Hampton, Lenzini and Renwick, Inc.
Civil Engineering • Structural Engineering • Environmental Services • Land Surveying
www.hlrengineering.com

July 8, 2020

Attn: Ellen Johnson
City Planner
City of St. Charles
2 E. Main Street
St. Charles, IL 60174

Re: PRIDE of Kane County Gas Station
St. Charles, IL
Traffic Study Memorandum

Dear Ms. Johnson:

Per your request we reviewed the revised Traffic Study and response letter submitted by Eriksson Engineering Associates, Ltd. on June 25, 2020 for the referenced project. We concur with the findings of the study and have one additional minor comment on the Traffic Study.

1. On Table 4, the analysis year headings currently show 2017 and 2029, but should read 2017 and 2025.

If you have any questions or need additional information regarding the above comments, please contact HLR at 847-697-6700.

Yours truly,

HAMPTON, LENZINI AND RENWICK, INC.

By: Callie Allbright

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Memorandum

TO: Daniel Soltis
CIMA Developers, LP

FROM: Stephen B. Corcoran, P.E., PTOE
Director of Traffic Engineering

DATE: April 27, 2020 **Revised June 25, 2020**

RE: PRIDE of Kane County
On-site Circulation
St. Charles, Illinois

This memorandum summarizes a review of the on-site circulation, site access, and car wash stacking requirements for the proposed PRIDE of Kane County gas station with a convenience store and tunnel carwash in St. Charles, Illinois. It is located on the southeast corner of North Avenue (IL 64) and Kirk Road. Three access drives are provided with a right-in and -out only drive on North Avenue and two internal drive connections with the adjacent Main Street Commons shopping center.

This memorandum provides supplemental information to original traffic study dated March 3, 2020 for the PRIDE of Kane County.

Existing and Total Traffic Volumes

For reference, the existing traffic volumes on the roads near the site are attached in **Figure 3** from the original report. The total traffic volumes are a combination of the existing traffic volumes, projected non-site growth in those volumes, and the site related traffic. These were combined with the gas station traffic volumes to generate the Year 2025 total traffic volumes which are shown on **Figure 8**.

Site Driveways

Capacity analyses were conducted for the three site driveways servicing the site to determine how well they will operate and the stacking at the stop signs. **Table 1** summarizes the results of the analyses. A copy of the capacity analyses is attached. Overall, each site driveway will operate at LOS D or better.

Right-In and –Out Drive on North Avenue

The proposed right-in and out driveway for the gas station will be located on the south side of North Avenue and designed with a pork chop island,16-foot inbound and outbound lanes, an eastbound right-turn lane, and an outbound stop sign. An additional 11.8 feet of the site along North Avenue will be dedicated to IDOT to accommodate the right-turn lane. The current median break for the existing driveway will need to be reconstructed as a barrier median. The outbound right-turn will operate well with up to two vehicles stacking at one time. The entry road between North Avenue and the east-west internal roadway is 105 feet long so outbound vehicles stacking at the stop sign will not impact internal site traffic.

Right-In and Left-Out Drive on the Main Street Commons Entrance Road

The gas station proposes to have a right-in and left-out only driveway on the Main Street Commons Entrance Road to allow site traffic to have access to the traffic signal on North Avenue. It will have 14-foot a right-turn inbound and left-out outbound lanes with paint striping and signage to prohibit right-turns out and left-turns in. Traffic exiting the gas station will operate at a level of service A or B with one vehicle stopped at the stop sign.

Table 1
Driveway Level of Service and Total Delay

Intersection	Movement	AM Peak		PM Peak		Saturday Peak	
		2017	2025	2017	2025	2017	2025
North Avenue Right-In and Out Drives	Sb Right	B-12.7	B-13.5	C-22.0	D-25.5	C-17.0	C-17.7
	Nb Right		C-25.0		C-17.8		C-19.0
Main Street Commons Access Drive	Wb Left		A-10.0		B-10.5		B-10.6
Internal Drive Connection by Pandya Express and Bank	Eb Approach	A-0.0	A-0.0	A-0.0	A-0.0	A-0.0	A-0.0
	Wb Approach	A-1.5	A-0.3	A-1.3	A-0.6	A-4.1	A-1.4
	Nb Approach	A-9.0	B-10.1	A-9.3	B-10.1	A-9.1	B-10.0
	Sb Approach	A-9.2	B-10.0	A-9.1	A-9.9	A-9.4	B-10.1

Panda Express/Bank/Main Street Commons Intersection

Within the Main Street Commons shopping center, there are two internal circulation roads to the north and west of their main parking fields that also provide access to a bank site and Panda Express restaurant site. Each approach has one lane for left-turns, throughs, and right-turns. Currently it is uncontrolled with no yield or stop signs. With the development of the gas station, it is recommended that the north and south legs be controlled by stop signs in order to establish the right of way for the drivers approaching the intersection. With the additional gas station traffic, the intersection will continue to work well with minimal delays and stacking.

Internal Circulation

The fuel pumps are located on the west side of the site. The pumps are 32-feet apart (east-west) to allow a fueling vehicle on each side (10 foot each) and a 22-foot center lane to allow vehicles to maneuver around other fueling vehicles when they are finished. In the north-south direction, there is 40 feet of pavement from the north curb line to the first pump, then 32-feet to the second pump, and 42-feet to a row of parking. This is sufficient space to allow a vehicle to fuel at each pump and have another vehicle waiting or a vehicle with a trailer while maintaining two-way traffic around the canopy.

Traffic entering from North Avenue will turn right at the east-west internal roadway to the fuel pumps and/or convenience store. A minimal amount of traffic will turn left to go directly to the car wash. Most customers will fuel their vehicles first and pay for the car wash at the same time to receive a PIN code for the wash. If an inbound vehicle turns left to go directly to the car wash, there is sufficient distance to turn left onto the circulation road and then turn left into the car wash.

The cross-easement connection between the gas station and Panda Express parking lot is 24-foot wide and should have a stop sign northbound where it meets the internal east-west road and a stop sign southbound where it enters the Panda Express parking lot.

Car Wash Stacking Requirements

The City of St. Charles Zoning Code required vehicle stacking for an automatic car wash is two vehicles per bay plus ten stacking spaces per bay (see **Appendix**). For the proposed tunnel car wash, there is one bay which will require a minimum stacking for 12 vehicles. The code's definition of stacking spaces shall begin behind the last vehicle being washed.

The car wash is a tunnel that pulls the vehicle thru the wash area. Vehicles enter on the west side traveling eastbound and exits the east side of the building and site. Ten spaces are provided south of the building for patrons to vacuum their vehicles. The car wash stacking consists of three vehicles in the car wash building, two single-file vehicles about to enter the building after the payment gates, two vehicles side by side paying for their car wash, and two lines of three vehicles each waiting to pay. That is a total of 13 stacking spaces minus the last one being washed for a total of 12 spaces which meets the zoning code requirement.

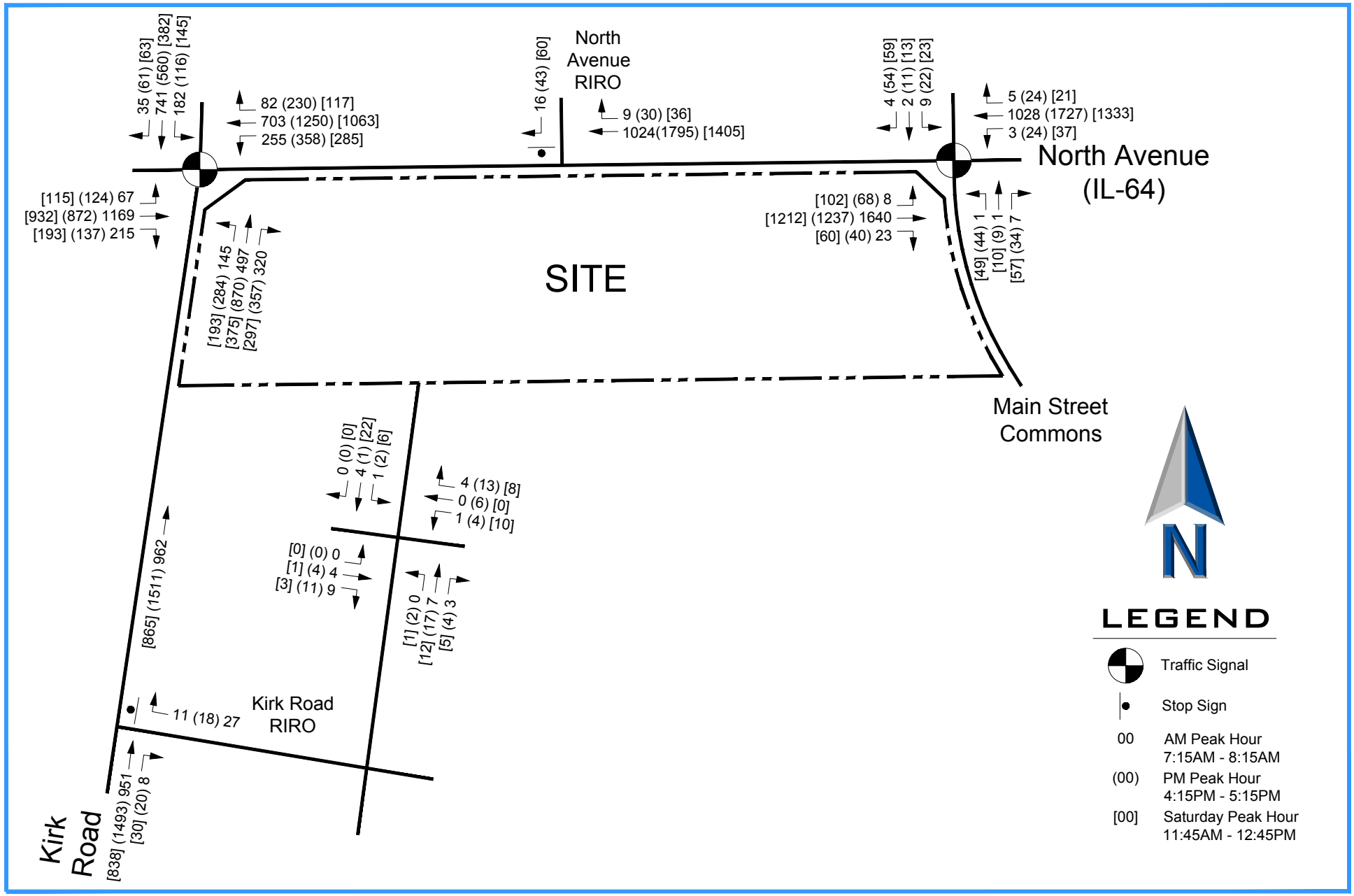
Studies of car washes at a gas station indicate that the typical maximum queue is six vehicles not including the vehicles in the car wash building. EEA's experience at other gas stations with car washes supports the study's findings. The proposed site plan provides queuing for 13 vehicles and satisfies the requirement.

Please note that a car wash at a gas station is an ancillary service available to the users of a gas station and not the primary use. They do not offer the additional services or products a full-service car wash would and do not spend as much time on-site. The overall processing time is less for the proposed gas station car wash because the driver receives a code at the pump, waits in line, and then their car is washed and dried. A full-service car wash typically takes cash payments and provides towel drying which lengthens the overall processing time.

APPENDIX

- **Figures 3 and 8**
- **Car Turning Path into Car Wash**
- **Driveway Capacity Analyses**
- **Zoning Code**

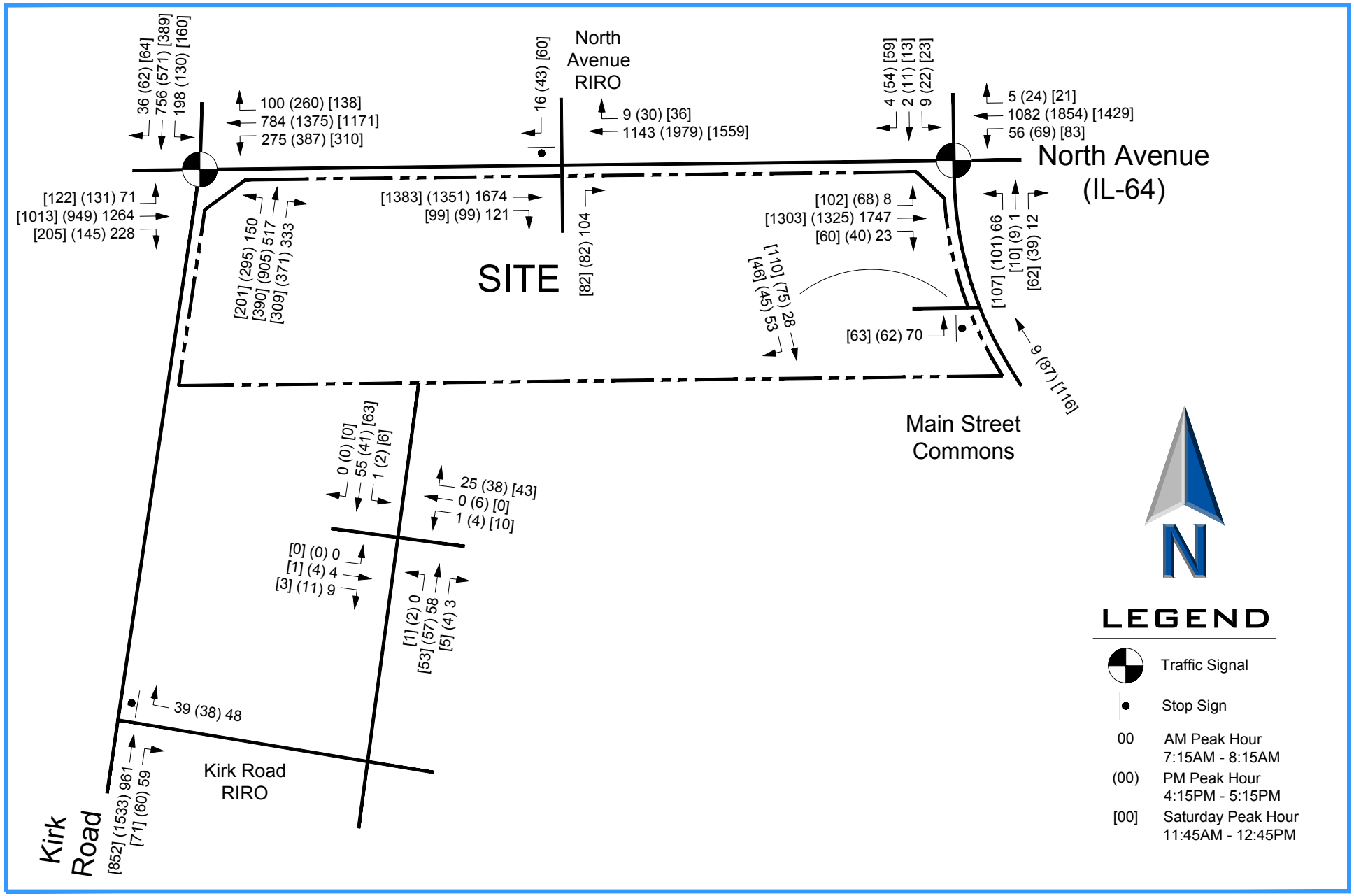
145 Commerce Drive, Ste 300, Grayslake, IL 60030
847.223.4804



ERIKSSON ENGINEERING ASSOCIATES, LTD.

2017 Existing Traffic Volumes

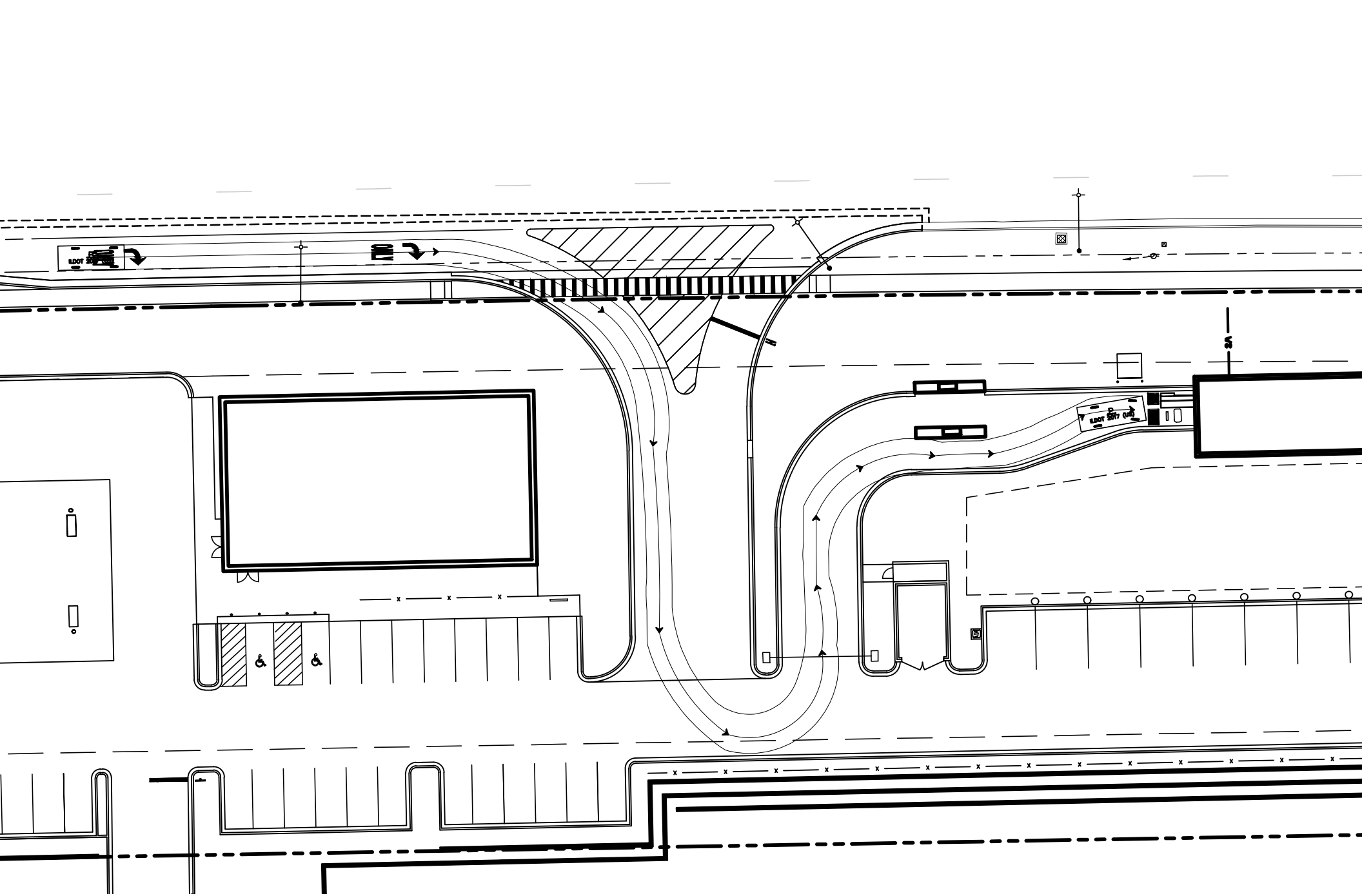
Figure 3



ERIKSSON ENGINEERING ASSOCIATES, LTD.

2025 Total Traffic Volumes

Figure 8



HCS7 Two-Way Stop-Control Report

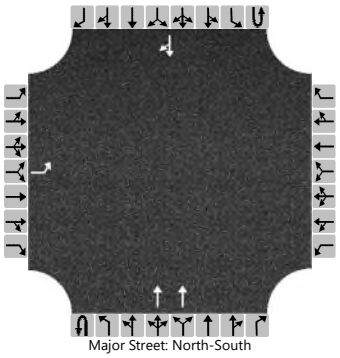
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	AM Peak Hour
Intersection Orientation	North-South
Project Description	PRIDE of Kane County

Site Information

Intersection	Main St Commons/Gas Dr
Jurisdiction	St Charles
East/West Street	PRIDE Driveway
North/South Street	Main Street Commons Entr
Peak Hour Factor	0.50
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	0		0	0	0	0	0	2	0	0	0	1	0
Configuration		L									T					TR
Volume (veh/h)		70									9				28	53
Percent Heavy Vehicles (%)		3														
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5														
Critical Headway (sec)		6.86														
Base Follow-Up Headway (sec)		3.5														
Follow-Up Headway (sec)		3.53														

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		140														
Capacity, c (veh/h)		862														
v/c Ratio		0.16														
95% Queue Length, Q_{95} (veh)		0.6														
Control Delay (s/veh)		10.0														
Level of Service (LOS)		A														
Approach Delay (s/veh)		10.0														
Approach LOS		A														

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HCS7 Two-Way Stop-Control Report

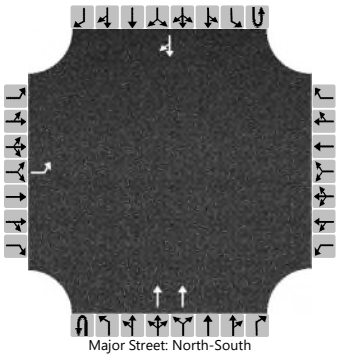
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	PM Peak Hour
Intersection Orientation	North-South
Project Description	PRIDE of Kane County

Site Information

Intersection	Main St Commons/Gas Dr
Jurisdiction	St Charles
East/West Street	PRIDE Driveway
North/South Street	Main Street Commons Entr
Peak Hour Factor	0.65
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	0		0	0	0	0	0	2	0	0	0	1	0
Configuration		L									T					TR
Volume (veh/h)		62									87				75	45
Percent Heavy Vehicles (%)		3														
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5														
Critical Headway (sec)		6.86														
Base Follow-Up Headway (sec)		3.5														
Follow-Up Headway (sec)		3.53														

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		95														
Capacity, c (veh/h)		749														
v/c Ratio		0.13														
95% Queue Length, Q_{95} (veh)		0.4														
Control Delay (s/veh)		10.5														
Level of Service (LOS)		B														
Approach Delay (s/veh)		10.5														
Approach LOS		B														

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HCS7 Two-Way Stop-Control Report

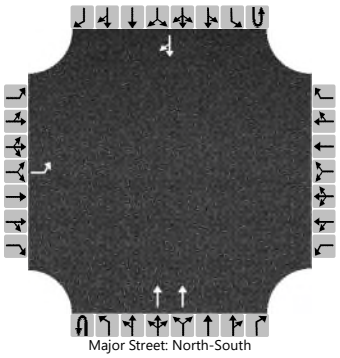
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	Sat. Peak Hour
Intersection Orientation	North-South
Project Description	PRIDE of Kane County

Site Information

Intersection	Main St Commons/Gas Dr
Jurisdiction	St Charles
East/West Street	PRIDE Driveway
North/South Street	Main Street Commons Entr
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	0		0	0	0	0	0	2	0	0	0	1	0
Configuration		L									T					TR
Volume (veh/h)		63									116				110	48
Percent Heavy Vehicles (%)		3														
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5														
Critical Headway (sec)		6.86														
Base Follow-Up Headway (sec)		3.5														
Follow-Up Headway (sec)		3.53														

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		79														
Capacity, c (veh/h)		724														
v/c Ratio		0.11														
95% Queue Length, Q_{95} (veh)		0.4														
Control Delay (s/veh)		10.6														
Level of Service (LOS)		B														
Approach Delay (s/veh)		10.6														
Approach LOS		B														

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HCS7 Two-Way Stop-Control Report

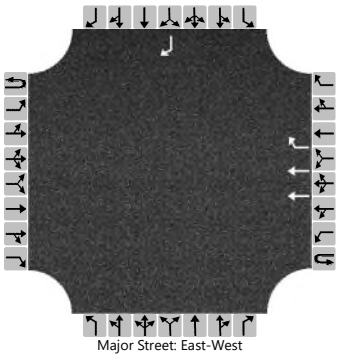
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	RIRO -Bank-On the Border
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume (veh/h)							1024	9								16
Percent Heavy Vehicles (%)																3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																6.9
Critical Headway (sec)																6.96
Base Follow-Up Headway (sec)																3.3
Follow-Up Headway (sec)																3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																17
Capacity, c (veh/h)																484
v/c Ratio																0.03
95% Queue Length, Q_{95} (veh)																0.1
Control Delay (s/veh)																12.7
Level of Service (LOS)																B
Approach Delay (s/veh)													12.7			
Approach LOS													B			

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HCS7 Two-Way Stop-Control Report

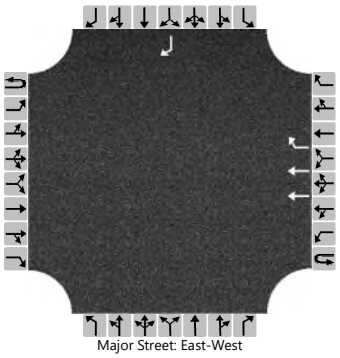
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	RIRO -Bank-On the Border
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume (veh/h)							1795	30								43
Percent Heavy Vehicles (%)																3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																6.9
Critical Headway (sec)																6.96
Base Follow-Up Headway (sec)																3.3
Follow-Up Headway (sec)																3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																46
Capacity, c (veh/h)																257
v/c Ratio																0.18
95% Queue Length, Q_{95} (veh)																0.6
Control Delay (s/veh)																22.0
Level of Service (LOS)																C
Approach Delay (s/veh)													22.0			
Approach LOS													C			

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HCS7 Two-Way Stop-Control Report

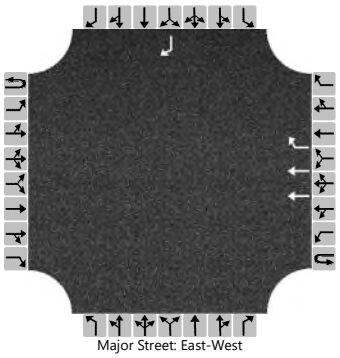
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	Saturday Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	RIRO -Bank-On the Border
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume (veh/h)							1405	36								60
Percent Heavy Vehicles (%)																3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																6.9
Critical Headway (sec)																6.96
Base Follow-Up Headway (sec)																3.3
Follow-Up Headway (sec)																3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																63
Capacity, c (veh/h)																362
v/c Ratio																0.17
95% Queue Length, Q_{95} (veh)																0.6
Control Delay (s/veh)																17.0
Level of Service (LOS)																C
Approach Delay (s/veh)													17.0			
Approach LOS													C			

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HCS7 Two-Way Stop-Control Report

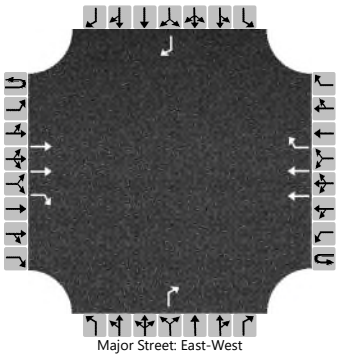
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	Pride+ Bank/PoSC Drive
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	2	1		0	0	1		0	0	1
Configuration			T	R			T	R				R				R
Volume (veh/h)			1674	121			1143	9				104				16
Percent Heavy Vehicles (%)												3				3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No				No				No				No		
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				6.9
Critical Headway (sec)												6.96				6.96
Base Follow-Up Headway (sec)												3.3				3.3
Follow-Up Headway (sec)												3.33				3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												109				17
Capacity, c (veh/h)												288				441
v/c Ratio												0.38				0.04
95% Queue Length, Q_{95} (veh)												1.7				0.1
Control Delay (s/veh)												25.0				13.5
Level of Service (LOS)												C				B
Approach Delay (s/veh)										25.0				13.5		
Approach LOS										C				B		

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HCS7 Two-Way Stop-Control Report

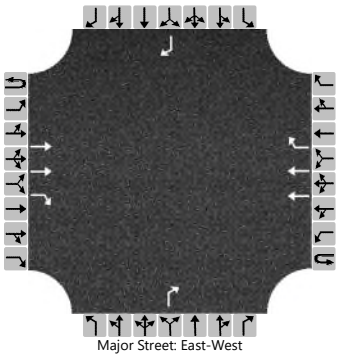
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	IDOT/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	Pride+ Bank/PoSC Drives
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	2	1		0	0	1		0	0	1
Configuration			T	R			T	R				R				R
Volume (veh/h)			1351	99			1979	9				82				43
Percent Heavy Vehicles (%)												3				3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				6.9
Critical Headway (sec)												6.96				6.96
Base Follow-Up Headway (sec)												3.3				3.3
Follow-Up Headway (sec)												3.33				3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												87				46
Capacity, c (veh/h)												369				221
v/c Ratio												0.24				0.21
95% Queue Length, Q_{95} (veh)												0.9				0.8
Control Delay (s/veh)												17.8				25.5
Level of Service (LOS)												C				D
Approach Delay (s/veh)									17.8				25.5			
Approach LOS									C				D			

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HCS7 Two-Way Stop-Control Report

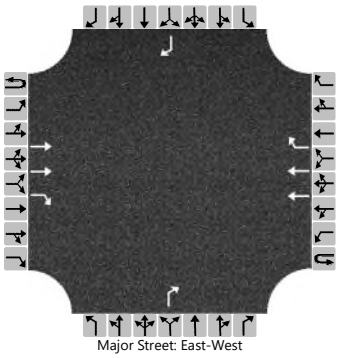
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	Saturday Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	Pride+Bank/PoSC Drives
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	2	1		0	0	1		0	0	1
Configuration			T	R			T	R				R				R
Volume (veh/h)			1383	99			1559	36				82				60
Percent Heavy Vehicles (%)												3				3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				6.9
Critical Headway (sec)												6.96				6.96
Base Follow-Up Headway (sec)												3.3				3.3
Follow-Up Headway (sec)												3.33				3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												85				63
Capacity, c (veh/h)												368				320
v/c Ratio												0.23				0.20
95% Queue Length, Q_{95} (veh)												0.9				0.7
Control Delay (s/veh)												17.7				19.0
Level of Service (LOS)												C				C
Approach Delay (s/veh)									17.7				19.0			
Approach LOS									C				C			

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HCS7 Two-Way Stop-Control Report

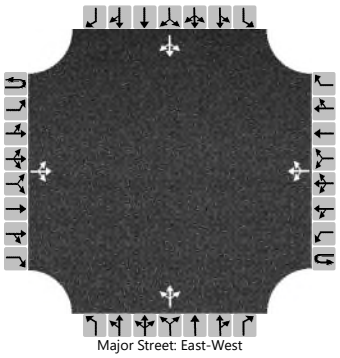
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2017
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.52
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	4	9		1	0	4		0	7	3		1	4	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				2					19				10	
Capacity, c (veh/h)		1606				1583					913				875	
v/c Ratio		0.00				0.00					0.02				0.01	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.0	
Control Delay (s/veh)		7.2				7.3					9.0				9.2	
Level of Service (LOS)		A				A					A				A	
Approach Delay (s/veh)	0.0				1.5				9.0				9.2			
Approach LOS									A				A			

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HCS7 Two-Way Stop-Control Report

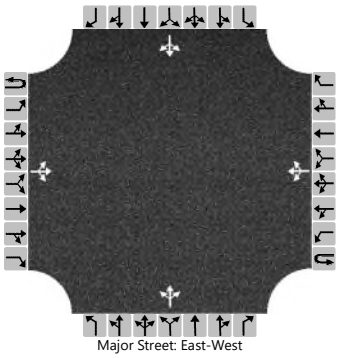
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.52
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	4	9		1	0	25		0	58	3		1	55	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				2					117				108	
Capacity, c (veh/h)		1553				1583					829				834	
v/c Ratio		0.00				0.00					0.14				0.13	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.5				0.4	
Control Delay (s/veh)		7.3				7.3					10.1				10.0	
Level of Service (LOS)		A				A					B				A	
Approach Delay (s/veh)	0.0				0.3				10.1				10.0			
Approach LOS									B				A			

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HCS7 Two-Way Stop-Control Report

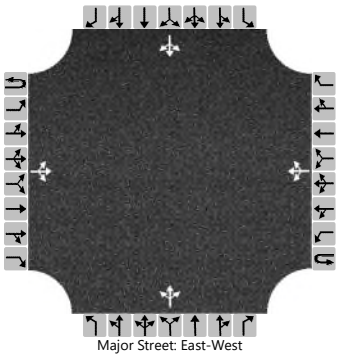
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2017
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.64
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	4	11		4	6	13		2	17	4		2	1	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				6					36				5	
Capacity, c (veh/h)		1577				1585					871				874	
v/c Ratio		0.00				0.00					0.04				0.01	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.0	
Control Delay (s/veh)		7.3				7.3					9.3				9.1	
Level of Service (LOS)		A				A					A				A	
Approach Delay (s/veh)	0.0				1.3				9.3				9.1			
Approach LOS									A				A			

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HCS7 Two-Way Stop-Control Report

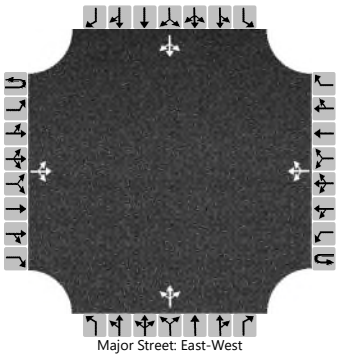
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.64
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	4	11		4	6	38		2	57	4		2	41	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				6					98				67	
Capacity, c (veh/h)		1526				1585					803				809	
v/c Ratio		0.00				0.00					0.12				0.08	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.4				0.3	
Control Delay (s/veh)		7.4				7.3					10.1				9.9	
Level of Service (LOS)		A				A					B				A	
Approach Delay (s/veh)		0.0				0.6				10.1				9.9		
Approach LOS										B				A		

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HCS7 Two-Way Stop-Control Report

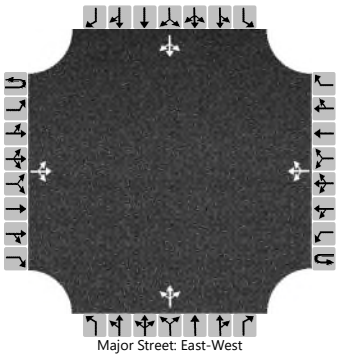
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2017
Time Analyzed	Sat Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.68
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	1	3		10	0	8		1	12	5		6	22	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				15					26				41	
Capacity, c (veh/h)		1601				1609					896				856	
v/c Ratio		0.00				0.01					0.03				0.05	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.2	
Control Delay (s/veh)		7.2				7.3					9.1				9.4	
Level of Service (LOS)		A				A					A				A	
Approach Delay (s/veh)		0.0				4.1				9.1				9.4		
Approach LOS										A				A		

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HCS7 Two-Way Stop-Control Report

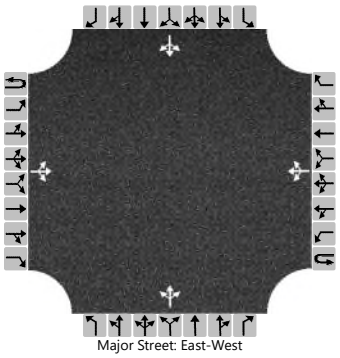
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	Sat Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.68
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	1	3		10	0	43		1	53	5		6	63	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				15					87				101	
Capacity, c (veh/h)		1533				1609					803				812	
v/c Ratio		0.00				0.01					0.11				0.12	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.4				0.4	
Control Delay (s/veh)		7.3				7.3					10.0				10.1	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	0.0				1.4				10.0				10.1			
Approach LOS									B				B			

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TABLE 17.24-3
REQUIRED OFF-STREET PARKING

USE	PARKING REQUIREMENT
Bank	4 per 1,000sf of GFA + 5 stacking per drive-in lane & ATM lane when there are 3 or less such lanes, or 4 stacking spaces per drive-in lane & ATM lane when there are 4 or more such lanes
Carpet Store	3 per 1000 sf of GFA
Car Wash, Automatic	2 per bay + 10 stacking spaces per bay
Car Wash, Manual/Hand Wash	1 per 2 bays + 2 stacking spaces per bay Where employees operate the vehicle in and out of the bay, and wash the vehicle in the bay, (hand-wash), no stacking is required, but the number of required parking spaces shall be increased by 1 per bay
Coffee or Tea Room	5 per 1,000sf of GFA
Day Care Center	3.5 per 1000 sf of GFA
Drive-Through Facility, except as specifically listed elsewhere	5 stacking spaces per drive-in service lane
Electronics Superstore	3 per 1000 sf of GFA
Financial Institution	4 per 1,000sf of GFA
Furniture Store	3 per 1000 sf of GFA
Gas Station (with or without retail sales of goods other than motor vehicle fuels)	1 per service bay + 4 per 1,000sf of GFA, provided that the number of required spaces may be reduced by the number of fuel pumps that can be accessed at any one time
Greenhouse/Plant Nursery	1 per 1,000sf of GFA + 3 per 1,000sf of outdoor sales area
Heavy Retail and Service	3 per 1,000sf of GFA + 3 per 1,000sf of outdoor sales area
Home Improvement Center	3 per 1,000sf of GFA + 4 per 1,000sf of outdoor sales area
Hotel/Motel	1 per room In CBD-1 & CBD-2, 1 per 4 lodging rooms
Kennel	1 per 1,000sf of GFA
Laundromat	2 per 1,000sf of GFA
Live Entertainment	10 per 1,000sf of GFA
Medical Cannabis Dispensing Organization	3 per 1,000 of GFA
Motor Vehicle Rental	3 per 1,000sf of GFA
Motor Vehicle Sales and Leasing	3 per 1,000sf of GFA (no required parking spaces shall be used for the display or storage of vehicles for sale or lease)
Motor Vehicle Service and Repair, Major or Minor	2 per service bay + 2 per 1,000sf of GFA

PRIDE of Kane County

Traffic Study

St. Charles, Illinois

Prepared For:

CIMA Developers LP

Prepared by:

Eriksson Engineering Associates, Ltd.

