0]))		0.01	0.03		
Protected ph. departure rate, Sp=s/3600		0.492	0.492		
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)		0.14	0.08		
XPerm		0.05	1.27		
XProt		0.06	0.31		
Case		1	3		
Queue at beginning of green arrow, Qa		0.23	1.79		
Queue at beginning of unsaturated green, Qu		0.09	1.85		
Residual queue, Qr		0.00	0.57		
Uniform Delay, d1		6.5	31.3		

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00		6.5	0.00	0.0	0.0	6.6
TR	0.0	0.00	27.0	25.0	0.00	0.0	0.0	25.0
	0.0						0.0	
Westbound								
L	0.0	0.00		31.3	0.00	0.0	0.0	36.5
TR	0.0	0.00	27.0	16.2	0.00	0.0	0.0	10.2
	0.0						0.0	
Northbound								
	0.0						0.0	
LT	0.0	0.00	50.5	44.2	0.00	0.0	0.0	45.9
R	0.0	0.00	50.5	42.5	0.00	0.0	0.0	43.1
Southbound								
	0.0						0.0	
LTR	0.0	0.00	50.5	45.6	0.00	0.0	0.0	49.9
	0.0						0.0	

Intersection Delay 23.4 sec/veh Intersection LOS C

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		LT	R		LTR		
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0		
Flow Rate	22	982		116	555		117	121		182		
So	1900	1900		1900	1900		1900	1900		1900		
No.Lanes	1	2	0	1	2	0	0 1	1		0 1		0
SL	560	1783		274	1802		1044	1583		1301		
LnCapacity	397	1042		193	1053		233	353		290		
Flow Ratio	0.0	0.6		0.4	0.3		0.1	0.1		0.1		
v/c Ratio	0.06	0.94		0.60	0.53		0.50	0.34		0.63		
Grn Ratio	0.71	0.58		0.71	0.58		0.22	0.22		0.22		
I Factor		1.000			1.000		1.000			1.000		
AT or PVG	4	4		4	4		3	3		3		
Pltn Ratio	1.33	1.33		1.33	1.33		1.00	1.00		1.00		
PF2	0.20	0.90		0.26	0.62		1.00	1.00		1.00		
Q1	0.0	29.4		0.3	7.5		3.7	3.7		5.9		
kB	0.5	0.9		0.3	0.9		0.4	0.5		0.4		
Q2	0.0	7.3		0.5	1.0		0.4	0.2		0.7		
Q Average	0.1	36.8		0.8	8.5		4.0	3.9		6.6		
Q Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0		
Q Storage	0	0		0	0		0	0		0		
Q S Ratio												
70th Percentile Output:												
fB%	1.2	1.1		1.2	1.2		1.2	1.2		1.2		
BOQ	0.1	41.9		0.9	10.0		4.8	4.7		7.8		
QSRatio												
85th Percentile Output:												
fB%	1.6	1.4		1.6	1.5		1.6	1.6		1.5		
BOQ	0.1	51.0		1.2	12.9		6.3	6.1		10.2		
QSRatio												
90th Percentile Output:												
fB%	1.8	1.5		1.8	1.7		1.7	1.7		1.7		
BOQ	0.1	53.8		1.4	14.1		7.0	6.8		11.1		
QSRatio												
95th Percentile Output:												
fB%	2.1	1.6		2.1	1.9		2.0	2.0		1.9		
BOQ	0.2	58.0		1.6	15.9		8.0	7.8		12.6		
QSRatio												
98th Percentile Output:												
fB%	2.7	1.8		2.6	2.2		2.4	2.4		2.3		
BOQ	0.2	64.7		2.1	18.8		9.9	9.6		15.2		
QSRatio												

ERROR MESSAGES

No errors to report.

HCS+: Signalized Intersections Release 5.3

Analyst: WRW
Agency: KLOA
Date: 5/23/2011
Period: Weekday PM
Project ID: 09-169; St Charles, IL
E/W St: Main St (IL 64)

Inter.: Main/7th St
Area Type: All other areas
Jurisd: IDOT
Year : Existing
N/S St: 7th St

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
LGConfig	L	TR		L	TR			LT	R		LTR	
Volume	15	940	100	110	1285	10	195	20	115	25	45	20
Lane Width	12.0	12.0		12.0	12.0			12.0	12.0		12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A	A			NB Left	A			
Thru		A			Thru	A			
Right		A			Right	A			
Peds					Peds				
WB Left	A	A			SB Left	A			
Thru		A			Thru	A			
Right		A			Right	A			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	10.0	91.0				34.0			
Yellow	3.0	4.0				4.0			
All Red	0.0	2.0				2.0			

Cycle Length: 150.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	298	1770	0.05	0.71	8.4	A		
TR	2066	3405	0.53	0.61	9.8	A	9.8	A
Westbound								
L	381	1770	0.30	0.71	8.2	A		
TR	2088	3442	0.65	0.61	11.5	B	11.2	B
Northbound								
LT	279	1232	0.81	0.23	71.2	E	63.5	E
R	359	1583	0.34	0.23	49.1	D		
Southbound								
LTR	281	1238	0.33	0.23	49.2	D	49.2	D

Intersection Delay = 17.9 (sec/veh) Intersection LOS = B

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: WRW
Agency/Co.: KLOA
Date Performed: 5/23/2011
Analysis Time Period: Weekday PM
Intersection: Main/7th St
Area Type: All other areas
Jurisdiction: IDOT
Analysis Year: Existing
Project ID: 09-169; St Charles, IL
E/W St: Main St (IL 64) N/S St: 7th St

