



# Study Report

Dakota Dunes/N. Sioux City Planning Study  
Operations Analysis and Recommendations

*Dakota Dunes and North Sioux City, SD*  
January 23, 2018



# **Dakota Dunes/North Sioux City Planning Study**

Dakota Dunes and North Sioux City, South Dakota  
January, 2018

Prepared for:

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City of North Sioux City  
Dakota Dunes Community Improvement District  
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# EXECUTIVE SUMMARY

The communities of Dakota Dunes and North Sioux City have partnered with the Sioux Interstate Metropolitan Planning Council (SIMPCO) and the South Dakota Department of Transportation (SDDOT), to study their primary roadways and plan roadway improvements that will provide proper transportation service through the year 2040. This study is a special effort within the ongoing transportation planning process conducted by SIMPCO for the metropolitan area including Sioux City, Iowa, and the surrounding cities, counties, and communities.

Data was gathered at locations throughout Dakota Dunes and North Sioux City and the data was used to analyze existing traffic operations and safety. Conditions were also forecast for the years of 2022 (five-year build condition) and 2040. The results of the analysis comprised a short list of deficiencies, concerns, and needs to coordinate community planning and enhance traffic flow.

Alternatives were developed to address the identified future transportation needs. Those alternatives were vetted through discussions with the Study Advisory Team and community. The results of those discussions are the recommendations contained in this report:

## Dakota Dunes

- Short-term (0-5 years)
  - Complete roundabout project at 2 River Dr. and Cottonwood Dr. – around 5 years to complete project. Project will be needed when the interim development plan is completed.
- Short to Mid-term (5-15 years)
  - Dakota Dunes will work to replace curb ramps along Dakota Dunes Blvd. as projects allow, getting all street ramps upgraded to meet ADA guidelines.
- Long-term (15-25 years)
  - Monitor the intersection of Dakota Dunes Blvd. and Sioux Point Rd. to ensure LOS is adequate to support traffic.

## North Sioux City

- Short-term (0-5 years)
  - Continue to coordinate with landowners/developers to prepare a plan for relocating Sioux Point Rd. and Streeter Dr. to connect to Sodrac Dr. so the frontage road connections near the Exit 2 interchange can be removed.
- Short to mid-term (5-15 years)
  - Remove frontage road connections prior to signal at SB ramp terminal at Exit 2.
  - Construct turn lanes on Northshore Dr. to reduce queuing and improve operations at school driveways.
  - Implement median on River Dr. at S. Derby Ln.

- Long-term (15-25 years)
  - Either reconstruct Northshore Dr. as 3-lane or construct new street along the north side of schools that connects to Exit 4.

### SDDOT

- Short-term (0-5 years)
  - Consider adding second northbound left turn lane at Exit 1 ramp terminal.
- Short to mid-term (5-15 years)
  - Monitor southbound off ramp terminal at Exit 2 for signal.
  - Consider options for southbound ramp terminal at Exit 4. North Sioux City has endorsed roundabout concept.
  - Monitor signal warrants at Exit 4 northbound ramp terminal.
- Long-term (15-25 years)
  - Monitor interchange and bridge conditions at Exits 2 and 4 to determine when improvements are needed. These will be considered during Decennial Study in 2020 and 2030.

# INTRODUCTION

## Background

The communities of Dakota Dunes and North Sioux City have partnered with the Sioux Interstate Metropolitan Planning Council (SIMPCO) and the South Dakota Department of Transportation (SDDOT), to study their primary roadways and plan roadway improvements that will provide proper transportation service through the year 2040. This study is a special effort within the ongoing transportation planning process conducted by SIMPCO for the metropolitan area including Sioux City, Iowa, and the surrounding cities, counties, and communities.

## Purpose

Interstate 29 is the primary transportation facility through North Sioux City and Dakota Dunes, carrying a large portion of daily commuting traffic along with regular through traffic. The arterial and collector roadways that connect to I-29 also experience periodic congestion associated with the local commuting traffic. This study evaluates the level of safety and congestion on those arterial and collector streets and develops improvements to enhance safety and reduce congestion through the 2040 horizon year.

## Project Location

The focus of this study is on four roadways that connect to I-29:

- Northshore Drive in North Sioux City via Exit 4
- River Drive in North Sioux City via Exit 2
- Dakota Dunes Boulevard in Dakota Dunes via Exit 1
- Sioux Point Road/Streeter Drive in both communities between Exits 1 and 4

The study area is shown in **Figure 1**.

Several intersections have been identified for specific analysis. They include:

- Sioux Point Road/Steamboat Drive
- Sioux Point Road/Tower Road
- Sioux Point Road/Dakota Dunes Boulevard
- Dakota Dunes Boulevard/Cottonwood Lane
- Dakota Dunes Boulevard/I-29 NB
- Dakota Dunes Boulevard/I-29 SB
- Dakota Dunes Boulevard/Courtyard Drive
- Dakota Dunes Boulevard/Levee Trail
- Dakota Dunes Boulevard/Meadows Boulevard
- Dakota Dunes Boulevard/Pinehurst Trail
- River Drive/Sodrac Drive
- River Drive/Sioux Point Road
- River Drive/I-29 SB
- River Drive/I-29 NB
- River Drive/South Derby Lane



- River Drive/North Derby Lane
- Northshore Drive/Westshore Drive
- Northshore Drive/West High School driveway
- Northshore Drive/Middle High School driveway
- Northshore Drive/East High School driveway
- Northshore Drive West Elementary School driveway
- Northshore Drive/East Elementary School driveway
- Northshore Drive/Penrose Drive
- Northshore Drive/Streeter Drive
- Northshore Drive/I-29 SB
- Northshore Drive/I-29 NB
- Northshore Drive/Military Road
- Northshore Drive/Highway 105

The locations of the analysis intersections are shown in **Figures 2-4**.

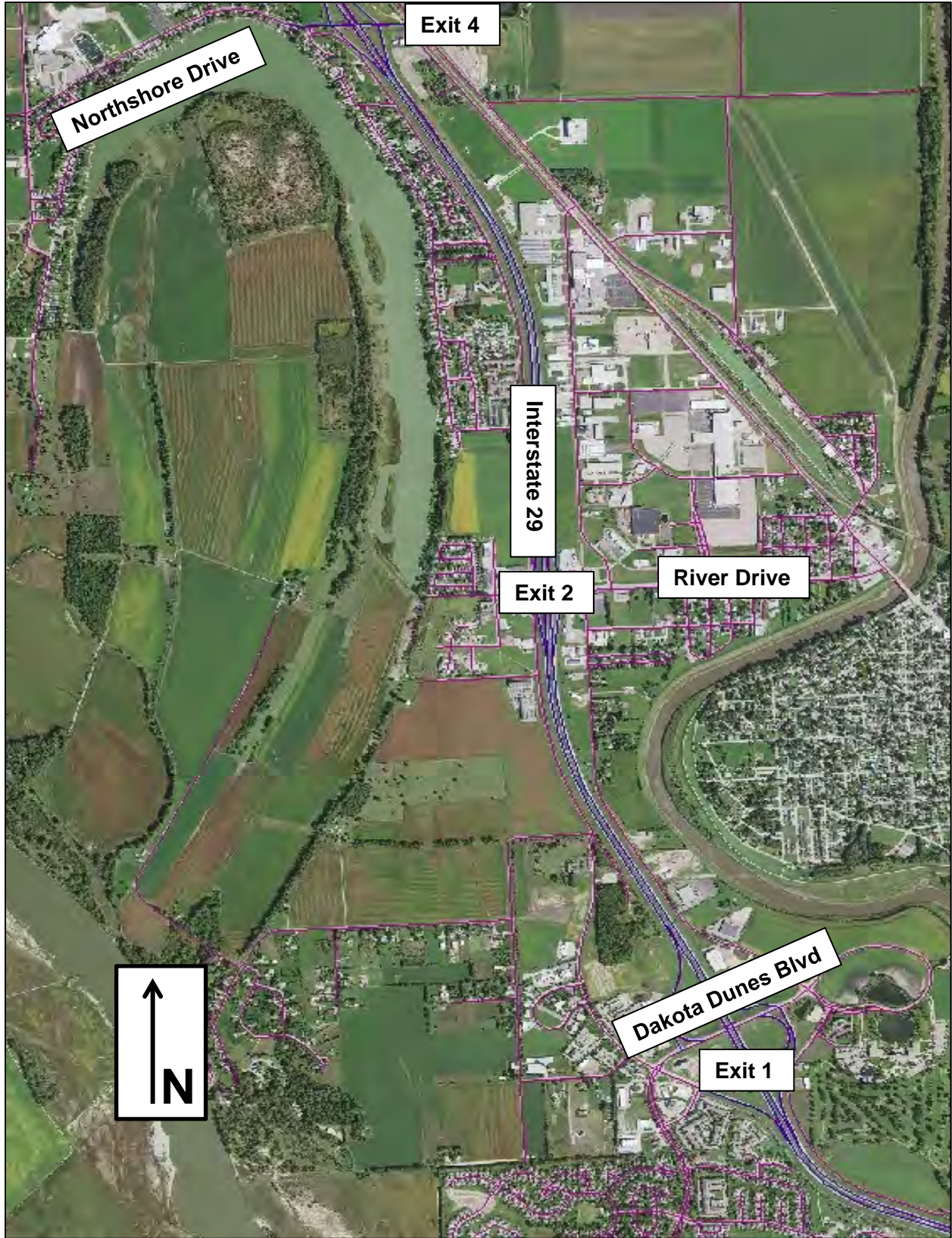
### **Data Gathering**

New turning movement counts were collected at the study analysis intersections and geometric data was gathered through field investigation. Specific field observations were conducted at the following locations:

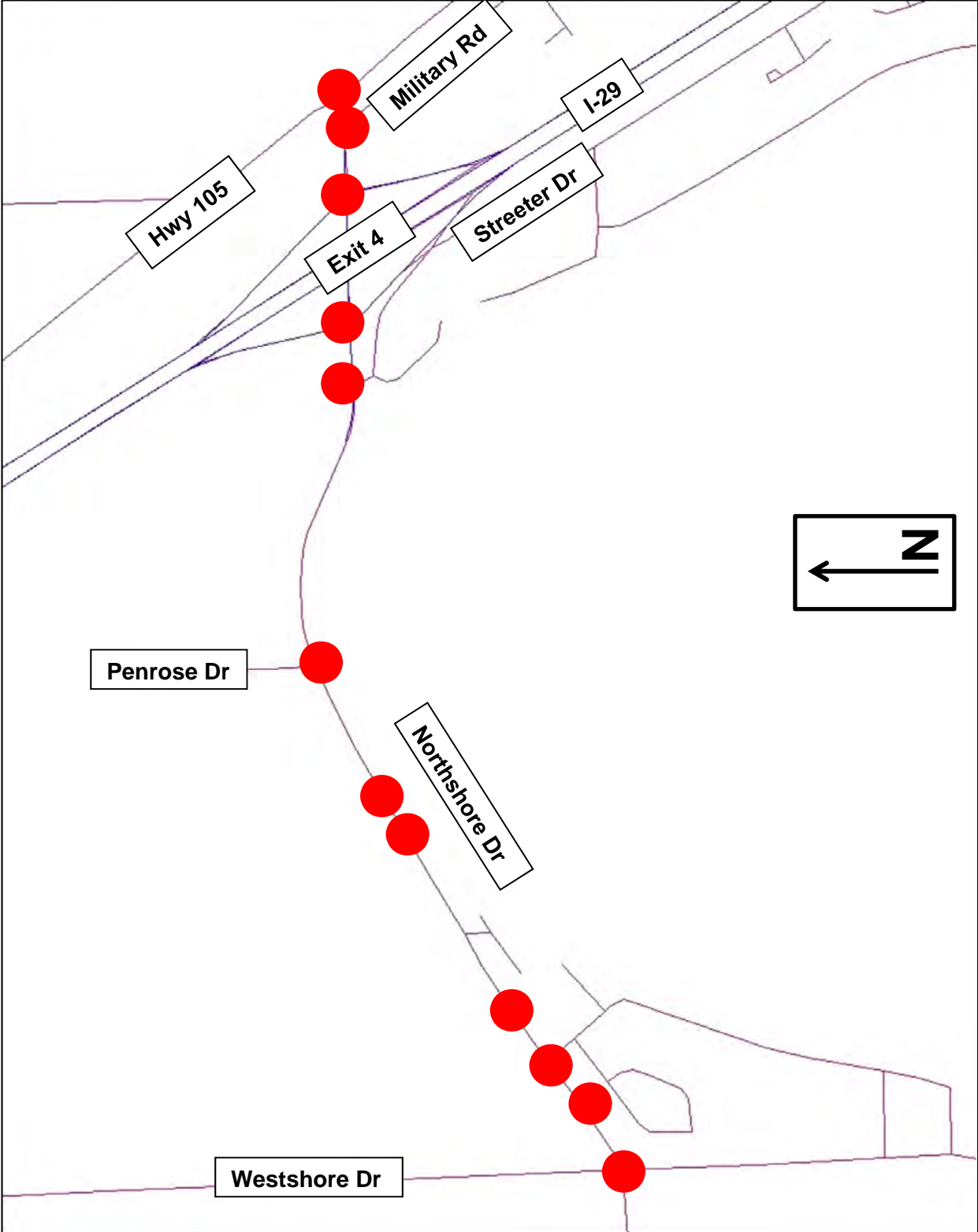
- School vehicular demand and pedestrian conflicts at school driveways on Northshore Drive
- Pedestrian demand and behavior at intersections on Dakota Dunes Boulevard

### **Methods and Assumptions**

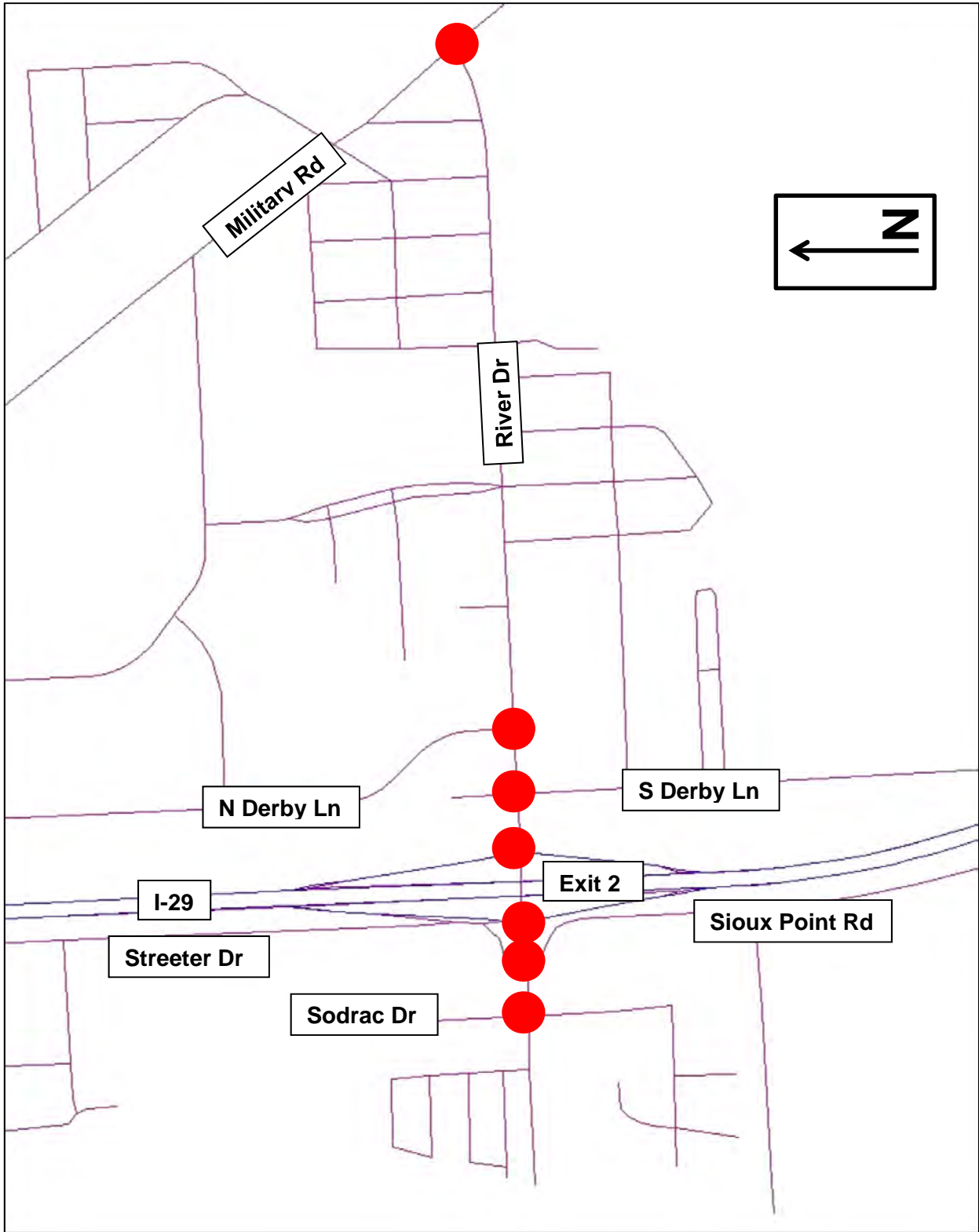
The methods and assumptions employed in study analysis were addressed in a Methods and Assumptions Memorandum. A copy of the memorandum is included in the Appendix.



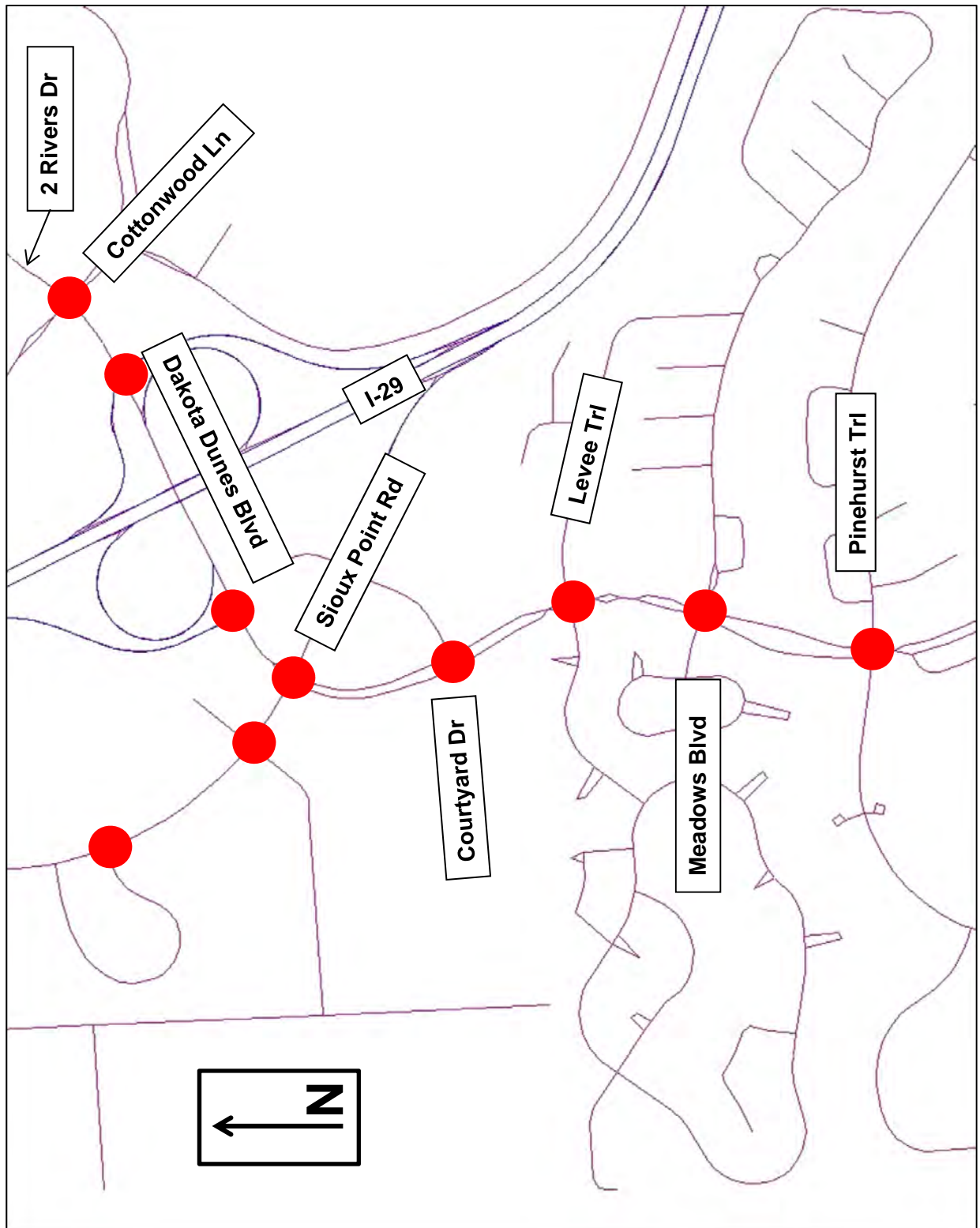
**Figure 1 – Study Area**



**Figure 2 – Study Area Analysis Intersections – Northshore Drive**



**Figure 3 – Study Area Analysis Intersections – River Drive**



**Figure 4 – Study Area Analysis Intersections – Dakota Dunes Blvd**

## Existing Conditions Analysis

The safety and operation of the existing study area roadways were analyzed to determine locations that may be in need of improvement. The analysis included evaluation of crash records, observations of vehicular demand and pedestrian conflicts on Northshore Drive in the vicinity of schools, observations of pedestrian behavior on Dakota Dunes Boulevard and level of service analysis at study area intersections.

### Crash Analysis

Crash records were provided by SDDOT in a geodatabase for the study area. The crash records were analyzed to produce crash record summaries and crash maps for the study area intersections which are provided in the Appendix.

The crash records showed that crash incidence at all the study area intersections was low, with most intersections experiencing 0-1 crashes per year. The crash rates were so low that there was insufficient data to determine any crash trends or produce a statistical analysis of critical crash rates in the study area. An overall summary of the crashes per year at the study area intersections is shown in **Table 1**.

### School Observation

An observation was conducted on April 18, 2017 at the Elementary and High School driveways on Northshore Drive. The intent of the observation was to identify the demand of vehicles to enter and leave the schools, identify potential conflicts between students and vehicles, identify needed changes in traffic control, and identify other needed roadway changes due to the presence of the schools adjacent to Northshore Drive.

The observation resulted in these findings:

- The lack of a left turn lane on Northshore Drive causes occasional backups as drivers wait to enter the schools.
- The exiting vehicle queues at the schools can be in excess of 10 vehicles at peak times.
- Signal warrants should be reviewed for the school driveways.
- There are no school-crossing signs installed at the crosswalk flasher at the Elementary School.

A follow-up analysis of the traffic signal warrants for the Elementary and High School driveways showed that traffic signals are not currently warranted at any of these locations.

### Pedestrian Observation

An observation was conducted on April 20, 2017 along Dakota Dunes Boulevard to identify potential problems with the existing pedestrian facilities. The observation resulted in these findings:

- Pedestrian demand to cross Dakota Dunes Boulevard is light – only 2 pedestrians attempted to cross during a 35 minute observation period.

- There are no gaps between vehicles during peak hours to allow a pedestrian to completely cross Dakota Dunes Boulevard. The pedestrians that did cross made a 2-stage crossing with a wait in the median. While the study area intersections don't comply with warrants for traffic signals, other pedestrian devices may be used. Such devices may include crosswalks with special signs and markings, and pedestrian-activated warning beacons.
- There are additional pedestrians that use the Dakota Dunes Boulevard facilities without crossing the street.
- The sidewalks along Dakota Dunes Boulevard are not fully compliant with the Americans with Disabilities Act (ADA). A program should be prepared for updating the sidewalks to comply with the ADA.



**The Americans with Disabilities Act (ADA) requires specified slopes, landing areas, and tactile warning devices at intersections.**



**A rolled-curb transition no longer complies with the ADA.**

**TABLE 1 - INTERSECTION CRASHES**  
**DAKOTA DUNES/NORTH SIOUX CITY TRAFFIC STUDY**

INTERSECTION	YEAR					TOTAL
	2012	2013	2014	2015	2016	
SIOUX POINT RD/STEAMBOAT DR	0	0	0	0	0	0
SIOUX POINT RD/TOWER RD	0	1	0	0	1	2
SIOUX POINT RD/DAKOTA DUNES BLVD	0	1	1	2	1	5
DAKOTA DUNES BLVD/COTTONWOOD LN	0	1	1	0	0	2
DAKOTA DUNES BLVD/I-29 NB	0	0	2	2	0	4
DAKOTA DUNES BLVD/I-29 SB	1	0	1	0	0	2
DAKOTA DUNES BLVD/COURTYARD DR	0	0	1	2	2	5
DAKOTA DUNES BLVD/LEVEE TRL	0	1	0	0	4	5
DAKOTA DUNES BLVD/MEADOWS BLVD	0	0	0	1	1	2
DAKOTA DUNES BLVD/PINEHURST TRL	0	0	0	1	1	2
RIVER DR/SODRAC DR	0	0	0	0	0	0
RIVER DR/SIOUX POINT RD	2	0	0	1	1	4
RIVER DR/I-29 SB	0	0	0	0	1	1
RIVER DR/I-29 NB	2	1	1	1	1	6
RIVER DR/S DERBY LN	0	1	3	0	1	5
RIVER DR/N DERBY LN	0	1	1	1	0	3
RIVER DR/MILITARY RD	3	0	0	1	0	4
NORTHSHORE DR/WESTSHORE DR	0	1	0	0	0	1
NORTHSHORE DR/WEST HIGH SCHOOL DRIVEWAY	0	0	0	0	0	0
NORTHSHORE DR/MIDDLE HIGH SCHOOL DRIVEWAY	0	1	0	0	0	1
NORTHSHORE DR/EAST HIGH SCHOOL DRIVEWAY	0	0	0	0	1	1
NORTHSHORE DR/WEST ELEMENTARY SCHOOL DRIVEWAY	0	0	0	0	0	0
NORTHSHORE DR/EAST ELEMENTARY SCHOOL DRIVEWAY	0	0	0	0	0	0
NORTHSHORE DR/PENROSE DR	0	0	0	0	0	0
NORTHSHORE DR/STREETER DR	0	0	1	0	0	1
NORTHSHORE DR/I-29 SB	0	0	0	0	0	0
NORTHSHORE DR/I-29 NB	0	0	0	1	0	1
NORTHSHORE DR/MILITARY RD	0	0	0	1	1	2
NORTHSHORE DR/OLD SD 105	0	0	0	0	2	2



## Operations Analysis

The existing operations at the study area intersections were evaluated using Highway Capacity Manual techniques in HCS 7 software. The Highway Capacity Manual is published by the Transportation Research Board of the National Academies of Science and Engineering and has been recognized by the Federal Highway Administration as the standard for evaluation of intersection operations.

Observations of traffic volumes provide an understanding of the general nature of traffic, but are insufficient to indicate either the ability of the street network to carry additional traffic or the quality of service provided by the street system. For this reason, the concept of *level of service* (LOS) was developed to correlate numerical traffic operational data to subjective descriptions of traffic performance at intersections. Each lane of traffic has delay associated with it and therefore a correlating LOS. The delay for each of these lanes leads to the calculation of the LOS for the entire intersection. LOS categories range from LOS “A” (best) to “F” (worst) as shown in **Table 2**.

**Table 2: Level of Service Description**

Level of Service	SIGNALIZED Intersection Control Delay (sec.)	UNSIGNALIZED Intersection Control Delay (sec.)	Intersection LOS Description
A	<=10.0	<=10.0	Free flow, insignificant delays.
B	10.1-20.0	10.1-15.0	Stable operation, minimal delays.
C	20.1-35.0	15.1-25.0	Stable operation, acceptable delays.
D	35.1-55.0	25.1-35.0	Restricted flow, regular delays.
E	55.1-80.0	35.1-50.0	Maximum capacity, extended delays. Volumes at or near capacity. Long queues form upstream from intersection.
F	>80.0	>50.0	Forced flow, excessive delays. Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections.

Source: *Highway Capacity Manual*, Transportation Research Board, 2010

The operations analysis shows that three ramp terminal intersections have a low enough level of service to indicate the need for future improvement:

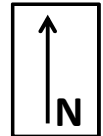
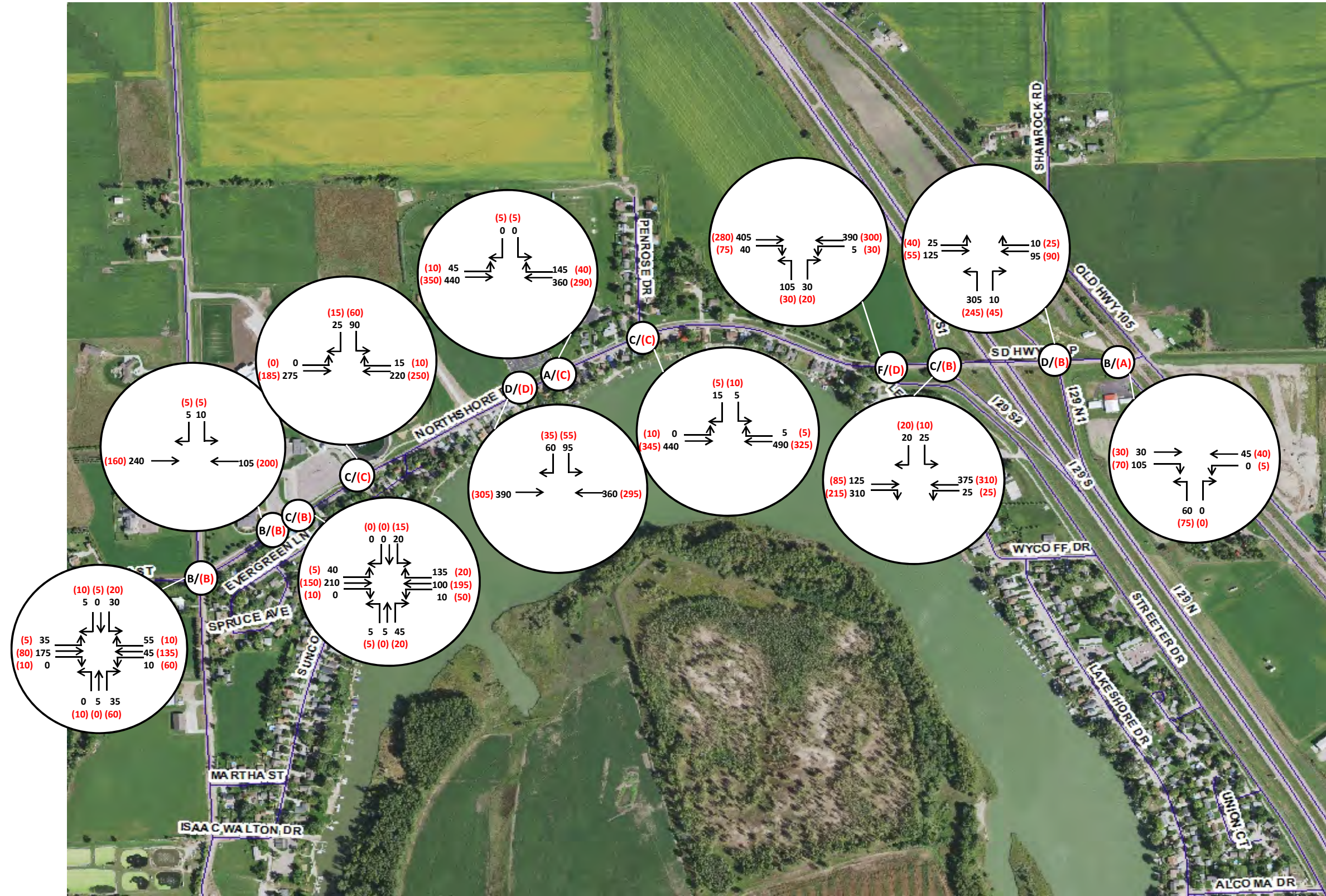
- Northshore Drive/I-29 NB – LOS D at stopped approach
- River Drive/I-29 SB – LOS F at stopped approach
- Dakota Dunes/I-29 NB – LOS E at signalized approach

Four intersections on the arterial/collector street system also have a level of service that may indicate a long-term need for improvement:

- Northshore Drive/Streeter Drive – LOS F at stopped approach

- River Drive/Sioux Point Road – LOS F at stopped approach
- Dakota Dunes Boulevard/Cottonwood Lane – LOS E at stopped approach
- Dakota Dunes Boulevard/Levee Trail – LOS E at stopped approach

Concepts will be developed for study area improvements later in this report. The current peak hour traffic volumes and levels of service are shown in **Figures 5-7**.

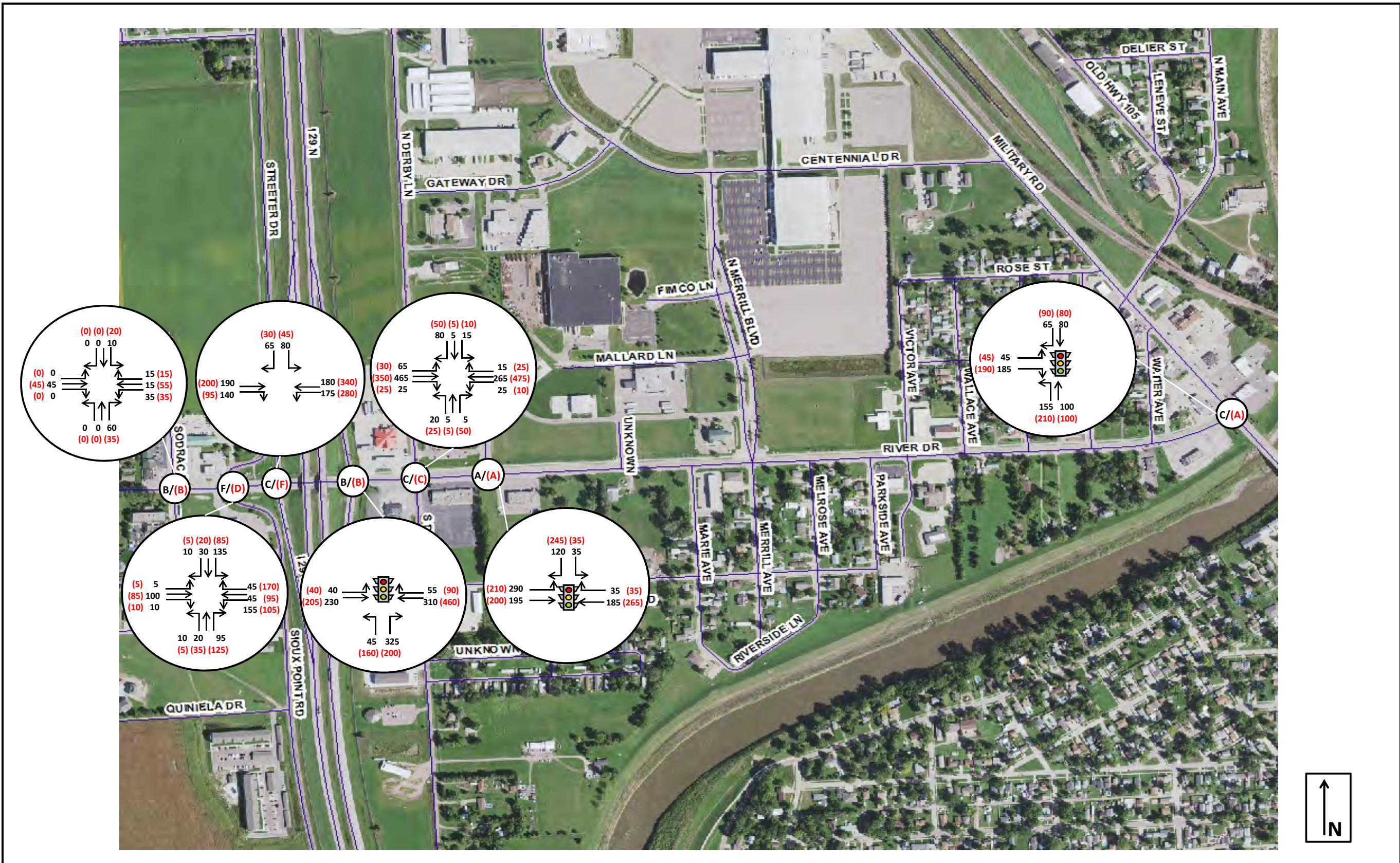


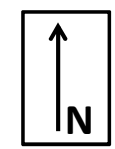
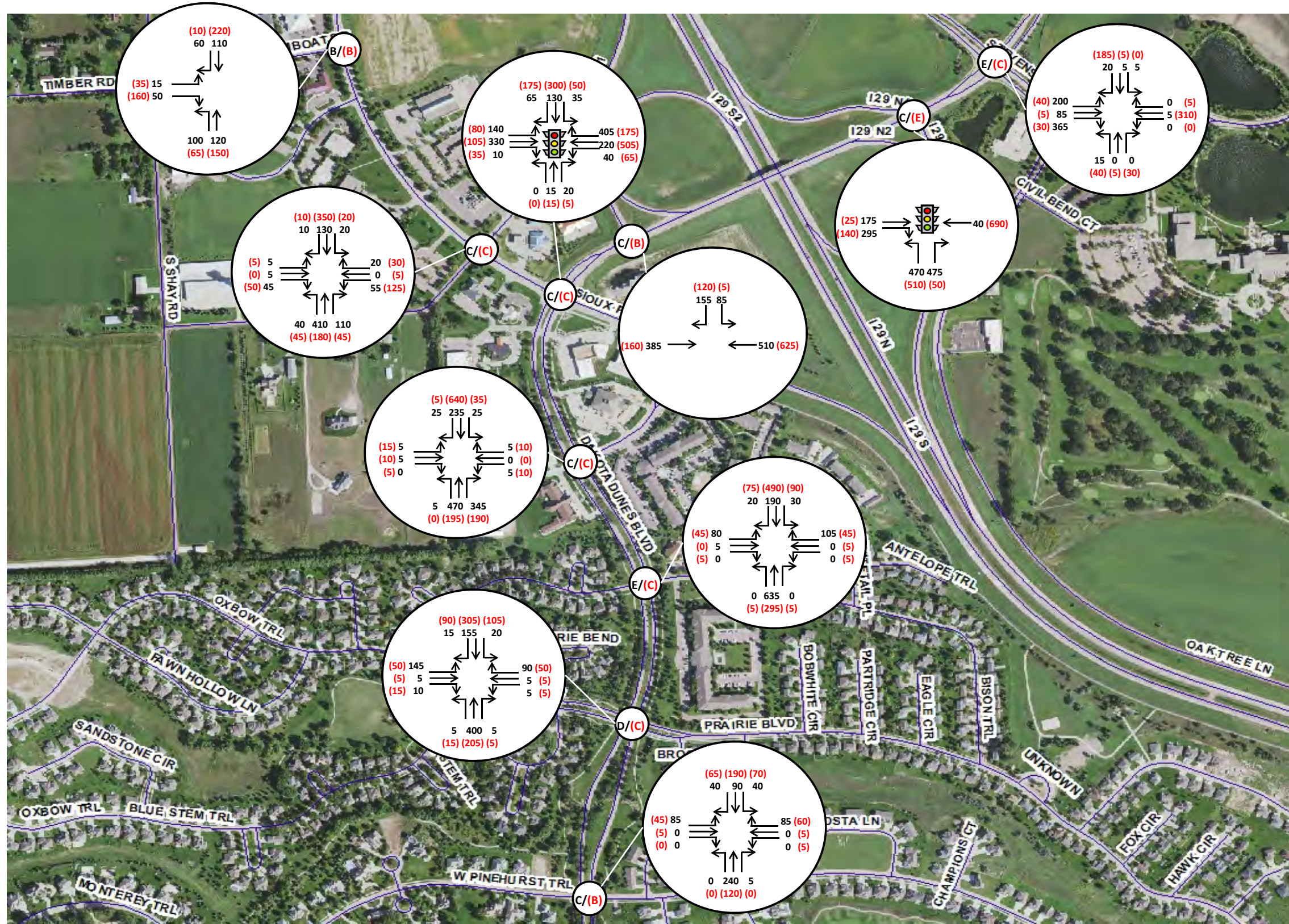
DAKOTA DUNES/NORTH SIOUX CITY  
PLANNING STUDY

NORTHSHORE DRIVE  
EXISTING PEAK HOUR TRAFFIC VOLUMES  
AND LEVEL OF SERVICE

OCTOBER 10, 2017

FIGURE 5





DAKOTA DUNES/NORTH SIOUX CITY  
PLANNING STUDY

DAKOTA DUNES BLVD/SIOUX PT RD  
EXISTING PEAK HOUR TRAFFIC VOLUMES  
AND LEVEL OF SERVICE

OCTOBER 10, 2017

FIGURE 7

## FUTURE YEAR CONDITIONS ANALYSIS

Traffic demand was forecast for two future time periods: 2022 and 2040. The 2022 scenario represents the build-out of currently planned development within the study area and was determined using trip generation rates published in the Institute of Transportation Engineers *Trip Generation Manual* (9<sup>th</sup> Edition, 2012). The 2040 scenario represents land use development within the planning horizon and was developed using the regional travel demand model maintained and operated by SIMPCO. The forecast traffic volumes were applied to the existing street system for analysis in this section of the report to determine future transportation deficiencies. Alternatives to correct those future deficiencies are addressed in the next section of the report.

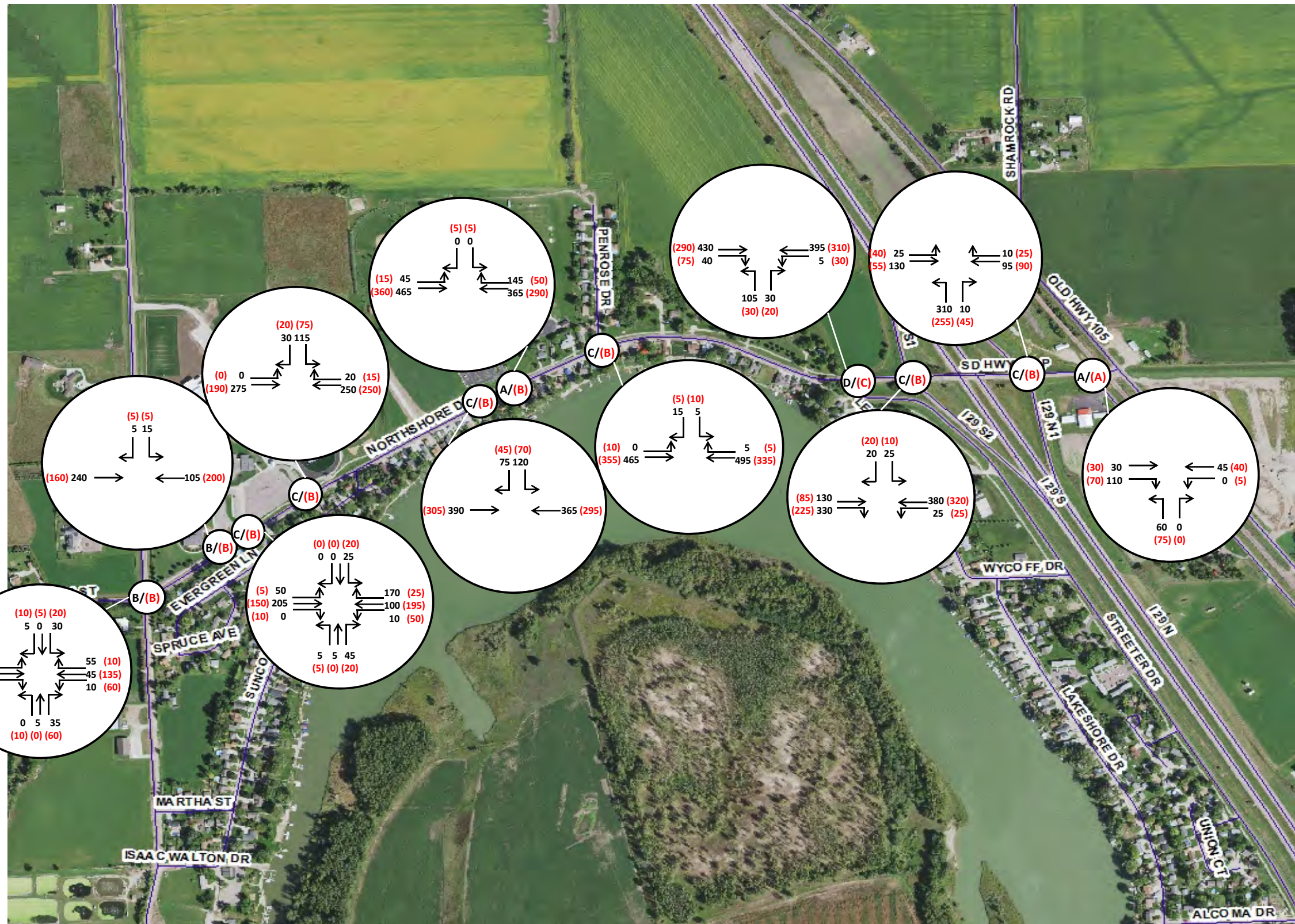
Both the 2022 and 2040 scenarios with the existing street system showed level of service results similar to the existing conditions scenario. The following Interstate ramp terminal intersections showed levels of service needing improvement as they resulted in LOS “D” or worse:

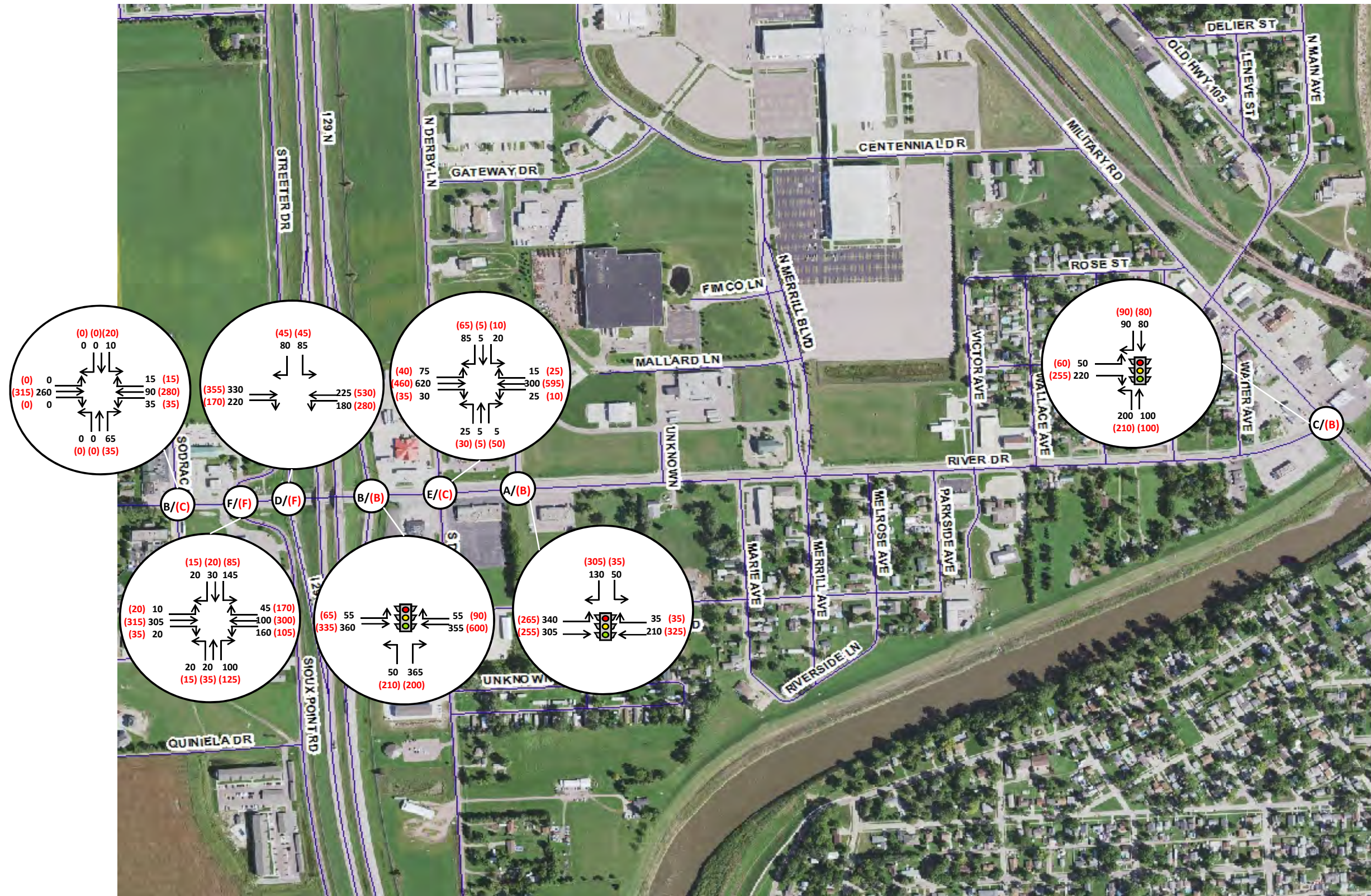
- River Drive/I-29 SB
- Dakota Dunes/I-29 NB

The following arterial/collector street intersections showed levels of service needing improvement:

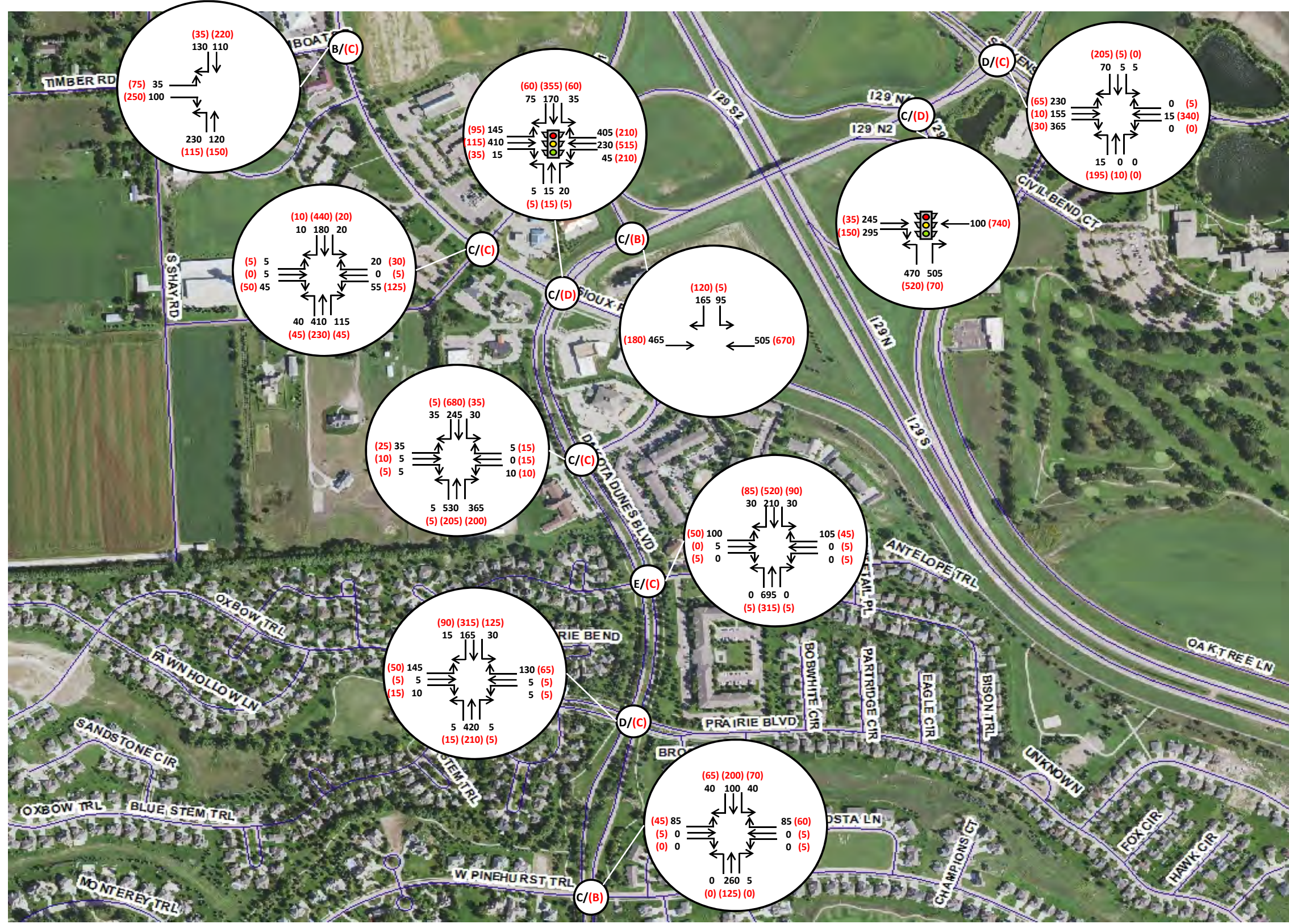
- Northshore Drive/Streeter Drive
- River Drive/Sioux Point Road
- Dakota Dunes Boulevard/Cottonwood Lane
- Dakota Dunes Boulevard/Levee Trail

Peak hour turning movement volumes and levels of service for the 2022 and 2040 scenarios with the existing street system are shown in **Figures 8 – 13**.







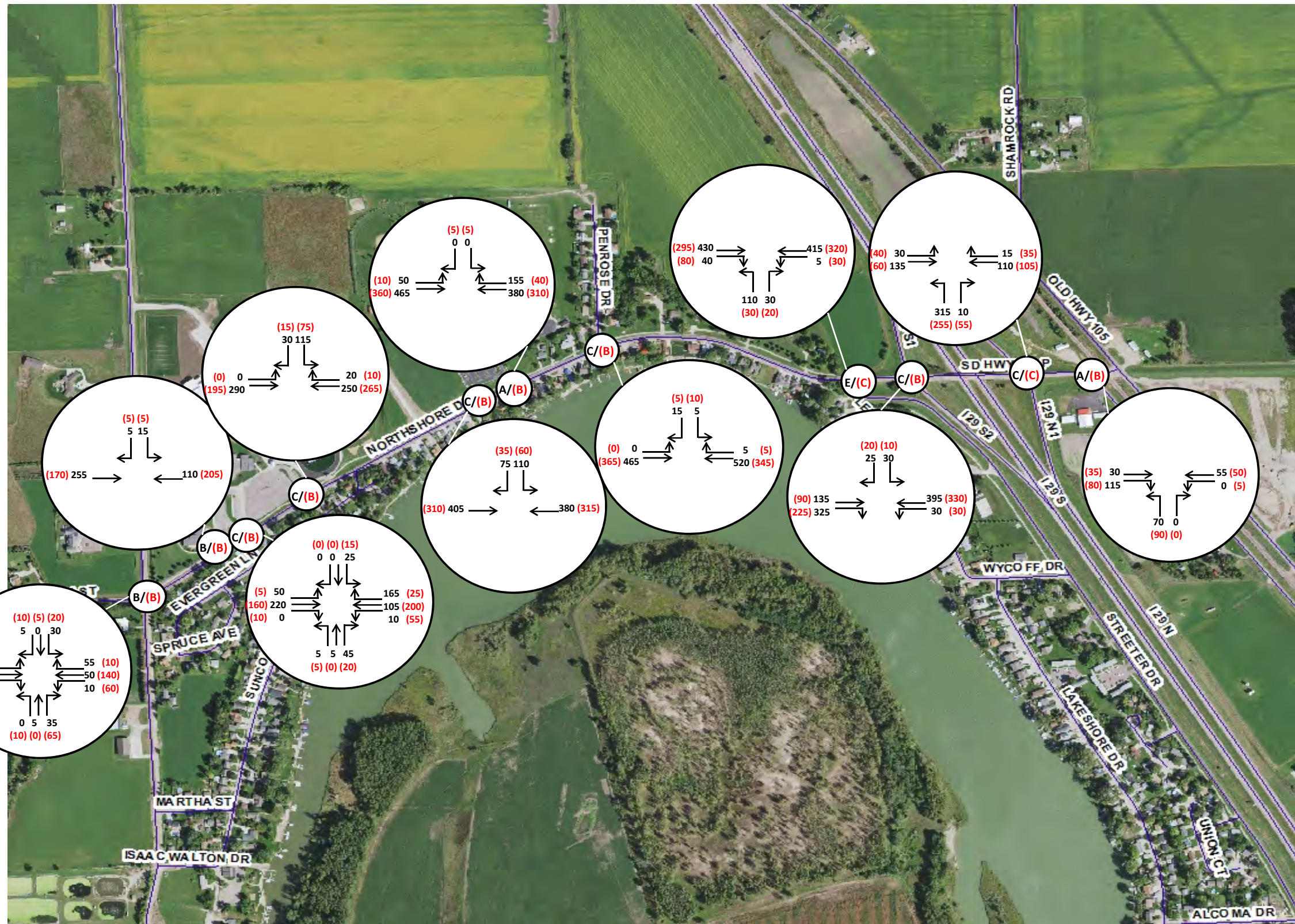


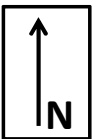
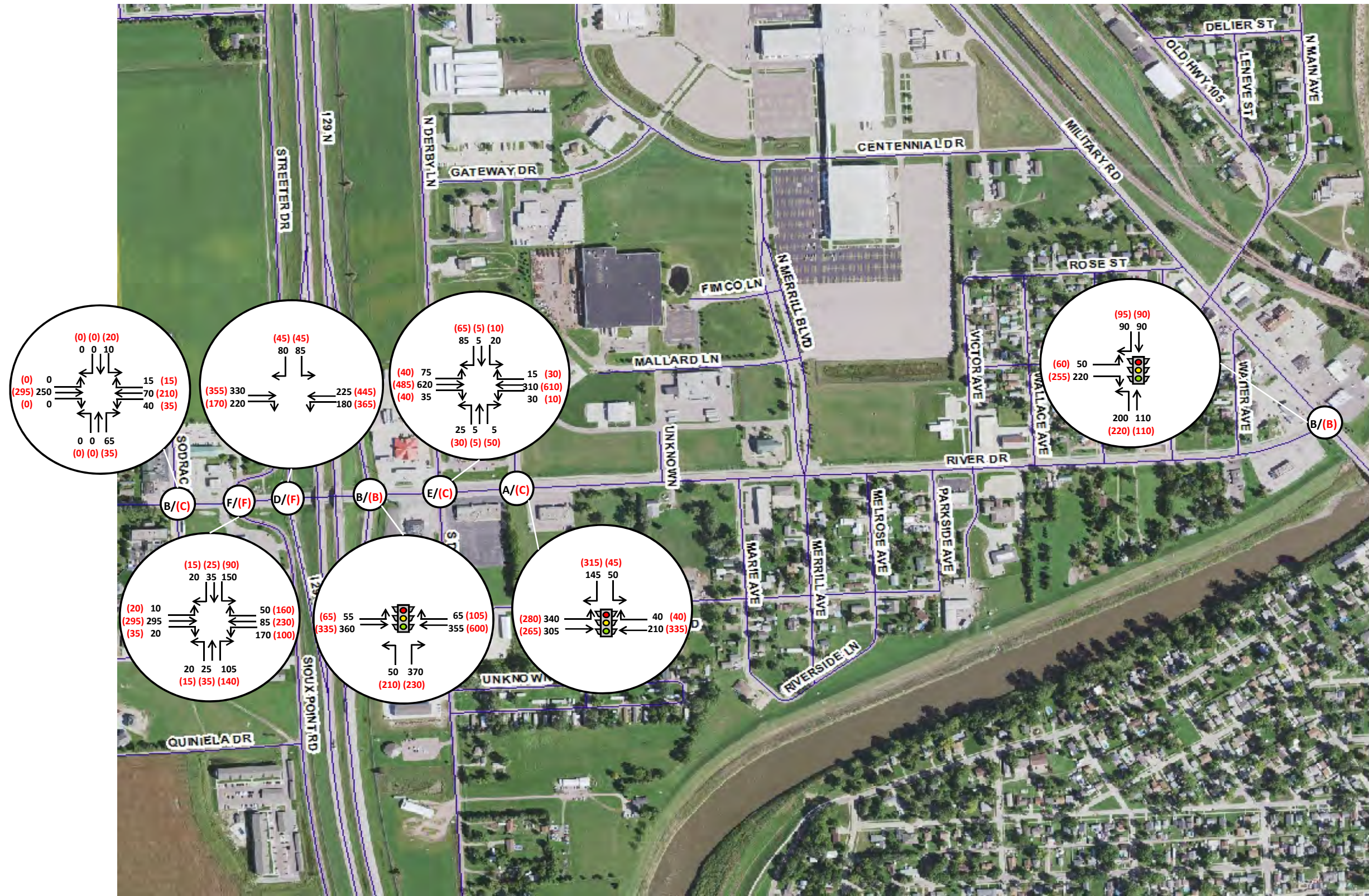
DAKOTA DUNES/NORTH SIOUX CITY  
PLANNING STUDY

DAKOTA DUNES BLVD./SIOUX POINT RD.  
2022 PEAK HOUR TRAFFIC VOLUMES  
AND LEVEL OF SERVICE

OCTOBER 10, 2017

FIGURE 10



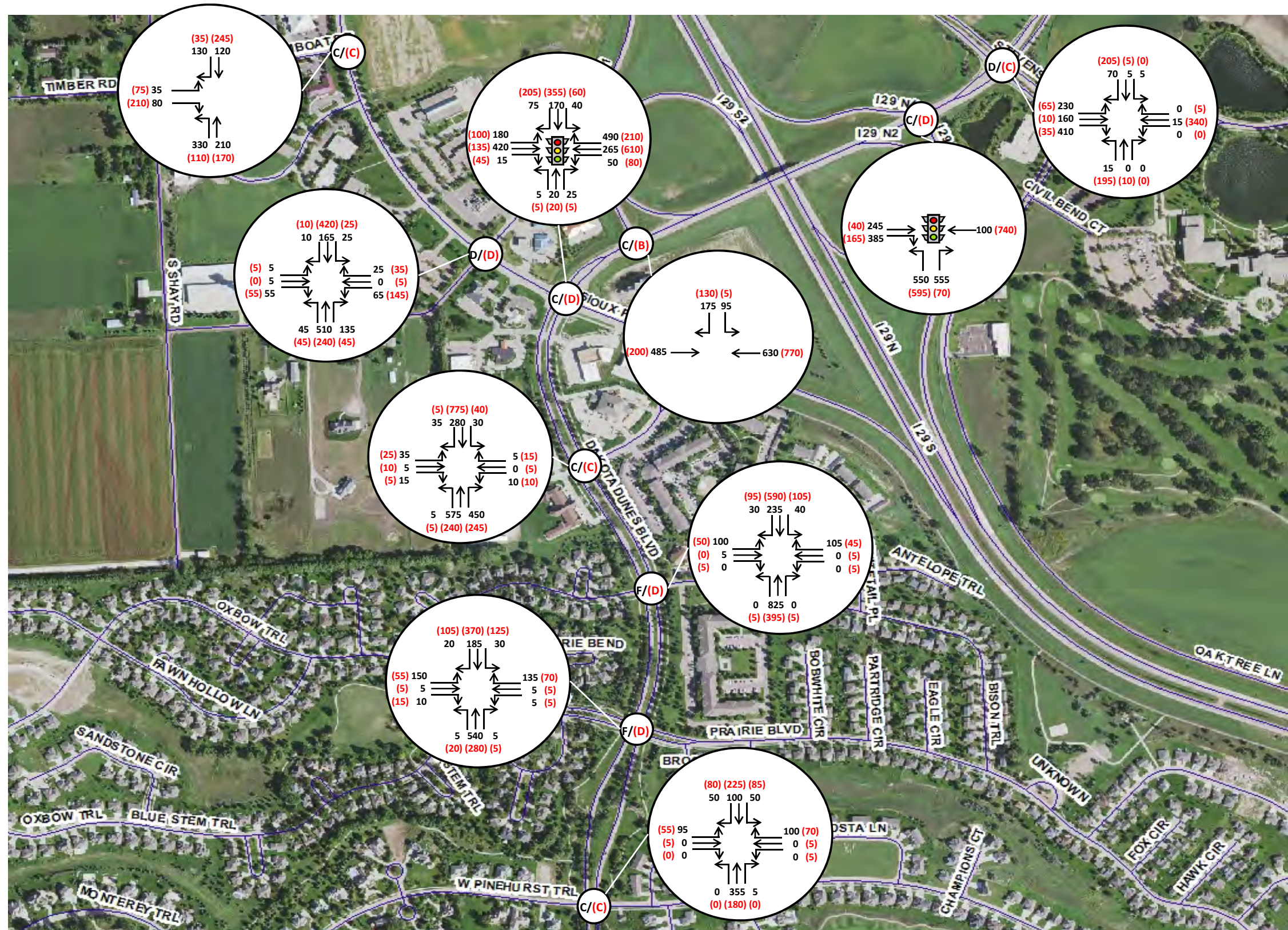


DAKOTA DUNES/NORTH SIOUX CITY  
PLANNING STUDY

RIVER DRIVE  
2040 PEAK HOUR TRAFFIC VOLUMES  
AND LEVEL OF SERVICE

OCTOBER 10, 2017

FIGURE 12



DAKOTA DUNES/NORTH SIOUX CITY  
PLANNING STUDY

DAKOTA DUNES BLVD./SIOUX POINT RD.  
2040 PEAK HOUR TRAFFIC VOLUMES  
AND LEVEL OF SERVICE

OCTOBER 10, 2017

FIGURE 13

## Alternatives Development

A number of roadway improvement alternatives were developed to address the capacity deficiencies identified in the intersection analysis, to address public concerns, to coordinate with other community planning efforts, and enhance traffic flow. The improvement alternatives are each described below and shown in **Figures Alt 1 – Alt 14**.

### Alternative 1:

Alternative 1 realigns Cottonwood Lane to provide better spacing between Cottonwood Lane and the I-29 northbound ramp terminal. The additional space between intersections will allow for smoother lane transitions, greater vehicle stacking, and enhance the ability to signalize the Cottonwood Lane/2 Rivers Drive intersection in the future.

### Alternative 2:

Alternative 2 realigns Cottonwood Lane to provide better spacing between Cottonwood Lane and the I-29 northbound ramp terminal and provides a roundabout intersection at Cottonwood Lane/2 Rivers Drive. This alternative provides many of the advantages of Alternative 1, while providing a roundabout intersection that will operate more safely and efficiently than a signalized intersection under the expected conditions.

### Alternative 3:

Alternative 3 provides a roundabout at the current location of Cottonwood Lane and 2 Rivers Drive. The roundabout allows the intersection to remain at its current location. Concerns exist with traffic growth between the I-29 NB ramp and Cottonwood Lane.

### Alternative 4:

Alternative 4 provides an additional left turn lane for the northbound off-ramp from I-29 to 2 Rivers Drive. The additional lane will provide less delay and queuing for ramp traffic.

### Alternative 5:

Alternative 5 provides additional lanes for westbound and southbound through traffic at Dakota Dunes Boulevard/Sioux Point Road. The additional lanes will reduce delay and queuing for all intersection users.

### Alternative 6:

Alternative 6 shows two options for re-aligning the frontage road and the Sioux Point Rd./Shay Rd. intersection. The existing intersection creates driver confusion and the proposed intersection will create a cleaner connection between the Dakota Dunes and North Sioux City communities.

#### Alternative 7:

Alternative 7 shows various options for realigning Sioux Point Road to connect to Sodrac Drive in North Sioux City. The realignment will create a cleaner connection between the Dakota Dunes and North Sioux City communities and will create greater spacing between the collector street intersection and the I-29 interchange at River Drive.

#### Alternative 8:

Similar to Alternative 7, Alternative 8 shows a realignment of Street Drive to connect to Sodrac Drive. The realignment will create a cleaner connection for north-south traffic and will create greater spacing between the collector street intersection and the I-29 interchange at River Drive.

#### Alternative 9:

Alternative 9 involved construction of a median on River Drive in the vicinity of the South Derby Lane intersection. The median will enhance safety by eliminating left turns and improve the level of service at the River Drive/South Derby Lane intersection.

#### Alternative 10:

Alternative 10 creates a dedicated northbound left turn lane for the River Drive/Military Road intersection. The left turn lane should enhance intersection safety.

#### Alternative 11:

Alternative 11 replaces the existing southbound diamond ramps at the I-29/Northshore Drive interchange with a folded diamond configuration. The southbound off-ramp will be realigned to the west to create a new terminal intersection at Streeter Drive. The southbound on-ramp will loop in the northwest quadrant of the interchange. The new ramp configuration would allow creation of a signalized intersection and would improve expected delay at the existing Streeter Drive intersection. The design geometric aligns Streeter Drive with the southbound off-ramp, but still presents level of service concerns.

#### Alternative 12:

Alternative 12 redirects traffic west of the Exit 4 interchange to a new east-west dike road that has been proposed to protect area development from flooding. The proposed dike road would provide direct access to the north side of the school properties further to the west. Traffic from Streeter Drive would be connected directly to Northshore Drive, eliminating the existing intersection.

#### Alternative 13:

Alternative 13 would create a single-lane roundabout intersection at the southbound ramp terminal at the Exit 4 interchange. The roundabout would allow direct connection of Streeter Drive, eliminating much of the existing delay and enhancing safety.

Alternative 14:

Alternative 14 would improve Northshore Drive to a 3-lane section due to the turning traffic and number of driveways. This assumes the Dike road alternative is not constructed.



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DATE  
**12/20/17**

EXHIBIT NUMBER  
**1**





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SHEET TITLE  
**DAKOTA DUNES / N. SIOUX CITY TRAFFIC STUDY**

DATE  
**12/20/17**

EXHIBIT NUMBER  
**2**



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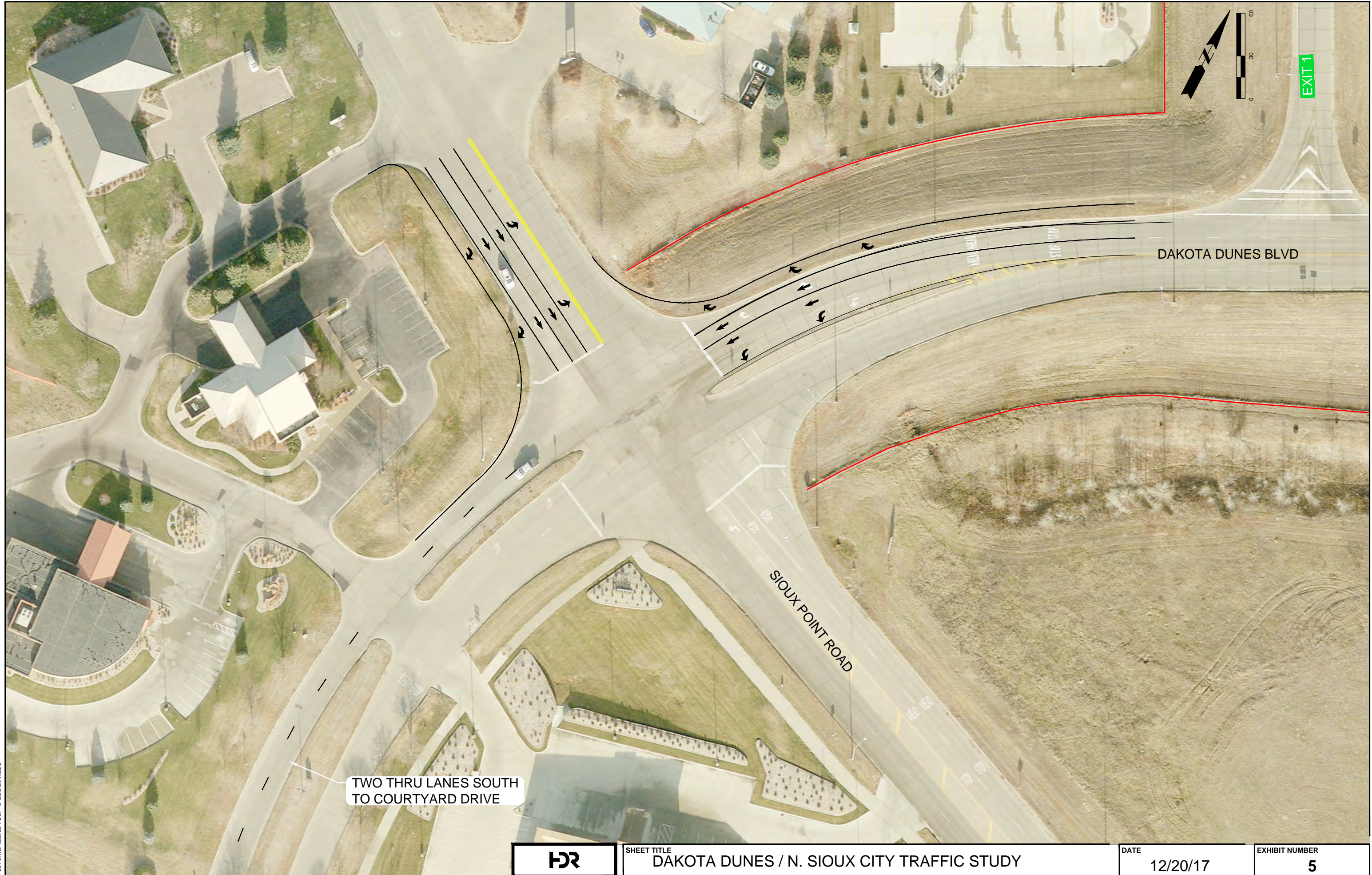
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**DAKOTA DUNES / N. SIOUX CITY TRAFFIC STUDY**

DATE  
**12/20/17**

EXHIBIT NUMBER  
**4**



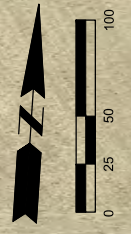
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 Barrenman, Heather



SHEET TITLE  
**DAKOTA DUNES / N. SIOUX CITY TRAFFIC STUDY**

DATE  
**12/20/17**

EXHIBIT NUMBER  
**5**



RE-ALIGNMENT OF SIOUX POINT ROAD

OPTION 1

OPTION 2

N. SHAY ROAD

S. FRONTAGE ROAD

I-29

I-29

SIOUX POINT ROAD

IF OPTION 1 IS USED, REMOVE REST OF S. FRONTAGED ROAD.