ERIKSSON ENGINEERING ASSOCIATES, LTD.

145 Commerce Drive, Ste A, Grayslake, IL 60030

847.223.8404

www.eea-ltd.com

1 – INTRODUCTION

Eriksson Engineering Associates, Ltd. (EEA) was retained by CIMA Developers LP to conduct a traffic study for a new gas station with a convenience store and car wash in St. Charles, Illinois. It is located on the southeast corner of the North Avenue (IL 64) and Kirk Road on a site with three farm structures. Access to the site is currently provided on North Avenue by a full access driveway with a median break in the existing westbound left-turn lane.

EEA was asked to review the existing and future traffic conditions around the gas station and to recommended improvements to its transportation network. The study area included North Avenue at Kirk Road, Main Street Commons, and the existing site access and at Kirk Road at the Main Street Commons driveway.

Data was collected of the existing traffic volumes along with traffic control devices, sidewalks, bike routes, and traffic lanes. Traffic projections were made for the Year 2025, after project completion, for the anticipated site traffic and regional traffic growth using data provided by the Institute of Transportation Engineers (ITE) and the Chicago Metropolitan Agency for Planning (CMAP). Capacity analyses were conducted and the recommendations developed for the site's transportation system. A review was conducted of the site circulation and the storage requirements for the car wash.

The traffic analysis developed the following conclusions:

- The development of the site as proposed will not adversely impact the level-of-service of study area intersections.
- Right-of-way will be dedicated to the Kane County Division of Transportation (10 additional feet) and the Illinois Department of Transportation (11.8 feet or more) along both roads for future regional roadway improvements.
- North Avenue access will be a right-in and –out only driveway with a pork chop island and an eastbound right-turn lane. The existing median break in the center median will be closed.
- Two cross easements will be provided to the Panda Express lot to the south and to the Main Street Center access road to the east with one inbound and one outbound lane.
- Sidewalks will be provided on the site frontage.
- The carwash storage meets the city code requirement of 12 vehicles.
- Site circulation is good with adequate distance around each fueling position to allow traffic to maneuver on-site.
- With the projected increases in regional traffic volumes, the intersection will need to consider the long-term improvements:
    - Southbound right-turn lane
    - North/South dual left-turn lanes

2 – EXISTING TRANSPORTATION NETWORK

Site Location and Area Land-Use

The site of the proposed gas station is located on the southeast corner of North Avenue and Kirk Road in St. Charles, Illinois. It has three vacant farm structures on approximately three acres of land. Charlestowne Mall, the West Suburban Bank, and On The Border restaurant are located to the north across North Avenue. Its eastern and southern borders are formed by the Main Street Shopping Center, and a Panda Express restaurant. St. John Neumann Church is on the opposite (northwest) corner of the intersection. First American Bank is to the west across Kirk Road. Access to the site is currently provided on North Avenue by a full access driveway with a median break in the existing left-turn lane. **Figure 1** illustrates the site's location and area roadways.

Bicycle/Pedestrian Routes

A multi-use path is located along the west side of Kirk Road extending thru the study area. Sidewalks are provided on the east side of Kirk Road south of the site. North Avenue has sidewalks along the south side of the road except for the site frontage. The north side of North Avenue has public sidewalk west of Kirk Road. The signalized intersection on North Avenue with Charlestowne Mall and Main Street Center has sidewalks on both sides of their entrance drives. Pedestrian signals and crosswalks are located on North Avenue west of Kirk Road and east of the Charlestowne Mall/Main Street signals.

Existing Roadway System

North Avenue (IL 64) is an east-west Strategic Regional Arterial (SRA) extending thru Kane County from the City of Chicago. It has two travel lanes in each direction with a barrier median. At its signalized intersection with Kirk Road, each approach has dual left-turn lanes, two thru lanes, and a right-turn lane. At the Charlestowne Mall/Main Street traffic signal, there are dual-left-turn lanes eastbound and single right- and left-turn lanes westbound. It is under the jurisdiction of the Illinois Department of Transportation and has a 45-mph posted speed limit west of Kirk Road and 35-mph east of Kirk Road.

Kirk Road **(Route 77)** is a north-south County Freeway extending north from Butterfield Road to Dunham Road. It has two travel lanes in each direction and a center median. At the North Avenue signalized intersection, Kirk Road has single left-turn lanes and two thru lanes. The northbound approach has a single right-turn lane. It is under the jurisdiction of the Kane County Division of Transportation and has a 40-mph posted speed limit.

Figure 2 illustrates the existing study area, travel lanes, and traffic control.

Existing Traffic Volumes

Weekday morning (6:00 to 9:00 AM) and afternoon (3:00 to 5:00 PM) and Saturday counts (11:00 AM to 2:00 PM) manual traffic counts were conducted at the study area intersections in 2017. The counts were collected over several days on Tuesday October 3rd and 10th, Thursday October 5th, and Wednesday October 11th, 2017 and on Saturday September 30th and October 7th and 14th.

These counts showed the peak-hours of traffic occurring from 7:15 to 8:15 AM and 4:15 to 5:15 PM on a weekday and from 11:45 AM to 12:45 PM on Saturday. **Figure 3** summarizes the existing traffic volumes with copies of the counts in the **Appendix**. North Avenue two-way traffic volumes varied from 2,700 to 3,200 vehicles per hour. Kirk Road carries less traffic with 1,700 to 2,200 vehicles per hour.

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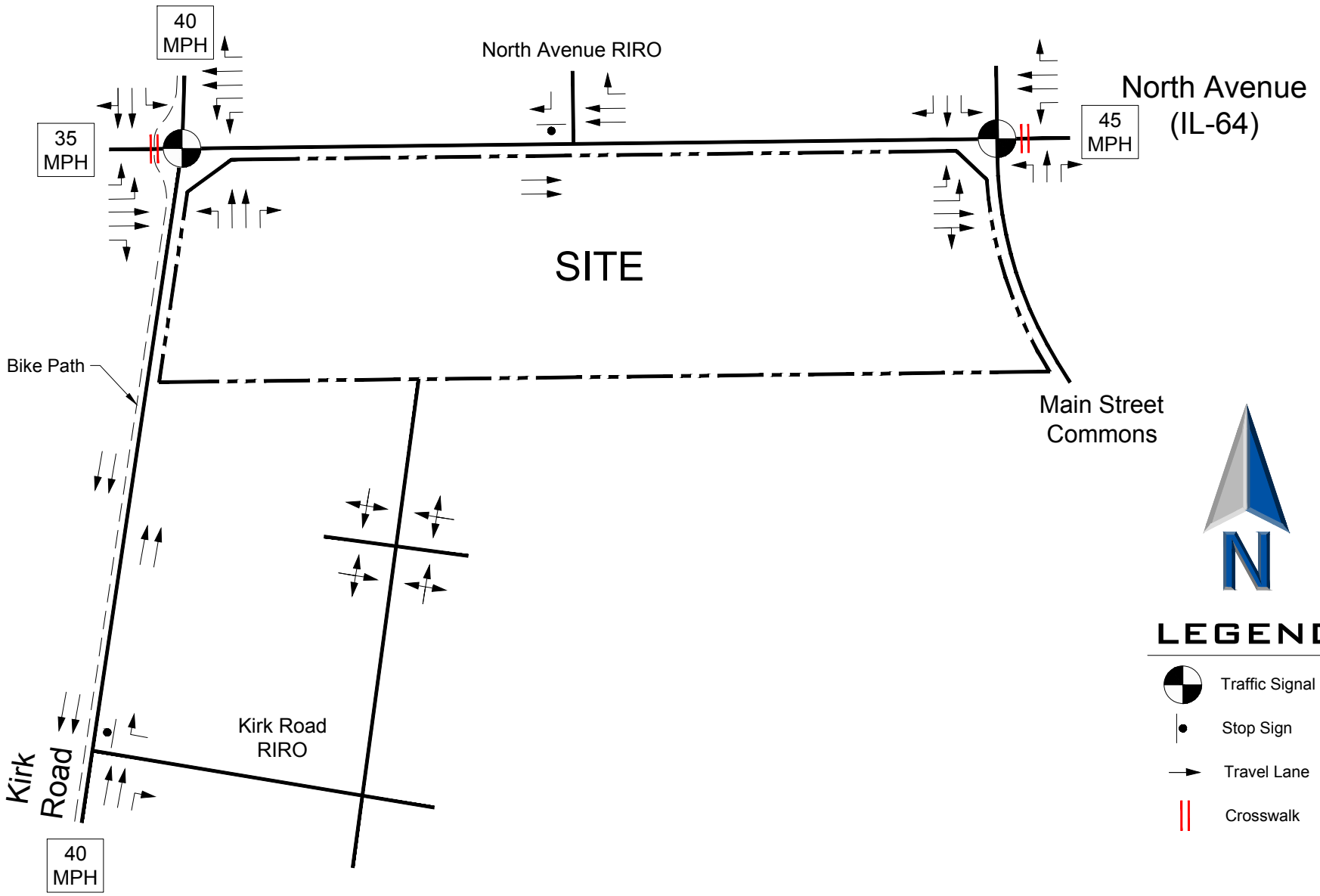
Site Location & Area Roadways

Figure 1



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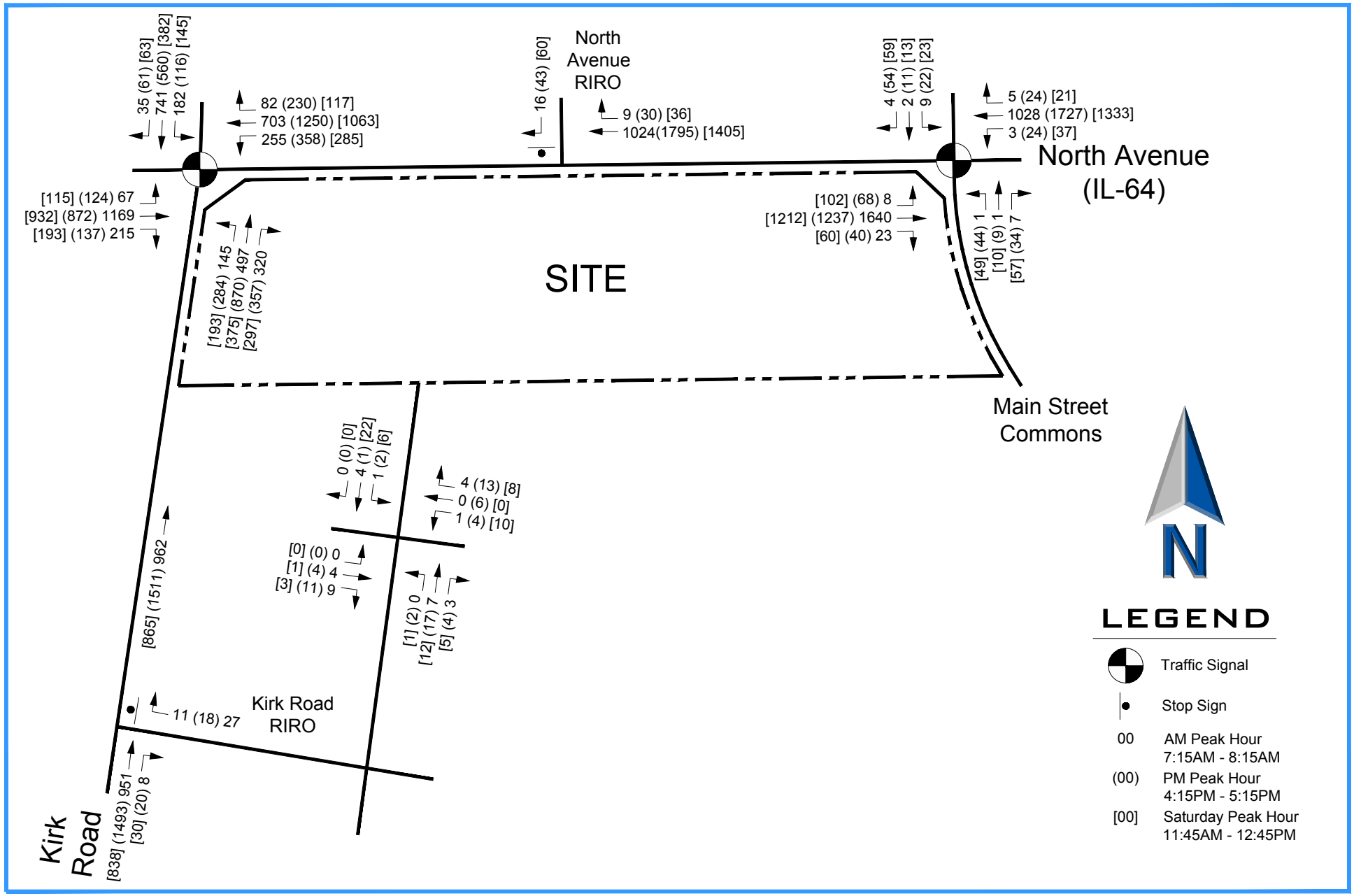
Existing Roadway Geometrics

Figure 2



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2017 Existing Traffic Volumes

Figure 3

3 – SITE TRANSPORTATION CHARACTERISTICS

Development Plan

The proposed development plan calls for a gas station with 16 fueling positions, a 3,600 square foot convenience center, and a tunnel car wash. Access is proposed from a right-in and-out drive on North Avenue, a right-in and out/left-out drive on the Main Street Commons access drive, and an internal driveway connection to the Panda Express parking lot.

Site Trip Generation

Gas station trip generation estimates were made using data provided by the Institute of Transportation Engineers (ITE) from its publication Trip Generation, 10th Edition for the weekday and Saturday peak-periods (see **Appendix**). Gas station trips are a combination of new trips attracted to the area and existing vehicles that travel by the site today that will stop at the station. These are called pass-by trips. **Table 1** summarizes the total site generated traffic volumes.

Table 1
PRIDE of Kane County Site Traffic Volumes

Use	Morning Peak Hour			Evening Peak Hour			Saturday Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Pass-By Trips	140	140	280	102	102	204	104	104	208
New Trips	85	85	170	82	82	164	82	82	164
Total Site Trips	**225**	**225**	**450**	**184**	**184**	**368**	**186**	**186**	**372**

(1) ITE Land Use Code 960 – Super Convenience Market/Service Station

Directional Distribution

The directional distribution of gas station traffic on the street system was determined from the existing roadway system and traffic volumes. The traffic distribution is shown on **Table 2** and **Figure 4**.

Table 2
Directional Distribution on Adjacent Roadways

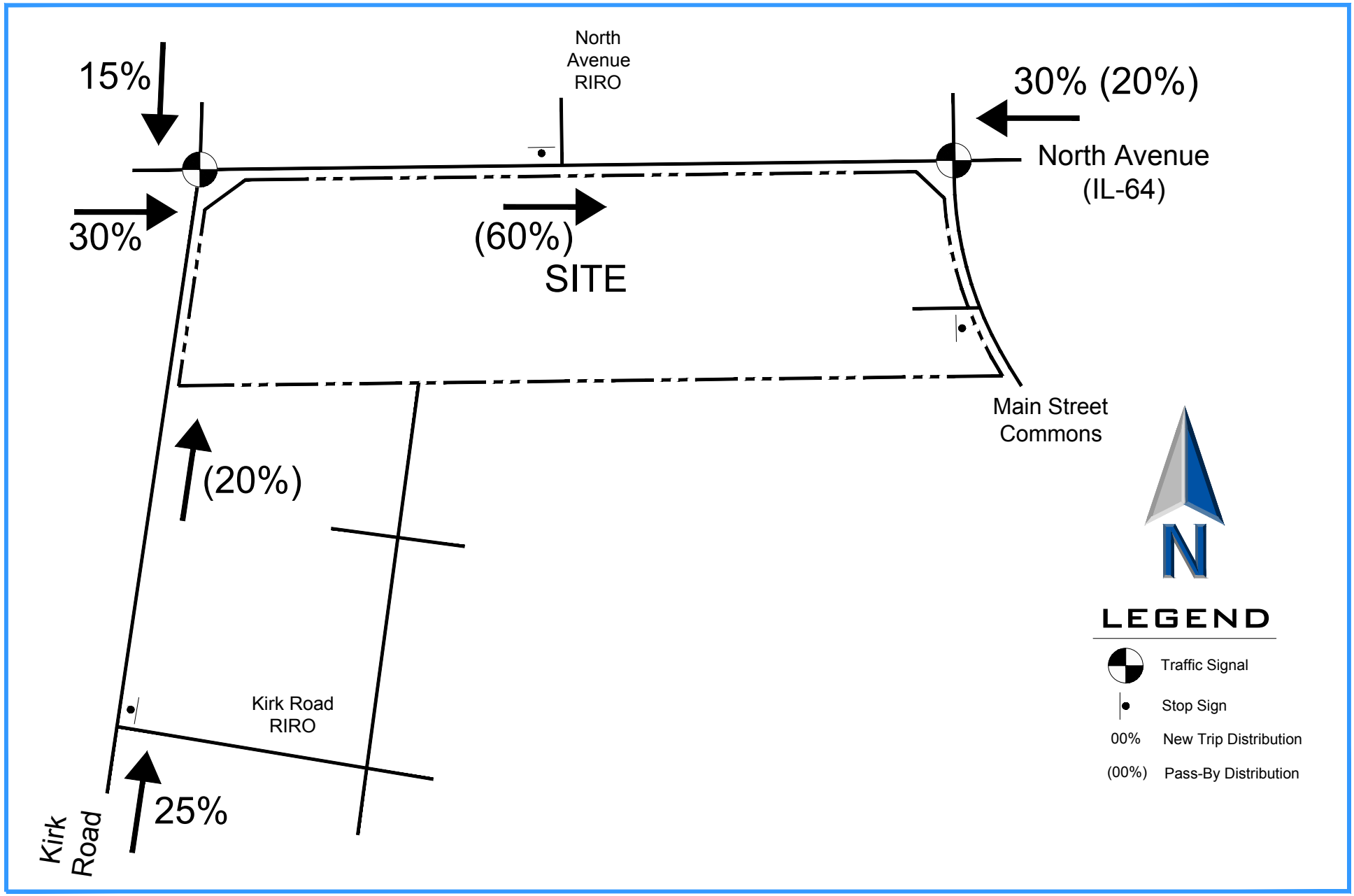
Direction	Distribution
North on Kirk Road	15%
South on Kirk Road	25%
East on North Avenue	30%
West on North Avenue	30%
Total	**100%**

Site Traffic Assignment

The total new and pass-by traffic was assigned to the access drives based on the directional distribution patterns and the proposed access system. **Figures 5** and **6** illustrates the proposed traffic assignments for pass-by and new trips.

Regional Traffic Growth

Total traffic volumes are a combination of the existing traffic volumes, projected non-site growth in those volumes, and the site related traffic. The total traffic volumes are estimated for a period five years in the future (Year 2025). Data provided by the Chicago Metropolitan Agency for Planning (see **Appendix**) shows regional growth in traffic volumes along North Avenue at 0.75 (west) to 0.95% (east) per year and along Kirk Road at 0.27 (north) to 0.5% (south) per year. These growth rates were applied to the existing traffic volumes to obtain the Year 2025 (**Figure 7**) future base traffic volumes without the gas station. These were combined with the gas station traffic volumes to generate the Year 2025 total traffic volumes which are shown on **Figure 8**.



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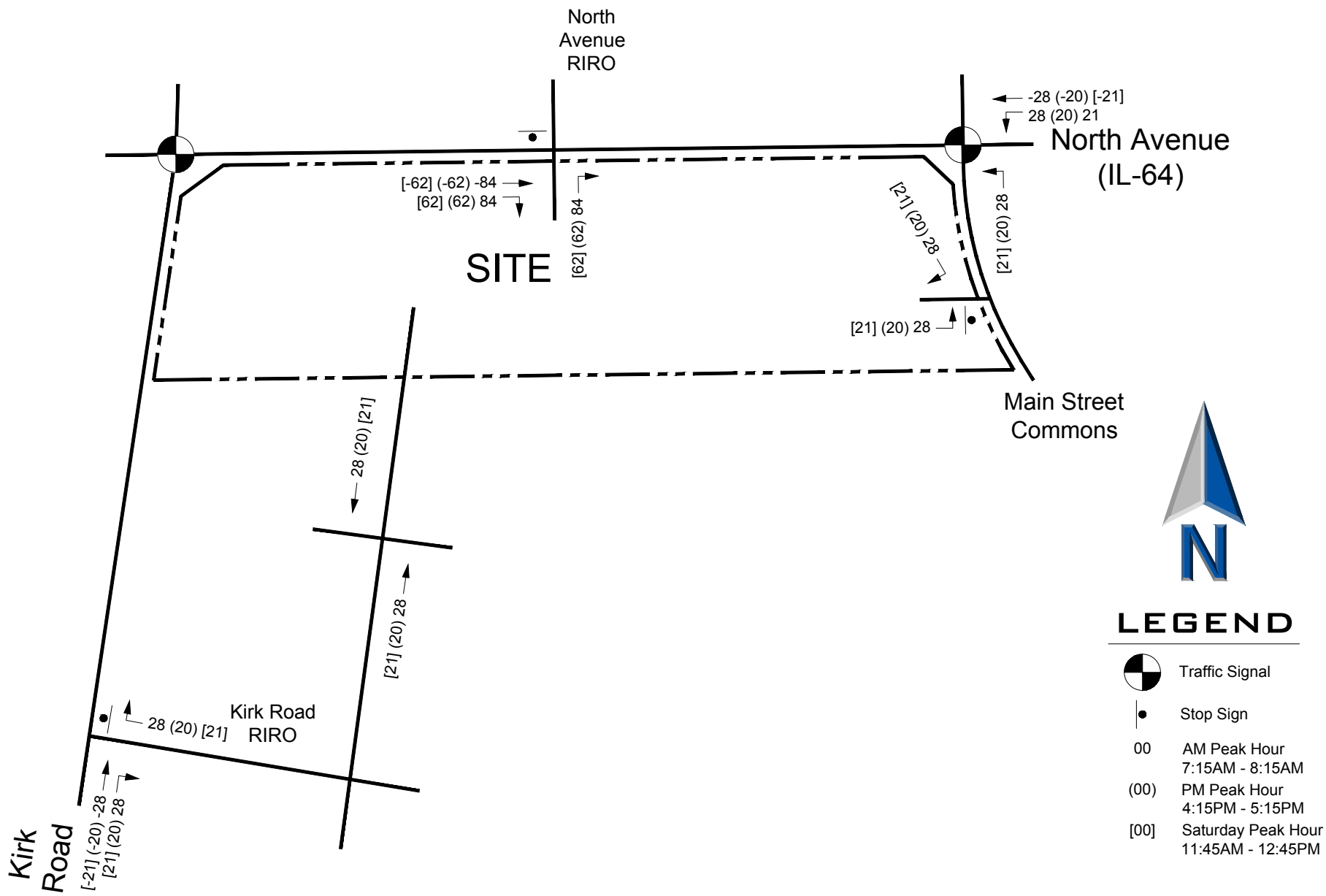
Directional Distribution

Figure 4



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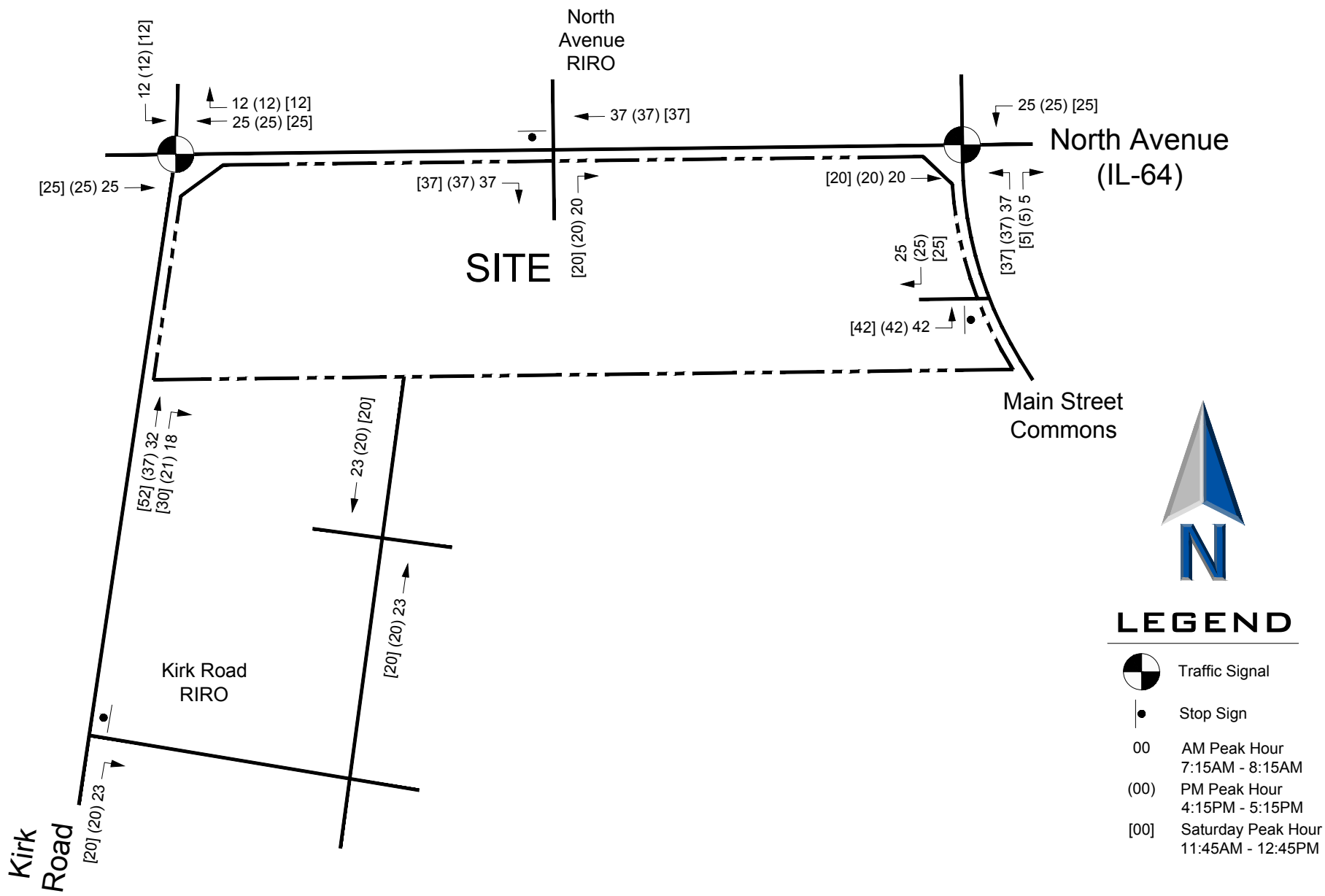
Pass-By Trip Assignment

Figure 5



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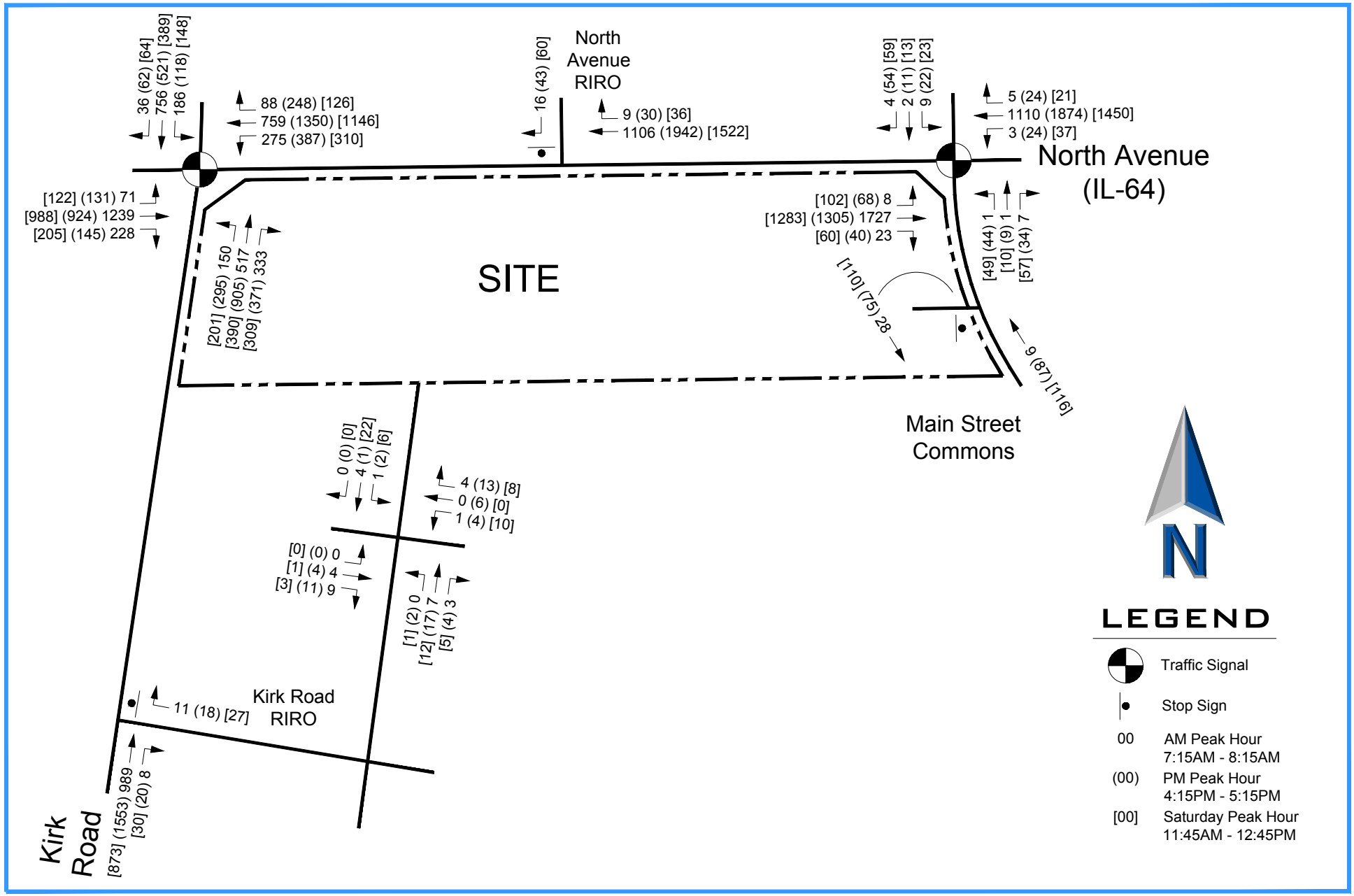
New Trip Assignment

Figure 6



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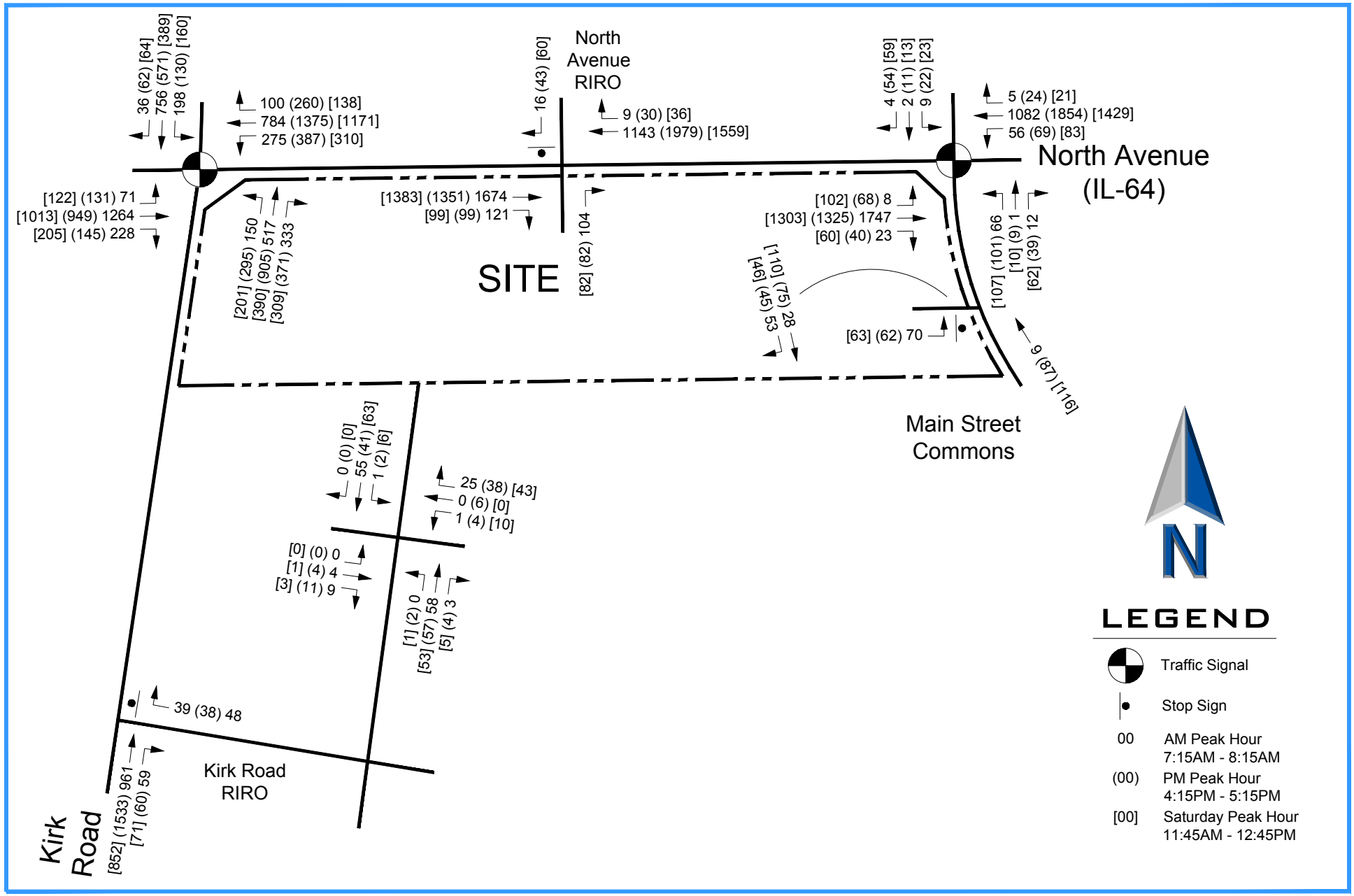
2025 Base Traffic Volumes

Figure 7



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2025 Total Traffic Volumes

Figure 8

4 – ANALYSES

Intersection Capacity Analyses

In order to determine the operation of the study area intersections and the access drives, intersection capacity analyses were conducted for the existing and projected traffic volumes. An intersection's ability to accommodate traffic flow is based on the average control delay experienced by vehicles passing through the intersection. The intersection and individual traffic movements are assigned a level of service (LOS), ranging from A to F based on the control delay created by a traffic signal or stop sign. Control delay consists of the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. LOS A has the best traffic flow and least delay. LOS E represents saturated or at capacity conditions. LOS F experiences oversaturated conditions and extensive delays. The Highway Capacity Manual definitions for levels of service and the corresponding control delay for both signalized and unsignalized intersections are shown in **Table 3**.