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	15	940	100	110	1285	10	195	20	115	25	45	20
% Heavy Veh	2	5	2	2	5	2	2	2	2	2	2	2
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PK 15 Vol	4	247	26	29	338	3	51	5	30	7	12	5
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900			1900	1900		1900	
ParkExist												
NumPark												
No. Lanes		1	2	0	1	2	0	0	1	1	0	1	0
LGConfig	L		TR	L		TR			LT	R		LTR	
Lane Width	12.0	12.0		12.0	12.0			12.0	12.0		12.0	
RTOR Vol			0			0			0			0
Adj Flow	16	1094		116	1364			226	121		94	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000			0.907			0.277	
Prop RTs		0.096			0.008			0.000	1.000		0.223	
Peds Bikes		50			50			50			50	
Buses	0	0		0	0			0	0		0	
%InProtPhase	0.0			0.0								

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Arriv. Type	4	4		4	4			3	3		3	
Unit Ext.	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Ext of g	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Ped Min g		3.8			3.8			3.8			3.8	

PHASE DATA

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	A	A			NB Left	A		
	Thru		A			Thru	A		
	Right		A			Right	A		
	Peds					Peds			
WB	Left	A	A			SB Left	A		
	Thru		A			Thru	A		
	Right		A			Right	A		
	Peds					Peds			
NB	Right					EB Right			
SB	Right					WB Right			
Green		10.0	91.0			34.0			
Yellow		3.0	4.0			4.0			
All Red		0.0	2.0			2.0			

Cycle Length: 150.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	15	940	100	110	1285	10	195	20	115	25	45	20
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj flow	16	989	105	116	1353	11	205	21	121	26	47	21
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Lane group	L	TR		L	TR			LT	R		LTR	
Adj flow	16	1094		116	1364			226	121		94	
Prop LTs	1.000	0.000		1.000	0.000			0.907			0.277	
Prop RTs	0.096			0.008			0.000	1.000		0.223		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		LT	R		LTR		
So	1900	1900		1900	1900		1900	1900		1900		
Lanes	1	2	0	1	2	0	0 1	1	0	1	0	
fW	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fHV	0.980	0.955		0.980	0.953		0.980	0.980		0.980		
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fBB	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fLU	1.000	0.952		1.000	0.952		1.000	1.000		1.000		
fRT		0.986			0.999		1.000	0.850		0.970		
fLT	0.950	1.000		0.950	1.000		0.661			0.685		
Sec.	0.150			0.219								
fLpb	1.000	1.000		1.000	1.000		1.000			1.000		
fRpb		1.000			1.000		1.000	1.000		1.000		
S	1770	3405		1770	3442		1232	1583		1238		
Sec.	279			407								

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)		Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound								
Prot		16	1770		0.01	0.067	118	0.14
Perm		0	279		0.00	0.647	180	0.00
Left	L	16				0.71	298	0.05
Prot								
Perm								
Thru	TR	1094	3405		0.32	0.61	2066	0.53
Right								
Westbound								
Prot		116	1770	#	0.07	0.067	118	0.98
Perm		0	407		0.00	0.647	263	0.00
Left	L	116				0.71	381	0.30
Prot								
Perm								
Thru	TR	1364	3442	#	0.40	0.61	2088	0.65
Right								
Northbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LT	226	1232	#	0.18	0.23	279	0.81
Right	R	121	1583		0.08	0.23	359	0.34
Southbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	94	1238		0.08	0.23	281	0.33
Right								

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.65
Total lost time per cycle, L = 18.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.73

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
L	0.05	0.71	8.3	1.000	298	0.11	0.1	0.0	8.4	A		
TR	0.53	0.61	17.1	0.559	2066	0.13	0.3	0.0	9.8	A	9.8	A
Westbound												
L	0.30	0.71	7.7	1.000	381	0.11	0.5	0.0	8.2	A		
TR	0.65	0.61	19.2	0.559	2088	0.23	0.7	0.0	11.5	B	11.2	B
Northbound												
LT	0.81	0.23	54.9	1.000	279	0.35	16.3	0.0	71.2	E	63.5	E
R	0.34	0.23	48.6	1.000	359	0.11	0.6	0.0	49.1	D		
Southbound												
LTR	0.33	0.23	48.5	1.000	281	0.11	0.7	0.0	49.2	D	49.2	D

Intersection delay = 17.9 (sec/veh) Intersection LOS = B

SUPPLEMENTAL PERMITTED LT WORKSHEET for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	150.0 sec				
Total actual green time for LT lane group, G (s)		104.0	104.0		
Effective permitted green time for LT lane group, g(s)		97.0	97.0		
Opposing effective green time, go (s)		91.0	91.0		
Number of lanes in LT lane group, N		1	1		
Number of lanes in opposing approach, No		2	2		
Adjusted LT flow rate, VLT (veh/h)		16	116		
Proportion of LT in LT lane group, PLT		1.000	1.000		
Proportion of LT in opposing flow, PLTo		0.00	0.00		
Adjusted opposing flow rate, Vo (veh/h)		1364	1094		
Lost time for LT lane group, tL		6.00	6.00		
Computation					
LT volume per cycle, LTC=VLTC/3600		0.67	4.83		
Opposing lane util. factor, fLUo		0.952	0.952	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		29.85	23.94		
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g		0.0	0.0		
Opposing platoon ratio, Rpo (refer Exhibit 16-11)		1.33	1.33		
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]		0.19	0.19		
gq, (see Exhibit C16-4,5,6,7,8)		24.31	15.93		
gu=g-gq if gq>=gf, or = g-gf if gq<gf		72.69	81.07		
n=Max(gq-gf)/2,0)		12.15	7.97		
PTHo=1-PLTo		1.00	1.00		
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]		1.00	1.00		
EL1 (refer to Exhibit C16-3)		5.01	3.82		
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g		0.04	0.04		
gdiff=max(gq-gf,0)		0.00	0.00		
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)		0.15	0.22		
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT		0.150	0.219		

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.