OPTION 1



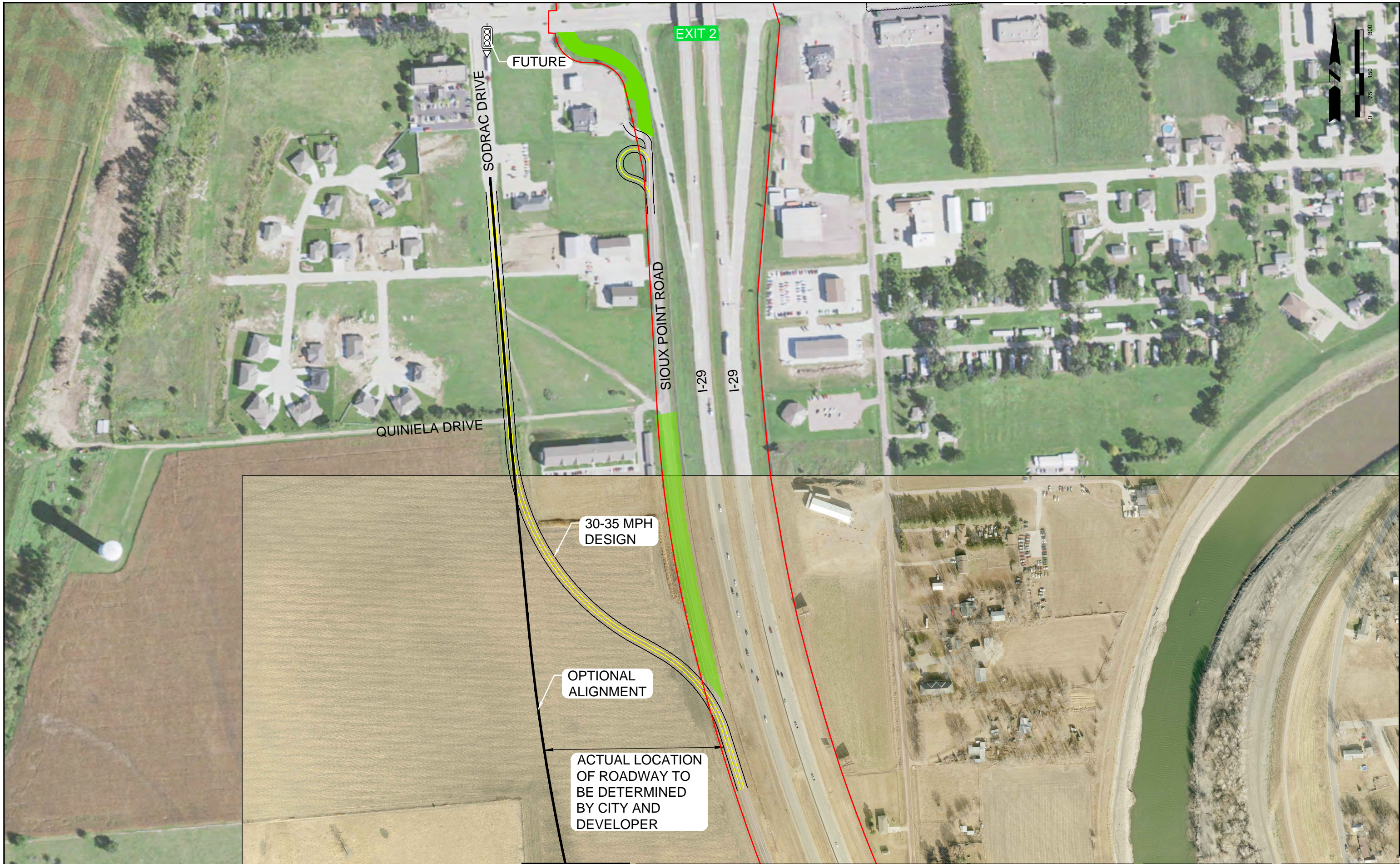
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DAKOTA DUNES / N. SIOUX CITY TRAFFIC STUDY

DATE  
12/20/17

EXHIBIT NUMBER  
6

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PLOT DATE: 12/20/17 2:07 PM Brennan, Heather

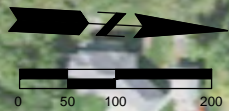
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PLOT DATE: 12/20/17 2:07 PM Burman, Heather



SHEET TITLE  
DAKOTA DUNES / N. SIOUX CITY TRAFFIC STUDY

DATE  
12/20/17

EXHIBIT NUMBER  
7



SODRAC DRIVE

FUTURE

30-35 MPH  
DESIGN SPEED

STREETER DRIVE

I29

I29

EXIT 2

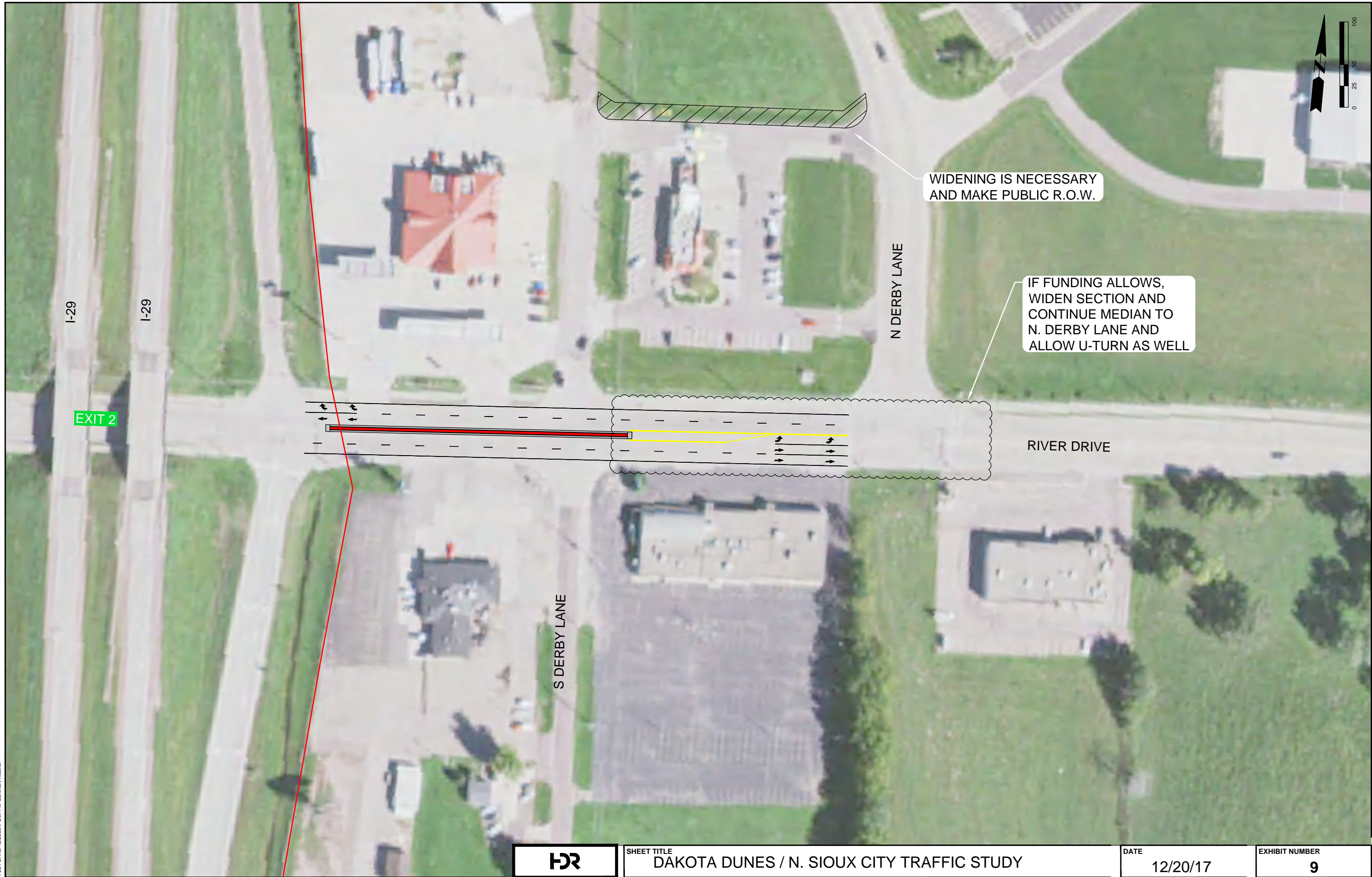


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DATE  
12/20/17

EXHIBIT NUMBER  
8

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PLOT DATE: 12/28/2017 2:07 PM Brennan, Heather



I-29

I-29

EXIT 2

S DERBY LANE

N DERBY LANE

RIVER DRIVE

WIDENING IS NECESSARY AND MAKE PUBLIC R.O.W.

IF FUNDING ALLOWS, WIDEN SECTION AND CONTINUE MEDIAN TO N. DERBY LANE AND ALLOW U-TURN AS WELL



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9

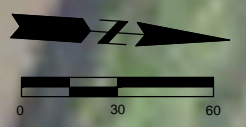




RIVER DRIVE

MILITARY ROAD

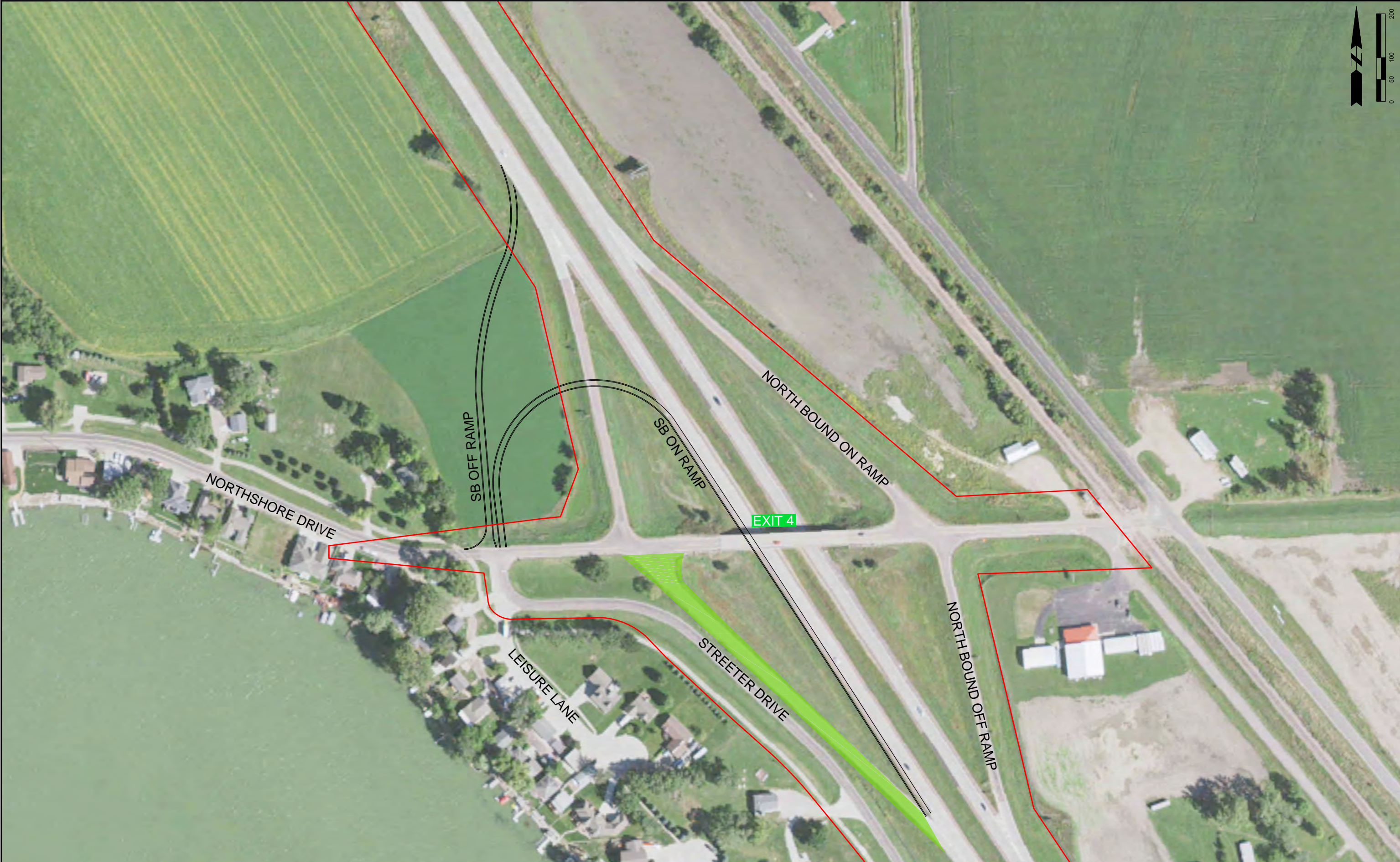
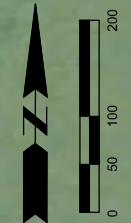
CONVERT TO A THREE LANE OVER BRIDGE.



SHEET TITLE  
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DATE  
**12/20/17**

EXHIBIT NUMBER  
**10**



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SHEET TITLE  
DAKOTA DUNES / N. SIOUX CITY TRAFFIC STUDY

DATE  
12/20/17

EXHIBIT NUMBER  
11

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SHEET TITLE  
**DAKOTA DUNES / N. SIOUX CITY TRAFFIC STUDY**

DATE  
**12/20/17**

EXHIBIT NUMBER  
**12**



SHEET TITLE  
**DAKOTA DUNES / N. SIOUX CITY TRAFFIC STUDY**

DATE  
**12/20/17**

EXHIBIT NUMBER  
**13**

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PLOT DATE: 12/20/17 2:07 PM Brennan, Heather



SHEET TITLE  
**DAKOTA DUNES / N. SIOUX CITY TRAFFIC STUDY**

DATE  
**12/20/17**

EXHIBIT NUMBER  
**14**

## Recommendations

The following recommendations were developed based on analysis of existing and forecast conditions and discussions with the Dakota Dunes CID, the City of North Sioux City, SIMPCO, and SDDOT.

### Dakota Dunes

- Short-term (0-5 years)
  - Complete roundabout project at 2 River Dr. and Cottonwood Dr. – around 5 years to complete project. Project will be needed when the interim development plan is completed.
- Short to Mid-term (5-15 years)
  - Dakota Dunes will work to replace curb ramps along Dakota Dunes Blvd. as projects allow, getting all street ramps upgraded to meet ADA guidelines.
- Long-term (15-25 years)
  - Monitor the intersection of Dakota Dunes Blvd. and Sioux Point Rd. to ensure LOS is adequate to support traffic.

### North Sioux City

- Short-term (0-5 years)
  - Continue to coordinate with landowners/developers to prepare a plan for relocating Sioux Point Rd. and Streeter Dr. to connect to Sodrac Dr. so the frontage road connections near the Exit 2 interchange can be removed.
- Short to mid-term (5-15 years)
  - Remove frontage road connections prior to signal at SB ramp terminal at Exit 2.
  - Construct turn lanes on Northshore Dr. to reduce queuing and improve operations at school driveways.
  - Implement median on River Dr. at S. Derby Ln.
- Long-term (15-25 years)
  - Either reconstruct Northshore Dr. as 3-lane or construct new street along the north side of schools that connects to Exit 4.

### SDDOT

- Short-term (0-5 years)
  - Consider adding second northbound left turn lane at Exit 1 ramp terminal.
- Short to mid-term (5-15 years)
  - Monitor southbound ramp terminal at Exit 2 for signal.
  - Consider options for southbound ramp terminal at Exit 4. North Sioux City has endorsed roundabout concept.
  - Monitor signal warrants at Exit 4 northbound ramp terminal.
- Long-term (15-25 years)

- Monitor interchange and bridge conditions at Exits 2 and 4 to determine when improvements are needed. These will be considered during Decennial Study in 2020, 2030 or beyond.

## **APPENDIX**

**1 – 2017 Level of Service**

**2 – 2022 Level of Service**

**3 – 2040 Level of Service**

**4 – Methods and Assumptions Document**

**5 – Crash Maps and Records**

**6 – School Observation Notes**

**7 – Traffic Counts**



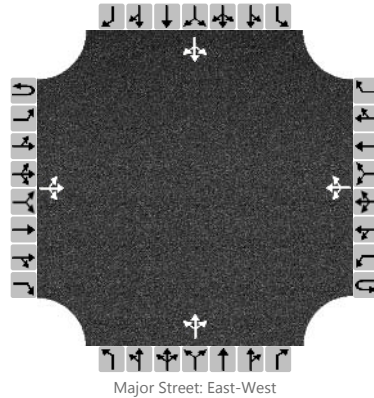
# APPENDIX

## Part 1 – 2017 Level of Service

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/WESTSHORE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/20/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2017	North/South Street	WESTSHORE DRIVE				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.82				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		35	175	0		10	45	55		0	5	35		30	0	5
Percent Heavy Vehicles (%)		1				2				0	0	0		3	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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.12				7.10	6.50	6.20		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)		2.21				2.22				3.50	4.00	3.30		3.53	4.03	3.33

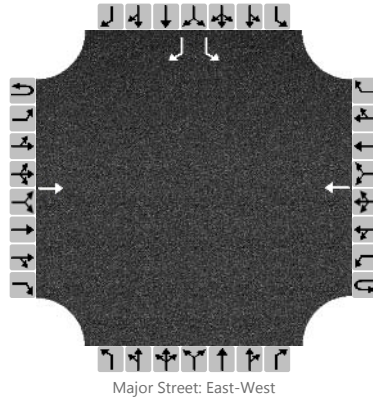
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		43				12					49					43	
Capacity, c (veh/h)		1471				1356					766					517	
v/c Ratio		0.03				0.01					0.06					0.08	
95% Queue Length, Q <sub>95</sub> (veh)		0.1				0.0					0.2					0.3	
Control Delay (s/veh)		7.5				7.7					10.0					12.6	
Level of Service, LOS		A				A					B					B	
Approach Delay (s/veh)		1.5				0.8				10.0				12.6			
Approach LOS										B				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/20/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2017	North/South Street	HS WEST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.74				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			240				105							10		5
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)															7.1		6.2
Critical Headway (sec)															7.10		6.20
Base Follow-Up Headway (sec)															3.5		3.3
Follow-Up Headway (sec)															3.50		3.30

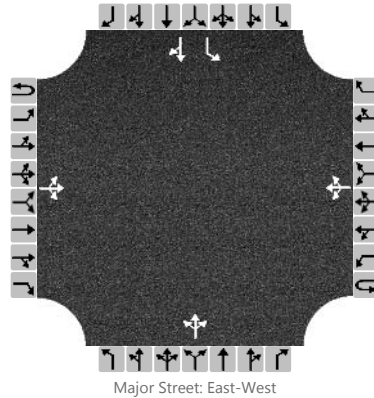
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)															14		7
Capacity, c (veh/h)															510		911
v/c Ratio															0.03		0.01
95% Queue Length, Q <sub>95</sub> (veh)															0.1		0.0
Control Delay (s/veh)															12.3		9.0
Level of Service, LOS															B		A
Approach Delay (s/veh)													11.2				
Approach LOS													B				

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/HS MID DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/20/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	HS MIDDLE DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.75				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		1	1	0
Configuration			LTR				LTR				LTR			L		TR
Volume, V (veh/h)		40	210	0		10	100	135		5	5	45		20	0	0
Percent Heavy Vehicles (%)		3				3				1	1	1		0	0	0
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.11	6.51	6.21		7.10	6.50	6.20
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				3.51	4.01	3.31		3.50	4.00	3.30

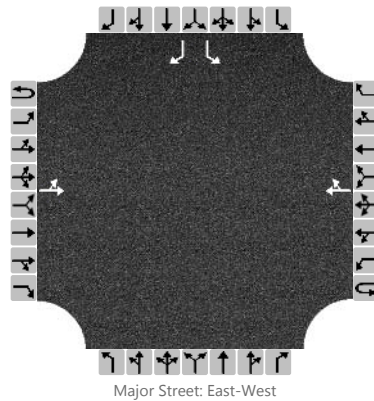
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		53				13					74				27		0
Capacity, c (veh/h)		1240				1275					623				323		0
v/c Ratio		0.04				0.01					0.12				0.08		
95% Queue Length, Q <sub>95</sub> (veh)		0.1				0.0					0.4				0.3		
Control Delay (s/veh)		8.0				7.9					11.6				17.2		5.0
Level of Service, LOS		A				A					B				C		A
Approach Delay (s/veh)		1.6				0.4				11.6				17.2			
Approach LOS										B				C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/HS EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/20/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	HS EAST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.75				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume, V (veh/h)		0	275				220	15						90		25
Percent Heavy Vehicles (%)		4												0		0
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.14												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.24												3.50		3.30

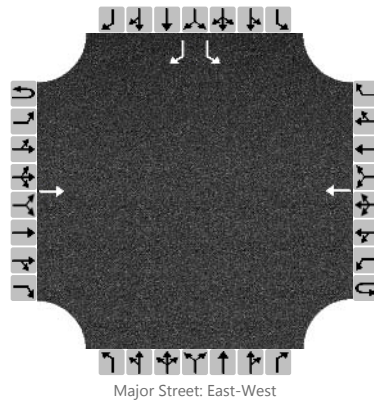
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0												120		33
Capacity, c (veh/h)		1234												373		742
v/c Ratio		0.00												0.32		0.04
95% Queue Length, Q <sub>95</sub> (veh)		0.0												1.4		0.1
Control Delay (s/veh)		7.9												19.1		10.1
Level of Service, LOS		A												C		B
Approach Delay (s/veh)	0.0												17.2			
Approach LOS	C															

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/ES WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2017	North/South Street	ES WEST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.75				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			390				360							95		60
Percent Heavy Vehicles (%)														4		4
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)														7.1		6.2
Critical Headway (sec)														7.14		6.24
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.54		3.34

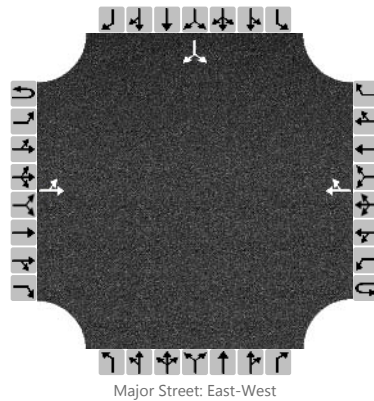
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														127		80
Capacity, c (veh/h)														220		581
v/c Ratio														0.58		0.14
95% Queue Length, Q <sub>95</sub> (veh)														3.2		0.5
Control Delay (s/veh)														41.6		12.2
Level of Service, LOS														E		B
Approach Delay (s/veh)													30.2			
Approach LOS	D															

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/ES EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2017	North/South Street	ES EAST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.75				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		45	440				360	145						0		0
Percent Heavy Vehicles (%)		3												2		2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												7.12		6.22
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.52		3.32

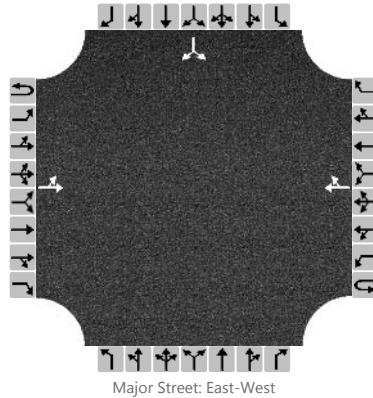
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		60														0
Capacity, c (veh/h)		912														0
v/c Ratio		0.07														
95% Queue Length, Q <sub>95</sub> (veh)		0.2														
Control Delay (s/veh)		9.2														5.0
Level of Service, LOS		A														A
Approach Delay (s/veh)	1.7												5.0			
Approach LOS													A			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/PENROSE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	PENROSE DRIVE				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.75				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		0	440				490	5						5		15
Percent Heavy Vehicles (%)		3												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.30

## Delay, Queue Length, and Level of Service

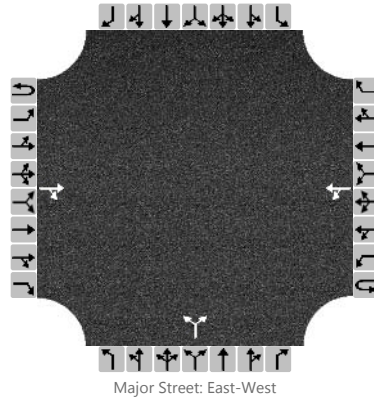
Flow Rate, v (veh/h)		0														27
Capacity, c (veh/h)		923														305
v/c Ratio		0.00														0.09
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.3
Control Delay (s/veh)		8.9														17.9
Level of Service, LOS		A														C
Approach Delay (s/veh)	0.0												17.9			
Approach LOS													C			



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/STREETER				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	STREETER DRIVE				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.75				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			405	40		5	390			105		30				
Percent Heavy Vehicles (%)						2				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.12					7.11		6.21			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.22					3.51		3.31			

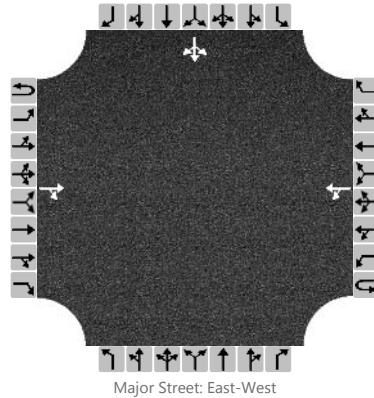
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						7					180					
Capacity, c (veh/h)						982					220					
v/c Ratio						0.01					0.82					
95% Queue Length, Q <sub>95</sub> (veh)						0.0					6.1					
Control Delay (s/veh)						8.7					67.9					
Level of Service, LOS						A					F					
Approach Delay (s/veh)					0.2				67.9							
Approach LOS									F							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 SB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	I-29 SB				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.75				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration				TR		LT									LTR	
Volume, V (veh/h)			125	310		25	375							25	0	20
Percent Heavy Vehicles (%)						3								7	7	7
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.13								7.17	6.57	6.27
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.23								3.56	4.06	3.36

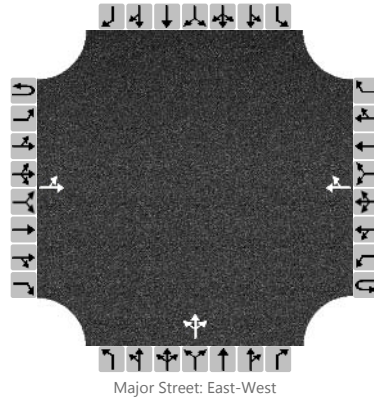
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						33										60
Capacity, c (veh/h)						988										313
v/c Ratio						0.03										0.19
95% Queue Length, Q <sub>95</sub> (veh)						0.1										0.7
Control Delay (s/veh)						8.8										19.2
Level of Service, LOS						A										C
Approach Delay (s/veh)					0.9								19.2			
Approach LOS													C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 NB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	I-29 NB				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.75				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration		LT						TR			LTR					
Volume, V (veh/h)		25	125				95	10		305	0	10				
Percent Heavy Vehicles (%)		3								3	3	3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

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

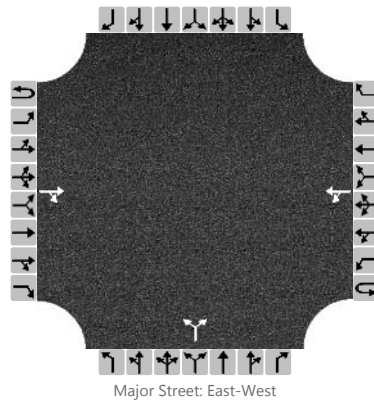
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		33								420							
Capacity, c (veh/h)		1435								583							
v/c Ratio		0.02								0.72							
95% Queue Length, Q <sub>95</sub> (veh)		0.1								6.0							
Control Delay (s/veh)		7.6								25.5							
Level of Service, LOS		A								D							
Approach Delay (s/veh)		1.4								25.5							
Approach LOS										D							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/MILITARY				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	MILITARY ROAD				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.75				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			30	105		0	45			60		0				
Percent Heavy Vehicles (%)						4				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

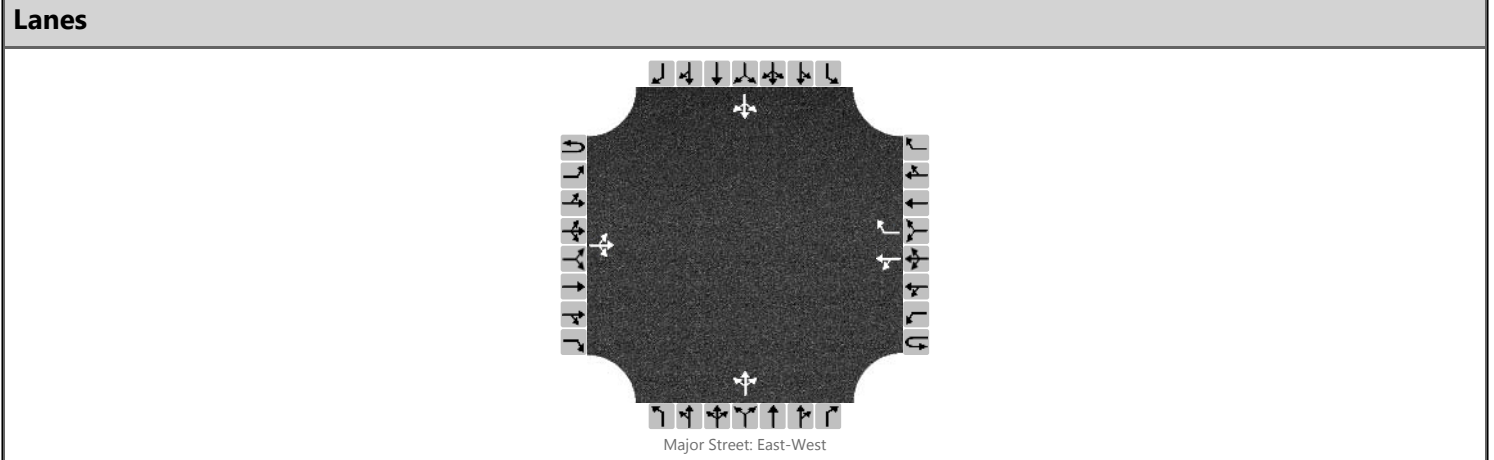
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.14				7.13		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.24				3.53		3.33				

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						0					80					
Capacity, c (veh/h)						1381					791					
v/c Ratio						0.00					0.10					
95% Queue Length, Q <sub>95</sub> (veh)						0.0					0.3					
Control Delay (s/veh)						7.6					10.1					
Level of Service, LOS						A					B					
Approach Delay (s/veh)					0.0				10.1							
Approach LOS									B							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SODRAC				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	RIVER DRIVE				
Analysis Year	2017	North/South Street	SODRAC DRIVE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.78				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	1		0	1	0		0	1	0
Configuration			LTR			LT		R			LTR				LTR	
Volume, V (veh/h)		0	45	0		35	15	15		0	0	60		10	0	0
Percent Heavy Vehicles (%)		3				2				5	5	5		0	0	0
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.12				7.15	6.55	6.25		7.10	6.50	6.20
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				2.22				3.54	4.04	3.34		3.50	4.00	3.30

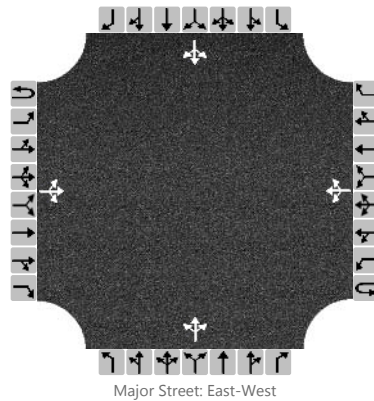
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)		0				45					77					13	
Capacity, c (veh/h)		1564				1545					1001					682	
v/c Ratio		0.00				0.03					0.08					0.02	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.2					0.1	
Control Delay (s/veh)		7.3				7.4					8.9					10.4	
Level of Service, LOS		A				A					A					B	
Approach Delay (s/veh)		0.0				4.1				8.9				10.4			
Approach LOS										A				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SIOUX POINT				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	RIVER DRIVE				
Analysis Year	2017	North/South Street	SODRAC DRIVE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.79				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		5	100	10		155	45	45		10	20	95		135	30	10
Percent Heavy Vehicles (%)		2				2				0	0	0		1	1	1
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.12				4.12				7.10	6.50	6.20		7.11	6.51	6.21
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)		2.22				2.22				3.50	4.00	3.30		3.51	4.01	3.31

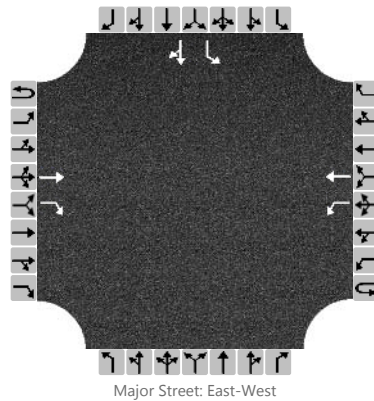
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		6				196					158					222	
Capacity, c (veh/h)		1474				1442					637					283	
v/c Ratio		0.00				0.14					0.25					0.78	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.5					1.0					6.1	
Control Delay (s/veh)		7.5				7.9					12.5					51.9	
Level of Service, LOS		A				A					B					F	
Approach Delay (s/veh)		0.3				5.4				12.5				51.9			
Approach LOS										B				F			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/I-29 SB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	RIVER DRIVE				
Analysis Year	2017	North/South Street	I-29 SB				
Time Analyzed	AM PEAK	Peak Hour Factor	0.84				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	1	0	1	1	0		0	0	0		1	1	0
Configuration			T	R		L	T							L		TR
Volume, V (veh/h)			190	140		175	180							80	0	65
Percent Heavy Vehicles (%)						5								1	1	1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

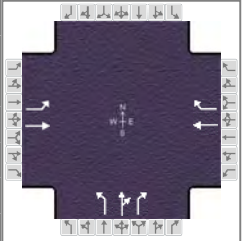
Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.15								7.11	6.51	6.21
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.24								3.51	4.01	3.31

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						208								95		77
Capacity, c (veh/h)						1152								240		828
v/c Ratio						0.18								0.40		0.09
95% Queue Length, Q <sub>95</sub> (veh)						0.7								1.8		0.3
Control Delay (s/veh)						8.8								29.5		9.8
Level of Service, LOS						A								D		A
Approach Delay (s/veh)					4.3								20.7			
Approach LOS													C			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Apr 21, 2017	Area Type	Other
Jurisdiction	NORTH SIOUX CITY	Time Period	AM PEAK	PHF	0.83
Urban Street	RIVER DRIVE	Analysis Year	2017	Analysis Period	1 > 7:00
Intersection	I-29 NB	File Name	RIVER SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand ( v ), veh/h	40	230			310	55	45	0	325			

Signal Information													
Cycle, s	39.8	Reference Phase	2										
Offset, s	8	Reference Point	Begin										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	11.4	15.3	0.0	0.0	0.0	0.0	1 → 2 → 3 → 4		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	5.0	0.0	0.0	0.0	0.0	← 5 ← 6 ← 7 ← 8		
				Red	2.0	2.0	0.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		6.0		7.0		9.0		
Phase Duration, s		17.4		17.4		22.3		
Change Period, ( Y+R <sub>c</sub> ), s		6.0		6.0		7.0		
Max Allow Headway ( MAH ), s		3.0		3.0		3.3		
Queue Clearance Time ( g <sub>s</sub> ), s		10.3		8.6		7.4		
Green Extension Time ( g <sub>e</sub> ), s		1.1		1.1		0.6		
Phase Call Probability		1.00		1.00		0.96		
Max Out Probability		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			6	16	3	8	18			
Adjusted Flow Rate ( v ), veh/h	48	277			290	33	54	0	235			
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1098	1588			1525	1292	1464	1538	1303			
Queue Service Time ( g <sub>s</sub> ), s	1.6	6.0			6.6	0.7	0.9	0.0	5.4			
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	8.3	6.0			6.6	0.7	0.9	0.0	5.4			
Green Ratio ( g/C )	0.29	0.29			0.29	0.29	0.39	0.39	0.39			
Capacity ( c ), veh/h	311	456			438	371	565	593	503			
Volume-to-Capacity Ratio ( X )	0.155	0.607			0.661	0.088	0.096	0.000	0.467			
Back of Queue ( Q ), ft/ln ( 95 th percentile)	14.9	71.8			80.2	7.4	8.7	0	44.7			
Back of Queue ( Q ), veh/ln ( 95 th percentile)	0.6	2.9			3.1	0.3	0.3	0.0	1.7			
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.17	0.00			0.00	0.00	0.00	0.00	0.09			
Uniform Delay ( d <sub>1</sub> ), s/veh	16.2	12.2			12.5	10.4	7.8	0.0	9.2			
Incremental Delay ( d <sub>2</sub> ), s/veh	0.1	0.5			0.6	0.0	0.0	0.0	0.3			
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay ( d ), s/veh	16.2	12.7			13.1	10.4	7.8	0.0	9.4			
Level of Service ( LOS )	B	B			B	B	A		A			
Approach Delay, s/veh / LOS	13.2	B		12.8	B		9.1	A	0.0			
Intersection Delay, s/veh / LOS	11.8						B					

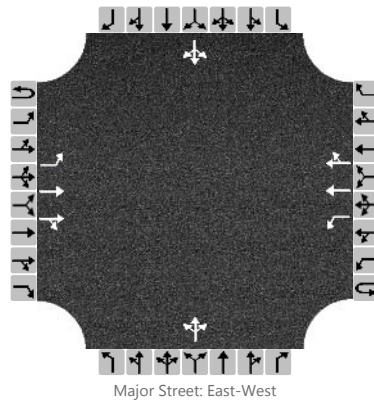
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	1.9	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.2	A	1.0	A		



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/S DERBY LANE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/21/2017	East/West Street	RIVER DRIVE				
Analysis Year	2017	North/South Street	S DERBY LANE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.88				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0
Configuration		L	T	TR		L	T	TR			LTR				LTR	
Volume, V (veh/h)		65	465	25		25	265	15		20	5	5		15	5	80
Percent Heavy Vehicles (%)		4				6				0	0	0		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

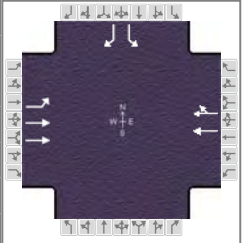
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.18				4.22				7.50	6.50	6.90		7.54	6.54	6.94
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.24				2.26				3.50	4.00	3.30		3.52	4.02	3.32

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		74				28					35					114	
Capacity, c (veh/h)		1225				984					223					565	
v/c Ratio		0.06				0.03					0.16					0.20	
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.1					0.5					0.7	
Control Delay (s/veh)		8.1				8.8					24.1					13.0	
Level of Service, LOS		A				A					C					B	
Approach Delay (s/veh)		1.0				0.7				24.1				13.0			
Approach LOS										C				B			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Apr 21, 2017	Area Type	Other
Jurisdiction	NORTH SIOUX CITY	Time Period	AM PEAK	PHF	0.88
Urban Street	RIVER DRIVE	Analysis Year	2017	Analysis Period	1 > 7:00
Intersection	N DERBY LANE	File Name	RIVER SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	290	195			185	35					35	120

Signal Information				Phase Diagram								
Cycle, s	39.0	Reference Phase	2									
Offset, s	114	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	8.6	12.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Yellow	3.0	4.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Red	0.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

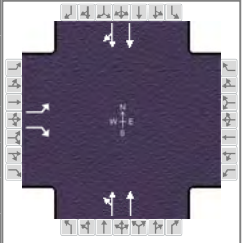
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		8.3				9.0
Phase Duration, s	11.6	29.6		18.0				9.4
Change Period, ( Y+R <sub>c</sub> ), s	3.0	6.0		6.0				5.0
Max Allow Headway ( MAH ), s	3.1	3.0		3.0				3.3
Queue Clearance Time ( g <sub>s</sub> ), s	8.0	3.5		6.7				4.9
Green Extension Time ( g <sub>e</sub> ), s	0.7	1.0		1.0				0.2
Phase Call Probability	0.99	1.00		1.00				0.85
Max Out Probability	0.00	0.00		0.00				0.02

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate ( v ), veh/h	400	269			117	116				40		136
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1500	1499			1575	1521				1512		1345
Queue Service Time ( g <sub>s</sub> ), s	6.0	1.5			4.7	2.2				0.9		2.9
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	6.0	1.5			4.7	2.2				0.9		2.9
Green Ratio ( g/C )	0.58	0.61			0.31	0.31				0.11		0.33
Capacity ( c ), veh/h	731	1816			485	468				170		448
Volume-to-Capacity Ratio ( X )	0.547	0.148			0.242	0.247				0.235		0.304
Back of Queue ( Q ), ft/ln ( 95 th percentile )	31.3	6.4			24.7	24				12.2		27.4
Back of Queue ( Q ), veh/ln ( 95 th percentile )	1.2	0.3			1.0	1.0				0.5		1.1
Queue Storage Ratio ( RQ ) ( 95 th percentile )	0.26	0.00			0.00	0.00				0.12		0.00
Uniform Delay ( d <sub>1</sub> ), s/veh	5.6	3.3			10.1	10.1				15.8		9.6
Incremental Delay ( d <sub>2</sub> ), s/veh	0.2	0.0			0.1	0.1				0.3		0.1
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay ( d ), s/veh	5.8	3.3			10.2	10.2				16.0		9.8
Level of Service ( LOS )	A	A			B	B				B		A
Approach Delay, s/veh / LOS	4.8	A		10.2	B		0.0			11.2		B
Intersection Delay, s/veh / LOS	7.0						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.6	A	2.2	B	2.7	C	2.8	C
Bicycle LOS Score / LOS	0.9	A	0.7	A				F

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Apr 21, 2017	Area Type	Other
Jurisdiction	NORTH SIOUX CITY	Time Period	AM PEAK	PHF	0.88
Urban Street	RIVER DRIVE	Analysis Year	2017	Analysis Period	1 > 7:00
Intersection	MILITARY ROAD	File Name	RIVER-MILITARY.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand ( v ), veh/h	45		185				155	100			80	65

Signal Information												
Cycle, s	116.0	Reference Phase	2									
Offset, s	0	Reference Point	Begin									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	83.5	20.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Yellow	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Red	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2		6
Case Number		9.0				8.0		8.0
Phase Duration, s		26.5				89.5		89.5
Change Period, ( Y+R <sub>c</sub> ), s		6.0				6.0		6.0
Max Allow Headway ( MAH ), s		3.4				0.0		0.0
Queue Clearance Time ( g <sub>s</sub> ), s		19.9						
Green Extension Time ( g <sub>e</sub> ), s		0.6				0.0		0.0
Phase Call Probability		1.00						
Max Out Probability		0.00						

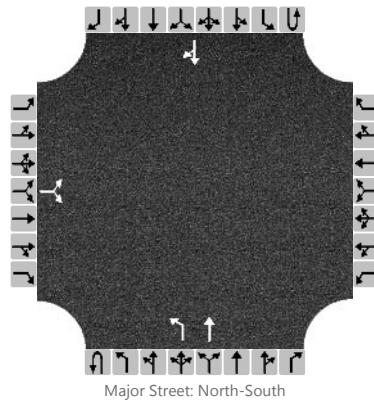
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2		6		16
Adjusted Flow Rate ( v ), veh/h	51		210				176	114		69		67
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1500		1335				1210	1433		1575		1404
Queue Service Time ( g <sub>s</sub> ), s	3.4		17.9				5.8	4.7		2.8		1.6
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	3.4		17.9				8.6	4.7		2.8		1.6
Green Ratio ( g/C )	0.18		0.18				0.72	0.72		0.72		0.72
Capacity ( c ), veh/h	264		235				934	1032		1134		1011
Volume-to-Capacity Ratio ( X )	0.193		0.893				0.189	0.110		0.061		0.066
Back of Queue ( Q ), ft/ln ( 95 th percentile )	57.7		261.5				68.6	37.5		21.8		21.1
Back of Queue ( Q ), veh/ln ( 95 th percentile )	2.3		10.3				2.7	1.5		0.9		0.8
Queue Storage Ratio ( RQ ) ( 95 th percentile )	0.00		0.00				0.00	0.00		0.00		0.00
Uniform Delay ( d <sub>1</sub> ), s/veh	40.7		46.7				6.2	4.9		4.7		4.8
Incremental Delay ( d <sub>2</sub> ), s/veh	0.1		4.7				0.4	0.2		0.1		0.1
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0		0.0				0.0	0.0		0.0		0.0
Control Delay ( d ), s/veh	40.9		51.4				6.7	5.1		4.9		4.9
Level of Service ( LOS )	D		D				A	A		A		A
Approach Delay, s/veh / LOS	49.3		D	0.0			6.1	A		4.9		A
Intersection Delay, s/veh / LOS	22.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	0.7	A	1.6	B
Bicycle LOS Score / LOS		F			0.7	A	0.6	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/STEAMBOAT				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	STEAMBOAT DRIVE				
Analysis Year	2017	North/South Street	SIOUX POINT ROAD				
Time Analyzed	AM PEAK	Peak Hour Factor	0.76				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound					
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R		
Movement																		
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6		
Number of Lanes		0	0	0		0	0	0		0	1	1	0		0	0	1	0
Configuration			LR							L	T						TR	
Volume, V (veh/h)		15		50						100	120					110	60	
Percent Heavy Vehicles (%)		1		1						1								
Proportion Time Blocked																		
Percent Grade (%)	0																	
Right Turn Channelized	No				No				No				No					
Median Type/Storage	Undivided																	

## Critical and Follow-up Headways

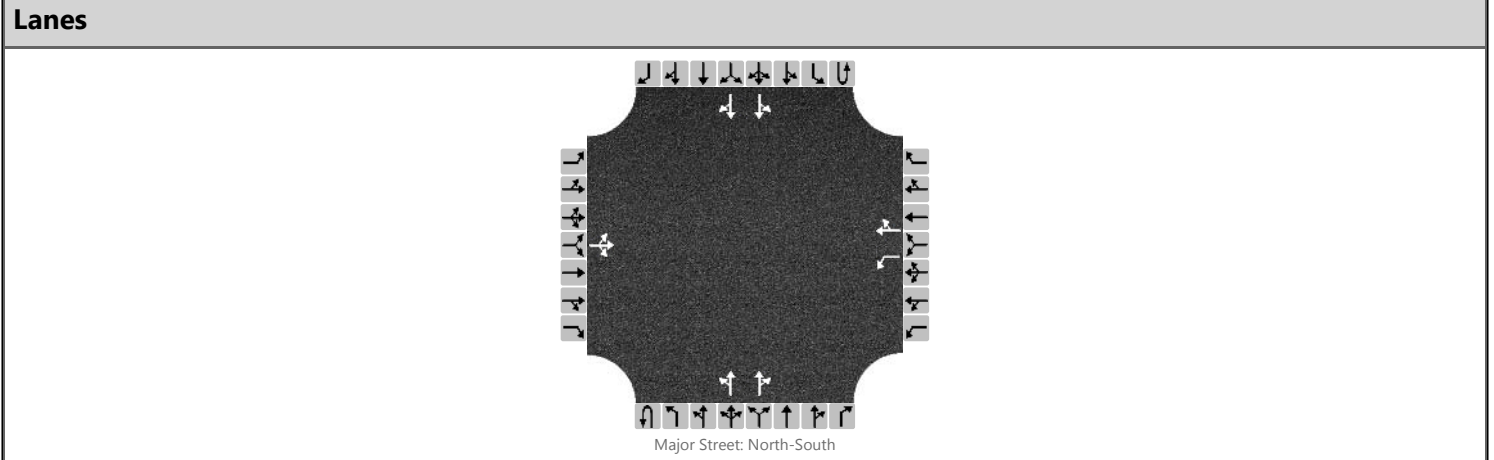
Base Critical Headway (sec)		7.1		6.2						4.1							
Critical Headway (sec)		6.41		6.21						4.11							
Base Follow-Up Headway (sec)		3.5		3.3						2.2							
Follow-Up Headway (sec)		3.51		3.31						2.21							

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			86							132							
Capacity, c (veh/h)			690							1350							
v/c Ratio			0.12							0.10							
95% Queue Length, Q <sub>95</sub> (veh)			0.4							0.3							
Control Delay (s/veh)			11.0							8.0							
Level of Service, LOS			B							A							
Approach Delay (s/veh)	11.0								3.6								
Approach LOS	B																

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/TOWER				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	TOWER ROAD				
Analysis Year	2017	North/South Street	SIOUX POINT ROAD				
Time Analyzed	AM PEAK	Peak Hour Factor	0.79				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		1	1	0	0	0	2	0	0	0	2	0
Configuration			LTR			L		TR		LT		TR		LT		TR
Volume, V (veh/h)		5	5	45		55	0	20		40	410	110		20	130	10
Percent Heavy Vehicles (%)		2	2	2		1	1	1		1				2		
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)		7.5	6.5	6.9		7.5	6.5	6.9		4.1				4.1		
Critical Headway (sec)		7.54	6.54	6.94		7.52	6.52	6.92		4.12				4.14		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.51	4.01	3.31		2.21				2.22		

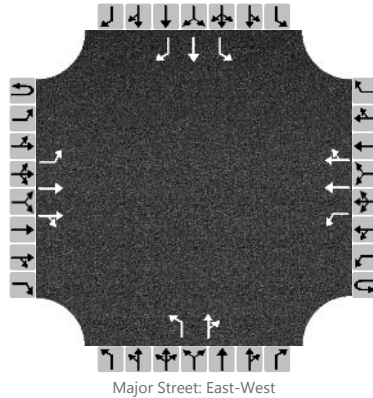
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			69			70		25		51				25		
Capacity, c (veh/h)			667			228		670		1403				926		
v/c Ratio			0.10			0.31		0.04		0.04				0.03		
95% Queue Length, Q <sub>95</sub> (veh)			0.3			1.2		0.1		0.1				0.1		
Control Delay (s/veh)			11.0			27.6		10.6		7.7				9.0		
Level of Service, LOS			B			D		B		A				A		
Approach Delay (s/veh)	11.0				23.1				0.7				1.2			
Approach LOS	B				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	TWO RIVERS/COTTONWOOD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	TWO RIVERS DRIVE				
Analysis Year	2017	North/South Street	COTTONWOOD LANE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.59				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	1
Configuration		L	T	TR		L	T	TR		L		TR		L	T	R
Volume, V (veh/h)		200	85	365		0	5	0		15	0	0		5	5	20
Percent Heavy Vehicles (%)		1				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				Yes			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

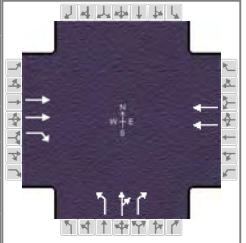
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.12				4.10				7.50	6.50	6.90		7.50	6.50	6.90
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.21				2.20				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		339				0				25		0		8	8	34	
Capacity, c (veh/h)		1618				859				121		0		251	105	1085	
v/c Ratio		0.21				0.00				0.21				0.03	0.08	0.03	
95% Queue Length, Q <sub>95</sub> (veh)		0.8				0.0				0.7				0.1	0.2	0.1	
Control Delay (s/veh)		7.8				9.2				42.2		5.0		19.8	42.2	8.4	
Level of Service, LOS		A				A				E		A		C	E	A	
Approach Delay (s/veh)		2.4				0.0				42.2				15.7			
Approach LOS										E				C			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Apr 24, 2017	Area Type	Other
Jurisdiction	DAKOTA DUNES	Time Period	AM PEAK	PHF	0.65
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2017	Analysis Period	1 > 7:00
Intersection	I-29 NB	File Name	DD SIGNALS AM.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h		175	295		40		470	0	475			

Signal Information												
Cycle, s	70.0	Reference Phase	2									
Offset, s	46	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	22.3	35.7	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	1.5	2.5	0.0	0.0	0.0	0.0				

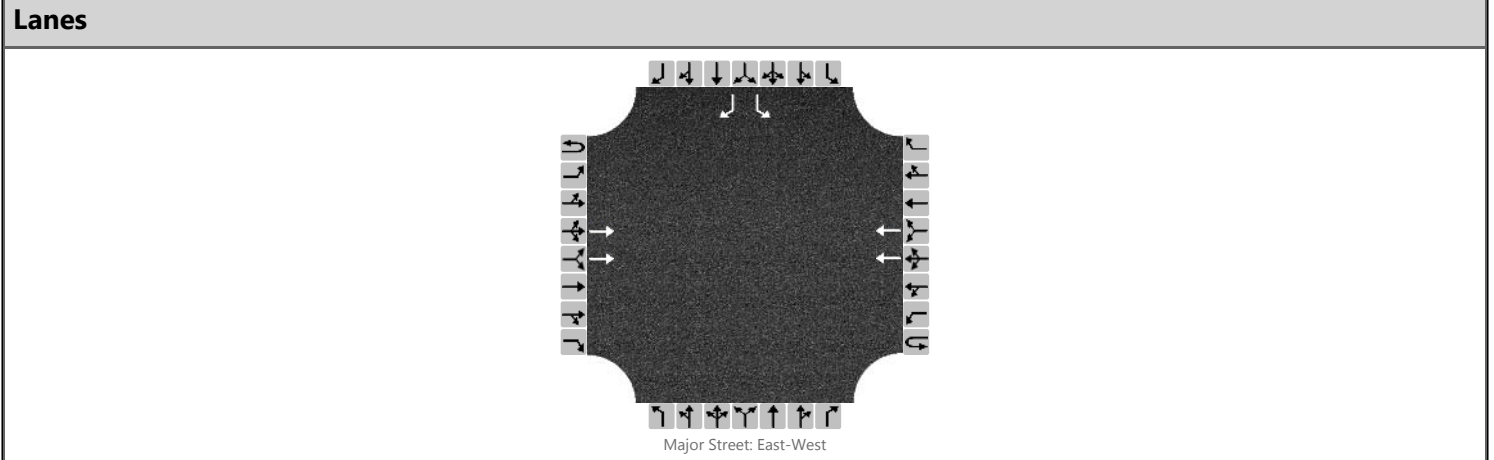
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		7.0		8.0		9.0		
Phase Duration, s		27.8		27.8		42.2		
Change Period, ( Y+R <sub>c</sub> ), s		5.5		5.5		6.5		
Max Allow Headway ( MAH ), s		0.0		0.0		3.1		
Queue Clearance Time ( g <sub>s</sub> ), s						33.4		
Green Extension Time ( g <sub>e</sub> ), s		0.0		0.0		2.3		
Phase Call Probability						1.00		
Max Out Probability						0.09		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12		6		3	8	18			
Adjusted Flow Rate ( v ), veh/h		197	197		62		723	0	438			
Adjusted Saturation Flow Rate ( s ), veh/h/ln		1499	1335		1523		1512	1600	1345			
Queue Service Time ( g <sub>s</sub> ), s		3.7	9.1		1.0		31.4	0.0	16.6			
Cycle Queue Clearance Time ( g <sub>c</sub> ), s		3.7	9.1		1.0		31.4	0.0	16.6			
Green Ratio ( g/C )		0.32	0.32		0.32		0.51	0.51	0.51			
Capacity ( c ), veh/h		953	424		968		772	817	687			
Volume-to-Capacity Ratio ( X )		0.207	0.464		0.064		0.937	0.000	0.638			
Back of Queue ( Q ), ft/ln ( 95 th percentile)		57.8	148.8		15.1		411.8	0	179			
Back of Queue ( Q ), veh/ln ( 95 th percentile)		2.3	5.9		0.6		16.3	0.0	7.1			
Queue Storage Ratio ( RQ ) ( 95 th percentile)		0.00	0.60		0.00		0.00	0.00	0.45			
Uniform Delay ( d <sub>1</sub> ), s/veh		19.6	22.8		16.6		16.1	0.0	12.4			
Incremental Delay ( d <sub>2</sub> ), s/veh		0.5	3.5		0.1		12.3	0.0	0.4			
Initial Queue Delay ( d <sub>3</sub> ), s/veh		0.0	0.0		0.0		0.0	0.0	0.0			
Control Delay ( d ), s/veh		20.0	26.3		16.7		28.4	0.0	12.8			
Level of Service ( LOS )		C	C		B		C		B			
Approach Delay, s/veh / LOS	23.2	C		16.7	B		22.5	C		0.0		
Intersection Delay, s/veh / LOS	22.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.7	C	1.9	B	2.7	C	3.0	C
Bicycle LOS Score / LOS	0.9	A	0.5	A	2.4	B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/I-29 SB				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	I-29 SB				
Time Analyzed	AM PEAK	Peak Hour Factor	0.72				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			385				510							85		155
Percent Heavy Vehicles (%)														1		1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

**Critical and Follow-up Headways**

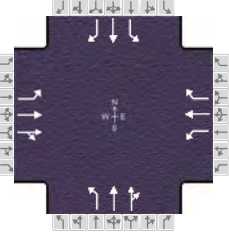
Base Critical Headway (sec)														7.5		6.9
Critical Headway (sec)														7.52		6.92
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.51		3.31

**Delay, Queue Length, and Level of Service**

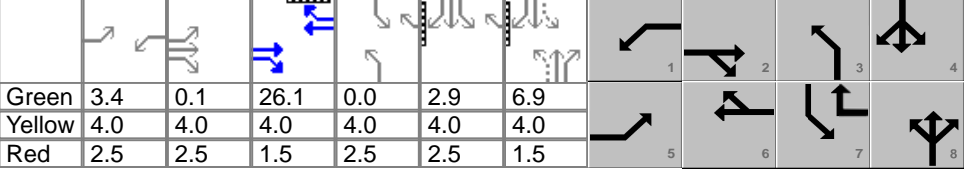
Flow Rate, v (veh/h)														118		215
Capacity, c (veh/h)														207		645
v/c Ratio														0.57		0.33
95% Queue Length, Q <sub>95</sub> (veh)														3.1		1.5
Control Delay (s/veh)														43.2		13.3
Level of Service, LOS														E		B
Approach Delay (s/veh)													23.9			
Approach LOS													C			



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	HDR			Duration, h	0.25	
Analyst	RL	Analysis Date	Apr 24, 2017	Area Type	Other	
Jurisdiction	DAKOTA DUNES	Time Period	AM PEAK	PHF	0.78	
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2017	Analysis Period	1 > 7:00	
Intersection	SIOUX PT RD	File Name	DD SIGNALS AM.xus			
Project Description	DD/NSC TRAFFIC STUDY					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand ( $v$ ), veh/h	140	330	10	40	220	405	0	15	20	35	130	65

Signal Information																							
Cycle, s	70.0	Reference Phase	2	Green	3.4	0.1	26.1	0.0	2.9	6.9	Yellow	4.0	4.0	4.0	4.0	4.0	Red	2.5	2.5	1.5	2.5	2.5	1.5
Offset, s	0	Reference Point	End	Uncoordinated	No	Simult. Gap E/W	On	Force Mode	Fixed	Simult. Gap N/S	On												

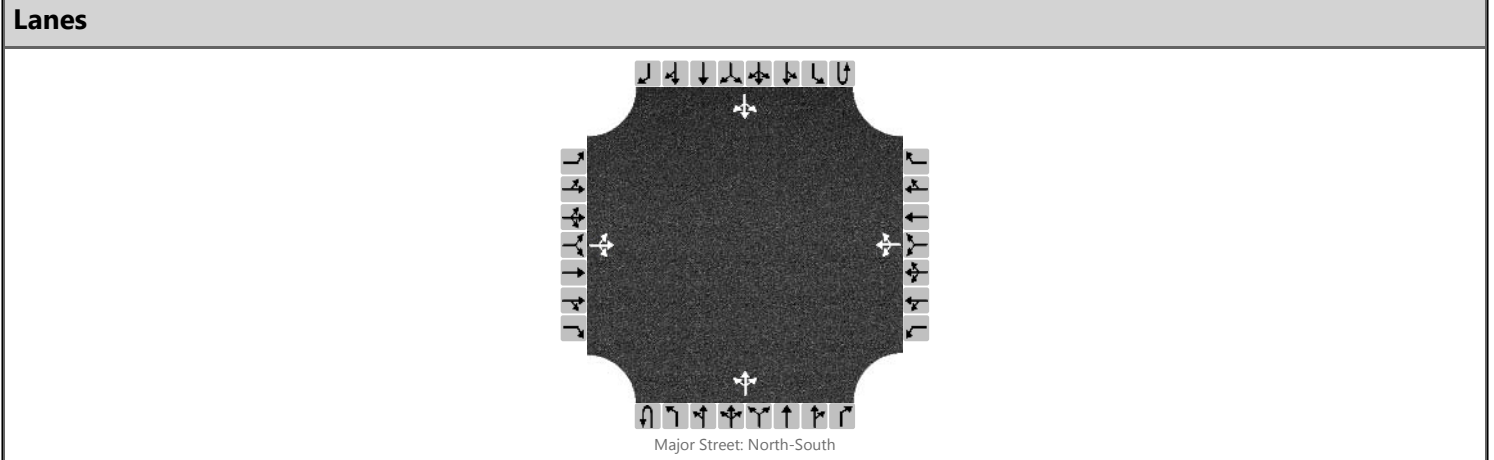
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	1.1	4.0	1.1	3.0
Phase Duration, s	16.5	38.3	9.9	31.6	0.0	12.4	9.4	21.9
Change Period, ( $Y+R_c$ ), s	6.5	5.5	6.5	5.5	6.5	5.5	6.5	5.5
Max Allow Headway ( $MAH$ ), s	3.1	0.0	3.1	0.0	0.0	3.1	3.1	3.1
Queue Clearance Time ( $g_s$ ), s	10.2		4.7			2.7	3.8	8.3
Green Extension Time ( $g_e$ ), s	0.2	0.0	0.0	0.0	0.0	0.3	0.0	0.4
Phase Call Probability	0.97		0.68			0.99	0.58	1.00
Max Out Probability	0.00		0.01			0.01	1.00	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	179	215	214	58	320	356	0	16	16	45	167	51
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1500	1575	1567	1500	1575	1356	1500	1575	1376	1500	1575	1335
Queue Service Time ( $g_s$ ), s	8.2	5.9	5.9	2.7	12.0	15.5	0.0	0.7	0.7	1.8	6.3	2.1
Cycle Queue Clearance Time ( $g_c$ ), s	8.2	5.9	5.9	2.7	12.0	15.5	0.0	0.7	0.7	1.8	6.3	2.1
Green Ratio ( $g/C$ )	0.14	0.47	0.47	0.05	0.37	0.41	0.01	0.10	0.10	0.17	0.23	0.23
Capacity ( $c$ ), veh/h	215	737	733	73	587	562	226	156	137	287	368	312
Volume-to-Capacity Ratio ( $X$ )	0.835	0.292	0.292	0.802	0.545	0.634	0.000	0.103	0.117	0.156	0.453	0.164
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	135.2	91.9	91.6	43.3	169.4	189.7	0	10.9	10.7	27.8	102.1	29
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	5.3	3.6	3.6	1.7	6.7	7.6	0.0	0.4	0.4	1.1	4.0	1.1
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	1.13	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00
Uniform Delay ( $d_1$ ), s/veh	29.2	11.5	11.5	31.4	20.0	19.4	0.0	28.7	28.7	24.9	23.0	21.4
Incremental Delay ( $d_2$ ), s/veh	3.3	1.0	1.0	2.9	1.4	2.1	0.0	0.1	0.1	0.1	0.3	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	32.4	12.5	12.5	34.4	21.3	21.5	0.0	28.8	28.9	25.0	23.3	21.5
Level of Service ( LOS )	C	B	B	C	C	C		C	C	C	C	C
Approach Delay, s/veh / LOS	18.4		B	22.4		C	28.8		C	23.2		C
Intersection Delay, s/veh / LOS	21.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.8	C	3.1	C	2.4	B
Bicycle LOS Score / LOS	1.0	A	1.6	B	0.5	A	0.9	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/COURTYARD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	COURTYARD DRIVE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.86				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		5	5	0		5	0	5		5	470	345		25	235	25
Percent Heavy Vehicles (%)		0	0	0		0	0	0		1				4		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

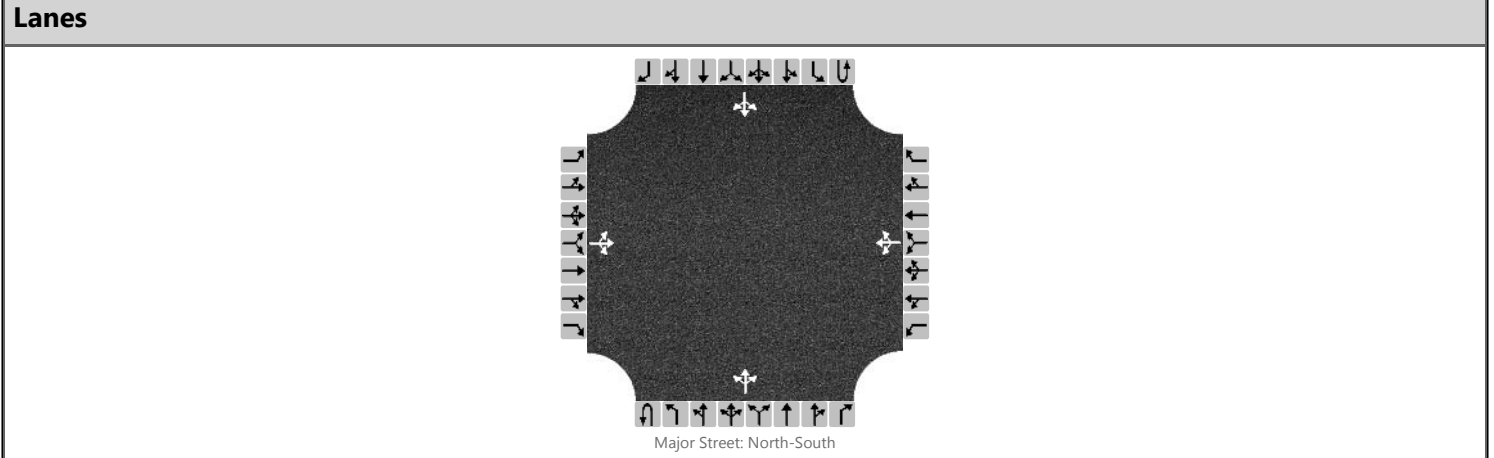
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.11				4.14		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			12				12				6				29	
Capacity, c (veh/h)			261				346				1264				715	
v/c Ratio			0.05				0.03				0.00				0.04	
95% Queue Length, Q <sub>95</sub> (veh)			0.1				0.1				0.0				0.1	
Control Delay (s/veh)			19.5				15.8				7.9				10.2	
Level of Service, LOS			C				C				A				B	
Approach Delay (s/veh)	19.5				15.8				0.1				1.4			
Approach LOS	C				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/LEVEE				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	LEVEE TRAIL				
Time Analyzed	AM PEAK	Peak Hour Factor	0.86				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		80	5	0		0	0	105		0	635	0		30	190	20
Percent Heavy Vehicles (%)		0	0	0		1	1	1		1				5		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

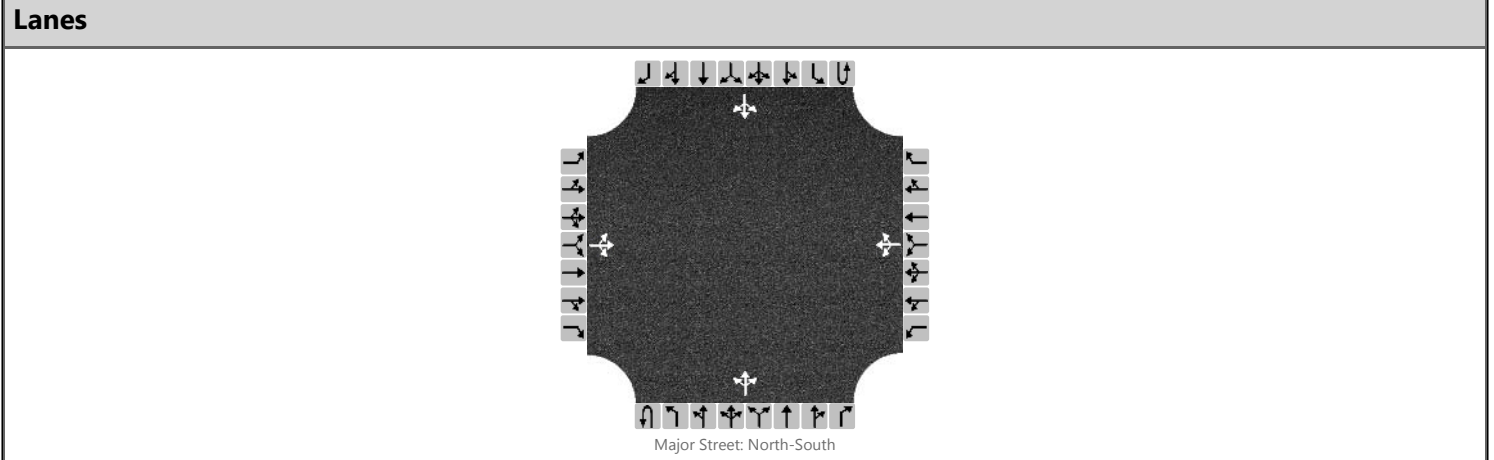
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.11	6.51	6.21		4.11				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.51	4.01	3.31		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			99				122				0				35	
Capacity, c (veh/h)			204				419				1328				856	
v/c Ratio			0.48				0.29				0.00				0.04	
95% Queue Length, Q <sub>95</sub> (veh)			2.4				1.2				0.0				0.1	
Control Delay (s/veh)			38.2				17.1				7.7				9.4	
Level of Service, LOS			E				C				A				A	
Approach Delay (s/veh)	38.2				17.1				0.0				1.6			
Approach LOS	E				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/MEADOWS				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	MEADOWS BLVD				
Time Analyzed	AM PEAK	Peak Hour Factor	0.86				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		145	5	10		5	5	90		5	400	5		20	155	15
Percent Heavy Vehicles (%)		2	2	2		1	1	1		1				5		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

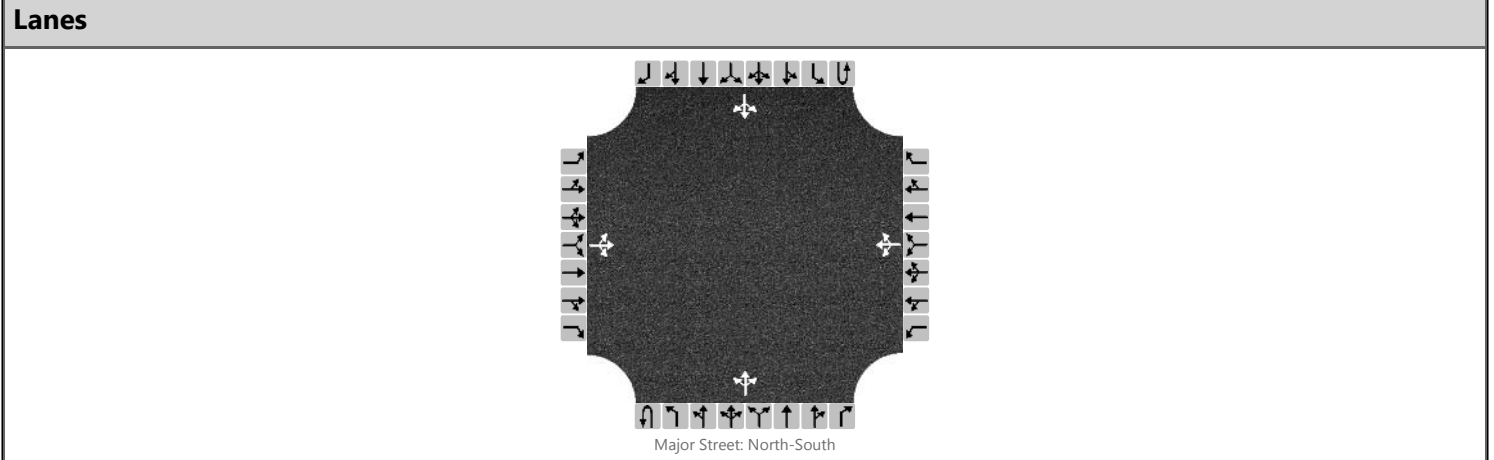
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.11	6.51	6.21		4.11				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.51	4.01	3.31		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			187				117				6				23	
Capacity, c (veh/h)			353				575				1381				1077	
v/c Ratio			0.53				0.20				0.00				0.02	
95% Queue Length, Q <sub>95</sub> (veh)			3.0				0.8				0.0				0.1	
Control Delay (s/veh)			26.1				12.9				7.6				8.4	
Level of Service, LOS			D				B				A				A	
Approach Delay (s/veh)	26.1				12.9				0.1				1.1			
Approach LOS	D				B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/PINEHURST				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	PINEHURST TRAIL				
Time Analyzed	AM PEAK	Peak Hour Factor	0.87				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		85	0	0		0	0	85		0	240	5		40	90	40
Percent Heavy Vehicles (%)		0	0	0		3	3	3		1				5		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

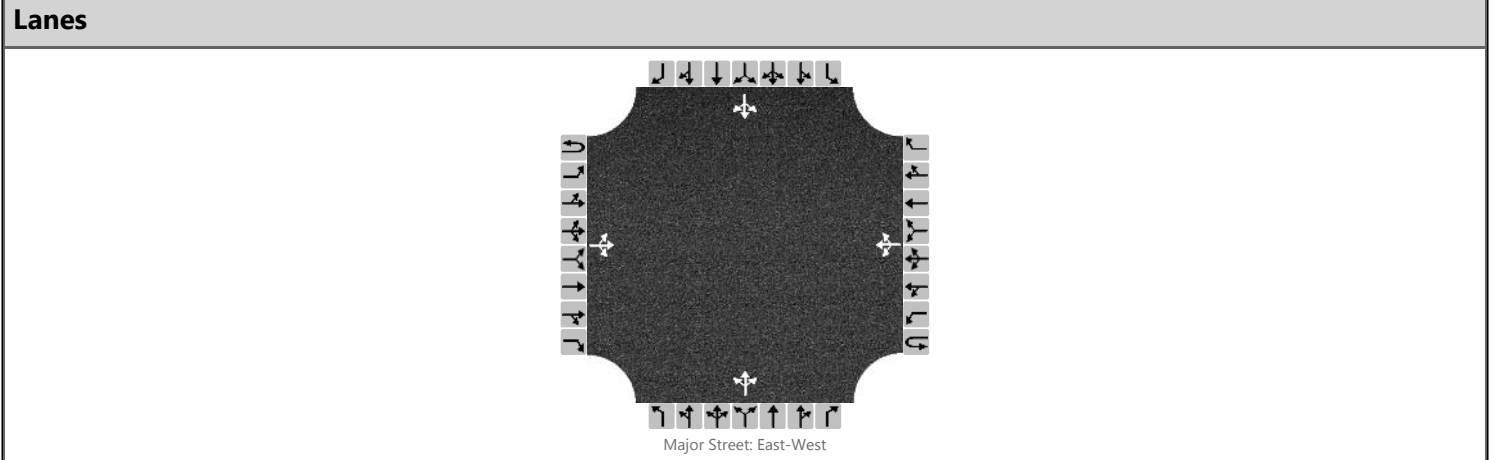
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.13	6.53	6.23		4.11				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.53	4.03	3.33		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			98				98				0				46	
Capacity, c (veh/h)			456				757				1438				1266	
v/c Ratio			0.21				0.13				0.00				0.04	
95% Queue Length, Q <sub>95</sub> (veh)			0.8				0.4				0.0				0.1	
Control Delay (s/veh)			15.0				10.5				7.5				8.0	
Level of Service, LOS			C				B				A				A	
Approach Delay (s/veh)	15.0				10.5				0.0				2.1			
Approach LOS	C				B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/WESTSHORE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	WESTSHORE DRIVE				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.89				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		5	80	10		60	135	10		10	0	60		20	5	10
Percent Heavy Vehicles (%)		1				1				1	1	1		3	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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.11	6.51	6.21		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)		2.21				2.21				3.51	4.01	3.31		3.53	4.03	3.33