Table 3
Level of Service Criteria for Intersections

Level of Service	Description	Control Delay (seconds/vehicle)	
		Signals	Stop Signs
A	Minimal delay and few stops	<10	<10
B	Low delay with more stops	>10-20	>10-15
C	Light congestion	>20-35	>15-25
D	Congestion is more noticeable with longer delays	>35-55	>25-35
E	High delays and number of stops	>55-80	>35-50
F	Unacceptable delays and over capacity	>80	>50

Source: Highway Capacity Manual

Capacity analyses were conducted for each intersection using the Highway Capacity Software (Version 7.8.5) to determine the operations of the road system. These analyses were performed for the weekday peak-hours at the current intersections (2017) and in the future (2025). The capacity analyses are summarized in **Table 4** and included in the **Appendix**.

Right-In and –Out Drive on Kirk Road

The existing right-in and –out driveway south of the site on northbound Kirk Road operates well now and in the future with Level of Service B or Cs. No additional improvements are required.

North Avenue at Charlestowne Mall/Main Street Center

This signalized intersection will continue to have acceptable levels of service and delay during the peak-hours in the Year 2025. However, the traffic exiting either mall will experience higher delays due to North Avenue being given the priority in the allocation of green time for traffic progression. The Year 2025 intersection delays do increase slightly from existing conditions more as a result of regional traffic growth rather than from the proposed gas station.

North Avenue and Kirk Road

Currently, the overall intersection operates at an acceptable Level of Service D/E during the weekday peak hours. Kirk Road gets less green time and the north-south movements operate at LOS E or F which indicates the need for additional green time or road improvements. With the projected increases in regional traffic volumes, the intersection will need to consider the long-term improvements:

- Southbound right-turn lane
- North/South dual left-turn lanes

Table 4
Intersection Level of Service and Total Delay

Intersection	Movement	AM Peak		PM Peak		Saturday Peak	
		2017	2029	2017	2029	2017	2029
North Avenue at Kirk Road (Traffic Signal)	Eb Appr.	C-23.5	C-26.1	C-32.7	D-35.1	C-23.5	C-26.4
	Wb Appr.	C-25.6	C-26.0	C-34.6	D-37.6	C-23.7	C-26.4
	Nb Appr.	D-50.4	D-51.3	E-71.4	F-84.9	D-39.1	D-38.7
	Sb Appr.	F-100+	F-100+	F-93.0	F-97.5	D-45.0	D-44.6
	Intersection	D-51.2	D-54.1	D-53.1	E-58.6	C-30.0	C-31.4
North Avenue at Charlestown/Main (Traffic Signal)	Eb Appr.	A-2.7	A-6.2	A-5.2	A-7.9	A-7.9	B-11.7
	Wb Appr.	A-0.6	A-4.0	A-2.7	A-6.5	A-4.9	A-8.4
	Nb Appr.	E-57.7	D-53.7	E-63.5	E-58.8	D-48.7	D-44.6
	Sb Appr.	E-59.1	E-57.7	E-65.5	E-65.5	D-49.8	D-49.8
	Intersection	A-2.4	A-6.9	A-7.0	B-10.6	A-9.4	B-13.0
Kirk Avenue Right-In and Out Drive	Wb Right	B-12.2	B-12.7	C-16.6	C-18.0	B-11.7	B-12.1

Sidewalks

The development plan incorporates sidewalks along its North Avenue and Kirk Road frontages

Right-of-Way

The Kane County Access Ordinance requires developments along County Freeways, such as Kirk Road, to dedicate 75 to 100 feet of half right-of-way along their frontage. Currently, the site has a 60-foot half right-of-way with a corner cut. Discussions with KDOT indicated that this site should match the dedication of the properties to the south which have 70-foot half right-of-way. This west side of the site would require an additional 10-foot dedication and an adjustment of the corner cut.

Site Driveways

Capacity analyses were conducted for the three site driveways servicing the site to determine how well they will operate and the stacking at the stop signs. **Table 5** summarizes the results of the analyses. A copy of the capacity analyses is attached. Overall, each site driveway will operate at LOS D or better.

Table 5
Driveway Level of Service and Total Delay

Intersection	Movement	AM Peak		PM Peak		Saturday Peak	
		2017	2025	2017	2025	2017	2025
North Avenue Right-In and Out Drives	Sb Right	B-12.7	B-13.5	C-22.0	D-25.5	C-17.0	C-17.7
	Nb Right		C-25.0		C-17.8		C-19.0
Main Street Commons Access Drive	Wb Left		A-10.0		B-10.5		B-10.6
Internal Drive Connection by Panda Express and Bank	Eb Approach	A-0.0	A-0.0	A-0.0	A-0.0	A-0.0	A-0.0
	Wb Approach	A-1.5	A-0.3	A-1.3	A-0.6	A-4.1	A-1.4
	Nb Approach	A-9.0	B-10.1	A-9.3	B-10.1	A-9.1	B-10.0
	Sb Approach	A-9.2	B-10.0	A-9.1	A-9.9	A-9.4	B-10.1

Right-In and –Out Drive on North Avenue

The proposed right-in and out driveway for the gas station will be located on the south side of North Avenue and designed with a pork chop island,16-foot inbound and outbound lanes, an eastbound right-turn lane, and an outbound stop sign. An additional 11.8 feet of the site along North Avenue will be dedicated to IDOT to accommodate the right-turn lane. The current median break for the existing driveway will need to be reconstructed as a barrier median. The outbound right-turn will operate well with up to two vehicles stacking at one time. The entry road between North Avenue and the east-west internal roadway is 105 feet long so outbound vehicles stacking at the stop sign will not impact internal site traffic.

Right-In and Left-Out Drive on the Main Street Commons Entrance Road

The gas station proposes to have a right-in and left-out only driveway on the Main Street Commons Entrance Road to allow site traffic to have access to the traffic signal on North Avenue. It will have 14-foot a right-turn inbound and left-out outbound lanes with paint striping and signage to prohibit right-turns out and left-turns in. Traffic exiting the gas station will operate at a level of service A or B with one vehicle stopped at the stop sign.

Panda Express/Bank/Main Street Commons Intersection

Within the Main Street Commons shopping center, there are two internal circulation roads to the north and west of their main parking fields that also provide access to a bank site and Panda Express restaurant site. Each approach has one lane for left-turns, throughs, and right-turns. Currently it is uncontrolled with no yield or stop signs. With the development of the gas station, it is recommended that the north and south legs be controlled by stop signs in order to establish the right of way for the drivers approaching the intersection. With the additional gas station traffic, the intersection will continue to work well with minimal delays and stacking.

Internal Circulation

The fuel pumps are located on the west side of the site. The pumps are 32-feet apart (east-west) to allow a fueling vehicle on each side (10 foot each) and a 22-foot center lane to allow vehicles to maneuver around other fueling vehicles when they are finished. In the north-south direction, there is 40 feet of pavement from the north curb line to the first pump, then 32-feet to the second pump, and 42-feet to a row of parking. This is sufficient space to allow a vehicle to fuel at each pump and have another vehicle waiting or a vehicle with a trailer while maintaining two-way traffic around the canopy.

Traffic entering from North Avenue will turn right at the east-west internal roadway to the fuel pumps and/or convenience store. A minimal amount of traffic will turn left to go directly to the car wash. Most customers will fuel their vehicles first and pay for the car wash at the same time to receive a PIN code for the wash. If an inbound vehicle turns left to go directly to the car wash, there is sufficient distance to turn left onto the circulation road and then turn left into the car wash.

The cross-easement connection between the gas station and Panda Express parking lot is 24-foot wide and should have a stop sign northbound where it meets the internal east-west road and a stop sign southbound where it enters the Panda Express parking lot.

Car Wash Stacking Requirements

The City of St. Charles Zoning Code required vehicle stacking for an automatic car wash is two vehicles per bay plus ten stacking spaces per bay (see **Appendix**). For the proposed tunnel car wash, there is one bay which will require a minimum stacking for 12 vehicles. The code's definition of stacking spaces shall begin behind the last vehicle being washed.

6 - CONCLUSION

The preceding traffic analysis analyzed the propose PRIDE of Kane County gas station with a convenience store and car wash site and developed the following conclusions:

- The development of the site as proposed will not adversely impact the level-of-service of study area intersections.
- Right-of-way will be dedicated to the Kane County Division of Transportation (10 additional feet) and the Illinois Department of Transportation (11.8 feet or more) along both roads for future regional roadway improvements.
- North Avenue access will be a right-in and –out only driveway with a pork chop island and an eastbound right-turn lane. The existing median break in the center median will be closed.
- Two cross easements will be provided to the Panda Express lot to the south and to the Main Street Center access road to the east with one inbound and one outbound lane.
- Sidewalks will be provided on the site frontage.
- The carwash storage meets the city code requirement of 12 vehicles.
- Site circulation is good with adequate distance around each fueling position to allow traffic to maneuver on-site.
- With the projected increases in regional traffic volumes, the intersection will need to consider the long-term improvements:
    - Southbound right-turn lane
    - North/South dual left-turn lanes

APPENDIX

- **Existing Traffic Counts**
- **CMAP Letter**
- **ITE Trip Generation Calculations**
- **Intersection Capacity Analyses**
- **Zoning Code**

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Kirk Road and North Avenue (IL 64)

St. Chalres, Illinois

Begin Time	Kirk Road Southbound			North Avenue Westbound			Kirk Road Northbound			North Avenue Eastbound			15 Minute Totals	60 Minute Totals	Peak Hour Factor
	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn			
	Tuesday October 3, 2017														
6:00 AM	3	140	32	7	75	48	58	89	22	26	197	7	704	3407	0.86
6:15 AM	4	151	35	12	92	60	63	90	29	32	219	8	795	3690	0.93
6:30 AM	3	180	42	22	105	62	63	117	21	36	249	15	915	3962	0.93
6:45 AM	5	201	38	21	147	81	60	116	26	47	238	13	993	4127	0.96
7:00 AM	15	168	31	15	138	55	87	156	27	29	244	22	987	4267	0.94
7:15 AM	9	184	37	18	159	57	80	129	33	49	295	17	1067	**4316**	**0.95**
7:30 AM	7	181	51	22	155	55	91	134	34	47	283	20	1080	4236	0.93
7:45 AM	10	209	48	17	168	75	72	116	43	64	293	18	1133	4010	0.88
8:00 AM	9	167	46	25	152	68	77	118	35	55	272	12	1036	3655	0.88
8:15 AM	8	172	46	22	149	64	72	105	36	48	254	11	987		
8:30 AM	9	148	29	24	148	52	68	104	34	40	184	14	854		
8:45 AM	8	107	23	22	168	62	45	89	29	33	181	11	778		
Total	90	2008	458	227	1656	739	836	1363	369	506	2909	168			
7:15-8:15 AM	**35**	**741**	**182**	**82**	**634**	**255**	**320**	**497**	**145**	**215**	**1143**	**67**	**4316**		
	Tuesday October 3, 2017														
3:00 PM	6	88	29	29	249	76	90	168	47	33	199	27	1041	4383	0.91
3:15 PM	14	98	29	34	245	74	72	174	58	44	171	19	1032	4581	0.92
3:30 PM	21	92	50	46	276	64	72	181	58	78	236	28	1202	4777	0.96
3:45 PM	15	132	40	38	272	64	63	163	57	48	195	21	1108	4837	0.96
4:00 PM	13	134	28	41	319	90	80	186	72	40	208	28	1239	5114	0.92
4:15 PM	13	136	21	47	310	85	66	211	73	33	197	36	1228	**5203**	**0.94**
4:30 PM	12	127	28	58	305	87	87	203	67	29	224	35	1262	5150	0.93
4:45 PM	19	155	36	65	314	95	114	241	66	39	212	29	1385	5131	0.93
5:00 PM	17	142	31	60	305	91	90	215	78	36	239	24	1328	4970	0.94
5:15 PM	11	136	32	49	281	85	81	189	79	41	165	26	1175		
5:30 PM	14	150	37	49	306	102	81	174	62	40	194	34	1243		
5:45 PM	15	174	40	42	291	87	80	169	82	39	180	25	1224		
Total	170	1564	401	558	3473	1000	976	2274	799	500	2420	332			
4:15-5:15 PM	**61**	**560**	**116**	**230**	**1234**	**358**	**357**	**870**	**284**	**137**	**872**	**124**	**5203**		
	Saturday September 30, 2017														
11:00 AM	14	94	32	29	231	61	63	101	44	45	228	24	966	3978	0.92
11:15 AM	14	77	43	18	254	60	56	72	40	42	217	23	916	4024	0.93
11:30 AM	9	109	36	33	275	61	58	104	59	33	219	21	1017	4131	0.96
11:45 AM	20	83	44	31	280	78	81	97	56	45	232	32	1079	**4137**	**0.96**
Noon	11	100	39	22	245	68	76	90	59	51	225	26	1012	4012	0.98
12:15 PM	22	91	34	32	263	76	74	81	43	51	231	25	1023	3905	0.95
12:30 PM	10	108	28	32	252	63	66	107	35	46	244	32	1023	3910	0.95
12:45 PM	19	98	32	35	265	74	53	85	39	47	183	24	954	3870	0.94
1:00 PM	13	93	20	34	210	62	67	103	36	42	202	23	905	3904	0.95
1:15 PM	18	129	36	31	243	74	90	105	42	41	199	20	1028		
1:30 PM	21	96	21	30	254	62	78	97	44	45	212	23	983		
1:45 PM	21	118	28	29	206	70	69	117	48	29	218	35	988		
Total	192	1196	393	356	2978	809	831	1159	545	517	2610	308			
11:45AM-12:45PM	**63**	**382**	**145**	**117**	**1040**	**285**	**297**	**375**	**193**	**193**	**932**	**115**	**4137**		

North Avenue (IL 64) at West Charles Towne Mall

St Charles, Illinois

Begin Time	Charles Towne Mall Southbound			North Avenue Westbound			Mall Entrance Northbound			North Avenue Eastbound			15 Minute Totals	60 Minute Totals	Peak Hour Factor
	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn			
	Thursday October 5, 2017														
6:00 AM	0	0	1	0	124	0	3	1	0	0	239	1	369	2037	0.85
6:15 AM	1	0	2	1	163	2	4	0	1	3	297	1	475	2247	0.94
6:30 AM	2	0	2	0	204	4	1	0	1	2	374	5	595	2463	0.89
6:45 AM	1	0	5	0	254	6	0	0	1	2	323	6	598	2608	0.88
7:00 AM	2	1	2	1	183	1	0	0	1	6	378	4	579	2667	0.90
7:15 AM	0	0	3	1	246	3	3	1	1	7	425	1	691	**2731**	**0.92**
7:30 AM	3	1	0	1	252	0	3	0	0	4	472	4	740	2645	0.89
7:45 AM	1	0	5	2	256	0	1	0	0	7	382	3	657	2582	0.95
8:00 AM	0	1	1	1	274	0	0	0	0	5	361	0	643	2505	0.93
8:15 AM	3	0	3	1	224	1	0	0	0	6	363	4	605		
8:30 AM	5	3	1	1	254	3	2	1	3	8	392	4	677		
8:45 AM	6	1	3	0	278	1	0	2	1	9	273	6	580		
Total	24	7	28	9	2712	21	17	5	9	59	4279	39			
7:15-8:15 AM	**4**	**2**	**9**	**5**	**1028**	**3**	**7**	**1**	**1**	**23**	**1640**	**8**	**2731**		
	Thursday October 5, 2017														
3:00 PM	11	2	3	5	335	8	6	1	9	8	282	12	682	2864	0.92
3:15 PM	12	1	2	6	367	9	3	2	8	12	272	17	711	2969	0.94
3:30 PM	9	0	3	5	355	2	10	0	13	7	277	9	690	3038	0.97
3:45 PM	23	3	10	4	392	7	5	3	10	5	303	16	781	3118	0.99
4:00 PM	15	0	2	8	421	11	10	4	12	12	279	13	787	3120	0.99
4:15 PM	12	6	6	4	418	9	6	0	4	12	287	16	780	**3197**	**0.93**
4:30 PM	17	2	6	3	428	4	12	6	14	10	262	6	770	3321	0.92
4:45 PM	13	0	3	6	437	4	9	0	11	8	270	22	783	3383	0.94
5:00 PM	12	3	7	11	444	7	7	3	15	10	321	24	864	3337	0.92
5:15 PM	11	3	10	16	453	4	10	7	9	20	337	24	904		
5:30 PM	20	5	12	7	440	6	17	7	11	15	276	16	832		
5:45 PM	18	2	10	7	387	4	7	1	9	6	272	14	737		
Total	173	27	74	82	4877	75	102	34	125	125	3438	189			
4:15-5:15 PM	**54**	**11**	**22**	**24**	**1727**	**24**	**34**	**9**	**44**	**40**	**1140**	**68**	**3197**		
	Saturday October 7, 2017														
11:00 AM	13	0	4	3	315	9	8	0	6	16	261	19	654	2690	0.94
11:15 AM	11	4	4	4	324	4	11	4	11	10	238	17	642	2763	0.95
11:30 AM	14	2	2	4	329	6	10	0	9	17	262	25	680	2802	0.96
11:45 AM	11	2	8	4	335	10	19	2	11	17	261	34	714	**2892**	**0.94**
Noon	13	2	5	6	326	10	17	2	16	15	297	18	727	2890	0.94
12:15 PM	24	2	5	3	294	7	11	2	14	15	274	30	681	2882	0.94
12:30 PM	11	7	5	8	378	10	10	4	8	13	296	20	770	2980	0.96
12:45 PM	19	5	7	6	335	8	20	3	7	15	256	31	712	2975	0.95
1:00 PM	21	1	7	9	307	4	19	3	4	19	308	17	719	2934	0.94
1:15 PM	28	2	6	9	325	10	14	3	8	17	312	45	779		
1:30 PM	23	2	3	3	305	12	13	2	7	12	344	39	765		
1:45 PM	24	2	5	4	274	8	12	3	12	17	289	21	671		
Total	212	31	61	63	3847	98	164	28	113	183	3398	316			
11:45AM-12:45PM	**59**	**13**	**23**	**21**	**1333**	**37**	**57**	**10**	**49**	**60**	**1128**	**102**	**2892**		

ERIKSSON ENGINEERING ASSOCIATES, LTD

Right-in and Out Driveways

St Charles, Illinois				
	Northbound Kirk Road Retail RIRO		Westbound North Avenue Bank/On the Border	
Begin Time	Right IN	Right OUT	Right IN	Right OUT
	Tues Oct. 3, 2017		**Thurs Oct. 5, 2017**	
6:00 AM	2	11	2	2
6:15 AM	0	3	2	3
6:30 AM	1	1	0	4
6:45 AM	4	1	0	2
7:00 AM	1	1	5	3
7:15 AM	1	5	0	6
7:30 AM	3	5	2	1
7:45 AM	4	1	4	3
8:00 AM	0	0	3	6
8:15 AM	2	0	1	7
8:30 AM	0	5	2	4
8:45 AM	5	4	2	4
Total	23	37	23	45
7:15-8:15 AM	**8**	**11**	**9**	**16**
	Tues Oct. 3, 2017		**Thurs Oct. 5, 2017**	
3:00 PM	2	4	7	5
3:15 PM	3	9	4	13
3:30 PM	7	8	5	8
3:45 PM	6	3	10	18
4:00 PM	5	8	10	8
4:15 PM	2	3	2	8
4:30 PM	1	8	11	13
4:45 PM	5	1	6	14
5:00 PM	12	6	11	8
5:15 PM	11	10	9	16
5:30 PM	3	16	9	24
5:45 PM	3	15	13	10
Total	60	91	97	145
4:15-5:15 PM	**20**	**18**	**30**	**43**
	Saturday Sept. 30, 2017		**Saturday Oct. 7, 2017**	
11:00 AM	10	7	9	14
11:15 AM	12	9	7	7
11:30 AM	6	6	8	10
11:45 AM	8	10	5	15
Noon	6	2	10	21
12:15 PM	12	6	10	14
12:30 PM	4	9	11	10
12:45 PM	5	7	7	17
1:00 PM	9	6	11	13
1:15 PM	5	7	10	9
1:30 PM	2	8	7	14
1:45 PM	6	3	4	11
Total	85	80	99	155
11:45AM-12:45PM	**30**	**27**	**36**	**60**

Eastside of Kird Road
670 feet south of North Ave.

Northside of North Ave.
400 feet east of Kirk Road

Internal Intersection: Pandya Express/Bank of America/Shopping Center

St. Charles, Illinois															
	Panda Epress Drive Southbound			North Circulation Road Westbound			West Circulation Road Northbound			Panda/BOA Access Eastbound			15	60	Peak
Begin Time	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Minute Totals	Minute Totals	Hour Factor
	Tuesday October 3, 2017														
6:00 AM	0	7	2	1	0	0	1	1	0	7	0	0	19	49	0.53
6:15 AM	0	2	3	7	0	0	0	5	2	4	0	0	23	31	0.34
6:30 AM	0	0	0	0	0	0	0	2	0	0	1	0	3	21	0.40
6:45 AM	0	0	1	1	0	1	0	1	0	0	0	0	4	34	0.53
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	33	0.52
7:15 AM	0	0	0	3	0	1	1	0	0	5	3	0	13	**33**	**0.52**
7:30 AM	0	4	1	1	0	0	0	6	0	4	0	0	16	23	0.36
7:45 AM	0	0	0	0	0	0	2	0	0	0	1	0	3	37	0.31
8:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	38	0.32
8:15 AM	0	0	0	0	0	0	2	0	1	0	0	0	3		
8:30 AM	0	1	3	3	2	0	0	10	2	8	1	0	30		
8:45 AM	0	0	0	1	0	1	0	1	0	1	0	0	4		
Total	0	15	10	17	2	3	6	27	5	29	6	0			
7:15-8:15 AM	**0**	**4**	**1**	**4**	**0**	**1**	**3**	**7**	**0**	**9**	**4**	**0**	**33**		
	Tuesday October 3, 2017														
3:00 PM	0	0	0	4	0	2	4	1	0	1	1	0	13	52	0.68
3:15 PM	0	0	0	0	1	2	0	0	0	4	0	0	7	55	0.72
3:30 PM	0	2	1	2	0	2	5	3	0	2	2	0	19	73	0.73
3:45 PM	0	0	0	3	0	1	3	5	0	0	1	0	13	66	0.66
4:00 PM	0	0	0	3	0	2	2	4	1	4	0	0	16	62	0.62
4:15 PM	0	0	1	6	1	0	1	11	0	3	2	0	25	**64**	**0.64**
4:30 PM	0	0	0	4	0	1	1	0	1	5	0	0	12	64	0.64
4:45 PM	0	0	1	1	2	0	2	1	0	1	1	0	9	100	0.52
5:00 PM	0	1	0	2	3	3	0	5	1	2	1	0	18	117	0.61
5:15 PM	0	3	1	4	1	1	0	10	0	2	2	1	25		
5:30 PM	0	7	1	8	3	1	1	8	0	13	6	0	48		
5:45 PM	0	5	2	1	0	1	0	3	1	8	5	0	26		
Total	0	18	7	38	11	16	19	51	4	45	21	1			
4:15-5:15 PM	**0**	**1**	**2**	**13**	**6**	**4**	**4**	**17**	**2**	**11**	**4**	**0**	**64**		
	Saturday September 30, 2017														
11:00 AM	0	2	3	3	5	2	2	7	2	0	2	0	28	89	0.79
11:15 AM	0	5	2	0	3	1	0	3	1	1	7	0	23	71	0.66
11:30 AM	0	7	4	4	1	1	1	6	0	0	3	0	27	73	0.68
11:45 AM	0	5	2	0	0	0	1	2	0	1	0	0	11	**68**	**0.68**
Noon	0	3	0	2	0	2	0	2	0	1	0	0	10	69	0.69
12:15 PM	0	4	2	5	0	6	3	4	0	0	1	0	25	75	0.75
12:30 PM	0	10	2	1	0	2	1	4	1	1	0	0	22	60	0.68
12:45 PM	0	4	3	1	0	0	2	2	0	0	0	0	12	53	0.83
1:00 PM	0	4	2	4	0	1	1	4	0	0	0	0	16	59	0.82
1:15 PM	0	3	2	1	0	2	0	1	0	1	0	0	10		
1:30 PM	0	2	2	5	0	2	0	4	0	0	0	0	15		
1:45 PM	0	4	1	6	0	2	2	3	0	0	0	0	18		
Total	0	53	25	32	9	21	13	42	4	5	13	0			
11:45AM-12:45PM	**0**	**22**	**6**	**8**	**0**	**10**	**5**	**12**	**1**	**3**	**1**	**0**	**68**		

Butterfield Road (IL 56) Right-Turns

Aurora, Illinois						
	Pride Access Drive Northbound		Butterfield Road Eastbound	15	60	Peak
Begin Time	Right IN	Right OUT	Right Turn	Minute Totals	Minute Totals	Hour Factor
	Tuesday October 10, 2017					
7:00 AM	10	8	41	59	251	0.87
7:15 AM	8	6	36	50	251	0.87
7:30 AM	16	9	45	70	**255**	**0.89**
7:45 AM	13	10	49	72	249	0.86
8:00 AM	14	7	38	59	224	0.88
8:15 AM	11	7	36	54		
8:30 AM	12	9	43	64		
8:45 AM	12	6	29	47		
Total	96	62	317			
7:30-8:30 AM	**54**	**33**	**168**	**255**		
	Tuesday October 10, 2017					
4:00 PM	13	5	25	43	**167**	**0.85**
4:15 PM	10	8	31	49	156	0.80
4:30 PM	8	4	25	37	143	0.94
4:45 PM	11	8	19	38	138	0.91
5:00 PM	9	8	15	32	133	0.92
5:15 PM	12	5	19	36		
5:30 PM	5	6	21	32		
5:45 PM	10	2	21	33		
Total	78	46	176			
4:00-5:00 PM	**42**	**25**	**100**	**167**		
	Saturday October 14, 2017					
11:00 AM	8	3	30	41	**175**	**0.88**
11:15 AM	5	5	40	50	171	0.86
11:30 AM	11	9	21	41	171	0.86
11:45 AM	9	7	27	43	174	0.87
Noon	4	6	27	37	171	0.86
12:15 PM	10	6	34	50	134	0.67
12:30 PM	7	5	32	44	84	0.48
12:45 PM	10	4	26	40	40	0.25
Total	64	45	237			
11:00 AM - Noon	**33**	**24**	**118**	**175**		

Rand Road (US 12) Right-turn Volumes and Driveway Volumes

Lake County, Illinois												
	West Pride Access		East Pride Access				Self-Storage Access		Rand Road Westbound Right	15	60	Peak
Begin Time	Right IN	Right OUT	Right IN	Left IN	Right OUT	Left OUT	Right IN	Right OUT	Right Turn	Minute Totals	Minute Totals	Hour Factor
	Wednesday October 11, 2017											
7:00 AM	0	0	16	2	4	0	0	0	77	77	375	0.81
7:15 AM	0	2	17	1	6	0	0	0	92	92	**390**	**0.84**
7:30 AM	0	2	21	0	6	0	2	1	87	90	385	0.83
7:45 AM	0	2	21	0	7	0	0	0	116	116	385	0.83
8:00 AM	1	0	22	0	6	0	0	1	91	92	349	0.95
8:15 AM	0	0	20	0	7	0	0	0	87	87		
8:30 AM	0	0	22	0	12	0	1	0	89	90		
8:45 AM	1	0	21	0	7	0	0	0	80	80		
Total	2	6	160	3	55	0	3	2	719			
7:15-8:15 AM	**1**	**6**	**81**	**1**	**25**	**0**	**2**	**2**	**386**	**390**		
	Wednesday October 11, 2017											
4:00 PM	0	0	19	0	8	0	0	0	125	125	525	0.92
4:15 PM	0	1	26	0	13	0	1	2	133	136	**543**	**0.95**
4:30 PM	0	3	29	0	5	1	2	0	140	142	510	0.89
4:45 PM	0	0	21	1	16	1	3	1	118	122	498	0.87
5:00 PM	0	0	32	1	5	0	0	1	142	143	494	0.86
5:15 PM	1	1	22	0	8	0	0	0	103	103		
5:30 PM	0	0	25	2	9	0	1	3	126	130		
5:45 PM	0	1	19	2	7	1	0	0	118	118		
Total	1	6	193	6	71	3	7	7	1005			
4:15-5:15 PM	**0**	**4**	**108**	**2**	**39**	**2**	**6**	**4**	**533**	**543**		
	Saturday October 7, 2017											
11:00 AM	0	1	24	4	12	0	1	0	57	99	433	0.89
11:15 AM	1	0	22	1	13	0	0	2	75	114	435	0.89
11:30 AM	0	0	22	1	12	4	0	0	59	98	429	0.88
11:45 AM	2	1	27	0	9	5	1	2	75	122	**443**	**0.91**
Noon	0	2	18	0	13	2	0	0	66	101	422	0.94
12:15 PM	1	3	20	2	5	2	3	1	71	108	321	0.72
12:30 PM	0	5	31	0	6	0	1	1	68	112	213	0.48
12:45 PM	1	2	19	1	9	2	0	0	67	101	101	0.25
Total	5	14	183	9	79	15	6	6	538			
11:45 AM-12:45 PM	**3**	**11**	**96**	**2**	**33**	**9**	**5**	**4**	**280**	**443**		

Chicago Metropolitan Agency for Planning

233 South Wacker Drive
Suite 800
Chicago, Illinois 60606

312 454 0400
www.cmap.illinois.gov

August 22, 2019

Stephen B. Corcoran, P.E., PTOE
Director of Traffic Engineering
Eriksson Engineering Associates
145 Commerce Drive
Suite A
Grayslake, IL 60030

Subject: ***North Avenue (IL 64) @ Kirk Road***
IDOT

Dear Mr. Corcoran:

In response to a request made on your behalf and dated August 21, 2019, we have developed year 2050 average daily traffic (ADT) projections for the subject location.

ROAD SEGMENT	Current Volumes	Year 2050 ADT
Kirk Rd north of North Ave (IL 64)	18,800	20,400
Kirk Rd south of North Ave (IL 64)	24,800	28,800
North Ave (IL 64) west of Kirk Rd	32,900	41,000
North Ave (IL 64) east of Kirk Rd	33,500	44,000

Traffic projections are developed using existing ADT data provided in the request letter and the results from the March 2019 CMAP Travel Demand Analysis. The regional travel model uses CMAP 2050 socioeconomic projections and assumes the implementation of the ON TO 2050 Comprehensive Regional Plan for the Northeastern Illinois area. The provision of this data in support of your request does not constitute a CMAP endorsement of the proposed development or any subsequent developments.

If you have any questions, please call me at (312) 386-8806.

Sincerely,

Jose Rodriguez, PTP, AICP
Senior Planner, Research & Analysis

cc: Quigley (IDOT)
S:\AdminGroups\ResearchAnalysis\2019_ForecastsTraffic\StCharles\ka-18-19\ka-18-19.docx

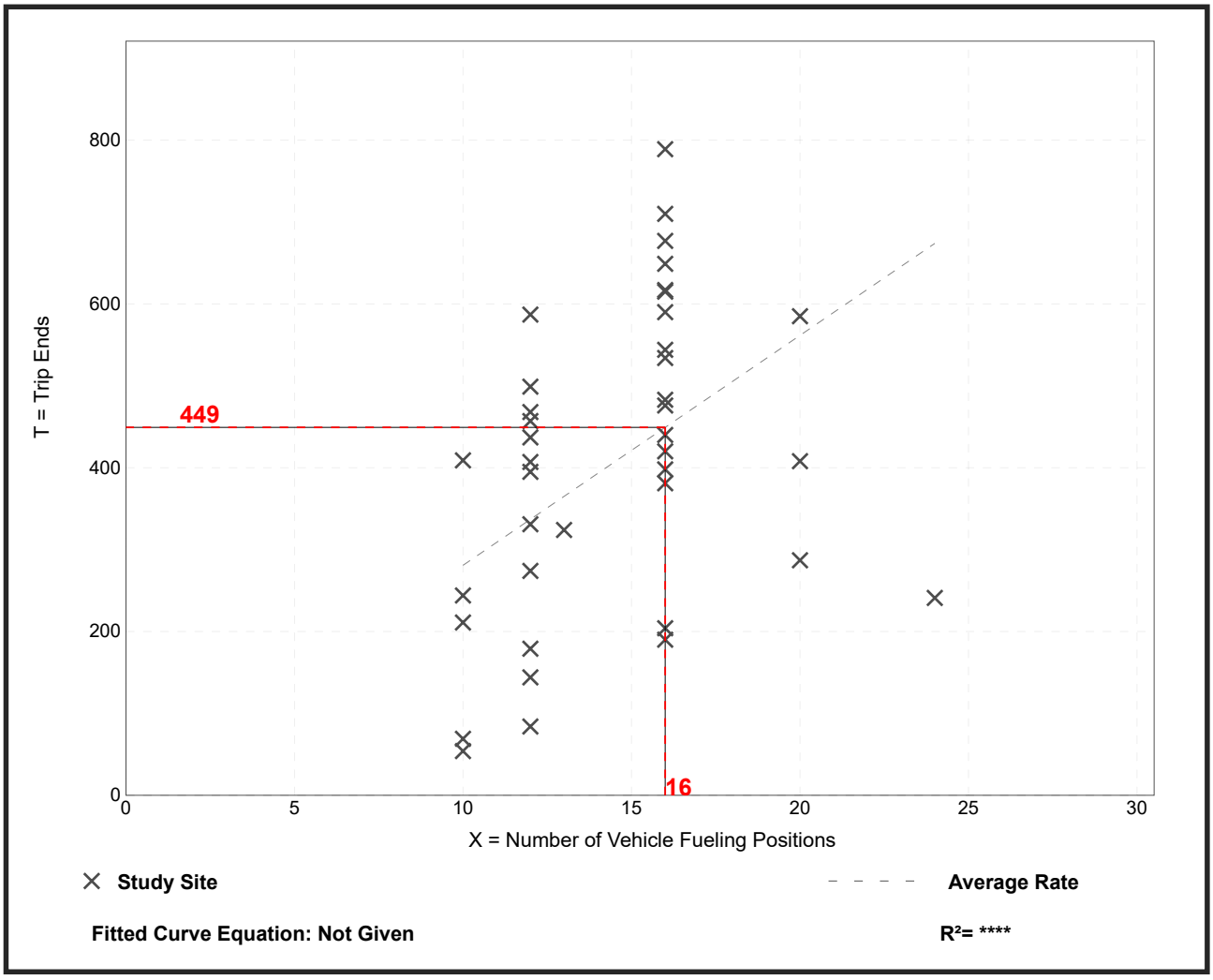
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs: **Vehicle Fueling Positions**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 39
Avg. Num. of Vehicle Fueling Positions: 14
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
28.08	5.40 - 49.31	11.98