For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	150.0 sec				
Total actual green time for LT lane group, G (s)				34.0	34.0
Effective permitted green time for LT lane group, g(s)				34.0	34.0
Opposing effective green time, go (s)				34.0	34.0
Number of lanes in LT lane group, N				1	1

Number of lanes in opposing approach, No			1	1
Adjusted LT flow rate, VLT (veh/h)			205	26
Proportion of LT in LT lane group, PLT	0.000	0.000	0.907	0.277
Proportion of LT in opposing flow, PLTo			0.28	0.91
Adjusted opposing flow rate, Vo (veh/h)			94	226
Lost time for LT lane group, tL			6.00	6.00
Computation				
LT volume per cycle, LTC=VLTC/3600			8.54	1.08
Opposing lane util. factor, fLUo	0.952	0.952	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)			3.92	9.42
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g			0.0	7.4
Opposing platoon ratio, Rpo (refer Exhibit 16-11)			1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]			0.77	0.77
gq, (see Exhibit C16-4,5,6,7,8)			4.65	14.78
gu=g-gq if gq>=gf, or = g-gf if gq<gf			29.35	19.22
n=Max(gq-gf)/2,0)			2.33	3.71
PTHo=1-PLTo			0.72	0.09
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]			0.91	0.28
EL1 (refer to Exhibit C16-3)			1.52	1.74
EL2=Max((1-Ptho**n)/Plto, 1.0)			1.91	1.10
fmin=2(1+PL)/g or fmin=2(1+Pl)/g			0.11	0.08
gdiff=max(gq-gf,0)			4.65	7.42
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)			0.66	0.69
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT			0.661	0.685

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

OCCbicg
OCCr
Number of cross-street receiving lanes, Nrec
Number of turning lanes, Nturn
ApbT
Proportion right-turns, PRT
Proportion right-turns using protected phase, PRTA
Right turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

		EBLT	WBLT	NBLT	SBLT
Cycle length, C	150.0 sec				
Adj. LT vol from Vol Adjustment Worksheet, v		16	116		
v/c ratio from Capacity Worksheet, X		0.05	0.30		
Protected phase effective green interval, g (s)		10.0	10.0		
Opposing queue effective green interval, gq		24.31	15.93		
Unopposed green interval, gu		72.69	81.07		
Red time r=(C-g-gq-gu)		43.0	43.0		
Arrival rate, qa=v/(3600(max[X,1.0]))		0.00	0.03		
Protected ph. departure rate, Sp=s/3600		0.492	0.492		
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)		0.10	0.14		
XPerm		0.06	0.29		
XProt		0.05	0.35		
Case		1	1		
Queue at beginning of green arrow, Qa		0.19	1.39		
Queue at beginning of unsaturated green, Qu		0.11	0.51		
Residual queue, Qr		0.00	0.00		
Uniform Delay, d1		8.3	7.7		

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00		8.3	0.00	0.0	0.0	8.4
TR	0.0	0.00	29.5	17.1	0.00	0.0	0.0	9.8
	0.0						0.0	
Westbound								
L	0.0	0.00		7.7	0.00	0.0	0.0	8.2
TR	0.0	0.00	29.5	19.2	0.00	0.0	0.0	11.5
	0.0						0.0	
Northbound								
	0.0						0.0	
LT	0.0	0.00	58.0	54.9	0.00	0.0	0.0	71.2
R	0.0	0.00	58.0	48.6	0.00	0.0	0.0	49.1
Southbound								
	0.0						0.0	
LTR	0.0	0.00	58.0	48.5	0.00	0.0	0.0	49.2
	0.0						0.0	

Intersection Delay 17.9 sec/veh Intersection LOS B

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		LT	R		LTR		
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0		
Flow Rate	16	574		116	716		226	121		94		
So	1900	1900		1900	1900		1900	1900		1900		
No.Lanes	1	2	0	1	2	0	0 1	1		0 1	0	
SL	418	1788		534	1807		1232	1583		1238		
LnCapacity	298	1085		381	1096		279	359		281		
Flow Ratio	0.0	0.3		0.2	0.4		0.2	0.1		0.1		
v/c Ratio	0.05	0.53		0.30	0.65		0.81	0.34		0.33		
Grn Ratio	0.71	0.61		0.71	0.61		0.23	0.23		0.23		
I Factor		1.000			1.000		1.000			1.000		
AT or PVG	4	4		4	4		3	3		3		
Pltn Ratio	1.33	1.33		1.33	1.33		1.00	1.00		1.00		
PF2	0.18	0.58		0.19	0.62		1.00	1.00		1.00		
Q1	0.0	8.0		0.3	12.1		8.9	4.2		3.3		
kB	0.4	1.0		0.5	1.0		0.4	0.5		0.4		
Q2	0.0	1.1		0.2	1.8		1.5	0.3		0.2		
Q Average	0.1	9.1		0.5	13.9		10.4	4.5		3.5		
Q Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0		
Q Storage	0	0		0	0		0	0		0		
Q S Ratio												
70th Percentile Output:												
fB%	1.2	1.2		1.2	1.2		1.2	1.2		1.2		
BOQ	0.1	10.7		0.6	16.3		12.3	5.3		4.2		
QSRatio												
85th Percentile Output:												
fB%	1.6	1.5		1.6	1.5		1.5	1.6		1.6		
BOQ	0.1	13.8		0.8	20.7		15.8	7.0		5.5		
QSRatio												
90th Percentile Output:												
fB%	1.8	1.7		1.8	1.6		1.6	1.7		1.7		
BOQ	0.1	15.0		0.9	22.2		17.1	7.7		6.1		
QSRatio												
95th Percentile Output:												
fB%	2.1	1.9		2.1	1.8		1.8	2.0		2.0		
BOQ	0.1	16.9		1.0	24.7		19.2	8.8		7.0		
QSRatio												
98th Percentile Output:												
fB%	2.7	2.2		2.7	2.0		2.1	2.4		2.5		
BOQ	0.2	19.9		1.3	28.4		22.4	10.8		8.6		
QSRatio												

ERROR MESSAGES

No errors to report.