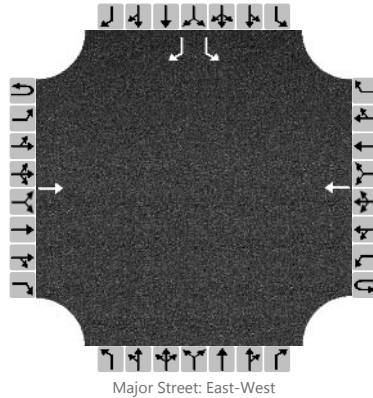
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)		6				67					78					39	
Capacity, c (veh/h)		1421				1497					860					552	
v/c Ratio		0.00				0.04					0.09					0.07	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.3					0.2	
Control Delay (s/veh)		7.5				7.5					9.6					12.0	
Level of Service, LOS		A				A					A					B	
Approach Delay (s/veh)		0.5				2.5				9.6				12.0			
Approach LOS										A				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/HS WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	HS WEST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			160				200							5		5
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)															7.1		6.2
Critical Headway (sec)															7.10		6.20
Base Follow-Up Headway (sec)															3.5		3.3
Follow-Up Headway (sec)															3.50		3.30

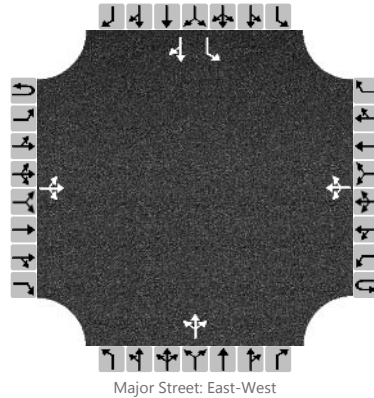
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)															5		5
Capacity, c (veh/h)															572		828
v/c Ratio															0.01		0.01
95% Queue Length, Q <sub>95</sub> (veh)															0.0		0.0
Control Delay (s/veh)															11.4		9.4
Level of Service, LOS															B		A
Approach Delay (s/veh)													10.4				
Approach LOS													B				

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/HS MID DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	HS MIDDLE DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.87				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		1	1	0
Configuration			LTR				LTR				LTR			L		TR
Volume, V (veh/h)		5	150	10		50	195	20		5	0	20		15	0	0
Percent Heavy Vehicles (%)		1				1				0	0	0		1	1	1
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.10	6.50	6.20		7.11	6.51	6.21
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)		2.21				2.21				3.50	4.00	3.30		3.51	4.01	3.31

## Delay, Queue Length, and Level of Service

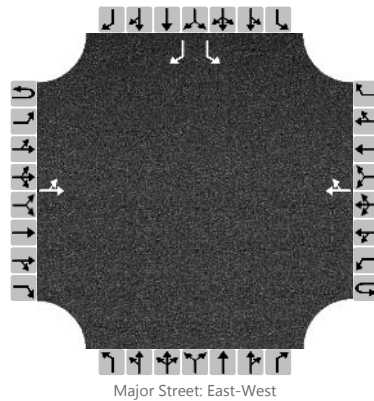
Flow Rate, v (veh/h)		6				57					29				17		0
Capacity, c (veh/h)		1324				1398					723				418		0
v/c Ratio		0.00				0.04					0.04				0.04		
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.1				0.1		
Control Delay (s/veh)		7.7				7.7					10.2				14.0		5.0
Level of Service, LOS		A				A					B				B		A
Approach Delay (s/veh)		0.3				1.7				10.2				14.0			
Approach LOS										B				B			



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2017	North/South Street	HS EAST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.58				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume, V (veh/h)		0	185				250	10						60		15
Percent Heavy Vehicles (%)		7												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.17												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.26												3.50		3.30

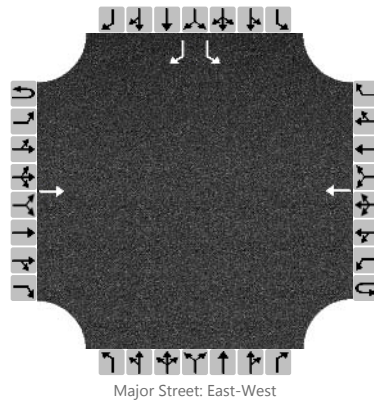
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0												103		26
Capacity, c (veh/h)		1088												326		621
v/c Ratio		0.00												0.32		0.04
95% Queue Length, Q <sub>95</sub> (veh)		0.0												1.3		0.1
Control Delay (s/veh)		8.3												21.1		11.0
Level of Service, LOS		A												C		B
Approach Delay (s/veh)	0.0												19.0			
Approach LOS													C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/ES WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	ES WEST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.56				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			305				295							55		35
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)														7.1		6.2
Critical Headway (sec)														7.10		6.20
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.50		3.30

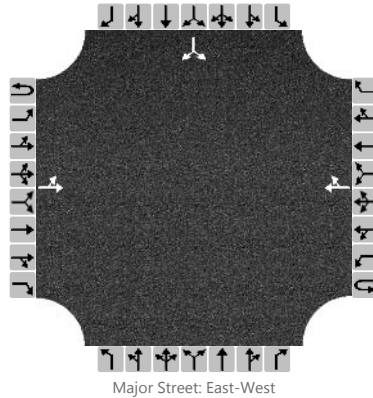
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														98		62
Capacity, c (veh/h)														200		555
v/c Ratio														0.49		0.11
95% Queue Length, Q <sub>95</sub> (veh)														2.4		0.4
Control Delay (s/veh)														39.2		12.3
Level of Service, LOS														E		B
Approach Delay (s/veh)													28.8			
Approach LOS													D			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/ES EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2017	North/South Street	ES EAST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.58				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		10	350				290	40						5		5
Percent Heavy Vehicles (%)		2												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.12												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.22												3.50		3.30

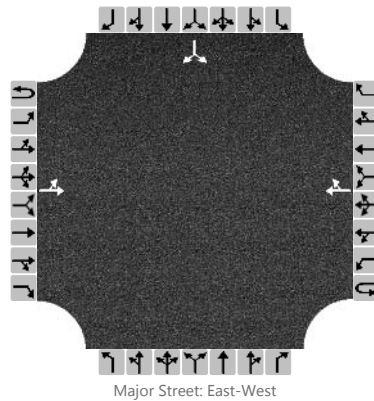
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		17														18
Capacity, c (veh/h)		1003														257
v/c Ratio		0.02														0.07
95% Queue Length, Q <sub>95</sub> (veh)		0.1														0.2
Control Delay (s/veh)		8.7														20.1
Level of Service, LOS		A														C
Approach Delay (s/veh)	0.5								0.5				20.1			
Approach LOS													C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/PENROSE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	PENROSE DRIVE				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.60				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		10	345				325	5						10		5
Percent Heavy Vehicles (%)		3												0		0
Proportion Time Blocked																
Percent Grade (%)																0
Right Turn Channelized		No			No				No			No				
Median Type/Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.30

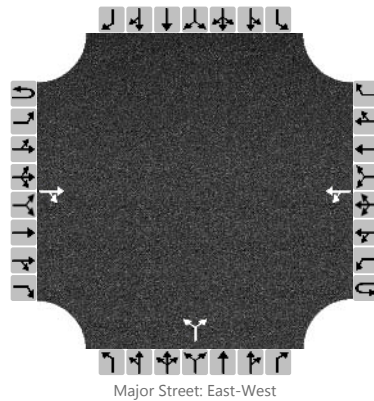
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		17														25
Capacity, c (veh/h)		1014														220
v/c Ratio		0.02														0.11
95% Queue Length, Q <sub>95</sub> (veh)		0.1														0.4
Control Delay (s/veh)		8.6														23.4
Level of Service, LOS		A														C
Approach Delay (s/veh)		0.5												23.4		
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/STREETER				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	STREETER DRIVE				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.63				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	0	0		0	0	0	
Configuration				TR		LT					LR					
Volume, V (veh/h)			280	75		30	300			30		20				
Percent Heavy Vehicles (%)						4				6		6				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.14				7.16		6.26				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.24				3.55		3.35				

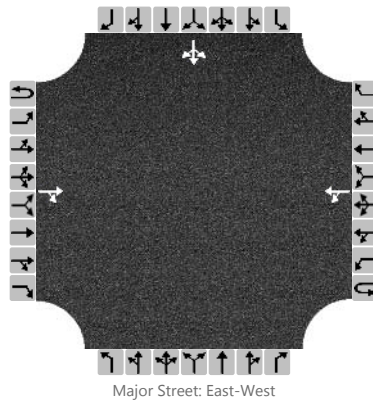
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						48				80						
Capacity, c (veh/h)						997				251						
v/c Ratio						0.05				0.32						
95% Queue Length, Q <sub>95</sub> (veh)						0.2				1.3						
Control Delay (s/veh)						8.8				25.9						
Level of Service, LOS						A				D						
Approach Delay (s/veh)					1.4				25.9							
Approach LOS									D							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 SB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	I-29 SB				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.66				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration				TR		LT									LTR	
Volume, V (veh/h)			85	215		25	310							10	0	20
Percent Heavy Vehicles (%)						2								7	7	7
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.12								7.17	6.57	6.27
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.22								3.56	4.06	3.36

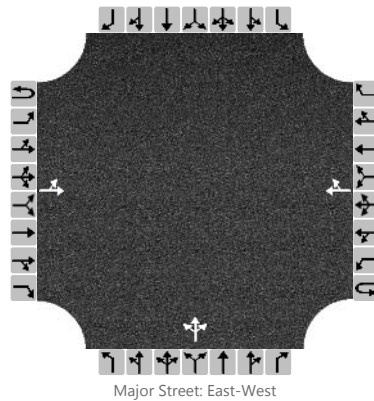
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						38									45	
Capacity, c (veh/h)						1105									421	
v/c Ratio						0.03									0.11	
95% Queue Length, Q <sub>95</sub> (veh)						0.1									0.4	
Control Delay (s/veh)						8.4									14.6	
Level of Service, LOS						A									B	
Approach Delay (s/veh)					1.0								14.6			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 NB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2017	North/South Street	I-29 NB				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.93				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration		LT						TR			LTR					
Volume, V (veh/h)		40	55				90	25		245	0	45				
Percent Heavy Vehicles (%)		3								0	0	0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1								7.1	6.5	6.2				
Critical Headway (sec)		4.13								7.10	6.50	6.20				
Base Follow-Up Headway (sec)		2.2								3.5	4.0	3.3				
Follow-Up Headway (sec)		2.23								3.50	4.00	3.30				

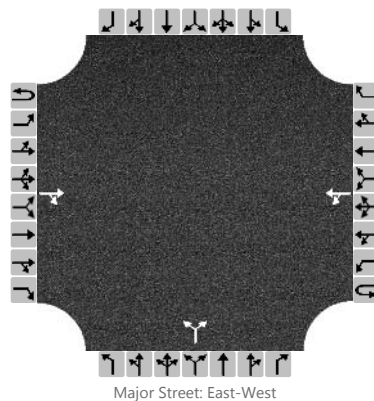
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		43									311						
Capacity, c (veh/h)		1455									721						
v/c Ratio		0.03									0.43						
95% Queue Length, Q <sub>95</sub> (veh)		0.1									2.2						
Control Delay (s/veh)		7.5									13.7						
Level of Service, LOS		A									B						
Approach Delay (s/veh)		3.3								13.7							
Approach LOS										B							

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	RL	Intersection	NORTHSHORE/MILITARY
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY
Date Performed	4/24/2017	East/West Street	NORTHSHORE DRIVE
Analysis Year	2017	North/South Street	MILITARY ROAD
Time Analyzed	PM EXISTING	Peak Hour Factor	0.85
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	DD/NSC TRAFFIC STUDY		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			30	70		5	40			75		0				
Percent Heavy Vehicles (%)						11				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.21					7.13		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.30					3.53		3.33			

## Delay, Queue Length, and Level of Service

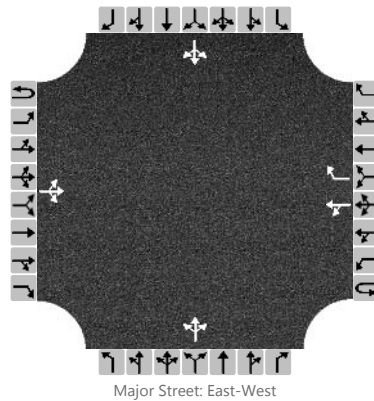
Flow Rate, v (veh/h)						6					88					
Capacity, c (veh/h)						1417					831					
v/c Ratio						0.00					0.11					
95% Queue Length, Q <sub>95</sub> (veh)						0.0					0.4					
Control Delay (s/veh)						7.6					9.8					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					0.9				9.8							
Approach LOS									A							



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SODRAC				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	RIVER DRIVE				
Analysis Year	2017	North/South Street	SODRAC DRIVE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.91				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	1		0	1	0		0	1	0
Configuration			LTR			LT		R			LTR				LTR	
Volume, V (veh/h)		0	45	0		35	55	15		0	0	35		20	0	0
Percent Heavy Vehicles (%)		0				0				9	9	9		0	0	0
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.19	6.59	6.29		7.10	6.50	6.20
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)		2.20				2.20				3.58	4.08	3.38		3.50	4.00	3.30

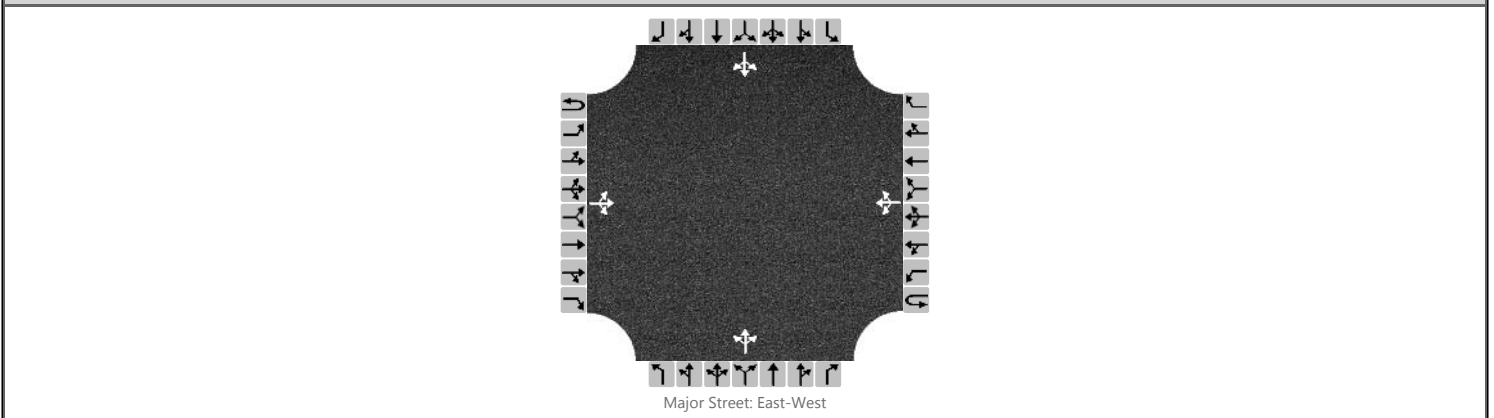
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				38					38					22	
Capacity, c (veh/h)		1536				1571					1000					715	
v/c Ratio		0.00				0.02					0.04					0.03	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.1					0.1	
Control Delay (s/veh)		7.3				7.3					8.7					10.2	
Level of Service, LOS		A				A					A					B	
Approach Delay (s/veh)		0.0				2.5				8.7				10.2			
Approach LOS										A				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SIOUX POINT				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	RIVER DRIVE				
Analysis Year	2017	North/South Street	SODRAC DRIVE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.81				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	1	0	
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		5	85	10		105	95	170		5	35	125		85	20	5
Percent Heavy Vehicles (%)		2				1				1	1	1		0	0	0
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.12				4.11				7.11	6.51	6.21		7.10	6.50	6.20
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)		2.22				2.21				3.51	4.01	3.31		3.50	4.00	3.30

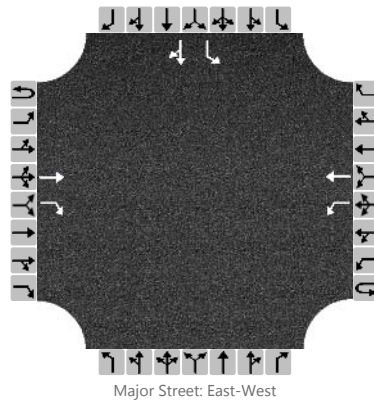
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		6				130				203				136		
Capacity, c (veh/h)		1232				1477				643				267		
v/c Ratio		0.00				0.09				0.32				0.51		
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.3				1.4				2.7		
Control Delay (s/veh)		7.9				7.7				13.2				31.6		
Level of Service, LOS		A				A				B				D		
Approach Delay (s/veh)	0.4				2.8				13.2				31.6			
Approach LOS									B				D			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/I-29 SB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	RIVER DRIVE				
Analysis Year	2017	North/South Street	I-29 SB				
Time Analyzed	PM PEAK	Peak Hour Factor	0.76				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	1	0	1	1	0		0	0	0		1	1	0
Configuration			T	R		L	T							L		TR
Volume, V (veh/h)			200	95		280	340							45	0	30
Percent Heavy Vehicles (%)						2								1	1	1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

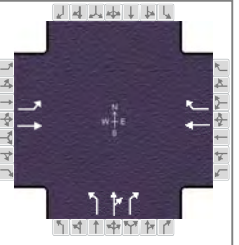
Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.12								7.11	6.51	6.21
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.22								3.51	4.01	3.31

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						368								59		39
Capacity, c (veh/h)						1170								83		614
v/c Ratio						0.31								0.71		0.06
95% Queue Length, Q <sub>95</sub> (veh)						1.4								3.4		0.2
Control Delay (s/veh)						9.5								117.2		11.3
Level of Service, LOS						A								F		B
Approach Delay (s/veh)					4.3								75.1			
Approach LOS													F			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Apr 24, 2017	Area Type	Other
Jurisdiction	NORTH SIOUX CITY	Time Period	PM PEAK	PHF	0.83
Urban Street	RIVER DRIVE	Analysis Year	2017	Analysis Period	1 > 7:00
Intersection	I-29 NB	File Name	RIVER SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	40	205			460	90	160	0	200			

Signal Information													
Cycle, s	47.0	Reference Phase	2										
Offset, s	8	Reference Point	Begin										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	18.2	15.8	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	5.0	0.0	0.0	0.0	0.0			
				Red	2.0	2.0	0.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		6.0		7.0		9.0		
Phase Duration, s		24.2		24.2		22.8		
Change Period, ( Y+R <sub>c</sub> ), s		6.0		6.0		7.0		
Max Allow Headway ( MAH ), s		3.1		3.1		3.2		
Queue Clearance Time ( g <sub>s</sub> ), s		17.0		14.6		6.6		
Green Extension Time ( g <sub>e</sub> ), s		1.2		1.4		0.6		
Phase Call Probability		1.00		1.00		0.99		
Max Out Probability		0.13		0.05		0.00		

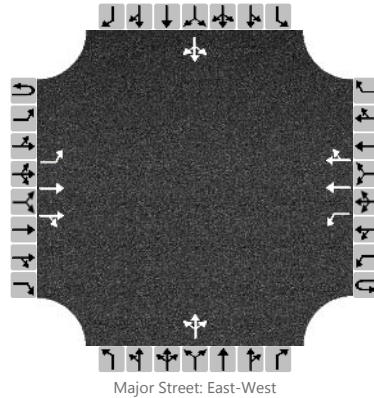
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3	8	18			
Adjusted Flow Rate ( v ), veh/h	48	247			480	57	193	0	145			
Adjusted Saturation Flow Rate ( s ), veh/h/ln	922	1588			1575	1335	1500	1575	1335			
Queue Service Time ( g <sub>s</sub> ), s	2.3	5.3			12.6	1.3	4.6	0.0	3.8			
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	15.0	5.3			12.6	1.3	4.6	0.0	3.8			
Green Ratio ( g/C )	0.39	0.39			0.39	0.39	0.34	0.34	0.34			
Capacity ( c ), veh/h	260	613			609	516	505	530	449			
Volume-to-Capacity Ratio ( X )	0.185	0.403			0.789	0.111	0.382	0.000	0.322			
Back of Queue ( Q ), ft/ln ( 95 th percentile)	19.3	63.2			163.9	13	52.5	0	38.5			
Back of Queue ( Q ), veh/ln ( 95 th percentile)	0.8	2.5			6.5	0.5	2.1	0.0	1.5			
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.21	0.00			0.00	0.00	0.00	0.00	0.08			
Uniform Delay ( d <sub>1</sub> ), s/veh	19.4	10.5			12.7	9.2	11.9	0.0	11.6			
Incremental Delay ( d <sub>2</sub> ), s/veh	0.1	0.2			2.1	0.0	0.2	0.0	0.2			
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay ( d ), s/veh	19.5	10.6			14.8	9.3	12.0	0.0	11.7			
Level of Service ( LOS )	B	B			B	A	B		B			
Approach Delay, s/veh / LOS	12.1	B		14.2	B		11.9	B	0.0			
Intersection Delay, s/veh / LOS	13.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	1.9	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.5	B	1.0	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/S DERBY LANE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	4/24/2017	East/West Street	RIVER DRIVE				
Analysis Year	2017	North/South Street	S DERBY LANE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.76				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0
Configuration		L	T	TR		L	T	TR			LTR				LTR	
Volume, V (veh/h)		30	350	25		10	475	25		25	5	50		10	5	50
Percent Heavy Vehicles (%)		2				2				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

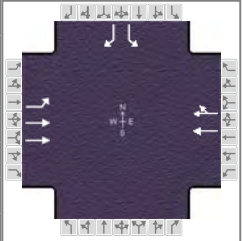
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.14				4.14				7.50	6.50	6.90		7.50	6.50	6.90
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.22				2.22				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		39				13					106					86	
Capacity, c (veh/h)		926				1066					360					402	
v/c Ratio		0.04				0.01					0.29					0.21	
95% Queue Length, Q <sub>95</sub> (veh)		0.1				0.0					1.2					0.8	
Control Delay (s/veh)		9.1				8.4					19.1					16.4	
Level of Service, LOS		A				A					C					C	
Approach Delay (s/veh)		0.7				0.2				19.1				16.4			
Approach LOS										C				C			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Apr 24, 2017	Area Type	Other
Jurisdiction	NORTH SIOUX CITY	Time Period	PM PEAK	PHF	0.88
Urban Street	RIVER DRIVE	Analysis Year	2017	Analysis Period	1 > 7:00
Intersection	N DERBY LANE	File Name	RIVER SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	210	200			265	35					35	245

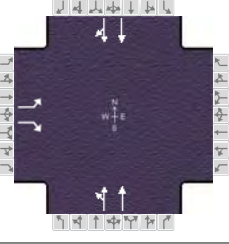
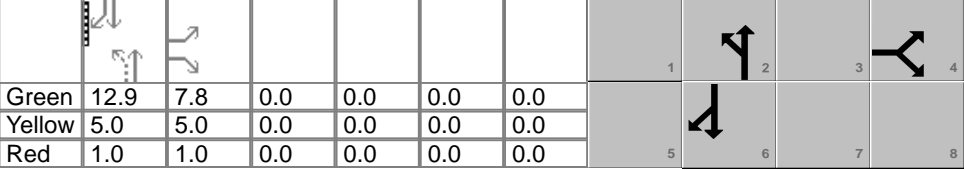
Signal Information				Phase Diagram								
Cycle, s	41.4	Reference Phase	2									
Offset, s	114	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	6.6	12.0	8.8	0.0	0.0	0.0				
		Yellow	3.0	4.0	3.0	0.0	0.0	0.0				
		Red	0.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		8.3				9.0
Phase Duration, s	9.6	27.6		18.0				13.8
Change Period, ( Y+R <sub>c</sub> ), s	3.0	6.0		6.0				5.0
Max Allow Headway ( MAH ), s	3.1	3.0		3.0				3.3
Queue Clearance Time ( g <sub>s</sub> ), s	6.2	3.7		8.7				8.8
Green Extension Time ( g <sub>e</sub> ), s	0.4	1.1		1.0				0.2
Phase Call Probability	0.94	1.00		1.00				0.97
Max Out Probability	0.00	0.00		0.00				1.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate ( v ), veh/h	250	238			163	161				40		278
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1500	1499			1575	1536				1512		1345
Queue Service Time ( g <sub>s</sub> ), s	4.2	1.7			6.7	3.4				0.9		6.8
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	4.2	1.7			6.7	3.4				0.9		6.8
Green Ratio ( g/C )	0.50	0.52			0.29	0.29				0.21		0.37
Capacity ( c ), veh/h	547	1565			456	445				322		501
Volume-to-Capacity Ratio ( X )	0.456	0.152			0.357	0.361				0.124		0.556
Back of Queue ( Q ), ft/ln ( 95 th percentile)	34.8	12.9			41.2	40				10.8		63.7
Back of Queue ( Q ), veh/ln ( 95 th percentile)	1.4	0.5			1.6	1.6				0.4		2.5
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.29	0.00			0.00	0.00				0.11		0.00
Uniform Delay ( d <sub>1</sub> ), s/veh	7.5	5.1			11.7	11.7				13.2		10.3
Incremental Delay ( d <sub>2</sub> ), s/veh	0.2	0.0			0.2	0.2				0.1		0.4
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay ( d ), s/veh	7.7	5.2			11.8	11.9				13.2		10.7
Level of Service ( LOS )	A	A			B	B				B		B
Approach Delay, s/veh / LOS	6.5	A		11.8	B		0.0			11.0		B
Intersection Delay, s/veh / LOS	9.3						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.3	B	2.7	C	2.8	C
Bicycle LOS Score / LOS	0.9	A	0.8	A				F

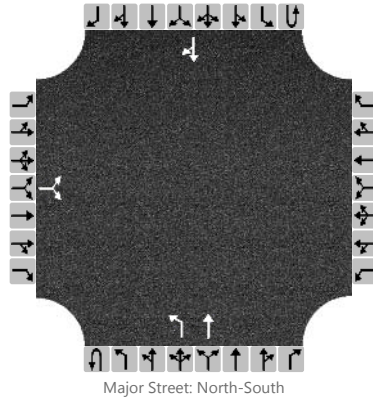
## HCS7 Signalized Intersection Results Summary

General Information					Intersection Information												
Agency	HDR				Duration, h	0.25											
Analyst	RL	Analysis Date	Apr 24, 2017		Area Type	Other											
Jurisdiction	NORTH SIOUX CITY		Time Period	PM PEAK		PHF	0.77										
Urban Street	RIVER DRIVE		Analysis Year	2017		Analysis Period	1 > 7:00										
Intersection	MILITARY ROAD		File Name	RIVER-MILITARY.xus													
Project Description	DD/NSC TRAFFIC STUDY																
Demand Information					EB			WB			NB			SB			
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R	
Demand ( v ), veh/h					45		190				210	100			80	90	
Signal Information										1		2		3		4	
Cycle, s	32.7	Reference Phase	2														
Offset, s	0	Reference Point	Begin														
Uncoordinated	Yes	Simult. Gap E/W	On														
Force Mode	Fixed	Simult. Gap N/S	On														
Green	12.9	7.8	0.0	0.0	0.0	0.0											
Yellow	5.0	5.0	0.0	0.0	0.0	0.0											
Red	1.0	1.0	0.0	0.0	0.0	0.0											
Timer Results					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT					
Assigned Phase						4				2		6					
Case Number						9.0				8.0		8.0					
Phase Duration, s						13.8				18.9		18.9					
Change Period, ( Y+R <sub>c</sub> ), s						6.0				6.0		6.0					
Max Allow Headway ( MAH ), s						3.4				3.3		3.3					
Queue Clearance Time ( g <sub>s</sub> ), s						7.7				11.6		4.8					
Green Extension Time ( g <sub>e</sub> ), s						0.7				1.3		1.3					
Phase Call Probability						0.94				1.00		1.00					
Max Out Probability						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					7		14				5	2		6		16	
Adjusted Flow Rate ( v ), veh/h					58		247				273	130		90		86	
Adjusted Saturation Flow Rate ( s ), veh/h/ln					1500		1335				934	1433		1575		1369	
Queue Service Time ( g <sub>s</sub> ), s					1.0		5.7				6.6	4.2		2.8		1.3	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s					1.0		5.7				9.6	4.2		2.8		1.3	
Green Ratio ( g/C )					0.24		0.24				0.39	0.39		0.39		0.39	
Capacity ( c ), veh/h					356		317				590	568		624		542	
Volume-to-Capacity Ratio ( X )					0.164		0.778				0.462	0.229		0.144		0.158	
Back of Queue ( Q ), ft/ln ( 95 th percentile )					11.6		62.4				55.8	17.5		11.6		11	
Back of Queue ( Q ), veh/ln ( 95 th percentile )					0.5		2.5				2.2	0.7		0.5		0.4	
Queue Storage Ratio ( RQ ) ( 95 th percentile )					0.00		0.00				0.00	0.00		0.00		0.00	
Uniform Delay ( d <sub>1</sub> ), s/veh					9.9		11.7				10.2	6.6		6.3		6.4	
Incremental Delay ( d <sub>2</sub> ), s/veh					0.1		1.6				0.2	0.1		0.0		0.0	
Initial Queue Delay ( d <sub>3</sub> ), s/veh					0.0		0.0				0.0	0.0		0.0		0.0	
Control Delay ( d ), s/veh					10.0		13.3				10.4	6.6		6.4		6.4	
Level of Service ( LOS )					A		B				B	A		A		A	
Approach Delay, s/veh / LOS					12.6		B	0.0			9.2	A	6.4		A		
Intersection Delay, s/veh / LOS					9.8			A									
Multimodal Results					EB			WB			NB			SB			
Pedestrian LOS Score / LOS					2.7		C	2.8		C	0.7	A	1.6		B		
Bicycle LOS Score / LOS							F				0.8	A	0.6		A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/STEAMBOAT				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	STEAMBOAT DRIVE				
Analysis Year	2017	North/South Street	SIOUX POINT ROAD				
Time Analyzed	PM PEAK	Peak Hour Factor	0.73				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0		1	1	0		0	1	0
Configuration			LR							L	T					TR
Volume, V (veh/h)		35		160						65	150				220	10
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

## Delay, Queue Length, and Level of Service

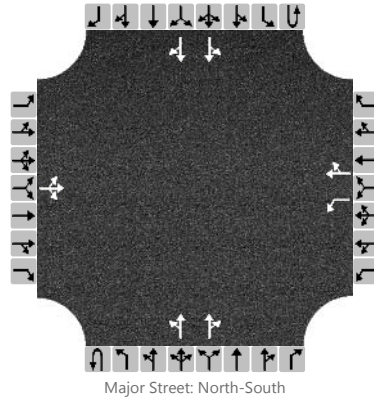
Flow Rate, v (veh/h)			267							89						
Capacity, c (veh/h)			632							1257						
v/c Ratio			0.42							0.07						
95% Queue Length, Q <sub>95</sub> (veh)			2.1							0.2						
Control Delay (s/veh)			14.8							8.1						
Level of Service, LOS			B							A						
Approach Delay (s/veh)	14.8								2.4							
Approach LOS	B															



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/TOWER				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	TOWER ROAD				
Analysis Year	2017	North/South Street	SIOUX POINT ROAD				
Time Analyzed	PM PEAK	Peak Hour Factor	0.79				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		1	1	0	0	0	2	0	0	0	2	0
Configuration			LTR			L		TR		LT		TR		LT		TR
Volume, V (veh/h)		5	0	50		125	5	30		45	180	45		20	350	10
Percent Heavy Vehicles (%)		2	2	2		2	2	2		0				0		
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)		7.5	6.5	6.9		7.5	6.5	6.9		4.1				4.1		
Critical Headway (sec)		7.54	6.54	6.94		7.54	6.54	6.94		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.20				2.20		

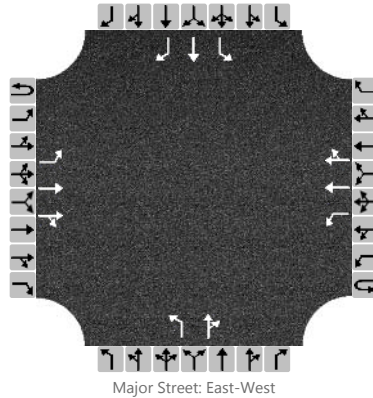
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			69			158		44		57				25		
Capacity, c (veh/h)			668			308		665		1116				1289		
v/c Ratio			0.10			0.51		0.07		0.05				0.02		
95% Queue Length, Q <sub>95</sub> (veh)			0.3			2.8		0.2		0.2				0.1		
Control Delay (s/veh)			11.0			28.4		10.8		8.4				7.8		
Level of Service, LOS			B			D		B		A				A		
Approach Delay (s/veh)	11.0				24.6				1.5				0.5			
Approach LOS	B				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	TWO RIVERS/COTTONWOOD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	TWO RIVERS DRIVE				
Analysis Year	2017	North/South Street	COTTONWOOD LANE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.57				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	1
Configuration		L	T	TR		L	T	TR		L		TR		L	T	R
Volume, V (veh/h)		40	5	30		0	310	5		40	5	30		0	5	185
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				Yes			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

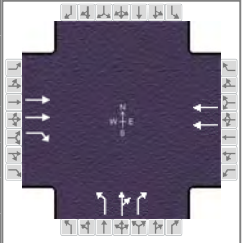
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.10				4.10				7.50	6.50	6.90		7.50	6.50	6.90
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		70				0				70		62		0	9	325	
Capacity, c (veh/h)		1027				1554				255		793		292	319	728	
v/c Ratio		0.07				0.00				0.28		0.08		0.00	0.03	0.45	
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.0				1.1		0.3		0.0	0.1	2.3	
Control Delay (s/veh)		8.8				7.3				24.4		9.9		17.3	16.6	13.9	
Level of Service, LOS		A				A				C		A		C	C	B	
Approach Delay (s/veh)		4.6				0.0				17.6				14.0			
Approach LOS										C				B			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Apr 24, 2017	Area Type	Other
Jurisdiction	DAKOTA DUNES	Time Period	PM PEAK	PHF	0.65
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2017	Analysis Period	1 > 7:00
Intersection	I-29 NB	File Name	DD SIGNALS PM.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h		25	140		690		510	0	50			

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	46	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	36.5	41.5	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	1.5	2.5	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		7.0		8.0		9.0		
Phase Duration, s		42.0		42.0		48.0		
Change Period, ( Y+R <sub>c</sub> ), s		5.5		5.5		6.5		
Max Allow Headway ( MAH ), s		0.0		0.0		3.0		
Queue Clearance Time ( g <sub>s</sub> ), s						43.5		
Green Extension Time ( g <sub>e</sub> ), s		0.0		0.0		0.0		
Phase Call Probability						1.00		
Max Out Probability						1.00		

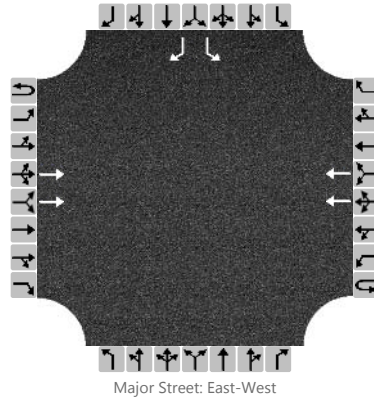
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12		6		3	8	18			
Adjusted Flow Rate ( v ), veh/h		25	86		1062		785	0	46			
Adjusted Saturation Flow Rate ( s ), veh/h/ln		1499	1335		1523		1512	1600	1345			
Queue Service Time ( g <sub>s</sub> ), s		0.5	2.9		28.6		41.5	0.0	1.7			
Cycle Queue Clearance Time ( g <sub>c</sub> ), s		0.5	2.9		28.6		41.5	0.0	1.7			
Green Ratio ( g/C )		0.41	0.41		0.41		0.46	0.46	0.46			
Capacity ( c ), veh/h		1216	541		1235		697	738	620			
Volume-to-Capacity Ratio ( X )		0.021	0.158		0.859		1.125	0.000	0.074			
Back of Queue ( Q ), ft/ln ( 95 th percentile)		7.6	41.3		408.6		979	0	21.5			
Back of Queue ( Q ), veh/ln ( 95 th percentile)		0.3	1.6		16.3		38.8	0.0	0.9			
Queue Storage Ratio ( RQ ) ( 95 th percentile)		0.00	0.17		0.00		0.00	0.00	0.05			
Uniform Delay ( d <sub>1</sub> ), s/veh		17.2	12.8		24.4		24.3	0.0	13.5			
Incremental Delay ( d <sub>2</sub> ), s/veh		0.0	0.6		7.9		74.1	0.0	0.0			
Initial Queue Delay ( d <sub>3</sub> ), s/veh		0.0	0.0		0.0		0.0	0.0	0.0			
Control Delay ( d ), s/veh		17.3	13.5		32.3		98.3	0.0	13.6			
Level of Service ( LOS )		B	B		C		F		B			
Approach Delay, s/veh / LOS	14.3		B	32.3		C	93.6		F	0.0		
Intersection Delay, s/veh / LOS	56.7						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	1.9	B	2.7	C	2.9	C
Bicycle LOS Score / LOS	0.6	A	1.4	A	1.9	B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/I-29 SB				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	I-29 SB				
Time Analyzed	PM PEAK	Peak Hour Factor	0.74				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			160				625							5		120
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)																0
Right Turn Channelized			No				No					No				No
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

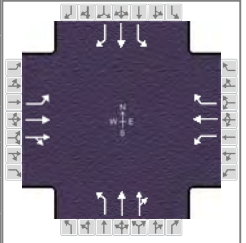
Base Critical Headway (sec)															7.5		6.9
Critical Headway (sec)															7.50		6.90
Base Follow-Up Headway (sec)															3.5		3.3
Follow-Up Headway (sec)															3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)															7		162
Capacity, c (veh/h)															217		586
v/c Ratio															0.03		0.28
95% Queue Length, Q <sub>95</sub> (veh)															0.1		1.1
Control Delay (s/veh)															22.2		13.5
Level of Service, LOS															C		B
Approach Delay (s/veh)	13.8																
Approach LOS	B																

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	HDR			Duration, h	0.25		
Analyst	RL	Analysis Date	Apr 24, 2017	Area Type	Other		
Jurisdiction	DAKOTA DUNES	Time Period	PM PEAK	PHF	0.84		
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2017	Analysis Period	1 > 7:00		
Intersection	SIOUX PT RD	File Name	DD SIGNALS PM.xus				
Project Description	DD/NSC TRAFFIC STUDY						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	80	105	35	65	505	175	0	15	5	50	300	175

Signal Information				Signal Timing (s)								Signal Phases			
Cycle, s	90.0	Reference Phase	2	Green	6.7	0.3	42.3	0.0	3.9	12.9	1	2	3	4	
Offset, s	0	Reference Point	Begin	Yellow	4.0	0.0	4.0	4.0	4.0	4.0	5	6	7	8	
Uncoordinated	No	Simult. Gap E/W	On	Red	1.5	0.0	2.5	1.5	1.5	2.5					
Force Mode	Fixed	Simult. Gap N/S	On												

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	4.0	1.1	3.0
Phase Duration, s	12.5	49.1	12.2	48.8	0.0	19.4	9.4	28.7
Change Period, ( $Y+R_c$ ), s	5.5	6.5	5.5	6.5	5.5	6.5	5.5	6.5
Max Allow Headway ( $MAH$ ), s	3.1	0.0	3.1	0.0	0.0	3.1	3.1	3.1
Queue Clearance Time ( $g_s$ ), s	7.6		7.3			2.6	4.9	21.5
Green Extension Time ( $g_e$ ), s	0.1	0.0	0.1	0.0	0.0	0.9	0.0	0.8
Phase Call Probability	0.91		0.90			1.00	0.77	1.00
Max Out Probability	0.00		0.00			0.00	1.00	0.03

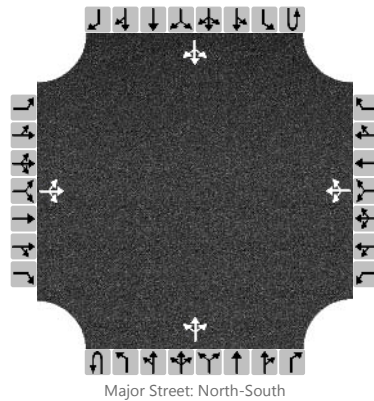
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate ( $v$ ), veh/h	95	75	74	92	713	148	0	12	12	60	357	125
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1512	1588	1500	1524	1600	1356	1524	1600	1468	1524	1600	1356
Queue Service Time ( $g_s$ ), s	5.6	2.4	2.5	5.3	38.2	5.4	0.0	0.6	0.6	2.9	19.5	6.9
Cycle Queue Clearance Time ( $g_c$ ), s	5.6	2.4	2.5	5.3	38.2	5.4	0.0	0.6	0.6	2.9	19.5	6.9
Green Ratio ( $g/C$ )	0.08	0.47	0.47	0.07	0.47	0.51	0.08	0.14	0.14	0.21	0.25	0.25
Capacity ( $c$ ), veh/h	117	751	710	113	752	696	90	229	210	337	395	335
Volume-to-Capacity Ratio ( $X$ )	0.814	0.100	0.104	0.813	0.948	0.213	0.000	0.052	0.057	0.177	0.904	0.373
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	99.6	38.3	38.3	69.8	403.7	57.9	0	10	10	46.8	334.6	98.4
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	4.0	1.5	1.5	2.8	16.1	2.3	0.0	0.4	0.4	1.9	13.4	3.9
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.83	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.00
Uniform Delay ( $d_1$ ), s/veh	40.9	13.1	13.1	39.3	21.8	11.9	0.0	33.3	33.3	29.4	32.8	28.1
Incremental Delay ( $d_2$ ), s/veh	5.1	0.3	0.3	0.9	5.5	0.1	0.0	0.0	0.0	0.1	12.4	0.3
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	46.0	13.4	13.4	40.2	27.3	12.0	0.0	33.3	33.4	29.5	45.2	28.4
Level of Service ( LOS )	D	B	B	D	C	B		C	C	C	D	C
Approach Delay, s/veh / LOS	26.1		C	26.2		C	33.4		C	39.6		D
Intersection Delay, s/veh / LOS	30.4						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.4		B	2.9		C	2.9		C	2.5		B
Bicycle LOS Score / LOS	0.7		A	1.8		B	0.5		A	1.4		A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/COURTYARD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	COURTYARD DRIVE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.83				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		15	10	5		10	0	10		0	195	190		35	640	5
Percent Heavy Vehicles (%)		0	0	0		0	0	0		1				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

## Critical and Follow-up Headways

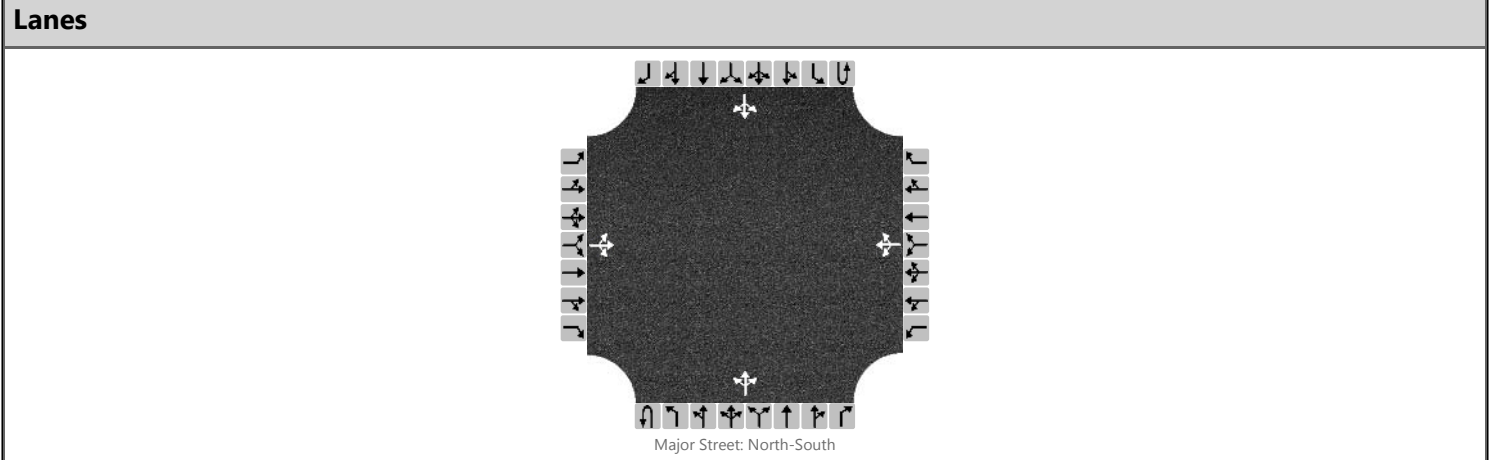
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.11				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.21				2.20		

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			36				24				0				42	
Capacity, c (veh/h)			270				363				844				1108	
v/c Ratio			0.13				0.07				0.00				0.04	
95% Queue Length, Q <sub>95</sub> (veh)			0.5				0.2				0.0				0.1	
Control Delay (s/veh)			20.3				15.6				9.3				8.4	
Level of Service, LOS			C				C				A				A	
Approach Delay (s/veh)	20.3				15.6				0.0				1.0			
Approach LOS	C				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/LEVEE				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	LEVEE TRAIL				
Time Analyzed	PM PEAK	Peak Hour Factor	0.86				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		45	0	5		5	5	45		5	295	5		90	490	75
Percent Heavy Vehicles (%)		0	0	0		2	2	2		1				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.12	6.52	6.22		4.11				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.52	4.02	3.32		2.21				2.20		

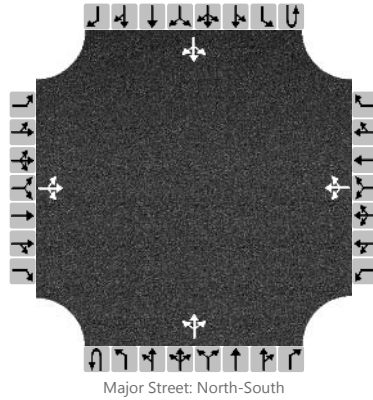
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			58				64				6				105	
Capacity, c (veh/h)			242				517				935				1221	
v/c Ratio			0.24				0.12				0.01				0.09	
95% Queue Length, Q <sub>95</sub> (veh)			0.9				0.4				0.0				0.3	
Control Delay (s/veh)			24.5				12.9				8.9				8.2	
Level of Service, LOS			C				B				A				A	
Approach Delay (s/veh)	24.5				12.9				0.2				2.2			
Approach LOS	C				B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/MEADOWS				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	MEADOWS BLVD				
Time Analyzed	PM PEAK	Peak Hour Factor	0.83				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		50	5	15		5	5	50		15	205	5		105	305	90
Percent Heavy Vehicles (%)		1	1	1		0	0	0		0				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.10	6.50	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.50	4.00	3.30		2.20				2.20		

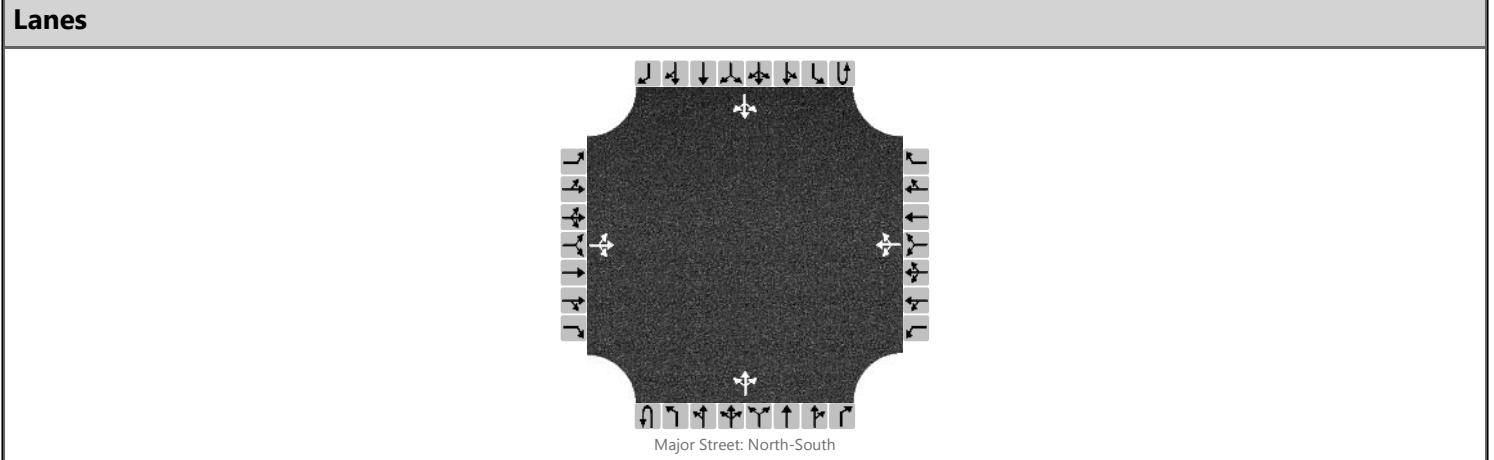
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			84				72				18				127	
Capacity, c (veh/h)			318				613				1098				1324	
v/c Ratio			0.26				0.12				0.02				0.10	
95% Queue Length, Q <sub>95</sub> (veh)			1.0				0.4				0.0				0.3	
Control Delay (s/veh)			20.3				11.6				8.3				8.0	
Level of Service, LOS			C				B				A				A	
Approach Delay (s/veh)	20.3				11.6				0.7				2.6			
Approach LOS	C				B											



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/PINEHURST				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	4/24/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2017	North/South Street	PINEHURST TRAIL				
Time Analyzed	PM PEAK	Peak Hour Factor	0.88				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0	
Configuration			LTR				LTR				LTR				LTR		
Volume, V (veh/h)		45	5	0		5	5	60		0	120	0		70	190	65	
Percent Heavy Vehicles (%)		0	0	0		1	1	1		0				0			
Proportion Time Blocked																	
Percent Grade (%)		0				0											
Right Turn Channelized		No				No				No							
Median Type/Storage		Left + Thru								1							

**Critical and Follow-up Headways**

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.11	6.51	6.21		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.51	4.01	3.31		2.20				2.20		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			57				80				0				80		
Capacity, c (veh/h)			454				801				1284				1461		
v/c Ratio			0.13				0.10				0.00				0.05		
95% Queue Length, Q <sub>95</sub> (veh)			0.4				0.3				0.0				0.2		
Control Delay (s/veh)			14.1				10.0				7.8				7.6		
Level of Service, LOS			B				A				A				A		
Approach Delay (s/veh)		14.1				10.0				0.0				2.0			
Approach LOS		B				A											

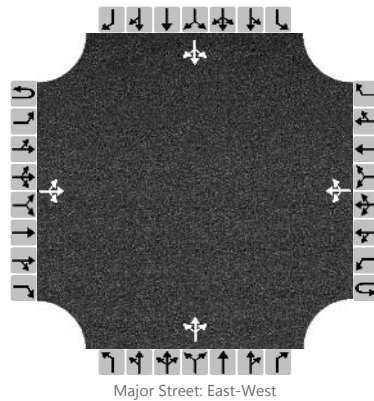
# APPENDIX

## Part 2 – 2022 Level of Service

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/WESTSHORE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	WESTSHORE DRIVE				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR					LTR
Volume, V (veh/h)		35	175	0		10	45	55		0	5	35		30	0	5
Percent Heavy Vehicles (%)		1				1				1	1	1		3	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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.11	6.51	6.21		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)		2.21				2.21				3.51	4.01	3.31		3.53	4.03	3.33

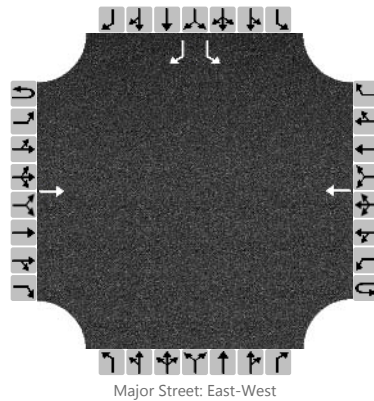
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		39				11				45						39	
Capacity, c (veh/h)		1485				1385				782						555	
v/c Ratio		0.03				0.01				0.06						0.07	
95% Queue Length, Q <sub>95</sub> (veh)		0.1				0.0				0.2						0.2	
Control Delay (s/veh)		7.5				7.6				9.9						12.0	
Level of Service, LOS		A				A				A						B	
Approach Delay (s/veh)		1.4				0.7				9.9				12.0			
Approach LOS										A				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2023	North/South Street	HS WEST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.80				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			240				105							15		5
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)														7.1		6.2
Critical Headway (sec)														7.10		6.20
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.50		3.30

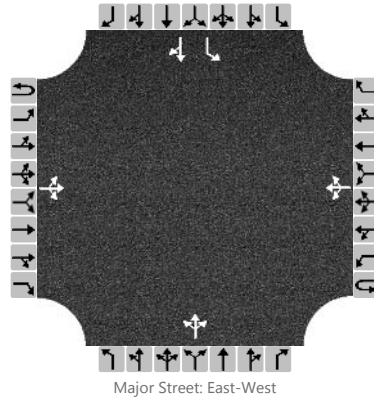
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														19		6
Capacity, c (veh/h)														538		924
v/c Ratio														0.04		0.01
95% Queue Length, Q <sub>95</sub> (veh)														0.1		0.0
Control Delay (s/veh)														11.9		8.9
Level of Service, LOS														B		A
Approach Delay (s/veh)													11.2			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS MID DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2023	North/South Street	HS MIDDLE DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		1	1	0
Configuration			LTR				LTR				LTR			L		TR
Volume, V (veh/h)		50	205	0		10	100	170		5	5	45		25	0	0
Percent Heavy Vehicles (%)		3				3				1	1	1		0	0	0
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.11	6.51	6.21		7.10	6.50	6.20
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				3.51	4.01	3.31		3.50	4.00	3.30

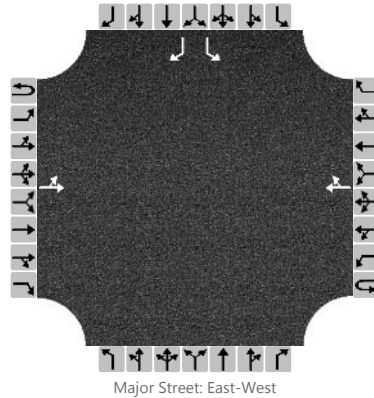
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		56				11				62				28		0	
Capacity, c (veh/h)		1254				1333				670				369		0	
v/c Ratio		0.04				0.01				0.09				0.08			
95% Queue Length, Q <sub>95</sub> (veh)		0.1				0.0				0.3				0.2			
Control Delay (s/veh)		8.0				7.7				10.9				15.5		5.0	
Level of Service, LOS		A				A				B				C		A	
Approach Delay (s/veh)		1.9				0.3				10.9				15.5			
Approach LOS										B				C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2023	North/South Street	HS EAST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume, V (veh/h)		0	275				250	20						115		30
Percent Heavy Vehicles (%)		4												0		0
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.14												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.24												3.50		3.30

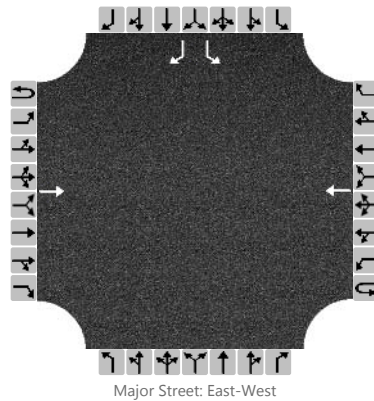
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0												128		33
Capacity, c (veh/h)		1248												419		755
v/c Ratio		0.00												0.31		0.04
95% Queue Length, Q <sub>95</sub> (veh)		0.0												1.3		0.1
Control Delay (s/veh)		7.9												17.3		10.0
Level of Service, LOS		A												C		A
Approach Delay (s/veh)	0.0												15.8			
Approach LOS	C															

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/ES WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	ES WEST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			390				365							120		75
Percent Heavy Vehicles (%)														4		4
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)														7.1		6.2
Critical Headway (sec)														7.14		6.24
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.54		3.34

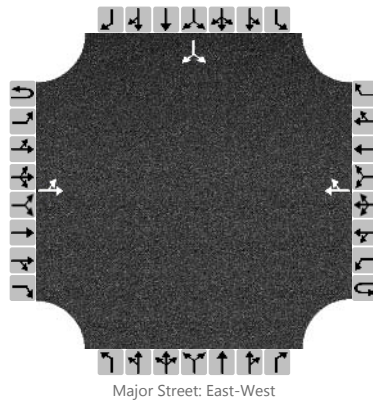
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														133		83
Capacity, c (veh/h)														283		640
v/c Ratio														0.47		0.13
95% Queue Length, Q <sub>95</sub> (veh)														2.4		0.4
Control Delay (s/veh)														28.5		11.5
Level of Service, LOS														D		B
Approach Delay (s/veh)													22.0			
Approach LOS													C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/ES EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	ES EAST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		45	465				365	145						0		0
Percent Heavy Vehicles (%)		3												2		2
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												7.12		6.22
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.52		3.32

## Delay, Queue Length, and Level of Service

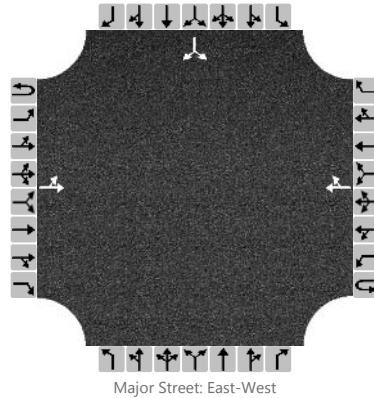
Flow Rate, v (veh/h)		50														0	
Capacity, c (veh/h)		999														0	
v/c Ratio		0.05															
95% Queue Length, Q <sub>95</sub> (veh)		0.2															
Control Delay (s/veh)		8.8														5.0	
Level of Service, LOS		A														A	
Approach Delay (s/veh)		1.4												5.0			
Approach LOS		A															



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/PENROSE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	PENROSE DRIVE				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		0	465				495	5						5		15
Percent Heavy Vehicles (%)		3												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.30

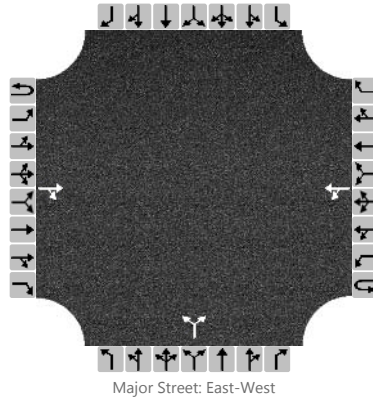
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0														23
Capacity, c (veh/h)		1009														373
v/c Ratio		0.00														0.06
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.2
Control Delay (s/veh)		8.6														15.3
Level of Service, LOS		A														C
Approach Delay (s/veh)	0.0												15.3			
Approach LOS													C			

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	RL	Intersection	NORTHSHORE/STREETER
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE
Analysis Year	2023	North/South Street	STREETER DRIVE
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	DD/NSC TRAFFIC STUDY		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			430	40		5	395			105		30				
Percent Heavy Vehicles (%)						2				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.12				7.11		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.22				3.51		3.31				

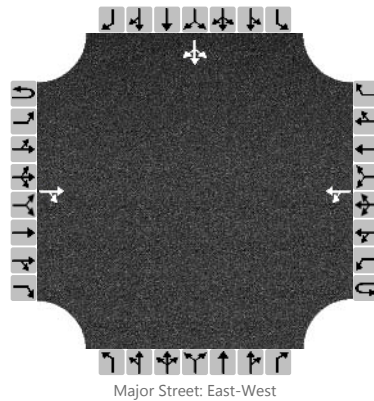
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						6				150						
Capacity, c (veh/h)						1044				274						
v/c Ratio						0.01				0.55						
95% Queue Length, Q <sub>95</sub> (veh)						0.0				3.0						
Control Delay (s/veh)						8.5				32.9						
Level of Service, LOS						A				D						
Approach Delay (s/veh)					0.2				32.9							
Approach LOS									D							

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	RL	Intersection	NORTHSHORE/I-29 SB
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE
Analysis Year	2023	North/South Street	I-29 SB
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	DD/NSC TRAFFIC STUDY		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration				TR		LT									LTR	
Volume, V (veh/h)			130	330		25	380							25	0	20
Percent Heavy Vehicles (%)						3								7	7	7
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.13								7.17	6.57	6.27
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.23								3.56	4.06	3.36

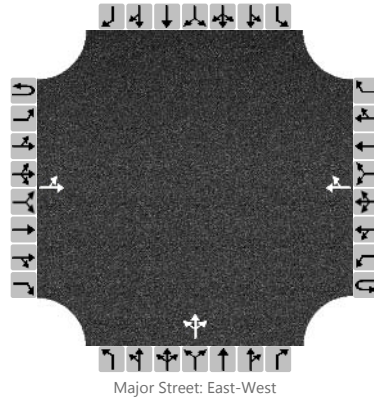
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						28										50
Capacity, c (veh/h)						1048										376
v/c Ratio						0.03										0.13
95% Queue Length, Q <sub>95</sub> (veh)						0.1										0.5
Control Delay (s/veh)						8.5										16.0
Level of Service, LOS						A										C
Approach Delay (s/veh)					0.8								16.0			
Approach LOS													C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 NB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	I-29 NB				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration		LT						TR		LTR						
Volume, V (veh/h)		25	130				95	10		310	0	10				
Percent Heavy Vehicles (%)		3								3	3	3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

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

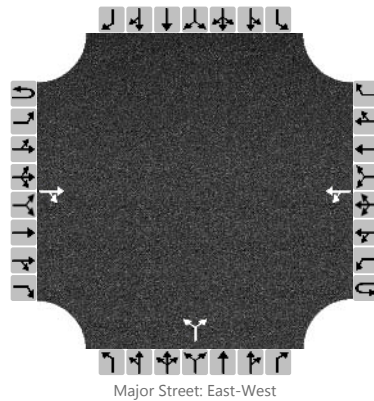
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		28								355						
Capacity, c (veh/h)		1464								634						
v/c Ratio		0.02								0.56						
95% Queue Length, Q <sub>95</sub> (veh)		0.1								3.5						
Control Delay (s/veh)		7.5								17.7						
Level of Service, LOS		A								C						
Approach Delay (s/veh)	1.4								17.7							
Approach LOS									C							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/MILITARY				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	MILITARY ROAD				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			30	110		0	45			60		0				
Percent Heavy Vehicles (%)						4				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.14				7.13		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.24				3.53		3.33				

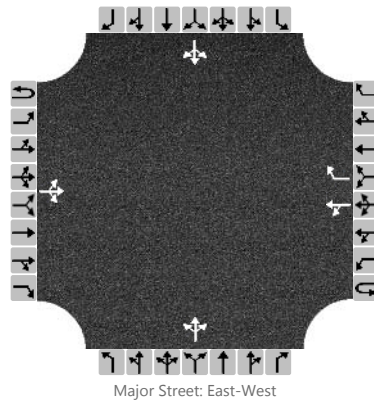
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						0					67					
Capacity, c (veh/h)						1411					822					
v/c Ratio						0.00					0.08					
95% Queue Length, Q <sub>95</sub> (veh)						0.0					0.3					
Control Delay (s/veh)						7.6					9.8					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					0.0				9.8							
Approach LOS									A							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SODRAC				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	RIVER DRIVE				
Analysis Year	2023	North/South Street	SODRAC DRIVE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	1		0	1	0		0	1	0
Configuration			LTR			LT		R			LTR				LTR	
Volume, V (veh/h)		0	260	0		35	90	15		0	0	65		10	0	0
Percent Heavy Vehicles (%)		3				2				5	5	5		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

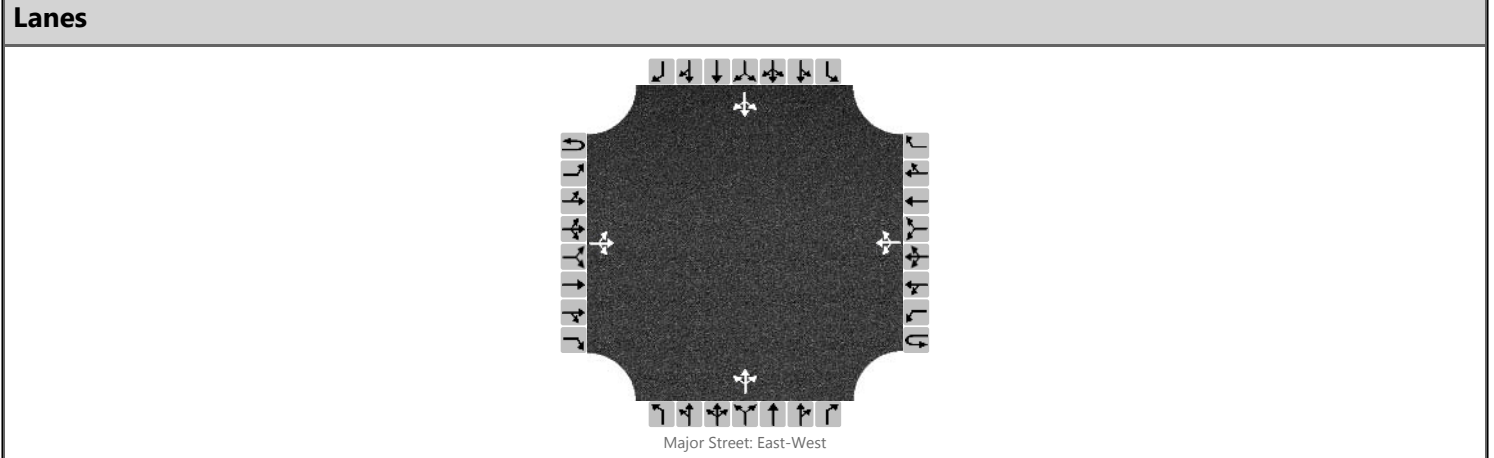
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.12				7.15	6.55	6.25		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.22				3.54	4.04	3.34		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				39					72					11	
Capacity, c (veh/h)		1464				1272					744					425	
v/c Ratio		0.00				0.03					0.10					0.03	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.3					0.1	
Control Delay (s/veh)		7.5				7.9					10.4					13.7	
Level of Service, LOS		A				A					B					B	
Approach Delay (s/veh)		0.0				2.1				10.4				13.7			
Approach LOS										B				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SIOUX POINT				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	RIVER DRIVE				
Analysis Year	2023	North/South Street	SODRAC DRIVE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		10	305	20		160	100	45		20	20	100		145	30	20
Percent Heavy Vehicles (%)		2				2				0	0	0		1	1	1
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.12				4.12				7.10	6.50	6.20		7.11	6.51	6.21
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)		2.22				2.22				3.50	4.00	3.30		3.51	4.01	3.31

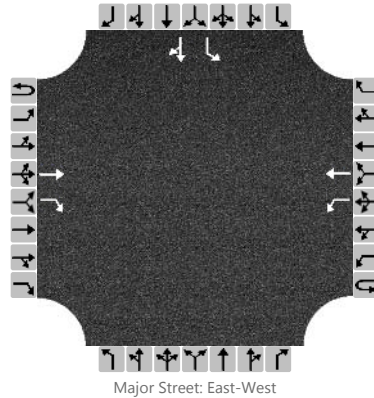
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)		11				178					155					216	
Capacity, c (veh/h)		1417				1197					428					193	
v/c Ratio		0.01				0.15					0.36					1.12	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.5					1.6					10.5	
Control Delay (s/veh)		7.6				8.5					18.1					150.5	
Level of Service, LOS		A				A					C					F	
Approach Delay (s/veh)		0.3				5.2				18.1				150.5			
Approach LOS										C				F			

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	RL	Intersection	RIVER/I-29 SB
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY
Date Performed	6/27/2017	East/West Street	RIVER DRIVE
Analysis Year	2023	North/South Street	I-29 SB
Time Analyzed	AM PEAK	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	DD/NSC TRAFFIC STUDY		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	1	0	1	1	0		0	0	0		1	1	0
Configuration			T	R		L	T							L		TR
Volume, V (veh/h)			330	220		180	225							85	0	80
Percent Heavy Vehicles (%)						5								1	1	1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.15								7.11	6.51	6.21
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.24								3.51	4.01	3.31

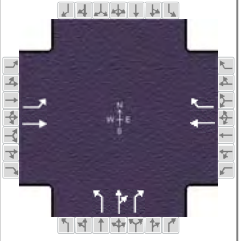
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						200								94		89
Capacity, c (veh/h)						955								182		791
v/c Ratio						0.21								0.52		0.11
95% Queue Length, Q <sub>95</sub> (veh)						0.8								2.6		0.4
Control Delay (s/veh)						9.8								44.2		10.1
Level of Service, LOS						A								E		B
Approach Delay (s/veh)					4.3								27.6			
Approach LOS													D			



# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Jun 27, 2017	Area Type	Other
Jurisdiction	NORTH SIOUX CITY	Time Period	AM PEAK	PHF	0.83
Urban Street	RIVER DRIVE	Analysis Year	2023	Analysis Period	1 > 7:00
Intersection	I-29 NB	File Name	RIVER SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	55	360			355	55	50	0	365			

Signal Information													
Cycle, s	43.2	Reference Phase	2										
Offset, s	8	Reference Point	Begin										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	14.4	15.7	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	5.0	0.0	0.0	0.0	0.0			
				Red	2.0	2.0	0.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		6.0		7.0		9.0		
Phase Duration, s		20.4		20.4		22.7		
Change Period, ( $Y+R_c$ ), s		6.0		6.0		7.0		
Max Allow Headway ( $MAH$ ), s		3.1		3.1		3.3		
Queue Clearance Time ( $g_s$ ), s		12.8		9.9		9.6		
Green Extension Time ( $g_e$ ), s		1.6		1.6		0.7		
Phase Call Probability		1.00		1.00		0.98		
Max Out Probability		0.00		0.00		0.00		

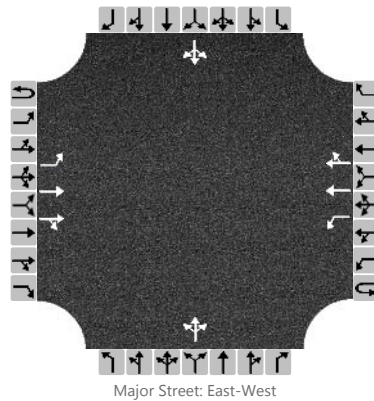
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3	8	18			
Adjusted Flow Rate ( $v$ ), veh/h	66	434			330	33	60	0	283			
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1059	1588			1525	1292	1464	1538	1303			
Queue Service Time ( $g_s$ ), s	2.4	10.8			7.9	0.7	1.2	0.0	7.6			
Cycle Queue Clearance Time ( $g_c$ ), s	10.4	10.8			7.9	0.7	1.2	0.0	7.6			
Green Ratio ( $g/C$ )	0.33	0.33			0.33	0.33	0.36	0.36	0.36			
Capacity ( $c$ ), veh/h	327	531			510	432	534	561	475			
Volume-to-Capacity Ratio ( $X$ )	0.203	0.817			0.647	0.075	0.113	0.000	0.596			
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	22.4	134.1			95.6	7.5	12.2	0	71.5			
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	0.9	5.3			3.7	0.3	0.5	0.0	2.8			
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.25	0.00			0.00	0.00	0.00	0.00	0.14			
Uniform Delay ( $d_1$ ), s/veh	16.6	13.2			12.2	9.8	9.1	0.0	11.1			
Incremental Delay ( $d_2$ ), s/veh	0.1	1.2			0.5	0.0	0.0	0.0	0.4			
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay ( $d$ ), s/veh	16.7	14.4			12.7	9.8	9.1	0.0	11.6			
Level of Service ( LOS )	B	B			B	A	A		B			
Approach Delay, s/veh / LOS	14.7	B		12.4	B		11.2	B	0.0			
Intersection Delay, s/veh / LOS	13.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	1.9	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.3	A	1.3	A	1.1	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/S DERBY LANE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	RIVER DRIVE				
Analysis Year	2023	North/South Street	S DERBY LANE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0
Configuration		L	T	TR		L	T	TR			LTR				LTR	
Volume, V (veh/h)		75	620	30		25	300	15		25	5	5		20	5	85
Percent Heavy Vehicles (%)		4				6				0	0	0		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

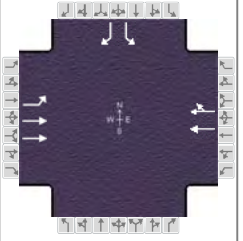
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.18				4.22				7.50	6.50	6.90		7.54	6.54	6.94
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.24				2.26				3.50	4.00	3.30		3.52	4.02	3.32

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		83				28					40					122	
Capacity, c (veh/h)		1191				850					156					467	
v/c Ratio		0.07				0.03					0.26					0.26	
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.1					1.0					1.0	
Control Delay (s/veh)		8.2				9.4					35.8					15.4	
Level of Service, LOS		A				A					E					C	
Approach Delay (s/veh)		0.9				0.7				35.8				15.4			
Approach LOS										E				C			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Jun 27, 2017	Area Type	Other
Jurisdiction	NORTH SIOUX CITY	Time Period	AM PEAK	PHF	0.88
Urban Street	RIVER DRIVE	Analysis Year	2023	Analysis Period	1 > 7:00
Intersection	N DERBY LANE	File Name	RIVER SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	340	305			210	35					50	130

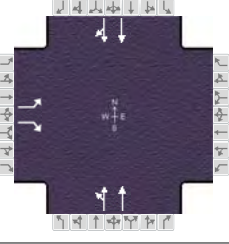
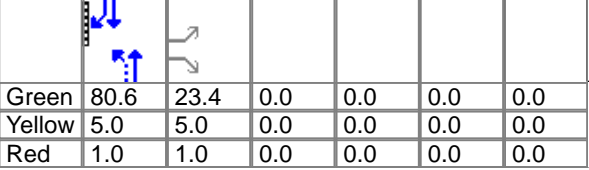
Signal Information														
Cycle, s	40.5	Reference Phase	2											
Offset, s	114	Reference Point	End											
Uncoordinated	Yes	Simult. Gap E/W	On	Green	9.6	12.0	4.9	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	4.0	3.0	0.0	0.0	0.0				
				Red	0.0	2.0	2.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		8.3				9.0
Phase Duration, s	12.6	30.6		18.0				9.9
Change Period, ( Y+R <sub>c</sub> ), s	3.0	6.0		6.0				5.0
Max Allow Headway ( MAH ), s	3.1	3.0		3.0				3.3
Queue Clearance Time ( g <sub>s</sub> ), s	9.5	4.5		5.4				5.2
Green Extension Time ( g <sub>e</sub> ), s	0.2	1.4		1.4				0.2
Phase Call Probability	0.99	1.00		1.00				0.90
Max Out Probability	1.00	0.00		0.00				0.04