Data Plot and Equation



Trip Generation Manual, 10th Edition ● Institute of Transportation Engineers

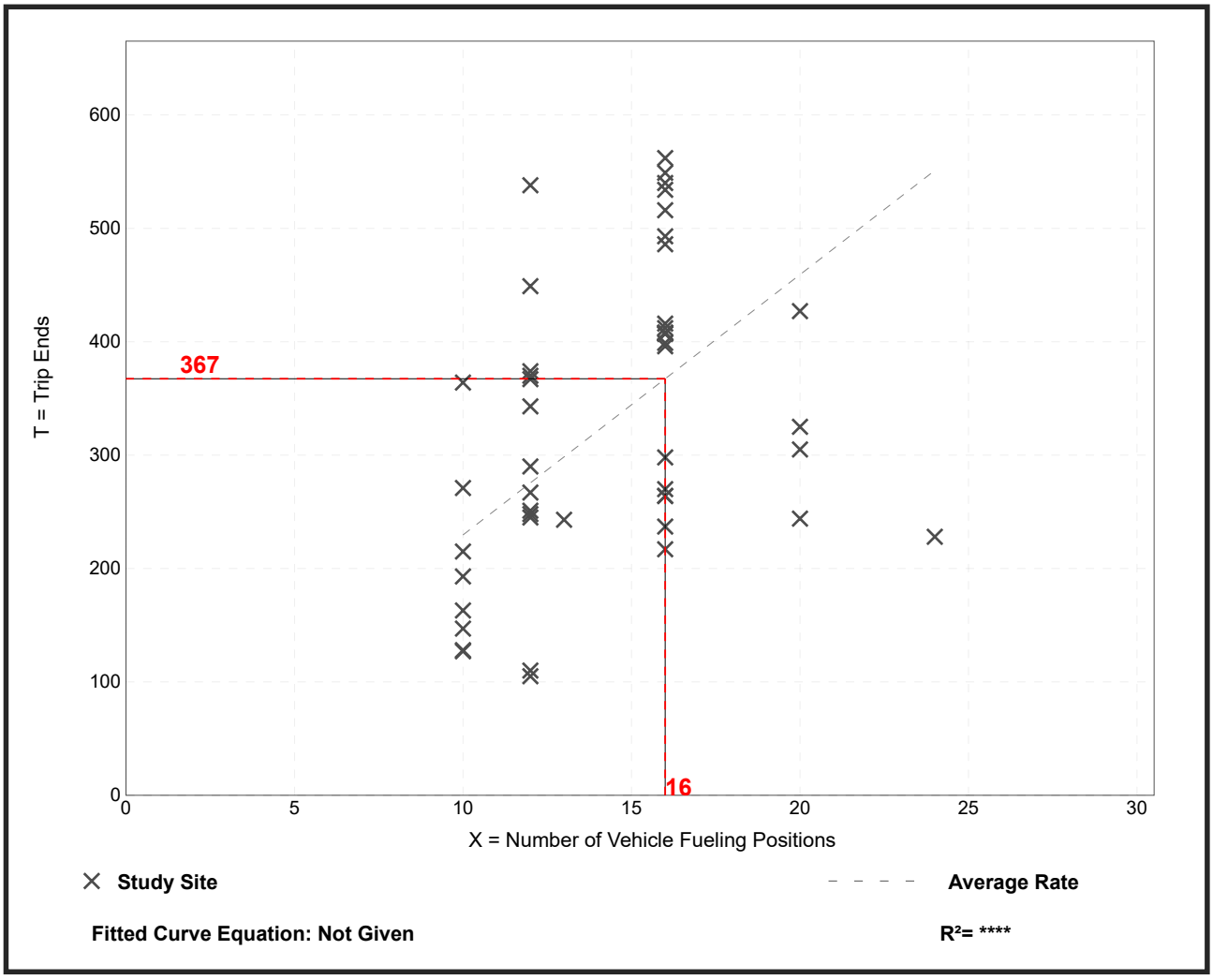
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs: **Vehicle Fueling Positions**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 48
Avg. Num. of Vehicle Fueling Positions: 14
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
22.96	8.75 - 44.83	8.34

Data Plot and Equation



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Super Convenience Market/Gas Station
(960)

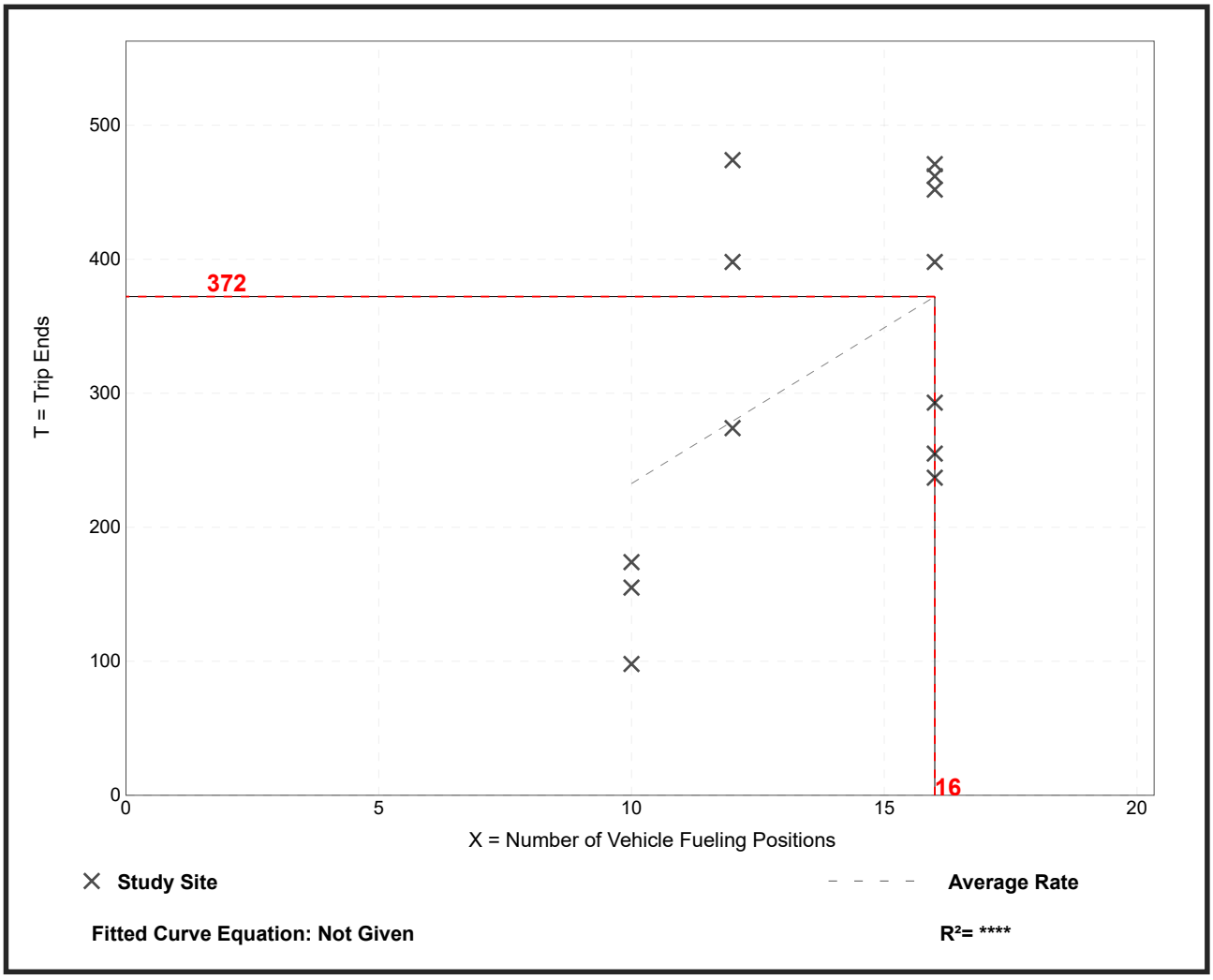
Vehicle Trip Ends vs: **Vehicle Fueling Positions**
On a: **Saturday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 13
Avg. Num. of Vehicle Fueling Positions: 14
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
23.26	9.80 - 39.50	8.20

Data Plot and Equation



Trip Generation Manual, 10th Edition ● Institute of Transportation Engineers

HCS7 Two-Way Stop-Control Report

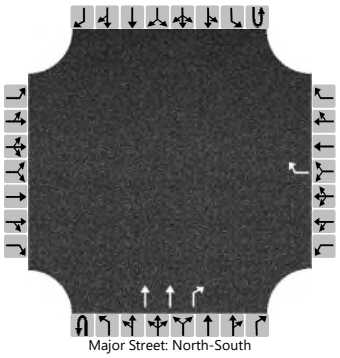
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	AM Peak Hour
Intersection Orientation	North-South
Project Description	Pride of St. Charles

Site Information

Intersection	Northbound Kirk Road RIRO
Jurisdiction	KDOT/St Charles
East/West Street	Retail RIRO Drive
North/South Street	Kirk Road
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	1	0	0	0	0
Configuration								R			T	R				
Volume (veh/h)								11			951	8				
Percent Heavy Vehicles (%)								3								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No					No					
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.96								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.33								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								12								
Capacity, c (veh/h)								513								
v/c Ratio								0.02								
95% Queue Length, Q_{95} (veh)								0.1								
Control Delay (s/veh)								12.2								
Level of Service (LOS)								B								
Approach Delay (s/veh)						12.2										
Approach LOS						B										

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HCS7 Two-Way Stop-Control Report

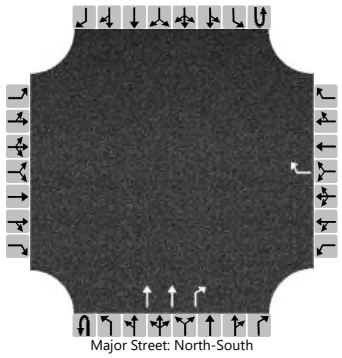
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	PM Peak Hour
Intersection Orientation	North-South
Project Description	Pride of St. Charles

Site Information

Intersection	Northbound Kirk Road RIRO
Jurisdiction	KDOT/St Charles
East/West Street	Retail RIRO Drive
North/South Street	Kirk Road
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	1	0	0	0	0
Configuration								R			T	R				
Volume (veh/h)								18			1493	20				
Percent Heavy Vehicles (%)								3								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No					No					
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.96								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.33								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								19								
Capacity, c (veh/h)								329								
v/c Ratio								0.06								
95% Queue Length, Q_{95} (veh)								0.2								
Control Delay (s/veh)								16.6								
Level of Service (LOS)								C								
Approach Delay (s/veh)						16.6										
Approach LOS						C										

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HCS7 Two-Way Stop-Control Report

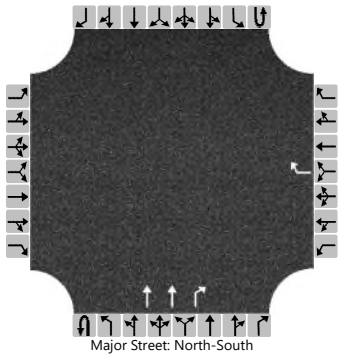
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	Saturday Peak Hour
Intersection Orientation	North-South
Project Description	Pride of St. Charles

Site Information

Intersection	Northbound Kirk Road RIRO
Jurisdiction	KDOT/St Charles
East/West Street	Retail RIRO Drive
North/South Street	Kirk Road
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	1	0	0	0	0
Configuration								R			T	R				
Volume (veh/h)								27			838	30				
Percent Heavy Vehicles (%)								3								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No					No					
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.96								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.33								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								28								
Capacity, c (veh/h)								565								
v/c Ratio								0.05								
95% Queue Length, Q_{95} (veh)								0.2								
Control Delay (s/veh)								11.7								
Level of Service (LOS)								B								
Approach Delay (s/veh)						11.7										
Approach LOS						B										

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HCS7 Two-Way Stop-Control Report

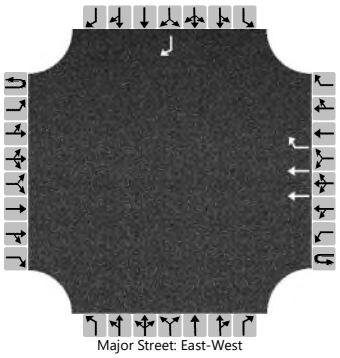
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	RIRO -Bank-On the Border
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume (veh/h)							1024	9								16
Percent Heavy Vehicles (%)																3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																6.9
Critical Headway (sec)																6.96
Base Follow-Up Headway (sec)																3.3
Follow-Up Headway (sec)																3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																17
Capacity, c (veh/h)																484
v/c Ratio																0.03
95% Queue Length, Q_{95} (veh)																0.1
Control Delay (s/veh)																12.7
Level of Service (LOS)																B
Approach Delay (s/veh)													12.7			
Approach LOS													B			

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HCS7 Two-Way Stop-Control Report

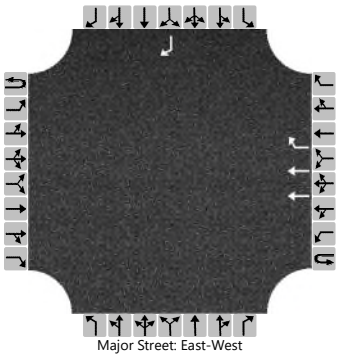
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	RIRO -Bank-On the Border
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume (veh/h)							1795	30								43
Percent Heavy Vehicles (%)																3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																6.9
Critical Headway (sec)																6.96
Base Follow-Up Headway (sec)																3.3
Follow-Up Headway (sec)																3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																46
Capacity, c (veh/h)																257
v/c Ratio																0.18
95% Queue Length, Q_{95} (veh)																0.6
Control Delay (s/veh)																22.0
Level of Service (LOS)																C
Approach Delay (s/veh)													22.0			
Approach LOS													C			

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HCS7 Two-Way Stop-Control Report

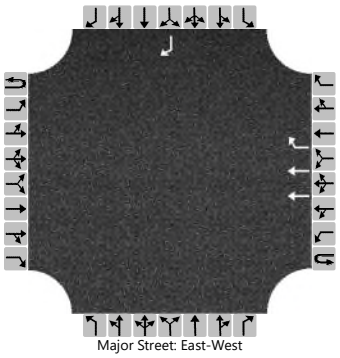
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	Saturday Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	RIRO -Bank-On the Border
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume (veh/h)							1405	36								60
Percent Heavy Vehicles (%)																3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																6.9
Critical Headway (sec)																6.96
Base Follow-Up Headway (sec)																3.3
Follow-Up Headway (sec)																3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																63
Capacity, c (veh/h)																362
v/c Ratio																0.17
95% Queue Length, Q_{95} (veh)																0.6
Control Delay (s/veh)																17.0
Level of Service (LOS)																C
Approach Delay (s/veh)													17.0			
Approach LOS													C			

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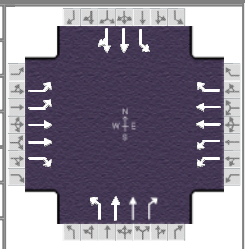
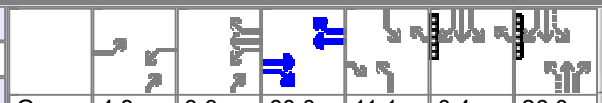
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	AM Peak Hour	PHF	0.95
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 7:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 AM.xus		
Project Description	Pride of St. Charles				

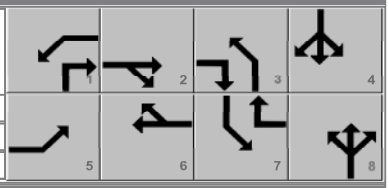


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	67	1169	215	255	703	82	145	497	320	182	741	35

Signal Information								
Cycle, s	130.0	Reference Phase	2					
Offset, s	0	Reference Point	End					
Uncoordinated	No	Simult. Gap E/W	On					
Force Mode	Fixed	Simult. Gap N/S	On					



Green	4.8	3.3	60.0	11.1	0.4	26.0
Yellow	3.5	3.5	4.5	3.5	0.0	4.5
Red	1.0	1.0	1.5	0.0	0.0	1.5



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	67	1169	215	255	703	82	145	497	320	182	741	35
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	2000	1900	1900	2000	1900	1900	2000	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7	7	7	7	7	7	7	7	7	7	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Turn Bay Length, ft	170	0	125	325	0	160	145	0	145	135	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	45	45	45	40	40	40	40	40	40

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	16.0	63.0	20.0	67.0	15.0	32.0	15.0	32.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Red Clearance Interval (R_c), s	1.0	1.5	1.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	15	3	15	3	15	3	15
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		0.0		9.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		38.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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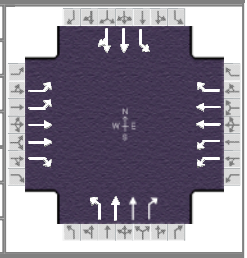
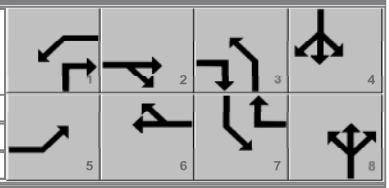
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	AM Peak Hour	PHF	0.95
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 7:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	67	1169	215	255	703	82	145	497	320	182	741	35

Signal Information												
Cycle, s	130.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	4.8	3.3	60.0	11.1	0.4	26.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	3.5	4.5	3.5	0.0	4.5		
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.5	0.0	0.0	1.5		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	3.0	1.1	4.0
Phase Duration, s	9.3	66.0	17.0	73.7	14.6	32.0	15.0	32.4
Change Period, ($Y+R_c$), s	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.0	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	4.7		12.3		11.1	28.0	13.5	28.4
Green Extension Time (g_e), s	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.85		1.00	1.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	71	1231	226	268	740	86	153	523	337	192	412	405
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1800	1522	1661	1800	1522	1711	1800	1522	1711	1796	1767
Queue Service Time (g_s), s	2.7	31.4	10.3	10.3	11.2	3.1	9.1	17.7	26.0	11.5	26.4	26.4
Cycle Queue Clearance Time (g_c), s	2.7	31.4	10.3	10.3	11.2	3.1	9.1	17.7	26.0	11.5	26.4	26.4
Green Ratio (*g/C*)	0.04	0.46	0.55	0.10	0.52	0.61	0.29	0.20	0.30	0.29	0.20	0.20
Capacity (*c*), veh/h	122	1661	832	320	1876	928	202	720	451	261	365	359
Volume-to-Capacity Ratio (*X*)	0.579	0.741	0.272	0.839	0.395	0.093	0.757	0.727	0.747	0.735	1.129	1.129
Back of Queue (*Q*), ft/ln (95 th percentile)	55.5	457.5	176.2	218.2	184.6	48.1	210.1	338.2	410.6	245.9	784.3	734.3
Back of Queue (*Q*), veh/ln (95 th percentile)	2.1	17.3	6.7	8.3	7.0	1.8	8.0	12.8	15.6	9.3	29.7	29.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.33	0.00	1.41	0.67	0.00	0.30	1.45	0.00	2.83	1.82	0.00	0.00
Uniform Delay (d_1), s/veh	61.6	19.5	15.7	57.7	11.2	10.5	39.0	48.7	41.3	38.8	51.8	51.8
Incremental Delay (d_2), s/veh	1.6	3.0	0.8	10.4	0.6	0.2	12.9	3.2	6.0	9.1	86.9	87.4
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	63.2	22.5	16.5	68.2	11.8	10.7	52.0	51.9	47.3	47.9	138.7	139.2
Level of Service (LOS)	E	C	B	E	B	B	D	D	D	D	F	F
Approach Delay, s/veh / LOS	23.5	C		25.6	C		50.4	D		121.6	F	
Intersection Delay, s/veh / LOS	51.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.43	B	2.27	B	2.60	C	2.60	C
Bicycle LOS Score / LOS	1.75	B	1.39	A	1.32	A	1.32	A

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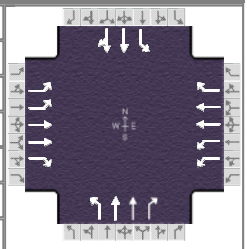
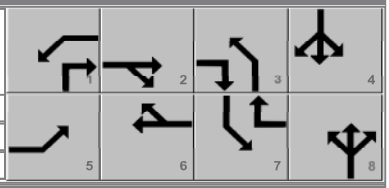
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	AM Peak Hour	PHF	0.95
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 7:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	67	1169	215	255	703	82	145	497	320	182	741	35

Signal Information												
Cycle, s	130.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
				Green	4.8	3.3	60.0	11.1	0.4	26.0		
				Yellow	3.5	3.5	4.5	3.5	0.0	4.5		
				Red	1.0	1.0	1.5	0.0	0.0	1.5		



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000	0.847		0.000	0.847		0.000	0.847		0.984	0.984
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3600	1522	3322	3600	1522	1711	3600	1522	1711	3403	161
Proportion of Vehicles Arriving on Green (P)	0.04	0.62	0.46	0.10	0.69	0.52	0.09	0.20	0.20	0.09	0.20	0.20
Incremental Delay Factor (k)	0.04	0.50	0.50	0.20	0.50	0.50	0.26	0.25	0.27	0.26	0.50	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Green Ratio (g/C)	0.04	0.46	0.10	0.52	0.29	0.20	0.29	0.20
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	643	0	844	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	26.0	0.0	26.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	8.3	0.0
Permitted Queue Service Time (g_{ps}), s					0.0		5.6	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		1522		1522		1522		
Protected Right Effective Green Time (g_R), s		11.1		11.5		12.5		

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.557	0.000	1.852	0.000	1.852	0.000
Pedestrian F_s / F_{delay}	0.000	0.118	0.000	0.108	0.000	0.149	0.000	0.149
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	922.78	18.86	1042.02	14.91	400.00	41.60	406.00	41.29
Bicycle F_w / F_v	-3.64	1.26	-3.64	0.90	-3.64	0.84	-3.64	0.83

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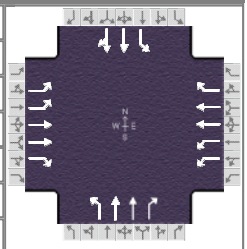
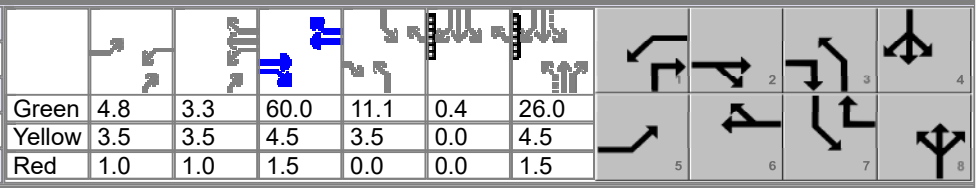
HCS7 Signalized Intersection Results Graphical Summary

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	AM Peak Hour	PHF	0.95
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 7:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 AM.xus		
Project Description	Pride of St. Charles				



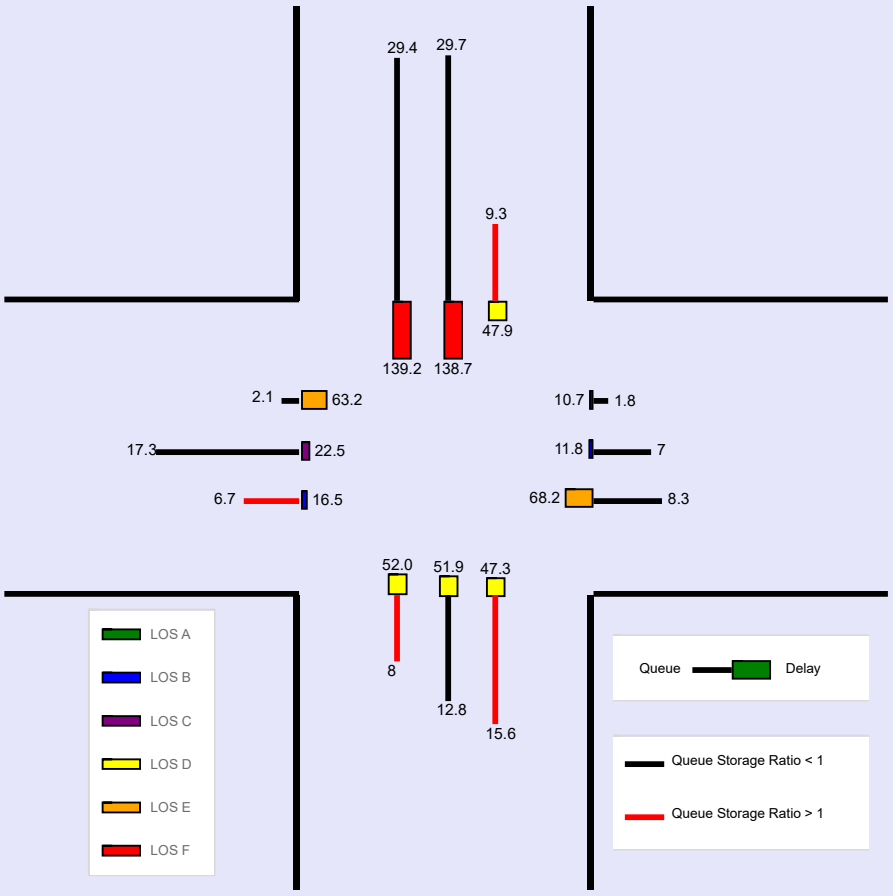
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	67	1169	215	255	703	82	145	497	320	182	741	35

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	4.8	3.3	60.0	11.1	0.4	26.0
Yellow	3.5	3.5	4.5	3.5	0.0	4.5
Red	1.0	1.0	1.5	0.0	0.0	1.5

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	55.5	457.5	176.2	218.2	184.6	48.1	210.1	338.2	410.6	245.9	784.3	734.3
Back of Queue (*Q*), veh/ln (95 th percentile)	2.1	17.3	6.7	8.3	7.0	1.8	8.0	12.8	15.6	9.3	29.7	29.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.33	0.00	1.41	0.67	0.00	0.30	1.45	0.00	2.83	1.82	0.00	0.00
Control Delay (*d*), s/veh	63.2	22.5	16.5	68.2	11.8	10.7	52.0	51.9	47.3	47.9	138.7	139.2
Level of Service (LOS)	E	C	B	E	B	B	D	D	D	D	F	F
Approach Delay, s/veh / LOS	23.5	C		25.6	C		50.4	D		121.6	F	
Intersection Delay, s/veh / LOS	51.2						D					



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--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

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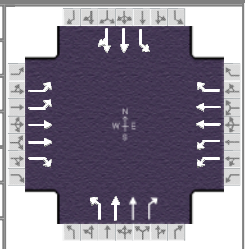
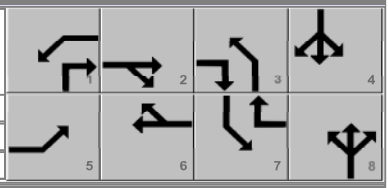
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	PM Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 16:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	124	872	137	358	1250	230	284	870	357	116	560	61

Signal Information					EB			WB			NB			SB		
Cycle, s	150.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	8.0	6.8		60.2	10.6	7.4	29.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	3.5		4.5	3.5	3.5	4.5					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0		1.5	0.0	0.0	1.5					



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	124	872	137	358	1250	230	284	870	357	116	560	61
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	2000	1900	1900	2000	1900	1900	2000	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7	7	7	7	7	7	7	7	7	7	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Turn Bay Length, ft	170	0	125	325	0	160	145	0	145	135	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	45	45	45	40	40	40	40	40	40

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	18.0	62.0	28.0	72.0	25.0	44.0	16.0	35.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Red Clearance Interval (R_c), s	1.0	1.5	1.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	15	3	15	3	15	3	15
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		0.0		9.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		38.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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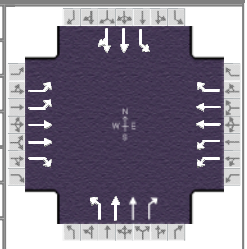
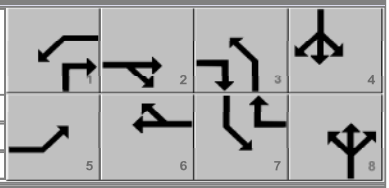
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	PM Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 16:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	124	872	137	358	1250	230	284	870	357	116	560	61

Signal Information					EB			WB			NB			SB		
Cycle, s	150.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	8.0	6.8		60.2	10.6	7.4	29.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	3.5		4.5	3.5	3.5	4.5					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0		1.5	0.0	0.0	1.5					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	3.0	1.1	4.0
Phase Duration, s	12.5	66.2	23.8	77.5	25.0	45.9	14.1	35.0
Change Period, ($Y+R_c$), s	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.0	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	7.9		18.9		23.5	40.1	10.6	29.9
Green Extension Time (g_e), s	0.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.03		0.26		1.00	1.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	132	928	146	381	1330	245	302	926	380	123	336	325
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1800	1522	1661	1800	1522	1711	1800	1522	1711	1796	1734
Queue Service Time (g_s), s	5.9	27.4	7.2	16.9	39.8	13.0	21.5	38.1	30.2	8.6	27.8	27.9
Cycle Queue Clearance Time (g_c), s	5.9	27.4	7.2	16.9	39.8	13.0	21.5	38.1	30.2	8.6	27.8	27.9
Green Ratio (*g/C*)	0.05	0.40	0.54	0.13	0.48	0.55	0.35	0.27	0.39	0.26	0.19	0.19
Capacity (*c*), veh/h	177	1444	829	428	1716	833	299	957	601	169	347	335
Volume-to-Capacity Ratio (*X*)	0.746	0.642	0.176	0.890	0.775	0.294	1.012	0.967	0.632	0.730	0.966	0.970
Back of Queue (*Q*), ft/ln (95 th percentile)	121.4	440.9	126.5	328.1	547.2	216.6	521.6	715.5	445.2	193.5	603.3	560.7
Back of Queue (*Q*), veh/ln (95 th percentile)	4.6	16.7	4.8	12.4	20.7	8.2	19.8	27.1	16.9	7.3	22.9	22.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.71	0.00	1.01	1.01	0.00	1.35	3.60	0.00	3.07	1.43	0.00	0.00
Uniform Delay (d_1), s/veh	70.0	27.3	17.2	64.3	21.5	18.3	44.9	54.4	36.6	46.6	60.0	60.1
Incremental Delay (d_2), s/veh	2.3	2.2	0.5	13.5	3.5	0.9	55.2	21.2	1.6	9.4	39.0	40.7
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	72.3	29.5	17.7	77.8	25.0	19.2	100.0	75.6	38.2	56.0	99.0	100.8
Level of Service (LOS)	E	C	B	E	C	B	F	E	D	E	F	F
Approach Delay, s/veh / LOS	32.7	C		34.6	C		71.4	E		93.0	F	
Intersection Delay, s/veh / LOS	53.1						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.44	B	2.28	B	2.60	C	2.61	C
Bicycle LOS Score / LOS	1.48	A	2.10	B	1.81	B	1.13	A

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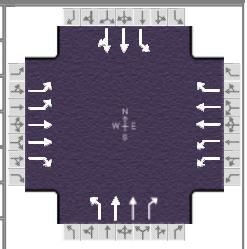
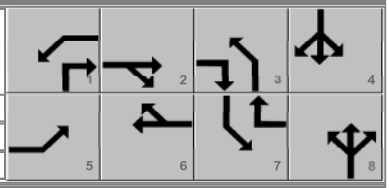
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	PM Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 16:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	124	872	137	358	1250	230	284	870	357	116	560	61

Signal Information												
Cycle, s	150.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
				Green	8.0	6.8	60.2	10.6	7.4	29.0		
				Yellow	3.5	3.5	4.5	3.5	3.5	4.5		
				Red	1.0	1.0	1.5	0.0	0.0	1.5		



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000	0.847		0.000	0.847		0.000	0.847		0.965	0.965
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3600	1522	3322	3600	1522	1711	3600	1522	1711	3184	346
Proportion of Vehicles Arriving on Green (P)	0.05	0.53	0.40	0.13	0.64	0.48	0.14	0.27	0.27	0.07	0.19	0.19
Incremental Delay Factor (k)	0.04	0.50	0.50	0.25	0.50	0.50	0.50	0.47	0.16	0.18	0.47	0.47

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Green Ratio (g/C)	0.05	0.40	0.13	0.48	0.35	0.27	0.26	0.19
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	743	0	580	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	31.0	0.0	29.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0
Permitted Queue Service Time (g_{ps}), s					1.1		0.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		1522		1522		1522		
Protected Right Effective Green Time (g_R), s		21.5		10.6		19.3		

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.557	0.000	1.852	0.000	1.852	0.000
Pedestrian F_s / F_{delay}	0.000	0.132	0.000	0.121	0.000	0.148	0.000	0.156
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	802.25	26.90	953.49	20.53	531.81	40.42	386.67	48.80
Bicycle F_w / F_v	-3.64	0.99	-3.64	1.61	-3.64	1.33	-3.64	0.65

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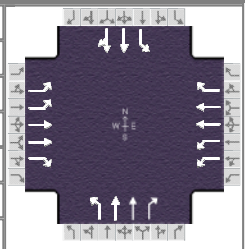
HCS7 Signalized Intersection Results Graphical Summary

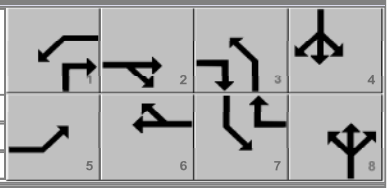
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	PM Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 16:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 PM.xus		
Project Description	Pride of St. Charles				



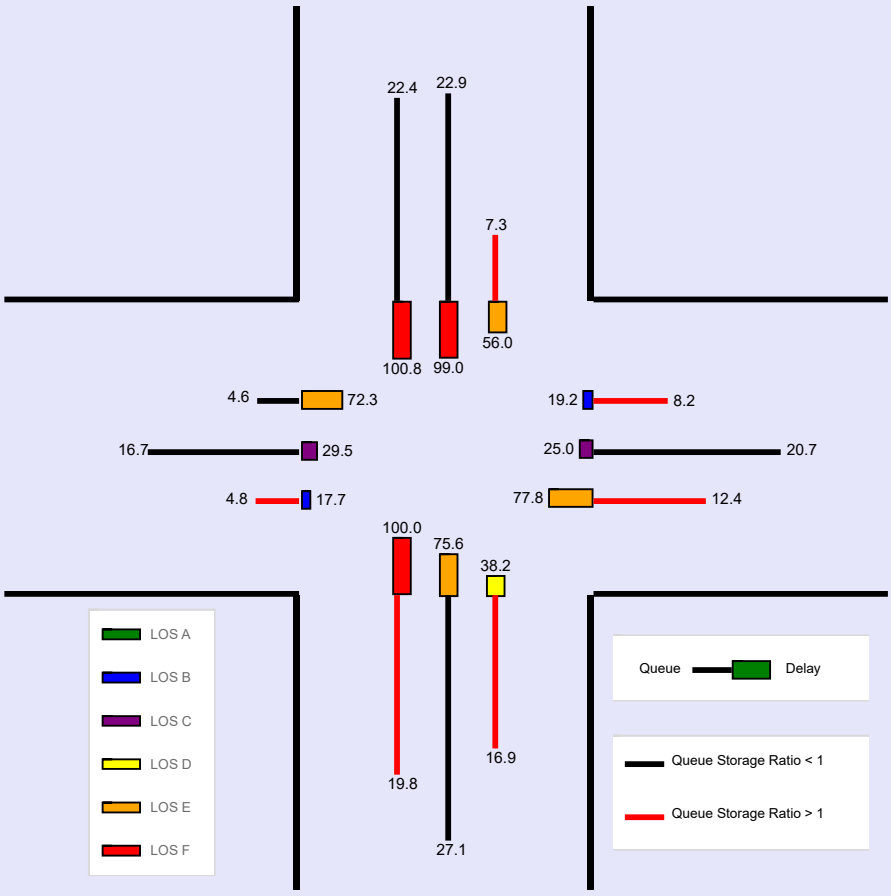
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	124	872	137	358	1250	230	284	870	357	116	560	61

Signal Information			
Cycle, s	150.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.0	6.8	60.2	10.6	7.4	29.0	
Yellow	3.5	3.5	4.5	3.5	3.5	4.5	
Red	1.0	1.0	1.5	0.0	0.0	1.5	



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	121.4	440.9	126.5	328.1	547.2	216.6	521.6	715.5	445.2	193.5	603.3	560.7
Back of Queue (*Q*), veh/ln (95 th percentile)	4.6	16.7	4.8	12.4	20.7	8.2	19.8	27.1	16.9	7.3	22.9	22.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.71	0.00	1.01	1.01	0.00	1.35	3.60	0.00	3.07	1.43	0.00	0.00
Control Delay (*d*), s/veh	72.3	29.5	17.7	77.8	25.0	19.2	100.0	75.6	38.2	56.0	99.0	100.8
Level of Service (LOS)	E	C	B	E	C	B	F	E	D	E	F	F
Approach Delay, s/veh / LOS	32.7	C		34.6	C		71.4	E		93.0	F	
Intersection Delay, s/veh / LOS	53.1						D					



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--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

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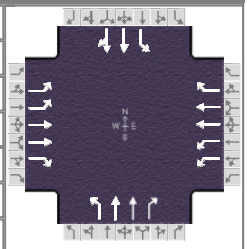
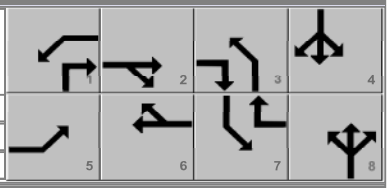
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	SAT Peak Hour	PHF	0.96
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 11:45
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	115	932	193	285	1063	117	193	375	297	145	382	63