HCS+: Signalized Intersections Release 5.3

Analyst: WRW
Agency: KLOA
Date: 5/23/2011
Period: Weekday PM
Project ID: 09-169; St Charles, IL
E/W St: Main St (IL 64)

Inter.: Main/7th St
Area Type: All other areas
Jurisd: IDOT
Year : Existing
N/S St: 7th St

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
LGConfig	L	TR		L	TR			LT	R		LTR	
Volume	24	1060	105	115	1448	38	205	28	120	53	52	25
Lane Width	12.0	12.0		12.0	12.0			12.0	12.0		12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	A	A			NB	Left	A			
	Thru		A				Thru	A			
	Right		A				Right	A			
	Peds						Peds				
WB	Left	A	A			SB	Left	A			
	Thru		A				Thru	A			
	Right		A				Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		10.0	91.0					34.0			
Yellow		3.0	4.0					4.0			
All Red		0.0	2.0					2.0			

Cycle Length: 150.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	247	1770	0.10	0.71	10.5	B		
TR	2067	3407	0.59	0.61	10.6	B	10.6	B
Westbound								
L	338	1770	0.36	0.71	9.1	A		
TR	2084	3435	0.75	0.61	13.5	B	13.2	B
Northbound								
LT	261	1152	0.94	0.23	96.3	F	80.4	F
R	359	1583	0.35	0.23	49.3	D		
Southbound								
LTR	173	764	0.79	0.23	76.4	E	76.4	E

Intersection Delay = 22.0 (sec/veh) Intersection LOS = C

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: WRW
Agency/Co.: KLOA
Date Performed: 5/23/2011
Analysis Time Period: Weekday PM
Intersection: Main/7th St
Area Type: All other areas
Jurisdiction: IDOT
Analysis Year: Existing
Project ID: 09-169; St Charles, IL
E/W St: Main St (IL 64) N/S St: 7th St

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	24	1060	105	115	1448	38	205	28	120	53	52	25
% Heavy Veh	2	5	2	2	5	2	2	2	2	2	2	2
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PK 15 Vol	6	279	28	30	381	10	54	7	32	14	14	7
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900			1900	1900		1900	
ParkExist												
NumPark												
No. Lanes		1	2	0	1	2	0	0	1	1	0	1	0
LGConfig	L		TR	L		TR			LT	R		LTR	
Lane Width	12.0	12.0		12.0	12.0			12.0	12.0		12.0	
RTOR Vol			0			0			0			0
Adj Flow	25	1227		121	1564			245	126		137	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000			0.882			0.409	
Prop RTs		0.090			0.026			0.000	1.000		0.190	
Peds Bikes		50			50			50			50	
Buses	0	0		0	0			0	0		0	
%InProtPhase	0.0			0.0								

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Arriv. Type	4	4		4	4			3	3		3	
Unit Ext.	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Ext of g	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Ped Min g		3.8			3.8			3.8			3.8	

PHASE DATA

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	A	A			NB Left A			
	Thru		A			Thru A			
	Right		A			Right A			
	Peds					Peds			
WB	Left	A	A			SB Left A			
	Thru		A			Thru A			
	Right		A			Right A			
	Peds					Peds			
NB	Right					EB Right			
SB	Right					WB Right			
Green		10.0	91.0			34.0			
Yellow		3.0	4.0			4.0			
All Red		0.0	2.0			2.0			

Cycle Length: 150.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	24	1060	105	115	1448	38	205	28	120	53	52	25
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj flow	25	1116	111	121	1524	40	216	29	126	56	55	26
No. Lanes	1	2	0	1	2	0	0	1	1	0	1	0
Lane group	L	TR		L	TR			LT	R		LTR	
Adj flow	25	1227		121	1564			245	126		137	
Prop LTs	1.000	0.000		1.000	0.000			0.882			0.409	
Prop RTs		0.090			0.026			0.000	1.000		0.190	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		LT	R		LTR		
So	1900	1900		1900	1900		1900	1900		1900		
Lanes	1	2	0	1	2	0	0 1	1	0	1	0	
fW	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fHV	0.980	0.955		0.980	0.953		0.980	0.980		0.980		
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fBB	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000		
fLU	1.000	0.952		1.000	0.952		1.000	1.000		1.000		
fRT		0.986			0.996		1.000	0.850		0.974		
fLT	0.950	1.000		0.950	1.000		0.618			0.421		
Sec.	0.107			0.183								
fLpb	1.000	1.000		1.000	1.000		1.000			1.000		
fRpb		1.000			1.000		1.000	1.000		1.000		
S	1770	3407		1770	3435		1152	1583		764		
Sec.	199			340								