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate ( v ), veh/h	460	413			132	130				57		148
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1500	1499			1575	1527				1512		1345
Queue Service Time ( g <sub>s</sub> ), s	7.5	2.5			3.4	2.6				1.4		3.2
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	7.5	2.5			3.4	2.6				1.4		3.2
Green Ratio ( g/C )	0.58	0.61			0.30	0.30				0.12		0.36
Capacity ( c ), veh/h	772	1823			466	452				183		482
Volume-to-Capacity Ratio ( X )	0.596	0.227			0.282	0.287				0.311		0.306
Back of Queue ( Q ), ft/ln ( 95 th percentile )	43.1	11.7			30.8	29.9				18.4		29.8
Back of Queue ( Q ), veh/ln ( 95 th percentile )	1.7	0.5			1.2	1.2				0.7		1.2
Queue Storage Ratio ( RQ ) ( 95 th percentile )	0.36	0.00			0.00	0.00				0.18		0.00
Uniform Delay ( d <sub>1</sub> ), s/veh	5.7	3.6			11.0	11.0				16.3		9.4
Incremental Delay ( d <sub>2</sub> ), s/veh	0.4	0.0			0.1	0.1				0.4		0.1
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay ( d ), s/veh	6.1	3.6			11.1	11.1				16.6		9.5
Level of Service ( LOS )	A	A			B	B				B		A
Approach Delay, s/veh / LOS	4.9		A	11.1		B	0.0			11.5		B
Intersection Delay, s/veh / LOS	7.1						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.6	A	2.2	B	2.7	C	2.8	C
Bicycle LOS Score / LOS	1.1	A	0.7	A				F

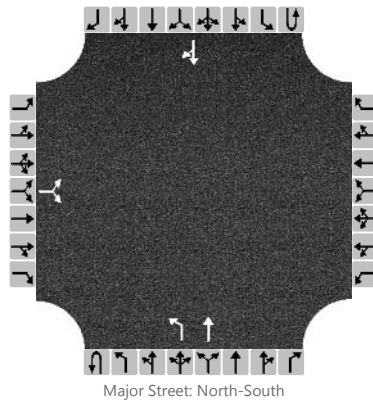
## HCS7 Signalized Intersection Results Summary

General Information					Intersection Information											
Agency	HDR				Duration, h	0.25										
Analyst	RL	Analysis Date	Jun 27, 2017		Area Type	Other										
Jurisdiction	NORTH SIOUX CITY		Time Period	AM PEAK		PHF	0.90									
Urban Street	RIVER DRIVE		Analysis Year	2023		Analysis Period	1 > 7:00									
Intersection	MILITARY ROAD		File Name	RIVER-MILITARY.xus												
Project Description	DD/NSC TRAFFIC STUDY															
Demand Information					EB			WB			NB			SB		
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R
Demand ( v ), veh/h					50		220				200	100			80	90
Signal Information									1		2		3		4	
Cycle, s	116.0	Reference Phase	2													
Offset, s	0	Reference Point	Begin													
Uncoordinated	No	Simult. Gap E/W	On													
Force Mode	Fixed	Simult. Gap N/S	On													
Timer Results					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase						4				2		6				
Case Number						9.0				8.0		8.0				
Phase Duration, s						29.4				86.6		86.6				
Change Period, ( Y+R <sub>c</sub> ), s						6.0				6.0		6.0				
Max Allow Headway ( MAH ), s						3.4				0.0		0.0				
Queue Clearance Time ( g <sub>s</sub> ), s						22.8										
Green Extension Time ( g <sub>e</sub> ), s						0.7				0.0		0.0				
Phase Call Probability						1.00										
Max Out Probability						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					7		14				5	2		6		16
Adjusted Flow Rate ( v ), veh/h					56		244				222	111		77	73	
Adjusted Saturation Flow Rate ( s ), veh/h/ln					1500		1335				1188	1433		1575	1370	
Queue Service Time ( g <sub>s</sub> ), s					3.6		20.8				8.5	4.8		3.2	2.0	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s					3.6		20.8				11.7	4.8		3.2	2.0	
Green Ratio ( g/C )					0.20		0.20				0.69	0.69		0.69	0.69	
Capacity ( c ), veh/h					303		270				887	995		1094	951	
Volume-to-Capacity Ratio ( X )					0.183		0.906				0.251	0.112		0.070	0.077	
Back of Queue ( Q ), ft/ln ( 95 th percentile )					60.6		294				102.8	41.3		27.3	26.2	
Back of Queue ( Q ), veh/ln ( 95 th percentile )					2.4		11.6				4.1	1.6		1.1	1.0	
Queue Storage Ratio ( RQ ) ( 95 th percentile )					0.00		0.00				0.00	0.00		0.00	0.00	
Uniform Delay ( d <sub>1</sub> ), s/veh					38.3		45.2				7.9	5.9		5.7	5.7	
Incremental Delay ( d <sub>2</sub> ), s/veh					0.1		4.7				0.7	0.2		0.1	0.2	
Initial Queue Delay ( d <sub>3</sub> ), s/veh					0.0		0.0				0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh					38.5		49.9				8.5	6.1		5.8	5.9	
Level of Service ( LOS )					D		D				A	A		A	A	
Approach Delay, s/veh / LOS					47.7		D	0.0			7.7	A	5.8		A	
Intersection Delay, s/veh / LOS					22.7					C						
Multimodal Results					EB			WB			NB			SB		
Pedestrian LOS Score / LOS					2.8		C	2.8		C	0.7		A	1.6		B
Bicycle LOS Score / LOS							F				0.8		A	0.6		A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/STEAMBOAT				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/14/2017	East/West Street	STEAMBOAT DRIVE				
Analysis Year	2023	North/South Street	SIOUX POINT ROAD				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	0	0		0	0	0		1	1	0		0	0	1	0
Configuration			LR							L	T						TR
Volume, V (veh/h)		35		100						230	120					110	130
Percent Heavy Vehicles (%)		1		1						1							
Proportion Time Blocked																	
Percent Grade (%)		0															
Right Turn Channelized		No				No				No				No			
Median Type/Storage		Undivided															

## Critical and Follow-up Headways

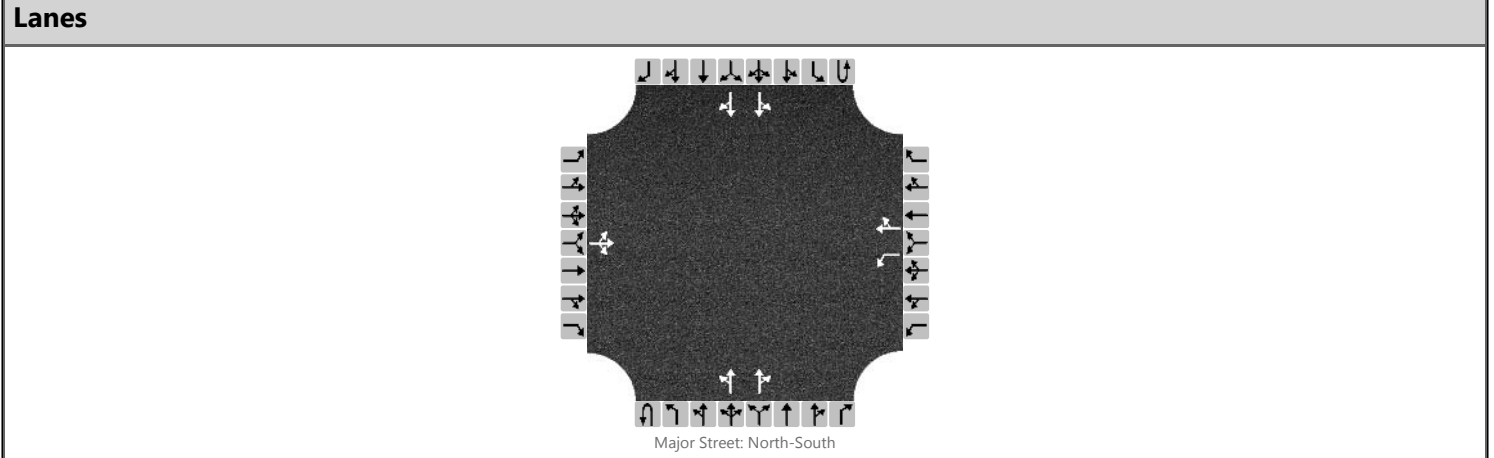
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.41		6.21						4.11						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.51		3.31						2.21						

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			150							256						
Capacity, c (veh/h)			546							1303						
v/c Ratio			0.27							0.20						
95% Queue Length, Q <sub>95</sub> (veh)			1.1							0.7						
Control Delay (s/veh)			14.1							8.4						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		14.1								5.6						
Approach LOS		B														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/TOWER				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/14/2017	East/West Street	TOWER ROAD				
Analysis Year	2023	North/South Street	SIOUX POINT ROAD				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		1	1	0	0	0	2	0	0	0	2	0	
Configuration			LTR			L		TR		LT		TR		LT		TR	
Volume, V (veh/h)		5	5	45		55	0	20		40	410	115		20	180	10	
Percent Heavy Vehicles (%)		2	2	2		1	1	1		1				2			
Proportion Time Blocked																	
Percent Grade (%)		0				0											
Right Turn Channelized		No				No				No							
Median Type/Storage		Undivided															

**Critical and Follow-up Headways**

Base Critical Headway (sec)		7.5	6.5	6.9		7.5	6.5	6.9		4.1				4.1		
Critical Headway (sec)		7.54	6.54	6.94		7.52	6.52	6.92		4.12				4.14		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.51	4.01	3.31		2.21				2.22		

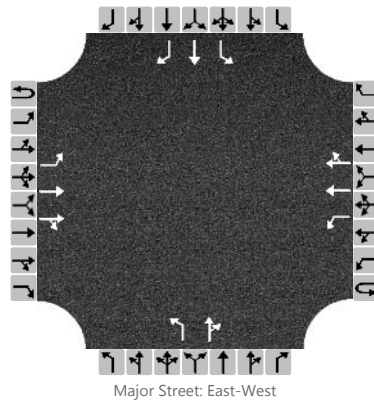
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			62			61		22		44				22			
Capacity, c (veh/h)			658			262		708		1364				987			
v/c Ratio			0.09			0.23		0.03		0.03				0.02			
95% Queue Length, Q <sub>95</sub> (veh)			0.3			0.9		0.1		0.1				0.1			
Control Delay (s/veh)			11.0			22.9		10.3		7.7				8.7			
Level of Service, LOS			B			C		B		A				A			
Approach Delay (s/veh)		11.0				19.5				0.7				0.9			
Approach LOS		B				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	TWO RIVERS/COTTONWOOD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/14/2017	East/West Street	TWO RIVERS DRIVE				
Analysis Year	2023	North/South Street	COTTONWOOD LANE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	1
Configuration		L	T	TR		L	T	TR		L		TR		L	T	R
Volume, V (veh/h)		230	155	365		0	15	0		15	0	0		5	5	70
Percent Heavy Vehicles (%)		1				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				Yes			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

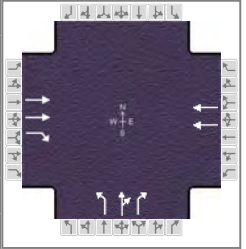
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.12				4.10				7.50	6.50	6.90		7.50	6.50	6.90
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.21				2.20				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		256				0				17		0		6	6	78	
Capacity, c (veh/h)		1606				1006				189		0		333	178	1078	
v/c Ratio		0.16				0.00				0.09				0.02	0.03	0.07	
95% Queue Length, Q <sub>95</sub> (veh)		0.6				0.0				0.3				0.1	0.1	0.2	
Control Delay (s/veh)		7.7				8.6				26.0		5.0		16.0	25.9	8.6	
Level of Service, LOS		A				A				D		A		C	D	A	
Approach Delay (s/veh)		2.4				0.0				26.0				10.2			
Approach LOS										D				B			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Apr 24, 2017	Area Type	Other
Jurisdiction	DAKOTA DUNES	Time Period	AM PEAK	PHF	0.65
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2017	Analysis Period	1 > 7:00
Intersection	I-29 NB	File Name	DD SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h		245	295		100		470	0	505			

Signal Information				Phase Timing (s)								Phase Diagram			
Cycle, s	75.0	Reference Phase	2	Green	24.8	38.2	0.0	0.0	0.0	0.0	1	2	3	4	
Offset, s	58	Reference Point	End	Yellow	4.0	4.0	0.0	0.0	0.0	0.0	5	6	7	8	
Uncoordinated	No	Simult. Gap E/W	On	Red	1.5	2.5	0.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On												

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		7.0		8.0		9.0		
Phase Duration, s		30.3		30.3		44.7		
Change Period, ( $Y+R_c$ ), s		5.5		5.5		6.5		
Max Allow Headway ( $MAH$ ), s		0.0		0.0		3.1		
Queue Clearance Time ( $g_s$ ), s						35.8		
Green Extension Time ( $g_e$ ), s		0.0		0.0		2.4		
Phase Call Probability						1.00		
Max Out Probability						0.14		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12		6		3	8	18			
Adjusted Flow Rate ( $v$ ), veh/h		237	170		154		723	0	485			
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln		1499	1335		1523		1512	1600	1345			
Queue Service Time ( $g_s$ ), s		5.2	9.0		2.7		33.8	0.0	20.7			
Cycle Queue Clearance Time ( $g_c$ ), s		5.2	9.0		2.7		33.8	0.0	20.7			
Green Ratio ( $g/C$ )		0.33	0.33		0.33		0.51	0.51	0.51			
Capacity ( $c$ ), veh/h		994	442		1009		769	814	684			
Volume-to-Capacity Ratio ( $X$ )		0.239	0.384		0.152		0.940	0.000	0.708			
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)		84.8	152.2		41.4		453.5	0	230			
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)		3.3	6.0		1.7		18.0	0.0	9.1			
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)		0.00	0.61		0.00		0.00	0.00	0.57			
Uniform Delay ( $d_1$ ), s/veh		23.1	27.0		17.7		17.4	0.0	14.1			
Incremental Delay ( $d_2$ ), s/veh		0.5	2.4		0.3		14.0	0.0	1.4			
Initial Queue Delay ( $d_3$ ), s/veh		0.0	0.0		0.0		0.0	0.0	0.0			
Control Delay ( $d$ ), s/veh		23.6	29.4		18.0		31.4	0.0	15.6			
Level of Service ( LOS )		C	C		B		C		B			
Approach Delay, s/veh / LOS	26.1	C		18.0	B		25.0	C		0.0		
Intersection Delay, s/veh / LOS	24.7						C					

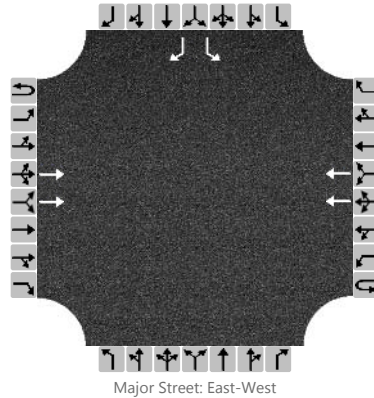
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.7	C	1.9	B	2.7	C	3.0	C
Bicycle LOS Score / LOS	1.0	A	0.6	A	2.5	B		



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/I-29 SB				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/14/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	I-29 SB				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			465				515							95		165
Percent Heavy Vehicles (%)														1		1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

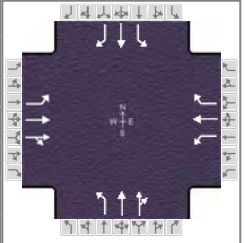
Base Critical Headway (sec)														7.5		6.9
Critical Headway (sec)														7.52		6.92
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.51		3.31

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														106		183
Capacity, c (veh/h)														264		714
v/c Ratio														0.40		0.26
95% Queue Length, Q <sub>95</sub> (veh)														1.8		1.0
Control Delay (s/veh)														27.5		11.8
Level of Service, LOS														D		B
Approach Delay (s/veh)													17.5			
Approach LOS													C			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Apr 24, 2017	Area Type	Other
Jurisdiction	DAKOTA DUNES	Time Period	AM PEAK	PHF	0.90
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2017	Analysis Period	1 > 7:00
Intersection	SIOUX PT RD	File Name	DD SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	145	410	15	45	230	405	5	15	20	35	170	75

Signal Information				Signal Timing (s)								Signal Phases			
Cycle, s	75.0	Reference Phase	2												
Offset, s	0	Reference Point	End	Green	4.1	5.7	29.6	0.5	2.2	8.9					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0	4.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.5	0.0	1.5	2.5	0.0	1.5					

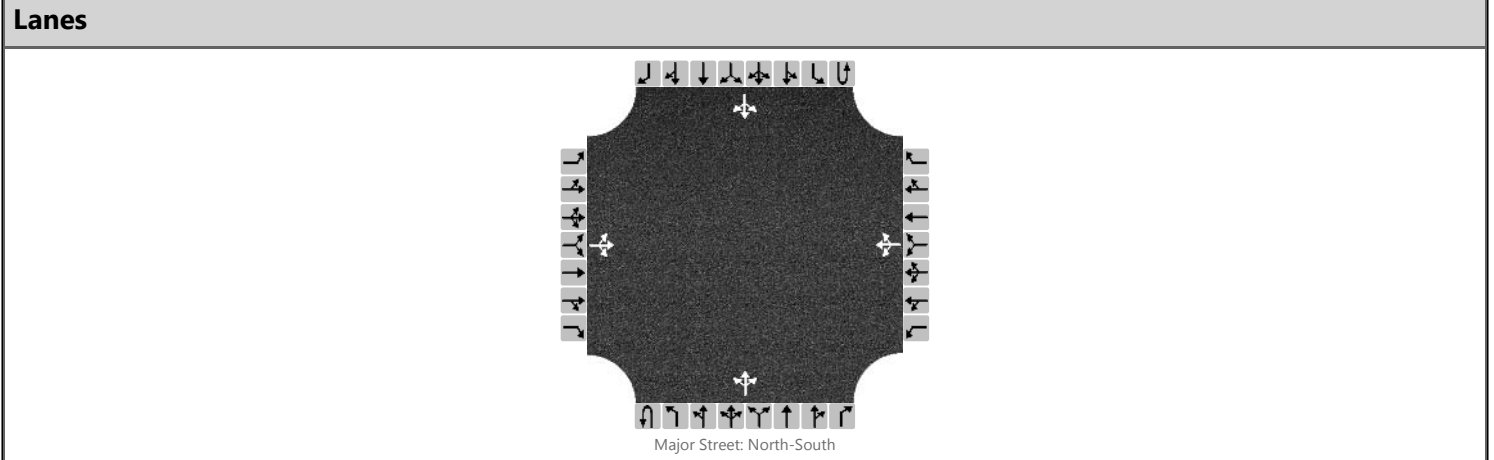
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	1.1	4.0	1.1	3.0
Phase Duration, s	16.3	40.7	10.6	35.1	7.0	14.4	9.3	16.6
Change Period, ( $Y+R_c$ ), s	6.5	5.5	6.5	5.5	6.5	5.5	6.5	5.5
Max Allow Headway ( $MAH$ ), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time ( $g_s$ ), s	9.9		5.3		2.2	2.7	3.7	10.7
Green Extension Time ( $g_e$ ), s	0.3	0.0	0.1	0.0	0.0	0.5	0.0	0.5
Phase Call Probability	0.97		0.75		0.11	1.00	0.56	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.61	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate ( $v$ ), veh/h	161	234	233	67	345	367	6	14	14	39	189	50
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1500	1575	1562	1500	1575	1356	1500	1575	1376	1500	1575	1335
Queue Service Time ( $g_s$ ), s	7.9	6.9	7.0	3.3	11.9	15.0	0.2	0.6	0.7	1.7	8.7	2.5
Cycle Queue Clearance Time ( $g_c$ ), s	7.9	6.9	7.0	3.3	11.9	15.0	0.2	0.6	0.7	1.7	8.7	2.5
Green Ratio ( $g/C$ )	0.13	0.47	0.47	0.05	0.39	0.43	0.13	0.12	0.12	0.16	0.15	0.15
Capacity ( $c$ ), veh/h	195	740	734	82	621	585	114	187	163	303	234	198
Volume-to-Capacity Ratio ( $X$ )	0.826	0.316	0.317	0.826	0.555	0.628	0.049	0.075	0.085	0.128	0.808	0.252
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	132.3	110.1	109.8	56.8	159	139.6	3.9	9.9	9.7	26.6	150.9	35.3
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	5.2	4.3	4.3	2.2	6.3	5.6	0.2	0.4	0.4	1.0	5.9	1.4
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	1.10	0.00	0.00	0.49	0.00	0.00	0.05	0.00	0.00	0.20	0.00	0.00
Uniform Delay ( $d_1$ ), s/veh	31.8	12.4	12.4	34.5	15.6	14.5	29.2	29.4	29.4	27.4	30.9	28.2
Incremental Delay ( $d_2$ ), s/veh	3.4	1.1	1.1	4.0	1.8	2.5	0.1	0.1	0.1	0.1	2.5	0.2
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	35.2	13.5	13.5	38.5	17.3	17.1	29.3	29.4	29.5	27.5	33.4	28.5
Level of Service (LOS)	D	B	B	D	B	B	C	C	C	C	C	C
Approach Delay, s/veh / LOS	19.1		B	19.0		B	29.4		C	31.7		C
Intersection Delay, s/veh / LOS	21.3						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.4		B	2.9		C	3.1		C	2.4		B
Bicycle LOS Score / LOS	1.0		A	1.4		A	0.5		A	0.9		A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/COURTYARD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/14/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	COURTYARD DRIVE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		35	5	15		10	0	5		5	530	365		30	245	35
Percent Heavy Vehicles (%)		0	0	0		0	0	0		1				4		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

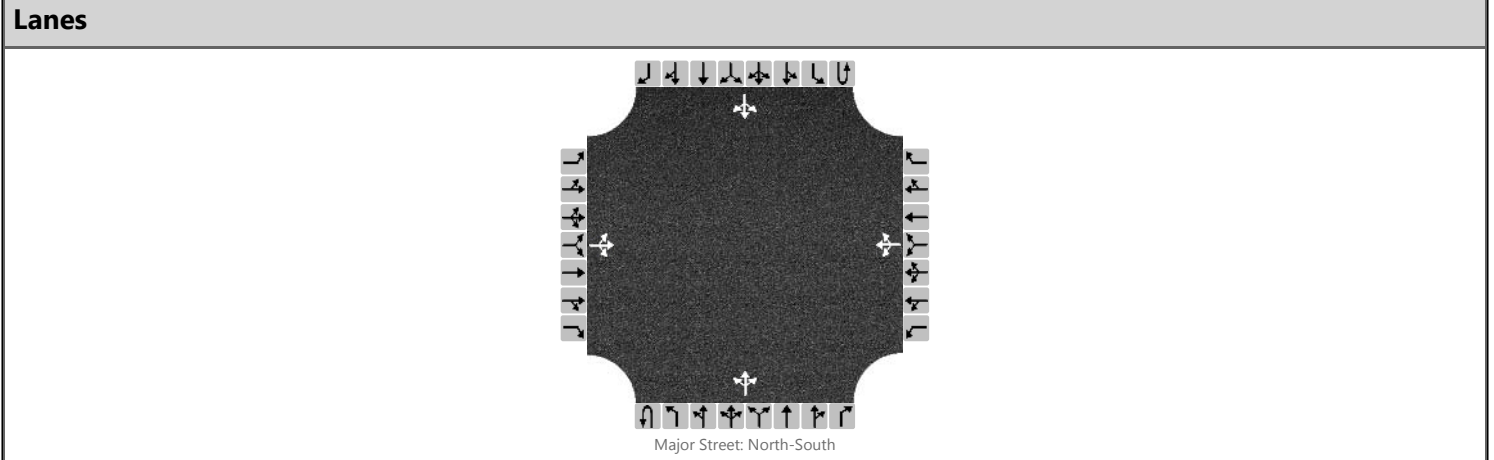
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.11				4.14		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			62				17				6				33	
Capacity, c (veh/h)			313				307				1255				687	
v/c Ratio			0.20				0.06				0.00				0.05	
95% Queue Length, Q <sub>95</sub> (veh)			0.7				0.2				0.0				0.2	
Control Delay (s/veh)			19.3				17.4				7.9				10.5	
Level of Service, LOS			C				C				A				B	
Approach Delay (s/veh)	19.3				17.4				0.2				1.6			
Approach LOS	C				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/LEVEE				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/14/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	LEVEE TRAIL				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		100	5	0		0	0	105		0	695	0		30	210	30
Percent Heavy Vehicles (%)		0	0	0		1	1	1		1				5		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left + Thru								1						

**Critical and Follow-up Headways**

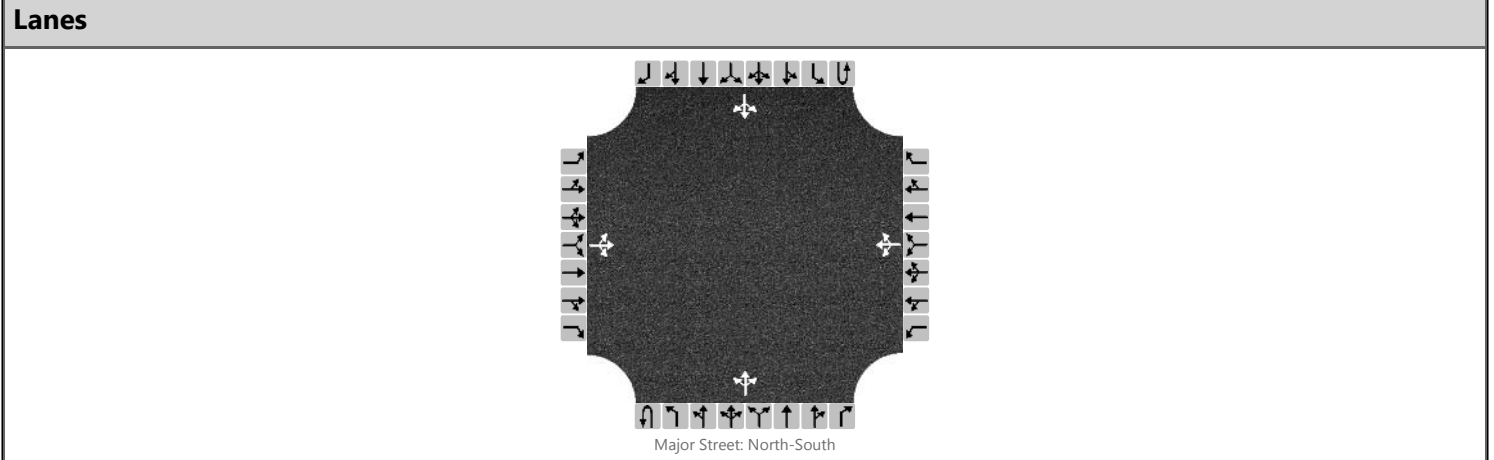
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.11	6.51	6.21		4.11				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.51	4.01	3.31		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			117				117				0				33	
Capacity, c (veh/h)			195				401				1303				831	
v/c Ratio			0.60				0.29				0.00				0.04	
95% Queue Length, Q <sub>95</sub> (veh)			3.3				1.2				0.0				0.1	
Control Delay (s/veh)			47.7				17.6				7.8				9.5	
Level of Service, LOS			E				C				A				A	
Approach Delay (s/veh)		47.7				17.6				0.0				1.5		
Approach LOS		E				C										

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/MEADOWS				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/14/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	MEADOWS BLVD				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		145	5	10		5	5	130		5	420	5		30	165	15
Percent Heavy Vehicles (%)		2	2	2		1	1	1		1				5		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

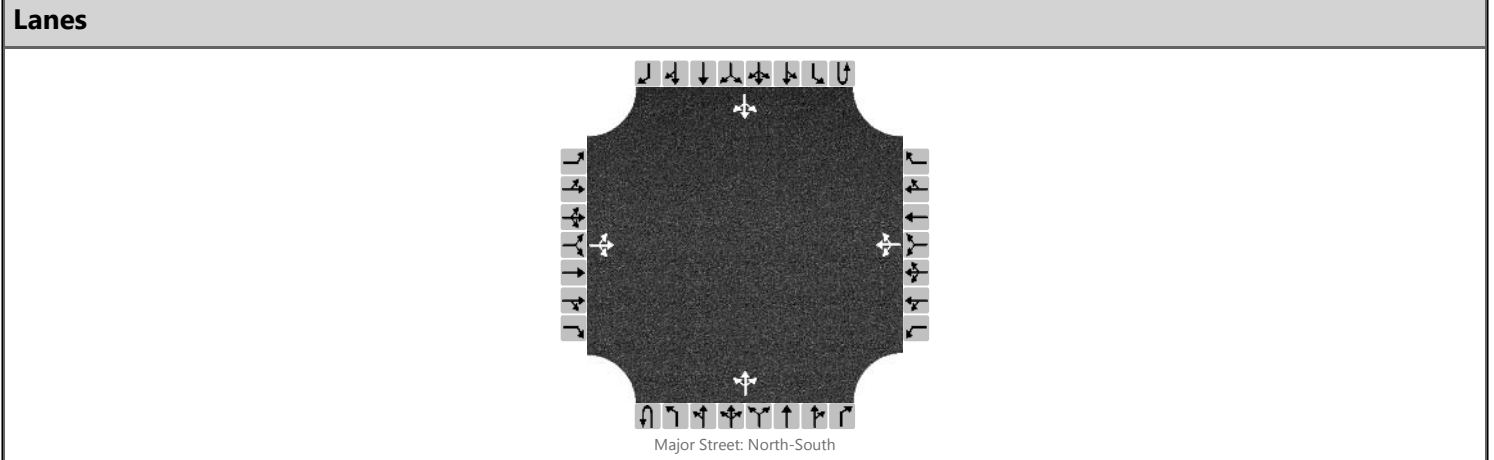
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.11	6.51	6.21		4.11				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.51	4.01	3.31		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			178				156				6				33	
Capacity, c (veh/h)			309				577				1378				1076	
v/c Ratio			0.58				0.27				0.00				0.03	
95% Queue Length, Q <sub>95</sub> (veh)			3.4				1.1				0.0				0.1	
Control Delay (s/veh)			31.3				13.5				7.6				8.5	
Level of Service, LOS			D				B				A				A	
Approach Delay (s/veh)	31.3				13.5				0.1				1.5			
Approach LOS	D				B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/PINEHURST				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/14/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	PINEHURST TRAIL				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		85	0	0		0	0	85		0	260	5		40	100	40
Percent Heavy Vehicles (%)		0	0	0		3	3	3		1				5		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.13	6.53	6.23		4.11				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.53	4.03	3.33		2.21				2.24		

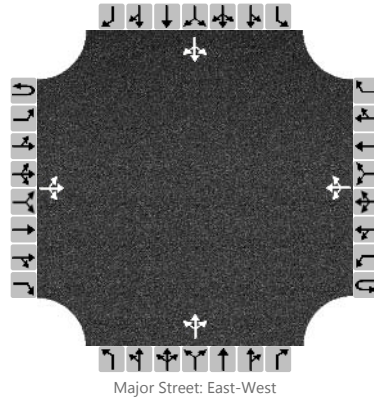
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			94				94				0				44	
Capacity, c (veh/h)			452				744				1431				1252	
v/c Ratio			0.21				0.13				0.00				0.04	
95% Queue Length, Q <sub>95</sub> (veh)			0.8				0.4				0.0				0.1	
Control Delay (s/veh)			15.1				10.5				7.5				8.0	
Level of Service, LOS			C				B				A				A	
Approach Delay (s/veh)	15.1				10.5				0.0				2.0			
Approach LOS	C				B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/WESTSHORE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	WESTSHORE DRIVE				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	1	0	
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		5	80	10		60	135	10		10	0	60		20	5	10
Percent Heavy Vehicles (%)		1				1				1	1	1		3	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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.11	6.51	6.21		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)		2.21				2.21				3.51	4.01	3.31		3.53	4.03	3.33

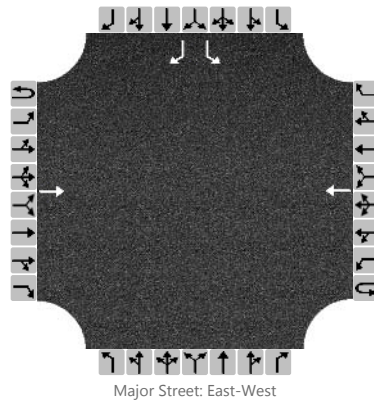
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		6				67					78					39
Capacity, c (veh/h)		1424				1498					863					553
v/c Ratio		0.00				0.04					0.09					0.07
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.3					0.2
Control Delay (s/veh)		7.5				7.5					9.6					12.0
Level of Service, LOS		A				A					A					B
Approach Delay (s/veh)	0.5				2.5				9.6				12.0			
Approach LOS									A				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2023	North/South Street	HS WEST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			160				200							5		5
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)														7.1		6.2
Critical Headway (sec)														7.10		6.20
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.50		3.30

## Delay, Queue Length, and Level of Service

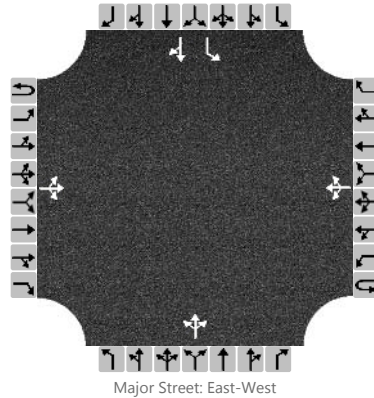
Flow Rate, v (veh/h)														6		6
Capacity, c (veh/h)														564		823
v/c Ratio														0.01		0.01
95% Queue Length, Q <sub>95</sub> (veh)														0.0		0.0
Control Delay (s/veh)														11.4		9.4
Level of Service, LOS														B		A
Approach Delay (s/veh)													10.4			
Approach LOS													B			



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS MID DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2023	North/South Street	HS MIDDLE DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		1	1	0	
Configuration			LTR				LTR				LTR			L		TR
Volume, V (veh/h)		5	150	10		50	195	25		5	0	20		20	0	0
Percent Heavy Vehicles (%)		1				1				0	0	0		1	1	1
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.10	6.50	6.20		7.11	6.51	6.21
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)		2.21				2.21				3.50	4.00	3.30		3.51	4.01	3.31

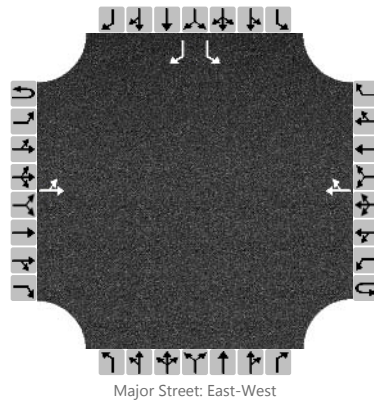
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		6				56				28				22		0
Capacity, c (veh/h)		1327				1404				726				426		0
v/c Ratio		0.00				0.04				0.04				0.05		
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1				0.1				0.2		
Control Delay (s/veh)		7.7				7.7				10.2				13.9		5.0
Level of Service, LOS		A				A				B				B		A
Approach Delay (s/veh)	0.3				1.7				10.2				13.9			
Approach LOS									B				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2023	North/South Street	HS EAST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume, V (veh/h)		0	190				250	15						75		20
Percent Heavy Vehicles (%)		7												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.17												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.26												3.50		3.30

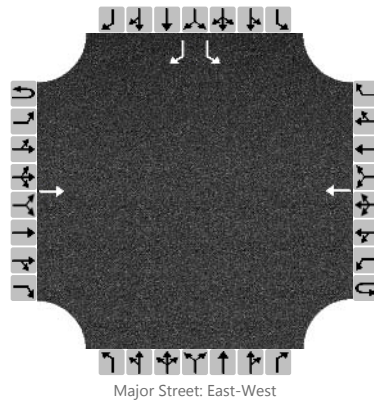
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0												83		22
Capacity, c (veh/h)		1240												486		758
v/c Ratio		0.00												0.17		0.03
95% Queue Length, Q <sub>95</sub> (veh)		0.0												0.6		0.1
Control Delay (s/veh)		7.9												13.9		9.9
Level of Service, LOS		A												B		A
Approach Delay (s/veh)	0.0												13.1			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/ES WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	ES WEST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			305				295							70		45
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)														7.1		6.2
Critical Headway (sec)														7.10		6.20
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.50		3.30

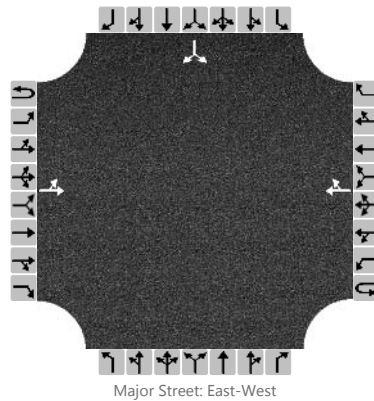
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														78		50
Capacity, c (veh/h)														375		718
v/c Ratio														0.21		0.07
95% Queue Length, Q <sub>95</sub> (veh)														0.8		0.2
Control Delay (s/veh)														17.1		10.4
Level of Service, LOS														C		B
Approach Delay (s/veh)													14.5			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/ES EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	ES EAST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		15	360				290	50						5		5
Percent Heavy Vehicles (%)		2												0		0
Proportion Time Blocked																
Percent Grade (%)																0
Right Turn Channelized		No			No				No				No			
Median Type/Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.12												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.22												3.50		3.30

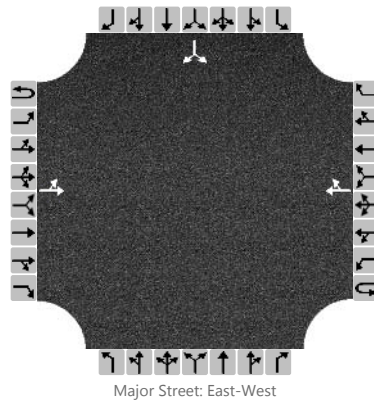
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		17														12	
Capacity, c (veh/h)		1180														428	
v/c Ratio		0.01														0.03	
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.1	
Control Delay (s/veh)		8.1														13.7	
Level of Service, LOS		A														B	
Approach Delay (s/veh)		0.5												13.7			
Approach LOS		B															

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/PENROSE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	PENROSE DRIVE				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		10	355				335	5						10		5
Percent Heavy Vehicles (%)		3												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.30

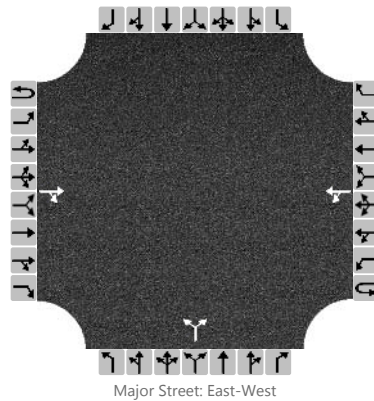
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11														17
Capacity, c (veh/h)		1174														380
v/c Ratio		0.01														0.04
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.1
Control Delay (s/veh)		8.1														14.9
Level of Service, LOS		A														B
Approach Delay (s/veh)	0.3												14.9			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/STREETER				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	STREETER DRIVE				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			290	75		30	310			30		20				
Percent Heavy Vehicles (%)						4				6		6				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.14					7.16		6.26			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.24					3.55		3.35			

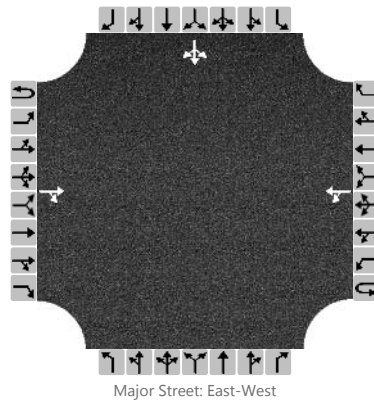
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						33					55					
Capacity, c (veh/h)						1141					388					
v/c Ratio						0.03					0.14					
95% Queue Length, Q <sub>95</sub> (veh)						0.1					0.5					
Control Delay (s/veh)						8.2					15.8					
Level of Service, LOS						A					C					
Approach Delay (s/veh)					1.0				15.8							
Approach LOS									C							

# HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	RL	Intersection	NORTHSHORE/I-29 SB
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE
Analysis Year	2023	North/South Street	I-29 SB
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	DD/NSC TRAFFIC STUDY		

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration				TR		LT									LTR	
Volume, V (veh/h)			85	225		25	320							10	0	20
Percent Heavy Vehicles (%)						2								7	7	7
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.12								7.17	6.57	6.27
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.22								3.56	4.06	3.36

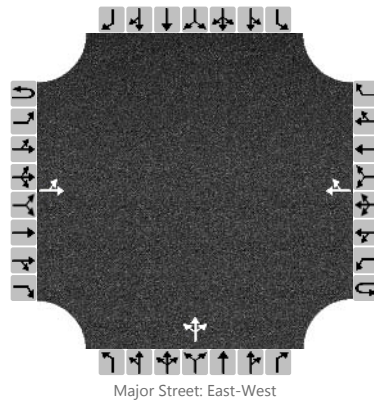
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						28										33
Capacity, c (veh/h)						1214										536
v/c Ratio						0.02										0.06
95% Queue Length, Q <sub>95</sub> (veh)						0.1										0.2
Control Delay (s/veh)						8.0										12.2
Level of Service, LOS						A										B
Approach Delay (s/veh)					0.8								12.2			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 NB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	I-29 NB				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration		LT						TR			LTR					
Volume, V (veh/h)		40	55				90	25		255	0	45				
Percent Heavy Vehicles (%)		3								0	0	0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1								7.1	6.5	6.2				
Critical Headway (sec)		4.13								7.10	6.50	6.20				
Base Follow-Up Headway (sec)		2.2								3.5	4.0	3.3				
Follow-Up Headway (sec)		2.23								3.50	4.00	3.30				

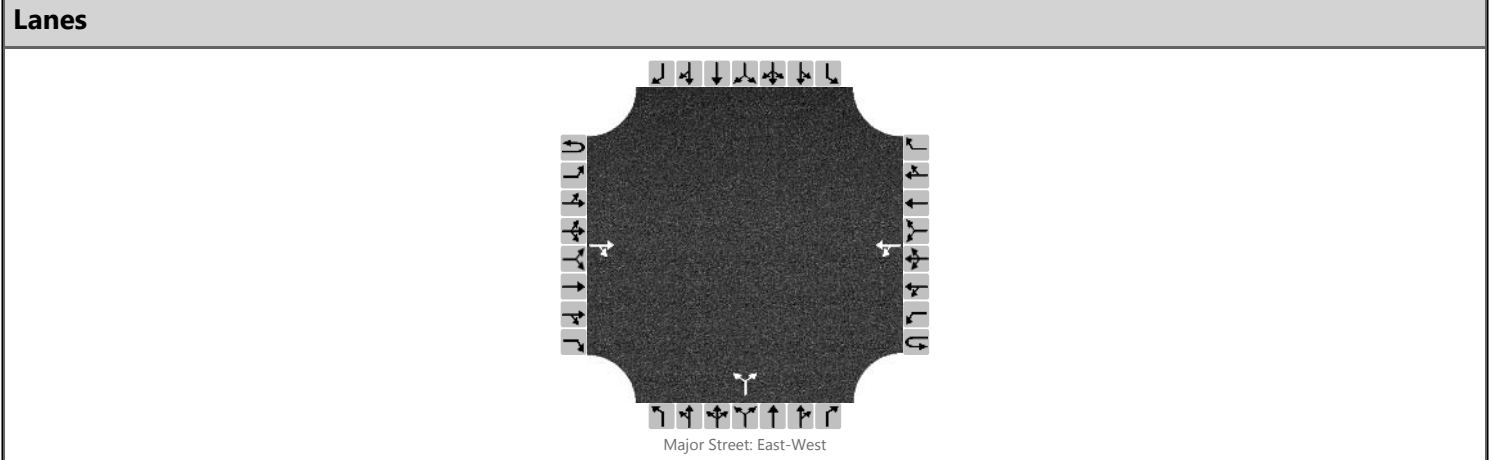
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		44								333						
Capacity, c (veh/h)		1450								713						
v/c Ratio		0.03								0.47						
95% Queue Length, Q <sub>95</sub> (veh)		0.1								2.5						
Control Delay (s/veh)		7.6								14.4						
Level of Service, LOS		A								B						
Approach Delay (s/veh)	3.3								14.4							
Approach LOS									B							



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/MILITARY				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2023	North/South Street	MILITARY ROAD				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			30	70		5	40			75		0				
Percent Heavy Vehicles (%)						11				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

**Critical and Follow-up Headways**

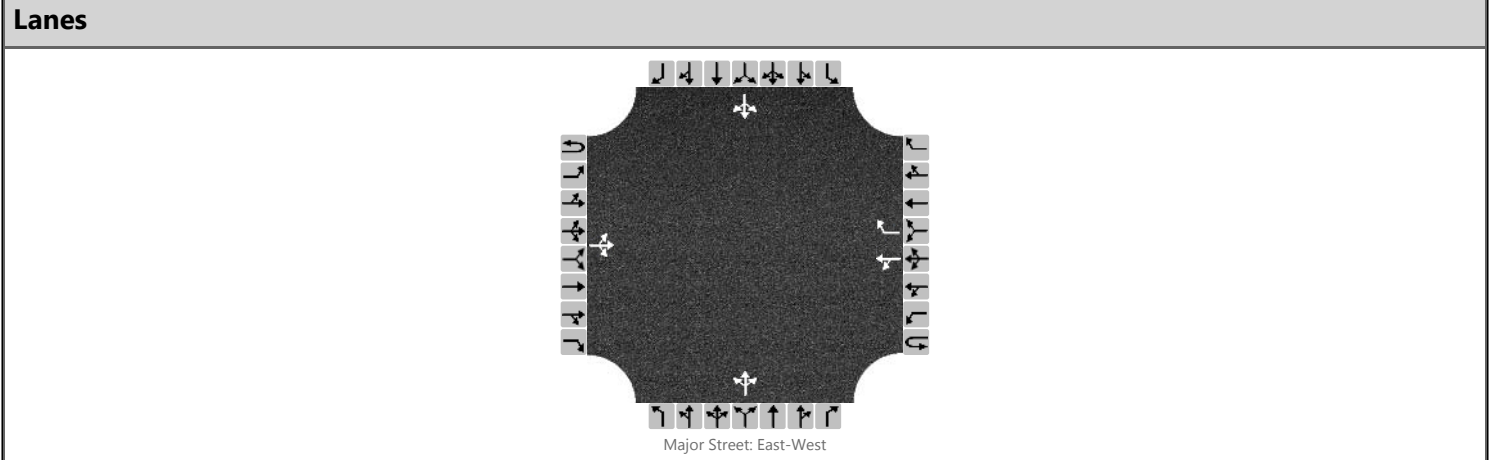
Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.21					7.13		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.30					3.53		3.33			

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)						6					83					
Capacity, c (veh/h)						1424					839					
v/c Ratio						0.00					0.10					
95% Queue Length, Q <sub>95</sub> (veh)						0.0					0.3					
Control Delay (s/veh)						7.5					9.8					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					0.9				9.8							
Approach LOS									A							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SODRAC				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	RIVER DRIVE				
Analysis Year	2023	North/South Street	SODRAC DRIVE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	1		0	1	0		0	1	0
Configuration			LTR			LT		R			LTR				LTR	
Volume, V (veh/h)		0	315	0		35	280	15		0	0	35		20	0	0
Percent Heavy Vehicles (%)		0				0				9	9	9		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

**Critical and Follow-up Headways**

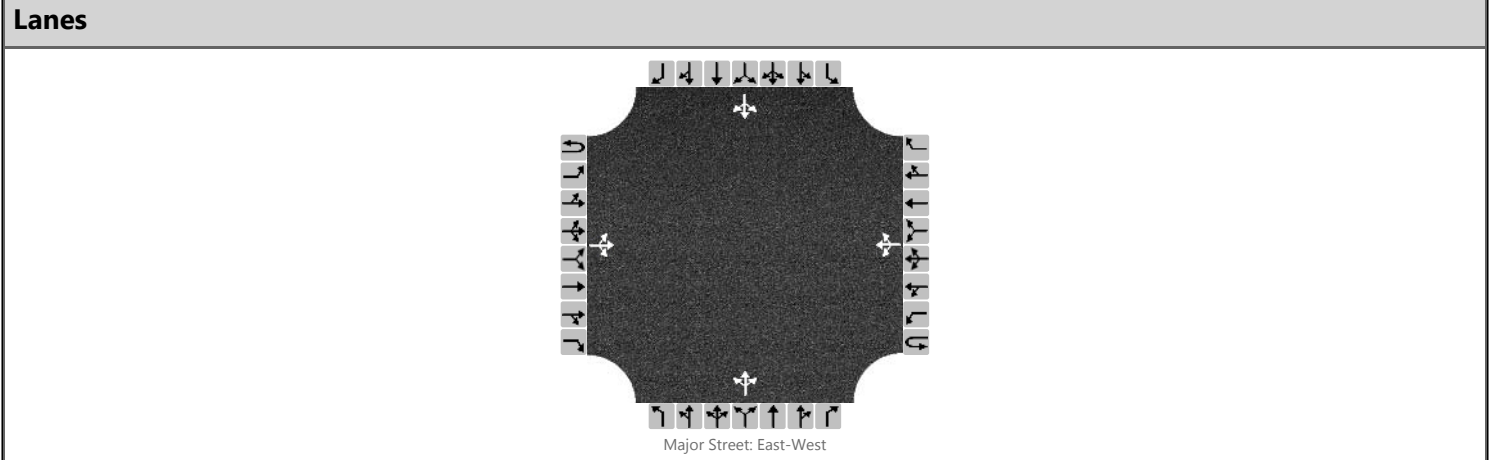
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.19	6.59	6.29		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.58	4.08	3.38		3.50	4.00	3.30

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)		0				39					39					22	
Capacity, c (veh/h)		1243				1220					678					298	
v/c Ratio		0.00				0.03					0.06					0.07	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.2					0.2	
Control Delay (s/veh)		7.9				8.0					10.6					18.0	
Level of Service, LOS		A				A					B					C	
Approach Delay (s/veh)		0.0				1.1				10.6				18.0			
Approach LOS										B				C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SIOUX POINT				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	RIVER DRIVE				
Analysis Year	2023	North/South Street	SODRAC DRIVE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		20	315	35		105	300	170		15	35	125		85	20	15
Percent Heavy Vehicles (%)		2				1				1	1	1		0	0	0
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.12				4.11				7.11	6.51	6.21		7.10	6.50	6.20
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)		2.22				2.21				3.51	4.01	3.31		3.50	4.00	3.30

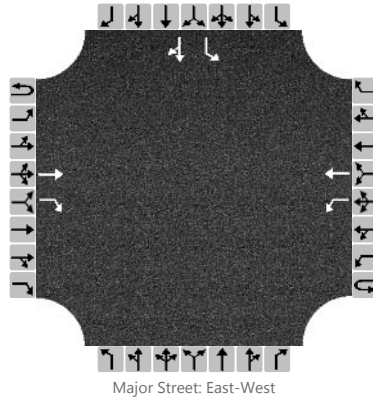
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)		22				117					195					133	
Capacity, c (veh/h)		1044				1175					346					119	
v/c Ratio		0.02				0.10					0.56					1.11	
95% Queue Length, Q <sub>95</sub> (veh)		0.1				0.3					3.3					8.0	
Control Delay (s/veh)		8.5				8.4					28.1					186.7	
Level of Service, LOS		A				A					D					F	
Approach Delay (s/veh)		0.7				2.6				28.1				186.7			
Approach LOS										D				F			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/I-29 SB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	6/27/2017	East/West Street	RIVER DRIVE				
Analysis Year	2023	North/South Street	I-29 SB				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	1	0	1	1	0		0	0	0		1	1	0
Configuration			T	R		L	T							L		TR
Volume, V (veh/h)			355	170		280	530							45	0	45
Percent Heavy Vehicles (%)						2								1	1	1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

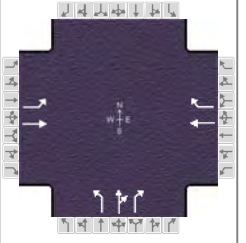
Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.12								7.11	6.51	6.21
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.22								3.51	4.01	3.31

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						311								50		50
Capacity, c (veh/h)						991								65		510
v/c Ratio						0.31								0.77		0.10
95% Queue Length, Q <sub>95</sub> (veh)						1.4								3.5		0.3
Control Delay (s/veh)						10.3								158.4		12.8
Level of Service, LOS						B								F		B
Approach Delay (s/veh)					3.6								85.6			
Approach LOS													F			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Jun 27, 2017	Area Type	Other
Jurisdiction	NORTH SIOUX CITY	Time Period	PM PEAK	PHF	0.90
Urban Street	RIVER DRIVE	Analysis Year	2023	Analysis Period	1 > 7:00
Intersection	I-29 NB	File Name	RIVER SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	65	335			600	90	210	0	200			

Signal Information													
Cycle, s	57.0	Reference Phase	2										
Offset, s	8	Reference Point	Begin										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	28.0	16.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	5.0	0.0	0.0	0.0	0.0			
				Red	2.0	2.0	0.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		6.0		7.0		9.0		
Phase Duration, s		34.0		34.0		23.0		
Change Period, ( Y+R <sub>c</sub> ), s		6.0		6.0		7.0		
Max Allow Headway ( MAH ), s		3.1		3.1		3.1		
Queue Clearance Time ( g <sub>s</sub> ), s		25.5		20.8		9.6		
Green Extension Time ( g <sub>e</sub> ), s		2.4		2.4		0.6		
Phase Call Probability		1.00		1.00		1.00		
Max Out Probability		0.00		0.00		0.00		

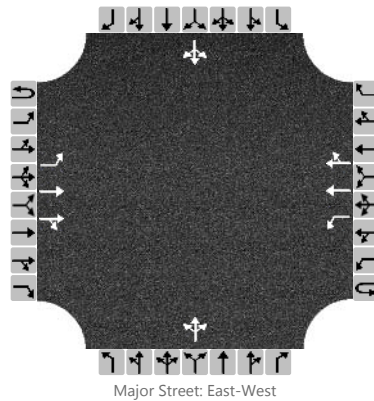
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3	8	18			
Adjusted Flow Rate ( v ), veh/h	72	372			620	57	233	0	133			
Adjusted Saturation Flow Rate ( s ), veh/h/ln	810	1588			1575	1335	1500	1575	1335			
Queue Service Time ( g <sub>s</sub> ), s	4.7	8.9			18.8	1.3	7.6	0.0	4.6			
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	23.5	8.9			18.8	1.3	7.6	0.0	4.6			
Green Ratio ( g/C )	0.49	0.49			0.49	0.49	0.28	0.28	0.28			
Capacity ( c ), veh/h	258	782			776	657	419	440	373			
Volume-to-Capacity Ratio ( X )	0.280	0.476			0.799	0.086	0.556	0.000	0.357			
Back of Queue ( Q ), ft/ln ( 95 th percentile)	36.4	105.3			210.6	12.9	101.6	0	54.2			
Back of Queue ( Q ), veh/ln ( 95 th percentile)	1.4	4.2			8.3	0.5	4.0	0.0	2.1			
Queue Storage Ratio ( RQ ) ( 95 th percentile)	0.40	0.00			0.00	0.00	0.00	0.00	0.11			
Uniform Delay ( d <sub>1</sub> ), s/veh	22.0	9.6			12.1	7.7	17.5	0.0	16.4			
Incremental Delay ( d <sub>2</sub> ), s/veh	0.2	0.2			0.6	0.0	0.4	0.0	0.2			
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay ( d ), s/veh	22.2	9.8			12.7	7.7	18.0	0.0	16.7			
Level of Service ( LOS )	C	A			B	A	B		B			
Approach Delay, s/veh / LOS	11.8	B		12.3	B	17.5	B	0.0				
Intersection Delay, s/veh / LOS	13.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	1.9	B	2.4	B	2.3	B
Bicycle LOS Score / LOS	1.2	A	1.7	B	1.1	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL			Intersection	RIVER/S DERBY LANE		
Agency/Co.	HDR			Jurisdiction	NORTH SIOUX CITY		
Date Performed	6/27/2017			East/West Street	RIVER DRIVE		
Analysis Year	2023			North/South Street	S DERBY LANE		
Time Analyzed	PM PEAK			Peak Hour Factor	0.90		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0
Configuration		L	T	TR		L	T	TR			LTR				LTR	
Volume, V (veh/h)		40	460	35		10	595	25		30	5	50		10	5	65
Percent Heavy Vehicles (%)		2				2				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

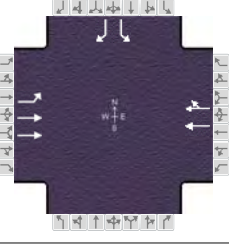
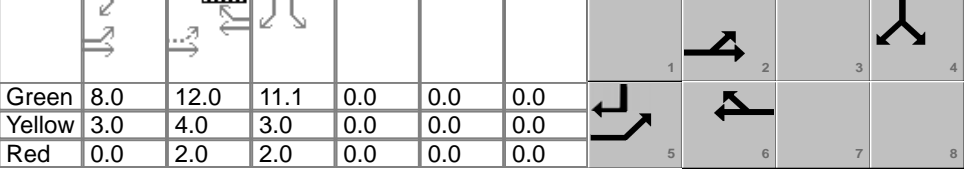
## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.14				4.14				7.50	6.50	6.90		7.50	6.50	6.90
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)		2.22				2.22				3.50	4.00	3.30		3.50	4.00	3.30

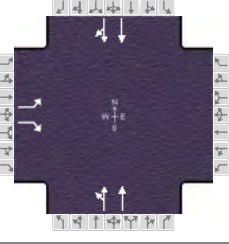
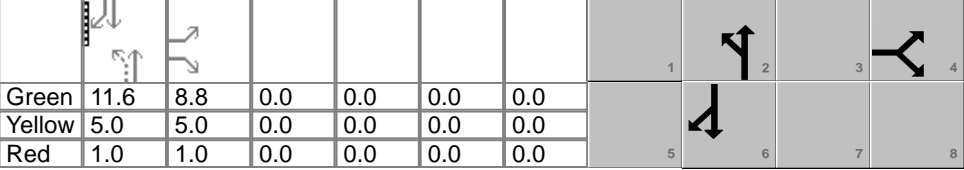
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		44				11					95					89	
Capacity, c (veh/h)		901				1016					307					405	
v/c Ratio		0.05				0.01					0.31					0.22	
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.0					1.3					0.8	
Control Delay (s/veh)		9.2				8.6					21.9					16.4	
Level of Service, LOS		A				A					C					C	
Approach Delay (s/veh)		0.7				0.1				21.9				16.4			
Approach LOS										C				C			

## HCS7 Signalized Intersection Results Summary

General Information						Intersection Information												
Agency	HDR					Duration, h	0.25											
Analyst	RL		Analysis Date	Jun 27, 2017		Area Type	Other											
Jurisdiction	NORTH SIOUX CITY		Time Period	PM PEAK		PHF	0.88											
Urban Street	RIVER DRIVE		Analysis Year	2023		Analysis Period	1 > 7:00											
Intersection	N DERBY LANE		File Name	RIVER SIGNALS.xus														
Project Description	DD/NSC TRAFFIC STUDY																	
Demand Information						EB			WB			NB			SB			
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R	
Demand ( v ), veh/h						265	255			325	35				35		305	
Signal Information																		
Cycle, s	45.1	Reference Phase	2															
Offset, s	114	Reference Point	End															
Uncoordinated	Yes	Simult. Gap E/W	On			Green	8.0	12.0	11.1	0.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On			Yellow	3.0	4.0	3.0	0.0	0.0	0.0						
						Red	0.0	2.0	2.0	0.0	0.0	0.0						
Timer Results						EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT					
Assigned Phase						5	2		6				4					
Case Number						1.0	4.0		8.3				9.0					
Phase Duration, s						11.0	29.0		18.0				16.1					
Change Period, ( Y+R <sub>c</sub> ), s						3.0	6.0		6.0				5.0					
Max Allow Headway ( MAH ), s						3.1	3.0		3.0				3.3					
Queue Clearance Time ( g <sub>s</sub> ), s						7.8	4.4		7.9				11.0					
Green Extension Time ( g <sub>e</sub> ), s						0.4	1.3		1.1				0.1					
Phase Call Probability						0.98	1.00		1.00				0.99					
Max Out Probability						0.03	0.00		0.02				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			6	16			7		14		
Adjusted Flow Rate ( v ), veh/h						303	292			197	195			40		347		
Adjusted Saturation Flow Rate ( s ), veh/h/ln						1500	1499			1575	1543			1512		1345		
Queue Service Time ( g <sub>s</sub> ), s						5.8	2.4			5.9	4.8			0.9		9.0		
Cycle Queue Clearance Time ( g <sub>c</sub> ), s						5.8	2.4			5.9	4.8			0.9		9.0		
Green Ratio ( g/C )						0.49	0.51			0.27	0.27			0.25		0.42		
Capacity ( c ), veh/h						561	1531			419	411			371		569		
Volume-to-Capacity Ratio ( X )						0.540	0.190			0.470	0.474			0.107		0.609		
Back of Queue ( Q ), ft/ln ( 95 th percentile )						54.3	20.6			61.8	60			11.5		90.1		
Back of Queue ( Q ), veh/ln ( 95 th percentile )						2.1	0.8			2.4	2.4			0.5		3.6		
Queue Storage Ratio ( RQ ) ( 95 th percentile )						0.45	0.00			0.00	0.00			0.11		0.00		
Uniform Delay ( d <sub>1</sub> ), s/veh						8.4	6.0			13.9	13.9			13.2		10.1		
Incremental Delay ( d <sub>2</sub> ), s/veh						0.3	0.0			0.3	0.3			0.0		1.1		
Initial Queue Delay ( d <sub>3</sub> ), s/veh						0.0	0.0			0.0	0.0			0.0		0.0		
Control Delay ( d ), s/veh						8.7	6.0			14.2	14.2			13.2		11.2		
Level of Service ( LOS )						A	A			B	B			B		B		
Approach Delay, s/veh / LOS						7.4	A		14.2	B		0.0		11.4		B		
Intersection Delay, s/veh / LOS						10.4						B						
Multimodal Results						EB			WB			NB			SB			
Pedestrian LOS Score / LOS						0.7	A		2.3	B		2.7	C		2.8	C		
Bicycle LOS Score / LOS						1.0	A		0.8	A					F			

## HCS7 Signalized Intersection Results Summary

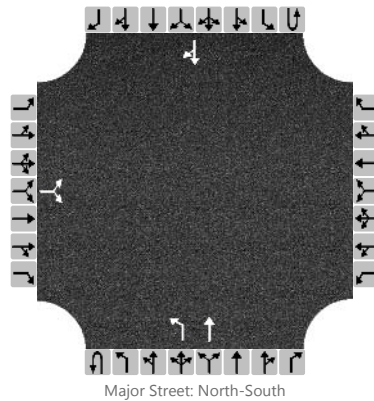
General Information					Intersection Information											
Agency	HDR				Duration, h	0.25										
Analyst	RL	Analysis Date	Jun 27, 2017		Area Type	Other										
Jurisdiction	NORTH SIOUX CITY		Time Period	PM PEAK	PHF	0.90										
Urban Street	RIVER DRIVE		Analysis Year	2023	Analysis Period	1 > 7:00										
Intersection	MILITARY ROAD		File Name	RIVER-MILITARY.xus												
Project Description	DD/NSC TRAFFIC STUDY															
Demand Information					EB			WB			NB			SB		
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R
Demand ( v ), veh/h					60		255				210	100			80	90
Signal Information									1		2		3		4	
Cycle, s	32.4	Reference Phase	2													
Offset, s	0	Reference Point	Begin													
Uncoordinated	Yes	Simult. Gap E/W	On													
Force Mode	Fixed	Simult. Gap N/S	On													
Green	11.6	8.8	0.0	0.0	0.0	0.0										
Yellow	5.0	5.0	0.0	0.0	0.0	0.0										
Red	1.0	1.0	0.0	0.0	0.0	0.0										
Timer Results					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase						4				2		6				
Case Number						9.0				8.0		8.0				
Phase Duration, s						14.8				17.6		17.6				
Change Period, ( Y+R <sub>c</sub> ), s						6.0				6.0		6.0				
Max Allow Headway ( MAH ), s						3.4				3.3		3.3				
Queue Clearance Time ( g <sub>s</sub> ), s						8.4				10.5		4.9				
Green Extension Time ( g <sub>e</sub> ), s						0.8				1.1		1.1				
Phase Call Probability						0.96				1.00		1.00				
Max Out Probability						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					7		14				5	2		6		16
Adjusted Flow Rate ( v ), veh/h					67		283				233	111		77	73	
Adjusted Saturation Flow Rate ( s ), veh/h/ln					1500		1335				918	1433		1575	1370	
Queue Service Time ( g <sub>s</sub> ), s					1.1		6.4				5.5	4.3		2.9	1.2	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s					1.1		6.4				8.5	4.3		2.9	1.2	
Green Ratio ( g/C )					0.27		0.27				0.36	0.36		0.36	0.36	
Capacity ( c ), veh/h					404		359				553	517		568	494	
Volume-to-Capacity Ratio ( X )					0.165		0.789				0.422	0.215		0.135	0.149	
Back of Queue ( Q ), ft/ln ( 95 th percentile )					12.1		67.2				49.2	16.3		10.9	10.3	
Back of Queue ( Q ), veh/ln ( 95 th percentile )					0.5		2.6				2.0	0.6		0.4	0.4	
Queue Storage Ratio ( RQ ) ( 95 th percentile )					0.00		0.00				0.00	0.00		0.00	0.00	
Uniform Delay ( d <sub>1</sub> ), s/veh					9.1		11.0				10.7	7.2		7.0	7.0	
Incremental Delay ( d <sub>2</sub> ), s/veh					0.1		1.5				0.2	0.1		0.0	0.1	
Initial Queue Delay ( d <sub>3</sub> ), s/veh					0.0		0.0				0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh					9.1		12.5				10.9	7.3		7.0	7.1	
Level of Service ( LOS )					A		B				B	A		A	A	
Approach Delay, s/veh / LOS					11.8		B	0.0			9.7	A	7.0	A		
Intersection Delay, s/veh / LOS					10.1			B								
Multimodal Results					EB			WB			NB			SB		
Pedestrian LOS Score / LOS					2.7		C	2.8		C	0.7	A	1.6	B		
Bicycle LOS Score / LOS							F				0.8	A	0.6	A		



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/STEAMBOAT				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/27/2017	East/West Street	STEAMBOAT DRIVE				
Analysis Year	2023	North/South Street	SIOUX POINT ROAD				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound					
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R		
Movement																		
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6		
Number of Lanes		0	0	0		0	0	0		0	1	1	0		0	0	1	0
Configuration			LR							L	T						TR	
Volume, V (veh/h)		75		250						115	150					220	35	
Percent Heavy Vehicles (%)		0		0						0								
Proportion Time Blocked																		
Percent Grade (%)		0																
Right Turn Channelized		No					No					No						
Median Type/Storage		Undivided																

## Critical and Follow-up Headways

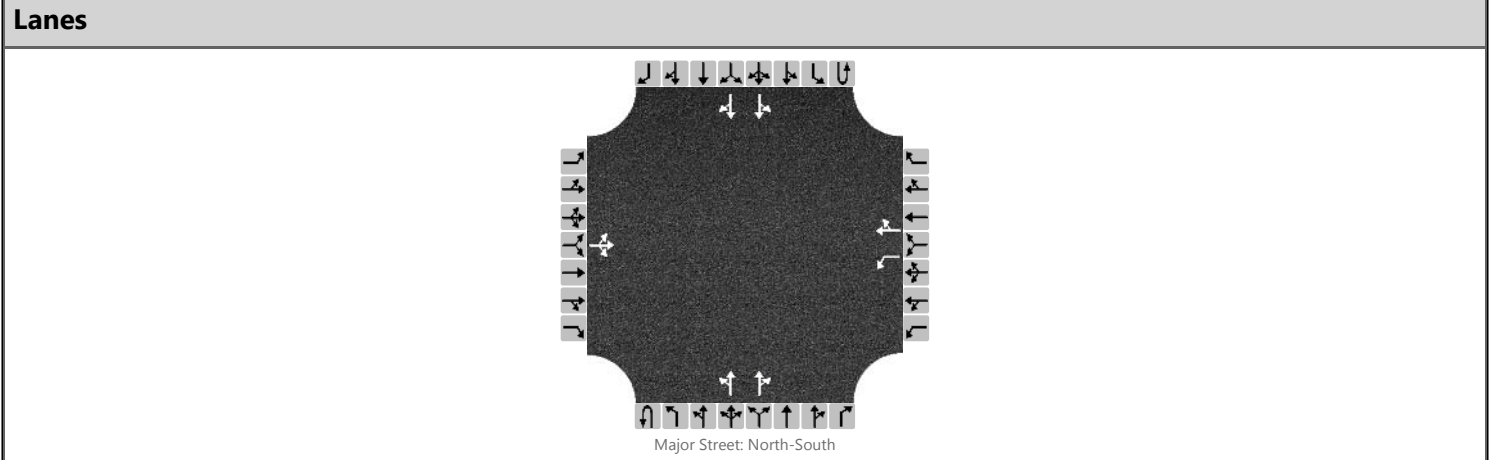
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			361							128						
Capacity, c (veh/h)			625							1291						
v/c Ratio			0.58							0.10						
95% Queue Length, Q <sub>95</sub> (veh)			3.7							0.3						
Control Delay (s/veh)			18.3							8.1						
Level of Service, LOS			C							A						
Approach Delay (s/veh)		18.3										3.5				
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/TOWER				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/27/2017	East/West Street	TOWER ROAD				
Analysis Year	2023	North/South Street	SIOUX POINT ROAD				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		1	1	0	0	0	2	0	0	0	2	0
Configuration			LTR			L		TR		LT		TR		LT		TR
Volume, V (veh/h)		5	0	50		125	5	30		45	230	45		20	440	10
Percent Heavy Vehicles (%)		2	2	2		2	2	2		0				0		
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)		7.5	6.5	6.9		7.5	6.5	6.9		4.1				4.1		
Critical Headway (sec)		7.54	6.54	6.94		7.54	6.54	6.94		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.20				2.20		

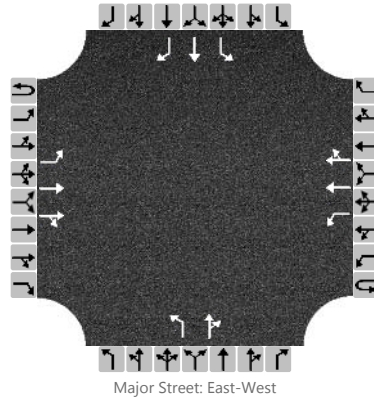
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			62			139		39		50				22		
Capacity, c (veh/h)			633			297		624		1075				1266		
v/c Ratio			0.10			0.47		0.06		0.05				0.02		
95% Queue Length, Q <sub>95</sub> (veh)			0.3			2.4		0.2		0.1				0.1		
Control Delay (s/veh)			11.3			27.3		11.2		8.5				7.9		
Level of Service, LOS			B			D		B		A				A		
Approach Delay (s/veh)	11.3				23.8				1.3				0.4			
Approach LOS	B				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	TWO RIVERS/COTTONWOOD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/27/2017	East/West Street	TWO RIVERS DRIVE				
Analysis Year	2023	North/South Street	COTTONWOOD LANE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	1
Configuration		L	T	TR		L	T	TR		L		TR		L	T	R
Volume, V (veh/h)		65	10	30		0	340	5		195	10	0		0	5	205
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				Yes			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

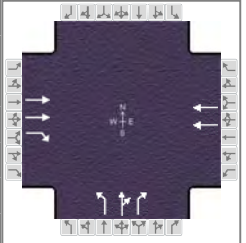
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.10				4.10				7.50	6.50	6.90		7.50	6.50	6.90
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		72				0				217		11		0	6	228	
Capacity, c (veh/h)		1186				1578				390		415		404	408	824	
v/c Ratio		0.06				0.00				0.56		0.03		0.00	0.01	0.28	
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.0				3.3		0.1		0.0	0.0	1.1	
Control Delay (s/veh)		8.2				7.3				25.2		13.9		13.9	13.9	11.0	
Level of Service, LOS		A				A				D		B		B	B	B	
Approach Delay (s/veh)		5.1				0.0				24.6				11.1			
Approach LOS										C				B			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Jun 27, 2017	Area Type	Other
Jurisdiction	DAKOTA DUNES	Time Period	PM PEAK	PHF	0.90
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2023	Analysis Period	1 > 7:00
Intersection	I-29 NB	File Name	DD SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h		35	150		740		520	0	70			

Signal Information				Phase Diagram								
Cycle, s	120.0	Reference Phase	2									
Offset, s	46	Reference Point	End									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	60.4	47.6	0.0	0.0	0.0	0.0				
		Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
		Red	1.5	2.5	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		7.0		8.0		9.0		
Phase Duration, s		65.9		65.9		54.1		
Change Period, ( $Y+R_c$ ), s		5.5		5.5		6.5		
Max Allow Headway ( $MAH$ ), s		0.0		0.0		3.1		
Queue Clearance Time ( $g_s$ ), s						46.8		
Green Extension Time ( $g_e$ ), s		0.0		0.0		0.8		
Phase Call Probability						1.00		
Max Out Probability						0.26		