Signal Information					EB			WB			NB			SB		
Cycle, s	120.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	6.4	2.0		51.7	10.5	2.7	22.1					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	3.5		4.5	3.5	0.0	4.5					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0		1.5	0.0	0.0	1.5					



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	115	932	193	285	1063	117	193	375	297	145	382	63
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	2000	1900	1900	2000	1900	1900	2000	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7	7	7	7	7	7	7	7	7	7	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Turn Bay Length, ft	170	0	125	325	0	160	145	0	145	135	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	45	45	45	40	40	40	40	40	40

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	14.0	50.0	19.0	55.0	21.0	33.0	18.0	30.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Red Clearance Interval (R_c), s	1.0	1.5	1.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	15	3	15	3	15	3	15
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		0.0		9.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		38.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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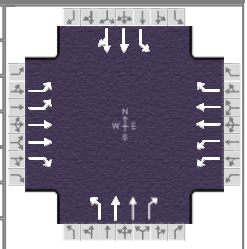
HCS7 Signalized Intersection Results Summary

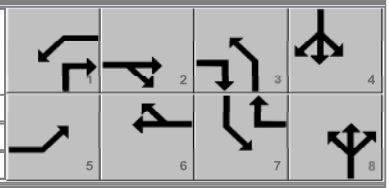
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	SAT Peak Hour	PHF	0.96
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 11:45
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	115	932	193	285	1063	117	193	375	297	145	382	63

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.4	2.0	51.7	10.5	2.7	22.1
Yellow	3.5	3.5	4.5	3.5	0.0	4.5
Red	1.0	1.0	1.5	0.0	0.0	1.5



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	3.0	1.1	4.0
Phase Duration, s	10.9	57.7	17.4	64.2	16.7	30.8	14.0	28.1
Change Period, ($Y+R_c$), s	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.0	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	6.2		12.5		13.1	23.0	10.5	17.0
Green Extension Time (g_e), s	0.1	0.0	0.4	0.0	0.1	1.9	0.1	2.1
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.01		0.26	0.21	0.32	0.08

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	120	971	201	297	1107	122	201	391	309	151	236	227
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1800	1522	1661	1800	1522	1711	1800	1522	1711	1796	1708
Queue Service Time (g_s), s	4.2	21.5	8.4	10.5	22.1	4.5	11.1	11.6	21.0	8.5	14.8	15.0
Cycle Queue Clearance Time (g_c), s	4.2	21.5	8.4	10.5	22.1	4.5	11.1	11.6	21.0	8.5	14.8	15.0
Green Ratio (*g/C*)	0.05	0.43	0.54	0.11	0.49	0.57	0.30	0.21	0.31	0.27	0.18	0.18
Capacity (*c*), veh/h	177	1550	824	358	1747	872	302	745	479	300	331	315
Volume-to-Capacity Ratio (*X*)	0.676	0.626	0.244	0.829	0.634	0.140	0.667	0.524	0.646	0.504	0.712	0.722
Back of Queue (*Q*), ft/ln (95 th percentile)	86	334.7	141.6	207.2	300	70.9	217.4	231.8	324.7	166.2	288.9	267.6
Back of Queue (*Q*), veh/ln (95 th percentile)	3.3	12.7	5.4	7.8	11.4	2.7	8.2	8.8	12.3	6.3	10.9	10.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.51	0.00	1.13	0.64	0.00	0.44	1.50	0.00	2.24	1.23	0.00	0.00
Uniform Delay (d_1), s/veh	55.8	19.1	14.6	52.4	14.8	11.9	34.3	42.3	35.4	35.4	45.9	46.0
Incremental Delay (d_2), s/veh	1.7	1.9	0.7	2.8	1.8	0.3	2.1	0.2	1.2	0.5	2.5	2.9
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	57.5	21.0	15.3	55.2	16.6	12.2	36.4	42.5	36.6	35.9	48.4	49.0
Level of Service (LOS)	E	C	B	E	B	B	D	D	D	D	D	D
Approach Delay, s/veh / LOS	23.5	C		23.7	C		39.1	D		45.5	D	
Intersection Delay, s/veh / LOS	30.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.43	B	2.27	B	2.60	C	2.60	C
Bicycle LOS Score / LOS	1.55	B	1.75	B	1.23	A	0.99	A

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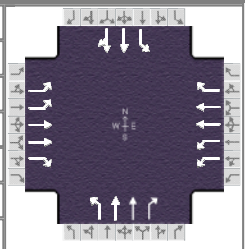
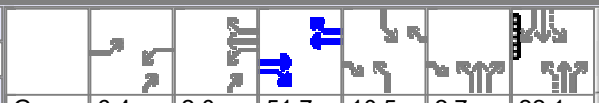
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	SAT Peak Hour	PHF	0.96
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 11:45
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 SAT.xus		
Project Description	Pride of St. Charles				

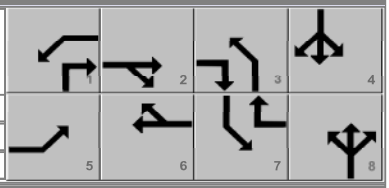


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	115	932	193	285	1063	117	193	375	297	145	382	63

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.4	2.0	51.7	10.5	2.7	22.1
Yellow	3.5	3.5	4.5	3.5	0.0	4.5
Red	1.0	1.0	1.5	0.0	0.0	1.5



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000	0.847		0.000	0.847		0.000	0.847		0.951	0.951
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3600	1522	3322	3600	1522	1711	3600	1522	1711	3011	493
Proportion of Vehicles Arriving on Green (P)	0.05	0.57	0.43	0.11	0.65	0.49	0.11	0.21	0.21	0.09	0.18	0.18
Incremental Delay Factor (k)	0.04	0.50	0.50	0.06	0.50	0.50	0.09	0.04	0.09	0.04	0.09	0.10

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Green Ratio (g/C)	0.05	0.43	0.11	0.49	0.30	0.21	0.27	0.18
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	892	0	954	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	23.3	0.0	22.1	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	7.1	0.0	11.3	0.0
Permitted Queue Service Time (g_{ps}), s					4.7		2.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		1522		1522		1522		
Protected Right Effective Green Time (g_R), s		13.2		10.5		12.9		

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.557	0.000	1.852	0.000	1.852	0.000
Pedestrian F_s / F_{delay}	0.000	0.119	0.000	0.111	0.000	0.146	0.000	0.148
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	861.36	19.45	970.35	15.90	414.01	37.73	368.92	39.91
Bicycle F_w / F_v	-3.64	1.07	-3.64	1.26	-3.64	0.74	-3.64	0.51

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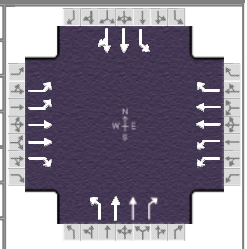
HCS7 Signalized Intersection Results Graphical Summary

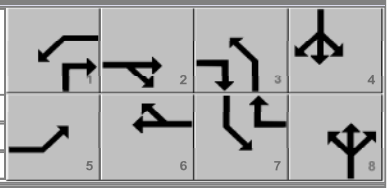
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	AJB	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	SAT Peak Hour	PHF	0.96
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 11:45
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2017 SAT.xus		
Project Description	Pride of St. Charles				



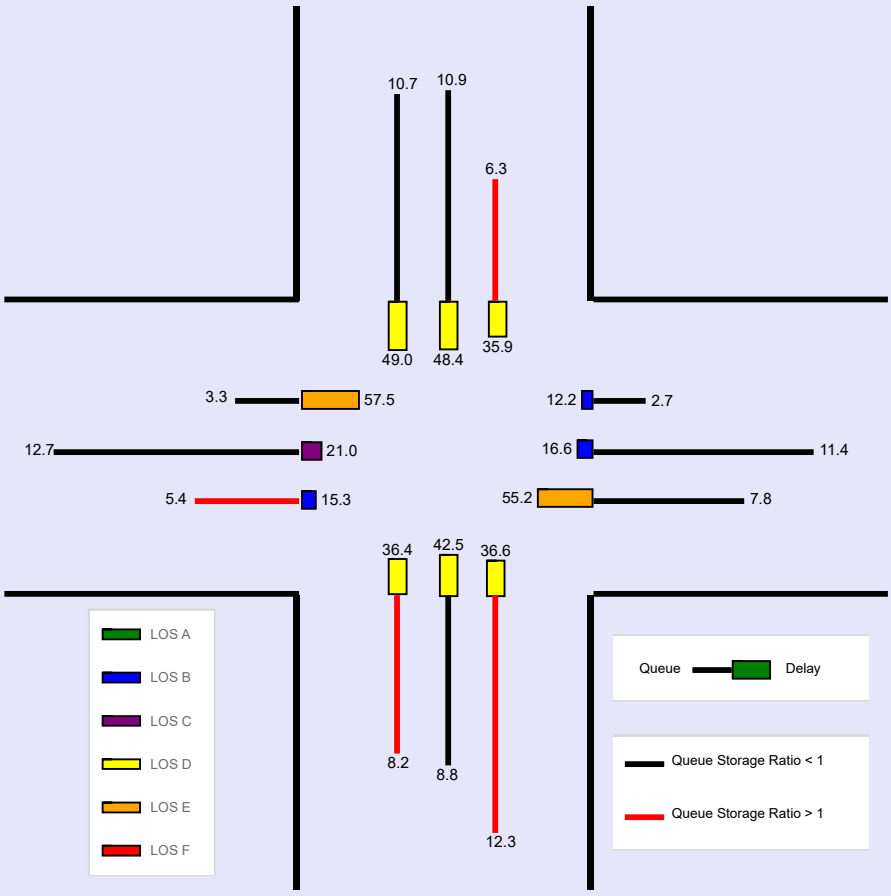
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	115	932	193	285	1063	117	193	375	297	145	382	63

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.4	2.0	51.7	10.5	2.7	22.1	
Yellow	3.5	3.5	4.5	3.5	0.0	4.5	
Red	1.0	1.0	1.5	0.0	0.0	1.5	



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	86	334.7	141.6	207.2	300	70.9	217.4	231.8	324.7	166.2	288.9	267.6
Back of Queue (*Q*), veh/ln (95 th percentile)	3.3	12.7	5.4	7.8	11.4	2.7	8.2	8.8	12.3	6.3	10.9	10.7
Queue Storage Ratio (*RQ*) (95 th percentile)	0.51	0.00	1.13	0.64	0.00	0.44	1.50	0.00	2.24	1.23	0.00	0.00
Control Delay (*d*), s/veh	57.5	21.0	15.3	55.2	16.6	12.2	36.4	42.5	36.6	35.9	48.4	49.0
Level of Service (LOS)	E	C	B	E	B	B	D	D	D	D	D	D
Approach Delay, s/veh / LOS	23.5	C		23.7	C		39.1	D		45.5	D	
Intersection Delay, s/veh / LOS	30.0						C					



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--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

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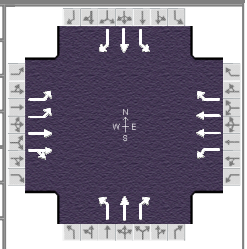
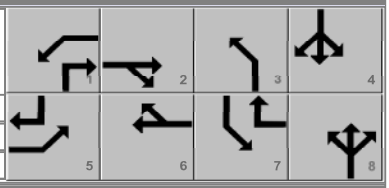
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	AM Peak Hour	PHF	0.92
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 7:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1640	23	3	1028	5	1	1	7	9	2	4

Signal Information												
Cycle, s	130.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	3.0	101.2	1.4	0.6	4.8	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	4.5	3.5	0.0	4.5	0.0		
				Red	0.0	1.5	0.0	0.0	1.5	0.0		



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1640	23	3	1028	5	1	1	7	9	2	4
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	2000	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h	0	L			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7		7	7	7	3	3	3	3	3	3
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	180	0		200	0	200	160	0	160	160	0	160
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	45	45	45	45	45	45	25	25	25	25	25	25

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	13.0	84.0	13.0	84.0	13.0	20.0	13.0	20.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	4.0	4.5	3.5	4.5
Red Clearance Interval (R_c), s	0.0	1.5	0.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	21	3	21	3	8	3	8
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		9.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		38.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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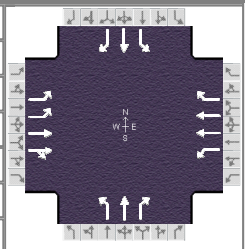
HCS7 Signalized Intersection Results Summary

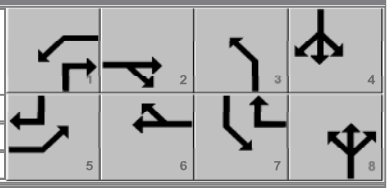
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	AM Peak Hour	PHF	0.92
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 7:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1640	23	3	1028	5	1	1	7	9	2	4

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.0	101.2	1.4	0.6	4.8	0.0
Yellow	3.5	4.5	3.5	0.0	4.5	0.0
Red	0.0	1.5	0.0	0.0	1.5	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	6.5	107.2	6.5	107.2	5.5	11.4	4.9	10.8
Change Period, ($Y+R_c$), s	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.0	0.0	3.0	0.0	3.3	3.4	3.3	3.4
Queue Clearance Time (g_s), s	2.3		2.2		2.1	2.6	2.7	2.3
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00		1.00		0.51	0.44	0.47	0.59
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	9	904	903	3	1117	5	1	1	8	10	2	4
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1796	1787	1711	1800	1522	1767	1953	1572	1767	1953	1572
Queue Service Time (g_s), s	0.3	0.0	1.1	0.2	0.0	0.1	0.1	0.1	0.6	0.7	0.1	0.3
Cycle Queue Clearance Time (g_c), s	0.3	0.0	1.1	0.2	0.0	0.1	0.1	0.1	0.6	0.7	0.1	0.3
Green Ratio (*g/C*)	0.02	0.78	0.78	0.02	0.78	0.79	0.05	0.04	0.06	0.05	0.04	0.06
Capacity (*c*), veh/h	77	1399	1392	39	2803	1202	126	81	101	110	71	94
Volume-to-Capacity Ratio (*X*)	0.113	0.647	0.649	0.083	0.399	0.005	0.009	0.013	0.075	0.089	0.030	0.046
Back of Queue (*Q*), ft/ln (95 th percentile)	6.7	42.9	46	5.1	7.9	1.1	1.6	1.6	11.1	14.6	3.3	6.4
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	1.6	1.8	0.2	0.3	0.0	0.1	0.1	0.4	0.6	0.1	0.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00	0.00	0.03	0.00	0.01	0.01	0.00	0.07	0.09	0.00	0.04
Uniform Delay (d_1), s/veh	62.2	0.0	0.1	62.2	0.0	2.9	58.9	59.8	57.2	59.3	60.4	57.6
Incremental Delay (d_2), s/veh	0.2	2.3	2.4	0.3	0.4	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	62.4	2.3	2.4	62.5	0.4	2.9	58.9	59.8	57.3	59.5	60.5	57.7
Level of Service (LOS)	E	A	A	E	A	A	E	E	E	E	E	E
Approach Delay, s/veh / LOS	2.7	A		0.6	A		57.7	E		59.1	E	
Intersection Delay, s/veh / LOS	2.4						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.03	B	2.20	B	2.47	B	2.47	B
Bicycle LOS Score / LOS	1.99	B	1.42	A	0.50	A	0.51	A

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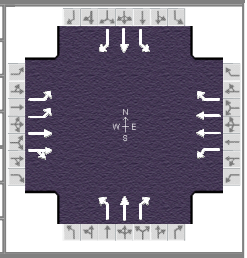
HCS7 Signalized Intersection Intermediate Values

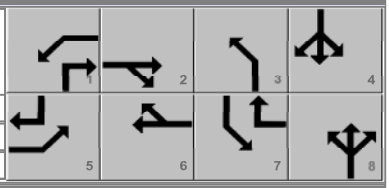
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	AM Peak Hour	PHF	0.92
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 7:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1640	23	3	1028	5	1	1	7	9	2	4

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.0	101.2	1.4	0.6	4.8	0.0
Yellow	3.5	4.5	3.5	0.0	4.5	0.0
Red	0.0	1.5	0.0	0.0	1.5	0.0



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	1.000	0.945	0.945	0.945	0.977	0.977	0.977	0.977	0.977	0.977
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.995	0.995		0.000	0.847		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3534	49	1711	3600	1522	1767	1953	1572	1767	1953	1572
Proportion of Vehicles Arriving on Green (P)	0.02	1.00	0.78	0.02	1.00	0.78	0.01	0.04	0.04	0.01	0.04	0.04
Incremental Delay Factor (k)	0.04	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.04	0.04

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Green Ratio (g/C)	0.02	0.78	0.02	0.78	0.05	0.04	0.05	0.04
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	1404	0	1405	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	4.8	0.0	4.8	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	4.6	0.0	3.3	0.0
Permitted Queue Service Time (g_{ps}), s					0.0		0.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln				1522		1572		1572
Protected Right Effective Green Time (g_R), s				1.4		3.0		3.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.389	0.000	1.557	0.000	1.710	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.046	0.000	0.046	0.000	0.164	0.000	0.164
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1557.28	3.19	1557.28	3.19	82.73	59.73	73.18	60.33
Bicycle F_w / F_v	-3.64	1.50	-3.64	0.93	-3.64	0.02	-3.64	0.03

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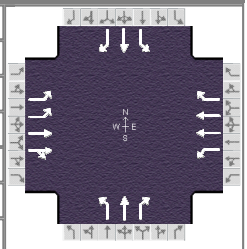
HCS7 Signalized Intersection Results Graphical Summary

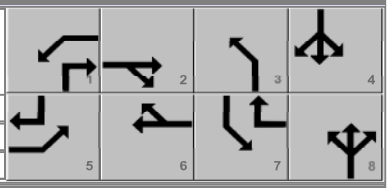
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	AM Peak Hour	PHF	0.92
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 7:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 AM.xus		
Project Description	Pride of St. Charles				



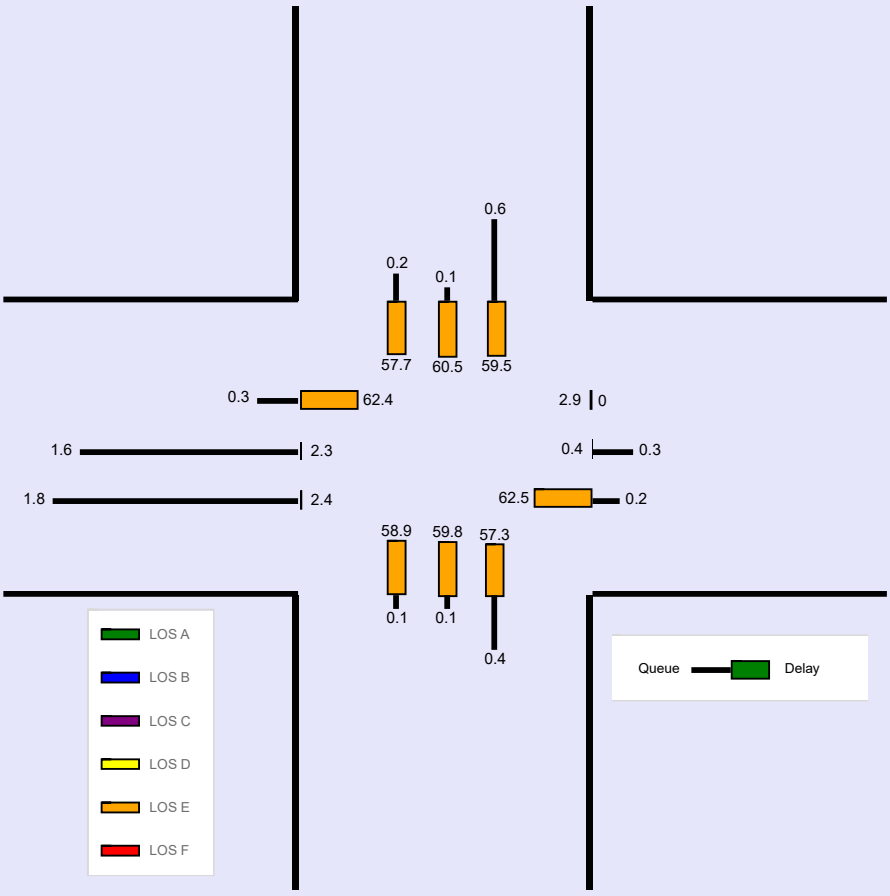
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1640	23	3	1028	5	1	1	7	9	2	4

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.0	101.2	1.4	0.6	4.8	0.0
Yellow	3.5	4.5	3.5	0.0	4.5	0.0
Red	0.0	1.5	0.0	0.0	1.5	0.0



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	6.7	42.9	46	5.1	7.9	1.1	1.6	1.6	11.1	14.6	3.3	6.4
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	1.6	1.8	0.2	0.3	0.0	0.1	0.1	0.4	0.6	0.1	0.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00	0.00	0.03	0.00	0.01	0.01	0.00	0.07	0.09	0.00	0.04
Control Delay (*d*), s/veh	62.4	2.3	2.4	62.5	0.4	2.9	58.9	59.8	57.3	59.5	60.5	57.7
Level of Service (LOS)	E	A	A	E	A	A	E	E	E	E	E	E
Approach Delay, s/veh / LOS	2.7	A		0.6	A		57.7	E		59.1	E	
Intersection Delay, s/veh / LOS	2.4						A					



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--- Messages ---

No errors or warnings exist.

--- Comments ---

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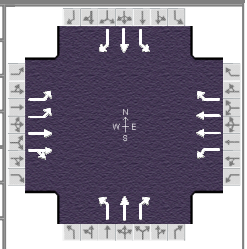
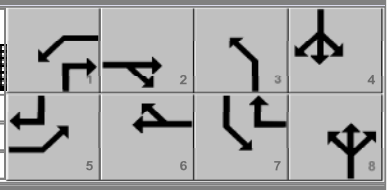
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	PM Peak Hour	PHF	0.93
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 16:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1237	40	24	1727	24	44	9	34	22	11	54

Signal Information												
Cycle, s	150.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	4.3	1.1	111.4	3.9	2.3	8.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	0.0	4.5	3.5	0.0	4.5		
				Red	0.0	0.0	1.5	0.0	0.0	1.5		



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1237	40	24	1727	24	44	9	34	22	11	54
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	2000	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7		7	7	7	3	3	3	3	3	3
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	180	0		200	0	200	160	0	160	160	0	160
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	45	45	45	45	45	45	25	25	25	25	25	25

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	16.0	93.0	16.0	93.0	16.0	25.0	16.0	25.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	4.0	4.5	3.5	4.5
Red Clearance Interval (R_c), s	0.0	1.5	0.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	21	3	21	3	8	3	8
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		9.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		38.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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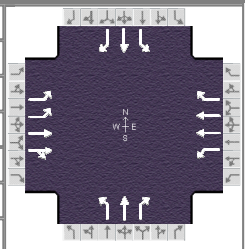
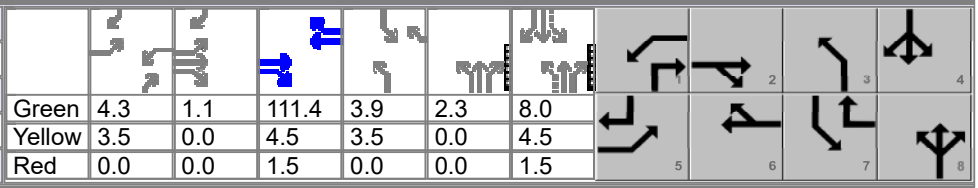
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	PM Peak Hour	PHF	0.93
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 16:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1237	40	24	1727	24	44	9	34	22	11	54

Signal Information												
Cycle, s	150.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	4.3	1.1	111.4	3.9	2.3	8.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	0.0	4.5	3.5	0.0	4.5		
				Red	0.0	0.0	1.5	0.0	0.0	1.5		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	8.9	118.5	7.8	117.4	9.7	16.3	7.4	14.0
Change Period, ($Y+R_c$), s	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.0	0.0	3.0	0.0	3.3	3.4	3.3	3.4
Queue Clearance Time (g_s), s	5.3		4.2		5.7	5.2	3.9	7.2
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Phase Call Probability	1.00		1.00		0.99	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.01	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	73	690	683	26	1857	26	47	10	37	24	12	58
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1796	1776	1711	1800	1522	1767	1953	1572	1767	1953	1572
Queue Service Time (g_s), s	3.3	0.0	1.8	2.2	2.4	0.6	3.7	0.7	3.2	1.9	0.9	5.2
Cycle Queue Clearance Time (g_c), s	3.3	0.0	1.8	2.2	2.4	0.6	3.7	0.7	3.2	1.9	0.9	5.2
Green Ratio (*g/C*)	0.04	0.75	0.75	0.03	0.74	0.77	0.09	0.07	0.10	0.08	0.05	0.09
Capacity (*c*), veh/h	119	1348	1333	49	2674	1170	181	134	153	165	104	140
Volume-to-Capacity Ratio (*X*)	0.614	0.512	0.513	0.532	0.694	0.022	0.261	0.072	0.239	0.144	0.114	0.415
Back of Queue (*Q*), ft/ln (95 th percentile)	66.6	24.8	37.1	48.1	38.6	8.1	79.1	16.3	60.8	39.7	20.4	1.3
Back of Queue (*Q*), veh/ln (95 th percentile)	2.5	0.9	1.5	1.8	1.5	0.3	3.1	0.6	2.4	1.6	0.8	0.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.37	0.00	0.00	0.24	0.00	0.04	0.49	0.00	0.38	0.25	0.00	0.01
Uniform Delay (d_1), s/veh	71.3	0.0	0.3	71.9	0.2	4.1	63.3	65.4	62.6	64.5	67.6	64.6
Incremental Delay (d_2), s/veh	1.9	1.4	1.4	3.3	1.5	0.0	0.3	0.1	0.3	0.1	0.2	0.7
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	73.2	1.4	1.7	75.2	1.7	4.1	63.6	65.4	62.9	64.6	67.8	65.4
Level of Service (LOS)	E	A	A	E	A	A	E	E	E	E	E	E
Approach Delay, s/veh / LOS	5.2	A		2.7	A		63.5	E		65.5	E	
Intersection Delay, s/veh / LOS	7.0						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.05	B	2.22	B	2.48	B	2.48	B
Bicycle LOS Score / LOS	1.68	B	2.06	B	0.64	A	0.64	A

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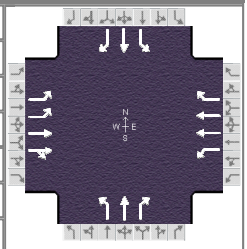
HCS7 Signalized Intersection Intermediate Values

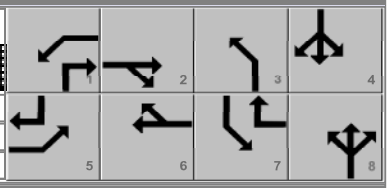
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	PM Peak Hour	PHF	0.93
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 16:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1237	40	24	1727	24	44	9	34	22	11	54

Signal Information			
Cycle, s	150.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.3	1.1	111.4	3.9	2.3	8.0
Yellow	3.5	0.0	4.5	3.5	0.0	4.5
Red	0.0	0.0	1.5	0.0	0.0	1.5



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	1.000	0.945	0.945	0.945	0.977	0.977	0.977	0.977	0.977	0.977
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.989	0.989		0.000	0.847		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3461	112	1711	3600	1522	1767	1953	1572	1767	1953	1572
Proportion of Vehicles Arriving on Green (P)	0.04	1.00	0.75	0.03	0.99	0.74	0.04	0.07	0.07	0.03	0.05	0.05
Incremental Delay Factor (k)	0.04	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.04	0.04

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Green Ratio (g/C)	0.04	0.75	0.03	0.74	0.09	0.07	0.08	0.05
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	1391	0	1394	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	8.3	0.0	8.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	7.1	0.0	7.6	0.0
Permitted Queue Service Time (g_{ps}), s					0.0		0.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln				1522		1572		1572
Protected Right Effective Green Time (g_R), s				3.9		4.3		5.4

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.389	0.000	1.557	0.000	1.710	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.062	0.000	0.064	0.000	0.167	0.000	0.169
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1500.66	4.68	1485.72	4.96	137.64	65.03	106.36	67.24
Bicycle F_w / F_v	-3.64	1.19	-3.64	1.57	-3.64	0.15	-3.64	0.15

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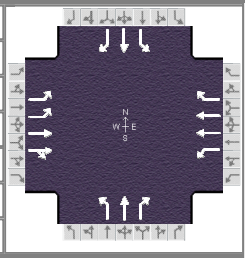
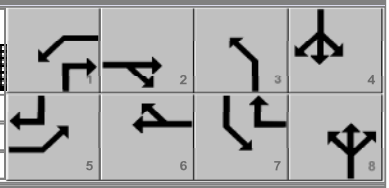
HCS7 Signalized Intersection Results Graphical Summary

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	PM Peak Hour	PHF	0.93
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 16:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 PM.xus		
Project Description	Pride of St. Charles				

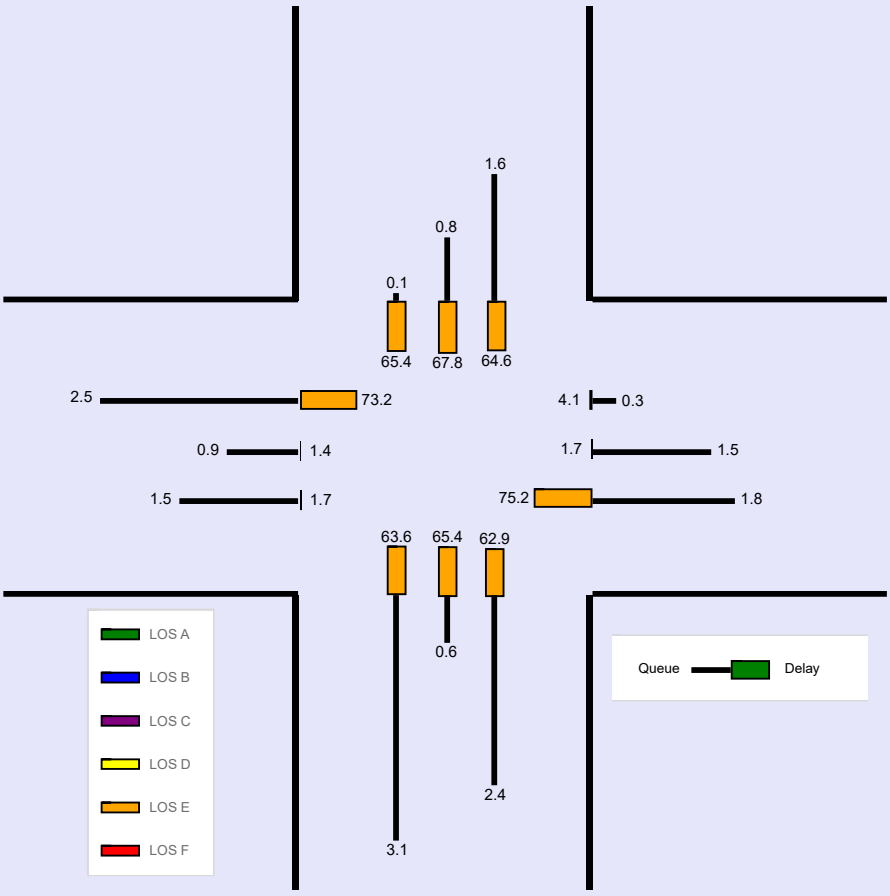


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1237	40	24	1727	24	44	9	34	22	11	54

Signal Information												
Cycle, s	150.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
				Green	4.3	1.1	111.4	3.9	2.3	8.0		
				Yellow	3.5	0.0	4.5	3.5	0.0	4.5		
				Red	0.0	0.0	1.5	0.0	0.0	1.5		



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	66.6	24.8	37.1	48.1	38.6	8.1	79.1	16.3	60.8	39.7	20.4	1.3
Back of Queue (*Q*), veh/ln (95 th percentile)	2.5	0.9	1.5	1.8	1.5	0.3	3.1	0.6	2.4	1.6	0.8	0.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.37	0.00	0.00	0.24	0.00	0.04	0.49	0.00	0.38	0.25	0.00	0.01
Control Delay (*d*), s/veh	73.2	1.4	1.7	75.2	1.7	4.1	63.6	65.4	62.9	64.6	67.8	65.4
Level of Service (LOS)	E	A	A	E	A	A	E	E	E	E	E	E
Approach Delay, s/veh / LOS	5.2	A		2.7	A		63.5	E		65.5	E	
Intersection Delay, s/veh / LOS	7.0						A					



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--- Messages ---

No errors or warnings exist.