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)		Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound								
Prot		25	1770		0.01	0.067	118	0.21
Perm		0	199		0.00	0.647	129	0.00
Left	L	25				0.71	247	0.10
Prot								
Perm								
Thru	TR	1227	3407		0.36	0.61	2067	0.59
Right								
Westbound								
Prot		118	1770	#	0.07	0.067	118	1.00
Perm		3	340		0.01	0.647	220	0.01
Left	L	121				0.71	338	0.36
Prot								
Perm								
Thru	TR	1564	3435	#	0.46	0.61	2084	0.75
Right								
Northbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LT	245	1152	#	0.21	0.23	261	0.94
Right	R	126	1583		0.08	0.23	359	0.35
Southbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	137	764		0.18	0.23	173	0.79
Right								

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.73
Total lost time per cycle, L = 18.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.83

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Del d2	Res Del d3	Lane Group Delay	LOS	Approach Delay	LOS
Eastbound												
L	0.10	0.71	10.3	1.000	247	0.11	0.2	0.0	10.5	B		
TR	0.59	0.61	18.1	0.559	2067	0.18	0.5	0.0	10.6	B	10.6	B
Westbound												
L	0.36	0.71	8.4	1.000	338	0.11	0.7	0.0	9.1	A		
TR	0.75	0.61	21.3	0.559	2084	0.31	1.6	0.0	13.5	B	13.2	B
Northbound												
LT	0.94	0.23	57.0	1.000	261	0.45	39.4	0.0	96.3	F	80.4	F
R	0.35	0.23	48.7	1.000	359	0.11	0.6	0.0	49.3	D		
Southbound												
LTR	0.79	0.23	54.7	1.000	173	0.34	21.7	0.0	76.4	E	76.4	E

Intersection delay = 22.0 (sec/veh) Intersection LOS = C

SUPPLEMENTAL PERMITTED LT WORKSHEET for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	150.0 sec				
Total actual green time for LT lane group, G (s)		104.0	104.0		
Effective permitted green time for LT lane group, g(s)		97.0	97.0		
Opposing effective green time, go (s)		91.0	91.0		
Number of lanes in LT lane group, N		1	1		
Number of lanes in opposing approach, No		2	2		
Adjusted LT flow rate, VLT (veh/h)		25	121		
Proportion of LT in LT lane group, PLT		1.000	1.000		
Proportion of LT in opposing flow, PLTo		0.00	0.00		
Adjusted opposing flow rate, Vo (veh/h)		1564	1227		
Lost time for LT lane group, tL		6.00	6.00		
Computation					
LT volume per cycle, LTC=VLTC/3600		1.04	5.04		
Opposing lane util. factor, fLUo		0.952	0.952	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		34.23	26.85		
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g		0.0	0.0		
Opposing platoon ratio, Rpo (refer Exhibit 16-11)		1.33	1.33		
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]		0.19	0.19		
gq, (see Exhibit C16-4,5,6,7,8)		33.41	19.64		
gu=g-gq if gq>=gf, or = g-gf if gq<gf		63.59	77.36		
n=Max(gq-gf)/2,0)		16.71	9.82		
PTHo=1-PLTo		1.00	1.00		
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]		1.00	1.00		
EL1 (refer to Exhibit C16-3)		6.13	4.37		
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g		0.04	0.04		
gdiff=max(gq-gf,0)		0.00	0.00		
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)		0.11	0.18		
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT		0.107	0.183		

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	150.0 sec				
Total actual green time for LT lane group, G (s)				34.0	34.0
Effective permitted green time for LT lane group, g(s)				34.0	34.0
Opposing effective green time, go (s)				34.0	34.0
Number of lanes in LT lane group, N				1	1

Number of lanes in opposing approach, No			1	1
Adjusted LT flow rate, VLT (veh/h)			216	56
Proportion of LT in LT lane group, PLT	0.000	0.000	0.882	0.409
Proportion of LT in opposing flow, PLTo			0.41	0.88
Adjusted opposing flow rate, Vo (veh/h)			137	245
Lost time for LT lane group, tL			6.00	6.00
Computation				
LT volume per cycle, LTC=VLTC/3600			9.00	2.33
Opposing lane util. factor, fLUo	0.952	0.952	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)			5.71	10.21
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g			0.0	0.7
Opposing platoon ratio, Rpo (refer Exhibit 16-11)			1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]			0.77	0.77
gq, (see Exhibit C16-4,5,6,7,8)			8.19	16.10
gu=g-gq if gq>=gf, or = g-gf if gq<gf			25.81	17.90
n=Max(gq-gf)/2,0)			4.10	7.68
PTHo=1-PLTo			0.59	0.12
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]			0.88	0.41
EL1 (refer to Exhibit C16-3)			1.59	1.78
EL2=Max((1-Ptho**n)/Plto, 1.0)			2.16	1.13
fmin=2(1+PL)/g or fmin=2(1+Pl)/g			0.11	0.08
gdiff=max(gq-gf,0)			8.19	15.37
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)			0.62	0.42
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT			0.618	0.421

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

OCCbicg
OCCr
Number of cross-street receiving lanes, Nrec
Number of turning lanes, Nturn
ApbT
Proportion right-turns, PRT
Proportion right-turns using protected phase, PRTA
Right turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

		EBLT	WBLT	NBLT	SBLT
Cycle length, C	150.0 sec				
Adj. LT vol from Vol Adjustment Worksheet, v		25	121		
v/c ratio from Capacity Worksheet, X		0.10	0.36		
Protected phase effective green interval, g (s)		10.0	10.0		
Opposing queue effective green interval, gq		33.41	19.64		
Unopposed green interval, gu		63.59	77.36		
Red time r=(C-g-gq-gu)		43.0	43.0		
Arrival rate, qa=v/(3600(max[X,1.0]))		0.01	0.03		
Protected ph. departure rate, Sp=s/3600		0.492	0.492		
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)		0.08	0.12		
XPerm		0.13	0.36		
XProt		0.07	0.36		
Case		1	1		
Queue at beginning of green arrow, Qa		0.30	1.45		
Queue at beginning of unsaturated green, Qu		0.23	0.66		
Residual queue, Qr		0.00	0.00		
Uniform Delay, d1		10.3	8.4		