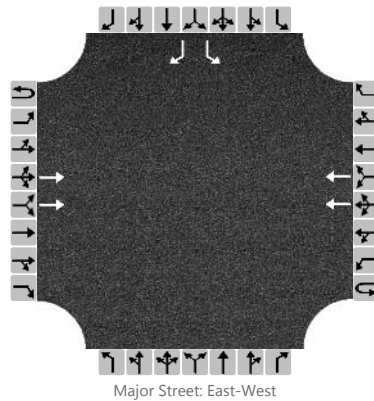
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12		6		3	8	18			
Adjusted Flow Rate ( $v$ ), veh/h		39	100		822		578	0	44			
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln		1499	1335		1523		1512	1600	1345			
Queue Service Time ( $g_s$ ), s		0.9	4.2		22.0		44.8	0.0	2.5			
Cycle Queue Clearance Time ( $g_c$ ), s		0.9	4.2		22.0		44.8	0.0	2.5			
Green Ratio ( $g/C$ )		0.50	0.50		0.50		0.40	0.40	0.40			
Capacity ( $c$ ), veh/h		1510	672		1534		599	634	533			
Volume-to-Capacity Ratio ( $X$ )		0.026	0.148		0.536		0.964	0.000	0.083			
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)		14.6	61.1		311		676	0	34.7			
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)		0.6	2.4		12.4		26.8	0.0	1.4			
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)		0.00	0.24		0.00		0.00	0.00	0.09			
Uniform Delay ( $d_1$ ), s/veh		17.8	13.8		20.3		35.4	0.0	22.6			
Incremental Delay ( $d_2$ ), s/veh		0.0	0.5		1.3		24.5	0.0	0.0			
Initial Queue Delay ( $d_3$ ), s/veh		0.0	0.0		0.0		0.0	0.0	0.0			
Control Delay ( $d$ ), s/veh		17.9	14.3		21.6		59.9	0.0	22.6			
Level of Service ( LOS )		B	B		C		E		C			
Approach Delay, s/veh / LOS	15.3	B		21.6	C		57.2	E		0.0		
Intersection Delay, s/veh / LOS	35.1						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.5	B	1.9	B	2.8	C	3.0	C
Bicycle LOS Score / LOS	0.6	A	1.2	A	1.5	B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/I-29 SB				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/27/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	I-29 SB				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			180				670							5		120
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

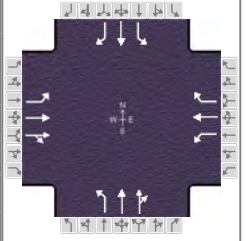
Base Critical Headway (sec)														7.5		6.9
Critical Headway (sec)														7.50		6.90
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.50		3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														6		133
Capacity, c (veh/h)														260		631
v/c Ratio														0.02		0.21
95% Queue Length, Q <sub>95</sub> (veh)														0.1		0.8
Control Delay (s/veh)														19.2		12.2
Level of Service, LOS														C		B
Approach Delay (s/veh)													12.5			
Approach LOS	B															

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	HDR			Duration, h	0.25		
Analyst	RL	Analysis Date	Jun 27, 2017	Area Type	Other		
Jurisdiction	DAKOTA DUNES	Time Period	PM PEAK	PHF	0.90		
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2023	Analysis Period	1 > 7:00		
Intersection	SIOUX PT RD	File Name	DD SIGNALS.xus				
Project Description	DD/NSC TRAFFIC STUDY						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	95	115	35	65	515	210	5	15	5	60	355	200

Signal Information				Signal Timing (s)								Signal Phases											
Cycle, s	120.0	Reference Phase	2	Green	6.9	3.2	53.2	0.8	4.5	27.4	Yellow	4.0	0.0	4.0	4.0	4.0	Red	1.5	0.0	2.5	1.5	0.0	2.5
Offset, s	0	Reference Point	Begin																				
Uncoordinated	No	Simult. Gap E/W	On																				
Force Mode	Fixed	Simult. Gap N/S	On																				

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	4.0	1.1	3.0
Phase Duration, s	15.6	62.8	12.4	59.7	6.3	33.9	10.8	38.4
Change Period, ( $Y+R_c$ ), s	5.5	6.5	5.5	6.5	5.5	6.5	5.5	6.5
Max Allow Headway ( $MAH$ ), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time ( $g_s$ ), s	10.2		7.6		2.3	2.7	5.9	30.8
Green Extension Time ( $g_e$ ), s	0.2	0.0	0.1	0.0	0.0	1.1	0.0	1.1
Phase Call Probability	0.97		0.91		0.17	1.00	0.89	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

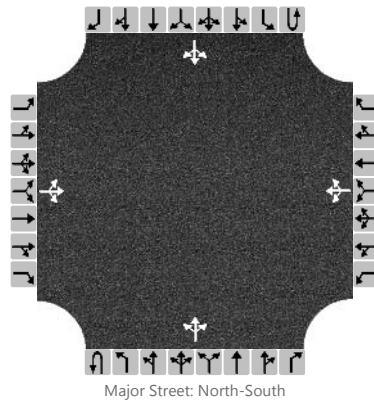
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate ( $v$ ), veh/h	106	76	74	71	563	137	6	11	11	67	394	133
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1512	1588	1507	1524	1600	1356	1524	1600	1468	1524	1600	1356
Queue Service Time ( $g_s$ ), s	8.2	3.2	3.3	5.6	34.1	7.0	0.3	0.6	0.7	3.9	28.8	9.6
Cycle Queue Clearance Time ( $g_c$ ), s	8.2	3.2	3.3	5.6	34.1	7.0	0.3	0.6	0.7	3.9	28.8	9.6
Green Ratio ( $g/C$ )	0.08	0.47	0.47	0.06	0.44	0.49	0.24	0.23	0.23	0.28	0.27	0.27
Capacity ( $c$ ), veh/h	127	745	707	88	709	661	80	365	335	442	425	360
Volume-to-Capacity Ratio ( $X$ )	0.829	0.101	0.105	0.807	0.794	0.207	0.070	0.030	0.033	0.151	0.928	0.370
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	149.4	55	54.9	101.6	431.3	104.9	5.7	11.5	11.4	65.7	441.2	143.1
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	5.9	2.2	2.2	4.1	17.3	4.2	0.2	0.5	0.5	2.6	17.6	5.7
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	1.24	0.00	0.00	0.88	0.00	0.00	0.08	0.00	0.00	0.51	0.00	0.00
Uniform Delay ( $d_1$ ), s/veh	54.1	17.7	17.8	57.1	23.4	18.0	38.1	36.0	36.0	32.4	42.9	35.9
Incremental Delay ( $d_2$ ), s/veh	5.2	0.3	0.3	4.1	5.8	0.4	0.1	0.0	0.0	0.1	6.6	0.2
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	59.3	18.0	18.1	61.3	29.2	18.4	38.3	36.0	36.0	32.5	49.6	36.1
Level of Service ( LOS )	E	B	B	E	C	B	D	D	D	C	D	D
Approach Delay, s/veh / LOS	35.1		D	30.3		C	36.5		D	44.6		D
Intersection Delay, s/veh / LOS	36.3						D					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS	2.4 / B	2.9 / C	3.0 / C	2.5 / B
Bicycle LOS Score / LOS	0.7 / A	1.8 / B	0.5 / A	1.5 / A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/COURTYARD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/27/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	COURTYARD DRIVE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		25	10	5		10	5	15		5	205	200		35	680	5
Percent Heavy Vehicles (%)		0	0	0		0	0	0		1				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.11				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.21				2.20		

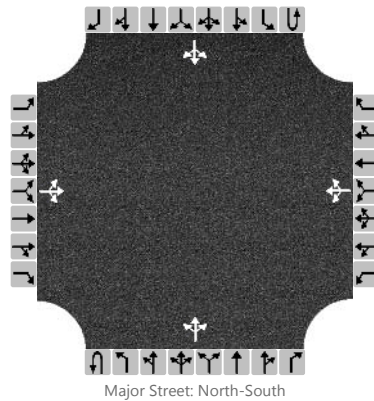
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			45				34				6				39	
Capacity, c (veh/h)			272				379				855				1121	
v/c Ratio			0.17				0.09				0.01				0.03	
95% Queue Length, Q <sub>95</sub> (veh)			0.6				0.3				0.0				0.1	
Control Delay (s/veh)			20.9				15.4				9.2				8.3	
Level of Service, LOS			C				C				A				A	
Approach Delay (s/veh)	20.9				15.4				0.2				0.9			
Approach LOS	C				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/LEVEE				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/27/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	LEVEE TRAIL				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		50	0	5		5	5	45		5	315	5		90	520	85
Percent Heavy Vehicles (%)		0	0	0		2	2	2		1				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.12	6.52	6.22		4.11				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.52	4.02	3.32		2.21				2.20		

## Delay, Queue Length, and Level of Service

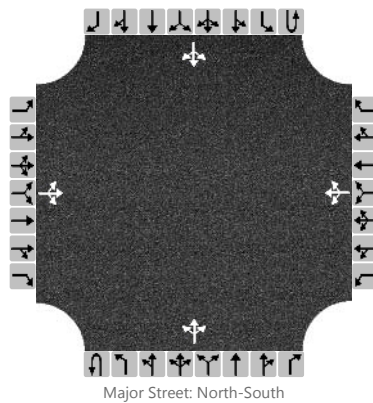
Flow Rate, v (veh/h)			62				62				6				100	
Capacity, c (veh/h)			241				509				923				1214	
v/c Ratio			0.26				0.12				0.01				0.08	
95% Queue Length, Q <sub>95</sub> (veh)			1.0				0.4				0.0				0.3	
Control Delay (s/veh)			25.0				13.0				8.9				8.2	
Level of Service, LOS			C				B				A				A	
Approach Delay (s/veh)	25.0				13.0				0.2				2.1			
Approach LOS	C				B											



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/MEADOWS				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/27/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	MEADOWS BLVD				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		50	5	15		5	5	65		15	210	5		125	315	90
Percent Heavy Vehicles (%)		1	1	1		0	0	0		0				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.10	6.50	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.50	4.00	3.30		2.20				2.20		

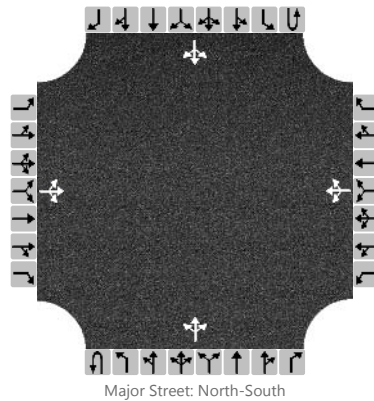
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			79				84				17				139	
Capacity, c (veh/h)			315				642				1121				1340	
v/c Ratio			0.25				0.13				0.02				0.10	
95% Queue Length, Q <sub>95</sub> (veh)			1.0				0.4				0.0				0.3	
Control Delay (s/veh)			20.2				11.4				8.3				8.0	
Level of Service, LOS			C				B				A				A	
Approach Delay (s/veh)	20.2				11.4				0.7				2.8			
Approach LOS	C				B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/PINEHURST				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	6/27/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2023	North/South Street	PINEHURST TRAIL				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		45	5	0		5	5	60		0	125	0		70	200	65
Percent Heavy Vehicles (%)		0	0	0		1	1	1		0				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.11	6.51	6.21		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.51	4.01	3.31		2.20				2.20		

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			56				79				0				78	
Capacity, c (veh/h)			453				797				1279				1457	
v/c Ratio			0.12				0.10				0.00				0.05	
95% Queue Length, Q <sub>95</sub> (veh)			0.4				0.3				0.0				0.2	
Control Delay (s/veh)			14.1				10.0				7.8				7.6	
Level of Service, LOS			B				B				A				A	
Approach Delay (s/veh)	14.1				10.0				0.0				2.0			
Approach LOS	B				B											

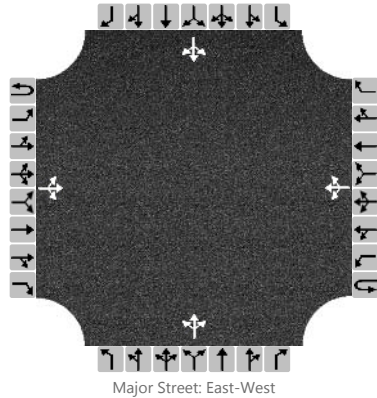
# APPENDIX

## Part 3 – 2040 Level of Service

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/WESTSHORE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	WESTSHORE DRIVE				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		40	190	0		10	50	55		0	5	35		30	0	5
Percent Heavy Vehicles (%)		1				1				1	1	1		3	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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.11	6.51	6.21		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)		2.21				2.21				3.51	4.01	3.31		3.53	4.03	3.33

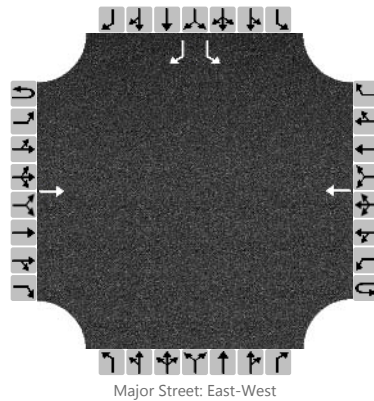
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		44				11					45					39	
Capacity, c (veh/h)		1477				1365					761					528	
v/c Ratio		0.03				0.01					0.06					0.07	
95% Queue Length, Q <sub>95</sub> (veh)		0.1				0.0					0.2					0.2	
Control Delay (s/veh)		7.5				7.7					10.0					12.4	
Level of Service, LOS		A				A					B					B	
Approach Delay (s/veh)		1.5				0.7				10.0				12.4			
Approach LOS										B				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/HS WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	HS WEST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.80				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			255				110							15		5
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)														7.1		6.2
Critical Headway (sec)														7.10		6.20
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.50		3.30

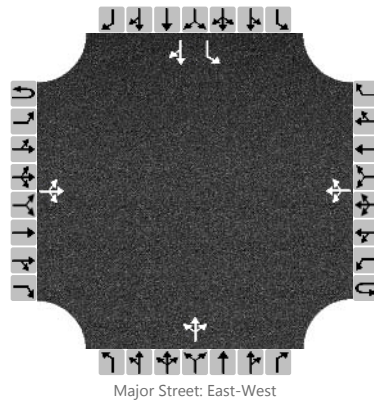
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														19		6
Capacity, c (veh/h)														517		916
v/c Ratio														0.04		0.01
95% Queue Length, Q <sub>95</sub> (veh)														0.1		0.0
Control Delay (s/veh)														12.2		9.0
Level of Service, LOS														B		A
Approach Delay (s/veh)													11.4			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/HS MID DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	HS MIDDLE DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		1	1	0
Configuration			LTR				LTR				LTR			L		TR
Volume, V (veh/h)		50	220	0		10	105	165		5	5	45		25	0	0
Percent Heavy Vehicles (%)		3				3				1	1	1		0	0	0
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.11	6.51	6.21		7.10	6.50	6.20
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				3.51	4.01	3.31		3.50	4.00	3.30

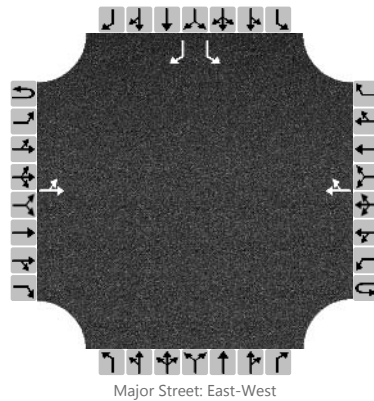
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		56				11				62				28		0	
Capacity, c (veh/h)		1254				1315				655				359		0	
v/c Ratio		0.04				0.01				0.09				0.08			
95% Queue Length, Q <sub>95</sub> (veh)		0.1				0.0				0.3				0.3			
Control Delay (s/veh)		8.0				7.8				11.1				15.9		5.0	
Level of Service, LOS		A				A				B				C		A	
Approach Delay (s/veh)		1.8				0.4				11.1				15.9			
Approach LOS										B				C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/HS EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	HS EAST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume, V (veh/h)		0	290				250	20						115		30
Percent Heavy Vehicles (%)		4												0		0
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.14												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.24												3.50		3.30

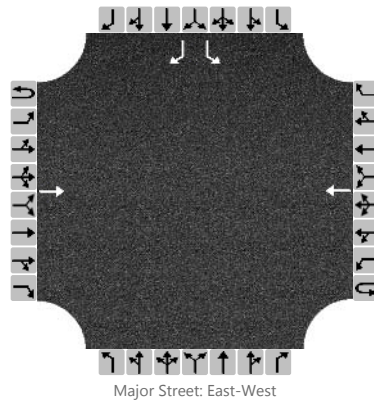
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0												128		33
Capacity, c (veh/h)		1248												409		755
v/c Ratio		0.00												0.31		0.04
95% Queue Length, Q <sub>95</sub> (veh)		0.0												1.3		0.1
Control Delay (s/veh)		7.9												17.8		10.0
Level of Service, LOS		A												C		A
Approach Delay (s/veh)	0.0												16.2			
Approach LOS	C															

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/ES WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	ES WEST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			405				380							110		75
Percent Heavy Vehicles (%)														4		4
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)														7.1		6.2
Critical Headway (sec)														7.14		6.24
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.54		3.34

## Delay, Queue Length, and Level of Service

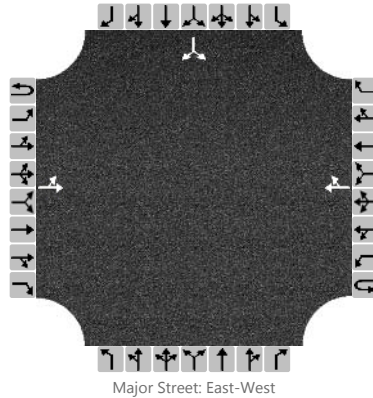
Flow Rate, v (veh/h)														122		83
Capacity, c (veh/h)														269		627
v/c Ratio														0.45		0.13
95% Queue Length, Q <sub>95</sub> (veh)														2.2		0.5
Control Delay (s/veh)														29.1		11.6
Level of Service, LOS														D		B
Approach Delay (s/veh)													22.0			
Approach LOS													C			



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/ES EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	ES EAST DRIVEWAY				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		50	465				380	155						0		0
Percent Heavy Vehicles (%)		3												2		2
Proportion Time Blocked																
Percent Grade (%)																0
Right Turn Channelized		No			No				No			No				
Median Type/Storage		Undivided														

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												7.12		6.22
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.52		3.32

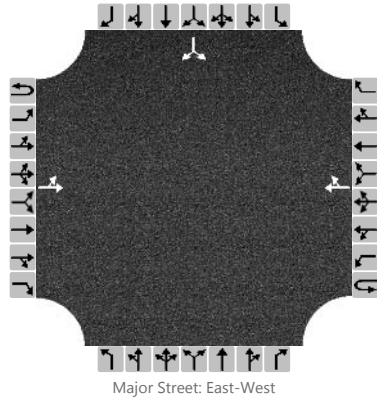
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		56														0
Capacity, c (veh/h)		976														0
v/c Ratio		0.06														
95% Queue Length, Q <sub>95</sub> (veh)		0.2														
Control Delay (s/veh)		8.9														5.0
Level of Service, LOS		A														A
Approach Delay (s/veh)		1.6												5.0		
Approach LOS		A														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/PENROSE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	PENROSE DRIVE				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		0	465				520	5						5		15
Percent Heavy Vehicles (%)		3												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.30

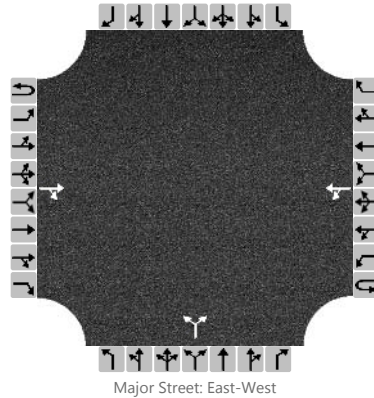
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0														23
Capacity, c (veh/h)		985														359
v/c Ratio		0.00														0.06
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.2
Control Delay (s/veh)		8.7														15.7
Level of Service, LOS		A														C
Approach Delay (s/veh)	0.0												15.7			
Approach LOS													C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/STREETER				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	STREETER DRIVE				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			430	40		5	415			110		30				
Percent Heavy Vehicles (%)						2				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.12				7.11		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.22				3.51		3.31				

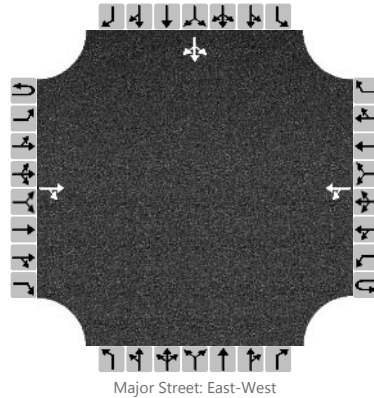
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						6					155					
Capacity, c (veh/h)						1044					265					
v/c Ratio						0.01					0.59					
95% Queue Length, Q <sub>95</sub> (veh)						0.0					3.4					
Control Delay (s/veh)						8.5					36.2					
Level of Service, LOS						A					E					
Approach Delay (s/veh)					0.2				36.2							
Approach LOS									E							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 SB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	I-29 SB				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration				TR		LT									LTR	
Volume, V (veh/h)			135	325		30	395							30	0	25
Percent Heavy Vehicles (%)						3								7	7	7
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.13								7.17	6.57	6.27
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.23								3.56	4.06	3.36

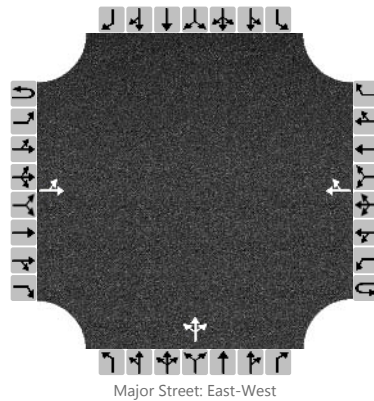
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						33									61	
Capacity, c (veh/h)						1048									364	
v/c Ratio						0.03									0.17	
95% Queue Length, Q <sub>95</sub> (veh)						0.1									0.6	
Control Delay (s/veh)						8.5									16.9	
Level of Service, LOS						A									C	
Approach Delay (s/veh)					0.9								16.9			
Approach LOS													C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 NB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	I-29 NB				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration		LT						TR		LTR						
Volume, V (veh/h)		30	135				110	15	315	0	10					
Percent Heavy Vehicles (%)		3							3	3	3					
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

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

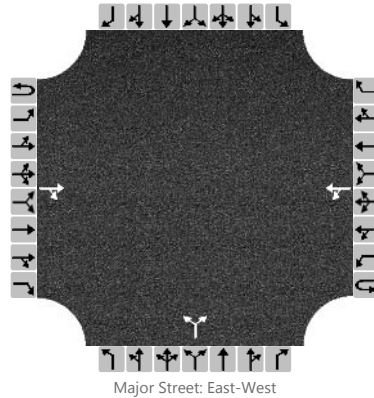
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		33								361						
Capacity, c (veh/h)		1437								601						
v/c Ratio		0.02								0.60						
95% Queue Length, Q <sub>95</sub> (veh)		0.1								4.0						
Control Delay (s/veh)		7.6								19.6						
Level of Service, LOS		A								C						
Approach Delay (s/veh)	1.5								19.6							
Approach LOS									C							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/MILITARY				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	MILITARY ROAD				
Time Analyzed	AM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			30	115		0	55			70		0				
Percent Heavy Vehicles (%)						4				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.14				7.13		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.24				3.53		3.33				

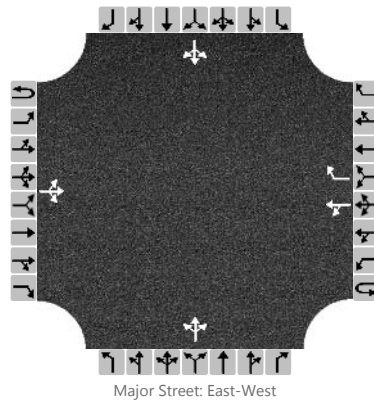
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						0					78					
Capacity, c (veh/h)						1404					805					
v/c Ratio						0.00					0.10					
95% Queue Length, Q <sub>95</sub> (veh)						0.0					0.3					
Control Delay (s/veh)						7.6					10.0					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					0.0				10.0							
Approach LOS									A							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL			Intersection	RIVER/SODRAC		
Agency/Co.	HDR			Jurisdiction	NORTH SIOUX CITY		
Date Performed	7/5/2017			East/West Street	RIVER DRIVE		
Analysis Year	2040			North/South Street	SODRAC DRIVE		
Time Analyzed	AM PEAK			Peak Hour Factor	0.90		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	1		0	1	0		0	1	0
Configuration			LTR			LT		R			LTR				LTR	
Volume, V (veh/h)		0	250	0		40	70	15		0	0	65		10	0	0
Percent Heavy Vehicles (%)		3				2				5	5	5		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

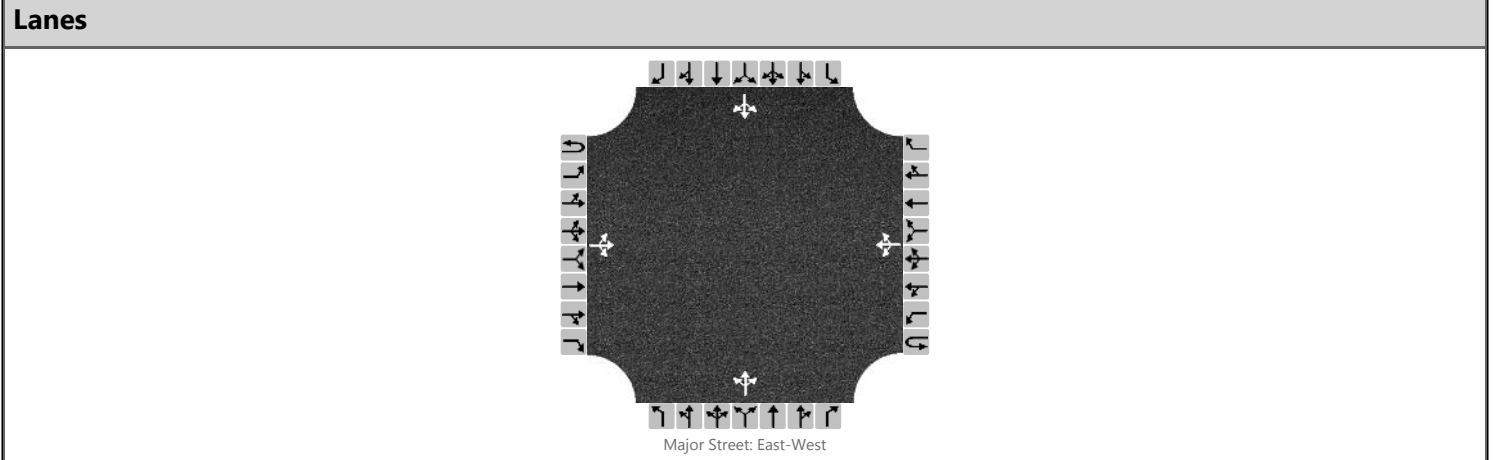
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.12				7.15	6.55	6.25		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.22				3.54	4.04	3.34		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				44					72					11	
Capacity, c (veh/h)		1491				1284					755					439	
v/c Ratio		0.00				0.03					0.10					0.03	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.3					0.1	
Control Delay (s/veh)		7.4				7.9					10.3					13.4	
Level of Service, LOS		A				A					B					B	
Approach Delay (s/veh)		0.0				2.7				10.3				13.4			
Approach LOS										B				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SIOUX POINT				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	RIVER DRIVE				
Analysis Year	2040	North/South Street	SODRAC DRIVE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		10	295	20		170	85	50		20	25	105		150	35	20
Percent Heavy Vehicles (%)		2				2				0	0	0		1	1	1
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.12				4.12				7.10	6.50	6.20		7.11	6.51	6.21
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)		2.22				2.22				3.50	4.00	3.30		3.51	4.01	3.31

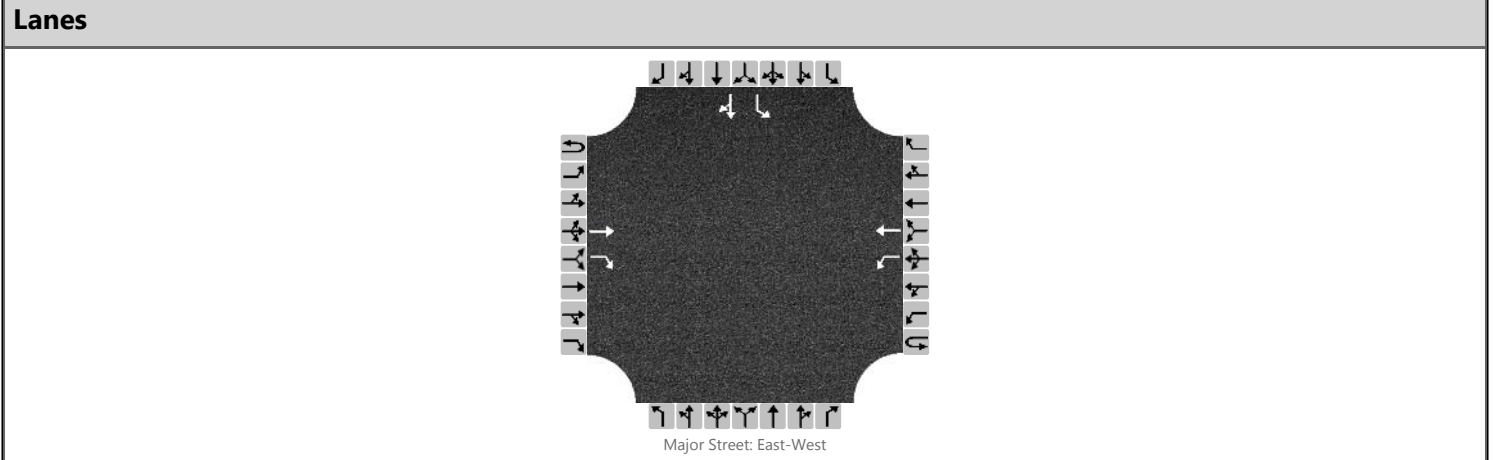
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)		11				189					167					228	
Capacity, c (veh/h)		1430				1208					420					187	
v/c Ratio		0.01				0.16					0.40					1.22	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.6					1.9					12.2	
Control Delay (s/veh)		7.5				8.5					19.1					188.2	
Level of Service, LOS		A				A					C					F	
Approach Delay (s/veh)		0.3				5.4				19.1				188.2			
Approach LOS										C				F			



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/I-29 SB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	RIVER DRIVE				
Analysis Year	2040	North/South Street	I-29 SB				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	1	0	1	1	0		0	0	0		1	1	0
Configuration			T	R		L	T							L		TR
Volume, V (veh/h)			330	220		180	225							85	0	80
Percent Heavy Vehicles (%)						5								1	1	1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

**Critical and Follow-up Headways**

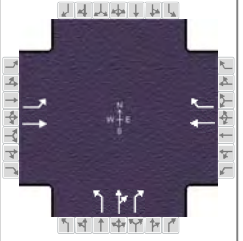
Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.15								7.11	6.51	6.21
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.24								3.51	4.01	3.31

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)						200								94		89
Capacity, c (veh/h)						955								182		791
v/c Ratio						0.21								0.52		0.11
95% Queue Length, Q <sub>95</sub> (veh)						0.8								2.6		0.4
Control Delay (s/veh)						9.8								44.2		10.1
Level of Service, LOS						A								E		B
Approach Delay (s/veh)					4.3								27.6			
Approach LOS													D			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	HDR			Duration, h	0.25		
Analyst	RL	Analysis Date	Jul 5, 2017	Area Type	Other		
Jurisdiction	NORTH SIOUX CITY	Time Period	AM PEAK	PHF	0.83		
Urban Street	RIVER DRIVE	Analysis Year	2040	Analysis Period	1 > 7:00		
Intersection	I-29 NB	File Name	RIVER SIGNALS.xus				
Project Description	DD/NSC TRAFFIC STUDY						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	55	360			355	65	50	0	370			

Signal Information													
Cycle, s	80.0	Reference Phase	2										
Offset, s	0	Reference Point	Begin										
Uncoordinated	No	Simult. Gap E/W	On	Green	48.9	18.1	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	5.0	0.0	0.0	0.0	0.0			
				Red	2.0	2.0	0.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		6.0		7.0		9.0		
Phase Duration, s		54.9		54.9		25.1		
Change Period, ( $Y+R_c$ ), s		6.0		6.0		7.0		
Max Allow Headway ( $MAH$ ), s		0.0		0.0		3.3		
Queue Clearance Time ( $g_s$ ), s						17.8		
Green Extension Time ( $g_e$ ), s		0.0		0.0		0.4		
Phase Call Probability						1.00		
Max Out Probability						0.24		

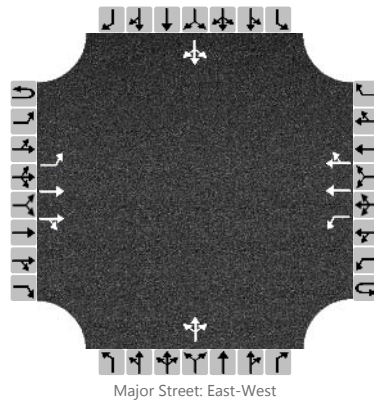
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3	8	18			
Adjusted Flow Rate ( $v$ ), veh/h	66	434			337	43	60	0	265			
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1052	1588			1525	1292	1464	1538	1303			
Queue Service Time ( $g_s$ ), s	2.9	11.7			12.2	0.6	2.7	0.0	15.8			
Cycle Queue Clearance Time ( $g_c$ ), s	15.1	11.7			12.2	0.6	2.7	0.0	15.8			
Green Ratio ( $g/C$ )	0.61	0.61			0.61	0.61	0.23	0.23	0.23			
Capacity ( $c$ ), veh/h	572	970			932	789	332	349	295			
Volume-to-Capacity Ratio ( $X$ )	0.116	0.447			0.361	0.054	0.181	0.000	0.897			
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	30.9	162.5			202	7.1	40.5	0	260.2			
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	1.2	6.4			7.7	0.3	1.6	0.0	10.0			
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.34	0.00			0.00	0.00	0.00	0.00	0.52			
Uniform Delay ( $d_1$ ), s/veh	12.5	8.3			12.7	3.3	24.9	0.0	30.0			
Incremental Delay ( $d_2$ ), s/veh	0.4	1.5			1.1	0.1	0.1	0.0	17.8			
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay ( $d$ ), s/veh	12.9	9.8			13.8	3.4	25.0	0.0	47.8			
Level of Service ( LOS )	B	A			B	A	C		D			
Approach Delay, s/veh / LOS	10.2	B		12.6	B		43.6	D		0.0		
Intersection Delay, s/veh / LOS	20.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	1.9	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.3	A	1.3	A	1.0	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/S DERBY LANE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	RIVER DRIVE				
Analysis Year	2040	North/South Street	S DERBY LANE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0
Configuration		L	T	TR		L	T	TR			LTR				LTR	
Volume, V (veh/h)		75	620	35		30	310	15		25	5	5		20	5	85
Percent Heavy Vehicles (%)		4				6				0	0	0		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

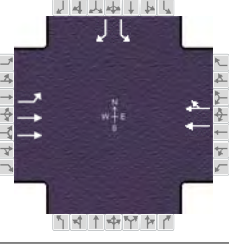
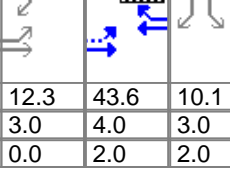
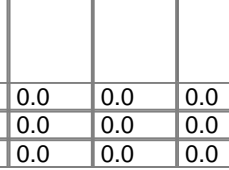
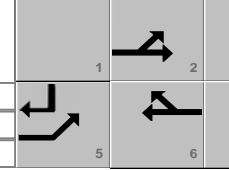
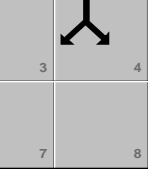
## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.18				4.22				7.50	6.50	6.90		7.54	6.54	6.94
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)		2.24				2.26				3.50	4.00	3.30		3.52	4.02	3.32

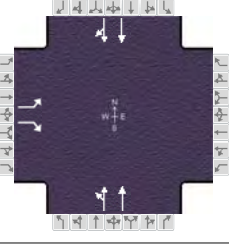
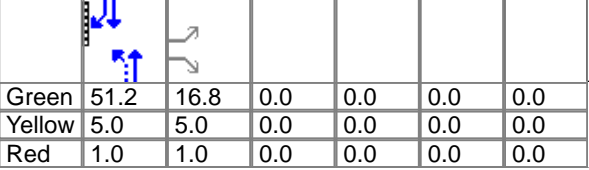
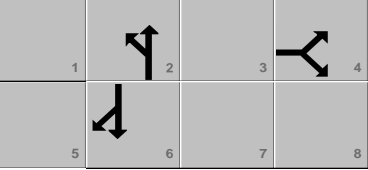
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		83				33					40					122	
Capacity, c (veh/h)		1180				846					150					455	
v/c Ratio		0.07				0.04					0.27					0.27	
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.1					1.0					1.1	
Control Delay (s/veh)		8.3				9.4					37.4					15.8	
Level of Service, LOS		A				A					E					C	
Approach Delay (s/veh)		0.8				0.8				37.4				15.8			
Approach LOS										E				C			

## HCS7 Signalized Intersection Results Summary

General Information					Intersection Information											
Agency	HDR				Duration, h	0.25										
Analyst	RL	Analysis Date	Jul 5, 2017		Area Type	Other										
Jurisdiction	NORTH SIOUX CITY		Time Period	AM PEAK		PHF	0.88									
Urban Street	RIVER DRIVE		Analysis Year	2040		Analysis Period	1 > 7:00									
Intersection	N DERBY LANE		File Name	RIVER SIGNALS.xus												
Project Description	DD/NSC TRAFFIC STUDY															
Demand Information					EB			WB			NB			SB		
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R
Demand ( v ), veh/h					340	305			210	40				50		145
Signal Information																
Cycle, s	80.0	Reference Phase	2		Green	12.3	43.6	10.1	0.0	0.0	0.0	0.0	1	2	3	4
Offset, s	28	Reference Point	End		Yellow	3.0	4.0	3.0	0.0	0.0	0.0	0.0	5	6	7	8
Uncoordinated	No	Simult. Gap E/W	On		Red	0.0	2.0	2.0	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On													
Timer Results					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					5	2		6				4				
Case Number					1.0	4.0		8.3				9.0				
Phase Duration, s					15.3	64.9		49.6				15.1				
Change Period, ( Y+R <sub>c</sub> ), s					3.0	6.0		6.0				5.0				
Max Allow Headway ( MAH ), s					3.1	0.0		0.0				3.3				
Queue Clearance Time ( g <sub>s</sub> ), s					11.4							10.0				
Green Extension Time ( g <sub>e</sub> ), s					0.9	0.0		0.0				0.2				
Phase Call Probability					1.00							0.99				
Max Out Probability					0.00							0.56				
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			6	16				7		14
Adjusted Flow Rate ( v ), veh/h					464	416			135	132				57		165
Adjusted Saturation Flow Rate ( s ), veh/h/ln					1500	1499			1575	1516				1512		1345
Queue Service Time ( g <sub>s</sub> ), s					9.4	3.2			5.8	3.5				2.7		8.0
Cycle Queue Clearance Time ( g <sub>c</sub> ), s					9.4	3.2			5.8	3.5				2.7		8.0
Green Ratio ( g/C )					0.72	0.74			0.55	0.55				0.13		0.28
Capacity ( c ), veh/h					846	2207			859	827				192		376
Volume-to-Capacity Ratio ( X )					0.548	0.188			0.157	0.160				0.297		0.438
Back of Queue ( Q ), ft/ln ( 95 th percentile )					91.8	28.1			49.6	48.4				43.8		109.2
Back of Queue ( Q ), veh/ln ( 95 th percentile )					3.6	1.1			2.0	1.9				1.7		4.3
Queue Storage Ratio ( RQ ) ( 95 th percentile )					0.76	0.00			0.00	0.00				0.44		0.00
Uniform Delay ( d <sub>1</sub> ), s/veh					5.2	3.1			9.0	9.1				31.7		23.6
Incremental Delay ( d <sub>2</sub> ), s/veh					0.2	0.1			0.4	0.4				0.3		0.3
Initial Queue Delay ( d <sub>3</sub> ), s/veh					0.0	0.0			0.0	0.0				0.0		0.0
Control Delay ( d ), s/veh					5.4	3.2			9.4	9.5				32.0		23.9
Level of Service ( LOS )					A	A			A	A				C		C
Approach Delay, s/veh / LOS					4.4		A	9.5		A	0.0			26.0		C
Intersection Delay, s/veh / LOS					8.9			A								
Multimodal Results					EB			WB			NB			SB		
Pedestrian LOS Score / LOS					0.6		A	2.2		B	2.8		C	2.9		C
Bicycle LOS Score / LOS					1.1		A	0.7		A					F	

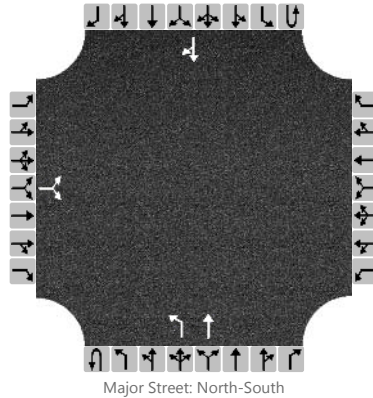
## HCS7 Signalized Intersection Results Summary

General Information					Intersection Information											
Agency	HDR				Duration, h	0.25										
Analyst	RL		Analysis Date	Jul 5, 2017		Area Type	Other									
Jurisdiction	NORTH SIOUX CITY		Time Period	AM PEAK		PHF	0.90									
Urban Street	RIVER DRIVE		Analysis Year	2040		Analysis Period	1 > 7:00									
Intersection	MILITARY ROAD		File Name	RIVER-MILITARY.xus												
Project Description	DD/NSC TRAFFIC STUDY															
Demand Information					EB			WB			NB			SB		
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R
Demand ( v ), veh/h					50		220				200	110			90	90
Signal Information																
Cycle, s	80.0	Reference Phase	2													
Offset, s	0	Reference Point	Begin													
Uncoordinated	No	Simult. Gap E/W	On													
Force Mode	Fixed	Simult. Gap N/S	On													
Green	51.2	16.8	0.0	0.0	0.0	0.0										
Yellow	5.0	5.0	0.0	0.0	0.0	0.0										
Red	1.0	1.0	0.0	0.0	0.0	0.0										
Timer Results					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase						4				2		6				
Case Number						9.0				8.0		8.0				
Phase Duration, s						22.8				57.2		57.2				
Change Period, ( Y+R <sub>c</sub> ), s						6.0				6.0		6.0				
Max Allow Headway ( MAH ), s						3.4				0.0		0.0				
Queue Clearance Time ( g <sub>s</sub> ), s						16.2										
Green Extension Time ( g <sub>e</sub> ), s						0.6				0.0		0.0				
Phase Call Probability						1.00										
Max Out Probability						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					7		14				5	2		6	16	
Adjusted Flow Rate ( v ), veh/h					56		244				222	122		82	79	
Adjusted Saturation Flow Rate ( s ), veh/h/ln					1500		1335				1163	1433		1575	1382	
Queue Service Time ( g <sub>s</sub> ), s					2.4		14.2				7.0	4.0		2.6	1.7	
Cycle Queue Clearance Time ( g <sub>c</sub> ), s					2.4		14.2				9.6	4.0		2.6	1.7	
Green Ratio ( g/C )					0.21		0.21				0.64	0.64		0.64	0.64	
Capacity ( c ), veh/h					315		280				834	917		1008	885	
Volume-to-Capacity Ratio ( X )					0.176		0.872				0.266	0.133		0.082	0.089	
Back of Queue ( Q ), ft/ln ( 95 th percentile )					39.1		208				79	34.7		22.3	21.4	
Back of Queue ( Q ), veh/ln ( 95 th percentile )					1.5		8.2				3.2	1.4		0.9	0.9	
Queue Storage Ratio ( RQ ) ( 95 th percentile )					0.00		0.00				0.00	0.00		0.00	0.00	
Uniform Delay ( d <sub>1</sub> ), s/veh					25.9		30.6				7.5	5.7		5.5	5.5	
Incremental Delay ( d <sub>2</sub> ), s/veh					0.1		3.3				0.8	0.3		0.2	0.2	
Initial Queue Delay ( d <sub>3</sub> ), s/veh					0.0		0.0				0.0	0.0		0.0	0.0	
Control Delay ( d ), s/veh					26.0		33.9				8.3	6.0		5.6	5.7	
Level of Service ( LOS )					C		C				A	A		A	A	
Approach Delay, s/veh / LOS					32.4		C	0.0			7.5	A	5.7	A		
Intersection Delay, s/veh / LOS					16.4			B								
Multimodal Results					EB			WB			NB			SB		
Pedestrian LOS Score / LOS					2.7		C	2.8		C	0.7	A	1.6	B		
Bicycle LOS Score / LOS							F				0.8	A	0.6	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/STEAMBOAT				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	STEAMBOAT DRIVE				
Analysis Year	2040	North/South Street	SIOUX POINT ROAD				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound					
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R		
Movement																		
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6		
Number of Lanes		0	0	0		0	0	0		0	1	1	0		0	0	1	0
Configuration			LR							L	T						TR	
Volume, V (veh/h)		35		80						330	210					120	130	
Percent Heavy Vehicles (%)		1		1						1								
Proportion Time Blocked																		
Percent Grade (%)		0																
Right Turn Channelized		No				No				No				No				
Median Type/Storage		Undivided																

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.41		6.21						4.11						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.51		3.31						2.21						

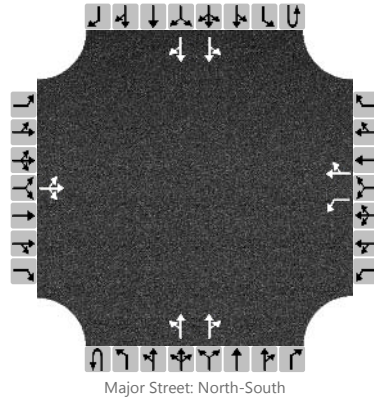
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			128							367						
Capacity, c (veh/h)			354							1291						
v/c Ratio			0.36							0.28						
95% Queue Length, Q <sub>95</sub> (veh)			1.6							1.2						
Control Delay (s/veh)			20.8							8.9						
Level of Service, LOS			C							A						
Approach Delay (s/veh)		20.8								5.4						
Approach LOS		C														

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/TOWER				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	TOWER ROAD				
Analysis Year	2040	North/South Street	SIOUX POINT ROAD				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		1	1	0	0	0	2	0	0	0	2	0
Configuration			LTR			L		TR		LT		TR		LT		TR
Volume, V (veh/h)		5	5	55		65	0	25		45	510	135		25	165	10
Percent Heavy Vehicles (%)		2	2	2		1	1	1		1				2		
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)		7.5	6.5	6.9		7.5	6.5	6.9		4.1				4.1		
Critical Headway (sec)		7.54	6.54	6.94		7.52	6.52	6.92		4.12				4.14		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.51	4.01	3.31		2.21				2.22		

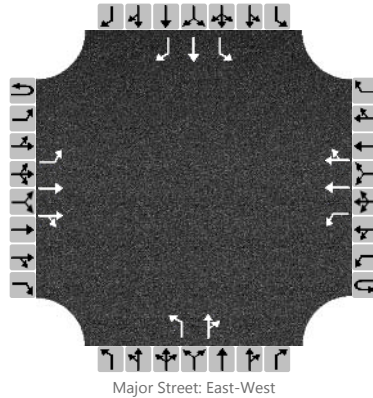
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			73			72		28		50				28		
Capacity, c (veh/h)			644			201		642		1384				880		
v/c Ratio			0.11			0.36		0.04		0.04				0.03		
95% Queue Length, Q <sub>95</sub> (veh)			0.4			1.5		0.1		0.1				0.1		
Control Delay (s/veh)			11.3			32.6		10.9		7.7				9.2		
Level of Service, LOS			B			D		B		A				A		
Approach Delay (s/veh)	11.3				26.5				0.7				1.3			
Approach LOS	B				D											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	TWO RIVERS/COTTONWOOD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	TWO RIVERS DRIVE				
Analysis Year	2040	North/South Street	COTTONWOOD LANE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	1
Configuration		L	T	TR		L	T	TR		L		TR		L	T	R
Volume, V (veh/h)		230	160	410		0	15	0		15	0	0		5	5	70
Percent Heavy Vehicles (%)		1				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				Yes			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.12				4.10				7.50	6.50	6.90		7.50	6.50	6.90
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)		2.21				2.20				3.50	4.00	3.30		3.50	4.00	3.30

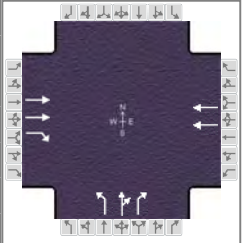
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		256				0				17		0		6	6	78	
Capacity, c (veh/h)		1606				959				178		0		331	165	1078	
v/c Ratio		0.16				0.00				0.10				0.02	0.04	0.07	
95% Queue Length, Q <sub>95</sub> (veh)		0.6				0.0				0.3				0.1	0.1	0.2	
Control Delay (s/veh)		7.7				8.8				27.3		5.0		16.1	27.6	8.6	
Level of Service, LOS		A				A				D		A		C	D	A	
Approach Delay (s/veh)		2.2				0.0				27.3				10.4			
Approach LOS										D				B			



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	HDR			Duration, h	0.25
Analyst	RL	Analysis Date	Jul 5, 2017	Area Type	Other
Jurisdiction	DAKOTA DUNES	Time Period	AM PEAK	PHF	0.65
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2040	Analysis Period	1 > 7:00
Intersection	I-29 NB	File Name	DD SIGNALS.xus		
Project Description	DD/NSC TRAFFIC STUDY				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h		245	385		100		550	0	555			

Signal Information														
Cycle, s	96.0	Reference Phase	2											
Offset, s	58	Reference Point	End											
Uncoordinated	No	Simult. Gap E/W	On	Green	28.1	55.9	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
				Red	1.5	2.5	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		7.0		8.0		9.0		
Phase Duration, s		33.6		33.6		62.4		
Change Period, ( Y+R <sub>c</sub> ), s		5.5		5.5		6.5		
Max Allow Headway ( MAH ), s		0.0		0.0		3.1		
Queue Clearance Time ( g <sub>s</sub> ), s						53.0		
Green Extension Time ( g <sub>e</sub> ), s		0.0		0.0		2.9		
Phase Call Probability						1.00		
Max Out Probability						0.16		

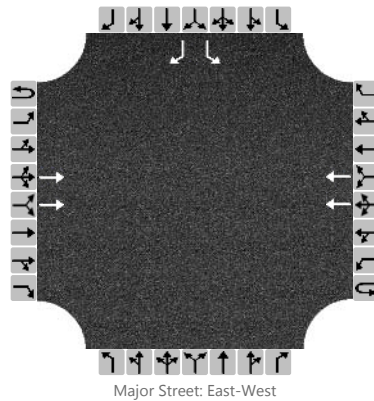
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12		6		3	8	18			
Adjusted Flow Rate ( v ), veh/h		230	216		154		846	0	515			
Adjusted Saturation Flow Rate ( s ), veh/h/ln		1499	1335		1523		1512	1600	1345			
Queue Service Time ( g <sub>s</sub> ), s		5.9	14.5		3.6		51.0	0.0	24.9			
Cycle Queue Clearance Time ( g <sub>c</sub> ), s		5.9	14.5		3.6		51.0	0.0	24.9			
Green Ratio ( g/C )		0.29	0.29		0.29		0.58	0.58	0.58			
Capacity ( c ), veh/h		879	391		893		880	931	783			
Volume-to-Capacity Ratio ( X )		0.261	0.551		0.172		0.962	0.000	0.658			
Back of Queue ( Q ), ft/ln ( 95 th percentile )		100.1	244.7		59.7		655.9	0	270.6			
Back of Queue ( Q ), veh/ln ( 95 th percentile )		3.9	9.6		2.4		26.0	0.0	10.7			
Queue Storage Ratio ( RQ ) ( 95 th percentile )		0.00	0.98		0.00		0.00	0.00	0.68			
Uniform Delay ( d <sub>1</sub> ), s/veh		27.9	35.9		25.3		19.1	0.0	13.6			
Incremental Delay ( d <sub>2</sub> ), s/veh		0.7	5.4		0.4		17.6	0.0	0.9			
Initial Queue Delay ( d <sub>3</sub> ), s/veh		0.0	0.0		0.0		0.0	0.0	0.0			
Control Delay ( d ), s/veh		28.6	41.2		25.7		36.7	0.0	14.5			
Level of Service ( LOS )		C	D		C		D		B			
Approach Delay, s/veh / LOS	34.7	C		25.7	C		28.3	C		0.0		
Intersection Delay, s/veh / LOS	29.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	1.9	B	2.7	C	3.1	C
Bicycle LOS Score / LOS	1.1	A	0.6	A	2.7	C		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/I-29 SB				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	I-29 SB				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			485				630							95		175
Percent Heavy Vehicles (%)														1		1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

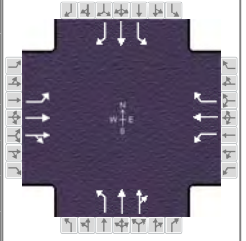
Base Critical Headway (sec)														7.5		6.9
Critical Headway (sec)														7.52		6.92
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.51		3.31

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														106		194
Capacity, c (veh/h)														209		649
v/c Ratio														0.51		0.30
95% Queue Length, Q <sub>95</sub> (veh)														2.6		1.3
Control Delay (s/veh)														38.7		12.9
Level of Service, LOS														E		B
Approach Delay (s/veh)													22.0			
Approach LOS													C			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	HDR			Duration, h	0.25		
Analyst	RL	Analysis Date	Jul 5, 2017	Area Type	Other		
Jurisdiction	DAKOTA DUNES	Time Period	AM PEAK	PHF	0.90		
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2040	Analysis Period	1 > 7:00		
Intersection	SIOUX PT RD	File Name	DD SIGNALS.xus				
Project Description	DD/NSC TRAFFIC STUDY						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	180	420	15	50	265	490	5	20	25	40	170	75

Signal Information				Signal Timing Diagram								
Cycle, s	96.0	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	2.3	42.9	0.7	2.8	10.9						
Yellow	4.0	4.0	4.0	4.0	0.0	4.0						
Red	2.5	2.5	1.5	2.5	0.0	1.5						

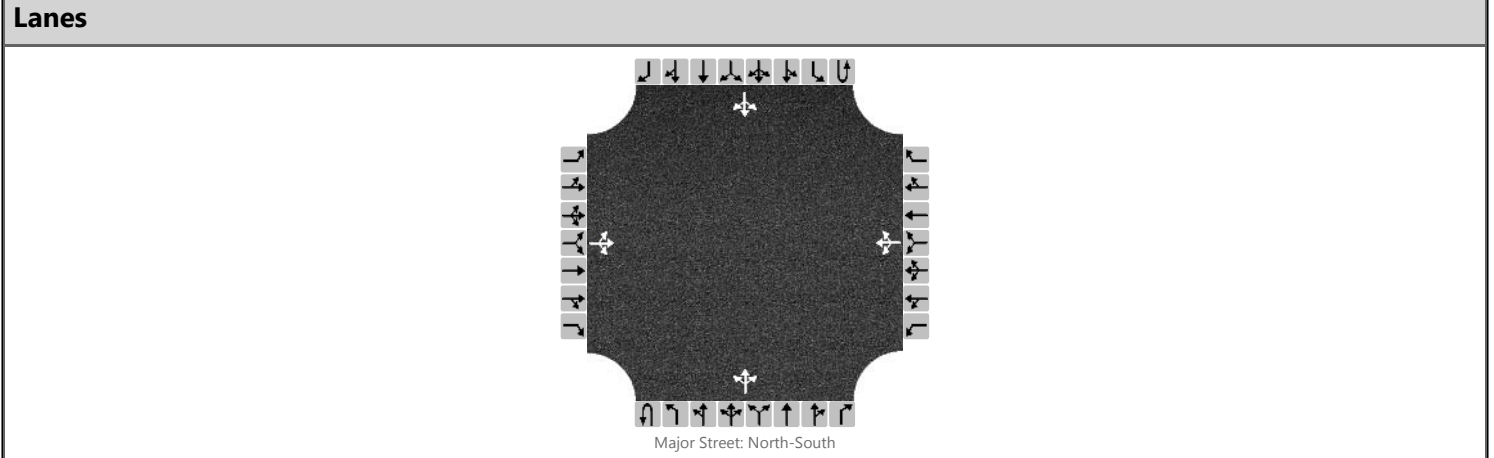
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	2.0	3.0	1.1	4.0	1.1	3.0
Phase Duration, s	21.2	57.2	12.5	48.4	7.2	16.4	10.0	19.1
Change Period, ( $Y+R_c$ ), s	6.5	5.5	6.5	5.5	6.5	5.5	6.5	5.5
Max Allow Headway ( $MAH$ ), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time ( $g_s$ ), s	14.5		6.8		2.3	3.2	4.5	13.2
Green Extension Time ( $g_e$ ), s	0.3	0.0	0.1	0.0	0.0	0.5	0.0	0.4
Phase Call Probability	1.00		0.87		0.14	1.00	0.69	1.00
Max Out Probability	0.00		0.00		0.00	0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
	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	200	240	238	76	403	449	6	20	19	44	189	50
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1500	1575	1562	1500	1575	1356	1500	1575	1363	1500	1575	1335
Queue Service Time ( $g_s$ ), s	12.5	7.9	8.0	4.8	21.8	27.9	0.3	1.1	1.2	2.5	11.2	3.2
Cycle Queue Clearance Time ( $g_c$ ), s	12.5	7.9	8.0	4.8	21.8	27.9	0.3	1.1	1.2	2.5	11.2	3.2
Green Ratio ( $g/C$ )	0.15	0.54	0.54	0.06	0.45	0.48	0.12	0.11	0.11	0.15	0.14	0.14
Capacity ( $c$ ), veh/h	230	848	841	93	704	655	91	178	154	267	224	190
Volume-to-Capacity Ratio ( $X$ )	0.868	0.282	0.283	0.816	0.572	0.684	0.061	0.110	0.125	0.167	0.844	0.264
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	211	127.7	127	81.1	312.3	388.5	5.3	18.8	18.4	41.3	201	47.5
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	8.3	5.0	5.0	3.2	12.3	15.5	0.2	0.7	0.7	1.6	7.9	1.9
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	1.76	0.00	0.00	0.71	0.00	0.00	0.07	0.00	0.00	0.32	0.00	0.00
Uniform Delay ( $d_1$ ), s/veh	39.7	12.1	12.1	43.2	28.8	29.2	37.9	38.2	38.3	35.8	40.1	36.7
Incremental Delay ( $d_2$ ), s/veh	3.9	0.8	0.8	2.8	1.5	2.5	0.1	0.1	0.1	0.1	3.3	0.3
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	43.6	12.9	12.9	46.0	30.2	31.7	38.0	38.3	38.4	35.9	43.5	37.0
Level of Service ( LOS )	D	B	B	D	C	C	D	D	D	D	D	D
Approach Delay, s/veh / LOS	21.9		C	32.3		C	38.3		D	41.1		D
Intersection Delay, s/veh / LOS	30.1						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.4		B	2.9		C	3.1		C	2.5		B
Bicycle LOS Score / LOS	1.0		A	1.6		B	0.5		A	1.0		A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/COURTYARD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	COURTYARD DRIVE				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		35	5	15		10	0	5		5	575	450		30	280	35
Percent Heavy Vehicles (%)		0	0	0		0	0	0		1				4		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

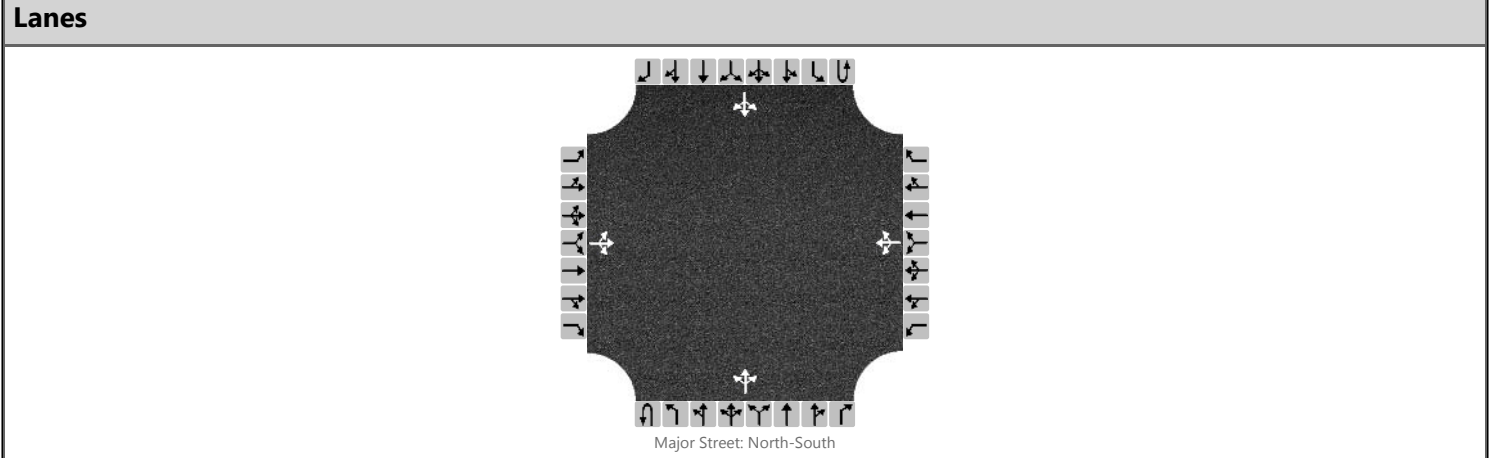
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.11				4.14		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			62				17				6				33	
Capacity, c (veh/h)			272				268				1214				606	
v/c Ratio			0.23				0.06				0.00				0.05	
95% Queue Length, Q <sub>95</sub> (veh)			0.9				0.2				0.0				0.2	
Control Delay (s/veh)			22.1				19.3				8.0				11.3	
Level of Service, LOS			C				C				A				B	
Approach Delay (s/veh)	22.1				19.3				0.2				1.7			
Approach LOS	C				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/LEVEE				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	LEVEE TRAIL				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		100	5	0		0	0	105		0	825	0		40	235	30
Percent Heavy Vehicles (%)		0	0	0		1	1	1		1				5		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Left + Thru								1						

**Critical and Follow-up Headways**

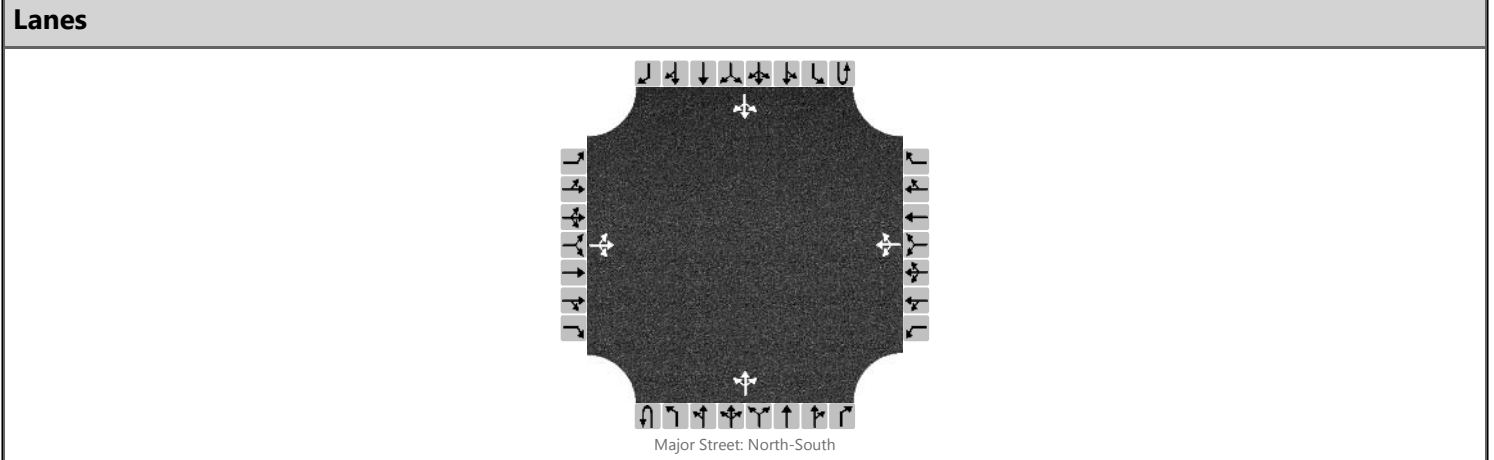
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.11	6.51	6.21		4.11				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.51	4.01	3.31		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			117				117				0				44	
Capacity, c (veh/h)			135				331				1273				733	
v/c Ratio			0.87				0.35				0.00				0.06	
95% Queue Length, Q <sub>95</sub> (veh)			5.6				1.6				0.0				0.2	
Control Delay (s/veh)			108.5				21.7				7.8				10.2	
Level of Service, LOS			F				C				A				B	
Approach Delay (s/veh)		108.5				21.7				0.0				2.0		
Approach LOS		F				C										

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/MEADOWS				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	MEADOWS BLVD				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0	
Configuration			LTR				LTR				LTR				LTR		
Volume, V (veh/h)		150	5	10		5	5	135		5	540	5		30	185	20	
Percent Heavy Vehicles (%)		2	2	2		1	1	1		1				5			
Proportion Time Blocked																	
Percent Grade (%)		0				0											
Right Turn Channelized		No				No				No				No			
Median Type/Storage		Left + Thru								1							

**Critical and Follow-up Headways**

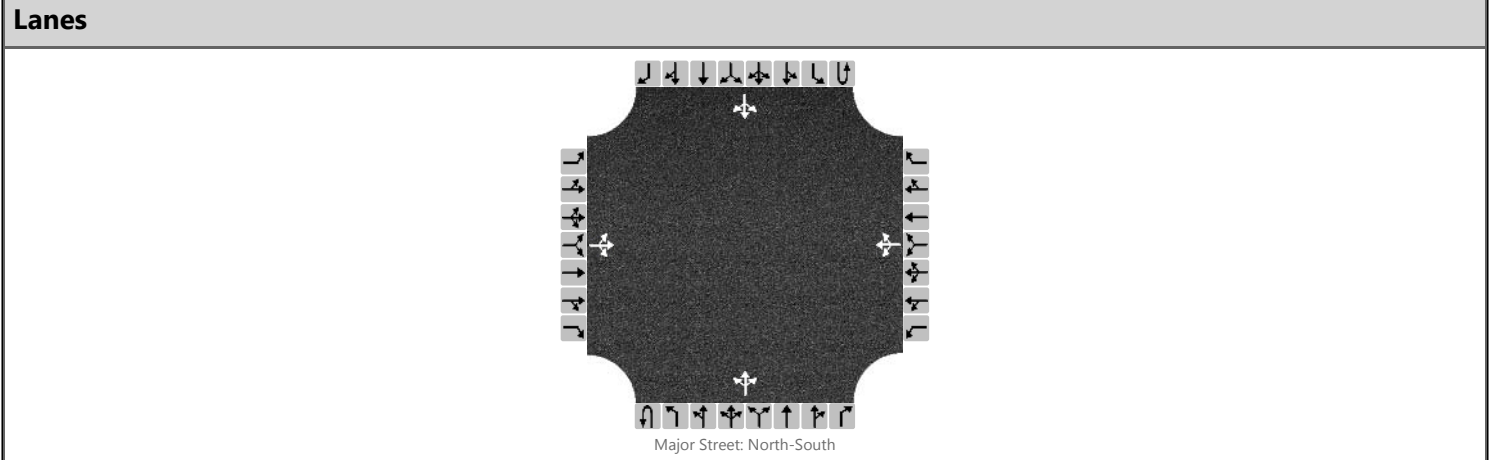
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.11	6.51	6.21		4.11				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.51	4.01	3.31		2.21				2.24		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			184				162			6				33			
Capacity, c (veh/h)			238				487			1346				959			
v/c Ratio			0.77				0.33			0.00				0.03			
95% Queue Length, Q <sub>95</sub> (veh)			5.6				1.4			0.0				0.1			
Control Delay (s/veh)			58.1				16.0			7.7				8.9			
Level of Service, LOS			F				C			A				A			
Approach Delay (s/veh)		58.1				16.0				0.1				1.4			
Approach LOS		F				C											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/PINEHURST				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	PINEHURST TRAIL				
Time Analyzed	AM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0	
Configuration			LTR				LTR				LTR				LTR		
Volume, V (veh/h)		95	0	0		0	0	100		0	355	5		50	100	50	
Percent Heavy Vehicles (%)		0	0	0		3	3	3		1				5			
Proportion Time Blocked																	
Percent Grade (%)		0				0											
Right Turn Channelized		No				No				No							
Median Type/Storage		Left + Thru								1							

**Critical and Follow-up Headways**

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.13	6.53	6.23		4.11				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.53	4.03	3.33		2.21				2.24		

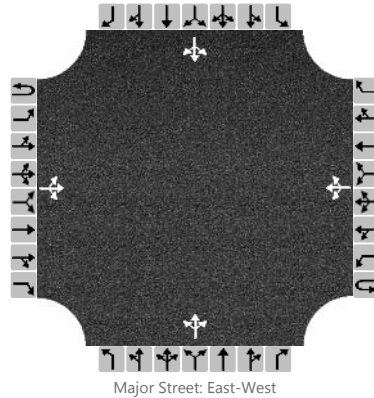
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			106				111				0				56		
Capacity, c (veh/h)			360				650				1417				1145		
v/c Ratio			0.29				0.17				0.00				0.05		
95% Queue Length, Q <sub>95</sub> (veh)			1.2				0.6				0.0				0.2		
Control Delay (s/veh)			19.1				11.7				7.5				8.3		
Level of Service, LOS			C				B				A				A		
Approach Delay (s/veh)		19.1				11.7				0.0				2.4			
Approach LOS		C				B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/WESTSHORE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	WESTSHORE DRIVE				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR					LTR
Volume, V (veh/h)		5	85	10		60	140	10		10	0	65		20	5	10
Percent Heavy Vehicles (%)		1				1				1	1	1		3	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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.11	6.51	6.21		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)		2.21				2.21				3.51	4.01	3.31		3.53	4.03	3.33

## Delay, Queue Length, and Level of Service

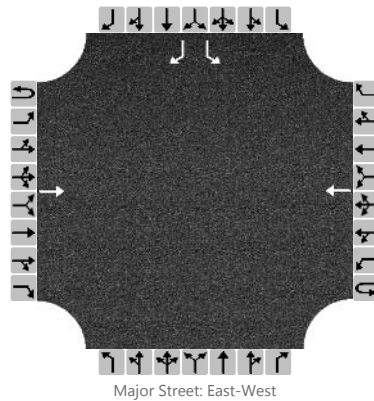
Flow Rate, v (veh/h)		6				67					83					39	
Capacity, c (veh/h)		1417				1492					860					542	
v/c Ratio		0.00				0.04					0.10					0.07	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.3					0.2	
Control Delay (s/veh)		7.6				7.5					9.6					12.2	
Level of Service, LOS		A				A					A					B	
Approach Delay (s/veh)		0.4				2.4				9.6				12.2			
Approach LOS										A				B			



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2040	North/South Street	HS WEST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			170				205							5		5
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)															7.1		6.2
Critical Headway (sec)															7.10		6.20
Base Follow-Up Headway (sec)															3.5		3.3
Follow-Up Headway (sec)															3.50		3.30

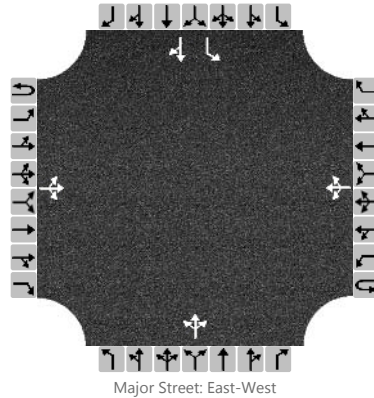
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)															6		6
Capacity, c (veh/h)															550		816
v/c Ratio															0.01		0.01
95% Queue Length, Q <sub>95</sub> (veh)															0.0		0.0
Control Delay (s/veh)															11.6		9.4
Level of Service, LOS															B		A
Approach Delay (s/veh)													10.5				
Approach LOS													B				

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/HS MID DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	HS MIDDLE DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		1	1	0
Configuration			LTR				LTR				LTR			L		TR
Volume, V (veh/h)		5	160	10		55	200	25		5	0	20		15	0	0
Percent Heavy Vehicles (%)		1				1				0	0	0		1	1	1
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)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.11				4.11				7.10	6.50	6.20		7.11	6.51	6.21
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)		2.21				2.21				3.50	4.00	3.30		3.51	4.01	3.31

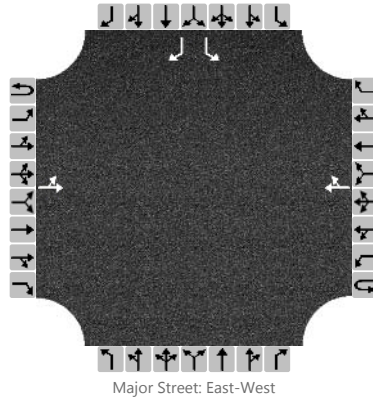
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		6				61					28				17		0
Capacity, c (veh/h)		1321				1391					708				408		0
v/c Ratio		0.00				0.04					0.04				0.04		
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.1				0.1		
Control Delay (s/veh)		7.7				7.7					10.3				14.2		5.0
Level of Service, LOS		A				A					B				B		A
Approach Delay (s/veh)		0.3				1.8				10.3				14.2			
Approach LOS										B				B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/HS EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2040	North/South Street	HS EAST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		LT						TR						L		R
Volume, V (veh/h)		0	195				265	10						75		15
Percent Heavy Vehicles (%)		7												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.17												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.26												3.50		3.30

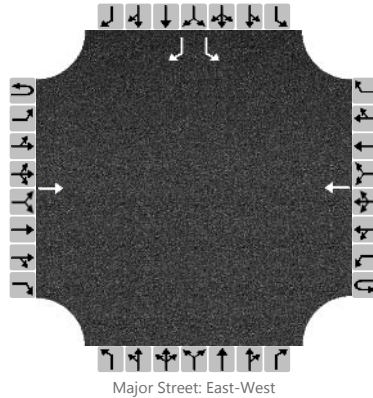
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0												83		17
Capacity, c (veh/h)		1230												473		744
v/c Ratio		0.00												0.18		0.02
95% Queue Length, Q <sub>95</sub> (veh)		0.0												0.6		0.1
Control Delay (s/veh)		7.9												14.2		9.9
Level of Service, LOS		A												B		A
Approach Delay (s/veh)	0.0												13.5			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/ES WEST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	ES WEST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			310				315							60		35
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)														7.1		6.2
Critical Headway (sec)														7.10		6.20
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.50		3.30

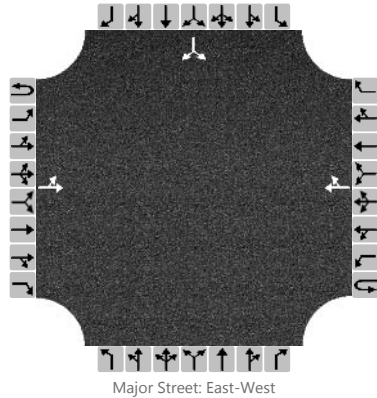
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)														67		39
Capacity, c (veh/h)														360		698
v/c Ratio														0.19		0.06
95% Queue Length, Q <sub>95</sub> (veh)														0.7		0.2
Control Delay (s/veh)														17.3		10.5
Level of Service, LOS														C		B
Approach Delay (s/veh)													14.8			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/ES EAST DRIVE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2040	North/South Street	ES EAST DRIVEWAY				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		10	360				310	40						5		5
Percent Heavy Vehicles (%)		2												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.12												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.22												3.50		3.30