--- Comments ---

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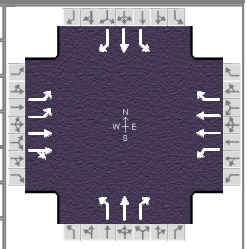
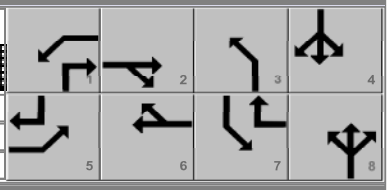
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	SAT Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 11:45
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1212	60	37	1333	21	49	10	57	23	13	59

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	4.7	1.3	81.3	3.5	2.2	8.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	0.0	4.5	3.5	0.0	4.5		
				Red	0.0	0.0	1.5	0.0	0.0	1.5		



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1212	60	37	1333	21	49	10	57	23	13	59
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	2000	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7		7	7	7	3	3	3	3	3	3
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	180	0		200	0	200	160	0	160	160	0	160
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	45	45	45	45	45	45	25	25	25	25	25	25

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	72.0	15.0	72.0	13.0	20.0	13.0	20.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	4.0	4.5	3.5	4.5
Red Clearance Interval (R_c), s	0.0	1.5	0.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	21	3	21	3	8	3	8
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		9.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		38.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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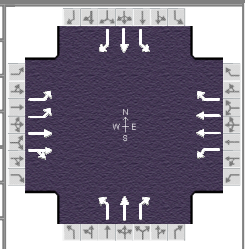
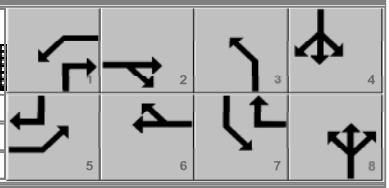
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	SAT Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 11:45
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1212	60	37	1333	21	49	10	57	23	13	59

Signal Information					EB			WB			NB			SB		
Cycle, s	120.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	4.7	1.3		81.3	3.5	2.2	8.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	0.0		4.5	3.5	0.0	4.5					
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0		1.5	0.0	0.0	1.5					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	9.5	88.6	8.2	87.3	9.2	16.2	7.0	14.0
Change Period, ($Y+R_c$), s	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.0	0.0	3.0	0.0	3.3	3.4	3.3	3.4
Queue Clearance Time (g_s), s	5.8		4.7		5.2	6.2	3.5	6.4
Green Extension Time (g_e), s	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Phase Call Probability	1.00		1.00		0.99	1.00	0.99	1.00
Max Out Probability	0.00		0.00		0.45	0.00	0.01	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	109	681	672	39	1418	22	52	11	61	24	14	63
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1796	1766	1711	1800	1522	1767	1953	1572	1767	1953	1572
Queue Service Time (g_s), s	3.8	7.6	9.4	2.7	9.6	0.5	3.2	0.6	4.2	1.5	0.8	4.4
Cycle Queue Clearance Time (g_c), s	3.8	7.6	9.4	2.7	9.6	0.5	3.2	0.6	4.2	1.5	0.8	4.4
Green Ratio (*g/C*)	0.05	0.69	0.69	0.04	0.68	0.71	0.11	0.08	0.12	0.10	0.07	0.12
Capacity (*c*), veh/h	166	1236	1215	68	2439	1076	220	166	196	200	130	183
Volume-to-Capacity Ratio (*X*)	0.652	0.551	0.553	0.582	0.581	0.021	0.237	0.064	0.310	0.123	0.107	0.342
Back of Queue (*Q*), ft/ln (95 th percentile)	76.7	94	106.8	57.1	98.6	7.2	67.2	13.9	77.8	31.6	18.5	81.6
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9	3.6	4.3	2.2	3.7	0.3	2.6	0.5	3.0	1.2	0.7	3.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.43	0.00	0.00	0.29	0.00	0.04	0.42	0.00	0.49	0.20	0.00	0.51
Uniform Delay (d_1), s/veh	56.0	1.9	2.4	56.7	2.3	5.2	48.8	50.5	47.8	49.8	52.7	48.8
Incremental Delay (d_2), s/veh	1.6	1.8	1.8	2.9	1.0	0.0	0.2	0.1	0.3	0.1	0.1	0.4
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	57.6	3.6	4.3	59.6	3.4	5.3	49.0	50.6	48.2	49.9	52.8	49.2
Level of Service (LOS)	E	A	A	E	A	A	D	D	D	D	D	D
Approach Delay, s/veh / LOS	7.9	A		4.9	A		48.7	D		49.8	D	
Intersection Delay, s/veh / LOS	9.4						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.06	B	2.23	B	2.47	B	2.47	B
Bicycle LOS Score / LOS	1.69	B	1.71	B	0.69	A	0.65	A

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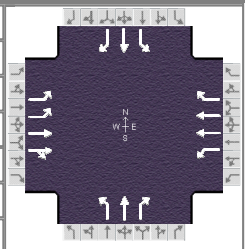
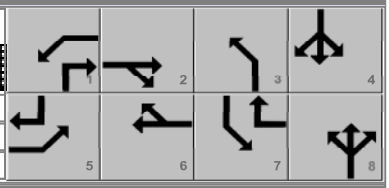
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	SAT Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 11:45
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1212	60	37	1333	21	49	10	57	23	13	59

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	4.7	1.3	81.3	3.5	2.2	8.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	0.0	4.5	3.5	0.0	4.5		
				Red	0.0	0.0	1.5	0.0	0.0	1.5		



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	1.000	0.945	0.945	0.945	0.977	0.977	0.977	0.977	0.977	0.977
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.983	0.983		0.000	0.847		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3394	168	1711	3600	1522	1767	1953	1572	1767	1953	1572
Proportion of Vehicles Arriving on Green (P)	0.05	0.92	0.69	0.04	0.90	0.68	0.04	0.08	0.08	0.03	0.07	0.07
Incremental Delay Factor (k)	0.04	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.04	0.04

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Green Ratio (g/C)	0.05	0.69	0.04	0.68	0.11	0.08	0.10	0.07
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	1389	0	1393	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	8.2	0.0	8.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	7.2	0.0	7.6	0.0
Permitted Queue Service Time (g_{ps}), s					0.0		0.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln				1522		1572		1572
Protected Right Effective Green Time (g_R), s				3.5		4.7		6.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.389	0.000	1.557	0.000	1.710	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.071	0.000	0.073	0.000	0.157	0.000	0.159
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1376.02	5.84	1354.93	6.24	169.73	50.25	132.91	52.29
Bicycle F_w / F_v	-3.64	1.21	-3.64	1.22	-3.64	0.20	-3.64	0.17

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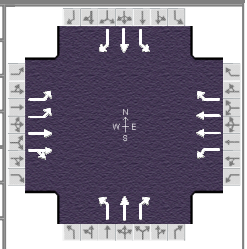
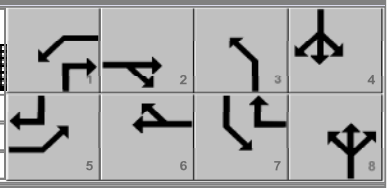
HCS7 Signalized Intersection Results Graphical Summary

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 12, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	SAT Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2017	Analysis Period	1> 11:45
Intersection	North Avenue at Charles…	File Name	North-Mall 2017 SAT.xus		
Project Description	Pride of St. Charles				

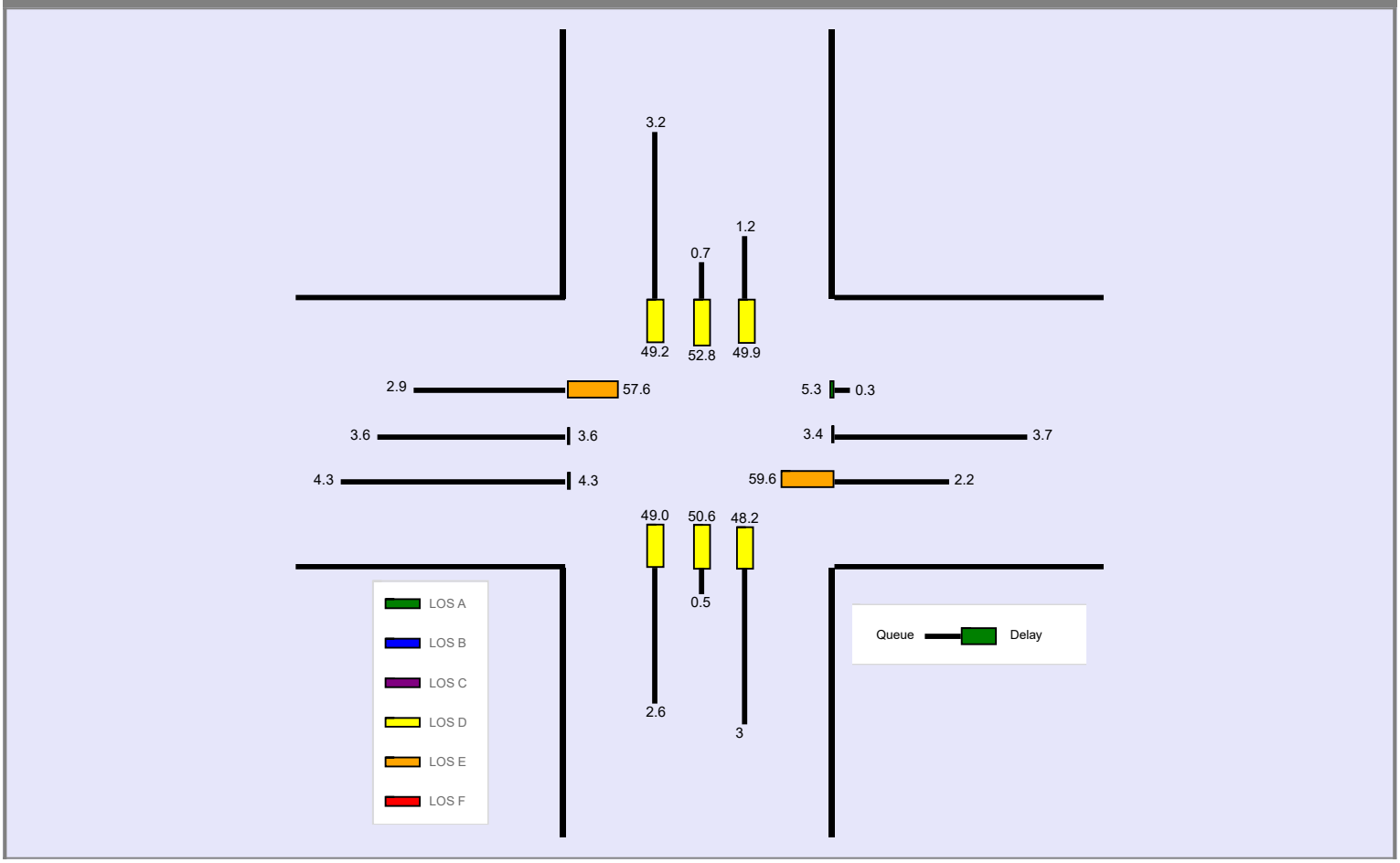


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1212	60	37	1333	21	49	10	57	23	13	59

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	4.7	1.3	81.3	3.5	2.2	8.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	0.0	4.5	3.5	0.0	4.5		
				Red	0.0	0.0	1.5	0.0	0.0	1.5		



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	76.7	94	106.8	57.1	98.6	7.2	67.2	13.9	77.8	31.6	18.5	81.6
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9	3.6	4.3	2.2	3.7	0.3	2.6	0.5	3.0	1.2	0.7	3.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.43	0.00	0.00	0.29	0.00	0.04	0.42	0.00	0.49	0.20	0.00	0.51
Control Delay (*d*), s/veh	57.6	3.6	4.3	59.6	3.4	5.3	49.0	50.6	48.2	49.9	52.8	49.2
Level of Service (LOS)	E	A	A	E	A	A	D	D	D	D	D	D
Approach Delay, s/veh / LOS	7.9	A		4.9	A		48.7	D		49.8	D	
Intersection Delay, s/veh / LOS	9.4						A					



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--- Messages ---

No errors or warnings exist.

--- Comments ---

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HCS7 Two-Way Stop-Control Report

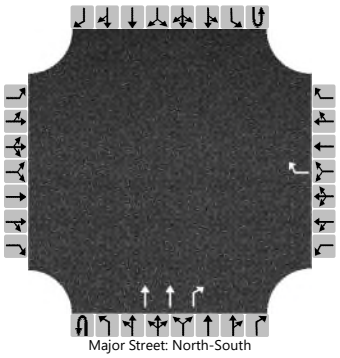
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	AM Peak Hour
Intersection Orientation	North-South
Project Description	Pride of St. Charles

Site Information

Intersection	Northbound Kirk Road RIRO
Jurisdiction	KDOT/St Charles
East/West Street	Retail RIRO Drive
North/South Street	Kirk Road
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	1	0	0	0	0
Configuration								R			T	R				
Volume (veh/h)								39			961	59				
Percent Heavy Vehicles (%)								3								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No					No					
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.96								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.33								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								41								
Capacity, c (veh/h)								509								
v/c Ratio								0.08								
95% Queue Length, Q_{95} (veh)								0.3								
Control Delay (s/veh)								12.7								
Level of Service (LOS)								B								
Approach Delay (s/veh)						12.7										
Approach LOS						B										

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HCS7 Two-Way Stop-Control Report

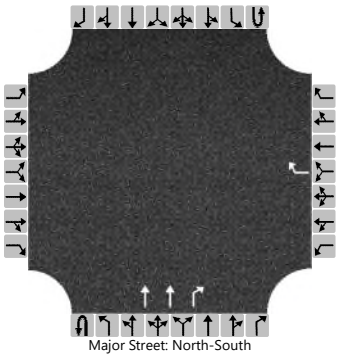
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	PM Peak Hour
Intersection Orientation	North-South
Project Description	Pride of St. Charles

Site Information

Intersection	Northbound Kirk Road RIRO
Jurisdiction	KDOT/St Charles
East/West Street	Retail RIRO Drive
North/South Street	Kirk Road
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	1	0	0	0	0
Configuration								R			T	R				
Volume (veh/h)								38			1533	60				
Percent Heavy Vehicles (%)								3								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No					No					
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.96								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.33								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								40								
Capacity, c (veh/h)								318								
v/c Ratio								0.13								
95% Queue Length, Q_{95} (veh)								0.4								
Control Delay (s/veh)								18.0								
Level of Service (LOS)								C								
Approach Delay (s/veh)						18.0										
Approach LOS						C										

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HCS7 Two-Way Stop-Control Report

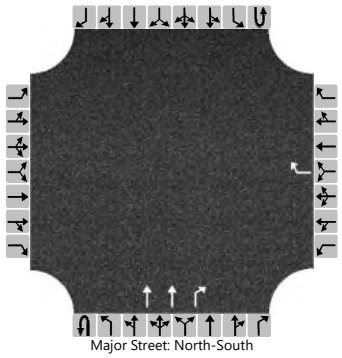
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	Saturday Peak Hour
Intersection Orientation	North-South
Project Description	Pride of St. Charles

Site Information

Intersection	Northbound Kirk Road RIRO
Jurisdiction	KDOT/St Charles
East/West Street	Retail RIRO Drive
North/South Street	Kirk Road
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	1	0	0	2	1	0	0	0	0
Configuration								R			T	R				
Volume (veh/h)								48			852	71				
Percent Heavy Vehicles (%)								3								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No					No					
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.96								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.33								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								50								
Capacity, c (veh/h)								559								
v/c Ratio								0.09								
95% Queue Length, Q_{95} (veh)								0.3								
Control Delay (s/veh)								12.1								
Level of Service (LOS)								B								
Approach Delay (s/veh)						12.1										
Approach LOS						B										

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HCS7 Two-Way Stop-Control Report

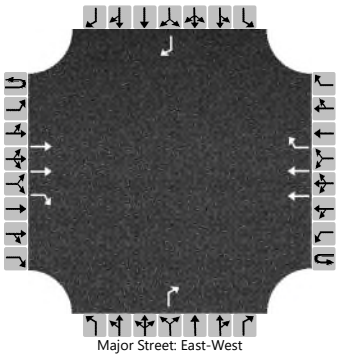
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	Pride+ Bank/PoSC Drive
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	2	1		0	0	1		0	0	1
Configuration			T	R			T	R				R				R
Volume (veh/h)			1674	121			1143	9				104				16
Percent Heavy Vehicles (%)												3				3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No				No				No				No		
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				6.9
Critical Headway (sec)												6.96				6.96
Base Follow-Up Headway (sec)												3.3				3.3
Follow-Up Headway (sec)												3.33				3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												109				17
Capacity, c (veh/h)												288				441
v/c Ratio												0.38				0.04
95% Queue Length, Q_{95} (veh)												1.7				0.1
Control Delay (s/veh)												25.0				13.5
Level of Service (LOS)												C				B
Approach Delay (s/veh)										25.0				13.5		
Approach LOS										C				B		

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HCS7 Two-Way Stop-Control Report

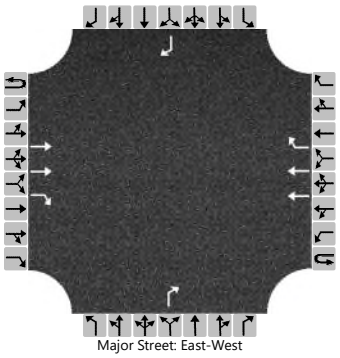
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	IDOT/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	Pride+ Bank/PoSC Drives
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	2	1		0	0	1		0	0	1
Configuration			T	R			T	R				R				R
Volume (veh/h)			1351	99			1979	9				82				43
Percent Heavy Vehicles (%)												3				3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				6.9
Critical Headway (sec)												6.96				6.96
Base Follow-Up Headway (sec)												3.3				3.3
Follow-Up Headway (sec)												3.33				3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												87				46
Capacity, c (veh/h)												369				221
v/c Ratio												0.24				0.21
95% Queue Length, Q_{95} (veh)												0.9				0.8
Control Delay (s/veh)												17.8				25.5
Level of Service (LOS)												C				D
Approach Delay (s/veh)									17.8				25.5			
Approach LOS									C				D			

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HCS7 Two-Way Stop-Control Report

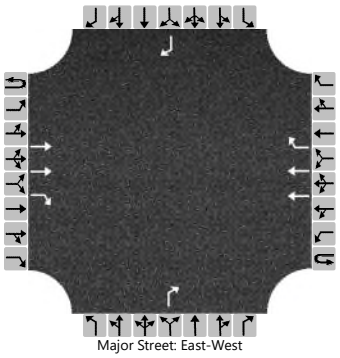
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	Saturday Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	Pride+Bank/PoSC Drives
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	2	1		0	0	1		0	0	1
Configuration			T	R			T	R				R				R
Volume (veh/h)			1383	99			1559	36				82				60
Percent Heavy Vehicles (%)												3				3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				6.9
Critical Headway (sec)												6.96				6.96
Base Follow-Up Headway (sec)												3.3				3.3
Follow-Up Headway (sec)												3.33				3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												85				63
Capacity, c (veh/h)												368				320
v/c Ratio												0.23				0.20
95% Queue Length, Q_{95} (veh)												0.9				0.7
Control Delay (s/veh)												17.7				19.0
Level of Service (LOS)												C				C
Approach Delay (s/veh)									17.7				19.0			
Approach LOS									C				C			

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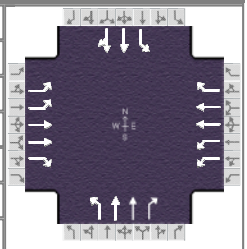
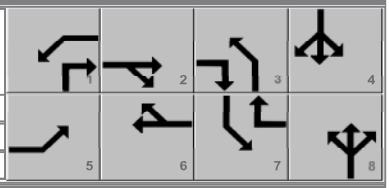
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	AM Peak Hour	PHF	0.95
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 7:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	71	1264	228	275	784	100	150	517	333	198	756	36

Signal Information												
Cycle, s	130.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
				Green	4.9	3.9	59.2	11.4	26.1	0.0		
				Yellow	3.5	3.5	4.5	3.5	4.5	0.0		
				Red	1.0	1.0	1.5	0.0	1.5	0.0		



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	71	1264	228	275	784	100	150	517	333	198	756	36
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	2000	1900	1900	2000	1900	1900	2000	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7	7	7	7	7	7	7	7	7	7	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Turn Bay Length, ft	170	0	125	325	0	160	145	0	145	135	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	45	45	45	40	40	40	40	40	40

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	16.0	63.0	20.0	67.0	15.0	32.0	15.0	32.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Red Clearance Interval (R_c), s	1.0	1.5	1.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	15	3	15	3	15	3	15
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		0.0		9.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		38.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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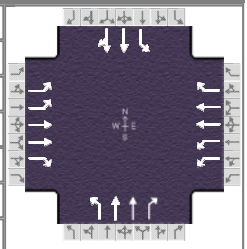
HCS7 Signalized Intersection Results Summary

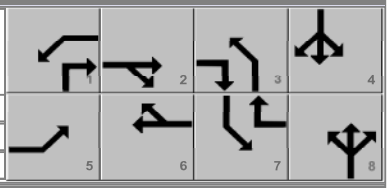
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	AM Peak Hour	PHF	0.95
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 7:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	71	1264	228	275	784	100	150	517	333	198	756	36

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.9	3.9	59.2	11.4	26.1	0.0
Yellow	3.5	3.5	4.5	3.5	4.5	0.0
Red	1.0	1.0	1.5	0.0	1.5	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	3.0	1.1	4.0
Phase Duration, s	9.4	65.2	17.8	73.6	14.9	32.0	15.0	32.1
Change Period, ($Y+R_c$), s	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.0	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g_s), s	4.9		13.1		11.4	28.0	13.5	28.1
Green Extension Time (g_e), s	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		1.00		1.00	1.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	75	1331	240	289	825	105	158	544	351	208	420	414
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1800	1522	1661	1800	1522	1711	1800	1522	1711	1796	1767
Queue Service Time (g_s), s	2.9	37.2	11.1	11.1	13.2	3.8	9.4	18.5	26.0	11.5	26.1	26.1
Cycle Queue Clearance Time (g_c), s	2.9	37.2	11.1	11.1	13.2	3.8	9.4	18.5	26.0	11.5	26.1	26.1
Green Ratio (*g/C*)	0.04	0.46	0.54	0.10	0.52	0.61	0.29	0.20	0.30	0.29	0.20	0.20
Capacity (*c*), veh/h	126	1639	827	340	1871	926	206	720	460	254	360	355
Volume-to-Capacity Ratio (*X*)	0.593	0.812	0.290	0.851	0.441	0.114	0.768	0.756	0.762	0.819	1.166	1.166
Back of Queue (*Q*), ft/ln (95 th percentile)	58.8	537.9	190.9	235.3	209	59.9	218.2	353.9	427.2	283.5	835.2	781.2
Back of Queue (*Q*), veh/ln (95 th percentile)	2.2	20.4	7.2	8.9	7.9	2.3	8.3	13.4	16.2	10.7	31.6	31.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.35	0.00	1.53	0.72	0.00	0.37	1.51	0.00	2.95	2.10	0.00	0.00
Uniform Delay (d_1), s/veh	61.5	21.2	16.1	57.4	11.6	10.7	38.9	49.0	41.1	41.1	52.0	52.0
Incremental Delay (d_2), s/veh	1.7	4.5	0.9	12.8	0.8	0.2	14.4	4.1	6.6	17.6	100.7	101.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	63.2	25.7	17.0	70.2	12.4	11.0	53.3	53.1	47.7	58.7	152.6	153.1
Level of Service (LOS)	E	C	B	E	B	B	D	D	D	E	F	F
Approach Delay, s/veh / LOS	26.1	C		26.0	C		51.3	D		134.0	F	
Intersection Delay, s/veh / LOS	54.1						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.43	B	2.27	B	2.60	C	2.60	C
Bicycle LOS Score / LOS	1.84	B	1.49	A	1.36	A	1.35	A

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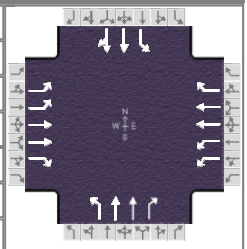
HCS7 Signalized Intersection Intermediate Values

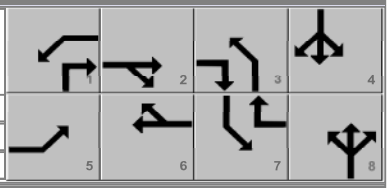
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	AM Peak Hour	PHF	0.95
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 7:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	71	1264	228	275	784	100	150	517	333	198	756	36

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.9	3.9	59.2	11.4	26.1	0.0
Yellow	3.5	3.5	4.5	3.5	4.5	0.0
Red	1.0	1.0	1.5	0.0	1.5	0.0



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000	0.847		0.000	0.847		0.000	0.847		0.984	0.984
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3600	1522	3322	3600	1522	1711	3600	1522	1711	3401	162
Proportion of Vehicles Arriving on Green (P)	0.04	0.61	0.46	0.10	0.69	0.52	0.09	0.20	0.20	0.09	0.20	0.20
Incremental Delay Factor (k)	0.04	0.50	0.50	0.25	0.50	0.50	0.28	0.28	0.28	0.33	0.50	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Green Ratio (g/C)	0.04	0.46	0.10	0.52	0.29	0.20	0.29	0.20
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	633	0	828	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	26.0	0.0	26.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0
Permitted Queue Service Time (g_{ps}), s					0.0		7.5	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		1522		1522		1522		
Protected Right Effective Green Time (g_R), s		11.4		11.5		13.3		

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.557	0.000	1.852	0.000	1.852	0.000
Pedestrian F_s / F_{delay}	0.000	0.119	0.000	0.109	0.000	0.149	0.000	0.149
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	910.67	19.28	1039.47	14.99	400.00	41.60	401.29	41.53
Bicycle F_w / F_v	-3.64	1.36	-3.64	1.01	-3.64	0.87	-3.64	0.86

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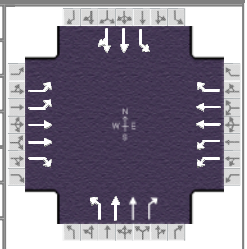
HCS7 Signalized Intersection Results Graphical Summary

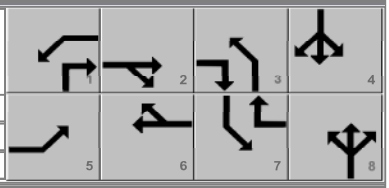
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	AM Peak Hour	PHF	0.95
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 7:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 AM.xus		
Project Description	Pride of St. Charles				



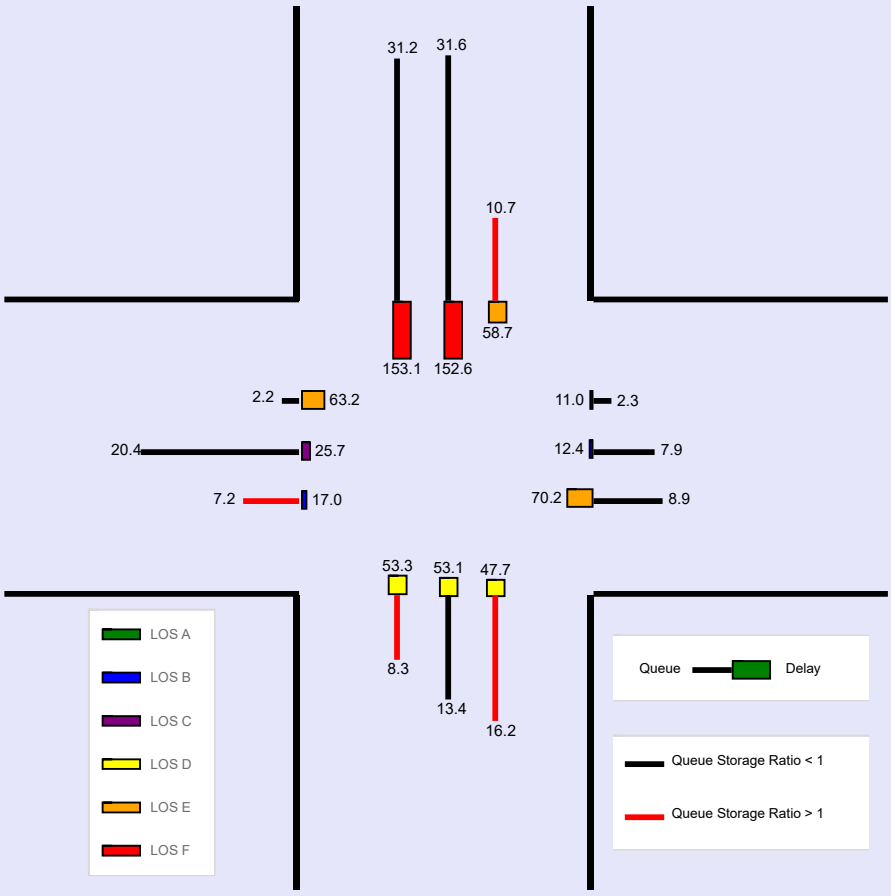
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	71	1264	228	275	784	100	150	517	333	198	756	36

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	4.9	3.9	59.2	11.4	26.1	0.0
Yellow	3.5	3.5	4.5	3.5	4.5	0.0
Red	1.0	1.0	1.5	0.0	1.5	0.0



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	58.8	537.9	190.9	235.3	209	59.9	218.2	353.9	427.2	283.5	835.2	781.2
Back of Queue (*Q*), veh/ln (95 th percentile)	2.2	20.4	7.2	8.9	7.9	2.3	8.3	13.4	16.2	10.7	31.6	31.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.35	0.00	1.53	0.72	0.00	0.37	1.51	0.00	2.95	2.10	0.00	0.00
Control Delay (*d*), s/veh	63.2	25.7	17.0	70.2	12.4	11.0	53.3	53.1	47.7	58.7	152.6	153.1
Level of Service (LOS)	E	C	B	E	B	B	D	D	D	E	F	F
Approach Delay, s/veh / LOS	26.1		C	26.0		C	51.3		D	134.0		F
Intersection Delay, s/veh / LOS	54.1						D					



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--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

WARNING: If demand exceeds capacity, a multiple-period analysis should be conducted.

--- Comments ---

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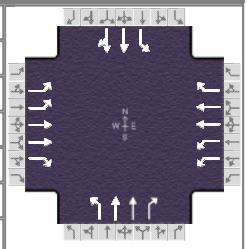
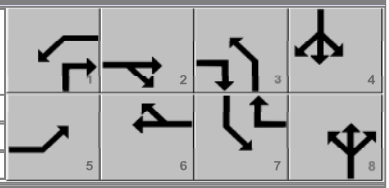
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	PM Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 16:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	131	949	145	387	1375	260	295	905	371	130	571	62

Signal Information					EB			WB			NB			SB		
Cycle, s	150.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	8.3	7.8		58.9	11.6	6.4		29.0				
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	3.5		4.5	3.5	3.5		4.5				
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0		1.5	0.0	0.0		1.5				



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	131	949	145	387	1375	260	295	905	371	130	571	62
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	2000	1900	1900	2000	1900	1900	2000	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7	7	7	7	7	7	7	7	7	7	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Turn Bay Length, ft	170	0	125	325	0	160	145	0	145	135	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	45	45	45	40	40	40	40	40	40

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	18.0	62.0	28.0	72.0	25.0	44.0	16.0	35.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Red Clearance Interval (R_c), s	1.0	1.5	1.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	15	3	15	3	15	3	15
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		0.0		9.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		38.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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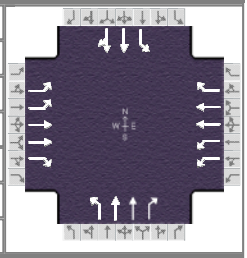
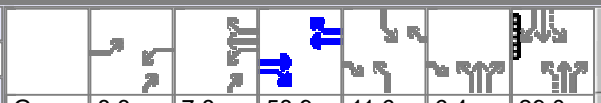
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	PM Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 16:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 PM.xus		
Project Description	Pride of St. Charles				

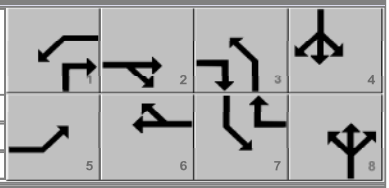


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	131	949	145	387	1375	260	295	905	371	130	571	62

Signal Information			
Cycle, s	150.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	8.3	7.8	58.9	11.6	6.4	29.0
Yellow	3.5	3.5	4.5	3.5	3.5	4.5
Red	1.0	1.0	1.5	0.0	0.0	1.5



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	3.0	1.1	4.0
Phase Duration, s	12.8	64.9	25.1	77.2	25.0	44.9	15.1	35.0
Change Period, ($Y+R_c$), s	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.0	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	8.2		20.3		23.5	40.9	11.6	30.6
Green Extension Time (g_e), s	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.05		0.86		1.00	1.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	139	1010	154	412	1463	277	314	963	395	138	342	331
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1800	1522	1661	1800	1522	1711	1800	1522	1711	1796	1734
Queue Service Time (g_s), s	6.2	32.0	7.9	18.3	48.9	14.9	21.5	38.9	31.7	9.6	28.5	28.6
Cycle Queue Clearance Time (g_c), s	6.2	32.0	7.9	18.3	48.9	14.9	21.5	38.9	31.7	9.6	28.5	28.6
Green Ratio (*g/C*)	0.06	0.39	0.54	0.14	0.47	0.55	0.35	0.26	0.40	0.27	0.19	0.19
Capacity (*c*), veh/h	184	1412	815	457	1708	840	295	933	604	181	347	335
Volume-to-Capacity Ratio (*X*)	0.756	0.715	0.189	0.900	0.856	0.329	1.063	1.032	0.654	0.765	0.985	0.988
Back of Queue (*Q*), ft/ln (95 th percentile)	128.2	508.5	137.8	354.9	665.8	241.2	572.7	807.5	465	220.7	628.5	583.8
Back of Queue (*Q*), veh/ln (95 th percentile)	4.9	19.3	5.2	13.4	25.2	9.1	21.7	30.6	17.6	8.4	23.8	23.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.75	0.00	1.10	1.09	0.00	1.51	3.95	0.00	3.21	1.63	0.00	0.00
Uniform Delay (d_1), s/veh	69.8	29.4	18.0	63.7	23.4	18.4	45.9	55.6	36.8	46.2	60.3	60.3
Incremental Delay (d_2), s/veh	2.4	3.1	0.5	16.1	5.8	1.0	70.0	38.1	2.0	14.2	44.0	45.8
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	72.2	32.5	18.5	79.8	29.2	19.4	115.9	93.6	38.9	60.4	104.3	106.1
Level of Service (LOS)	E	C	B	E	C	B	F	F	D	E	F	F
Approach Delay, s/veh / LOS	35.1	D		37.6	D		84.9	F		97.5	F	
Intersection Delay, s/veh / LOS	58.6						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.44	B	2.28	B	2.60	C	2.61	C
Bicycle LOS Score / LOS	1.56	B	2.26	B	1.87	B	1.16	A

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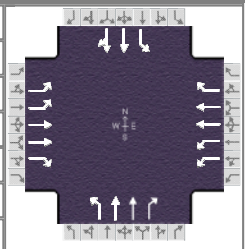
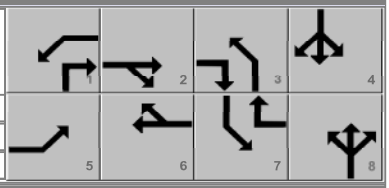
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	PM Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 16:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	131	949	145	387	1375	260	295	905	371	130	571	62

Signal Information					EB			WB			NB			SB		
Cycle, s	150.0	Reference Phase	2		L	T	R	L	T	R	L	T	R	L	T	R
Offset, s	0	Reference Point	End	Green	8.3	7.8		58.9	11.6	6.4		29.0				
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	3.5		4.5	3.5	3.5		4.5				
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0		1.5	0.0	0.0		1.5				



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000	0.847		0.000	0.847		0.000	0.847		0.965	0.965
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3600	1522	3322	3600	1522	1711	3600	1522	1711	3185	345
Proportion of Vehicles Arriving on Green (P)	0.06	0.52	0.39	0.14	0.63	0.47	0.14	0.26	0.26	0.08	0.19	0.19
Incremental Delay Factor (k)	0.04	0.50	0.50	0.31	0.50	0.50	0.50	0.50	0.18	0.25	0.49	0.49

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Green Ratio (g/C)	0.06	0.39	0.14	0.47	0.35	0.26	0.27	0.19
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	735	0	560	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	31.0	0.0	29.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Permitted Queue Service Time (g_{ps}), s					0.4		0.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		1522		1522		1522		
Protected Right Effective Green Time (g_R), s		21.5		11.6		20.6		

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.557	0.000	1.852	0.000	1.852	0.000
Pedestrian F_s / F_{delay}	0.000	0.133	0.000	0.122	0.000	0.149	0.000	0.156
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	784.70	27.69	949.02	20.71	518.17	41.17	386.67	48.80
Bicycle F_w / F_v	-3.64	1.08	-3.64	1.77	-3.64	1.38	-3.64	0.67

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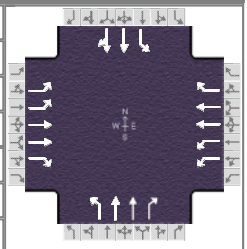
HCS7 Signalized Intersection Results Graphical Summary

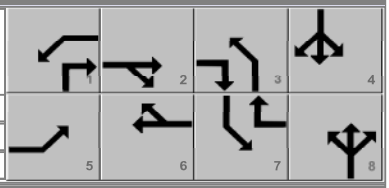
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	PM Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 16:15
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 PM.xus		
Project Description	Pride of St. Charles				



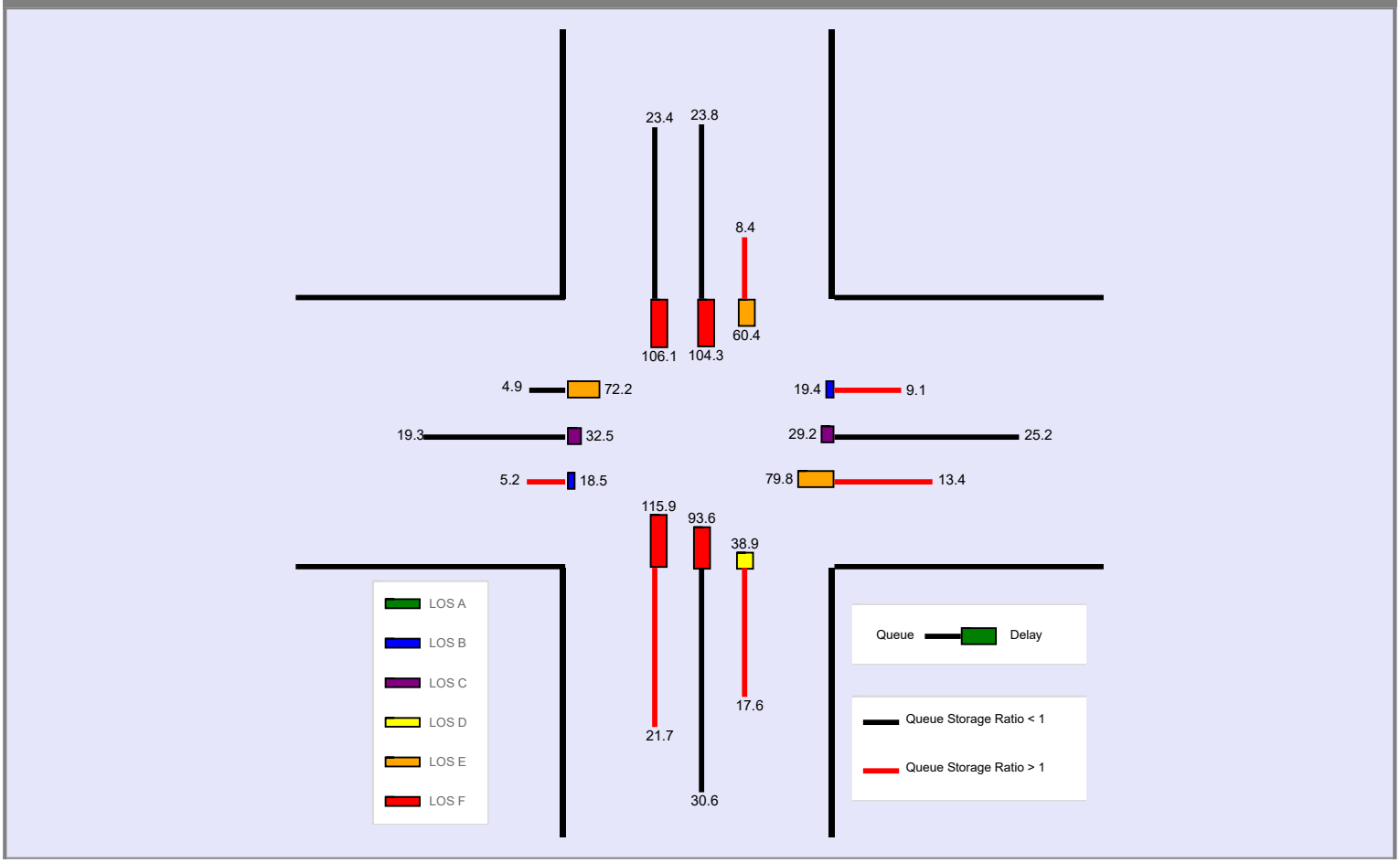
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	131	949	145	387	1375	260	295	905	371	130	571	62