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00		10.3	0.00	0.0	0.0	10.5
TR	0.0	0.00	29.5	18.1	0.00	0.0	0.0	10.6
	0.0						0.0	
Westbound								
L	0.0	0.00		8.4	0.00	0.0	0.0	9.1
TR	0.0	0.00	29.5	21.3	0.00	0.0	0.0	13.5
	0.0						0.0	
Northbound								
	0.0						0.0	
LT	0.0	0.00	58.0	57.0	0.00	0.0	0.0	96.3
R	0.0	0.00	58.0	48.7	0.00	0.0	0.0	49.3
Southbound								
	0.0						0.0	
LTR	0.0	0.00	58.0	54.7	0.00	0.0	0.0	76.4
	0.0						0.0	

Intersection Delay 22.0 sec/veh Intersection LOS C

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		LT	R		LTR		
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0		
Flow Rate	25	644		121	821		245	126		137		
So	1900	1900		1900	1900		1900	1900		1900		
No.Lanes	1	2	0	1	2	0	0 1	1		0 1	0	
SL	346	1789		474	1804		1152	1583		764		
LnCapacity	247	1085		338	1094		261	359		173		
Flow Ratio	0.1	0.4		0.3	0.5		0.2	0.1		0.2		
v/c Ratio	0.10	0.59		0.36	0.75		0.94	0.35		0.79		
Grn Ratio	0.71	0.61		0.71	0.61		0.23	0.23		0.23		
I Factor		1.000			1.000		1.000			1.000		
AT or PVG	4	4		4	4		3	3		3		
Pltn Ratio	1.33	1.33		1.33	1.33		1.00	1.00		1.00		
PF2	0.18	0.60		0.20	0.67		1.00	1.00		1.00		
Q1	0.1	9.9		0.3	16.6		10.0	4.4		5.4		
kB	0.4	1.0		0.5	1.0		0.4	0.5		0.3		
Q2	0.0	1.4		0.3	2.8		2.7	0.3		1.0		
Q Average	0.1	11.3		0.6	19.4		12.7	4.7		6.4		
Q Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0		
Q Storage	0	0		0	0		0	0		0		
Q S Ratio												
70th Percentile Output:												
fB%	1.2	1.2		1.2	1.2		1.2	1.2		1.2		
BOQ	0.1	13.2		0.7	22.5		14.9	5.6		7.6		
QSRatio												
85th Percentile Output:												
fB%	1.6	1.5		1.6	1.5		1.5	1.6		1.5		
BOQ	0.2	17.0		0.9	28.2		19.1	7.3		9.9		
QSRatio												
90th Percentile Output:												
fB%	1.8	1.6		1.8	1.6		1.6	1.7		1.7		
BOQ	0.2	18.3		1.0	30.1		20.5	8.0		10.8		
QSRatio												
95th Percentile Output:												
fB%	2.1	1.8		2.1	1.7		1.8	2.0		1.9		
BOQ	0.2	20.5		1.2	33.0		22.9	9.2		12.3		
QSRatio												
98th Percentile Output:												
fB%	2.7	2.1		2.7	1.9		2.1	2.4		2.3		
BOQ	0.3	23.9		1.5	37.3		26.5	11.2		14.8		
QSRatio												

ERROR MESSAGES

No errors to report.

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*12/18/2009*
Analysis Time Period	*Weekday AM*

Site Information

Intersection	*Main/9th St*
Jurisdiction	*IDOT*
Analysis Year	*Existing*

Project Description *09-169; St Charles, IL*

East/West Street: *Main St (IL 64)* North/South Street: *9th St*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*20*	*1560*			*875*	*95*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*21*	*1642*	*0*	*0*	*921*	*100*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*2*	*0*
Configuration	*L*	*T*			*T*	*TR*
Upstream Signal		*0*			*1*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*50*		*30*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*52*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (veh/h)	*21*					*52*		*31*
C (m) (veh/h)	*663*					*183*		*529*
v/c	*0.03*					*0.28*		*0.06*
95% queue length	*0.10*					*1.11*		*0.19*
Control Delay (s/veh)	*10.6*					*32.3*		*12.2*
LOS	*B*					*D*		*B*
Approach Delay (s/veh)	--	--				*24.8*		
Approach LOS	--	--				*C*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*WRW*	Intersection	*Main/9th St*
Agency/Co.	*KLOA*	Jurisdiction	*IDOT*
Date Performed	*5/23/2011*	Analysis Year	*Future*
Analysis Time Period	*Weekday AM*		

Project Description *09-169; St Charles, IL*

East/West Street: *Main St (IL 64)* North/South Street: *9th St*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*36*	*1736*			*985*	*103*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*37*	*1827*	*0*	*0*	*1036*	*108*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*2*	*0*
Configuration	*L*	*T*			*T*	*TR*
Upstream Signal		*0*			*1*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*62*		*49*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*65*	*0*	*51*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (veh/h)	*37*					*65*		*51*
C (m) (veh/h)	*597*					*151*		*489*
v/c	*0.06*					*0.43*		*0.10*
95% queue length	*0.20*					*1.92*		*0.35*
Control Delay (s/veh)	*11.4*					*45.7*		*13.2*
LOS	*B*					*E*		*B*
Approach Delay (s/veh)	--	--				*31.4*		
Approach LOS	--	--				*D*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*12/18/2009*
Analysis Time Period	*Weekday PM*