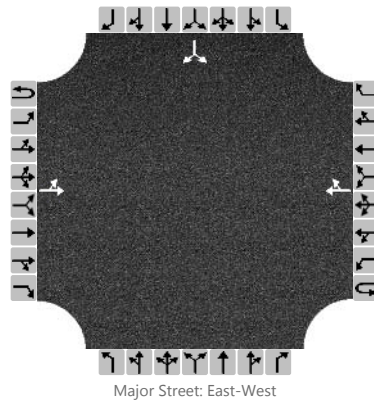
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11														12
Capacity, c (veh/h)		1170														425
v/c Ratio		0.01														0.03
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.1
Control Delay (s/veh)		8.1														13.7
Level of Service, LOS		A														B
Approach Delay (s/veh)	0.3								0.3				13.7			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTSHORE/PENROSE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTSHORE DRIVE				
Analysis Year	2040	North/South Street	PENROSE DRIVE				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration		LT						TR							LR	
Volume, V (veh/h)		0	365				345	5						10		5
Percent Heavy Vehicles (%)		3												0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												7.10		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.30

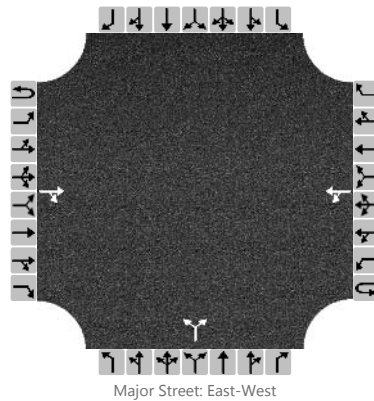
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0														17
Capacity, c (veh/h)		1163														382
v/c Ratio		0.00														0.04
95% Queue Length, Q <sub>95</sub> (veh)		0.0														0.1
Control Delay (s/veh)		8.1														14.9
Level of Service, LOS		A														B
Approach Delay (s/veh)	0.0												14.9			
Approach LOS													B			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/STREETER				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	STREETER DRIVE				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			295	80		30	320			30		20				
Percent Heavy Vehicles (%)						4				6		6				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.14				7.16		6.26				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.24				3.55		3.35				

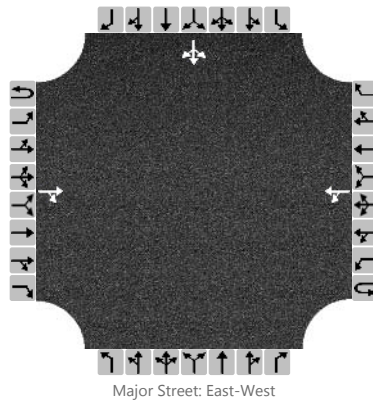
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						33					55					
Capacity, c (veh/h)						1130					377					
v/c Ratio						0.03					0.15					
95% Queue Length, Q <sub>95</sub> (veh)						0.1					0.5					
Control Delay (s/veh)						8.3					16.2					
Level of Service, LOS						A					C					
Approach Delay (s/veh)					1.0				16.2							
Approach LOS									C							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 SB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	I-29 SB				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration				TR		LT									LTR	
Volume, V (veh/h)			90	225		30	330							10	0	20
Percent Heavy Vehicles (%)						2								7	7	7
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.12								7.17	6.57	6.27
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.22								3.56	4.06	3.36

## Delay, Queue Length, and Level of Service

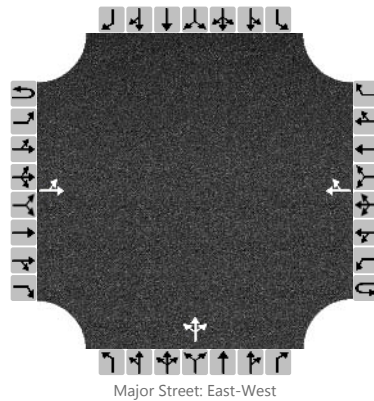
Flow Rate, v (veh/h)						33										33
Capacity, c (veh/h)						1208										520
v/c Ratio						0.03										0.06
95% Queue Length, Q <sub>95</sub> (veh)						0.1										0.2
Control Delay (s/veh)						8.1										12.4
Level of Service, LOS						A										B
Approach Delay (s/veh)					0.9								12.4			
Approach LOS													B			



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 NB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	I-29 NB				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration		LT						TR			LTR					
Volume, V (veh/h)		40	60				105	35		255	0	55				
Percent Heavy Vehicles (%)		3								0	0	0				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1								7.1	6.5	6.2				
Critical Headway (sec)		4.13								7.10	6.50	6.20				
Base Follow-Up Headway (sec)		2.2								3.5	4.0	3.3				
Follow-Up Headway (sec)		2.23								3.50	4.00	3.30				

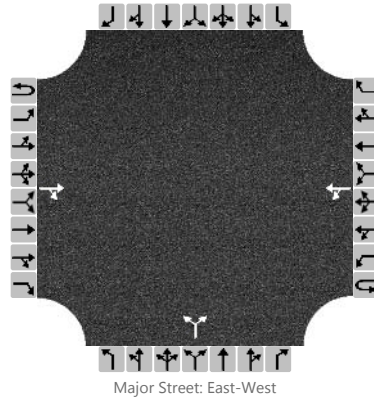
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		44								344						
Capacity, c (veh/h)		1416								691						
v/c Ratio		0.03								0.50						
95% Queue Length, Q <sub>95</sub> (veh)		0.1								2.8						
Control Delay (s/veh)		7.6								15.3						
Level of Service, LOS		A								C						
Approach Delay (s/veh)		3.2								15.3						
Approach LOS										C						

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/MILITARY				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	MILITARY ROAD				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			35	80		5	50			90		0				
Percent Heavy Vehicles (%)						11				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.21				7.13		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.30				3.53		3.33				

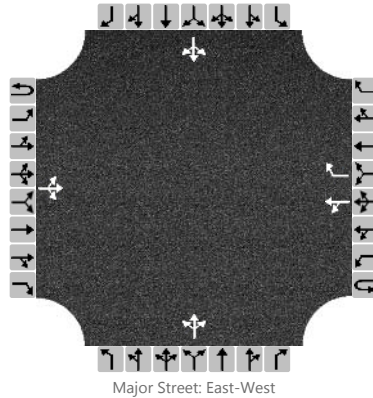
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						6					100					
Capacity, c (veh/h)						1404					810					
v/c Ratio						0.00					0.12					
95% Queue Length, Q <sub>95</sub> (veh)						0.0					0.4					
Control Delay (s/veh)						7.6					10.1					
Level of Service, LOS						A					B					
Approach Delay (s/veh)					0.8				10.1							
Approach LOS									B							

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL			Intersection	RIVER/SODRAC		
Agency/Co.	HDR			Jurisdiction	NORTH SIOUX CITY		
Date Performed	7/5/2017			East/West Street	RIVER DRIVE		
Analysis Year	2040			North/South Street	SODRAC DRIVE		
Time Analyzed	PM PEAK			Peak Hour Factor	0.90		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	1		0	1	0		0	1	0
Configuration			LTR			LT		R			LTR				LTR	
Volume, V (veh/h)		0	295	0		35	210	15		0	0	35		20	0	0
Percent Heavy Vehicles (%)		0				0				9	9	9		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

## Critical and Follow-up Headways

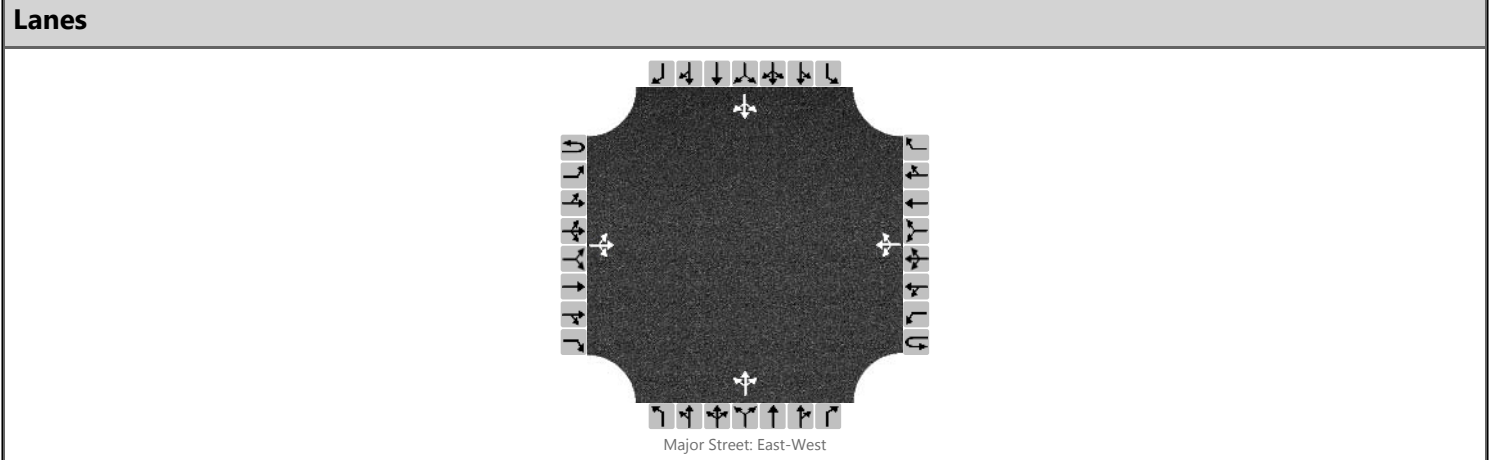
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.19	6.59	6.29		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.58	4.08	3.38		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		0				39					39					22	
Capacity, c (veh/h)		1327				1243					698					349	
v/c Ratio		0.00				0.03					0.06					0.06	
95% Queue Length, Q <sub>95</sub> (veh)		0.0				0.1					0.2					0.2	
Control Delay (s/veh)		7.7				8.0					10.5					16.0	
Level of Service, LOS		A				A					B					C	
Approach Delay (s/veh)		0.0				1.3				10.5				16.0			
Approach LOS										B				C			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/SIOUX POINT				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	RIVER DRIVE				
Analysis Year	2040	North/South Street	SIOUX POINT				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		20	295	35		100	230	160		15	35	140		90	25	15
Percent Heavy Vehicles (%)		2				1				1	1	1		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

**Critical and Follow-up Headways**

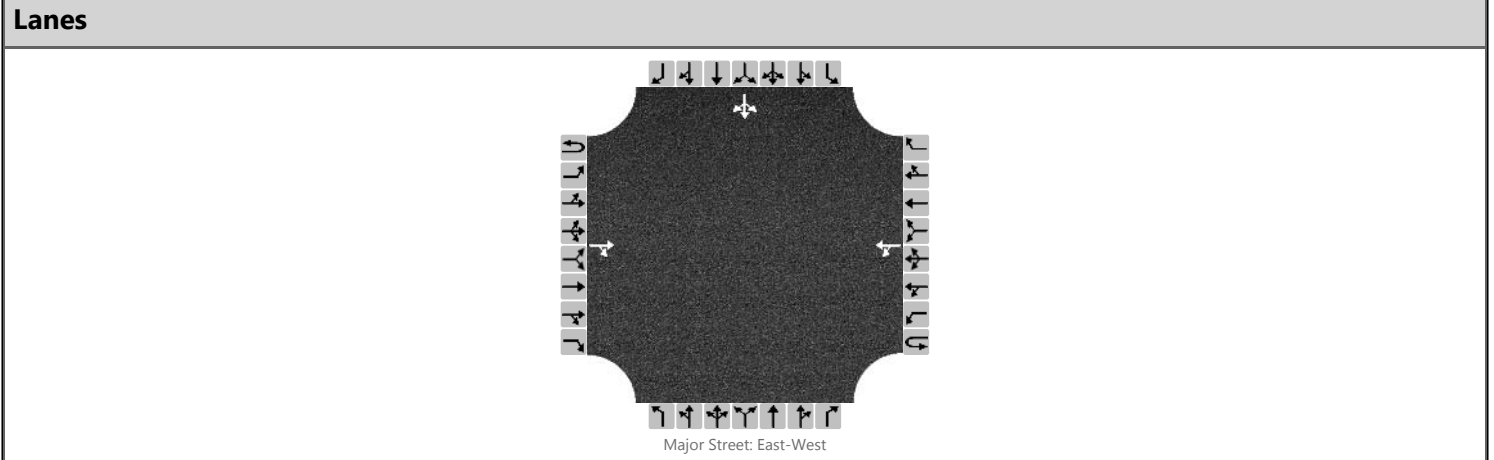
Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.12				4.11				7.11	6.51	6.21		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.22				2.21				3.51	4.01	3.31		3.50	4.00	3.30

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)		22				111					212					145	
Capacity, c (veh/h)		1125				1197					408					146	
v/c Ratio		0.02				0.09					0.52					0.99	
95% Queue Length, Q <sub>95</sub> (veh)		0.1				0.3					2.9					7.3	
Control Delay (s/veh)		8.3				8.3					23.0					132.4	
Level of Service, LOS		A				A					C					F	
Approach Delay (s/veh)		0.7				2.5				23.0				132.4			
Approach LOS										C				F			

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	NORTHSHORE/I-29 SB				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	NORTHSHORE DRIVE				
Analysis Year	2040	North/South Street	I-29 SB				
Time Analyzed	PM EXISTING	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration				TR		LT									LTR	
Volume, V (veh/h)			90	225		30	330							10	0	20
Percent Heavy Vehicles (%)						2								7	7	7
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

**Critical and Follow-up Headways**

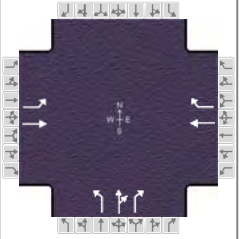
Base Critical Headway (sec)						4.1								7.1	6.5	6.2
Critical Headway (sec)						4.12								7.17	6.57	6.27
Base Follow-Up Headway (sec)						2.2								3.5	4.0	3.3
Follow-Up Headway (sec)						2.22								3.56	4.06	3.36

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)						33										33
Capacity, c (veh/h)						1208										520
v/c Ratio						0.03										0.06
95% Queue Length, Q <sub>95</sub> (veh)						0.1										0.2
Control Delay (s/veh)						8.1										12.4
Level of Service, LOS						A										B
Approach Delay (s/veh)					0.9								12.4			
Approach LOS													B			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	HDR			Duration, h	0.25		
Analyst	RL	Analysis Date	Jul 5, 2017	Area Type	Other		
Jurisdiction	NORTH SIOUX CITY	Time Period	PM PEAK	PHF	0.90		
Urban Street	RIVER DRIVE	Analysis Year	2040	Analysis Period	1 > 7:00		
Intersection	I-29 NB	File Name	RIVER SIGNALS.xus				
Project Description	DD/NSC TRAFFIC STUDY						



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand ( $v$ ), veh/h	65	335			600	105	210	0	230			

Signal Information													
Cycle, s	90.0	Reference Phase	2										
Offset, s	41	Reference Point	Begin										
Uncoordinated	No	Simult. Gap E/W	On	Green	61.0	16.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	5.0	0.0	0.0	0.0	0.0			
				Red	2.0	2.0	0.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		6.0		7.0		9.0		
Phase Duration, s		67.0		67.0		23.0		
Change Period, ( $Y+R_c$ ), s		6.0		6.0		7.0		
Max Allow Headway ( $MAH$ ), s		0.0		0.0		3.2		
Queue Clearance Time ( $g_s$ ), s						15.6		
Green Extension Time ( $g_e$ ), s		0.0		0.0		0.4		
Phase Call Probability						1.00		
Max Out Probability						0.43		

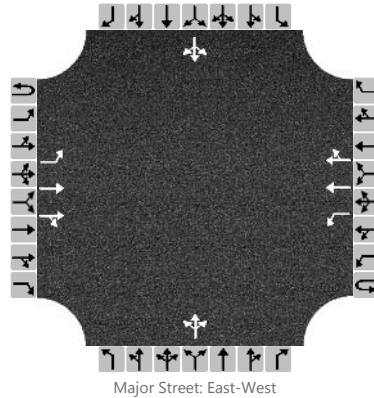
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3	8	18			
Adjusted Flow Rate ( $v$ ), veh/h	72	372			626	68	233	0	156			
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	805	1588			1575	1335	1500	1575	1335			
Queue Service Time ( $g_s$ ), s	4.4	8.9			15.3	2.2	13.6	0.0	9.8			
Cycle Queue Clearance Time ( $g_c$ ), s	19.7	8.9			15.3	2.2	13.6	0.0	9.8			
Green Ratio ( $g/C$ )	0.68	0.68			0.68	0.68	0.18	0.18	0.18			
Capacity ( $c$ ), veh/h	489	1076			1068	905	267	280	237			
Volume-to-Capacity Ratio ( $X$ )	0.148	0.346			0.587	0.075	0.875	0.000	0.656			
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	36.1	115.6			168.6	24.5	251.3	0	142.1			
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	1.4	4.6			6.6	1.0	9.9	0.0	5.6			
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.40	0.00			0.00	0.00	0.00	0.00	0.28			
Uniform Delay ( $d_1$ ), s/veh	12.0	6.1			5.2	7.3	36.0	0.0	34.4			
Incremental Delay ( $d_2$ ), s/veh	0.6	0.9			2.2	0.2	16.4	0.0	1.8			
Initial Queue Delay ( $d_3$ ), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay ( $d$ ), s/veh	12.6	7.0			7.4	7.4	52.4	0.0	36.2			
Level of Service (LOS)	B	A			A	A	D		D			
Approach Delay, s/veh / LOS	7.9	A		7.4	A	45.9	D	0.0				
Intersection Delay, s/veh / LOS	17.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	B	1.9	B	2.4	B	2.3	B
Bicycle LOS Score / LOS	1.2	A	1.7	B	1.1	A		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	RIVER/S DERBY LANE				
Agency/Co.	HDR	Jurisdiction	NORTH SIOUX CITY				
Date Performed	7/5/2017	East/West Street	RIVER DRIVE				
Analysis Year	2040	North/South Street	S DERBY LANE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Priority																	
Number of Lanes	0	1	2	0	0	1	2	0		0	1	0		0	1	0	
Configuration		L	T	TR		L	T	TR			LTR				LTR		
Volume, V (veh/h)		40	485	40		10	610	30		30	5	50		10	5	65	
Percent Heavy Vehicles (%)		2				2				0	0	0		0	0	0	
Proportion Time Blocked																	
Percent Grade (%)										0				0			
Right Turn Channelized		No			No				No				No				
Median Type/Storage	Undivided																

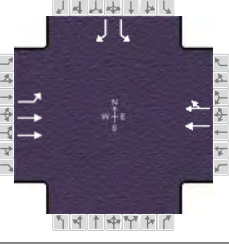
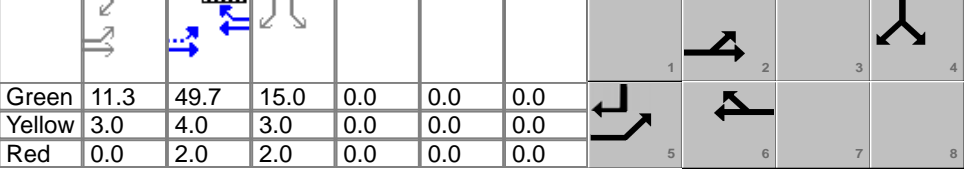
## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.14				4.14				7.50	6.50	6.90		7.50	6.50	6.90
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)		2.22				2.22				3.50	4.00	3.30		3.50	4.00	3.30

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		44				11					95					89
Capacity, c (veh/h)		884				988					289					388
v/c Ratio		0.05				0.01					0.33					0.23
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.0					1.4					0.9
Control Delay (s/veh)		9.3				8.7					23.4					17.0
Level of Service, LOS		A				A					C					C
Approach Delay (s/veh)		0.7			0.1				23.4				17.0			
Approach LOS		A			A				C				C			

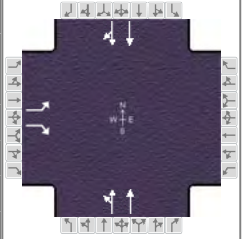
## HCS7 Signalized Intersection Results Summary

General Information					Intersection Information											
Agency	HDR				Duration, h	0.25										
Analyst	RL	Analysis Date	Jul 5, 2017		Area Type	Other										
Jurisdiction	NORTH SIOUX CITY		Time Period	PM PEAK	PHF	0.88										
Urban Street	RIVER DRIVE		Analysis Year	2040	Analysis Period	1 > 7:00										
Intersection	N DERBY LANE		File Name	RIVER SIGNALS.xus												
Project Description	DD/NSC TRAFFIC STUDY															
Demand Information					EB			WB			NB			SB		
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R
Demand ( v ), veh/h					280	265			335	40				45		315
Signal Information																
Cycle, s	90.0	Reference Phase	2													
Offset, s	114	Reference Point	End													
Uncoordinated	No	Simult. Gap E/W	On													
Force Mode	Fixed	Simult. Gap N/S	On		Green	11.3	49.7	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		Yellow	3.0	4.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		Red	0.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Timer Results					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					5	2		6				4				
Case Number					1.0	4.0		8.3				9.0				
Phase Duration, s					14.3	70.0		55.7				20.0				
Change Period, ( Y+R <sub>c</sub> ), s					3.0	6.0		6.0				5.0				
Max Allow Headway ( MAH ), s					3.1	0.0		0.0				3.3				
Queue Clearance Time ( g <sub>s</sub> ), s					10.7							17.0				
Green Extension Time ( g <sub>e</sub> ), s					0.6	0.0		0.0				0.0				
Phase Call Probability					1.00							1.00				
Max Out Probability					0.00							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			6	16				7		14
Adjusted Flow Rate ( v ), veh/h					323	305			206	203				51		358
Adjusted Saturation Flow Rate ( s ), veh/h/ln					1500	1499			1575	1536				1512		1345
Queue Service Time ( g <sub>s</sub> ), s					8.7	3.1			9.4	6.1				2.6		15.0
Cycle Queue Clearance Time ( g <sub>c</sub> ), s					8.7	3.1			9.4	6.1				2.6		15.0
Green Ratio ( g/C )					0.70	0.71			0.55	0.55				0.17		0.29
Capacity ( c ), veh/h					706	2133			870	849				252		393
Volume-to-Capacity Ratio ( X )					0.457	0.143			0.237	0.239				0.203		0.911
Back of Queue ( Q ), ft/ln ( 95 th percentile )					65.3	33.4			92.2	89.7				42.5		371.8
Back of Queue ( Q ), veh/ln ( 95 th percentile )					2.6	1.3			3.6	3.6				1.7		14.8
Queue Storage Ratio ( RQ ) ( 95 th percentile )					0.54	0.00			0.00	0.00				0.42		0.00
Uniform Delay ( d <sub>1</sub> ), s/veh					5.5	4.4			10.4	10.4				32.3		30.7
Incremental Delay ( d <sub>2</sub> ), s/veh					0.2	0.1			0.6	0.7				0.1		24.3
Initial Queue Delay ( d <sub>3</sub> ), s/veh					0.0	0.0			0.0	0.0				0.0		0.0
Control Delay ( d ), s/veh					5.6	4.5			11.0	11.1				32.5		55.0
Level of Service ( LOS )					A	A			B	B				C		E
Approach Delay, s/veh / LOS					5.1		A	11.0		B	0.0			52.2		D
Intersection Delay, s/veh / LOS					20.1					C						
Multimodal Results					EB			WB			NB			SB		
Pedestrian LOS Score / LOS					0.7		A	2.2		B	2.8		C	2.9		C
Bicycle LOS Score / LOS					1.0		A	0.8		A					F	



## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	HDR			Duration, h	0.25		
Analyst	RL	Analysis Date	Jul 5, 2017	Area Type	Other		
Jurisdiction	NORTH SIOUX CITY	Time Period	PM PEAK	PHF	0.90		
Urban Street	RIVER DRIVE	Analysis Year	2040	Analysis Period	1 > 7:00		
Intersection	MILITARY ROAD	File Name	RIVER-MILITARY.xus				
Project Description	DD/NSC TRAFFIC STUDY						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( $v$ ), veh/h	60		255				220	110			90	95

Signal Information												
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	Begin									
Uncoordinated	No	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	56.7	21.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Yellow	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Red	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2		6
Case Number		9.0				8.0		8.0
Phase Duration, s		27.3				62.7		62.7
Change Period, ( $Y+R_c$ ), s		6.0				6.0		6.0
Max Allow Headway ( $MAH$ ), s		3.4				0.0		0.0
Queue Clearance Time ( $g_s$ ), s		20.5						
Green Extension Time ( $g_e$ ), s		0.8				0.0		0.0
Phase Call Probability		1.00						
Max Out Probability		0.00						

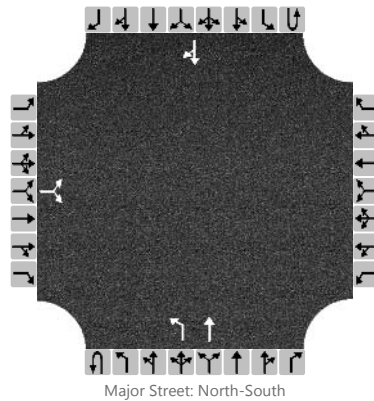
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2		6		16
Adjusted Flow Rate ( $v$ ), veh/h	67		283				244	122		85		81
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln	1500		1335				1159	1433		1575		1373
Queue Service Time ( $g_s$ ), s	3.2		18.5				9.0	4.1		2.8		2.1
Cycle Queue Clearance Time ( $g_c$ ), s	3.2		18.5				11.9	4.1		2.8		2.1
Green Ratio ( $g/C$ )	0.24		0.24				0.63	0.63		0.63		0.63
Capacity ( $c$ ), veh/h	354		315				810	903		993		865
Volume-to-Capacity Ratio ( $X$ )	0.188		0.898				0.302	0.135		0.086		0.094
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)	52.2		263.6				107.5	42.4		28.3		27.1
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)	2.1		10.4				4.3	1.7		1.1		1.1
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)	0.00		0.00				0.00	0.00		0.00		0.00
Uniform Delay ( $d_1$ ), s/veh	27.5		33.3				9.0	6.7		6.5		6.5
Incremental Delay ( $d_2$ ), s/veh	0.1		5.0				1.0	0.3		0.2		0.2
Initial Queue Delay ( $d_3$ ), s/veh	0.0		0.0				0.0	0.0		0.0		0.0
Control Delay ( $d$ ), s/veh	27.6		38.3				10.0	7.0		6.7		6.8
Level of Service (LOS)	C		D				A	A		A		A
Approach Delay, s/veh / LOS	36.3		D	0.0			9.0	A		6.7		A
Intersection Delay, s/veh / LOS	19.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.7	C	2.8	C	0.7	A	1.6	B
Bicycle LOS Score / LOS		F			0.8	A	0.6	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/STEAMBOAT				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	STEAMBOAT DRIVE				
Analysis Year	2040	North/South Street	SIOUX POINT ROAD				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	0	0		0	0	0		0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR	
Volume, V (veh/h)		75		210						110	170				245	35	
Percent Heavy Vehicles (%)		0		0						0							
Proportion Time Blocked																	
Percent Grade (%)	0																
Right Turn Channelized	No				No				No				No				
Median Type/Storage	Undivided																

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

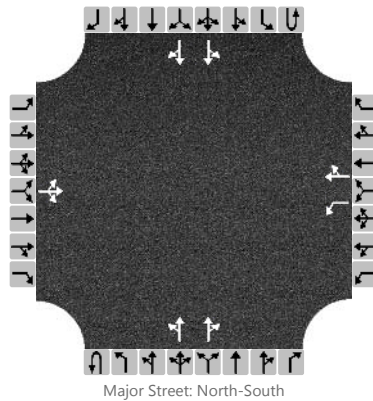
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			316							122						
Capacity, c (veh/h)			583							1261						
v/c Ratio			0.54							0.10						
95% Queue Length, Q <sub>95</sub> (veh)			3.2							0.3						
Control Delay (s/veh)			18.2							8.2						
Level of Service, LOS			C							A						
Approach Delay (s/veh)	18.2								3.2							
Approach LOS	C															

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	SIOUX POINT/TOWER				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	TOWER ROAD				
Analysis Year	2040	North/South Street	SIOUX POINT ROAD				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		1	1	0	0	0	2	0	0	0	2	0
Configuration			LTR			L		TR		LT		TR		LT		TR
Volume, V (veh/h)		5	0	55		145	5	35		45	240	45		25	420	10
Percent Heavy Vehicles (%)		2	2	2		2	2	2		0				0		
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)		7.5	6.5	6.9		7.5	6.5	6.9		4.1				4.1		
Critical Headway (sec)		7.54	6.54	6.94		7.54	6.54	6.94		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.20				2.20		

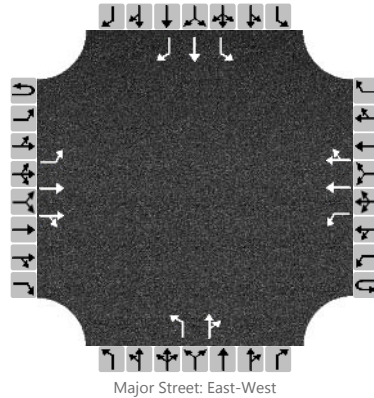
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			67			161		45		50				28		
Capacity, c (veh/h)			648			288		643		1095				1255		
v/c Ratio			0.10			0.56		0.07		0.05				0.02		
95% Queue Length, Q <sub>95</sub> (veh)			0.3			3.2		0.2		0.1				0.1		
Control Delay (s/veh)			11.2			32.2		11.0		8.4				7.9		
Level of Service, LOS			B			D		B		A				A		
Approach Delay (s/veh)	11.2				27.5				1.3				0.5			
Approach LOS	B				D											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	TWO RIVERS/COTTONWOOD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	TWO RIVERS DRIVE				
Analysis Year	2040	North/South Street	COTTONWOOD LANE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	1
Configuration		L	T	TR		L	T	TR		L		TR		L	T	R
Volume, V (veh/h)		65	10	35		0	340	5		195	10	0		0	5	205
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized	No				No				No				Yes			
Median Type/Storage	Undivided															

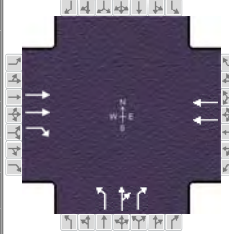
## Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.10				4.10				7.50	6.50	6.90		7.50	6.50	6.90
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)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

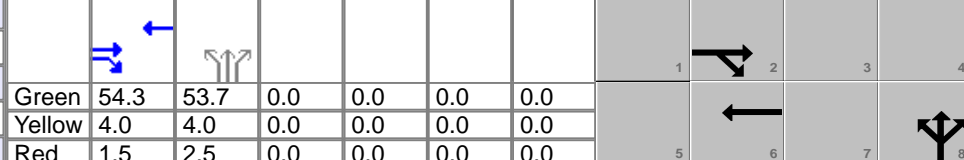
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		72				0				217		11		0	6	228	
Capacity, c (veh/h)		1186				1570				389		414		404	405	824	
v/c Ratio		0.06				0.00				0.56		0.03		0.00	0.01	0.28	
95% Queue Length, Q <sub>95</sub> (veh)		0.2				0.0				3.3		0.1		0.0	0.0	1.1	
Control Delay (s/veh)		8.2				7.3				25.3		13.9		13.9	14.0	11.0	
Level of Service, LOS		A				A				D		B		B	B	B	
Approach Delay (s/veh)		4.9				0.0				24.8				11.1			
Approach LOS										C				B			

## HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	HDR			Duration, h	0.25	
Analyst	RL	Analysis Date	Jul 5, 2017	Area Type	Other	
Jurisdiction	DAKOTA DUNES	Time Period	PM PEAK	PHF	0.90	
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2040	Analysis Period	1 > 7:00	
Intersection	I-29 NB	File Name	DD SIGNALS.xus			
Project Description	DD/NSC TRAFFIC STUDY					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand ( $v$ ), veh/h		40	165		740		595	0	70			

Signal Information														
Cycle, s	120.0	Reference Phase	2	Green	54.3	53.7	0.0	0.0	0.0	0.0				
Offset, s	10	Reference Point	End	Yellow	4.0	4.0	0.0	0.0	0.0	0.0				
Uncoordinated	No	Simult. Gap E/W	On	Red	1.5	2.5	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On											

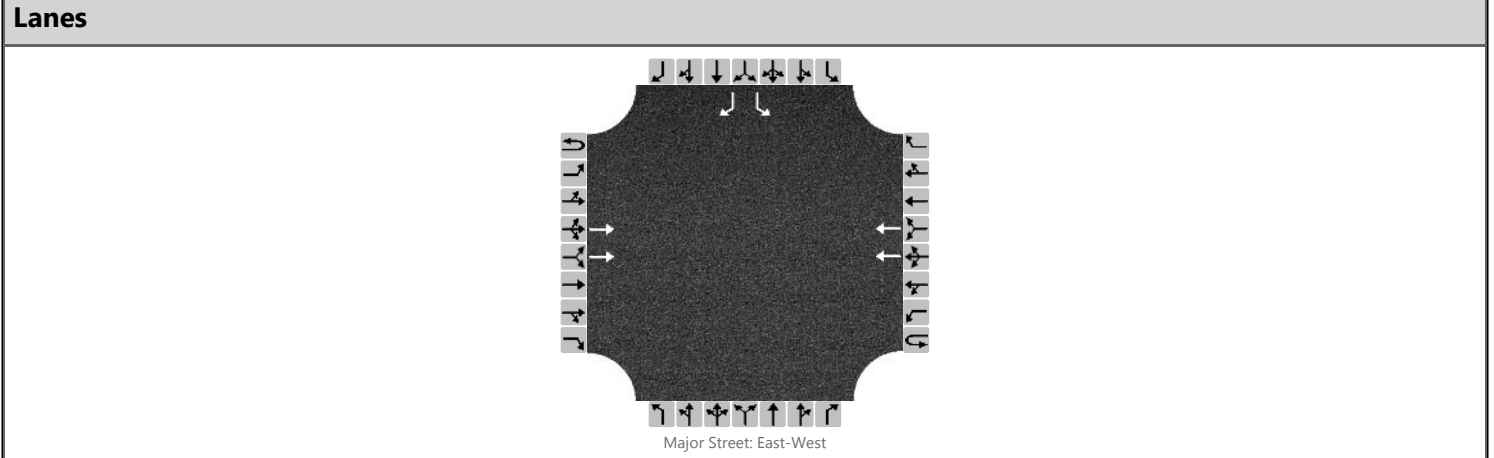
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		7.0		8.0		9.0		
Phase Duration, s		59.8		59.8		60.2		
Change Period, ( $Y+R_c$ ), s		5.5		5.5		6.5		
Max Allow Headway ( $MAH$ ), s		0.0		0.0		3.1		
Queue Clearance Time ( $g_s$ ), s						53.5		
Green Extension Time ( $g_e$ ), s		0.0		0.0		0.2		
Phase Call Probability						1.00		
Max Out Probability						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		2	12		6		3	8	18			
Adjusted Flow Rate ( $v$ ), veh/h		44	111		822		661	0	44			
Adjusted Saturation Flow Rate ( $s$ ), veh/h/ln		1499	1335		1523		1512	1600	1345			
Queue Service Time ( $g_s$ ), s		0.9	7.5		24.3		51.5	0.0	2.3			
Cycle Queue Clearance Time ( $g_c$ ), s		0.9	7.5		24.3		51.5	0.0	2.3			
Green Ratio ( $g/C$ )		0.45	0.45		0.45		0.45	0.45	0.45			
Capacity ( $c$ ), veh/h		1356	604		1378		677	716	602			
Volume-to-Capacity Ratio ( $X$ )		0.033	0.183		0.597		0.977	0.000	0.074			
Back of Queue ( $Q$ ), ft/ln ( 95 th percentile)		15	117.4		344.7		770.1	0	31.1			
Back of Queue ( $Q$ ), veh/ln ( 95 th percentile)		0.6	4.6		13.8		30.6	0.0	1.2			
Queue Storage Ratio ( $RQ$ ) ( 95 th percentile)		0.00	0.47		0.00		0.00	0.00	0.08			
Uniform Delay ( $d_1$ ), s/veh		17.1	26.2		24.7		32.5	0.0	18.9			
Incremental Delay ( $d_2$ ), s/veh		0.0	0.7		1.9		28.1	0.0	0.0			
Initial Queue Delay ( $d_3$ ), s/veh		0.0	0.0		0.0		0.0	0.0	0.0			
Control Delay ( $d$ ), s/veh		17.2	26.8		26.6		60.7	0.0	18.9			
Level of Service ( LOS )		B	C		C		E		B			
Approach Delay, s/veh / LOS	24.1	C		26.6	C		58.0	E			0.0	
Intersection Delay, s/veh / LOS	39.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.5	B	1.9	B	2.8	C	3.0	C
Bicycle LOS Score / LOS	0.6	A	1.2	A	1.7	B		

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/I-29 SB				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	I-29 SB				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	2	0	0	0	2	0		0	0	0		1	0	1
Configuration			T				T							L		R
Volume, V (veh/h)			200				770							5		130
Percent Heavy Vehicles (%)														0		0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

**Critical and Follow-up Headways**

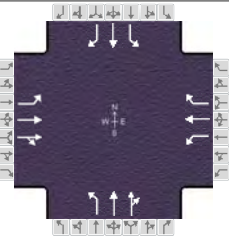
Base Critical Headway (sec)														7.5		6.9
Critical Headway (sec)														7.50		6.90
Base Follow-Up Headway (sec)														3.5		3.3
Follow-Up Headway (sec)														3.50		3.30

**Delay, Queue Length, and Level of Service**

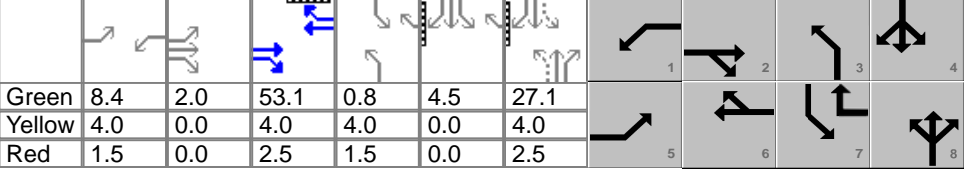
Flow Rate, v (veh/h)														6		144
Capacity, c (veh/h)														212		581
v/c Ratio														0.03		0.25
95% Queue Length, Q <sub>95</sub> (veh)														0.1		1.0
Control Delay (s/veh)														22.5		13.2
Level of Service, LOS														C		B
Approach Delay (s/veh)													13.6			
Approach LOS													B			

# HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	HDR			Duration, h	0.25		
Analyst	RL	Analysis Date	Jul 5, 2017		Area Type	Other	
Jurisdiction	DAKOTA DUNES	Time Period	PM PEAK		PHF	0.90	
Urban Street	DAKOTA DUNES BLVD	Analysis Year	2040		Analysis Period	1 > 7:00	
Intersection	SIOUX PT RD	File Name	DD SIGNALS.xus				
Project Description	DD/NSC TRAFFIC STUDY						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	100	135	45	80	610	210	5	20	5	60	355	205

Signal Information													
Cycle, s	120.0	Reference Phase	2										
Offset, s	0	Reference Point	Begin										
Uncoordinated	No	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green		8.4	2.0	53.1	0.8	4.5	27.1				
		Yellow		4.0	0.0	4.0	4.0	0.0	4.0				
		Red		1.5	0.0	2.5	1.5	0.0	2.5				

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	4.0	1.1	3.0
Phase Duration, s	16.0	61.6	13.9	59.6	6.3	33.6	10.8	38.1
Change Period, ( Y+R <sub>c</sub> ), s	5.5	6.5	5.5	6.5	5.5	6.5	5.5	6.5
Max Allow Headway ( MAH ), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time ( g <sub>s</sub> ), s	10.7		8.8		2.3	2.9	6.0	30.9
Green Extension Time ( g <sub>e</sub> ), s	0.1	0.0	0.1	0.0	0.0	1.1	0.0	0.6
Phase Call Probability	0.98		0.95		0.17	1.00	0.89	1.00
Max Out Probability	0.20		0.00		0.06	0.00	0.03	0.31

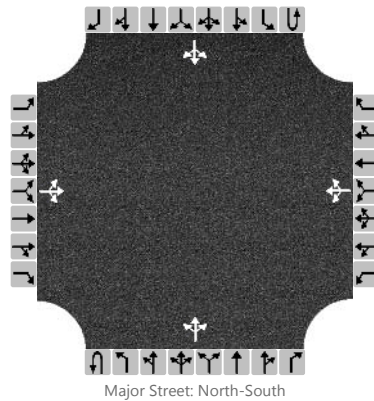
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate ( v ), veh/h	111	90	88	88	667	137	6	14	14	67	394	139
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1512	1588	1502	1524	1600	1356	1524	1600	1492	1524	1600	1356
Queue Service Time ( g <sub>s</sub> ), s	8.7	3.9	4.0	6.8	48.7	6.7	0.3	0.8	0.9	4.0	28.9	10.1
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	8.7	3.9	4.0	6.8	48.7	6.7	0.3	0.8	0.9	4.0	28.9	10.1
Green Ratio ( g/C )	0.09	0.46	0.46	0.07	0.44	0.49	0.23	0.23	0.23	0.28	0.26	0.26
Capacity ( c ), veh/h	132	730	690	107	708	660	76	361	337	435	421	357
Volume-to-Capacity Ratio ( X )	0.841	0.123	0.128	0.817	0.943	0.207	0.073	0.039	0.041	0.153	0.937	0.389
Back of Queue ( Q ), ft/ln ( 95 th percentile)	172.4	67.5	67.1	119.1	701.8	95.4	5.8	14.4	14.4	65.9	501.8	150.5
Back of Queue ( Q ), veh/ln ( 95 th percentile)	6.8	2.7	2.6	4.8	28.1	3.8	0.2	0.6	0.6	2.6	20.1	6.0
Queue Storage Ratio ( RQ ) ( 95 th percentile)	1.44	0.00	0.00	1.04	0.00	0.00	0.08	0.00	0.00	0.51	0.00	0.00
Uniform Delay ( d <sub>1</sub> ), s/veh	53.9	18.6	18.6	56.2	38.7	17.0	38.4	36.3	36.3	32.7	43.2	36.3
Incremental Delay ( d <sub>2</sub> ), s/veh	14.2	0.3	0.4	3.2	14.7	0.4	0.1	0.0	0.0	0.1	23.2	0.3
Initial Queue Delay ( d <sub>3</sub> ), 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	68.2	18.9	19.0	59.4	53.5	17.4	38.5	36.3	36.3	32.7	66.5	36.6
Level of Service ( LOS )	E	B	B	E	D	B	D	D	D	C	E	D
Approach Delay, s/veh / LOS	37.9		D	48.5		D	36.7		D	55.8		E
Intersection Delay, s/veh / LOS	49.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.9	C	3.0	C	2.5	B
Bicycle LOS Score / LOS	0.7	A	2.0	B	0.5	A	1.5	A

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/COURTYARD				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	COURTYARD DRIVE				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		25	10	5		10	5	15		5	240	245		40	775	5
Percent Heavy Vehicles (%)		0	0	0		0	0	0		1				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.11				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.21				2.20		

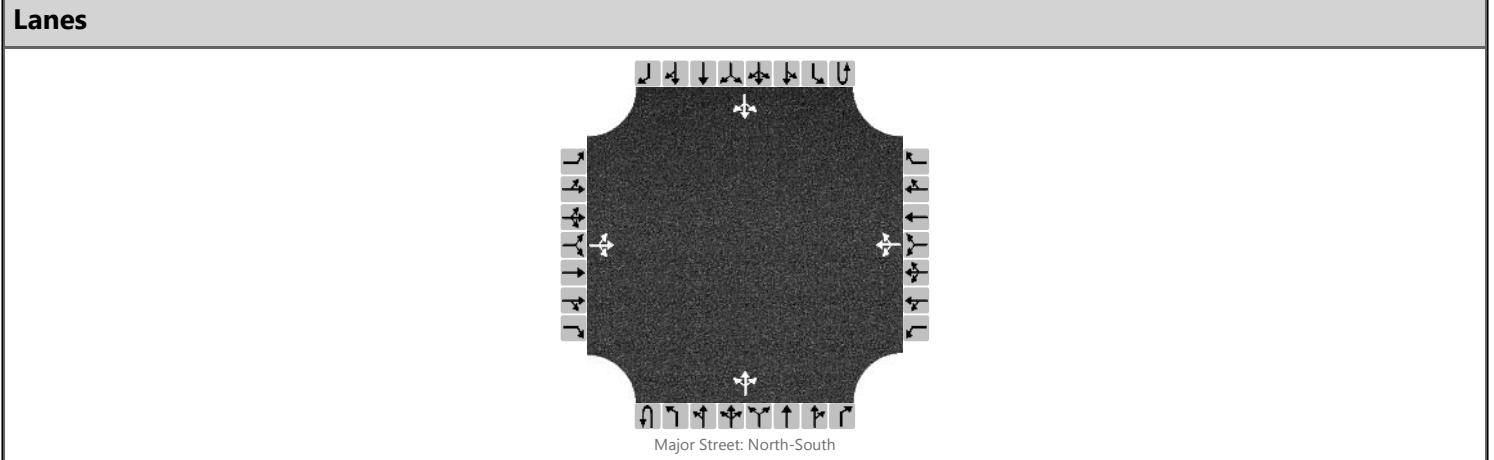
## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			45				34				6				44	
Capacity, c (veh/h)			226				323				781				1040	
v/c Ratio			0.20				0.11				0.01				0.04	
95% Queue Length, Q <sub>95</sub> (veh)			0.7				0.3				0.0				0.1	
Control Delay (s/veh)			24.8				17.4				9.6				8.6	
Level of Service, LOS			C				C				A				A	
Approach Delay (s/veh)	24.8				17.4				0.2				1.2			
Approach LOS	C				C											



# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/LEVEE				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	LEVEE TRAIL				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		50	0	5		5	5	45		5	395	5		105	590	95
Percent Heavy Vehicles (%)		0	0	0		2	2	2		1				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

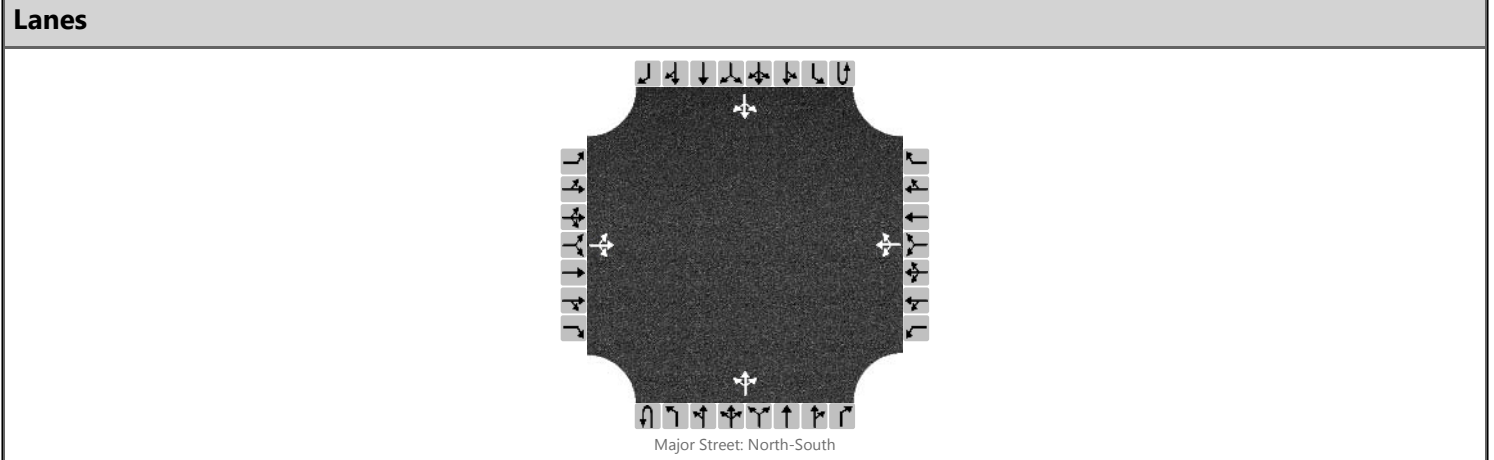
Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.12	6.52	6.22		4.11				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.52	4.02	3.32		2.21				2.20		

**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			62				62				6				117	
Capacity, c (veh/h)			189				433				855				1126	
v/c Ratio			0.33				0.14				0.01				0.10	
95% Queue Length, Q <sub>95</sub> (veh)			1.3				0.5				0.0				0.3	
Control Delay (s/veh)			33.1				14.7				9.2				8.6	
Level of Service, LOS			D				B				A				A	
Approach Delay (s/veh)	33.1				14.7				0.2				2.6			
Approach LOS	D				B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/MEADOWS				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	MEADOWS BLVD				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						



**Vehicle Volumes and Adjustments**

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		55	5	15		5	5	70		20	280	5		125	370	105
Percent Heavy Vehicles (%)		1	1	1		0	0	0		0				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

**Critical and Follow-up Headways**

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.11	6.51	6.21		7.10	6.50	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.51	4.01	3.31		3.50	4.00	3.30		2.20				2.20		

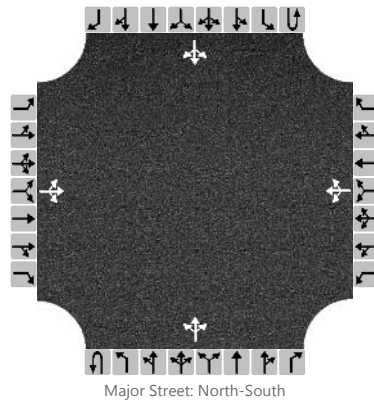
**Delay, Queue Length, and Level of Service**

Flow Rate, v (veh/h)			84				90				22				139	
Capacity, c (veh/h)			263				578				1049				1255	
v/c Ratio			0.32				0.16				0.02				0.11	
95% Queue Length, Q <sub>95</sub> (veh)			1.3				0.5				0.1				0.4	
Control Delay (s/veh)			25.0				12.4				8.5				8.2	
Level of Service, LOS			D				B				A				A	
Approach Delay (s/veh)	25.0				12.4				0.8				2.8			
Approach LOS	D				B											

# HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	RL	Intersection	DAKOTA DUNES/PINEHURST				
Agency/Co.	HDR	Jurisdiction	DAKOTA DUNES				
Date Performed	7/5/2017	East/West Street	DAKOTA DUNES BLVD				
Analysis Year	2040	North/South Street	PINEHURST TRAIL				
Time Analyzed	PM PEAK	Peak Hour Factor	0.90				
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25				
Project Description	DD/NSC TRAFFIC STUDY						

## Lanes



## Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		55	5	0		5	5	70		0	180	0		85	225	80
Percent Heavy Vehicles (%)		0	0	0		1	1	1		0				0		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Left + Thru								1							

## Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.11	6.51	6.21		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.51	4.01	3.31		2.20				2.20		

## Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			67				90				0				94	
Capacity, c (veh/h)			386				740				1232				1384	
v/c Ratio			0.17				0.12				0.00				0.07	
95% Queue Length, Q <sub>95</sub> (veh)			0.6				0.4				0.0				0.2	
Control Delay (s/veh)			16.3				10.5				7.9				7.8	
Level of Service, LOS			C				B				A				A	
Approach Delay (s/veh)	16.3				10.5				0.0				2.2			
Approach LOS	C				B											

# APPENDIX

## Part 4 – Methods and Assumptions Document



# Methods and Assumptions Document

Date: Monday, April 03, 2017

Project: Dakota Dunes and North Sioux City Traffic Analysis

To: SDDOT Representative, Brad Remmich & Study Team Members

From: HDR

Subject: Methods and Assumptions Documentation

This Methods and Assumptions document was developed in preparation for the Methods and Assumptions Meeting held as part of the project kick-off meeting with representatives from Dakota Dunes, North Sioux City, SIMPCO, SDDOT, and HDR. This document is intended to serve as a historical record of the process, dates, and decisions made by the study team representatives for the **Dakota Dunes and North Sioux City Traffic Analysis Project**.

1. Stakeholder Acceptance Page

The undersigned parties concur with the Methods and Assumptions for the **Dakota Dunes and North Sioux City Traffic Analysis Project** as presented in this document.

**SDDOT**



Signature

TRANSPORTATION Specialist

Title

7-27-17

Date

**Dakota Dunes Community Improvement District**



Signature

Manager

Title

7/26/17

Date

**City of North Sioux City**



Signature

Ted Cherry

Title

07/26/17

Date

**SIMPCO Representative**



Signature

Regional Planner 1

Title

07/26/17

Date

## 2 Introduction and Project Description

### 2.1 Project Background and Understanding

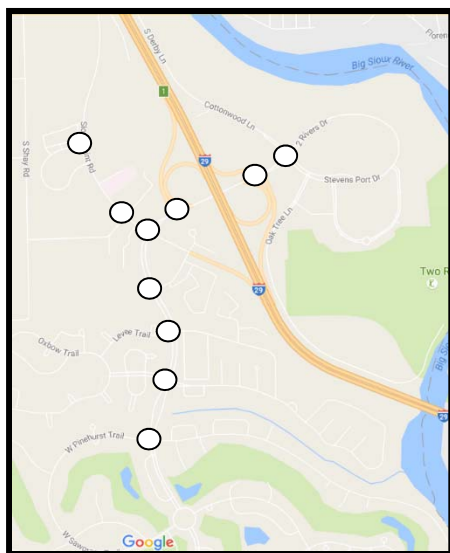
The South Dakota Department of Transportation (SDDOT) in conjunction with the Siouxland Interstate Metropolitan Planning Council (SIMPCO), Dakota Dunes, and North Sioux City has contracted with HDR Engineering, Inc. (HDR) to perform a transportation planning study for a variety of areas within the communities of North Sioux City and Dakota Dunes.

As development continues in these communities, the need to address traffic growth has become apparent. The locations identified for study with this project are areas noticed by city officials as locations of congestion or future development pressure. The purpose of this study is to develop a project list based on our analysis findings that either mitigate areas that fall short of meeting existing capacity standards or identify projects that will prepare for additional growth.

### 2.2 Location

The project areas are shown below along with the associated intersections and roadway segments that will be studied. In addition to the intersection evaluations, language will be included in the study to document how to address citizen requests for speed limit changes or traffic control changes:

**Area 1** – the general scope of work for Area 1 will be to identify capacity and safety concerns along Dakota Dunes Blvd and Sioux Point Road and to develop planning level conceptual alternatives for the intersection of Cottonwood Ln and Dakota Dunes Blvd. This includes study to determine if different pedestrian treatments are needed along Dakota Dunes Blvd as well; through observation most of the intersections are not ADA compliant. Options will be discussed that will allow for Dakota Dunes to address the current issues.

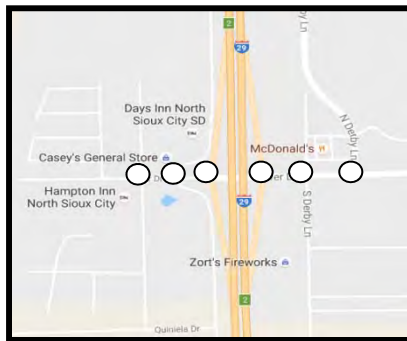


#### Intersections to be studied include:

- Sioux Point Rd/Steamboat Drive
- Sioux Point Rd/Tower Rd
- Sioux Point Rd/Dakota Dunes Blvd
- Dakota Dunes Blvd/ Cottonwood Lane
- Dakota Dunes Blvd/I29 NB
- Dakota Dunes Blvd/I29 SB
- Dakota Dunes Blvd/Courtyard Drive
- Dakota Dunes Blvd/Levee Trail
- Dakota Dunes Blvd/Meadows Blvd
- Dakota Dunes Blvd/East Pinehurst Trail

**Area 1 - Exit 1 (Dakota Dunes Blvd) along I29 and Misc. Intersections along Dakota Dunes Blvd and Sioux Point Road {Picture Courtesy of Google Maps}**

**Area 2** – the general scope of work for Area 2 will be to identify capacity and access concerns along River Blvd and to develop planning level conceptual alternatives assuming the spacing of Sioux Point Rd and S. Derby Ln is too close to the interchange ramps. A variety of typical sections and access recommendations will be made for the frontage roads on either side of I29 between Exit 1 and Exit 2. Conceptual illustrations of how Shay Rd could be realigned at the junction with Sioux Point Road will be included as well as realignments of Sioux Point Rd to Sodrac Drive.



- Intersections to be studied include:
- Sodrac Drive/River Drive
  - Sioux Point Rd/River Drive
  - I29 SB/River Drive
  - I29 NB/River Drive
  - S. Derby Ln/River Drive
  - N. Derby Ln/River Drive

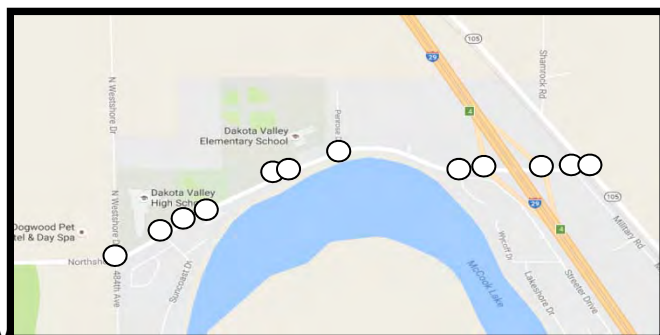
**Area 2 - Exit 2 (River Drive) along I29 and Misc. Intersections along River Drive {Picture Courtesy of Google Maps}**

**Area 3** – the general scope of work for Area 3 will be to identify capacity and access concerns along Northshore Drive. Connections at Streeter Drive and Westshore Drive will be reviewed. An operational evaluation will be made at the intersections identified and intersection controls will be recommended. Recommendations may also be provided for issues observed directly with school pickup and drop-off issues as they affect Northshore Drive. A variety of typical sections and access recommendations will be made for Northshore Drive between Westshore Drive and I29.

- Intersections to be studied include:
- Northshore Drive/N. Westshore Drive
  - Northshore Drive/HS West Driveway
  - Northshore Drive/HS Middle Driveway
  - Northshore Drive/HS East Driveway
  - Northshore Drive/ES West Driveway
  - Northshore Drive/ES East Driveway
  - Northshore Drive/Penrose Drive
  - Northshore Drive/Streeter Drive
  - Northshore Drive/I29 SB
  - Northshore Drive/I29 NB
  - Northshore Drive/Military Rd
  - Northshore Drive/ Hwy 105

**Area 3 - Exit 4 (Northshore Drive) along I29 and Misc. Intersections along Northshore Drive {Picture Courtesy of Google Maps}**

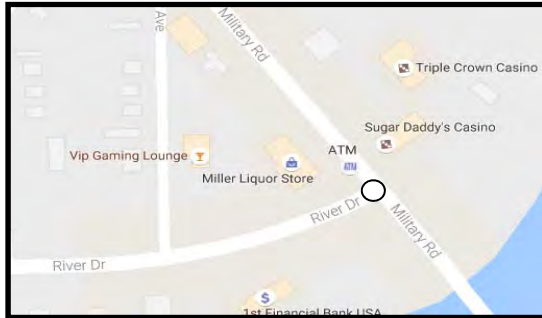
**DESCRIPTION OF WORK TASKS**





**Area 4** – the general scope of work for Area 4 will be to review the operations of the intersection of Military Road and River Drive and determine how the bridge location impacts the operations. Recommendations will be provided to maximize the efficiency of the intersection within the constraints of the bridge.

**Area 4 – Intersection of River Drive and Military Road {Picture Courtesy of Google Maps}**



Intersection to be studied:

- River Drive/Military Rd

## 2.3 Need for Study

The scope of work for this study will allow the SDDOT, City of North Sioux City, Dakota Dunes, and SIMPCO to identify improvements within the four areas being study as identified under 2.2. Those areas were selected for study in order to prepare for additional traffic growth or to review safety concerns.

### Study Schedule

- Feb 2017 – NTP
- March 2017 – Provide Methods and Assumptions document, Address Comments
- April 2017 – Complete Data Gathering, Begin Update of Forecasting Model with Iowa DOT
- May to July – Complete Traffic Forecasting, Complete Operations and Crash Analysis, Prepare Draft Study Report
- August 2017 – Submit Final Report
- December 2017 – Work Order Completion with SDDOT

## 2.4 Facilities Affected by the Study

The facilities affected by this project include the sections of the roadway systems identified in the previous “Location” section of this memorandum.

## 2.5 Previous Studies

The agency partners for this study have identified a few previous studies that would appear to benefit or provide background for this study. Also SIMPCO in coordination with the Iowa DOT has retained the travel demand model based on the growth plans of these communities and that model will be used to assist with the creation of the future No-Build traffic volumes:

- Exit 4 / FEMA Floodplain Study
- 2010 Decennial Study

## 2.6 Study Advisory Team Members

A Study Advisory Team has been formed to guide the study through completion. The Study Advisory Team is comprised of representative parties of the SDDOT, City of North Sioux City, Dakota Dunes, and SIMPCO. Members of the Study Advisory Team are:

<b>PARTICIPANT</b>	<b>AGENCY</b>
Brad Remmich	SDDOT
Ted Cherry	City of North Sioux City
Jeff Dooley	CID of Dakota Dunes
Michelle Bostinelos	SIMPCO
Gabriel Appiah	SIMPCO
Rick Laughlin	HDR
Jason Kjenstad	HDR

Additional team members may be added as the study progresses or agency representatives not included in the above list may be part of the study to provide material reviews on behalf of that agency.

## 3. Analysis Years/Periods

Existing Conditions: 2017

Interim Build Scenario: 2022

\*Future No-Build Scenario: 2040

\*Future Build Scenario: 2040

\* The volumes created in 2040 will not change between the build and no-build scenario's, the no-build analysis is simply looking at those volumes applied to existing intersection geometry.

## 4. Data Collection

Turning movement counts have been collected for the analysis intersections listed in the Location section of this document. Turning movement data including the AM and PM peak hours were collected on March 7, 2017. Additional data was collected in Area 3 for the analysis near the school. The turning movement data collected was from 6:30 AM to 8:30 AM, and from 2:30 PM to 6:30 PM near the Dakota Valley School and 4:30 PM to 6:30 PM for PM peak only at all other locations.

School site investigation was completed on April 18<sup>th</sup>, 2017 at the Dakota Valley School along Northshore Drive and a pedestrian evaluation and review was completed on April 20<sup>th</sup>, 2017 along Dakota Dunes Blvd south of Sioux Point Rd.

Other vehicular volume, GIS, survey, plan and crash data is available from State and City resources and has been provided for review and use in this study.

## 5. Traffic Forecasting and Volume Development

Future-year traffic (2040) will be determined through the use of the travel demand model that is maintained for the MPO by Iowa DOT. Interim year (2022) traffic volumes will be developed using ITE trip generation tables for development that has been identified by either Dakota Dunes or North Sioux City. That trip generation will be applied directly to the 2017 existing counts for the interim analysis period.

At this point HDR is not sure if modifications will be needed to the travel demand model land use assumptions, we will review that data and discuss with the cities involved to determine if there are any assumptions that are not consistent with what the cities anticipate taking place. The Iowa DOT has indicated that they would make the appropriate model changes if needed.

Traffic volumes will be balanced to create coherent volume networks for the weekday AM and PM peak hours for the current year (2017), interim year (2022), and future year (2040). The volume networks will represent average condition with school in session.

## 6. Traffic Operations Analysis

Analysis of existing and proposed intersection operations will be conducted using HCM 2010 software current addition. HCS 2010 analysis reports will be provided in the study documentation and will serve as the basis for intersection analysis. Specific operational variables are listed below:

### Variables

- Peak Hour Factor (PHF) – use peak hour factors developed from turning movement counts for existing conditions. Use a default PHF of .90 for future year conditions.
- Saturation Flow Rate - SDDOT Design Manual (Page 24, Chapter 15) requires the use of 1,600 vph. These values will be used within the study area.
- Right Turn on Red percentage – right turn on red percentage will be based on sampling of actual operations. Potential locations included Exit 2 NB to EB, Sioux Point Rd/Dakota Dunes Blvd, Exit 1 NB to EB, Dakota Dunes Blvd/Courtyard Dr.
- Heavy Vehicle Percentage - Based on new turning movement counts and SDDOT classification data.
- Phase Change Intervals - Vehicle clearance times will be based on MUTCD and ITE calculation methods.
- Pedestrian clearance times will be based on existing timings.
- Speeds – based on approach speed limits.

## 7. Safety Issues

Crash reports for the study area will be analyzed and safety problems within the study area will be identified. A period of 5 years will be used for this study. Potential crash issue intersections are Dakota Dunes Blvd/Cottonwood Street and Dakota Dunes Blvd/Sioux Point Rd.

## **8. Selection of Measures of Effectiveness (MOE)**

The effectiveness of traffic operations in the study area will be based on the appropriate level of service measurement. Interstate ramp terminal intersections will have a minimum level of service of C. All other signalized intersections will need to meet a minimum requirement of level of service D. Stop sign-controlled intersections may have a lower level of service as it is reported on the side street.

Measures of Effectiveness (MOE's) provided will include: level of service (LOS)

## **9. Data Provided**

The following will be provided by the participating agencies to aid the consultant in performing the study:

- Existing crash data via SDDOT GIS database (SDDOT)
- Existing Control of Access Limits at Interchanges (SDDOT)
- Provide local knowledge of Pedestrian concerns (Dakota Dunes and N. Sioux City)
- 5 year projected growth in areas of study (Dakota Dunes and N. Sioux City)
- Available construction plans (HDR will request at a later date if needed)
- Existing Signal Timing Data (SDDOT)
- Available GIS data, including aerial photography

## **10. Deviations/Justifications**

No deviations from standards are currently known. If it is determined during the study that deviations are required, the methods and assumptions document will be amended prior to proceeding.

## **11. Conclusion**

All sections contained in this document will guide the traffic data collection and traffic assessment for this study.

## **12. Appendices**

The appendix includes the following:

- Methods and Assumptions Study Team Meeting Minutes

# APPENDIX

# Agenda

Project: Dakota Dunes and North Sioux City Transportation Planning Project

Subject: Kick Off Meeting and M&A Review

Date: Monday, April 03, 2017

Location: Dakota Dunes Conference Room 1:00 PM

Attendees: Brad Remmich, SDDOT  
Ted Cherry, North Sioux City  
Michelle Bostinelos, SIMPCO  
Gabriel Appiah, SIMPCO  
Jason Kjenstad, HDR  
Rick Laughlin, HDR

## Agenda Items:

1. **Introductions:**
2. **Project Update:**
  - a. NTP – February 23<sup>rd</sup>, 2017
  - b. Traffic Counts – GHA was on-site March 7<sup>th</sup>, 2017
  - c. Kick-off Meeting – April 3<sup>rd</sup>, 2017
3. **M&A Document Overview:** (see attached Draft M&A Document)
4. **Project Schedule:**
  - Feb 2017 – NTP
  - March 2017 – Provide Methods and Assumptions document, Address Comments
  - April 2017 – Complete Data Gathering, Begin Update of Forecasting Model with Iowa DOT
  - May to July – Complete Traffic Forecasting, Complete Operations and Crash Analysis, Prepare Draft Study Report
  - August 2017 – Submit Final Report
  - December 2017 – Work Order Completion with SDDOT
5. **Upcoming Tasks**
  - a. School Observation Dakota Valley / Pedestrian Observation in Dakota Dunes
  - b. 5 Year Development Projections (Areas and Land Uses) for 2022
  - c. Coordination with Iowa DOT on Travel Demand Model
  - d. Data Needs:
    - i. Crash Database from SDDOT
    - ii. Existing Signal Timings
    - iii. Existing Control of Access at Interchanges

## Meeting Notes for M&A Document Review

### Dakota Dunes and North Sioux City Traffic Analysis

Kick-off meeting, 4/3/2017

Rick Laughlin / Jason Kjenstad

1. General – School and pedestrian observations tentatively scheduled for Tuesday, April 18.
2. M & A, page 2 – Add signature blocks for SIMPCO, Dakota Dunes, and North Sioux City
3. M & A, Section 2.2 – change terminology from “design” to “options” or “concepts”
4. M & A, Section 2.2 – change “studies” in boxes to “studied”
5. M & A, Section 2.2 – Dakota Dunes wants options for any study intersection that shows need for improvement
6. M & A, Section 2.2 – Participants would like general information on procedures for properly employing traffic controls and speed limits.
7. M & A, Section 2.2 – Address future development of the Sioux Point Rd/Shay Rd. intersection
8. M & A, Section 2.2 – Address the possibility of moving flows from River Dr/Sioux Point Rd west to Sodrak Dr
9. M & A, Section 2.2 – Address traffic control at Northshore Dr/Westshore Dr, and at Northshore Dr/Streeter Dr
10. M & A, Section 2.5 – Additional studies may include a FEMA flood study (SIMPCO) and the Decennial Interstate Corridor Study
11. M & A, Section 4 – Add information specifying the peak hours and that additional data includes the school and pedestrian observations
12. M & A, Section 6 – Provide spreadsheets to the SAT with peak hour factors, heavy vehicle percentages
13. M & A, Section 6 – locations with potential high right-turn-on-red percentage include:
  - a. Exit 2 NB to EB
  - b. Sioux Point/Dakota Dunes
  - c. Exit 1 NB to EB
  - d. Dakota Dunes/Courtyard
14. M & A, Section 7 – specify that 5 years of crash data will be analyzed
15. M & A, Section 7 – locations with potential crash concentrations include:
  - a. Dakota Dunes/Cottonwood
  - b. Dakota Dunes/Sioux Point
16. M & A, Section 8 – revise to indicate that LOS D will be the minimum operational threshold for arterial street intersections (SDDOT jurisdiction on I-29 only).