Signal Information			
Cycle, s	150.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.3	7.8	58.9	11.6	6.4	29.0	
Yellow	3.5	3.5	4.5	3.5	3.5	4.5	
Red	1.0	1.0	1.5	0.0	0.0	1.5	



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	128.2	508.5	137.8	354.9	665.8	241.2	572.7	807.5	465	220.7	628.5	583.8
Back of Queue (*Q*), veh/ln (95 th percentile)	4.9	19.3	5.2	13.4	25.2	9.1	21.7	30.6	17.6	8.4	23.8	23.4
Queue Storage Ratio (*RQ*) (95 th percentile)	0.75	0.00	1.10	1.09	0.00	1.51	3.95	0.00	3.21	1.63	0.00	0.00
Control Delay (*d*), s/veh	72.2	32.5	18.5	79.8	29.2	19.4	115.9	93.6	38.9	60.4	104.3	106.1
Level of Service (LOS)	E	C	B	E	C	B	F	F	D	E	F	F
Approach Delay, s/veh / LOS	35.1		D	37.6		D	84.9		F	97.5		F
Intersection Delay, s/veh / LOS	58.6						E					



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--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

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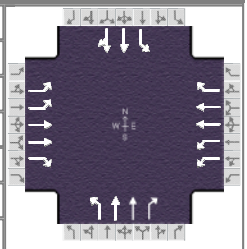
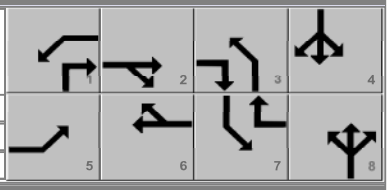
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	SAT Peak Hour	PHF	0.96
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 11:45
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	122	1013	205	310	1171	138	201	390	309	160	389	64

Signal Information					EB			WB			NB		
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	6.6	2.7	49.4	11.3	2.3	23.1			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	3.5	4.5	3.5	0.0	4.5			
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.5	0.0	0.0	1.5			



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	122	1013	205	310	1171	138	201	390	309	160	389	64
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	2000	1900	1900	2000	1900	1900	2000	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7	7	7	7	7	7	7	7	7	7	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Turn Bay Length, ft	170	0	125	325	0	160	145	0	145	135	0	
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	35	35	35	45	45	45	40	40	40	40	40	40

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	14.0	50.0	19.0	55.0	21.0	33.0	18.0	30.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Red Clearance Interval (R_c), s	1.0	1.5	1.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	15	3	15	3	15	3	15
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		0.0		9.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		0.0		38.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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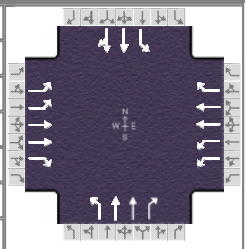
HCS7 Signalized Intersection Results Summary

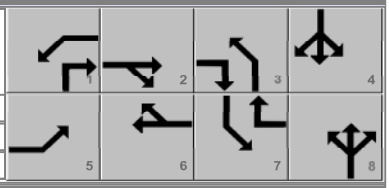
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	SAT Peak Hour	PHF	0.96
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 11:45
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	122	1013	205	310	1171	138	201	390	309	160	389	64

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.6	2.7	49.4	11.3	2.3	23.1
Yellow	3.5	3.5	4.5	3.5	0.0	4.5
Red	1.0	1.0	1.5	0.0	0.0	1.5



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	3.0	2.0	3.0	1.1	3.0	1.1	4.0
Phase Duration, s	11.1	55.4	18.3	62.6	17.1	31.4	14.8	29.1
Change Period, ($Y+R_c$), s	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.0	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	6.5		13.4		13.5	23.7	11.2	17.2
Green Extension Time (g_e), s	0.1	0.0	0.4	0.0	0.1	1.7	0.1	2.2
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.07		0.39	0.35	0.81	0.10

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	127	1055	214	323	1220	144	209	406	322	167	240	232
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1800	1522	1661	1800	1522	1711	1800	1522	1711	1796	1708
Queue Service Time (g_s), s	4.5	26.0	9.3	11.4	27.5	5.4	11.5	12.0	21.7	9.2	15.0	15.2
Cycle Queue Clearance Time (g_c), s	4.5	26.0	9.3	11.4	27.5	5.4	11.5	12.0	21.7	9.2	15.0	15.2
Green Ratio (*g/C*)	0.06	0.41	0.53	0.12	0.47	0.57	0.31	0.21	0.33	0.29	0.19	0.19
Capacity (*c*), veh/h	184	1483	800	383	1699	862	313	762	498	311	346	329
Volume-to-Capacity Ratio (*X*)	0.690	0.711	0.267	0.844	0.718	0.167	0.670	0.533	0.647	0.537	0.695	0.705
Back of Queue (*Q*), ft/ln (95 th percentile)	91.2	401.5	158.3	227.8	370.2	86.7	224	238.5	333.5	181.3	292.1	270.2
Back of Queue (*Q*), veh/ln (95 th percentile)	3.5	15.2	6.0	8.6	14.0	3.3	8.5	9.0	12.6	6.9	11.1	10.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.54	0.00	1.27	0.70	0.00	0.54	1.54	0.00	2.30	1.34	0.00	0.00
Uniform Delay (d_1), s/veh	55.7	21.8	15.7	52.0	16.9	12.5	33.7	42.0	34.5	34.5	45.2	45.3
Incremental Delay (d_2), s/veh	1.7	2.9	0.8	6.4	2.6	0.4	2.4	0.2	1.5	0.5	2.6	3.0
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	57.4	24.7	16.5	58.4	19.5	12.9	36.1	42.2	35.9	35.0	47.7	48.3
Level of Service (LOS)	E	C	B	E	B	B	D	D	D	D	D	D
Approach Delay, s/veh / LOS	26.4	C		26.4	C		38.7	D		44.6	D	
Intersection Delay, s/veh / LOS	31.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.43	B	2.27	B	2.60	C	2.60	C
Bicycle LOS Score / LOS	1.64	B	1.88	B	1.26	A	1.01	A

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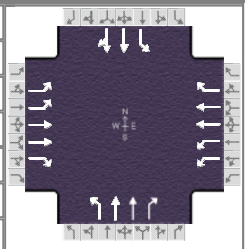
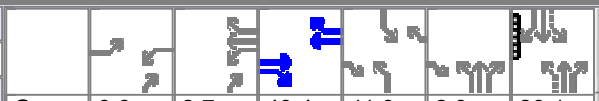
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	SAT Peak Hour	PHF	0.96
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 11:45
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 SAT.xus		
Project Description	Pride of St. Charles				

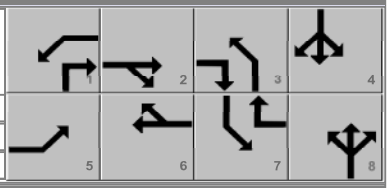


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	122	1013	205	310	1171	138	201	390	309	160	389	64

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.6	2.7	49.4	11.3	2.3	23.1
Yellow	3.5	3.5	4.5	3.5	0.0	4.5
Red	1.0	1.0	1.5	0.0	0.0	1.5



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000	0.847		0.000	0.847		0.000	0.847		0.951	0.951
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3600	1522	3322	3600	1522	1711	3600	1522	1711	3012	492
Proportion of Vehicles Arriving on Green (P)	0.06	0.55	0.41	0.12	0.63	0.47	0.11	0.21	0.21	0.09	0.19	0.19
Incremental Delay Factor (k)	0.04	0.50	0.50	0.14	0.50	0.50	0.10	0.04	0.11	0.04	0.11	0.12

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	4.5	6.0	4.5	6.0	3.5	6.0	3.5	6.0
Green Ratio (g/C)	0.06	0.41	0.12	0.47	0.31	0.21	0.29	0.19
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	885	0	940	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	23.9	0.0	23.1	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	7.9	0.0	11.4	0.0
Permitted Queue Service Time (g_{ps}), s					5.0		2.5	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		1522		1522		1522		
Protected Right Effective Green Time (g_R), s		13.6		11.3		13.8		

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.710	0.000	1.557	0.000	1.852	0.000	1.852	0.000
Pedestrian F_s / F_{delay}	0.000	0.122	0.000	0.113	0.000	0.145	0.000	0.147
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	824.14	20.74	943.72	16.74	423.45	37.28	384.85	39.13
Bicycle F_w / F_v	-3.64	1.15	-3.64	1.39	-3.64	0.77	-3.64	0.53

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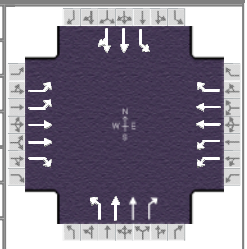
HCS7 Signalized Intersection Results Graphical Summary

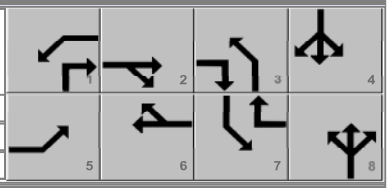
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/Kane County	Time Period	SAT Peak Hour	PHF	0.96
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 11:45
Intersection	North Avenue at Kirk Road	File Name	North-Kirk 2025 SAT.xus		
Project Description	Pride of St. Charles				



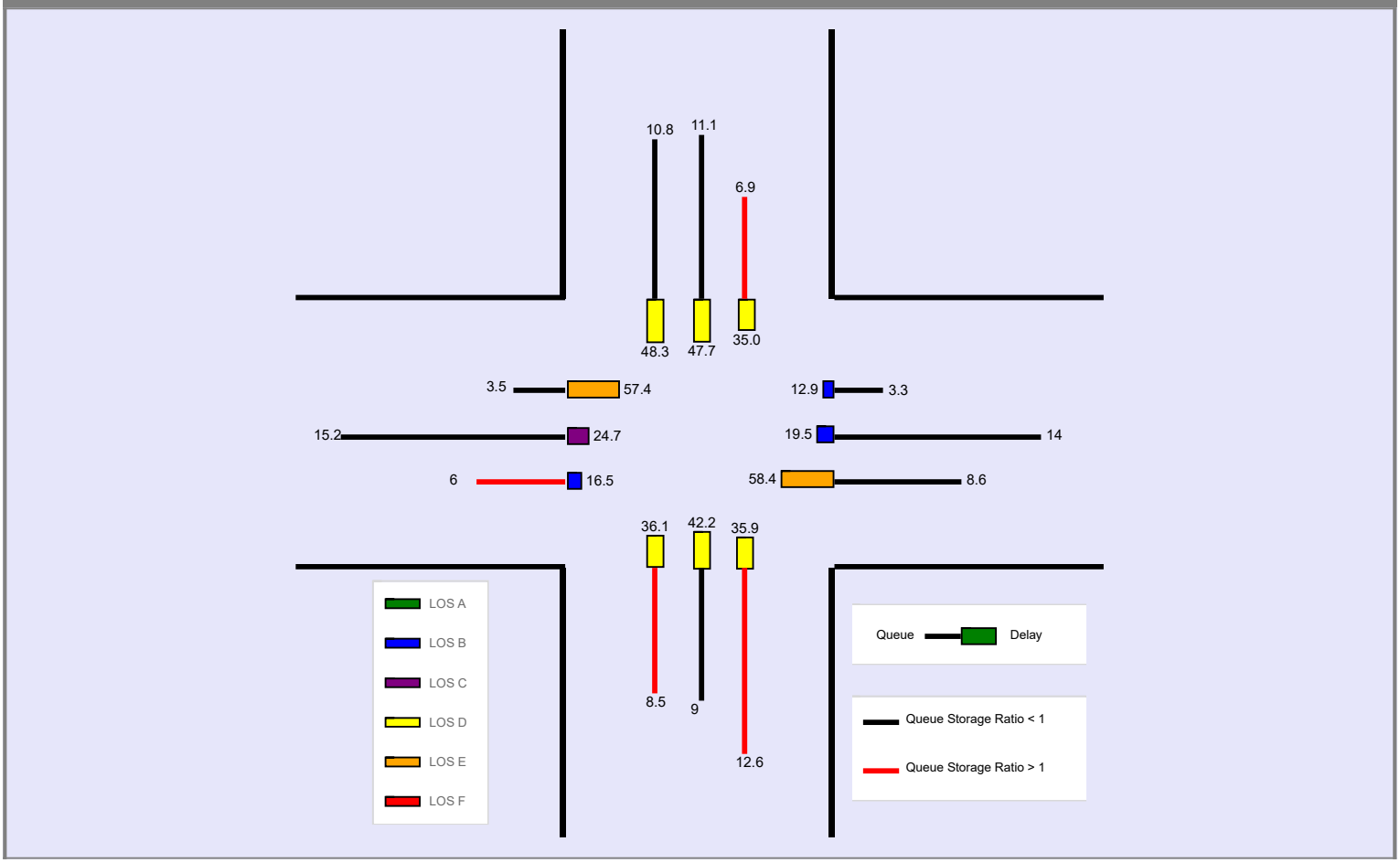
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	122	1013	205	310	1171	138	201	390	309	160	389	64

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.6	2.7	49.4	11.3	2.3	23.1	
Yellow	3.5	3.5	4.5	3.5	0.0	4.5	
Red	1.0	1.0	1.5	0.0	0.0	1.5	



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	91.2	401.5	158.3	227.8	370.2	86.7	224	238.5	333.5	181.3	292.1	270.2
Back of Queue (*Q*), veh/ln (95 th percentile)	3.5	15.2	6.0	8.6	14.0	3.3	8.5	9.0	12.6	6.9	11.1	10.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.54	0.00	1.27	0.70	0.00	0.54	1.54	0.00	2.30	1.34	0.00	0.00
Control Delay (*d*), s/veh	57.4	24.7	16.5	58.4	19.5	12.9	36.1	42.2	35.9	35.0	47.7	48.3
Level of Service (LOS)	E	C	B	E	B	B	D	D	D	D	D	D
Approach Delay, s/veh / LOS	26.4	C		26.4	C		38.7	D		44.6	D	
Intersection Delay, s/veh / LOS	31.4						C					



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--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

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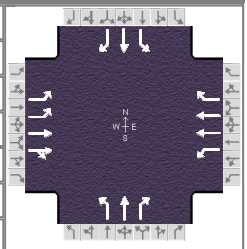
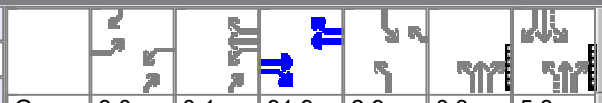
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	AM Peak Hour	PHF	0.92
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 7:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 AM.xus		
Project Description	Pride of St. Charles				

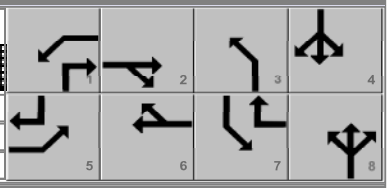


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1747	23	56	1082	5	66	1	12	9	2	4

Signal Information									
Cycle, s	130.0	Reference Phase	2						
Offset, s	0	Reference Point	End						
Uncoordinated	No	Simult. Gap E/W	On						
Force Mode	Fixed	Simult. Gap N/S	On						



Green	3.0	0.1	91.9	2.9	0.3	5.3
Yellow	3.5	3.5	4.5	3.5	4.0	4.5
Red	0.0	0.0	1.5	0.0	0.0	1.5



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1747	23	56	1082	5	66	1	12	9	2	4
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	2000	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7		7	7	7	3	3	3	3	3	3
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	180	0		200	0	200	160	0	160	160	0	160
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	45	45	45	45	45	45	25	25	25	25	25	25

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	13.0	84.0	13.0	84.0	13.0	20.0	13.0	20.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	4.0	4.5	3.5	4.5
Red Clearance Interval (R_c), s	0.0	1.5	0.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	21	3	21	3	8	3	8
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		9.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		38.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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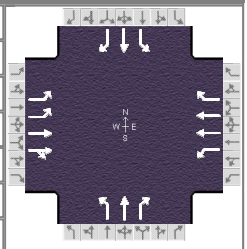
HCS7 Signalized Intersection Results Summary

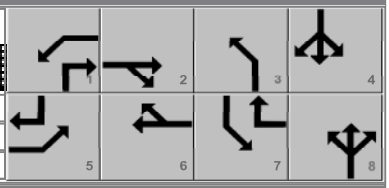
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	AM Peak Hour	PHF	0.92
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 7:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1747	23	56	1082	5	66	1	12	9	2	4

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.0	0.1	91.9	2.9	0.3	5.3
Yellow	3.5	3.5	4.5	3.5	4.0	4.5
Red	0.0	0.0	1.5	0.0	0.0	1.5



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	6.5	97.9	10.1	101.5	10.7	15.7	6.4	11.3
Change Period, ($Y+R_c$), s	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.0	0.0	3.0	0.0	3.3	3.4	3.3	3.4
Queue Clearance Time (g_s), s	2.3		6.6		6.9	3.0	2.7	2.3
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00		1.00		0.97	0.96	0.96	0.67
Max Out Probability	0.00		0.00		1.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	9	962	962	61	1176	5	72	1	13	10	2	4
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1796	1788	1711	1800	1522	1767	1953	1572	1767	1953	1572
Queue Service Time (g_s), s	0.3	14.1	15.6	4.6	1.6	0.1	4.9	0.1	1.0	0.7	0.1	0.3
Cycle Queue Clearance Time (g_c), s	0.3	14.1	15.6	4.6	1.6	0.1	4.9	0.1	1.0	0.7	0.1	0.3
Green Ratio (*g/C*)	0.02	0.71	0.71	0.05	0.73	0.76	0.11	0.07	0.13	0.06	0.04	0.06
Capacity (*c*), veh/h	77	1269	1263	87	2644	1151	203	145	197	152	80	101
Volume-to-Capacity Ratio (*X*)	0.113	0.758	0.761	0.700	0.445	0.005	0.354	0.007	0.066	0.064	0.027	0.043
Back of Queue (*Q*), ft/ln (95 th percentile)	6.7	142.5	144	96.4	23.1	1.5	102.6	1.6	17.6	14.2	3.3	6.3
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	5.4	5.8	3.7	0.9	0.1	4.0	0.1	0.7	0.6	0.1	0.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00	0.00	0.48	0.00	0.01	0.64	0.00	0.11	0.09	0.00	0.04
Uniform Delay (d_1), s/veh	62.2	1.5	1.7	60.7	0.4	3.9	53.9	55.7	50.2	57.4	59.8	57.1
Incremental Delay (d_2), s/veh	0.2	4.3	4.4	3.8	0.5	0.0	0.4	0.0	0.1	0.1	0.1	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	62.4	5.8	6.1	64.5	0.9	3.9	54.3	55.7	50.2	57.4	59.9	57.2
Level of Service (LOS)	E	A	A	E	A	A	D	E	D	E	E	E
Approach Delay, s/veh / LOS	6.2	A		4.0	A		53.7	D		57.7	E	
Intersection Delay, s/veh / LOS	6.9						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.06	B	2.22	B	2.47	B	2.47	B
Bicycle LOS Score / LOS	2.08	B	1.51	B	0.63	A	0.51	A

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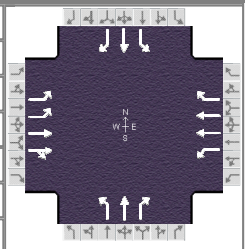
HCS7 Signalized Intersection Intermediate Values

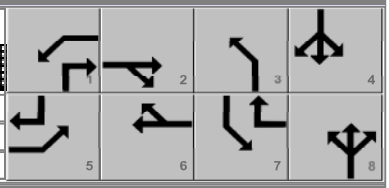
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	AM Peak Hour	PHF	0.92
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 7:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 AM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1747	23	56	1082	5	66	1	12	9	2	4

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.0	0.1	91.9	2.9	0.3	5.3
Yellow	3.5	3.5	4.5	3.5	4.0	4.5
Red	0.0	0.0	1.5	0.0	0.0	1.5



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	1.000	0.945	0.945	0.945	0.977	0.977	0.977	0.977	0.977	0.977
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.995	0.995		0.000	0.847		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3538	46	1711	3600	1522	1767	1953	1572	1767	1953	1572
Proportion of Vehicles Arriving on Green (P)	0.02	0.94	0.71	0.05	0.98	0.73	0.05	0.07	0.07	0.02	0.04	0.04
Incremental Delay Factor (k)	0.04	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.04	0.04

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Green Ratio (g/C)	0.02	0.71	0.05	0.73	0.11	0.07	0.06	0.04
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	1404	0	1405	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	7.3	0.0	5.3	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	5.2	0.0	5.3	0.0
Permitted Queue Service Time (g_{ps}), s					0.1		0.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln				1522		1572		1572
Protected Right Effective Green Time (g_R), s				2.9		6.6		3.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.389	0.000	1.557	0.000	1.710	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.069	0.000	0.061	0.000	0.161	0.000	0.164
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1413.16	5.60	1468.63	4.59	148.67	55.70	82.07	59.77
Bicycle F_w / F_v	-3.64	1.59	-3.64	1.02	-3.64	0.14	-3.64	0.03

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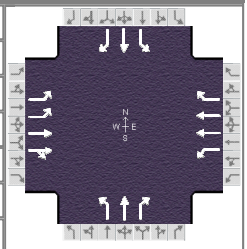
HCS7 Signalized Intersection Results Graphical Summary

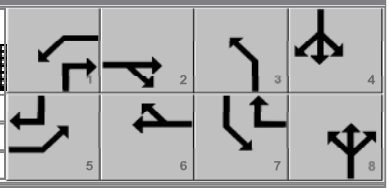
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	AM Peak Hour	PHF	0.92
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 7:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 AM.xus		
Project Description	Pride of St. Charles				



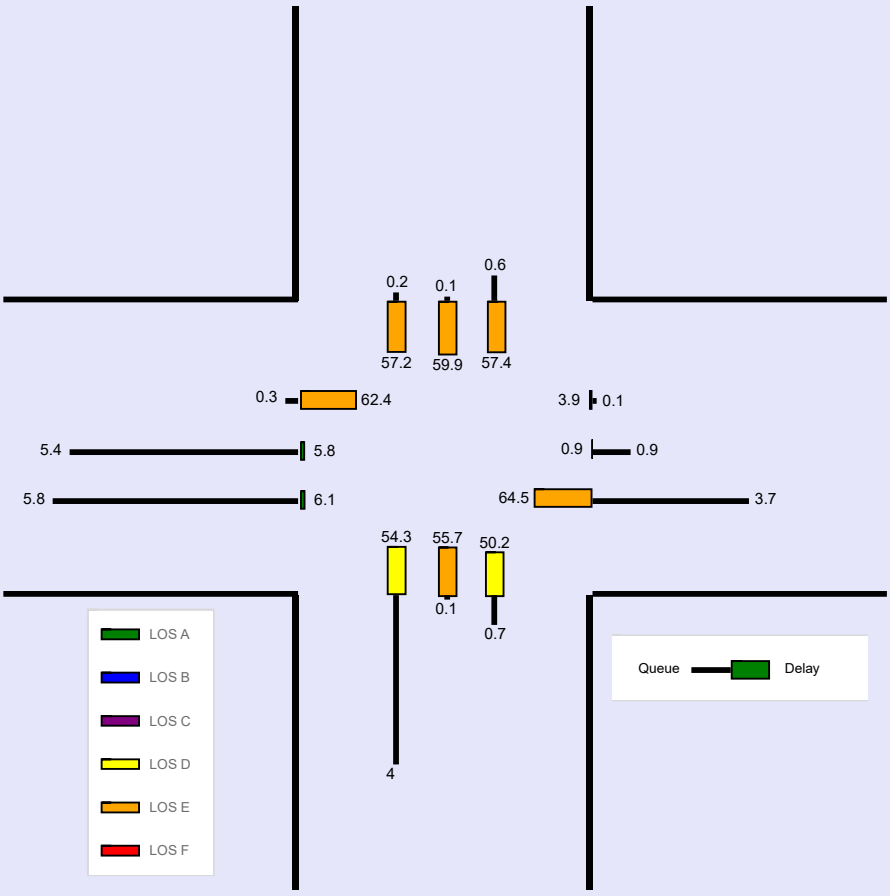
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1747	23	56	1082	5	66	1	12	9	2	4

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.0	0.1	91.9	2.9	0.3	5.3
Yellow	3.5	3.5	4.5	3.5	4.0	4.5
Red	0.0	0.0	1.5	0.0	0.0	1.5



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	6.7	142.5	144	96.4	23.1	1.5	102.6	1.6	17.6	14.2	3.3	6.3
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	5.4	5.8	3.7	0.9	0.1	4.0	0.1	0.7	0.6	0.1	0.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.04	0.00	0.00	0.48	0.00	0.01	0.64	0.00	0.11	0.09	0.00	0.04
Control Delay (*d*), s/veh	62.4	5.8	6.1	64.5	0.9	3.9	54.3	55.7	50.2	57.4	59.9	57.2
Level of Service (LOS)	E	A	A	E	A	A	D	E	D	E	E	E
Approach Delay, s/veh / LOS	6.2	A		4.0	A		53.7	D		57.7	E	
Intersection Delay, s/veh / LOS	6.9						A					



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--- Messages ---

No errors or warnings exist.

--- Comments ---

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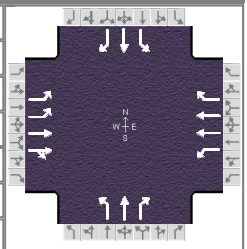
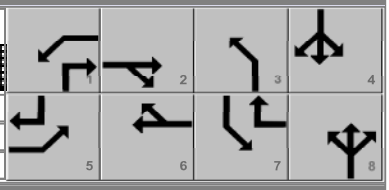
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	PM Peak Hour	PHF	0.93
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 16:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1325	40	69	1859	21	101	9	39	22	11	54

Signal Information												
Cycle, s	150.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On	Green	5.4	3.1	103.5	3.9	3.1	8.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	0.0	4.5	3.5	4.0	4.5		
				Red	0.0	0.0	1.5	0.0	0.0	1.5		



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1325	40	69	1859	21	101	9	39	22	11	54
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	2000	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h	0	L			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7		7	7	7	3	3	3	3	3	3
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	180	0		200	0	200	160	0	160	160	0	160
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	45	45	45	45	45	45	25	25	25	25	25	25

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	16.0	93.0	16.0	93.0	16.0	25.0	16.0	25.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	4.0	4.5	3.5	4.5
Red Clearance Interval (R_c), s	0.0	1.5	0.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	21	3	21	3	8	3	8
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		9.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		38.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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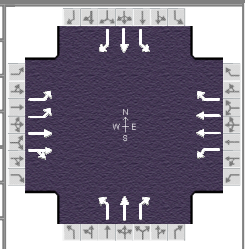
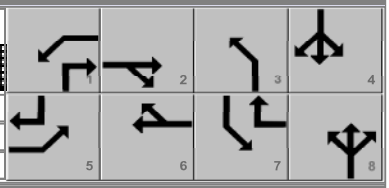
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	PM Peak Hour	PHF	0.93
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 16:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1325	40	69	1859	21	101	9	39	22	11	54

Signal Information					EB			WB			NB			SB		
Cycle, s	150.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	5.4	3.1		103.5	3.9	3.1	8.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	0.0		4.5	3.5	4.0	4.5					
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0		1.5	0.0	0.0	1.5					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	8.9	109.5	12.0	112.7	14.5	21.1	7.4	14.0
Change Period, ($Y+R_c$), s	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.0	0.0	3.0	0.0	3.3	3.4	3.3	3.4
Queue Clearance Time (g_s), s	5.3		8.4		10.5	5.5	3.9	7.2
Green Extension Time (g_e), s	0.1	0.0	0.1	0.0	0.0	0.2	0.0	0.2
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		1.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	73	737	731	74	1999	23	109	10	42	24	12	58
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1796	1777	1711	1800	1522	1767	1953	1572	1767	1953	1572
Queue Service Time (g_s), s	3.3	10.8	12.5	6.4	16.7	0.6	8.5	0.7	3.5	1.9	0.9	5.2
Cycle Queue Clearance Time (g_c), s	3.3	10.8	12.5	6.4	16.7	0.6	8.5	0.7	3.5	1.9	0.9	5.2
Green Ratio (*g/C*)	0.04	0.69	0.69	0.06	0.71	0.74	0.14	0.10	0.16	0.08	0.05	0.09
Capacity (*c*), veh/h	119	1240	1227	97	2560	1122	238	197	247	168	104	140
Volume-to-Capacity Ratio (*X*)	0.616	0.594	0.596	0.766	0.781	0.020	0.457	0.049	0.170	0.141	0.114	0.415
Back of Queue (*Q*), ft/ln (95 th percentile)	66.6	128.3	138.2	137.8	121.5	8.5	179.1	15.7	64.8	39.7	20.4	1.3
Back of Queue (*Q*), veh/ln (95 th percentile)	2.5	4.9	5.5	5.2	4.6	0.3	7.0	0.6	2.5	1.6	0.8	0.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.37	0.00	0.00	0.69	0.00	0.04	1.12	0.00	0.40	0.25	0.00	0.01
Uniform Delay (d_1), s/veh	71.3	2.3	2.8	69.8	1.6	5.3	59.6	61.0	54.7	64.5	67.6	64.6
Incremental Delay (d_2), s/veh	1.9	2.1	2.1	4.7	2.4	0.0	0.5	0.0	0.1	0.1	0.2	0.7
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	73.2	4.4	4.9	74.4	4.0	5.3	60.1	61.0	54.8	64.6	67.8	65.4
Level of Service (LOS)	E	A	A	E	A	A	E	E	D	E	E	E
Approach Delay, s/veh / LOS	7.9	A		6.5	A		58.8	E		65.5	E	
Intersection Delay, s/veh / LOS	10.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.07	B	2.23	B	2.47	B	2.48	B
Bicycle LOS Score / LOS	1.76	B	2.22	B	0.75	A	0.64	A

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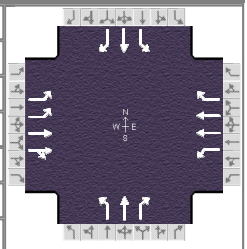
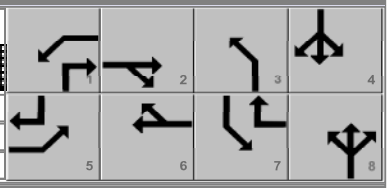
HCS7 Signalized Intersection Intermediate Values

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	PM Peak Hour	PHF	0.93
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 16:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 PM.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1325	40	69	1859	21	101	9	39	22	11	54

Signal Information												
Cycle, s	150.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
				Green	5.4	3.1	103.5	3.9	3.1	8.0		
				Yellow	3.5	0.0	4.5	3.5	4.0	4.5		
				Red	0.0	0.0	1.5	0.0	0.0	1.5		



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	1.000	0.945	0.945	0.945	0.977	0.977	0.977	0.977	0.977	0.977
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.990	0.990		0.000	0.847		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3469	105	1711	3600	1522	1767	1953	1572	1767	1953	1572
Proportion of Vehicles Arriving on Green (P)	0.04	0.92	0.69	0.06	0.95	0.71	0.07	0.10	0.10	0.03	0.05	0.05
Incremental Delay Factor (k)	0.04	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.04	0.04

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Green Ratio (g/C)	0.04	0.69	0.06	0.71	0.14	0.10	0.08	0.05
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	1391	0	1394	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	10.0	0.0	8.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	7.1	0.0	8.0	0.0
Permitted Queue Service Time (g_{ps}), s					0.2		0.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln				1522		1572		1572
Protected Right Effective Green Time (g_R), s				3.9		8.5		5.4

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.389	0.000	1.557	0.000	1.710	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.079	0.000	0.074	0.000	0.165	0.000	0.169
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1380.33	7.20	1422.08	6.26	201.31	60.66	106.42	67.23
Bicycle F_w / F_v	-3.64	1.27	-3.64	1.73	-3.64	0.26	-3.64	0.15

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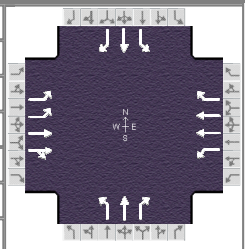
HCS7 Signalized Intersection Results Graphical Summary

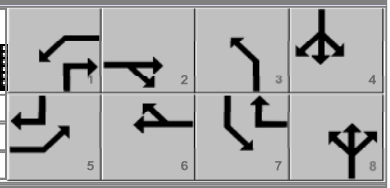
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	PM Peak Hour	PHF	0.93
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 16:15
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 PM.xus		
Project Description	Pride of St. Charles				



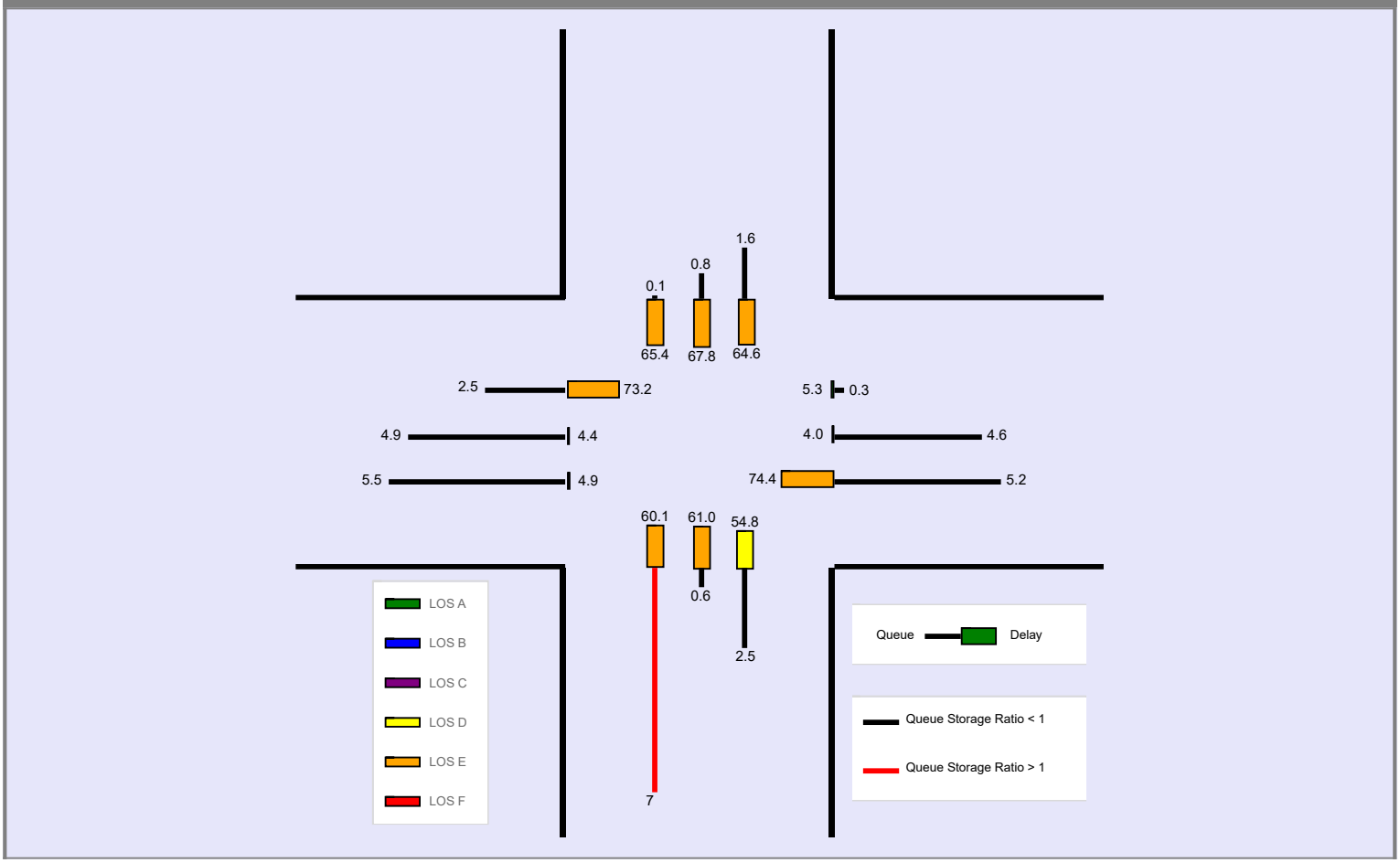
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	68	1325	40	69	1859	21	101	9	39	22	11	54