Site Information

Intersection	*Main/9th St*
Jurisdiction	*IDOT*
Analysis Year	*Existing*

Project Description *09-169; St Charles, IL*

East/West Street: *Main St (IL 64)* North/South Street: *9th St*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*20*	*1015*			*1500*	*135*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*21*	*1068*	*0*	*0*	*1578*	*142*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*2*	*0*
Configuration	*L*	*T*			*T*	*TR*
Upstream Signal		*0*			*1*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*40*		*30*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*42*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (veh/h)	*21*					*42*		*31*
C (m) (veh/h)	*362*					*109*		*334*
v/c	*0.06*					*0.39*		*0.09*
95% queue length	*0.18*					*1.58*		*0.30*
Control Delay (s/veh)	*15.6*					*57.4*		*16.9*
LOS	*C*					*F*		*C*
Approach Delay (s/veh)	--	--				*40.2*		
Approach LOS	--	--				*E*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*WRW*	Intersection	*Main/9th St*
Agency/Co.	*KLOA*	Jurisdiction	*IDOT*
Date Performed	*5/23/2011*	Analysis Year	*Future*
Analysis Time Period	*Weekday PM*		

Project Description *09-169; St Charles, IL*

East/West Street: *Main St (IL 64)* | North/South Street: *9th St*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*35*	*1134*			*1525*	*153*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*36*	*1193*	*0*	*0*	*1605*	*161*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*2*	*0*
Configuration	*L*	*T*			*T*	*TR*
Upstream Signal		*0*			*1*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*55*		*50*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*57*	*0*	*52*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (veh/h)	*36*					*57*		*52*
C (m) (veh/h)	*349*					*101*		*325*
v/c	*0.10*					*0.56*		*0.16*
95% queue length	*0.34*					*2.63*		*0.56*
Control Delay (s/veh)	*16.5*					*79.2*		*18.2*
LOS	*C*					*F*		*C*
Approach Delay (s/veh)	--	--				*50.1*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*12/18/2009*
Analysis Time Period	*Weekday AM*

Site Information

Intersection	*Dean/State*
Jurisdiction	*Local*
Analysis Year	*Existing*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *Dean St*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*90*	*25*	*215*	*45*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*94*	*26*	*226*	*47*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*35*		*85*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*36*	*0*	*89*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*226*		*125*				
C (m) (veh/h)		*1468*		*670*				
v/c		*0.15*		*0.19*				
95% queue length		*0.54*		*0.68*				
Control Delay (s/veh)		*7.9*		*11.6*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*11.6*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*5/23/2011*
Analysis Time Period	*Weekday AM*

Site Information

Intersection	*Dean/State*
Jurisdiction	*Local*
Analysis Year	*Future*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *Dean St*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*90*	*49*	*231*	*50*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*94*	*51*	*243*	*52*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*61*		*94*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*64*	*0*	*98*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*243*		*162*				
C (m) (veh/h)		*1437*		*568*				
v/c		*0.17*		*0.29*				
95% queue length		*0.61*		*1.17*				
Control Delay (s/veh)		*8.0*		*13.8*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*13.8*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*12/18/2009*
Analysis Time Period	*Weekday PM*

Site Information

Intersection	*Dean/State*
Jurisdiction	*Local*
Analysis Year	*Existing*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *Dean St*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*130*	*25*	*100*	*40*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*136*	*26*	*105*	*42*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*30*		*95*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*31*	*0*	*100*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*105*		*131*				
C (m) (veh/h)		*1417*		*786*				
v/c		*0.07*		*0.17*				
95% queue length		*0.24*		*0.60*				
Control Delay (s/veh)		*7.7*		*10.5*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*10.5*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*5/23/2011*
Analysis Time Period	*Weekday PM*

Site Information

Intersection	*Dean/State*
Jurisdiction	*Local*
Analysis Year	*Future*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *Dean St*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*140*	*48*	*109*	*45*	
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*147*	*50*	*114*	*47*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*60*		*107*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*63*	*0*	*112*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*114*		*175*				
C (m) (veh/h)		*1376*		*702*				
v/c		*0.08*		*0.25*				
95% queue length		*0.27*		*0.98*				
Control Delay (s/veh)		*7.9*		*11.8*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*11.8*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*WRW*	Intersection	*State/9th*
Agency/Co.	*KLOA*	Jurisdiction	*Local*
Date Performed	*5/23/2011*	Analysis Year	*Existing*
Analysis Time Period	*Weekday AM*		

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *9th St*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*5*	*235*			*115*	*5*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*5*	*247*	*0*	*0*	*121*	*5*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*5*		*5*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*5*	*0*	*5*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*5*						*10*	
C (m) (veh/h)	*1460*						*742*	
v/c	*0.00*						*0.01*	
95% queue length	*0.01*						*0.04*	
Control Delay (s/veh)	*7.5*						*9.9*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*9.9*		
Approach LOS	--	--				*A*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*WRW*	Intersection	*State/9th*
Agency/Co.	*KLOA*	Jurisdiction	*Local*
Date Performed	*5/23/2011*	Analysis Year	*Future*
Analysis Time Period	*Weekday AM*		