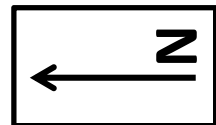
# APPENDIX

# APPENDIX

## Part 5 – Crash Maps and Records



Crash Map – Northshore Dr/Westshore Dr

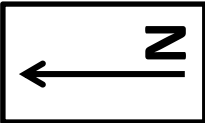


# Northshore/Westshore

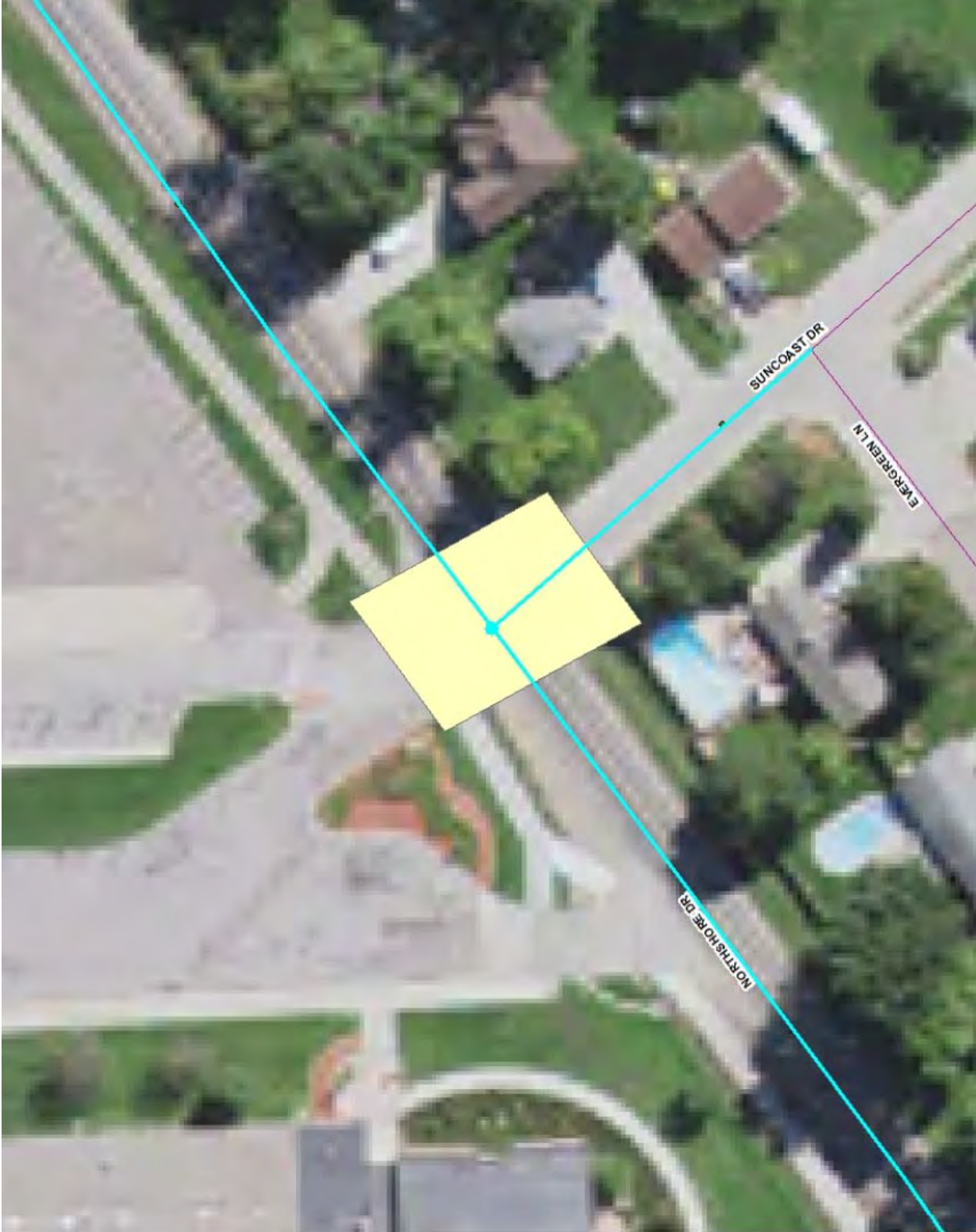
AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
10/26/2013 6:33:00 PM	Backing, Straight ahead	Motor vehicle in transport	No injury	Angle	Asphalt ( blacktop )	Dusk	Failure to keep in proper lane; Improper backing; None



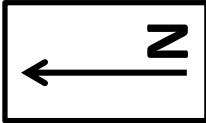
**Crash Map – Northshore Dr/W High School Drive**



No Crashes Reported  
At this Location



Crash Map – Northshore Dr/Middle High School Drive



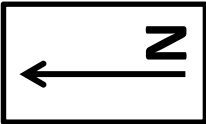
# Northshore-Middle High School drive

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
1/4/2013 6:15:00 PM	Stopped in traffic lane, Turning left	Motor vehicle in transport	No injury	Angle	Asphalt ( blacktop )	Dark - lighted roadway	Improper turn; None





Crash Map – Northshore Dr/E High School Drive

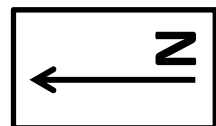


# Northshore/East High School drive

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
5/13/2016 3:30:00 PM	Slowing in traffic lane, Straight ahead	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Daylight	Followed too closely; None



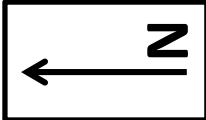
**Crash Map – Northshore Dr/W Elem School Drive**



No Crashes Reported  
At this Location



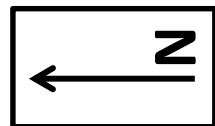
**Crash Map – Northshore Dr/E Elem School Drive**



No Crashes Reported  
At this Location

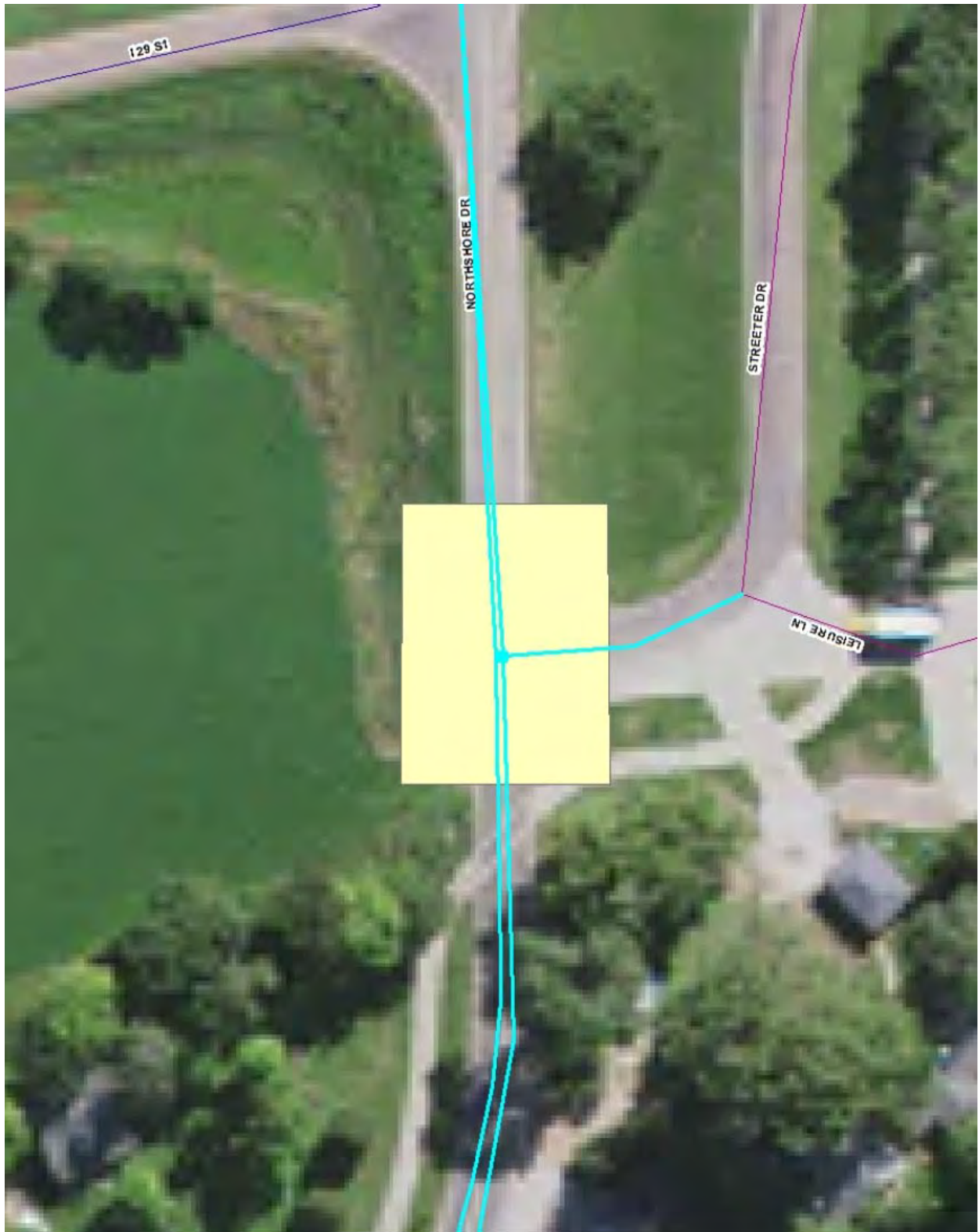


**Crash Map – Northshore Dr/Penrose Dr**

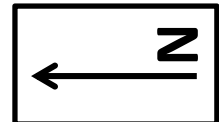


No Crashes Reported  
At this Location





Crash Map – Northshore Dr/Streeter Dr

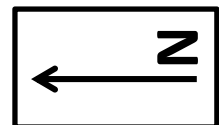


# Northshore/Streeter

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
5/6/2014 7:43:00 AM	Straight ahead, Turning left	Motor vehicle in transport	No injury	Angle	Asphalt ( blacktop )	Daylight	Failed to yield to vehicle; None



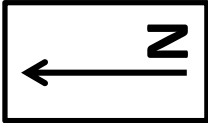
**Crash Map – Northshore Dr/I-29 SB**



No Crashes Reported  
At this Location



Crash Map – Northshore Dr/I-29 NB

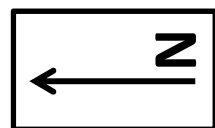


# Northshore/I-29 NB

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
4/6/2015 10:59:00 AM	Backing, Straight ahead	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Asphalt ( blacktop )	Daylight	Improper backing; None



**Crash Map – Northshore Dr/Military Rd**



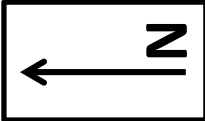
# Northshore/Military

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
11/20/2015 3:15:00 PM	Turning right	Highway traffic sign post/sign	No injury	No collision between 2 MV in transport	Concrete	Daylight	Driving too fast for conditions; None
4/25/2016 2:30:00 PM	Straight ahead, Turning left	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Failed to yield to vehicle; None

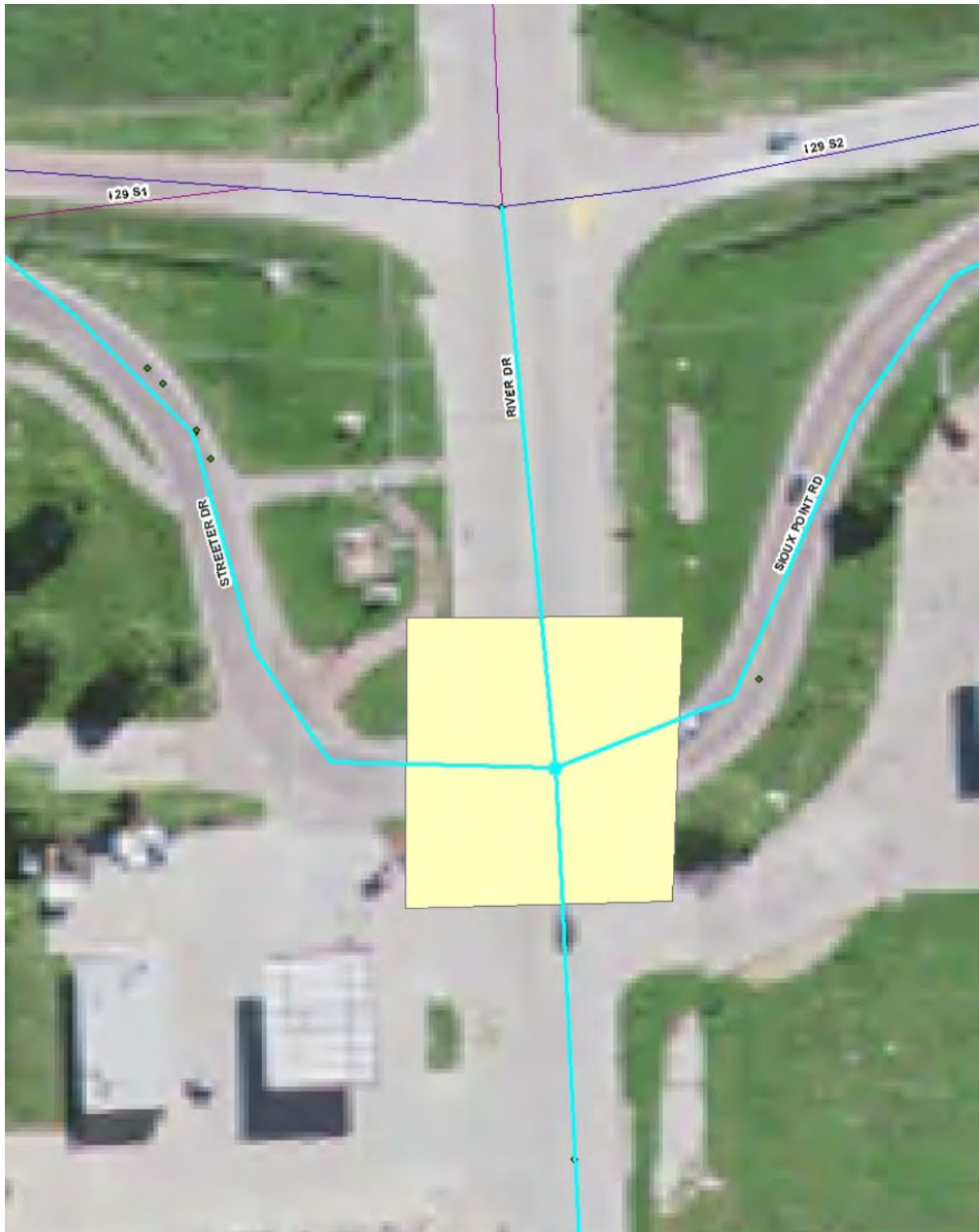




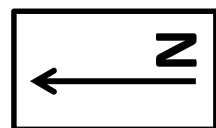
Crash Map – River Dr/Sodrac Dr



No Crashes Reported  
At this Location

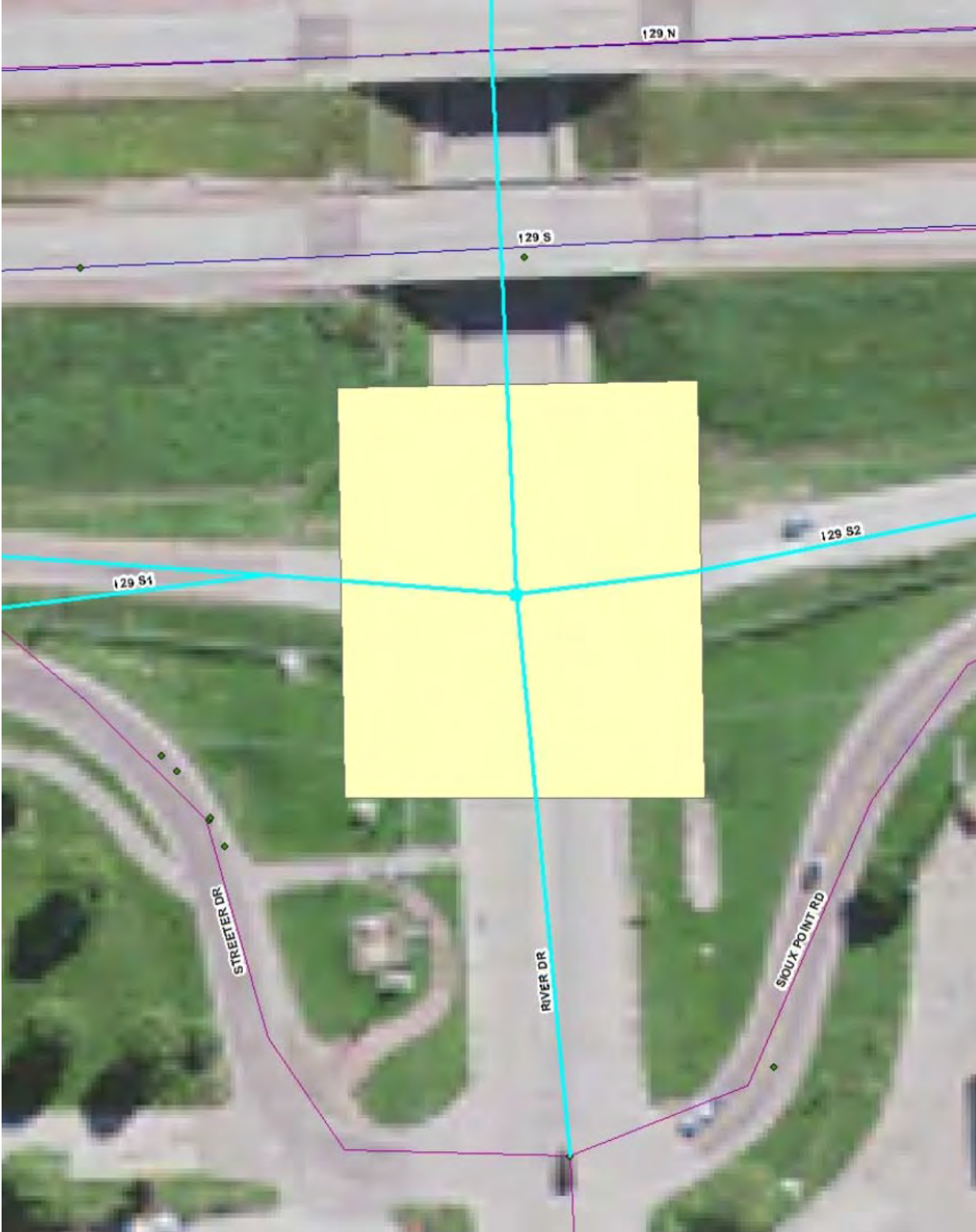


**Crash Map – River Dr/Sioux Point Rd**

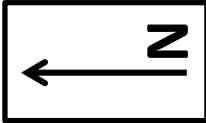


# River/Sioux Point

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
7/12/2015 11:00:00 AM	Straight ahead, Turning left	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Distracted (list distraction in narrative); Failed to yield to vehicle; None
7/18/2012 2:45:00 PM	Straight ahead, Turning right	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Failed to yield to vehicle; None
8/6/2012 7:45:00 AM	Straight ahead, Turning left	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Failed to yield to vehicle; None
12/13/2016 5:25:00 PM	Straight ahead	Motor vehicle in transport	Possible	Angle	Concrete	Dark - lighted roadway	Failed to yield to vehicle; None



Crash Map – Northshore Dr/I-29 SB

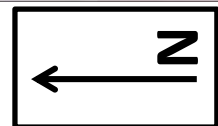


# River/I-29 SB

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
6/23/2016 6:20:00 PM	Straight ahead, Turning left	Motor vehicle in transport	Non-incapacitating	Angle	Concrete	Daylight	Failed to yield to vehicle; None



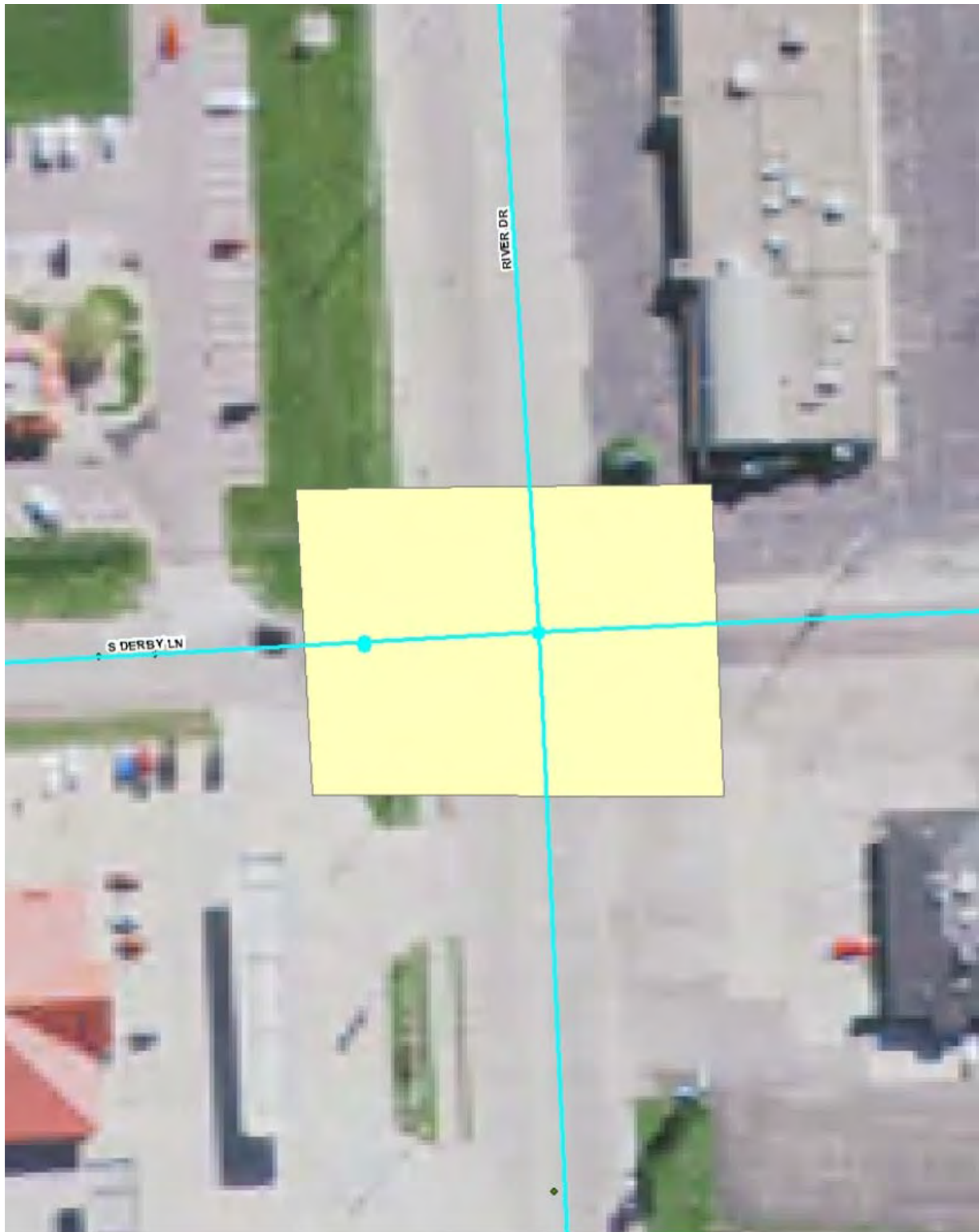
**Crash Map – River Dr/I-29 NB**



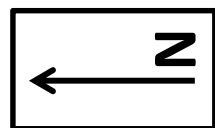
# River/I-29 NB

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
12/8/2013 2:37:00 PM	Straight ahead	Motor vehicle in transport	Non-incapacitating	Angle	Concrete	Daylight	Disregarded traffic signs or signals; Driving too fast for conditions; None
12/18/2014 4:38:00 PM	Stopped in traffic lane, Straight ahead	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Followed too closely; None
7/11/2012 4:30:00 PM	Changing lanes, Straight ahead	Motor vehicle in transport	No injury	Sideswipe, same direction	Concrete	Daylight	Improper lane change; None
3/22/2012 11:25:00 AM	Slowing in traffic lane	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Daylight	None
5/29/2015 9:06:00 PM	Straight ahead, Turning right	Motor vehicle in transport	No injury	Angle	Concrete	Dusk	Failed to yield to vehicle; None
12/12/2016 9:38:00 AM	Turning right	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Improper turn; None





**Crash Map – River Dr/S Derby Ln**

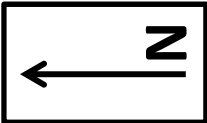


# River/S Derby

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
2/6/2013 6:05:00 AM	Straight ahead	Motor vehicle in transport	Possible	Angle	Concrete	Dawn	Failed to yield to vehicle; None
1/25/2016 8:14:00 PM	Straight ahead	Motor vehicle in transport	No injury	Angle	Concrete	Dark - lighted roadway	Failed to yield to vehicle; None
9/15/2014 5:00:00 PM	Overtaking/passing, Turning right	Motor vehicle in transport	No injury	Sideswipe, same direction	Concrete	Daylight	Failure to keep in proper lane; None
8/31/2014 2:58:00 AM	Straight ahead	Ditch	Possible	No collision between 2 MV in transport	Concrete	Dark - lighted roadway	Unknown
11/22/2014 9:40:00 PM	Straight ahead	Ditch	No injury	No collision between 2 MV in transport	Asphalt ( blacktop )	Dark - roadway not lighted	None; Running off road



Crash Map – River Dr/N Derby Ln

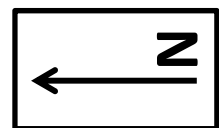


# River/N Derby

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
11/6/2013 10:40:00 PM	Straight ahead	Utility pole	No injury	No collision between 2 MV in transport	Concrete	Dark - lighted roadway	Fatigued/asleep; Running off road
2/4/2014 1:50:00 PM	Stopped in traffic lane, Straight ahead	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Daylight	Followed too closely; None
10/9/2015 12:00:00 PM	Straight ahead, Turning left	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	None



**Crash Map – River Dr/Military Rd**

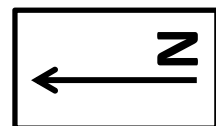


# River/Military

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
12/29/2012 3:00:00 PM	Straight ahead, Turning right	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Daylight	Followed too closely; None
4/12/2012 8:15:00 PM	Stopped in traffic lane, Straight ahead	Motor vehicle in transport	Possible	Rear-end ( front to rear )	Concrete	Dusk	Followed too closely; None
2/9/2012 11:34:00 AM	Changing lanes, Straight ahead	Motor vehicle in transport	No injury	Sideswipe, same direction	Concrete	Daylight	Improper lane change; None
10/29/2015 6:28:00 AM	Stopped in traffic lane, Straight ahead	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Dawn	Followed too closely; None

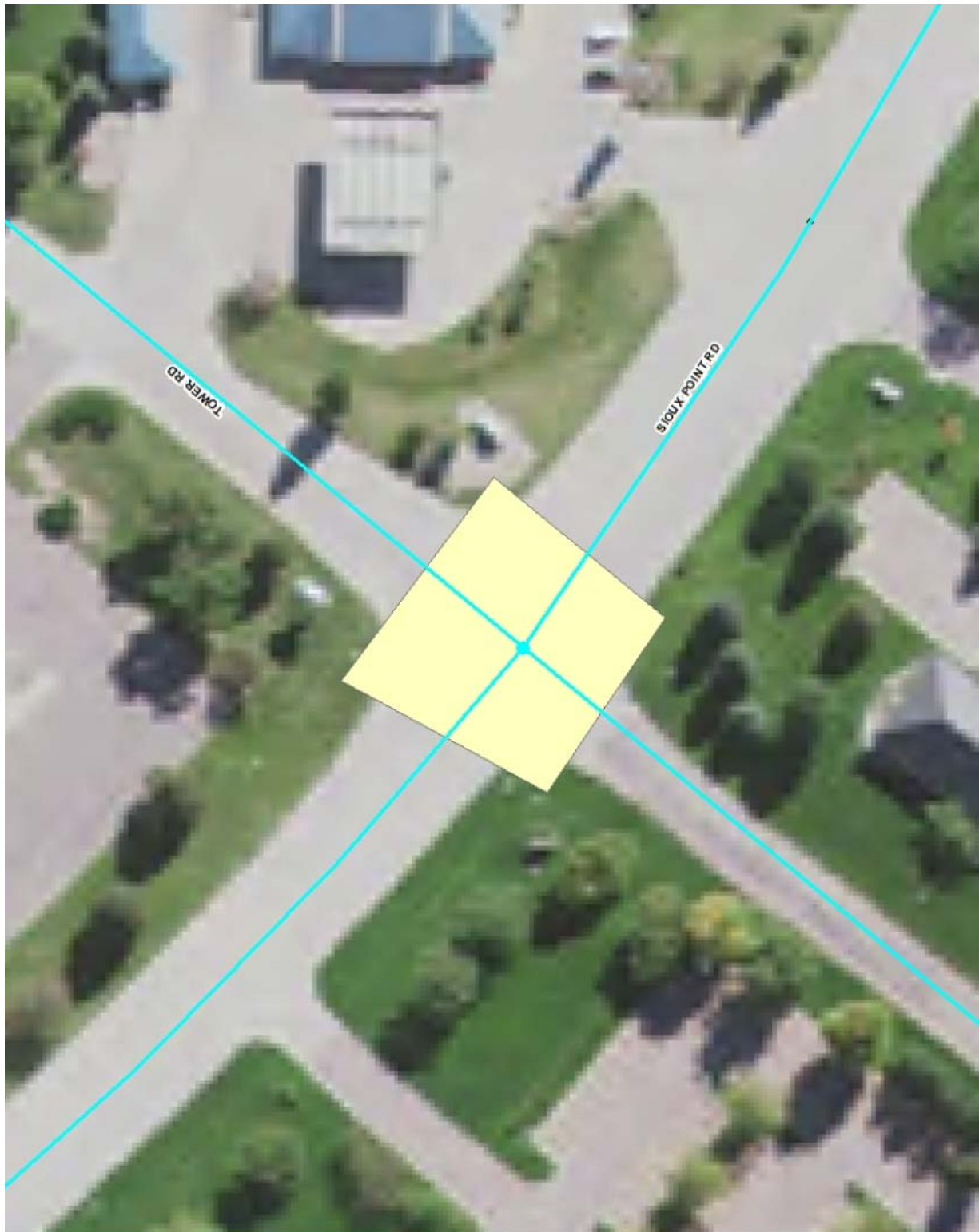


**Crash Map – Sioux Point Rd/Steamboat Dr**

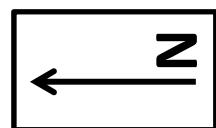


No Crashes Reported  
At this Location



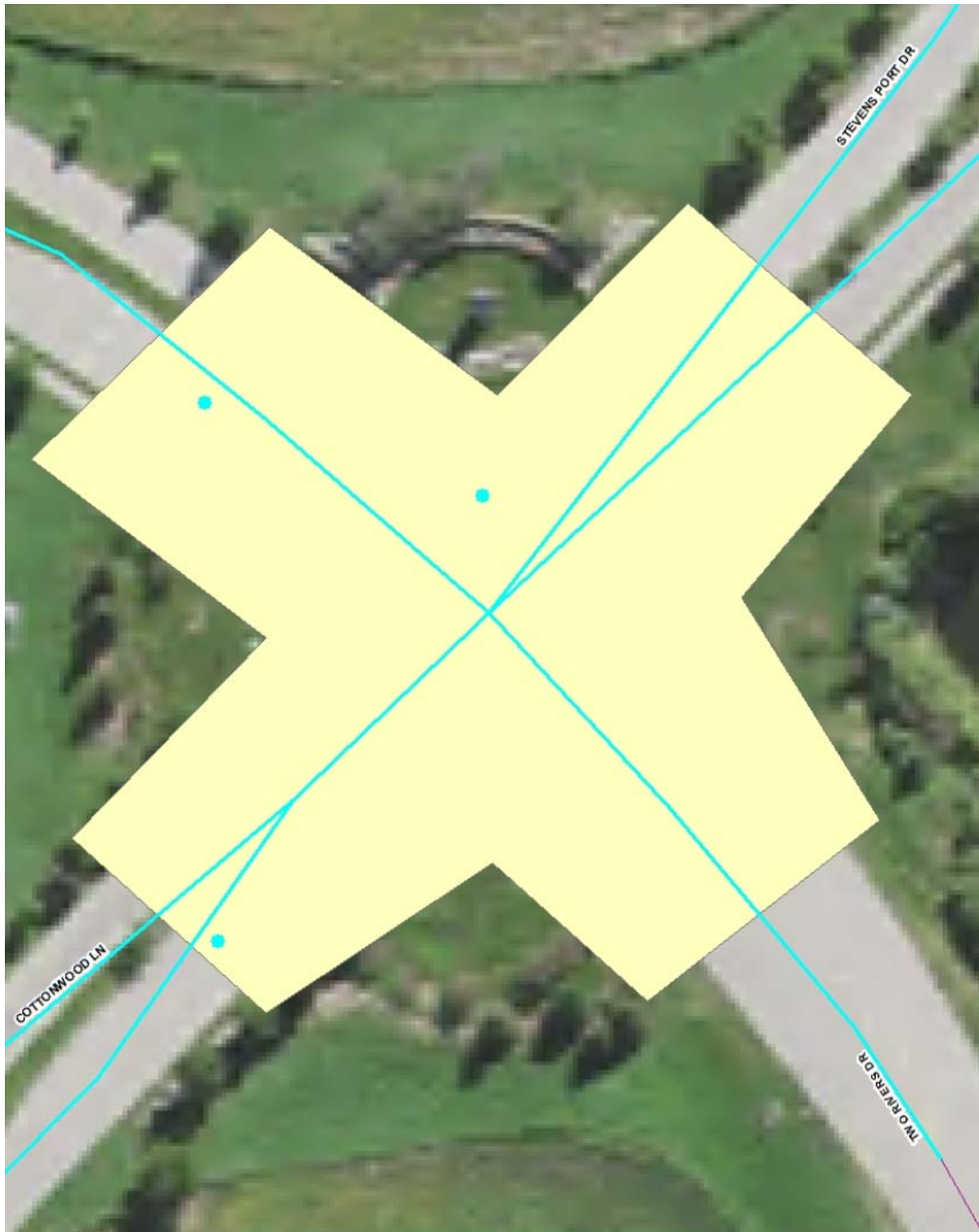


**Crash Map – Sioux Point Rd/Tower Rd**

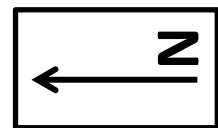


# Sioux Point/Tower

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
12/2/2013 11:14:00 AM	Straight ahead	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Disregarded traffic signs or signals; None
2/2/2016 11:21:00 AM	Straight ahead	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	None

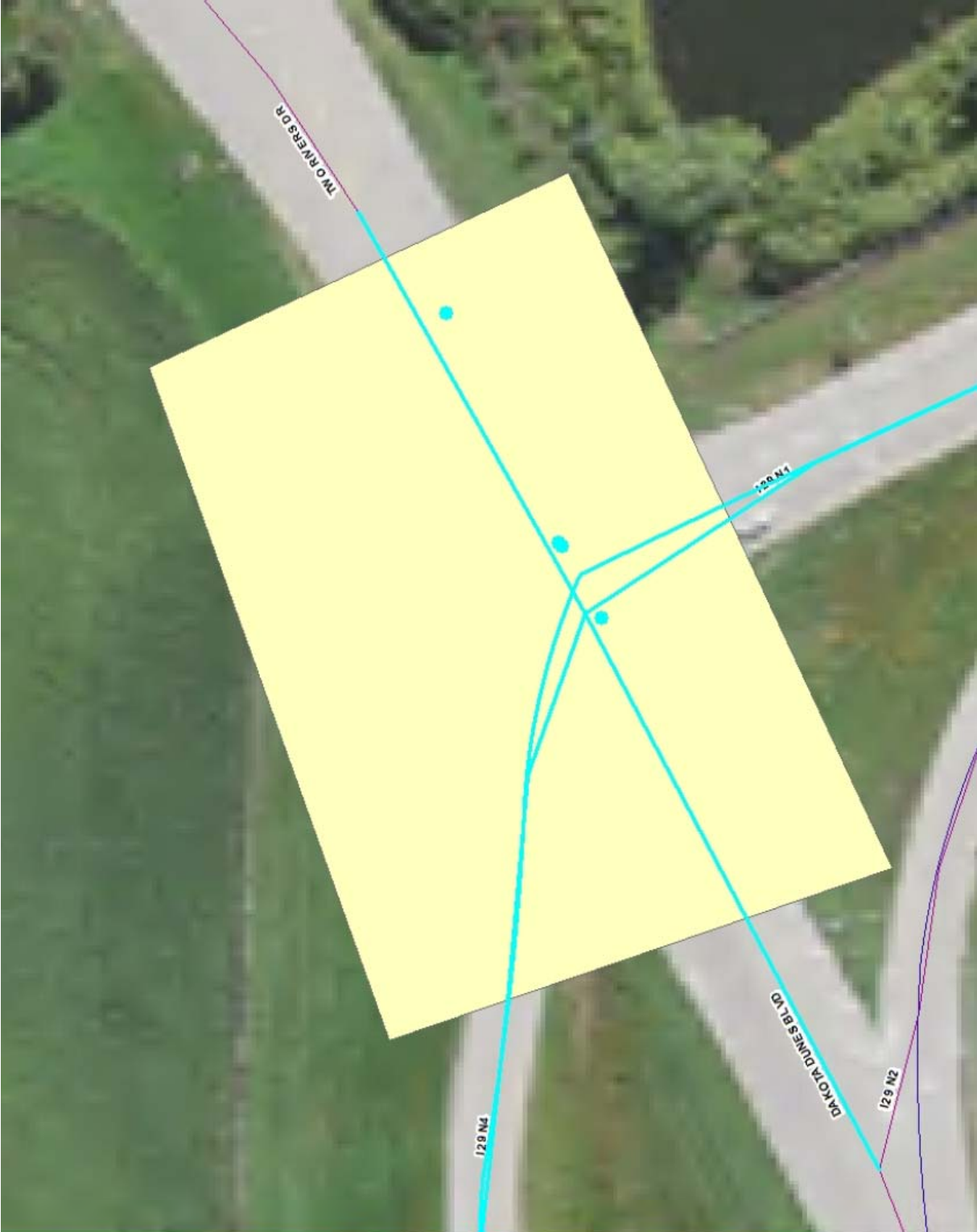


**Crash Map – Two Rivers Dr/Cottonwood Ln**

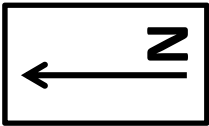


# Dakota Dunes/Cottonwood

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
12/11/2014 6:15:00 PM	<null>	Animal - wild	Wild animal hit	No collision between 2 MV in transport	Wild animal hit - damage only	Dark - lighted roadway	Wild animal hit - damage only
9/13/2013 9:00:00 PM	Stopped in traffic lane, Straight ahead	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Dark - lighted roadway	Distracted (list distraction in narrative); None
5/12/2014 10:28:00 AM	Making U-turn, Straight ahead	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Improper turn; None

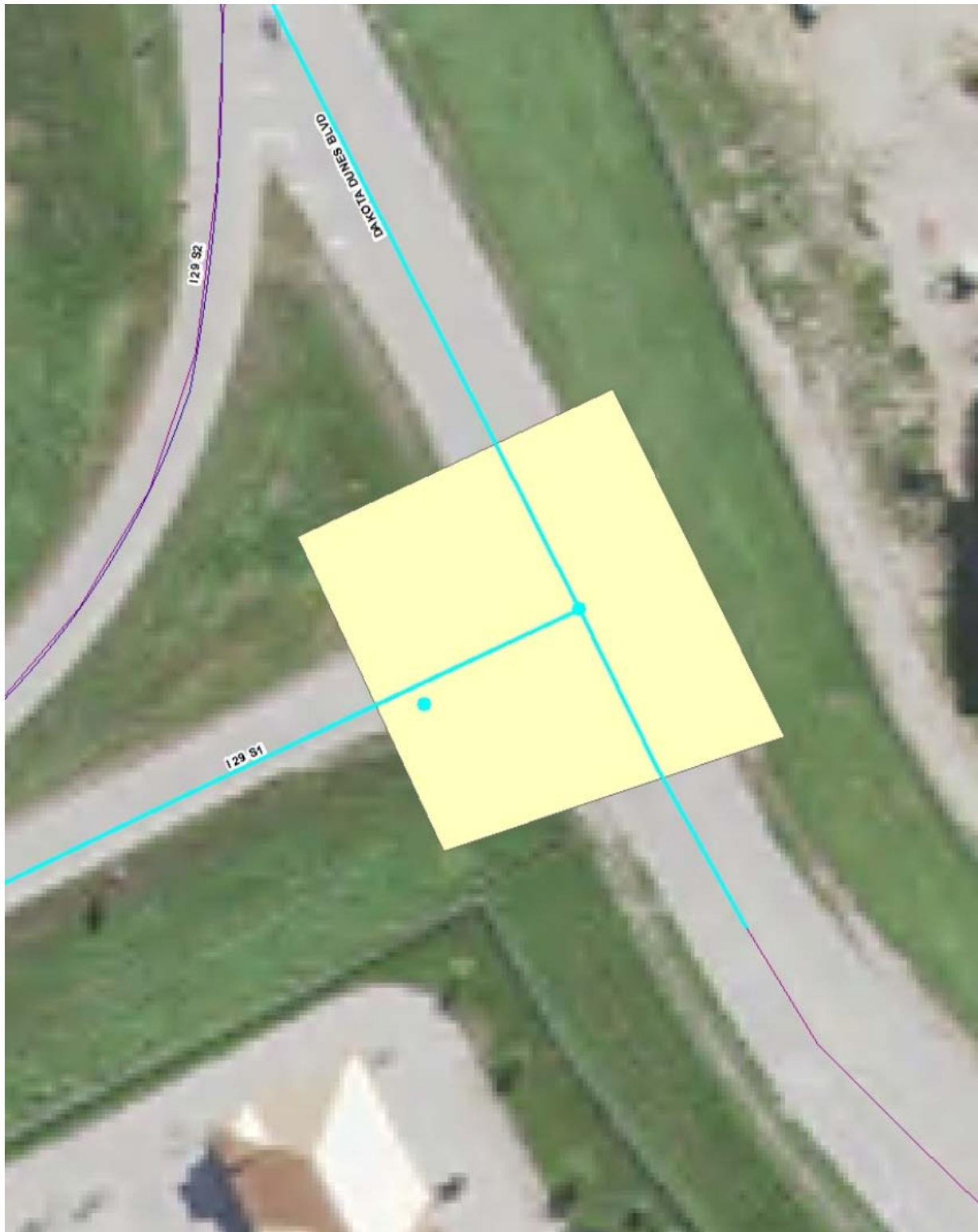


Crash Map – Dakota Dunes Blvd/I-29 NB

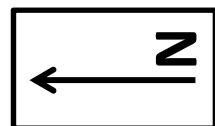


# Dakota Dunes/I-29 NB

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
1/15/2015 4:09:00 PM	Stopped in traffic lane, Straight ahead	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Daylight	None
10/22/2014 5:25:00 PM	Stopped in traffic lane, Straight ahead	Motor vehicle in transport	Non-incapacitating	Rear-end ( front to rear )	Concrete	Daylight	Failed to yield to vehicle; None
3/4/2014 4:00:00 PM	Straight ahead, Turning left	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Disregarded traffic signs or signals; None
12/23/2015 4:58:00 PM	Slowing in traffic lane, Straight ahead	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Dusk	Failed to yield to vehicle; None



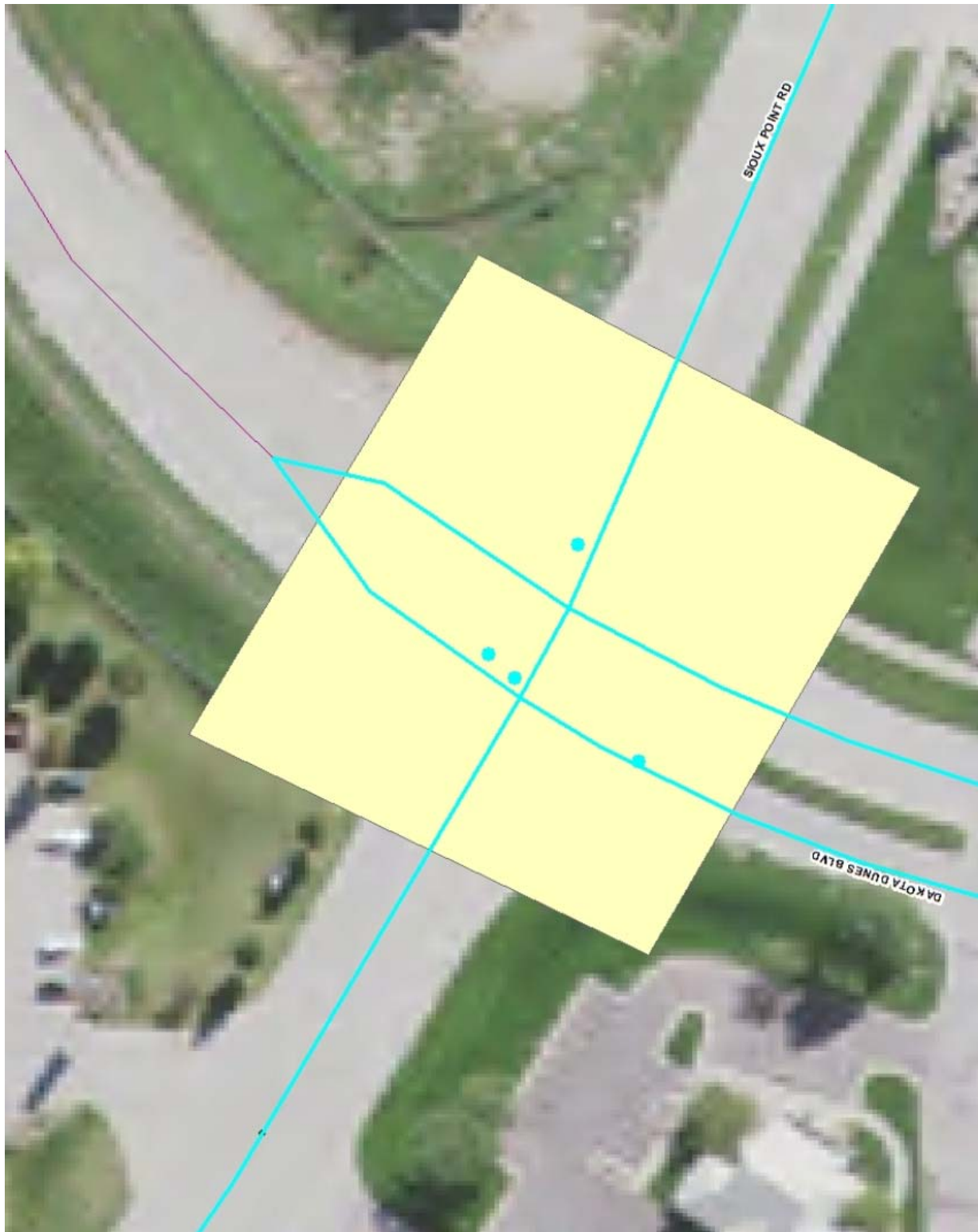
**Crash Map – Dakota Dunes Blvd/I-29 SB**



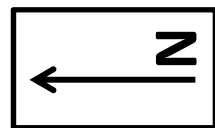
# Dakota Dunes/I-29 SB

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
10/16/2012 3:40:00 PM	Slowing in traffic lane, Stopped in traffic lane	Motor vehicle in transport	No injury	Sideswipe, same direction	Concrete	Daylight	Failure to keep in proper lane; None
12/22/2014 5:45:00 PM	Straight ahead, Turning right	Motor vehicle in transport	No injury	Angle	Concrete	Dark - lighted roadway	Failed to yield to vehicle; None





**Crash Map – Dakota Dunes Blvd/Sioux Point Rd**

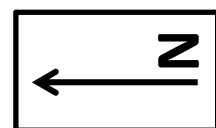


# Dakota Dunes/Sioux Point

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
5/18/2015 6:05:00 PM	Stopped in traffic lane, Straight ahead	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Daylight	Improper lane change; Improper passing; None
10/7/2013 3:30:00 PM	Straight ahead	Motor vehicle in transport	Incapacitating	Angle	Concrete	Daylight	Disregarded traffic signs or signals; Failed to yield to vehicle; None
10/14/2014 3:34:00 PM	Straight ahead	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Daylight	Failed to yield to vehicle; Followed too closely; None
11/20/2015 2:10:00 PM	Straight ahead, Turning left	Motor vehicle used as equipment ( snowplow plowing )	No injury	No collision between 2 MV in transport	Concrete	Daylight	Failed to yield to vehicle; None
12/5/2016 5:50:00 PM	Stopped in traffic lane, Straight ahead	Motor vehicle in transport	Non-incapacitating	Rear-end ( front to rear )	Concrete	Dark - lighted roadway	Followed too closely; None

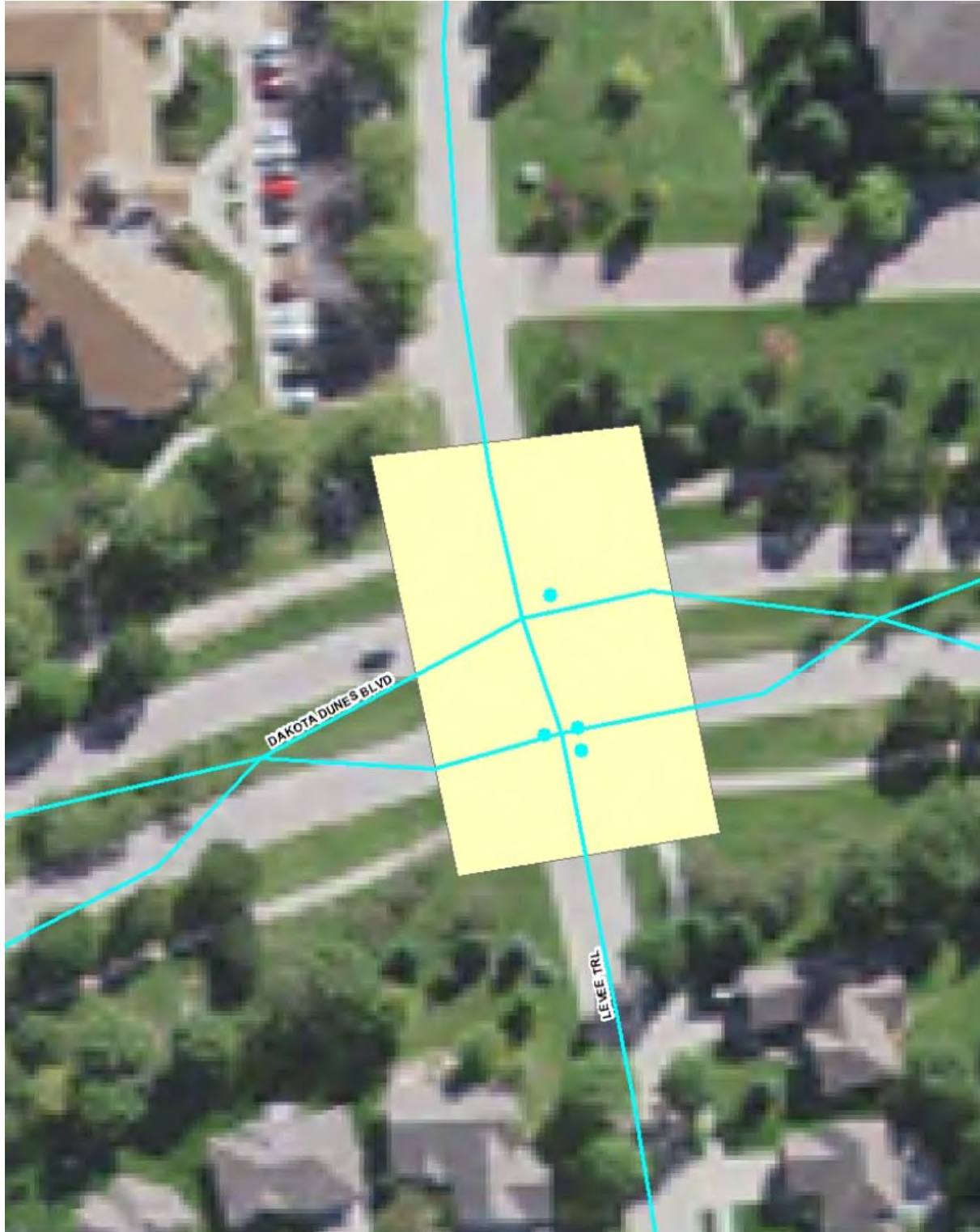


**Crash Map – Dakota Dunes Blvd/Courtyard Dr**

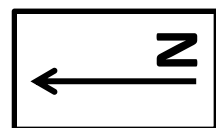


# Dakota Dunes/Courtyard

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
12/21/2016 8:16:00 AM	Straight ahead, Turning left	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Driving too fast for conditions; Followed too closely; None
1/5/2014 2:08:00 PM	Overtaking/passin g, Turning left	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Improper passing; None
2/1/2015 5:00:00 PM	Turning left	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Asphalt ( blacktop )	Daylight	None
12/9/2015 9:00:00 AM	Backing, Turning right	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	None; Other
12/23/2016 9:45:00 AM	Straight ahead	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Distracted (list distraction in narrative); Failed to yield to vehicle; None

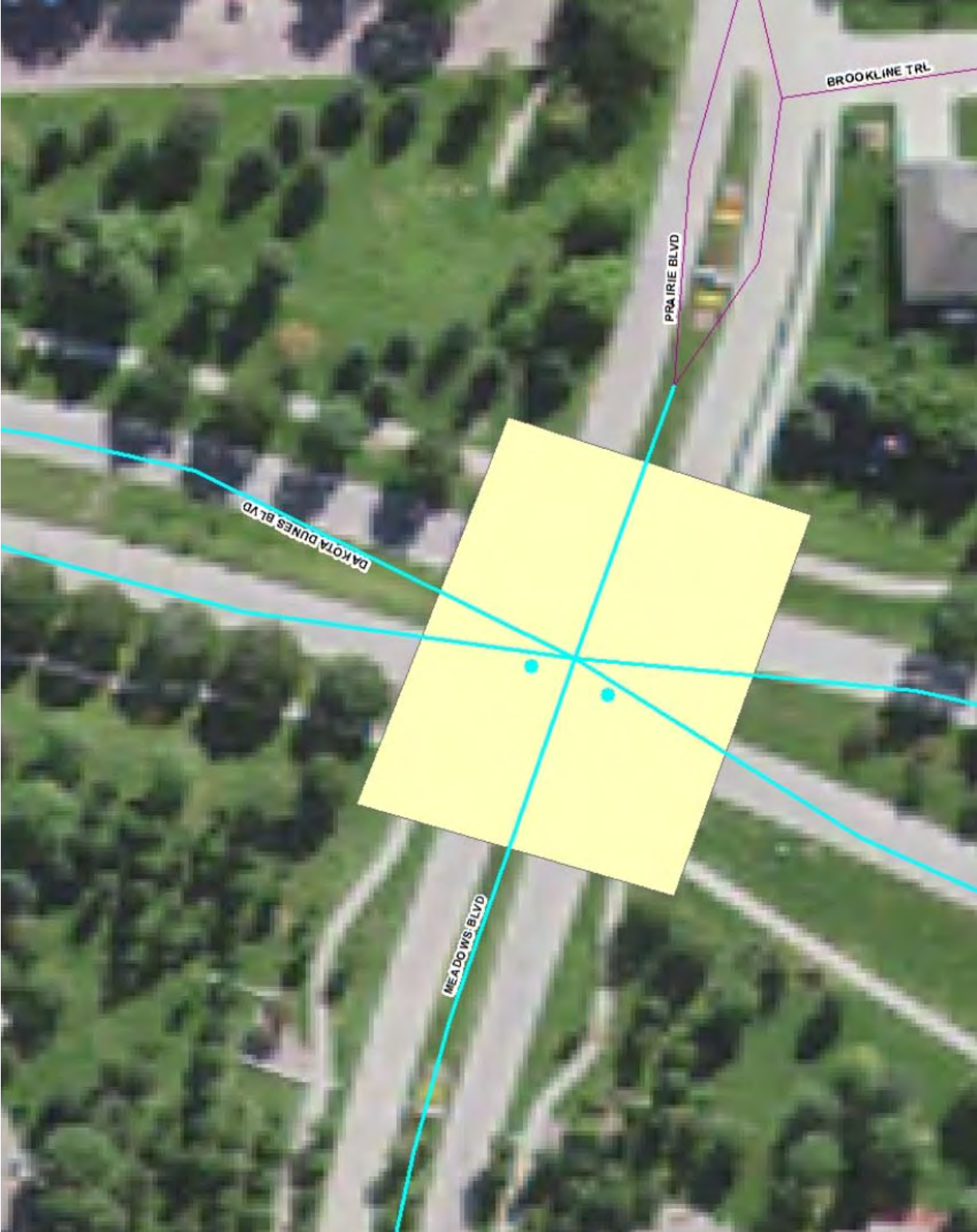


Crash Map – Dakota Dunes Blvd/Levee Trl

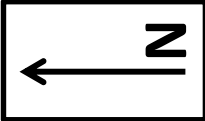


# Dakota Dunes/Levee

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
10/18/2016 10:05:00 AM	Overtaking/passing, Turning right	Motor vehicle in transport	No injury	Sideswipe, same direction	Concrete	Daylight	Improper passing; None
12/18/2016 11:44:00 AM	Stopped in traffic lane, Turning right	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Driving too fast for conditions; None
7/27/2016 7:14:00 PM	Straight ahead, Turning right	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Followed too closely; Improper turn; None
12/6/2013 8:57:00 PM	Straight ahead	Motor vehicle in transport	No injury	Angle	Concrete	Dark - lighted roadway	Failed to yield to vehicle; None
1/27/2016 8:16:00 AM	Straight ahead	Motor vehicle in transport	No injury	Angle	Concrete	Daylight	Failed to yield to vehicle; None



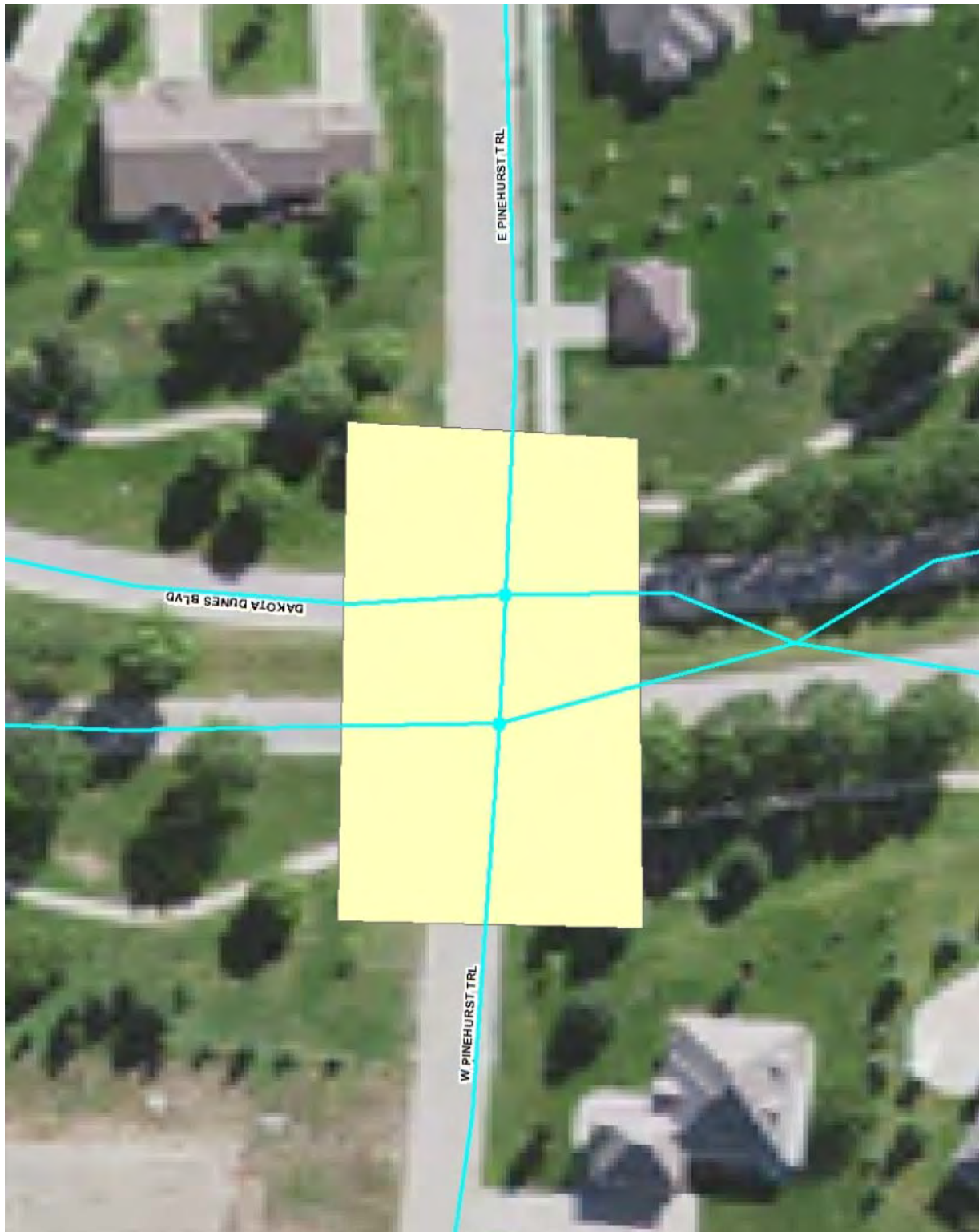
Crash Map – Dakota Dunes Blvd/Meadow Blvd



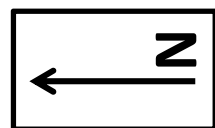
# Dakota Dunes/Meadows

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
8/3/2015 2:00:00 PM	Straight ahead, Turning left	Motor vehicle in transport	No injury	Rear-end ( front to rear )	Concrete	Daylight	Distracted (list distraction in narrative); None
9/16/2016 4:10:00 PM	Overtaking/passing, Straight ahead	Motor vehicle in transport	No injury	Sideswipe, same direction	Concrete	Daylight	None; Other





**Crash Map – Dakota Dunes Blvd/Pinehurst Trl**



# Dakota Dunes/Pinehurst

AccidentDateTi	VehicleManeuver	FirstHarmfulEven	InjurySeverity	MannerOfCollision	RoadSurfaceCondi	LightCondition	DriverContribCirc
12/2/2015 12:29:00 PM	Straight ahead	Motor vehicle in transport	Possible	Angle	Concrete	Daylight	Failed to yield to vehicle; None
10/18/2016 1:56:00 PM	Straight ahead	Motor vehicle in transport	Non-incapacitating	Angle	Concrete	Daylight	Disregarded traffic signs or signals; None

# APPENDIX

## Part 6 – School Observation Notes

## Observation Notes

### Dakota Dunes/North Sioux City traffic study

April 18, 2017

#### School Operations

- 7:00-7:40 AM – traffic steady but light, few delays
- 7:40-7:50 AM – gradual increase in traffic, few delays
  - Elementary school exit – one driver overlapped outbound lanes, possible need to renew paint.
- 7:50-8:00 AM – similar volume, short delays at Elementary exit
- 8:00-8:10 AM – traffic steady
  - slight congestion at Elementary just after 8:00 – incoming and outgoing
  - Lack of left turn lane on Northshore causes occasional backup
  - Outgoing queues noted at High School
  - Occasional condition where cars stop on Northshore to let the Elementary exiting queue clear out
  - Drop-off area at the High School is full
- 8:10-8:20 AM peak period
  - Exiting queue at Elementary is 10+ vehicles
  - Bus stopped on Northshore to let Elementary queue clear out
- (General) – review signal warrants at Elementary and High School exits
- 8:20-8:30 – reduced volume and delay
- (General) – there are no school crossing signs installed at the crosswalk flasher at the Elementary school
- 2:40-2:50 PM – traffic light, Elementary storage area is full
- 2:50-3:00 – no change
- 3:00-3:10 – no change
- 3:10-3:20 – Elementary dismissal
  - Cars stacked on Northshore waiting to enter Elementary school driveway
  - Steady flow exiting Elementary, little delay due to light traffic on Northshore
  - By 3:18 most of the parents waiting to pick up have dispersed at Elementary
  - High school dismissal about 3:15 – exiting traffic grows at new driveway
- 3:20-3:30 – traffic moderate to steady on Northshore
  - Steady flows exiting at new HS driveway
  - Traffic from the west HS driveways slows exiting from the new driveway
  - 3:25 – buses leave High School
- 3:30-3:40 – peak is over, traffic light

#### River Drive PM Operations

- (General) the Southbound right turn from North Derby seems to move with little conflict due to overlap and right-turn-on-red
- 4:37 PM – a queue extended from I-29 NB signal to North Derby for 1 cycle

- 5:08 PM –queues both directions at I-29 NB. The EB queue is for the left turn movement. The WB queue extends to North Derby for several cycles.
- 5:15 PM – queues are dispersed

<b>Warrants Summary</b>												
<b>Information</b>												
Analyst	RL	Intersection	ELEMENTARY WEST DRIVE									
Agency/Co	HDR	Jurisdiction	N SIOUX CITY									
Date Performed	10/9/2017	Units	U.S. Customary									
Project ID	DD/NSC TRANS PLAN	Time Period Analyzed	WEEKDAY									
East/West Street	NORTHSHORE DRIVE	North/South Street	ELEM. SCHOOL WEST DRIVE									
File Name	Warrants1	Major Street	East-West									
Project Description <i>DD/NSC TRANS PLAN</i>												
<b>General</b>						<b>Roadway Network</b>						
Major Street Speed (mph)	15	<input type="checkbox"/>	Population < 10,000				Two Major Routes			<input type="checkbox"/>		
Nearest Signal (ft)	0	<input type="checkbox"/>	Coordinated Signal System				Weekend Count			<input type="checkbox"/>		
Crashes (per year)	0	<input type="checkbox"/>	Adequate Trials of Alternatives				5-yr Growth Factor			0		
<b>Geometry and Traffic</b>	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N	0	1	0	0	1	0	0	0	0	0	0	0
Lane usage		LT			T						LR	
Vehicle Volume Averages (vph)	0	99	0	0	99	0	0	0	0	15	0	8
Peds (ped/h) / Gaps (gaps/h)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--
Delay (s/veh) / (veh-hr)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--
<b>Warrant 1: Eight-Hour Vehicular Volume</b>												<input type="checkbox"/>
1 A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--												<input type="checkbox"/>
1 B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--												<input type="checkbox"/>
1 (80%) Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)												<input type="checkbox"/>
<b>Warrant 2: Four-Hour Vehicular Volume</b>												<input type="checkbox"/>
2 A. Four-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)												<input type="checkbox"/>
<b>Warrant 3: Peak Hour</b>												<input type="checkbox"/>
3 A. Peak-Hour Conditions (Minor delay --and-- minor volume --and-- total volume ) --or--												<input type="checkbox"/>
3 B. Peak- Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)												<input type="checkbox"/>
<b>Warrant 4: Pedestrian Volume</b>												<input type="checkbox"/>
4 A. Four Hour Volumes --or--												<input type="checkbox"/>
4 B. One-Hour Volumes												<input type="checkbox"/>
<b>Warrant 5: School Crossing</b>												<input type="checkbox"/>
5. Student Volumes --and--												<input type="checkbox"/>
5. Gaps Same Period												<input type="checkbox"/>
<b>Warrant 6: Coordinated Signal System</b>												<input type="checkbox"/>
6. Degree of Platooning (Predominant direction or both directions)												<input type="checkbox"/>
<b>Warrant 7: Crash Experience</b>												<input type="checkbox"/>
7 A. Adequate trials of alternatives, observance and enforcement failed --and--												<input type="checkbox"/>
7 B. Reported crashes susceptible to correction by signal (12-month period) --and--												<input type="checkbox"/>

7 C. (80%) Volumes for Warrants 1A, 1B --or-- 4 are satisfied	<input type="checkbox"/>
<b>Warrant 8: Roadway Network</b>	<input type="checkbox"/>
8 A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2 or 3) --or--	<input type="checkbox"/>
8 B. Weekend Volume (Five hours total)	<input type="checkbox"/>
<b>Warrant 9: Grade Crossing</b>	<input type="checkbox"/>
9 A. Grade Crossing within 140 ft --and--	<input type="checkbox"/>
9 B. Peak-Hour Vehicular Volumes	<input type="checkbox"/>

# APPENDIX

## Part 7 – Traffic Counts



Leg Direction Start Time	48th Ave Southbound					Northshore Dr Westbound					N Westshore Dr Northbound					334th St Eastbound					
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Int Total
2017-03-07 06:45:00	0	0	1	0	1	3	4	0	0	7	3	0	0	0	3	0	24	0	0	24	35
2017-03-07 07:00:00	0	0	1	0	1	4	8	2	0	14	4	0	0	0	4	0	25	0	0	25	44
2017-03-07 07:15:00	0	1	2	0	3	11	4	1	0	16	9	0	0	0	9	1	37	2	0	40	68
2017-03-07 07:30:00	0	0	8	0	8	10	12	1	0	23	7	1	2	0	10	0	50	7	0	57	98
2017-03-07 07:45:00	3	1	11	0	15	19	14	1	0	34	8	1	0	0	9	0	67	11	0	78	136
2017-03-07 08:00:00	0	0	7	0	7	16	14	5	0	35	5	1	0	0	6	0	22	16	0	38	86
2017-03-07 08:15:00	1	0	4	0	5	2	10	6	0	18	1	2	0	0	3	0	25	6	0	31	57
2017-03-07 08:30:00	0	0	0	0	0	2	7	3	0	12	3	0	1	0	4	0	10	0	0	10	26
2017-03-07 14:30:00	0	0	3	0	3	2	16	1	0	19	2	0	0	0	2	0	10	0	0	10	34
2017-03-07 14:45:00	0	0	3	0	3	3	12	0	0	15	3	0	0	0	3	0	18	0	0	18	39
2017-03-07 15:00:00	0	0	3	0	3	3	16	2	0	21	3	0	0	0	3	0	17	1	0	18	45
2017-03-07 15:15:00	18	0	44	0	62	21	28	4	0	53	3	0	0	0	3	0	11	1	0	12	130
2017-03-07 15:30:00	2	0	7	0	9	4	20	0	0	24	2	0	1	0	3	0	14	2	0	16	52
2017-03-07 15:45:00	3	1	7	0	11	4	25	6	0	35	4	0	1	0	5	0	9	2	0	11	62
2017-03-07 16:00:00	3	1	15	0	19	1	22	8	1	32	7	0	1	0	8	2	12	0	0	14	73
2017-03-07 16:15:00	3	2	7	0	12	2	17	12	0	31	1	1	1	0	3	2	12	1	0	15	61
2017-03-07 16:30:00	1	2	6	0	9	2	20	12	0	34	11	3	1	0	15	2	9	2	0	13	71
2017-03-07 16:45:00	6	0	5	0	11	5	36	15	0	56	1	0	1	0	2	2	14	0	0	16	85
2017-03-07 17:00:00	1	2	6	0	9	4	32	17	0	53	14	0	3	0	17	3	19	2	0	24	103
2017-03-07 17:15:00	4	2	7	0	13	3	42	14	0	59	9	0	4	0	13	1	24	1	0	26	111
2017-03-07 17:30:00	2	0	5	0	7	1	27	21	0	49	9	0	1	0	10	3	17	0	0	20	86
2017-03-07 17:45:00	1	2	2	0	5	3	33	11	0	47	24	0	3	0	27	1	14	0	0	15	94
2017-03-07 18:00:00	0	0	7	0	7	1	20	6	0	27	3	1	0	0	4	0	14	0	0	14	52
2017-03-07 18:15:00	0	0	3	0	3	0	9	10	0	19	4	1	2	0	7	5	14	0	0	19	48
<b>Grand Total</b>	<b>48</b>	<b>14</b>	<b>164</b>	<b>0</b>	<b>226</b>	<b>126</b>	<b>448</b>	<b>158</b>	<b>1</b>	<b>733</b>	<b>140</b>	<b>11</b>	<b>22</b>	<b>0</b>	<b>173</b>	<b>22</b>	<b>488</b>	<b>54</b>	<b>0</b>	<b>564</b>	<b>1696</b>
<b>% Approach</b>	21.2%	6.2%	72.6%	0.0%		17.2%	61.1%	21.6%	0.1%		80.9%	6.4%	12.7%	0.0%		3.9%	86.5%	9.6%	0.0%		
<b>% Total</b>	2.8%	0.8%	9.7%	0.0%	13.3%	7.4%	26.4%	9.3%	0.1%	43.2%	8.3%	0.6%	1.3%	0.0%	10.2%	1.3%	28.8%	3.2%	0.0%	33.3%	
<b>Lights</b>	48	13	162	0	223	124	442	155	1	722	138	11	21	0	170	22	481	54	0	557	1672
<b>% Lights</b>	100.0%	92.9%	98.8%	0.0%	98.7%	98.4%	98.7%	98.1%	100.0%	98.5%	98.6%	100.0%	95.5%	0.0%	98.3%	100.0%	98.6%	100.0%	0.0%	98.8%	98.6%
<b>Articulated Trucks</b>	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
<b>% Articulated Trucks</b>	0.0%	7.1%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.5%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
<b>Buses and Single-Unit Trucks</b>	0	0	2	0	2	2	6	3	0	11	2	0	0	0	2	0	7	0	0	7	22
<b>% Buses and Single-Unit Trucks</b>	0.0%	0.0%	1.2%	0.0%	0.9%	1.6%	1.3%	1.9%	0.0%	1.5%	1.4%	0.0%	0.0%	0.0%	1.2%	0.0%	1.4%	0.0%	0.0%	1.2%	1.3%

Leg Direction Start Time	HS West Driveway Southbound				Northshore Dr Westbound				Northshore Dr Eastbound				Int Total
	Right	Left	U-Turn	App Total	Right	Thru	U-Turn	App Total	Thru	Left	U-Turn	App Total	
2017-03-07 06:45:00	0	0	0	0	0	7	0	7	28	0	0	28	35
2017-03-07 07:00:00	0	0	0	0	0	14	0	14	27	0	0	27	41
2017-03-07 07:15:00	0	0	0	0	0	16	0	16	51	0	0	51	67
2017-03-07 07:30:00	0	0	0	0	0	25	0	25	69	0	0	69	94
2017-03-07 07:45:00	4	4	0	8	0	30	0	30	82	0	0	82	120
2017-03-07 08:00:00	2	7	0	9	0	33	0	33	40	0	0	40	82
2017-03-07 08:15:00	0	3	0	3	0	17	0	17	28	0	0	28	48
2017-03-07 08:30:00	0	0	0	0	0	12	0	12	12	0	0	12	24
2017-03-07 14:30:00	0	5	0	5	0	17	0	17	15	0	0	15	37
2017-03-07 14:45:00	0	1	0	1	0	15	0	15	23	0	0	23	39
2017-03-07 15:00:00	0	0	0	0	0	22	0	22	24	0	0	24	46
2017-03-07 15:15:00	2	11	0	13	0	50	0	50	57	1	0	58	121
2017-03-07 15:30:00	1	2	0	3	0	22	0	22	23	0	0	23	48
2017-03-07 15:45:00	0	0	0	0	0	35	0	35	19	0	0	19	54
2017-03-07 16:00:00	4	4	0	8	0	30	0	30	35	0	0	35	73
2017-03-07 16:15:00	0	2	0	2	0	29	0	29	21	0	0	21	52
2017-03-07 16:30:00	1	0	0	1	0	33	0	33	26	1	0	27	61
2017-03-07 16:45:00	3	0	0	3	0	52	0	52	20	0	0	20	75
2017-03-07 17:00:00	1	0	0	1	0	55	0	55	39	0	0	39	95
2017-03-07 17:15:00	4	2	0	6	0	53	0	53	39	0	0	39	98
2017-03-07 17:30:00	0	0	0	0	0	47	0	47	31	0	0	31	78
2017-03-07 17:45:00	0	0	0	0	0	47	0	47	41	0	0	41	88
2017-03-07 18:00:00	1	1	0	2	0	26	0	26	23	0	0	23	51
2017-03-07 18:15:00	0	0	0	0	0	21	0	21	22	0	0	22	43
<b>Grand Total</b>	23	42	0	65	0	708	0	708	795	2	0	797	1570
<b>% Approach</b>	35.4%	64.6%	0.0%		0.0%	100.0%	0.0%		99.7%	0.3%	0.0%		
<b>% Total</b>	1.5%	2.7%	0.0%	4.1%	0.0%	45.1%	0.0%	45.1%	50.6%	0.1%	0.0%	50.8%	
<b>Lights</b>	21	28	0	49	0	699	0	699	784	2	0	786	1534
<b>% Lights</b>	91.3%	66.7%	0.0%	75.4%	0.0%	98.7%	0.0%	98.7%	98.6%	100.0%	0.0%	98.6%	97.7%
<b>Buses and Single-Unit Trucks</b>	2	14	0	16	0	9	0	9	11	0	0	11	36
<b>% Buses and Single-Unit Trucks</b>	8.7%	33.3%	0.0%	24.6%	0.0%	1.3%	0.0%	1.3%	1.4%	0.0%	0.0%	1.4%	2.3%