Signal Information			
Cycle, s	150.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	5.4	3.1	103.5	3.9	3.1	8.0						
Yellow	3.5	0.0	4.5	3.5	4.0	4.5						
Red	0.0	0.0	1.5	0.0	0.0	1.5						



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	66.6	128.3	138.2	137.8	121.5	8.5	179.1	15.7	64.8	39.7	20.4	1.3
Back of Queue (*Q*), veh/ln (95 th percentile)	2.5	4.9	5.5	5.2	4.6	0.3	7.0	0.6	2.5	1.6	0.8	0.1
Queue Storage Ratio (*RQ*) (95 th percentile)	0.37	0.00	0.00	0.69	0.00	0.04	1.12	0.00	0.40	0.25	0.00	0.01
Control Delay (*d*), s/veh	73.2	4.4	4.9	74.4	4.0	5.3	60.1	61.0	54.8	64.6	67.8	65.4
Level of Service (LOS)	E	A	A	E	A	A	E	E	D	E	E	E
Approach Delay, s/veh / LOS	7.9	A		6.5	A		58.8	E		65.5	E	
Intersection Delay, s/veh / LOS	10.6						B					



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--- Messages ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

--- Comments ---

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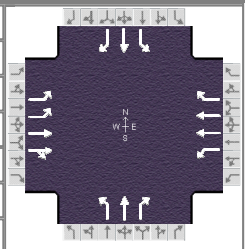
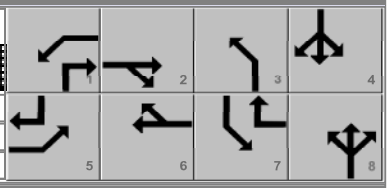
HCS7 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	SAT Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 11:45
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1303	60	83	1429	21	107	10	62	23	13	59

Signal Information												
Cycle, s	120.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
				Green	6.0	2.2	75.4	3.5	1.9	8.0		
				Yellow	3.5	0.0	4.5	3.5	4.0	4.5		
				Red	0.0	0.0	1.5	0.0	0.0	1.5		



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1303	60	83	1429	21	107	10	62	23	13	59
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	2000	1900	1900	2000	1900	1900	2000	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	7	7		7	7	7	3	3	3	3	3	3
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Turn Bay Length, ft	180	0		200	0	200	160	0	160	160	0	160
Grade (*Pg*), %		0			0			0			0	
Speed Limit, mi/h	45	45	45	45	45	45	25	25	25	25	25	25

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	72.0	15.0	72.0	13.0	20.0	13.0	20.0
Yellow Change Interval (*Y*), s	3.5	4.5	3.5	4.5	4.0	4.5	3.5	4.5
Red Clearance Interval (R_c), s	0.0	1.5	0.0	1.5	0.0	1.5	0.0	1.5
Minimum Green (G_{min}), s	3	21	3	21	3	8	3	8
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk (*Walk*), s		0.0		0.0		9.0		0.0
Pedestrian Clearance Time (*PC*), s		0.0		0.0		38.0		0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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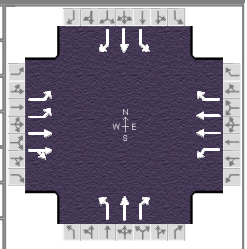
HCS7 Signalized Intersection Results Summary

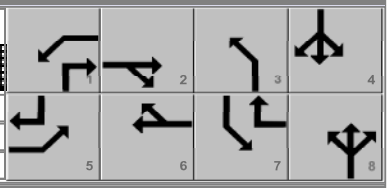
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	SAT Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 11:45
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1303	60	83	1429	21	107	10	62	23	13	59

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	2.2	75.4	3.5	1.9	8.0
Yellow	3.5	0.0	4.5	3.5	4.0	4.5
Red	0.0	0.0	1.5	0.0	0.0	1.5



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	9.5	81.4	11.7	83.6	13.0	19.9	7.0	14.0
Change Period, ($Y+R_c$), s	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Max Allow Headway (*MAH*), s	3.0	0.0	3.0	0.0	3.3	3.4	3.3	3.4
Queue Clearance Time (g_s), s	5.8		8.1		9.0	6.3	3.5	6.4
Green Extension Time (g_e), s	0.1	0.0	0.1	0.0	0.0	0.3	0.0	0.2
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	0.00		0.00		1.00	0.00	0.01	0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	109	729	721	88	1520	22	114	11	66	24	14	63
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1661	1796	1768	1711	1800	1522	1767	1953	1572	1767	1953	1572
Queue Service Time (g_s), s	3.8	17.2	18.9	6.1	16.0	0.6	7.0	0.6	4.3	1.5	0.8	4.4
Cycle Queue Clearance Time (g_c), s	3.8	17.2	18.9	6.1	16.0	0.6	7.0	0.6	4.3	1.5	0.8	4.4
Green Ratio (*g/C*)	0.05	0.63	0.63	0.07	0.65	0.68	0.16	0.12	0.18	0.10	0.07	0.12
Capacity (*c*), veh/h	166	1129	1111	116	2327	1029	275	226	289	205	130	183
Volume-to-Capacity Ratio (*X*)	0.655	0.646	0.649	0.759	0.653	0.022	0.414	0.047	0.228	0.120	0.106	0.343
Back of Queue (*Q*), ft/ln (95 th percentile)	76.8	203.3	208.1	127.5	160.8	8.3	143.5	13.3	78.3	31.6	18.5	81.6
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9	7.7	8.3	4.8	6.1	0.3	5.6	0.5	3.1	1.2	0.7	3.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.43	0.00	0.00	0.64	0.00	0.04	0.90	0.00	0.49	0.20	0.00	0.51
Uniform Delay (d_1), s/veh	56.0	5.0	5.7	55.0	4.0	6.4	45.5	47.2	41.7	49.7	52.7	48.8
Incremental Delay (d_2), s/veh	1.6	2.9	2.9	3.8	1.4	0.0	0.4	0.0	0.1	0.1	0.1	0.4
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	57.6	7.9	8.7	58.7	5.5	6.4	45.9	47.2	41.9	49.8	52.8	49.2
Level of Service (LOS)	E	A	A	E	A	A	D	D	D	D	D	D
Approach Delay, s/veh / LOS	11.7	B		8.4	A		44.6	D		49.8	D	
Intersection Delay, s/veh / LOS	13.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.07	B	2.24	B	2.46	B	2.47	B
Bicycle LOS Score / LOS	1.77	B	1.83	B	0.80	A	0.65	A

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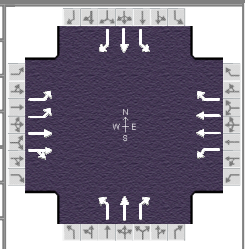
HCS7 Signalized Intersection Intermediate Values

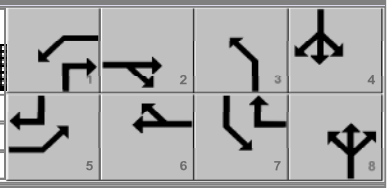
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	SAT Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 11:45
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 SAT.xus		
Project Description	Pride of St. Charles				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1303	60	83	1429	21	107	10	62	23	13	59

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	2.2	75.4	3.5	1.9	8.0
Yellow	3.5	0.0	4.5	3.5	4.0	4.5
Red	0.0	0.0	1.5	0.0	0.0	1.5



Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles and Grade Factor (f_{HVg})	0.945	0.945	1.000	0.945	0.945	0.945	0.977	0.977	0.977	0.977	0.977	0.977
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	0.971	1.000	1.000	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.984	0.984		0.000	0.847		0.000	0.847		0.000	0.847
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Work Zone Adjustment Factor (f_{wz})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
DDI Factor (f_{DDI})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Movement Saturation Flow Rate (s), veh/h	3322	3408	157	1711	3600	1522	1767	1953	1572	1767	1953	1572
Proportion of Vehicles Arriving on Green (P)	0.05	0.84	0.63	0.07	0.86	0.65	0.07	0.12	0.12	0.03	0.07	0.07
Incremental Delay Factor (k)	0.04	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.04	0.04

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	3.5	6.0	3.5	6.0	4.0	6.0	3.5	6.0
Green Ratio (g/C)	0.05	0.63	0.07	0.65	0.16	0.12	0.10	0.07
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0	1389	0	1393	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0	10.0	0.0	8.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0	7.2	0.0	8.0	0.0
Permitted Queue Service Time (g_{ps}), s					0.2		0.0	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln				1522		1572		1572
Protected Right Effective Green Time (g_R), s				3.5		8.2		6.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.389	0.000	1.557	0.000	1.710	0.000	1.710	0.000
Pedestrian F_s / F_{delay}	0.000	0.085	0.000	0.081	0.000	0.154	0.000	0.159
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1256.86	8.28	1293.02	7.50	231.72	46.90	132.98	52.29
Bicycle F_w / F_v	-3.64	1.29	-3.64	1.35	-3.64	0.31	-3.64	0.17

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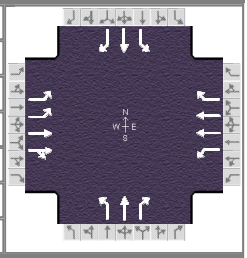
HCS7 Signalized Intersection Results Graphical Summary

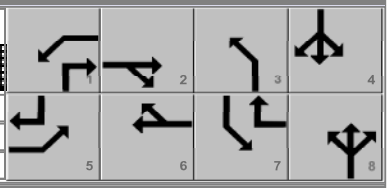
General Information				Intersection Information	
Agency	Eriksson Engineering			Duration, h	0.250
Analyst	SBC	Analysis Date	Nov 11, 2019	Area Type	Other
Jurisdiction	IDOT/St. Charles	Time Period	SAT Peak Hour	PHF	0.94
Urban Street	North Avenue (IL-64)	Analysis Year	2025	Analysis Period	1> 11:45
Intersection	North Avenue at Charles…	File Name	North-Mall 2025 SAT.xus		
Project Description	Pride of St. Charles				



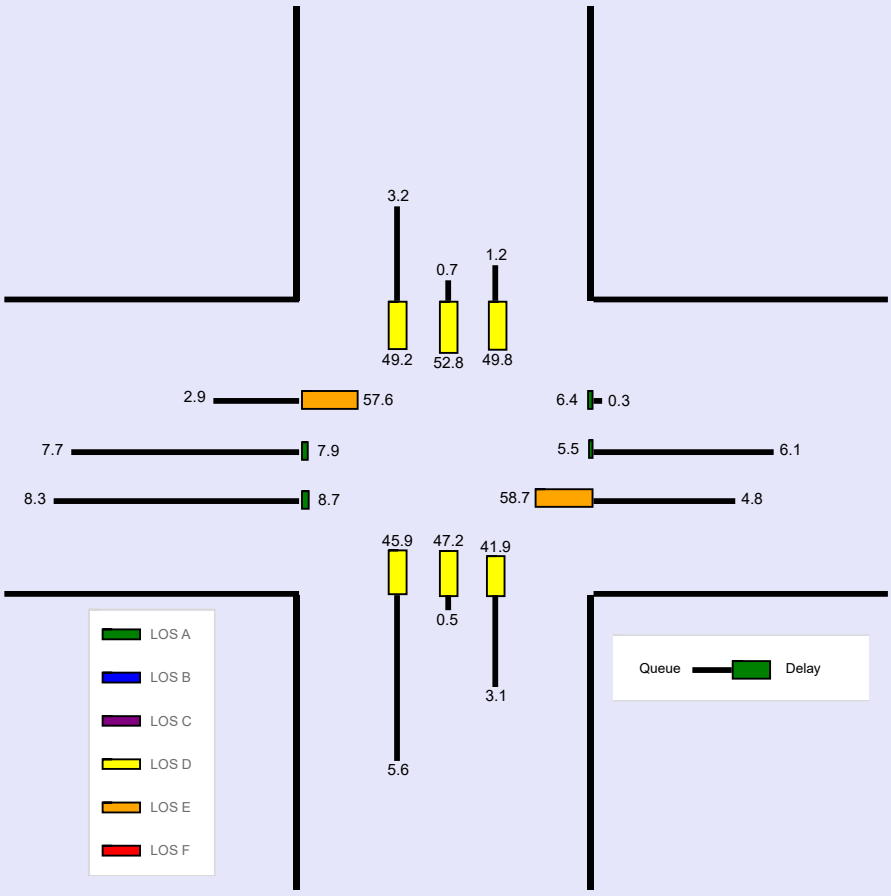
Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	102	1303	60	83	1429	21	107	10	62	23	13	59

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	2.2	75.4	3.5	1.9	8.0
Yellow	3.5	0.0	4.5	3.5	4.0	4.5
Red	0.0	0.0	1.5	0.0	0.0	1.5



Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Back of Queue (*Q*), ft/ln (95 th percentile)	76.8	203.3	208.1	127.5	160.8	8.3	143.5	13.3	78.3	31.6	18.5	81.6
Back of Queue (*Q*), veh/ln (95 th percentile)	2.9	7.7	8.3	4.8	6.1	0.3	5.6	0.5	3.1	1.2	0.7	3.2
Queue Storage Ratio (*RQ*) (95 th percentile)	0.43	0.00	0.00	0.64	0.00	0.04	0.90	0.00	0.49	0.20	0.00	0.51
Control Delay (*d*), s/veh	57.6	7.9	8.7	58.7	5.5	6.4	45.9	47.2	41.9	49.8	52.8	49.2
Level of Service (LOS)	E	A	A	E	A	A	D	D	D	D	D	D
Approach Delay, s/veh / LOS	11.7	B		8.4	A		44.6	D		49.8	D	
Intersection Delay, s/veh / LOS	13.0						B					



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--- Messages ---

No errors or warnings exist.

--- Comments ---

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Memorandum

TO: Daniel Soltis
CIMA Developers, LP

FROM: Stephen B. Corcoran, P.E., PTOE
Director of Traffic Engineering

DATE: April 27, 2020 **Revised June 25, 2020**

RE: PRIDE of Kane County
On-site Circulation
St. Charles, Illinois

This memorandum summarizes a review of the on-site circulation, site access, and car wash stacking requirements for the proposed PRIDE of Kane County gas station with a convenience store and tunnel carwash in St. Charles, Illinois. It is located on the southeast corner of North Avenue (IL 64) and Kirk Road. Three access drives are provided with a right-in and -out only drive on North Avenue and two internal drive connections with the adjacent Main Street Commons shopping center.

This memorandum provides supplemental information to original traffic study dated March 3, 2020 for the PRIDE of Kane County.

Existing and Total Traffic Volumes

For reference, the existing traffic volumes on the roads near the site are attached in **Figure 3** from the original report. The total traffic volumes are a combination of the existing traffic volumes, projected non-site growth in those volumes, and the site related traffic. These were combined with the gas station traffic volumes to generate the Year 2025 total traffic volumes which are shown on **Figure 8**.

Site Driveways

Capacity analyses were conducted for the three site driveways servicing the site to determine how well they will operate and the stacking at the stop signs. **Table 1** summarizes the results of the analyses. A copy of the capacity analyses is attached. Overall, each site driveway will operate at LOS D or better.

Right-In and –Out Drive on North Avenue

The proposed right-in and out driveway for the gas station will be located on the south side of North Avenue and designed with a pork chop island,16-foot inbound and outbound lanes, an eastbound right-turn lane, and an outbound stop sign. An additional 11.8 feet of the site along North Avenue will be dedicated to IDOT to accommodate the right-turn lane. The current median break for the existing driveway will need to be reconstructed as a barrier median. The outbound right-turn will operate well with up to two vehicles stacking at one time. The entry road between North Avenue and the east-west internal roadway is 105 feet long so outbound vehicles stacking at the stop sign will not impact internal site traffic.

Right-In and Left-Out Drive on the Main Street Commons Entrance Road

The gas station proposes to have a right-in and left-out only driveway on the Main Street Commons Entrance Road to allow site traffic to have access to the traffic signal on North Avenue. It will have 14-foot a right-turn inbound and left-out outbound lanes with paint striping and signage to prohibit right-turns out and left-turns in. Traffic exiting the gas station will operate at a level of service A or B with one vehicle stopped at the stop sign.

HCS7 Two-Way Stop-Control Report

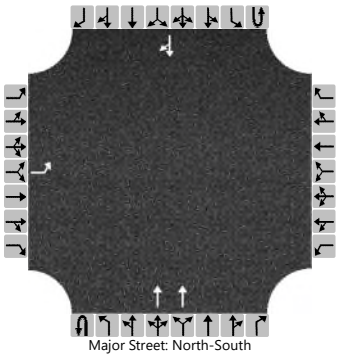
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	AM Peak Hour
Intersection Orientation	North-South
Project Description	PRIDE of Kane County

Site Information

Intersection	Main St Commons/Gas Dr
Jurisdiction	St Charles
East/West Street	PRIDE Driveway
North/South Street	Main Street Commons Entr
Peak Hour Factor	0.50
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	0		0	0	0	0	0	2	0	0	0	1	0
Configuration		L									T					TR
Volume (veh/h)		70									9				28	53
Percent Heavy Vehicles (%)		3														
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5														
Critical Headway (sec)		6.86														
Base Follow-Up Headway (sec)		3.5														
Follow-Up Headway (sec)		3.53														

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		140														
Capacity, c (veh/h)		862														
v/c Ratio		0.16														
95% Queue Length, Q_{95} (veh)		0.6														
Control Delay (s/veh)		10.0														
Level of Service (LOS)		A														
Approach Delay (s/veh)		10.0														
Approach LOS		A														

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HCS7 Two-Way Stop-Control Report

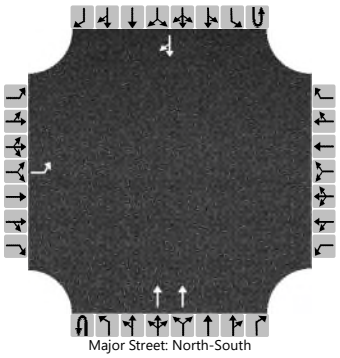
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	PM Peak Hour
Intersection Orientation	North-South
Project Description	PRIDE of Kane County

Site Information

Intersection	Main St Commons/Gas Dr
Jurisdiction	St Charles
East/West Street	PRIDE Driveway
North/South Street	Main Street Commons Entr
Peak Hour Factor	0.65
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	0		0	0	0	0	0	2	0	0	0	1	0
Configuration		L									T					TR
Volume (veh/h)		62									87				75	45
Percent Heavy Vehicles (%)		3														
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5														
Critical Headway (sec)		6.86														
Base Follow-Up Headway (sec)		3.5														
Follow-Up Headway (sec)		3.53														

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		95														
Capacity, c (veh/h)		749														
v/c Ratio		0.13														
95% Queue Length, Q_{95} (veh)		0.4														
Control Delay (s/veh)		10.5														
Level of Service (LOS)		B														
Approach Delay (s/veh)		10.5														
Approach LOS		B														

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HCS7 Two-Way Stop-Control Report

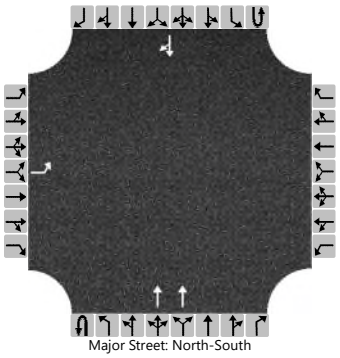
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	Sat. Peak Hour
Intersection Orientation	North-South
Project Description	PRIDE of Kane County

Site Information

Intersection	Main St Commons/Gas Dr
Jurisdiction	St Charles
East/West Street	PRIDE Driveway
North/South Street	Main Street Commons Entr
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	0		0	0	0	0	0	2	0	0	0	1	0
Configuration		L									T					TR
Volume (veh/h)		63									116				110	48
Percent Heavy Vehicles (%)		3														
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.5														
Critical Headway (sec)		6.86														
Base Follow-Up Headway (sec)		3.5														
Follow-Up Headway (sec)		3.53														

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		79														
Capacity, c (veh/h)		724														
v/c Ratio		0.11														
95% Queue Length, Q_{95} (veh)		0.4														
Control Delay (s/veh)		10.6														
Level of Service (LOS)		B														
Approach Delay (s/veh)		10.6														
Approach LOS		B														

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HCS7 Two-Way Stop-Control Report

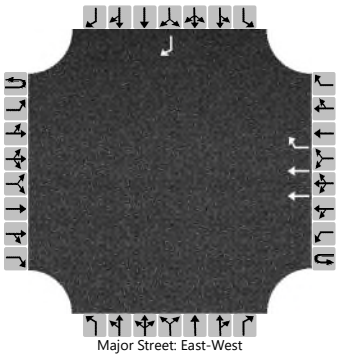
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	RIRO -Bank-On the Border
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume (veh/h)							1024	9								16
Percent Heavy Vehicles (%)																3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																6.9
Critical Headway (sec)																6.96
Base Follow-Up Headway (sec)																3.3
Follow-Up Headway (sec)																3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																17
Capacity, c (veh/h)																484
v/c Ratio																0.03
95% Queue Length, Q_{95} (veh)																0.1
Control Delay (s/veh)																12.7
Level of Service (LOS)																B
Approach Delay (s/veh)													12.7			
Approach LOS													B			

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HCS7 Two-Way Stop-Control Report

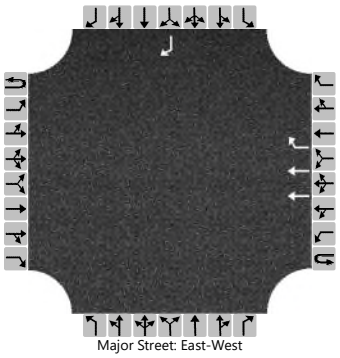
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	RIRO -Bank-On the Border
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume (veh/h)							1795	30								43
Percent Heavy Vehicles (%)																3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																6.9
Critical Headway (sec)																6.96
Base Follow-Up Headway (sec)																3.3
Follow-Up Headway (sec)																3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																46
Capacity, c (veh/h)																257
v/c Ratio																0.18
95% Queue Length, Q_{95} (veh)																0.6
Control Delay (s/veh)																22.0
Level of Service (LOS)																C
Approach Delay (s/veh)													22.0			
Approach LOS													C			

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HCS7 Two-Way Stop-Control Report

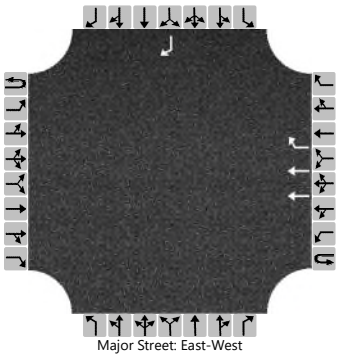
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/12/2019
Analysis Year	2017
Time Analyzed	Saturday Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	RIRO -Bank-On the Border
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume (veh/h)							1405	36								60
Percent Heavy Vehicles (%)																3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																6.9
Critical Headway (sec)																6.96
Base Follow-Up Headway (sec)																3.3
Follow-Up Headway (sec)																3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																63
Capacity, c (veh/h)																362
v/c Ratio																0.17
95% Queue Length, Q_{95} (veh)																0.6
Control Delay (s/veh)																17.0
Level of Service (LOS)																C
Approach Delay (s/veh)													17.0			
Approach LOS													C			

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HCS7 Two-Way Stop-Control Report

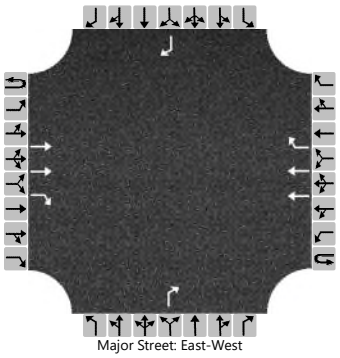
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	Pride+ Bank/PoSC Drive
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	2	1		0	0	1		0	0	1
Configuration			T	R			T	R				R				R
Volume (veh/h)			1674	121			1143	9				104				16
Percent Heavy Vehicles (%)												3				3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No				No				No				No		
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				6.9
Critical Headway (sec)												6.96				6.96
Base Follow-Up Headway (sec)												3.3				3.3
Follow-Up Headway (sec)												3.33				3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												109				17
Capacity, c (veh/h)												288				441
v/c Ratio												0.38				0.04
95% Queue Length, Q_{95} (veh)												1.7				0.1
Control Delay (s/veh)												25.0				13.5
Level of Service (LOS)												C				B
Approach Delay (s/veh)										25.0				13.5		
Approach LOS										C				B		

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HCS7 Two-Way Stop-Control Report

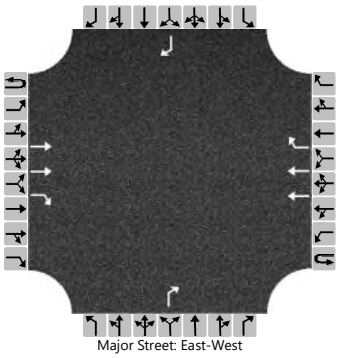
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	IDOT/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	Pride+ Bank/PoSC Drives
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	2	1		0	0	1		0	0	1
Configuration			T	R			T	R				R				R
Volume (veh/h)			1351	99			1979	9				82				43
Percent Heavy Vehicles (%)												3				3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				6.9
Critical Headway (sec)												6.96				6.96
Base Follow-Up Headway (sec)												3.3				3.3
Follow-Up Headway (sec)												3.33				3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												87				46
Capacity, c (veh/h)												369				221
v/c Ratio												0.24				0.21
95% Queue Length, Q_{95} (veh)												0.9				0.8
Control Delay (s/veh)												17.8				25.5
Level of Service (LOS)												C				D
Approach Delay (s/veh)									17.8				25.5			
Approach LOS									C				D			

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HCS7 Two-Way Stop-Control Report

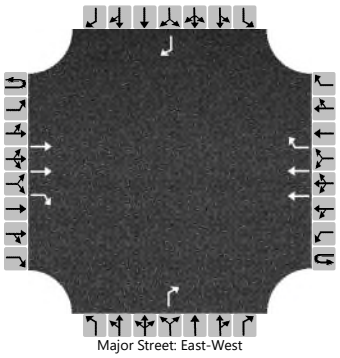
General Information

Analyst	SBC
Agency/Co.	EEA
Date Performed	11/11/2019
Analysis Year	2025
Time Analyzed	Saturday Peak Hour
Intersection Orientation	East-West
Project Description	Pride of St Charles

Site Information

Intersection	North Ave at RIRO
Jurisdiction	ID0T/St Charles
East/West Street	North Avenue (Rt 64)
North/South Street	Pride+Bank/PoSC Drives
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	2	1		0	0	1		0	0	1
Configuration			T	R			T	R				R				R
Volume (veh/h)			1383	99			1559	36				82				60
Percent Heavy Vehicles (%)												3				3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)												6.9				6.9
Critical Headway (sec)												6.96				6.96
Base Follow-Up Headway (sec)												3.3				3.3
Follow-Up Headway (sec)												3.33				3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												85				63
Capacity, c (veh/h)												368				320
v/c Ratio												0.23				0.20
95% Queue Length, Q_{95} (veh)												0.9				0.7
Control Delay (s/veh)												17.7				19.0
Level of Service (LOS)												C				C
Approach Delay (s/veh)									17.7				19.0			
Approach LOS									C				C			

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HCS7 Two-Way Stop-Control Report

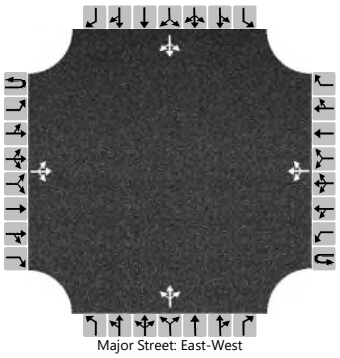
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2017
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.52
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	4	9		1	0	4		0	7	3		1	4	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				2					19				10	
Capacity, c (veh/h)		1606				1583					913				875	
v/c Ratio		0.00				0.00					0.02				0.01	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.0	
Control Delay (s/veh)		7.2				7.3					9.0				9.2	
Level of Service (LOS)		A				A					A				A	
Approach Delay (s/veh)		0.0				1.5				9.0				9.2		
Approach LOS										A				A		

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HCS7 Two-Way Stop-Control Report

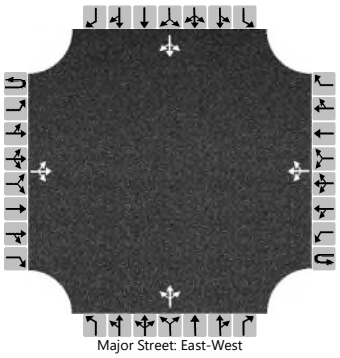
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.52
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	4	9		1	0	25		0	58	3		1	55	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				2					117				108	
Capacity, c (veh/h)		1553				1583					829				834	
v/c Ratio		0.00				0.00					0.14				0.13	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.5				0.4	
Control Delay (s/veh)		7.3				7.3					10.1				10.0	
Level of Service (LOS)		A				A					B				A	
Approach Delay (s/veh)	0.0				0.3				10.1				10.0			
Approach LOS									B				A			

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HCS7 Two-Way Stop-Control Report

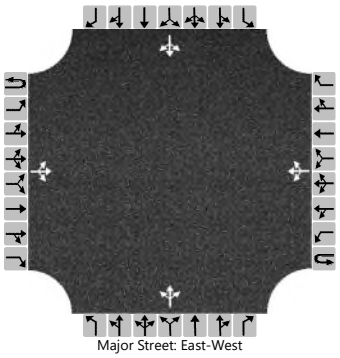
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2017
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.64
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	4	11		4	6	13		2	17	4		2	1	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				6					36				5	
Capacity, c (veh/h)		1577				1585					871				874	
v/c Ratio		0.00				0.00					0.04				0.01	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.0	
Control Delay (s/veh)		7.3				7.3					9.3				9.1	
Level of Service (LOS)		A				A					A				A	
Approach Delay (s/veh)	0.0				1.3				9.3				9.1			
Approach LOS									A				A			

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HCS7 Two-Way Stop-Control Report

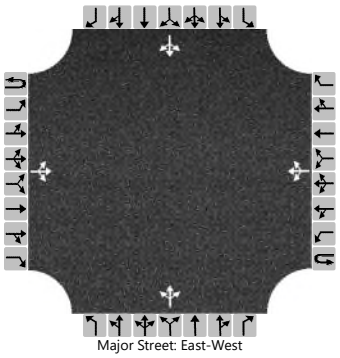
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.64
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	4	11		4	6	38		2	57	4		2	41	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				6					98				67	
Capacity, c (veh/h)		1526				1585					803				809	
v/c Ratio		0.00				0.00					0.12				0.08	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.4				0.3	
Control Delay (s/veh)		7.4				7.3					10.1				9.9	
Level of Service (LOS)		A				A					B				A	
Approach Delay (s/veh)		0.0				0.6				10.1				9.9		
Approach LOS										B				A		

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HCS7 Two-Way Stop-Control Report

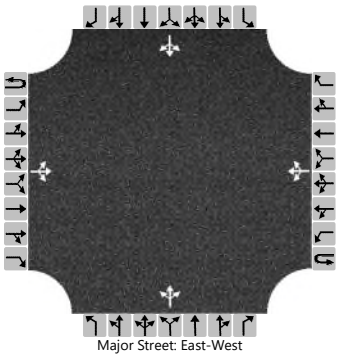
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2017
Time Analyzed	Sat Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.68
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	1	3		10	0	8		1	12	5		6	22	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				15					26				41	
Capacity, c (veh/h)		1601				1609					896				856	
v/c Ratio		0.00				0.01					0.03				0.05	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.1				0.2	
Control Delay (s/veh)		7.2				7.3					9.1				9.4	
Level of Service (LOS)		A				A					A				A	
Approach Delay (s/veh)		0.0				4.1				9.1				9.4		
Approach LOS										A				A		

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HCS7 Two-Way Stop-Control Report

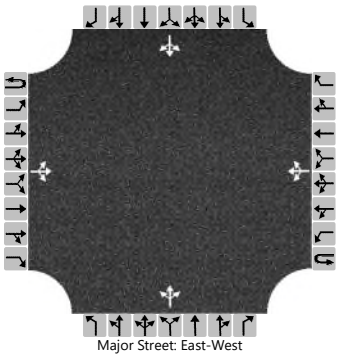
General Information

Analyst	SBC
Agency/Co.	Eriksson Engineering
Date Performed	4/21/2020
Analysis Year	2025
Time Analyzed	Sat Peak
Intersection Orientation	East-West
Project Description	PRIDE of Kane County

Site Information

Intersection	Panda/Bank/ Main St
Jurisdiction	St Charles
East/West Street	Bank/Main St East
North/South Street	Panda/Main St South
Peak Hour Factor	0.68
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	1	3		10	0	43		1	53	5		6	63	0
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				15					87				101	
Capacity, c (veh/h)		1533				1609					803				812	
v/c Ratio		0.00				0.01					0.11				0.12	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.4				0.4	
Control Delay (s/veh)		7.3				7.3					10.0				10.1	
Level of Service (LOS)		A				A					B				B	
Approach Delay (s/veh)	0.0				1.4				10.0				10.1			
Approach LOS									B				B			

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TABLE 17.24-3
REQUIRED OFF-STREET PARKING

USE	PARKING REQUIREMENT
Bank	4 per 1,000sf of GFA + 5 stacking per drive-in lane & ATM lane when there are 3 or less such lanes, or 4 stacking spaces per drive-in lane & ATM lane when there are 4 or more such lanes
Carpet Store	3 per 1000 sf of GFA
Car Wash, Automatic	2 per bay + 10 stacking spaces per bay
Car Wash, Manual/Hand Wash	1 per 2 bays + 2 stacking spaces per bay Where employees operate the vehicle in and out of the bay, and wash the vehicle in the bay, (hand-wash), no stacking is required, but the number of required parking spaces shall be increased by 1 per bay
Coffee or Tea Room	5 per 1,000sf of GFA
Day Care Center	3.5 per 1000 sf of GFA
Drive-Through Facility, except as specifically listed elsewhere	5 stacking spaces per drive-in service lane
Electronics Superstore	3 per 1000 sf of GFA
Financial Institution	4 per 1,000sf of GFA
Furniture Store	3 per 1000 sf of GFA
Gas Station (with or without retail sales of goods other than motor vehicle fuels)	1 per service bay + 4 per 1,000sf of GFA, provided that the number of required spaces may be reduced by the number of fuel pumps that can be accessed at any one time
Greenhouse/Plant Nursery	1 per 1,000sf of GFA + 3 per 1,000sf of outdoor sales area
Heavy Retail and Service	3 per 1,000sf of GFA + 3 per 1,000sf of outdoor sales area
Home Improvement Center	3 per 1,000sf of GFA + 4 per 1,000sf of outdoor sales area
Hotel/Motel	1 per room In CBD-1 & CBD-2, 1 per 4 lodging rooms
Kennel	1 per 1,000sf of GFA
Laundromat	2 per 1,000sf of GFA
Live Entertainment	10 per 1,000sf of GFA
Medical Cannabis Dispensing Organization	3 per 1,000 of GFA
Motor Vehicle Rental	3 per 1,000sf of GFA
Motor Vehicle Sales and Leasing	3 per 1,000sf of GFA (no required parking spaces shall be used for the display or storage of vehicles for sale or lease)
Motor Vehicle Service and Repair, Major or Minor	2 per service bay + 2 per 1,000sf of GFA