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *9th St*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*25*	*255*			*125*	*15*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*26*	*268*	*0*	*0*	*131*	*15*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*14*		*30*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*14*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*26*						*45*	
C (m) (veh/h)	*1436*						*757*	
v/c	*0.02*						*0.06*	
95% queue length	*0.06*						*0.19*	
Control Delay (s/veh)	*7.6*						*10.1*	
LOS	*A*						*B*	
Approach Delay (s/veh)	--	--				*10.1*		
Approach LOS	--	--				*B*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*WRW*	Intersection	*State/9th*
Agency/Co.	*KLOA*	Jurisdiction	*Local*
Date Performed	*5/23/2011*	Analysis Year	*Existing*
Analysis Time Period	*Weekday PM*		

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *9th St*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*5*	*120*			*120*	*5*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*5*	*126*	*0*	*0*	*126*	*5*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*5*		*5*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*5*	*0*	*5*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*5*						*10*	
C (m) (veh/h)	*1454*						*810*	
v/c	*0.00*						*0.01*	
95% queue length	*0.01*						*0.04*	
Control Delay (s/veh)	*7.5*						*9.5*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--					*9.5*	
Approach LOS	--	--					*A*	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*5/23/2011*
Analysis Time Period	*Weekday PM*

Site Information

Intersection	*State/9th*
Jurisdiction	*Local*
Analysis Year	*Future*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *9th St*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*27*	*130*			*130*	*7*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*28*	*136*	*0*	*0*	*136*	*7*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*20*		*37*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.95*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*21*	*0*	*38*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*28*						*59*	
C (m) (veh/h)	*1440*						*796*	
v/c	*0.02*						*0.07*	
95% queue length	*0.06*						*0.24*	
Control Delay (s/veh)	*7.5*						*9.9*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--					*9.9*	
Approach LOS	--	--					*A*	

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*12/18/2009*
Analysis Time Period	*Weekday AM*

Site Information

Intersection	*2nd/State*
Jurisdiction	*IDOT*
Analysis Year	*Existing*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *2nd St (IL 31)*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*15*	*465*	*5*	*1*	*760*	*195*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*15*	*489*	*5*	*1*	*800*	*205*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*40*	*0*	*25*	*1*	*0*	*1*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*42*	*0*	*26*	*1*	*0*	*1*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*15*	*1*		*2*			*68*	
C (m) (veh/h)	*685*	*1066*		*332*			*200*	
v/c	*0.02*	*0.00*		*0.01*			*0.34*	
95% queue length	*0.07*	*0.00*		*0.02*			*1.42*	
Control Delay (s/veh)	*10.4*	*8.4*		*15.9*			*32.0*	
LOS	*B*	*A*		*C*			*D*	
Approach Delay (s/veh)	--	--	*15.9*			*32.0*		
Approach LOS	--	--	*C*			*D*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*5/23/2011*
Analysis Time Period	*Weekday AM*

Site Information

Intersection	*2nd/State*
Jurisdiction	*IDOT*
Analysis Year	*Future*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *2nd St (IL 31)*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*29*	*520*	*5*	*0*	*850*	*214*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*30*	*547*	*5*	*0*	*894*	*225*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*56*	*0*	*41*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*58*	*0*	*43*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*30*	*0*		*0*			*101*	
C (m) (veh/h)	*620*	*1014*					*162*	
v/c	*0.05*	*0.00*					*0.62*	
95% queue length	*0.15*	*0.00*					*3.43*	
Control Delay (s/veh)	*11.1*	*8.6*					*58.3*	
LOS	*B*	*A*					*F*	
Approach Delay (s/veh)	--	--				*58.3*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*WRW*
Agency/Co.	*KLOA*
Date Performed	*12/18/2009*
Analysis Time Period	*Weekday PM*

Site Information

Intersection	*2nd/State*
Jurisdiction	*IDOT*
Analysis Year	*Existing*

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *2nd St (IL 31)*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*15*	*835*	*5*	*1*	*470*	*80*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*15*	*878*	*5*	*1*	*494*	*84*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*65*	*0*	*15*	*5*	*0*	*5*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*68*	*0*	*15*	*5*	*0*	*5*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*15*	*1*		*10*			*83*	
C (m) (veh/h)	*992*	*762*		*236*			*221*	
v/c	*0.02*	*0.00*		*0.04*			*0.38*	
95% queue length	*0.05*	*0.00*		*0.13*			*1.65*	
Control Delay (s/veh)	*8.7*	*9.7*		*20.9*			*30.8*	
LOS	*A*	*A*		*C*			*D*	
Approach Delay (s/veh)	--	--	*20.9*			*30.8*		
Approach LOS	--	--	*C*			*D*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*WRW*	Intersection	*2nd/State*
Agency/Co.	*KLOA*	Jurisdiction	*IDOT*
Date Performed	*5/23/2011*	Analysis Year	*Future*
Analysis Time Period	*Weekday PM*		

Project Description *09-169; St Charles, IL*

East/West Street: *State St* | North/South Street: *2nd St (IL 31)*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*30*	*935*	*5*	*1*	*525*	*95*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*31*	*984*	*5*	*1*	*552*	*100*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*		*TR*	*LT*		*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*82*	*0*	*32*	*1*	*0*	*1*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*86*	*0*	*33*	*1*	*0*	*1*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LT*		*LTR*			*LTR*	
v (veh/h)	*31*	*1*		*2*			*119*	
C (m) (veh/h)	*930*	*695*		*179*			*189*	
v/c	*0.03*	*0.00*		*0.01*			*0.63*	
95% queue length	*0.10*	*0.00*		*0.03*			*3.61*	
Control Delay (s/veh)	*9.0*	*10.2*		*25.3*			*51.8*	
LOS	*A*	*B*		*D*			*F*	
Approach Delay (s/veh)	--	--	*25.3*			*51.8*		
Approach LOS	--	--	*D*			*F*		

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