Leg Direction Start Time	HS Middle Driveway Southbound					North Shore Dr Westbound					Suncoast Dr Northbound					North Shore Dr Eastbound					Int Total
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	
2017-03-07 06:45:00	0	0	0	0	0	0	7	1	0	8	2	0	0	0	2	0	28	0	0	28	38
2017-03-07 07:00:00	0	1	0	0	1	0	14	2	0	16	4	0	0	0	4	0	26	0	0	26	47
2017-03-07 07:15:00	0	0	5	0	5	8	15	0	0	23	13	0	1	0	14	0	51	1	0	52	94
2017-03-07 07:30:00	0	1	8	0	9	14	22	1	0	37	8	1	1	0	10	0	61	4	0	65	121
2017-03-07 07:45:00	0	0	8	0	8	48	28	2	0	78	13	3	2	0	18	0	65	19	0	84	188
2017-03-07 08:00:00	0	0	0	0	0	66	32	8	0	106	9	2	1	0	12	0	34	16	0	50	168
2017-03-07 08:15:00	0	0	12	0	12	20	18	0	0	38	5	0	0	0	5	0	26	5	0	31	86
2017-03-07 08:30:00	0	0	1	0	1	1	12	2	0	15	3	0	0	0	3	0	12	0	0	12	31
2017-03-07 14:30:00	0	0	1	0	1	7	16	5	0	28	5	0	0	0	5	0	20	0	0	20	54
2017-03-07 14:45:00	0	0	1	0	1	11	15	5	0	31	2	0	0	0	2	0	23	0	0	23	57
2017-03-07 15:00:00	0	0	2	0	2	9	21	9	0	39	4	0	0	0	4	1	21	3	0	25	70
2017-03-07 15:15:00	1	1	3	0	5	28	50	7	0	85	7	0	0	0	7	0	59	9	0	68	165
2017-03-07 15:30:00	0	0	2	0	2	5	22	8	0	35	7	0	0	0	7	1	23	1	0	25	69
2017-03-07 15:45:00	0	1	4	0	5	11	34	7	0	52	5	0	1	0	6	1	18	0	0	19	82
2017-03-07 16:00:00	0	0	14	0	14	10	30	4	0	44	3	0	0	0	3	0	37	2	0	39	100
2017-03-07 16:15:00	0	0	2	0	2	3	29	10	0	42	4	0	0	0	4	2	21	0	0	23	71
2017-03-07 16:30:00	1	0	4	0	5	3	31	4	0	38	2	0	1	0	3	2	22	2	0	26	72
2017-03-07 16:45:00	0	0	1	0	1	5	54	7	0	66	7	0	0	0	7	0	20	0	0	20	94
2017-03-07 17:00:00	0	1	3	0	4	4	52	14	0	70	5	0	1	0	6	1	37	1	0	39	119
2017-03-07 17:15:00	0	0	7	0	7	10	53	13	0	76	7	0	2	0	9	3	37	1	0	41	133
2017-03-07 17:30:00	0	1	4	0	5	5	46	11	0	62	8	0	1	0	9	4	26	1	0	31	107
2017-03-07 17:45:00	1	0	2	0	3	0	45	11	0	56	1	0	1	0	2	1	41	0	0	42	103
2017-03-07 18:00:00	0	0	0	0	0	1	26	7	0	34	5	1	0	0	6	0	23	0	0	23	63
2017-03-07 18:15:00	0	0	0	0	0	6	20	7	0	33	2	0	1	0	3	2	19	2	0	23	59
<b>Grand Total</b>	<b>3</b>	<b>6</b>	<b>84</b>	<b>0</b>	<b>93</b>	<b>275</b>	<b>692</b>	<b>145</b>	<b>0</b>	<b>1112</b>	<b>131</b>	<b>7</b>	<b>13</b>	<b>0</b>	<b>151</b>	<b>18</b>	<b>750</b>	<b>67</b>	<b>0</b>	<b>835</b>	<b>2191</b>
<b>% Approach</b>	3.2%	6.5%	90.3%	0.0%		24.7%	62.2%	13.0%	0.0%		86.8%	4.6%	8.6%	0.0%		2.2%	89.8%	8.0%	0.0%		
<b>% Total</b>	0.1%	0.3%	3.8%	0.0%	<b>4.2%</b>	12.6%	31.6%	6.6%	0.0%	<b>50.8%</b>	6.0%	0.3%	0.6%	0.0%	<b>6.9%</b>	0.8%	34.2%	3.1%	0.0%	<b>38.1%</b>	
<b>Lights</b>	3	6	84	0	<b>93</b>	260	682	142	0	<b>1084</b>	129	7	13	0	<b>149</b>	18	723	66	0	<b>807</b>	<b>2133</b>
<b>% Lights</b>	100.0%	100.0%	100.0%	0.0%	<b>100.0%</b>	94.5%	98.6%	97.9%	0.0%	<b>97.5%</b>	98.5%	100.0%	100.0%	0.0%	<b>98.7%</b>	100.0%	96.4%	98.5%	0.0%	<b>96.6%</b>	<b>97.4%</b>
<b>Articulated Trucks</b>	0	0	0	0	<b>0</b>	0	1	0	0	<b>1</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	<b>1</b>
<b>% Articulated Trucks</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	0.0%	0.1%	0.0%	0.0%	<b>0.1%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	<b>0.0%</b>
<b>Buses and Single-Unit Trucks</b>	0	0	0	0	<b>0</b>	15	9	3	0	<b>27</b>	2	0	0	0	<b>2</b>	0	27	1	0	<b>28</b>	<b>57</b>
<b>% Buses and Single-Unit Trucks</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	5.5%	1.3%	2.1%	0.0%	<b>2.4%</b>	1.5%	0.0%	0.0%	0.0%	<b>1.3%</b>	0.0%	3.6%	1.5%	0.0%	<b>3.4%</b>	<b>2.6%</b>

Leg Direction Start Time	HS East Driveway Southbound				North Shore Dr Westbound				North Shore Dr Eastbound				
	Right	Left	U-Turn	App Total	Right	Thru	U-Turn	App Total	Thru	Left	U-Turn	App Total	Int Total
2017-03-07 06:45:00	0	0	0	0	1	10	0	11	30	0	0	30	41
2017-03-07 07:00:00	0	0	0	0	0	18	0	18	33	0	0	33	51
2017-03-07 07:15:00	1	1	0	2	1	21	0	22	71	0	0	71	95
2017-03-07 07:30:00	1	8	0	9	3	42	0	45	75	0	0	75	129
2017-03-07 07:45:00	7	34	0	41	6	69	0	75	84	0	0	84	200
2017-03-07 08:00:00	18	48	0	66	3	90	0	93	44	0	0	44	203
2017-03-07 08:15:00	1	17	0	18	0	31	0	31	42	0	0	42	91
2017-03-07 08:30:00	0	0	0	0	0	13	0	13	17	0	0	17	30
2017-03-07 14:30:00	1	0	0	1	0	27	0	27	26	1	0	27	55
2017-03-07 14:45:00	0	1	0	1	2	33	0	35	26	0	0	26	62
2017-03-07 15:00:00	1	0	0	1	13	46	0	59	25	0	0	25	85
2017-03-07 15:15:00	14	49	0	63	5	64	0	69	67	0	0	67	199
2017-03-07 15:30:00	0	7	0	7	0	39	0	39	33	0	0	33	79
2017-03-07 15:45:00	0	1	0	1	2	52	0	54	30	0	0	30	85
2017-03-07 16:00:00	0	5	0	5	1	42	0	43	53	0	0	53	101
2017-03-07 16:15:00	1	2	0	3	0	43	0	43	25	0	0	25	71
2017-03-07 16:30:00	0	2	0	2	0	37	0	37	29	0	1	30	69
2017-03-07 16:45:00	0	1	0	1	0	64	0	64	29	0	0	29	94
2017-03-07 17:00:00	0	0	0	0	0	72	0	72	43	0	0	43	115
2017-03-07 17:15:00	1	1	0	2	0	74	0	74	48	0	0	48	124
2017-03-07 17:30:00	0	0	0	0	2	64	0	66	41	0	0	41	107
2017-03-07 17:45:00	0	0	0	0	0	54	0	54	43	0	0	43	97
2017-03-07 18:00:00	0	1	0	1	0	33	0	33	30	0	0	30	64
2017-03-07 18:15:00	0	0	0	0	0	36	0	36	18	0	0	18	54
<b>Grand Total</b>	46	178	0	224	39	1074	0	1113	962	1	1	964	2301
<b>% Approach</b>	20.5%	79.5%	0.0%		3.5%	96.5%	0.0%		99.8%	0.1%	0.1%		
<b>% Total</b>	2.0%	7.7%	0.0%	9.7%	1.7%	46.7%	0.0%	48.4%	41.8%	0.0%	0.0%	41.9%	
<b>Lights</b>	46	178	0	224	39	1049	0	1088	934	1	1	936	2248
<b>% Lights</b>	100.0%	100.0%	0.0%	100.0%	100.0%	97.7%	0.0%	97.8%	97.1%	100.0%	100.0%	97.1%	97.7%
<b>Buses and Single-Unit Trucks</b>	0	0	0	0	0	25	0	25	28	0	0	28	53
<b>% Buses and Single-Unit Trucks</b>	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%	0.0%	2.2%	2.9%	0.0%	0.0%	2.9%	2.3%

Leg Direction Start Time	ES West Driveway Southbound				North Shore Dr Westbound				North Shore Dr Eastbound				Int Total
	Right	Left	U-Turn	App Total	Right	Thru	U-Turn	App Total	Thru	Left	U-Turn	App Total	
2017-03-07 06:45:00	1	0	0	1	0	12	0	12	31	0	0	31	44
2017-03-07 07:00:00	1	0	0	1	0	21	0	21	31	1	0	32	54
2017-03-07 07:15:00	0	1	0	1	0	26	0	26	68	2	0	70	97
2017-03-07 07:30:00	6	11	0	17	0	67	0	67	91	0	0	91	175
	8	12	0	20	0	126	0	126	221	3	0	224	370
2017-03-07 07:45:00	17	29	0	46	0	97	0	97	128	0	0	128	271
2017-03-07 08:00:00	30	46	0	76	0	145	0	145	96	0	0	96	317
2017-03-07 08:15:00	5	10	0	15	0	52	0	52	75	0	0	75	142
2017-03-07 08:30:00	0	1	0	1	0	13	0	13	17	0	0	17	31
	52	86	0	138	0	307	0	307	316	0	0	316	761
2017-03-07 14:30:00	0	1	0	1	0	30	0	30	26	0	0	26	57
2017-03-07 14:45:00	0	2	0	2	0	36	0	36	30	0	0	30	68
2017-03-07 15:00:00	18	30	0	48	0	50	0	50	26	0	0	26	124
2017-03-07 15:15:00	15	15	0	30	0	57	0	57	187	0	0	187	274
	33	48	0	81	0	173	0	173	269	0	0	269	523
2017-03-07 15:30:00	2	7	0	9	1	48	0	49	51	1	0	52	110
2017-03-07 15:45:00	1	2	0	3	0	67	0	67	35	0	0	35	105
2017-03-07 16:00:00	2	9	0	11	0	42	0	42	65	0	0	65	118
2017-03-07 16:15:00	1	5	0	6	0	42	0	42	47	0	0	47	95
	6	23	0	29	1	199	0	200	198	1	0	199	428
2017-03-07 16:30:00	2	4	0	6	0	37	0	37	39	0	0	39	82
2017-03-07 16:45:00	0	4	0	4	0	69	0	69	38	0	0	38	111
2017-03-07 17:00:00	0	0	0	0	0	76	0	76	51	0	0	51	127
2017-03-07 17:15:00	1	7	0	8	0	79	0	79	57	0	0	57	144
	3	15	0	18	0	261	0	261	185	0	0	185	464
2017-03-07 17:30:00	0	7	0	7	0	65	0	65	38	0	0	38	110
2017-03-07 17:45:00	0	0	0	0	0	55	0	55	50	0	0	50	105
2017-03-07 18:00:00	0	0	0	0	0	36	0	36	28	0	0	28	64
2017-03-07 18:15:00	0	0	0	0	0	34	0	34	22	0	0	22	56
	0	7	0	7	0	190	0	190	138	0	0	138	335
<b>Grand Total</b>	102	191	0	293	1	1256	0	1257	1327	4	0	1331	2881
<b>% Approach</b>	34.8%	65.2%	0.0%		0.1%	99.9%	0.0%		99.7%	0.3%	0.0%		
<b>% Total</b>	3.5%	6.6%	0.0%	10.2%	0.0%	43.6%	0.0%	43.6%	46.1%	0.1%	0.0%	46.2%	
<b>Lights</b>	101	186	0	287	1	1232	0	1233	1299	4	0	1303	2823
<b>% Lights</b>	99.0%	97.4%	0.0%	98.0%	100.0%	98.1%	0.0%	98.1%	97.9%	100.0%	0.0%	97.9%	98.0%
<b>Articulated Trucks</b>	0	0	0	0	0	0	0	0	1	0	0	1	1
<b>% Articulated Trucks</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%
<b>Buses and Single-Unit Trucks</b>	1	5	0	6	0	24	0	24	27	0	0	27	57
<b>% Buses and Single-Unit Trucks</b>	1.0%	2.6%	0.0%	2.0%	0.0%	1.9%	0.0%	1.9%	2.0%	0.0%	0.0%	2.0%	2.0%

Leg Direction Start Time	ES East Driveway Southbound				North Shore Dr Westbound				North Shore Dr Eastbound				Int Total
	Right	Left	U-Turn	App Total	Right	Thru	U-Turn	App Total	Thru	Left	U-Turn	App Total	
2017-03-07 06:45:00	0	0	0	0	0	12	0	12	33	0	0	33	45
2017-03-07 07:00:00	0	0	0	0	2	21	0	23	32	0	0	32	55
2017-03-07 07:15:00	1	0	0	1	9	25	0	34	67	2	0	69	104
2017-03-07 07:30:00	0	0	0	0	26	67	0	93	89	11	0	100	193
2017-03-07 07:45:00	1	0	0	1	48	95	0	143	135	21	0	156	300
2017-03-07 08:00:00	0	0	0	0	62	148	0	210	126	15	0	141	351
2017-03-07 08:15:00	0	0	0	0	7	49	0	56	88	0	0	88	144
2017-03-07 08:30:00	1	0	0	1	1	12	0	13	17	1	0	18	32
2017-03-07 14:30:00	1	0	0	1	5	29	0	34	26	1	0	27	62
2017-03-07 14:45:00	0	0	0	0	22	37	0	59	31	2	0	33	92
2017-03-07 15:00:00	0	0	0	0	28	50	0	78	49	6	0	55	133
2017-03-07 15:15:00	3	3	0	6	2	53	0	55	199	3	0	202	263
2017-03-07 15:30:00	0	0	0	0	0	49	0	49	58	1	0	59	108
2017-03-07 15:45:00	0	0	0	0	0	67	0	67	37	0	0	37	104
2017-03-07 16:00:00	0	3	0	3	0	42	0	42	74	0	0	74	119
2017-03-07 16:15:00	0	2	0	2	0	42	0	42	51	0	0	51	95
2017-03-07 16:30:00	0	0	0	0	0	38	0	38	42	1	0	43	81
2017-03-07 16:45:00	0	0	0	0	0	70	0	70	41	1	0	42	112
2017-03-07 17:00:00	0	0	0	0	0	76	0	76	51	0	0	51	127
2017-03-07 17:15:00	0	1	0	1	0	79	0	79	59	3	0	62	142
2017-03-07 17:30:00	0	0	0	0	0	66	0	66	43	3	0	46	112
2017-03-07 17:45:00	0	0	0	0	0	54	0	54	50	0	0	50	104
2017-03-07 18:00:00	0	0	0	0	0	36	0	36	28	0	0	28	64
2017-03-07 18:15:00	0	0	0	0	0	35	0	35	22	0	0	22	57
<b>Grand Total</b>	<b>7</b>	<b>9</b>	<b>0</b>	<b>16</b>	<b>212</b>	<b>1252</b>	<b>0</b>	<b>1464</b>	<b>1448</b>	<b>71</b>	<b>0</b>	<b>1519</b>	<b>2999</b>
<b>% Approach</b>	43.8%	56.3%	0.0%		14.5%	85.5%	0.0%		95.3%	4.7%	0.0%		
<b>% Total</b>	0.2%	0.3%	0.0%	<b>0.5%</b>	7.1%	41.7%	0.0%	<b>48.8%</b>	48.3%	2.4%	0.0%	<b>50.7%</b>	
<b>Lights</b>	3	6	0	<b>9</b>	200	1232	0	<b>1432</b>	1417	70	0	<b>1487</b>	<b>2928</b>
<b>% Lights</b>	42.9%	66.7%	0.0%	<b>56.3%</b>	94.3%	98.4%	0.0%	<b>97.8%</b>	97.9%	98.6%	0.0%	<b>97.9%</b>	<b>97.6%</b>
<b>Articulated Trucks</b>	0	0	0	<b>0</b>	0	1	0	<b>1</b>	0	0	0	<b>0</b>	<b>1</b>
<b>% Articulated Trucks</b>	0.0%	0.0%	0.0%	<b>0.0%</b>	0.0%	0.1%	0.0%	<b>0.1%</b>	0.0%	0.0%	0.0%	<b>0.0%</b>	<b>0.0%</b>
<b>Buses and Single-Unit Trucks</b>	4	3	0	<b>7</b>	12	19	0	<b>31</b>	31	1	0	<b>32</b>	<b>70</b>
<b>% Buses and Single-Unit Trucks</b>	57.1%	33.3%	0.0%	<b>43.8%</b>	5.7%	1.5%	0.0%	<b>2.1%</b>	2.1%	1.4%	0.0%	<b>2.1%</b>	<b>2.3%</b>

Leg Direction	Penrose Dr Southbound				Northshore Dr Westbound				Northshore Dr Eastbound				
Start Time	Right	Left	U-Turn	App Total	Right	Thru	U-Turn	App Total	Thru	Left	U-Turn	App Total	Int Total
2017-03-07 06:45:00	1	1	0	2	2	13	0	15	34	0	0	34	51
2017-03-07 07:00:00	0	3	0	3	1	23	0	24	32	0	0	32	59
2017-03-07 07:15:00	0	1	0	1	0	34	0	34	65	0	0	65	100
2017-03-07 07:30:00	2	3	0	5	1	94	0	95	93	0	0	93	193
2017-03-07 07:45:00	7	1	0	8	0	137	0	137	132	1	0	133	278
2017-03-07 08:00:00	4	0	0	4	0	204	0	204	127	0	0	127	335
2017-03-07 08:15:00	0	1	0	1	0	56	0	56	88	0	0	88	145
2017-03-07 08:30:00	0	2	0	2	0	13	0	13	20	0	0	20	35
2017-03-07 14:30:00	0	3	0	3	1	32	0	33	27	1	0	28	64
2017-03-07 14:45:00	0	0	0	0	1	60	0	61	28	2	0	30	91
2017-03-07 15:00:00	2	0	0	2	0	77	0	77	48	0	0	48	127
2017-03-07 15:15:00	0	1	0	1	0	54	0	54	193	5	0	198	253
2017-03-07 15:30:00	1	2	0	3	2	49	0	51	59	4	0	63	117
2017-03-07 15:45:00	0	1	0	1	1	71	0	72	36	0	0	36	109
2017-03-07 16:00:00	1	1	0	2	4	42	0	46	75	0	0	75	123
2017-03-07 16:15:00	1	0	0	1	0	43	0	43	54	0	0	54	98
2017-03-07 16:30:00	0	0	0	0	4	37	0	41	44	0	0	44	85
2017-03-07 16:45:00	1	0	0	1	3	73	0	76	40	0	0	40	117
2017-03-07 17:00:00	1	1	0	2	3	74	0	77	50	1	0	51	130
2017-03-07 17:15:00	1	2	0	3	3	93	0	96	60	1	0	61	160
2017-03-07 17:30:00	0	2	0	2	2	69	0	71	45	0	0	45	118
2017-03-07 17:45:00	0	0	0	0	2	55	0	57	53	0	0	53	110
2017-03-07 18:00:00	1	2	0	3	4	35	0	39	28	0	0	28	70
2017-03-07 18:15:00	1	4	0	5	0	35	0	35	22	1	0	23	63
<b>Grand Total</b>	24	31	0	55	34	1473	0	1507	1453	16	0	1469	3031
<b>% Approach</b>	43.6%	56.4%	0.0%		2.3%	97.7%	0.0%		98.9%	1.1%	0.0%		
<b>% Total</b>	0.8%	1.0%	0.0%	1.8%	1.1%	48.6%	0.0%	49.7%	47.9%	0.5%	0.0%	48.5%	
<b>Lights</b>	23	31	0	54	33	1443	0	1476	1417	16	0	1433	2963
<b>% Lights</b>	95.8%	100.0%	0.0%	98.2%	97.1%	98.0%	0.0%	97.9%	97.5%	100.0%	0.0%	97.5%	97.8%
<b>Articulated Trucks</b>	0	0	0	0	0	0	0	0	1	0	0	1	1
<b>% Articulated Trucks</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%
<b>Buses and Single-Unit Trucks</b>	1	0	0	1	1	30	0	31	35	0	0	35	67
<b>% Buses and Single-Unit Trucks</b>	4.2%	0.0%	0.0%	1.8%	2.9%	2.0%	0.0%	2.1%	2.4%	0.0%	0.0%	2.4%	2.2%

Leg Direction Start Time	Northshore Dr Westbound					Streeter Dr Northbound					Northshore Dr Eastbound			Int Total
	Thru	Left	U-Turn	App Total	Right	Left	U-Turn	App Total	Right	Thru	U-Turn	App Total		
2017-03-07 06:45:00	12	2	0	14	6	3	0	9	2	33	0	35	58	
2017-03-07 07:00:00	20	1	0	21	3	7	0	10	1	32	0	33	64	
2017-03-07 07:15:00	30	3	0	33	6	6	0	12	4	66	0	70	115	
2017-03-07 07:30:00	68	2	0	70	14	23	0	37	6	92	0	98	205	
2017-03-07 07:45:00	111	1	0	112	9	31	0	40	11	122	0	133	285	
2017-03-07 08:00:00	160	1	0	161	1	41	0	42	16	110	0	126	329	
2017-03-07 08:15:00	43	2	0	45	4	8	0	12	9	86	0	95	152	
2017-03-07 08:30:00	10	5	0	15	3	4	0	7	1	23	0	24	46	
2017-03-07 14:30:00	31	5	0	36	2	5	0	7	7	23	0	30	73	
2017-03-07 14:45:00	53	5	0	58	4	9	0	13	4	23	0	27	98	
2017-03-07 15:00:00	65	5	0	70	6	9	0	15	10	32	0	42	127	
2017-03-07 15:15:00	47	7	0	54	4	8	0	12	40	151	0	191	257	
2017-03-07 15:30:00	48	4	0	52	6	8	0	14	11	63	0	74	140	
2017-03-07 15:45:00	62	6	0	68	6	10	0	16	5	32	0	37	121	
2017-03-07 16:00:00	41	5	0	46	3	6	0	9	18	57	0	75	130	
2017-03-07 16:15:00	40	1	0	41	5	4	0	9	7	49	0	56	106	
2017-03-07 16:30:00	36	9	0	45	5	7	0	12	8	38	0	46	103	
2017-03-07 16:45:00	73	9	0	82	2	6	0	8	7	30	0	37	127	
2017-03-07 17:00:00	68	8	0	76	8	10	0	18	10	42	0	52	146	
2017-03-07 17:15:00	85	9	0	94	7	14	0	21	8	56	0	64	179	
2017-03-07 17:30:00	62	7	0	69	5	4	0	9	4	39	0	43	121	
2017-03-07 17:45:00	55	11	0	66	0	7	0	7	5	51	0	56	129	
2017-03-07 18:00:00	29	8	0	37	3	8	0	11	2	27	0	29	77	
2017-03-07 18:15:00	30	3	0	33	4	6	0	10	1	24	0	25	68	
<b>Grand Total</b>	1279	119	0	1398	116	244	0	360	197	1301	0	1498	3256	
<b>% Approach</b>	91.5%	8.5%	0.0%		32.2%	67.8%	0.0%		13.2%	86.8%	0.0%			
<b>% Total</b>	39.3%	3.7%	0.0%	42.9%	3.6%	7.5%	0.0%	11.1%	6.1%	40.0%	0.0%	46.0%		
<b>Lights</b>	1253	119	0	1372	115	240	0	355	191	1271	0	1462	3189	
<b>% Lights</b>	98.0%	100.0%	0.0%	98.1%	99.1%	98.4%	0.0%	98.6%	97.0%	97.7%	0.0%	97.6%	97.9%	
<b>Articulated Trucks</b>	1	0	0	1	0	0	0	0	0	1	0	1	2	
<b>% Articulated Trucks</b>	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	
<b>Buses and Single-Unit Trucks</b>	25	0	0	25	1	4	0	5	6	29	0	35	65	
<b>% Buses and Single-Unit Trucks</b>	2.0%	0.0%	0.0%	1.8%	0.9%	1.6%	0.0%	1.4%	3.0%	2.2%	0.0%	2.3%	2.0%	



Leg Direction Start Time	Streeter Dr Southbound				Northshore Dr Westbound				n/a Northbound				Northshore Dr Eastbound				App Total	Int Total			
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right			Thru	Left	U-Turn
2017-03-07 06:45:00	1	0	7	0	8	0	12	5	0	17	0	0	0	0	0	30	9	0	0	39	64
2017-03-07 07:00:00	5	0	3	0	8	0	16	3	0	19	0	0	0	0	0	27	8	0	0	35	62
2017-03-07 07:15:00	5	0	7	0	12	0	28	7	0	35	0	0	0	0	0	58	14	0	0	72	119
2017-03-07 07:30:00	5	0	6	0	11	0	69	11	0	80	0	0	0	0	0	76	30	0	0	106	197
2017-03-07 07:45:00	5	0	7	0	12	0	107	8	0	115	0	0	0	0	0	85	47	0	0	132	259
2017-03-07 08:00:00	6	0	8	0	14	0	153	6	0	159	0	0	0	0	0	84	27	0	0	111	284
2017-03-07 08:15:00	2	0	4	0	6	0	43	1	0	44	0	0	0	0	0	66	25	0	0	91	141
2017-03-07 08:30:00	2	0	6	0	8	0	13	3	0	16	0	0	0	0	0	19	6	0	0	25	49
2017-03-07 14:30:00	2	0	2	0	4	0	34	3	0	37	0	0	0	0	0	8	17	0	0	25	66
2017-03-07 14:45:00	4	0	1	0	5	0	54	2	0	56	0	0	0	0	0	16	10	0	0	26	87
2017-03-07 15:00:00	6	0	1	0	7	0	64	2	0	66	0	0	0	0	0	26	14	0	0	40	113
2017-03-07 15:15:00	5	0	2	0	7	0	50	10	0	60	0	0	0	0	0	123	31	0	0	154	221
2017-03-07 15:30:00	3	0	1	0	4	0	49	2	0	51	0	0	0	0	0	45	26	0	0	71	126
2017-03-07 15:45:00	4	0	7	0	11	0	64	7	0	71	0	0	0	0	0	23	15	0	0	38	120
2017-03-07 16:00:00	5	0	2	0	7	0	41	2	0	43	0	0	0	0	0	39	22	0	0	61	111
2017-03-07 16:15:00	1	0	1	0	2	0	40	2	0	42	0	0	0	0	0	37	16	0	0	53	97
2017-03-07 16:30:00	3	0	1	0	4	0	42	2	0	44	0	0	0	0	0	30	13	0	0	43	91
2017-03-07 16:45:00	4	0	3	0	7	0	79	7	0	86	0	0	0	0	0	18	14	0	0	32	125
2017-03-07 17:00:00	2	0	1	0	3	0	75	2	0	77	0	0	0	0	0	29	19	0	0	48	128
2017-03-07 17:15:00	1	0	2	0	3	0	90	6	0	96	0	0	0	0	0	50	14	0	0	64	163
2017-03-07 17:30:00	2	0	2	0	4	0	68	8	0	76	0	0	0	0	0	28	16	0	0	44	124
2017-03-07 17:45:00	6	0	2	0	8	0	61	4	0	65	0	0	0	0	0	33	17	0	0	50	123
2017-03-07 18:00:00	4	0	4	0	8	0	32	6	0	38	0	0	0	0	0	17	13	0	0	30	76
2017-03-07 18:15:00	0	0	1	0	1	0	33	5	0	38	0	0	0	0	0	16	12	0	0	28	67
<b>Grand Total</b>	<b>83</b>	<b>0</b>	<b>81</b>	<b>0</b>	<b>164</b>	<b>0</b>	<b>1317</b>	<b>114</b>	<b>0</b>	<b>1431</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>983</b>	<b>435</b>	<b>0</b>	<b>0</b>	<b>1418</b>	<b>3013</b>
<b>% Approach</b>	50.6%	0.0%	49.4%	0.0%		0.0%	92.0%	8.0%	0.0%		0.0%	0.0%	0.0%	0.0%		69.3%	30.7%	0.0%	0.0%		
<b>% Total</b>	2.8%	0.0%	2.7%	0.0%	<b>5.4%</b>	0.0%	43.7%	3.8%	0.0%	<b>47.5%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	32.6%	14.4%	0.0%	0.0%	<b>47.1%</b>	
<b>Lights</b>	81	0	71	0	<b>152</b>	0	1291	98	0	<b>1389</b>	0	0	0	0	<b>0</b>	970	415	0	0	<b>1385</b>	<b>2926</b>
<b>% Lights</b>	97.6%	0.0%	87.7%	0.0%	<b>92.7%</b>	0.0%	98.0%	86.0%	0.0%	<b>97.1%</b>	0.0%	0.0%	0.0%	0.0%		98.7%	95.4%	0.0%	0.0%	<b>97.7%</b>	<b>97.1%</b>
<b>Articulated Trucks</b>	0	0	1	0	<b>1</b>	0	0	11	0	<b>11</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	<b>12</b>
<b>% Articulated Trucks</b>	0.0%	0.0%	1.2%	0.0%	<b>0.6%</b>	0.0%	0.0%	9.6%	0.0%	<b>0.8%</b>	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	<b>0.4%</b>
<b>Buses and Single-Unit Trucks</b>	2	0	9	0	<b>11</b>	0	26	5	0	<b>31</b>	0	0	0	0	<b>0</b>	13	20	0	0	<b>33</b>	<b>75</b>
<b>% Buses and Single-Unit Trucks</b>	2.4%	0.0%	11.1%	0.0%	<b>6.7%</b>	0.0%	2.0%	4.4%	0.0%	<b>2.2%</b>	0.0%	0.0%	0.0%	0.0%		1.3%	4.6%	0.0%	0.0%	<b>2.3%</b>	<b>2.5%</b>

Leg Direction Start Time	n/a				Northshore Dr					I-29 NB				Northshore Dr					Int Total		
	Southbound		Westbound		Northbound		Eastbound		Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	App Total				
2017-03-07 06:45:00	0	0	0	0	0	2	8	0	0	10	8	0	9	0	17	0	14	2	0	16	43
2017-03-07 07:00:00	0	0	0	0	0	4	10	0	0	14	3	0	9	0	12	0	7	6	0	13	39
2017-03-07 07:15:00	0	0	0	0	0	5	12	0	0	17	4	0	25	0	29	0	16	4	0	20	66
2017-03-07 07:30:00	0	0	0	0	0	2	32	0	0	34	3	0	55	0	58	0	24	12	0	36	128
2017-03-07 07:45:00	0	0	0	0	0	0	25	0	0	25	4	0	94	0	98	0	48	6	0	54	177
2017-03-07 08:00:00	0	0	0	0	0	3	23	0	0	26	1	0	128	0	129	0	31	2	0	33	188
2017-03-07 08:15:00	0	0	0	0	0	5	14	0	0	19	2	0	28	0	30	0	23	6	0	29	78
2017-03-07 08:30:00	0	0	0	0	0	3	8	0	0	11	1	0	10	0	11	0	11	2	0	13	35
2017-03-07 14:30:00	0	0	0	0	0	2	16	0	0	18	3	0	18	0	21	0	16	4	0	20	59
2017-03-07 14:45:00	0	0	0	0	0	2	19	0	0	21	3	0	38	0	41	0	12	1	0	13	75
2017-03-07 15:00:00	0	0	0	0	0	3	21	0	0	24	6	0	50	0	56	0	10	4	0	14	94
2017-03-07 15:15:00	0	0	0	0	0	3	26	0	0	29	2	0	28	0	30	0	36	2	0	38	97
2017-03-07 15:30:00	0	0	0	0	0	4	20	0	0	24	3	0	37	0	40	0	18	4	0	22	86
2017-03-07 15:45:00	0	0	0	0	0	7	24	0	0	31	7	0	42	0	49	0	18	4	0	22	102
2017-03-07 16:00:00	0	0	0	0	0	11	17	0	0	28	7	0	24	0	31	0	12	11	0	23	82
2017-03-07 16:15:00	0	0	0	0	0	6	10	0	0	16	6	0	35	0	41	0	14	3	0	17	74
2017-03-07 16:30:00	0	0	0	0	0	5	15	0	0	20	7	0	30	0	37	0	8	5	0	13	70
2017-03-07 16:45:00	0	0	0	0	0	5	22	0	0	27	8	0	63	0	71	0	12	5	0	17	115
2017-03-07 17:00:00	0	0	0	0	0	8	25	0	0	33	12	0	50	0	62	0	11	11	0	22	117
2017-03-07 17:15:00	0	0	0	0	0	2	25	0	0	27	11	0	73	0	84	0	9	7	0	16	127
2017-03-07 17:30:00	0	0	0	0	0	5	18	0	0	23	13	0	58	0	71	0	8	10	0	18	112
2017-03-07 17:45:00	0	0	0	0	0	3	25	0	0	28	8	0	42	0	50	0	13	5	0	18	96
2017-03-07 18:00:00	0	0	0	0	0	11	18	0	0	29	7	0	17	0	24	0	16	2	0	18	71
2017-03-07 18:15:00	0	0	0	0	0	1	8	0	0	9	7	0	32	0	39	0	13	0	0	13	61
<b>Grand Total</b>	0	0	0	0	0	102	441	0	0	543	136	0	995	0	1131	0	400	118	0	518	2192
<b>% Approach</b>	0.0%	0.0%	0.0%	0.0%	0.0%	18.8%	81.2%	0.0%	0.0%	24.8%	6.2%	0.0%	45.4%	0.0%	51.6%	0.0%	77.2%	22.8%	0.0%	23.6%	
<b>% Total</b>	0.0%	0.0%	0.0%	0.0%	0.0%	4.7%	20.1%	0.0%	0.0%	24.8%	6.2%	0.0%	45.4%	0.0%	51.6%	0.0%	18.2%	5.4%	0.0%	23.6%	
<b>Lights</b>	0	0	0	0	0	97	407	0	0	504	125	0	985	0	1110	0	372	116	0	488	2102
<b>% Lights</b>	0.0%	0.0%	0.0%	0.0%	0.0%	95.1%	92.3%	0.0%	0.0%	92.8%	91.9%	0.0%	99.0%	0.0%	98.1%	0.0%	93.0%	98.3%	0.0%	94.2%	95.9%
<b>Articulated Trucks</b>	0	0	0	0	0	3	12	0	0	15	9	0	1	0	10	0	3	0	0	3	28
<b>% Articulated Trucks</b>	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	2.7%	0.0%	0.0%	2.8%	6.6%	0.0%	0.1%	0.0%	0.9%	0.0%	0.8%	0.0%	0.0%	0.6%	1.3%
<b>Buses and Single-Unit Trucks</b>	0	0	0	0	0	2	22	0	0	24	2	0	9	0	11	0	25	2	0	27	62
<b>% Buses and Single-Unit Trucks</b>	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	5.0%	0.0%	0.0%	4.4%	1.5%	0.0%	0.9%	0.0%	1.0%	0.0%	6.3%	1.7%	0.0%	5.2%	2.8%

Leg Direction Start Time	Driveway Southbound				App Total	Northshore Dr Westbound				App Total	Military Rd Northbound				App Total	Northshore Dr Eastbound				Int Total	
	Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		App Total
2017-03-07 06:45:00	0	0	0	0	0	0	7	0	0	7	0	0	5	0	5	10	11	0	0	21	33
2017-03-07 07:00:00	0	0	0	0	0	0	6	0	0	6	0	0	8	0	8	5	5	0	0	10	24
2017-03-07 07:15:00	0	0	0	0	0	0	7	0	0	7	0	0	9	0	9	14	6	0	0	20	36
2017-03-07 07:30:00	0	0	0	0	0	0	14	0	0	14	0	0	15	0	15	17	9	0	0	26	55
2017-03-07 07:45:00	0	0	0	0	0	0	14	0	0	14	0	0	14	0	14	42	8	0	0	50	78
2017-03-07 08:00:00	0	0	0	0	0	0	11	0	0	11	1	0	17	0	18	26	9	0	0	35	64
2017-03-07 08:15:00	0	0	0	0	0	0	5	1	0	6	0	0	12	0	12	20	6	0	0	26	44
2017-03-07 08:30:00	0	0	0	0	0	0	4	1	0	5	0	0	6	0	6	7	3	0	0	10	21
2017-03-07 14:30:00	0	0	0	0	0	0	4	1	0	5	1	0	15	0	16	11	7	0	0	18	39
2017-03-07 14:45:00	0	0	0	0	0	0	6	0	0	6	0	0	15	0	15	8	5	0	0	13	34
2017-03-07 15:00:00	0	0	0	0	0	0	6	0	0	6	1	0	15	0	16	6	11	0	0	17	39
2017-03-07 15:15:00	0	0	0	0	0	0	17	1	0	18	1	0	15	0	16	22	9	0	1	32	66
2017-03-07 15:30:00	0	0	0	0	0	0	5	1	0	6	1	0	18	0	19	18	7	2	0	27	52
2017-03-07 15:45:00	0	0	0	0	0	0	8	4	0	12	0	0	22	0	22	16	8	0	1	25	59
2017-03-07 16:00:00	0	0	0	0	0	0	10	1	0	11	0	0	18	0	18	14	5	0	0	19	48
2017-03-07 16:15:00	0	0	0	0	0	0	4	1	0	5	1	0	10	0	11	13	5	0	0	18	34
2017-03-07 16:30:00	0	0	0	0	0	0	4	0	0	4	2	0	18	0	20	9	8	0	0	17	41
2017-03-07 16:45:00	1	0	0	0	1	0	7	1	0	8	0	0	17	0	17	9	11	0	0	20	46
2017-03-07 17:00:00	1	0	0	0	1	0	4	0	0	4	1	0	30	0	31	6	16	0	0	22	58
2017-03-07 17:15:00	0	0	0	0	0	0	10	0	0	10	0	0	16	0	16	6	15	0	0	21	47
2017-03-07 17:30:00	0	0	0	0	0	0	11	0	0	11	0	0	11	0	11	5	16	0	0	21	43
2017-03-07 17:45:00	0	0	0	0	0	0	6	0	0	6	0	0	21	0	21	11	10	0	0	21	48
2017-03-07 18:00:00	0	0	0	0	0	0	9	0	0	9	0	0	21	0	21	13	10	0	0	23	53
2017-03-07 18:15:00	0	0	0	0	0	0	4	0	0	4	0	0	7	0	7	6	13	0	0	19	30
<b>Grand Total</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>183</b>	<b>12</b>	<b>0</b>	<b>195</b>	<b>9</b>	<b>0</b>	<b>355</b>	<b>0</b>	<b>364</b>	<b>314</b>	<b>213</b>	<b>2</b>	<b>2</b>	<b>531</b>	<b>1092</b>
<b>% Approach</b>	100.0%	0.0%	0.0%	0.0%	0.2%	0.0%	93.8%	6.2%	0.0%	17.9%	2.5%	0.0%	97.5%	0.0%	33.3%	59.1%	40.1%	0.4%	0.4%	48.6%	
<b>% Total</b>	0.2%	0.0%	0.0%	0.0%	0.2%	0.0%	16.8%	1.1%	0.0%	17.9%	0.8%	0.0%	32.5%	0.0%	33.3%	28.8%	19.5%	0.2%	0.2%	48.6%	
<b>Lights</b>	2	0	0	0	2	0	167	10	0	177	8	0	335	0	343	290	199	2	2	493	1015
<b>% Lights</b>	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	91.3%	83.3%	0.0%	90.8%	88.9%	0.0%	94.4%	0.0%	94.2%	92.4%	93.4%	100.0%	100.0%	92.8%	92.9%
<b>Articulated Trucks</b>	0	0	0	0	0	0	10	0	0	10	0	0	3	0	3	2	10	0	0	12	25
<b>% Articulated Trucks</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.5%	0.0%	0.0%	5.1%	0.0%	0.0%	0.8%	0.0%	0.8%	0.6%	4.7%	0.0%	0.0%	2.3%	2.3%
<b>Buses and Single-Unit Trucks</b>	0	0	0	0	0	0	6	2	0	8	1	0	17	0	18	22	4	0	0	26	52
<b>% Buses and Single-Unit Trucks</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.3%	16.7%	0.0%	4.1%	11.1%	0.0%	4.8%	0.0%	4.9%	7.0%	1.9%	0.0%	0.0%	4.9%	4.8%

Leg Direction Start Time	Sodrac Dr Southbound				River Dr Westbound				Sodrac Dr Northbound				River Dr Eastbound				App Total	Int Total			
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn					
2017-03-07 06:45:00	0	1	0	0	1	1	0	1	0	2	2	0	0	0	2	0	4	0	0	4	9
2017-03-07 07:00:00	0	0	5	0	5	2	1	2	0	5	2	0	0	0	2	0	6	0	0	6	18
2017-03-07 07:15:00	0	0	0	0	0	0	0	7	0	7	7	0	0	0	7	0	7	0	0	7	21
2017-03-07 07:30:00	0	1	1	0	2	1	4	2	0	7	11	0	0	0	11	0	11	0	0	11	31
2017-03-07 07:45:00	0	0	2	0	2	2	4	7	0	13	12	0	0	0	12	1	11	0	0	12	39
2017-03-07 08:00:00	0	0	0	0	0	2	1	11	0	14	8	0	0	0	8	0	4	0	0	4	26
2017-03-07 08:15:00	0	0	0	0	0	3	3	4	0	10	11	0	0	0	11	0	4	0	0	4	25
2017-03-07 08:30:00	0	0	2	0	2	3	2	7	0	12	3	0	0	0	3	0	2	1	0	3	20
2017-03-07 16:00:00	0	0	2	0	2	0	11	6	0	17	3	0	0	0	3	1	4	0	0	5	27
2017-03-07 16:15:00	0	0	2	0	2	4	6	7	0	17	1	0	0	0	1	0	7	0	0	7	27
2017-03-07 16:30:00	1	0	4	0	5	6	9	4	0	19	2	0	1	0	3	0	5	0	0	5	32
2017-03-07 16:45:00	0	0	6	0	6	2	5	6	0	13	3	0	0	0	3	0	0	0	0	0	22
2017-03-07 17:00:00	0	0	3	0	3	3	10	5	0	18	8	1	0	0	9	0	6	0	0	6	36
2017-03-07 17:15:00	0	0	3	0	3	2	12	5	0	19	8	0	0	0	8	0	4	0	0	4	34
2017-03-07 17:30:00	0	0	2	0	2	2	8	7	0	17	3	0	0	0	3	0	5	0	0	5	27
2017-03-07 17:45:00	0	0	4	0	4	4	10	7	0	21	2	0	0	0	2	1	9	0	0	10	37
<b>Grand Total</b>	1	2	36	0	39	37	86	88	0	211	86	1	1	0	88	3	89	1	0	93	431
<b>% Approach</b>	2.6%	5.1%	92.3%	0.0%		17.5%	40.8%	41.7%	0.0%		97.7%	1.1%	1.1%	0.0%		3.2%	95.7%	1.1%	0.0%		
<b>% Total</b>	0.2%	0.5%	8.4%	0.0%	9.0%	8.6%	20.0%	20.4%	0.0%	49.0%	20.0%	0.2%	0.2%	0.0%	20.4%	0.7%	20.6%	0.2%	0.0%	21.6%	
<b>Lights</b>	1	2	35	0	38	37	85	88	0	210	81	1	1	0	83	2	89	1	0	92	423
<b>% Lights</b>	100.0%	100.0%	97.2%	0.0%	97.4%	100.0%	98.8%	100.0%	0.0%	99.5%	94.2%	100.0%	100.0%	0.0%	94.3%	66.7%	100.0%	100.0%	0.0%	98.9%	98.1%
<b>Buses and Single-Unit Trucks</b>	0	0	1	0	1	0	1	0	0	1	5	0	0	0	5	1	0	0	0	1	8
<b>% Buses and Single-Unit Trucks</b>	0.0%	0.0%	2.8%	0.0%	2.6%	0.0%	1.2%	0.0%	0.0%	0.5%	5.8%	0.0%	0.0%	0.0%	5.7%	33.3%	0.0%	0.0%	0.0%	1.1%	1.9%

Leg Direction Start Time	Streeter Dr Southbound				River Dr Westbound				Sioux Point Rd Northbound				River Dr Eastbound				Int Total				
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right		Thru	Left	U-Turn	App Total
2017-03-07 06:45:00	0	3	27	0	<b>30</b>	7	4	15	0	<b>26</b>	7	1	2	0	<b>10</b>	2	16	0	0	<b>18</b>	<b>84</b>
2017-03-07 07:00:00	1	4	23	0	<b>28</b>	6	7	10	0	<b>23</b>	9	0	2	0	<b>11</b>	1	19	1	0	<b>21</b>	<b>83</b>
2017-03-07 07:15:00	0	5	40	0	<b>45</b>	9	8	30	0	<b>47</b>	24	4	1	0	<b>29</b>	1	22	1	0	<b>24</b>	<b>145</b>
2017-03-07 07:30:00	2	11	33	0	<b>46</b>	13	11	34	0	<b>58</b>	24	6	2	0	<b>32</b>	4	22	1	0	<b>27</b>	<b>163</b>
2017-03-07 07:45:00	3	9	38	0	<b>50</b>	12	18	59	0	<b>89</b>	25	7	3	0	<b>35</b>	3	34	0	0	<b>37</b>	<b>211</b>
2017-03-07 08:00:00	5	7	25	0	<b>37</b>	13	9	33	0	<b>55</b>	24	3	5	0	<b>32</b>	2	21	2	0	<b>25</b>	<b>149</b>
2017-03-07 08:15:00	4	8	21	0	<b>33</b>	12	10	32	0	<b>54</b>	15	2	3	0	<b>20</b>	2	18	0	0	<b>20</b>	<b>127</b>
2017-03-07 08:30:00	1	1	16	0	<b>18</b>	18	10	25	0	<b>53</b>	19	2	2	0	<b>23</b>	4	15	0	0	<b>19</b>	<b>113</b>
2017-03-07 16:00:00	2	7	12	0	<b>21</b>	37	16	23	0	<b>76</b>	23	11	3	0	<b>37</b>	1	14	0	0	<b>15</b>	<b>149</b>
2017-03-07 16:15:00	2	3	19	0	<b>24</b>	33	25	16	0	<b>74</b>	21	8	1	0	<b>30</b>	1	19	0	0	<b>20</b>	<b>148</b>
2017-03-07 16:30:00	3	3	21	0	<b>27</b>	38	18	33	0	<b>89</b>	36	5	3	0	<b>44</b>	1	19	1	0	<b>21</b>	<b>181</b>
2017-03-07 16:45:00	0	3	22	0	<b>25</b>	27	16	15	0	<b>58</b>	24	11	0	0	<b>35</b>	2	10	1	0	<b>13</b>	<b>131</b>
2017-03-07 17:00:00	2	5	32	0	<b>39</b>	49	22	28	0	<b>99</b>	53	14	1	0	<b>68</b>	3	21	2	0	<b>26</b>	<b>232</b>
2017-03-07 17:15:00	1	6	9	0	<b>16</b>	60	23	39	0	<b>122</b>	29	7	1	0	<b>37</b>	5	17	2	0	<b>24</b>	<b>199</b>
2017-03-07 17:30:00	1	6	27	0	<b>34</b>	36	24	27	0	<b>87</b>	20	7	2	0	<b>29</b>	2	24	1	0	<b>27</b>	<b>177</b>
2017-03-07 17:45:00	0	2	17	0	<b>19</b>	32	26	15	0	<b>73</b>	19	7	1	0	<b>27</b>	2	21	1	0	<b>24</b>	<b>143</b>
<b>Grand Total</b>	<b>27</b>	<b>83</b>	<b>382</b>	<b>0</b>	<b>492</b>	<b>402</b>	<b>247</b>	<b>434</b>	<b>0</b>	<b>1083</b>	<b>372</b>	<b>95</b>	<b>32</b>	<b>0</b>	<b>499</b>	<b>36</b>	<b>312</b>	<b>13</b>	<b>0</b>	<b>361</b>	<b>2435</b>
<b>% Approach</b>	5.5%	16.9%	77.6%	0.0%		37.1%	22.8%	40.1%	0.0%		74.5%	19.0%	6.4%	0.0%		10.0%	86.4%	3.6%	0.0%		
<b>% Total</b>	1.1%	3.4%	15.7%	0.0%	<b>20.2%</b>	16.5%	10.1%	17.8%	0.0%	<b>44.5%</b>	15.3%	3.9%	1.3%	0.0%	<b>20.5%</b>	1.5%	12.8%	0.5%	0.0%	<b>14.8%</b>	
<b>Lights</b>	26	83	379	0	<b>488</b>	399	247	427	0	<b>1073</b>	371	95	32	0	<b>498</b>	36	305	13	0	<b>354</b>	<b>2413</b>
<b>% Lights</b>	96.3%	100.0%	99.2%	0.0%	<b>99.2%</b>	99.3%	100.0%	98.4%	0.0%	<b>99.1%</b>	99.7%	100.0%	100.0%	0.0%	<b>99.8%</b>	100.0%	97.8%	100.0%	0.0%	<b>98.1%</b>	<b>99.1%</b>
<b>Articulated Trucks</b>	0	0	1	0	<b>1</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	<b>1</b>
<b>% Articulated Trucks</b>	0.0%	0.0%	0.3%	0.0%	<b>0.2%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	<b>0.0%</b>
<b>Buses and Single-Unit Trucks</b>	1	0	2	0	<b>3</b>	3	0	7	0	<b>10</b>	1	0	0	0	<b>1</b>	0	7	0	0	<b>7</b>	<b>21</b>
<b>% Buses and Single-Unit Trucks</b>	3.7%	0.0%	0.5%	0.0%	<b>0.6%</b>	0.7%	0.0%	1.6%	0.0%	<b>0.9%</b>	0.3%	0.0%	0.0%	0.0%	<b>0.2%</b>	0.0%	2.2%	0.0%	0.0%	<b>1.9%</b>	<b>0.9%</b>

Leg Direction Start Time	I-29 SB Southbound				River Dr Westbound				n/a Northbound				River Dr Eastbound				App Total	Int Total			
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right			Thru	Left	U-Turn
2017-03-07 06:45:00	7	0	10	0	17	0	20	27	0	47	0	0	0	0	0	28	22	0	0	50	114
2017-03-07 07:00:00	7	1	8	0	16	0	15	40	0	55	0	0	0	0	0	27	23	0	0	50	121
2017-03-07 07:15:00	9	0	19	0	28	0	41	47	0	88	0	0	0	0	0	40	49	0	0	89	205
2017-03-07 07:30:00	15	0	18	0	33	0	41	44	0	85	0	0	0	0	0	38	36	0	0	74	192
2017-03-07 07:45:00	24	0	19	0	43	0	64	44	0	108	0	0	0	0	0	43	55	0	0	98	249
2017-03-07 08:00:00	15	0	22	0	37	0	41	38	0	79	0	0	0	0	0	20	51	0	0	71	187
2017-03-07 08:15:00	10	1	16	0	27	0	43	40	0	83	0	0	0	0	0	22	31	0	0	53	163
2017-03-07 08:30:00	6	0	16	0	22	0	48	44	0	92	0	0	0	0	0	25	26	0	0	51	165
2017-03-07 16:00:00	5	0	6	0	11	0	71	65	0	136	0	0	0	0	0	14	34	0	0	48	195
2017-03-07 16:15:00	7	0	7	0	14	0	67	40	0	107	0	0	0	0	0	15	44	0	0	59	180
2017-03-07 16:30:00	8	0	7	0	15	0	81	77	0	158	0	0	0	0	0	19	57	0	0	76	249
2017-03-07 16:45:00	2	0	16	0	18	0	56	46	0	102	0	0	0	0	0	23	33	0	0	56	176
2017-03-07 17:00:00	12	1	9	0	22	0	89	107	0	196	0	0	0	0	0	35	71	0	0	106	324
2017-03-07 17:15:00	9	0	11	0	20	0	116	48	0	164	0	0	0	0	0	17	39	0	0	56	240
2017-03-07 17:30:00	11	0	10	0	21	0	72	37	0	109	0	0	0	0	0	22	48	0	0	70	200
2017-03-07 17:45:00	7	0	6	0	13	0	66	34	0	100	0	0	0	0	0	14	43	0	0	57	170
<b>Grand Total</b>	154	3	200	0	357	0	931	778	0	1709	0	0	0	0	0	402	662	0	0	1064	3130
<b>% Approach</b>	43.1%	0.8%	56.0%	0.0%		0.0%	54.5%	45.5%	0.0%		0.0%	0.0%	0.0%	0.0%		37.8%	62.2%	0.0%	0.0%		
<b>% Total</b>	4.9%	0.1%	6.4%	0.0%	11.4%	0.0%	29.7%	24.9%	0.0%	54.6%	0.0%	0.0%	0.0%	0.0%	0.0%	12.8%	21.2%	0.0%	0.0%	34.0%	
<b>Lights</b>	153	3	194	0	350	0	921	729	0	1650	0	0	0	0	0	397	656	0	0	1053	3053
<b>% Lights</b>	99.4%	100.0%	97.0%	0.0%	98.0%	0.0%	98.9%	93.7%	0.0%	96.5%	0.0%	0.0%	0.0%	0.0%		98.8%	99.1%	0.0%	0.0%	99.0%	97.5%
<b>Articulated Trucks</b>	0	0	4	0	4	0	0	31	0	31	0	0	0	0	0	0	1	0	0	1	36
<b>% Articulated Trucks</b>	0.0%	0.0%	2.0%	0.0%	1.1%	0.0%	0.0%	4.0%	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%		0.0%	0.2%	0.0%	0.0%	0.1%	1.2%
<b>Buses and Single-Unit Trucks</b>	1	0	2	0	3	0	10	18	0	28	0	0	0	0	0	5	5	0	0	10	41
<b>% Buses and Single-Unit Trucks</b>	0.6%	0.0%	1.0%	0.0%	0.8%	0.0%	1.1%	2.3%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%		1.2%	0.8%	0.0%	0.0%	0.9%	1.3%

Leg Direction Start Time	n/a				River Dr Westbound					I-29 NB Northbound					River Dr Eastbound					Int Total	
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn		App Total
2017-03-07 06:45:00	0	0	0	0	0	8	44	0	0	52	61	0	3	0	64	0	31	1	0	32	148
2017-03-07 07:00:00	0	0	0	0	0	8	54	0	0	62	43	0	3	0	46	0	25	4	0	29	137
2017-03-07 07:15:00	0	0	0	0	0	11	79	0	0	90	60	1	6	0	67	0	65	5	0	70	227
2017-03-07 07:30:00	0	0	0	0	0	10	72	0	0	82	80	0	9	0	89	0	50	7	0	57	228
2017-03-07 07:45:00	0	0	0	0	0	18	92	0	0	110	108	0	14	0	122	0	55	15	0	70	302
2017-03-07 08:00:00	0	0	0	0	0	16	65	0	0	81	77	0	16	0	93	0	62	11	0	73	247
2017-03-07 08:15:00	0	0	0	0	0	11	77	0	0	88	47	0	6	0	53	0	46	3	0	49	190
2017-03-07 08:30:00	0	0	0	0	0	10	84	0	0	94	37	0	8	0	45	0	41	2	0	43	182
2017-03-07 16:00:00	0	0	0	0	0	15	108	0	0	123	49	0	25	0	74	0	32	6	0	38	235
2017-03-07 16:15:00	0	0	0	0	0	11	80	0	0	91	45	0	28	0	73	0	46	7	0	53	217
2017-03-07 16:30:00	0	0	0	0	0	14	120	0	0	134	50	0	37	0	87	0	55	7	0	62	283
2017-03-07 16:45:00	0	0	0	0	0	21	74	0	0	95	46	0	28	0	74	0	42	8	0	50	219
2017-03-07 17:00:00	0	0	0	0	0	35	154	0	0	189	55	0	40	0	95	0	67	12	0	79	363
2017-03-07 17:15:00	0	0	0	0	0	19	106	0	0	125	49	0	54	0	103	0	40	11	0	51	279
2017-03-07 17:30:00	0	0	0	0	0	17	70	0	0	87	45	0	38	0	83	0	43	17	0	60	230
2017-03-07 17:45:00	0	0	0	0	0	19	71	0	0	90	31	0	31	0	62	0	40	8	0	48	200
<b>Grand Total</b>	0	0	0	0	0	243	1350	0	0	1593	883	1	346	0	1230	0	740	124	0	864	3687
<b>% Approach</b>	0.0%	0.0%	0.0%	0.0%		15.3%	84.7%	0.0%	0.0%		71.8%	0.1%	28.1%	0.0%		0.0%	85.6%	14.4%	0.0%		
<b>% Total</b>	0.0%	0.0%	0.0%	0.0%	0.0%	6.6%	36.6%	0.0%	0.0%	43.2%	23.9%	0.0%	9.4%	0.0%	33.4%	0.0%	20.1%	3.4%	0.0%	23.4%	
<b>Lights</b>	0	0	0	0	0	229	1293	0	0	1522	831	1	343	0	1175	0	730	121	0	851	3548
<b>% Lights</b>	0.0%	0.0%	0.0%	0.0%		94.2%	95.8%	0.0%	0.0%	95.5%	94.1%	100.0%	99.1%	0.0%	95.5%	0.0%	98.6%	97.6%	0.0%	98.5%	96.2%
<b>Articulated Trucks</b>	0	0	0	0	0	9	31	0	0	40	33	0	0	0	33	0	4	1	0	5	78
<b>% Articulated Trucks</b>	0.0%	0.0%	0.0%	0.0%		3.7%	2.3%	0.0%	0.0%	2.5%	3.7%	0.0%	0.0%	0.0%	2.7%	0.0%	0.5%	0.8%	0.0%	0.6%	2.1%
<b>Buses and Single-Unit Trucks</b>	0	0	0	0	0	5	26	0	0	31	19	0	3	0	22	0	6	2	0	8	61
<b>% Buses and Single-Unit Trucks</b>	0.0%	0.0%	0.0%	0.0%		2.1%	1.9%	0.0%	0.0%	1.9%	2.2%	0.0%	0.9%	0.0%	1.8%	0.0%	0.8%	1.6%	0.0%	0.9%	1.7%

Leg Direction Start Time	Derby Ln Southbound				App Total	River Dr Westbound				App Total	Derby Ln Northbound				App Total	River Dr Eastbound				Int Total	
	Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		App Total
2017-03-07 06:45:00	14	0	6	0	20	2	33	3	0	38	5	1	0	0	6	1	72	11	0	84	148
2017-03-07 07:00:00	11	1	2	0	14	4	47	6	0	57	2	1	2	0	5	1	53	8	0	62	138
2017-03-07 07:15:00	16	1	5	0	22	3	64	4	0	71	1	0	3	0	4	6	95	15	0	116	213
2017-03-07 07:30:00	23	2	6	0	31	5	55	7	0	67	1	2	5	0	8	3	94	19	0	116	222
2017-03-07 07:45:00	23	0	1	0	24	0	71	7	0	78	0	0	4	0	4	9	136	10	0	155	261
2017-03-07 08:00:00	13	0	4	0	17	6	57	7	0	70	5	0	8	0	13	7	106	14	0	127	227
2017-03-07 08:15:00	15	3	4	0	22	7	68	6	0	81	5	1	1	0	7	7	72	14	0	93	203
2017-03-07 08:30:00	16	1	4	0	21	2	68	6	0	76	3	0	5	0	8	5	59	11	0	75	180
2017-03-07 16:00:00	4	0	2	0	6	1	104	5	0	110	8	1	7	0	16	2	64	7	0	73	205
2017-03-07 16:15:00	7	1	3	0	11	4	66	5	0	75	4	0	8	0	12	7	71	3	0	81	179
2017-03-07 16:30:00	11	2	3	0	16	6	113	4	0	123	6	1	6	0	13	7	84	10	0	101	253
2017-03-07 16:45:00	11	2	4	0	17	9	74	1	0	84	5	3	6	0	14	7	68	6	0	81	196
2017-03-07 17:00:00	13	1	1	0	15	6	156	2	0	164	26	0	9	0	35	7	100	7	0	114	328
2017-03-07 17:15:00	8	2	3	0	13	3	98	5	0	106	11	0	6	0	17	4	69	5	0	78	214
2017-03-07 17:30:00	6	0	4	0	10	6	69	1	0	76	5	0	4	0	9	5	68	8	0	81	176
2017-03-07 17:45:00	18	1	4	0	23	3	61	4	0	68	3	0	3	0	6	7	58	4	0	69	166
<b>Grand Total</b>	209	17	56	0	282	67	1204	73	0	1344	90	10	77	0	177	85	1269	152	0	1506	3309
<b>% Approach</b>	74.1%	6.0%	19.9%	0.0%		5.0%	89.6%	5.4%	0.0%		50.8%	5.6%	43.5%	0.0%		5.6%	84.3%	10.1%	0.0%		
<b>% Total</b>	6.3%	0.5%	1.7%	0.0%	8.5%	2.0%	36.4%	2.2%	0.0%	40.6%	2.7%	0.3%	2.3%	0.0%	5.3%	2.6%	38.3%	4.6%	0.0%	45.5%	
<b>Lights</b>	200	17	55	0	272	63	1154	73	0	1290	90	10	77	0	177	82	1220	141	0	1443	3182
<b>% Lights</b>	95.7%	100.0%	98.2%	0.0%	96.5%	94.0%	95.8%	100.0%	0.0%	96.0%	100.0%	100.0%	100.0%	0.0%	100.0%	96.5%	96.1%	92.8%	0.0%	95.8%	96.2%
<b>Articulated Trucks</b>	7	0	1	0	8	0	23	0	0	23	0	0	0	0	0	1	27	10	0	38	69
<b>% Articulated Trucks</b>	3.3%	0.0%	1.8%	0.0%	2.8%	0.0%	1.9%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	2.1%	6.6%	0.0%	2.5%	2.1%
<b>Buses and Single-Unit Trucks</b>	2	0	0	0	2	4	27	0	0	31	0	0	0	0	0	2	22	1	0	25	58
<b>% Buses and Single-Unit Trucks</b>	1.0%	0.0%	0.0%	0.0%	0.7%	6.0%	2.2%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	1.7%	0.7%	0.0%	1.7%	1.8%



Leg Direction Start Time	Sioux Point Rd Southbound				Sioux Point Rd Northbound				Steamboat Dr Eastbound				Int Total
	Right	Thru	U-Turn	App Total	Thru	Left	U-Turn	App Total	Right	Left	U-Turn	App Total	
2017-03-07 06:45:00	1	13	0	14	5	3	0	8	2	0	0	2	24
2017-03-07 07:00:00	4	8	0	12	6	7	0	13	1	0	0	1	26
2017-03-07 07:15:00	6	21	0	27	25	23	0	48	10	1	0	11	86
2017-03-07 07:30:00	11	27	0	38	27	27	0	54	14	3	0	17	109
2017-03-07 07:45:00	21	36	0	57	48	30	0	78	14	2	0	16	151
2017-03-07 08:00:00	12	20	0	32	23	17	0	40	10	5	0	15	87
2017-03-07 08:15:00	18	29	0	47	21	27	0	48	11	5	0	16	111
2017-03-07 08:30:00	0	27	0	27	20	24	0	44	9	2	0	11	82
2017-03-07 16:00:00	8	23	0	31	27	6	0	33	15	8	0	23	87
2017-03-07 16:15:00	2	19	0	21	26	7	0	33	20	1	0	21	75
2017-03-07 16:30:00	3	33	0	36	31	7	0	38	13	10	0	23	97
2017-03-07 16:45:00	3	22	0	25	22	16	0	38	21	4	0	25	88
2017-03-07 17:00:00	2	45	0	47	40	14	0	54	41	14	0	55	156
2017-03-07 17:15:00	3	33	0	36	31	19	0	50	24	7	0	31	117
2017-03-07 17:30:00	1	23	0	24	17	8	0	25	27	12	0	39	88
2017-03-07 17:45:00	1	18	0	19	15	15	0	30	12	5	0	17	66
<b>Grand Total</b>	96	397	0	493	384	250	0	634	244	79	0	323	1450
<b>% Approach</b>	19.5%	80.5%	0.0%		60.6%	39.4%	0.0%		75.5%	24.5%	0.0%		
<b>% Total</b>	6.6%	27.4%	0.0%	34.0%	26.5%	17.2%	0.0%	43.7%	16.8%	5.4%	0.0%	22.3%	
<b>Lights</b>	95	396	0	491	383	249	0	632	241	79	0	320	1443
<b>% Lights</b>	99.0%	99.7%	0.0%	99.6%	99.7%	99.6%	0.0%	99.7%	98.8%	100.0%	0.0%	99.1%	99.5%
<b>Buses and Single-Unit Trucks</b>	1	1	0	2	1	1	0	2	3	0	0	3	7
<b>% Buses and Single-Unit Trucks</b>	1.0%	0.3%	0.0%	0.4%	0.3%	0.4%	0.0%	0.3%	1.2%	0.0%	0.0%	0.9%	0.5%

Leg Direction	Sioux Point Rd Southbound					Tower Rd Westbound					Sioux Point Rd Northbound					Tower Rd Eastbound					Int Total
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	
2017-03-07 06:45:00	0	5	2	0	7	1	0	6	0	7	12	38	6	0	56	2	0	0	0	2	72
2017-03-07 07:00:00	0	8	1	0	9	6	1	6	0	13	11	31	4	0	46	6	0	1	0	7	75
2017-03-07 07:15:00	0	24	4	0	28	4	2	8	0	14	13	60	7	0	80	6	0	6	0	12	134
2017-03-07 07:30:00	0	26	6	0	32	5	0	16	0	21	19	84	8	0	111	15	1	1	0	17	181
2017-03-07 07:45:00	1	42	7	0	50	8	0	14	0	22	38	132	5	0	175	12	1	3	0	16	263
2017-03-07 08:00:00	0	18	1	0	19	3	0	12	0	15	22	86	13	0	121	6	0	2	0	8	163
2017-03-07 08:15:00	1	37	2	0	40	4	1	15	0	20	19	68	9	0	96	10	0	0	0	10	166
2017-03-07 08:30:00	2	36	5	0	43	5	0	21	0	26	14	72	3	0	89	7	0	0	0	7	165
2017-03-07 16:00:00	0	55	5	0	60	9	0	21	0	30	9	25	3	0	37	8	0	1	0	9	136
2017-03-07 16:15:00	0	60	4	0	64	5	2	25	0	32	10	30	9	0	49	8	0	2	0	10	155
2017-03-07 16:30:00	2	75	5	0	82	7	2	31	0	40	10	21	9	0	40	10	1	0	0	11	173
2017-03-07 16:45:00	2	64	5	0	71	5	0	26	0	31	11	37	6	0	54	15	0	2	0	17	173
2017-03-07 17:00:00	4	125	9	0	138	13	0	34	0	47	5	35	8	0	48	11	1	0	0	12	245
2017-03-07 17:15:00	1	67	2	0	70	7	1	33	0	41	8	38	13	0	59	9	0	2	0	11	181
2017-03-07 17:30:00	1	67	4	0	72	8	0	17	0	25	10	21	6	0	37	5	1	0	0	6	140
2017-03-07 17:45:00	0	36	1	0	37	5	3	22	0	30	8	27	7	0	42	10	1	1	0	12	121
<b>Grand Total</b>	14	745	63	0	822	95	12	307	0	414	219	805	116	0	1140	140	6	21	0	167	2543
<b>% Approach</b>	1.7%	90.6%	7.7%	0.0%		22.9%	2.9%	74.2%	0.0%		19.2%	70.6%	10.2%	0.0%		83.8%	3.6%	12.6%	0.0%		
<b>% Total</b>	0.6%	29.3%	2.5%	0.0%	32.3%	3.7%	0.5%	12.1%	0.0%	16.3%	8.6%	31.7%	4.6%	0.0%	44.8%	5.5%	0.2%	0.8%	0.0%	6.6%	
<b>Lights</b>	14	738	63	0	815	94	11	302	0	407	218	802	115	0	1135	137	6	20	0	163	2520
<b>% Lights</b>	100.0%	99.1%	100.0%	0.0%	99.1%	98.9%	91.7%	98.4%	0.0%	98.3%	99.5%	99.6%	99.1%	0.0%	99.6%	97.9%	100.0%	95.2%	0.0%	97.6%	99.1%
<b>Buses and Single-Unit Trucks</b>	0	7	0	0	7	1	1	5	0	7	1	3	1	0	5	3	0	1	0	4	23
<b>% Buses and Single-Unit Trucks</b>	0.0%	0.9%	0.0%	0.0%	0.9%	1.1%	8.3%	1.6%	0.0%	1.7%	0.5%	0.4%	0.9%	0.0%	0.4%	2.1%	0.0%	4.8%	0.0%	2.4%	0.9%

Leg Direction Start Time	Cottonwood Ln Southbound				App Total	Two Rivers Dr Westbound				App Total	Cottonwood Ln Northbound				App Total	Two Rivers Dr Eastbound				App Total	Int Total
	Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		
2017-03-07 06:45:00	2	0	0	0	2	1	0	1	0	2	0	0	1	0	1	70	10	65	0	145	150
2017-03-07 07:00:00	1	0	0	0	1	0	1	0	0	1	0	1	0	0	1	60	7	38	0	105	108
2017-03-07 07:15:00	2	0	1	0	3	0	1	0	0	1	0	0	3	0	3	73	11	36	0	120	127
2017-03-07 07:30:00	2	0	0	0	2	1	0	0	0	1	0	0	3	0	3	81	31	48	0	160	166
2017-03-07 07:45:00	5	0	1	0	6	0	2	0	0	2	0	0	3	0	3	158	43	85	0	286	297
2017-03-07 08:00:00	7	1	0	0	8	0	2	1	0	3	0	0	4	0	4	55	2	37	0	94	109
2017-03-07 08:15:00	6	0	0	0	6	1	0	0	0	1	0	0	4	0	4	25	2	43	0	70	81
2017-03-07 08:30:00	4	0	1	0	5	0	4	0	0	4	0	0	3	0	3	33	1	21	0	55	67
2017-03-07 16:00:00	42	1	0	0	43	4	11	0	0	15	0	1	26	0	27	10	1	9	0	20	105
2017-03-07 16:15:00	21	1	0	0	22	0	13	0	0	13	0	0	21	0	21	11	2	10	1	24	80
2017-03-07 16:30:00	46	0	0	0	46	1	21	0	0	22	0	1	61	1	63	9	1	11	0	21	152
2017-03-07 16:45:00	33	2	0	0	35	1	17	0	0	18	0	5	27	0	32	7	0	19	1	27	112
2017-03-07 17:00:00	77	2	0	0	79	4	183	1	0	188	0	1	63	0	64	6	2	7	1	16	347
2017-03-07 17:15:00	30	0	1	0	31	0	93	0	0	93	0	1	48	0	49	4	1	3	0	8	181
2017-03-07 17:30:00	20	0	0	0	20	0	22	0	0	22	0	0	34	0	34	7	1	4	1	13	89
2017-03-07 17:45:00	5	0	0	0	5	0	10	0	0	10	0	0	19	0	19	3	2	5	0	10	44
<b>Grand Total</b>	303	7	4	0	314	13	380	3	0	396	0	10	320	1	331	612	117	441	4	1174	2215
<b>% Approach</b>	96.5%	2.2%	1.3%	0.0%		3.3%	96.0%	0.8%	0.0%		0.0%	3.0%	96.7%	0.3%		52.1%	10.0%	37.6%	0.3%		
<b>% Total</b>	13.7%	0.3%	0.2%	0.0%	14.2%	0.6%	17.2%	0.1%	0.0%	17.9%	0.0%	0.5%	14.4%	0.0%	14.9%	27.6%	5.3%	19.9%	0.2%	53.0%	
<b>Lights</b>	300	6	3	0	309	11	380	3	0	394	0	9	317	1	327	609	117	437	4	1167	2197
<b>% Lights</b>	99.0%	85.7%	75.0%	0.0%	98.4%	84.6%	100.0%	100.0%	0.0%	99.5%	0.0%	90.0%	99.1%	100.0%	98.8%	99.5%	100.0%	99.1%	100.0%	99.4%	99.2%
<b>Buses and Single-Unit Trucks</b>	3	1	1	0	5	2	0	0	0	2	0	1	3	0	4	3	0	4	0	7	18
<b>% Buses and Single-Unit Trucks</b>	1.0%	14.3%	25.0%	0.0%	1.6%	15.4%	0.0%	0.0%	0.0%	0.5%	0.0%	10.0%	0.9%	0.0%	1.2%	0.5%	0.0%	0.9%	0.0%	0.6%	0.8%

Leg Direction Start Time	n/a Southbound				Two Rivers Rd Westbound				I-29 NB Northbound				Two Rivers Rd Eastbound				Int Total				
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right		Thru	Left	U-Turn	App Total
2017-03-07 06:45:00	0	0	0	0	0	0	3	0	0	3	94	0	57	0	151	12	48	0	0	60	214
2017-03-07 07:00:00	0	0	0	0	0	0	2	0	0	2	88	0	63	0	151	12	21	0	0	33	186
2017-03-07 07:15:00	0	0	0	0	0	0	5	0	0	5	91	0	76	0	167	36	30	0	0	66	238
2017-03-07 07:30:00	0	0	0	0	0	0	6	0	0	6	118	0	105	0	223	71	41	0	0	112	341
2017-03-07 07:45:00	0	0	0	0	0	1	6	0	0	7	204	0	178	0	382	95	86	0	0	181	570
2017-03-07 08:00:00	0	0	0	0	0	1	16	0	0	17	63	0	113	0	176	111	31	0	0	142	335
2017-03-07 08:15:00	0	0	0	0	0	0	11	0	0	11	57	0	100	0	157	31	15	0	0	46	214
2017-03-07 08:30:00	0	0	0	0	0	2	9	0	0	11	35	0	97	0	132	7	20	0	0	27	170
2017-03-07 16:00:00	0	0	0	0	0	13	67	0	0	80	14	0	81	0	95	29	6	0	0	35	210
2017-03-07 16:15:00	0	0	0	0	0	6	50	0	0	56	16	0	97	0	113	24	9	2	0	35	204
2017-03-07 16:30:00	0	0	0	0	0	27	98	0	0	125	14	0	114	0	128	29	6	0	0	35	288
2017-03-07 16:45:00	0	0	0	0	0	16	62	0	0	78	19	0	123	0	142	28	8	0	0	36	256
2017-03-07 17:00:00	0	0	0	0	0	57	254	0	0	311	10	0	122	0	132	48	7	0	0	55	498
2017-03-07 17:15:00	0	0	0	0	0	38	138	0	0	176	7	0	149	0	156	39	2	1	0	42	374
2017-03-07 17:30:00	0	0	0	0	0	15	66	0	0	81	6	0	106	0	112	37	6	1	0	44	237
2017-03-07 17:45:00	0	0	0	0	0	6	28	0	0	34	9	0	102	0	111	16	1	0	0	17	162
<b>Grand Total</b>	0	0	0	0	0	182	821	0	0	1003	845	0	1683	0	2528	625	337	4	0	966	4497
<b>% Approach</b>	0.0%	0.0%	0.0%	0.0%		18.1%	81.9%	0.0%	0.0%		33.4%	0.0%	66.6%	0.0%		64.7%	34.9%	0.4%	0.0%		
<b>% Total</b>	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	18.3%	0.0%	0.0%	22.3%	18.8%	0.0%	37.4%	0.0%	56.2%	13.9%	7.5%	0.1%	0.0%	21.5%	
<b>Lights</b>	0	0	0	0	0	182	815	0	0	997	840	0	1668	0	2508	616	332	4	0	952	4457
<b>% Lights</b>	0.0%	0.0%	0.0%	0.0%		100.0%	99.3%	0.0%	0.0%	99.4%	99.4%	0.0%	99.1%	0.0%	99.2%	98.6%	98.5%	100.0%	0.0%	98.6%	99.1%
<b>Articulated Trucks</b>	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	3
<b>% Articulated Trucks</b>	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
<b>Buses and Single-Unit Trucks</b>	0	0	0	0	0	0	6	0	0	6	5	0	12	0	17	9	5	0	0	14	37
<b>% Buses and Single-Unit Trucks</b>	0.0%	0.0%	0.0%	0.0%		0.0%	0.7%	0.0%	0.0%	0.6%	0.6%	0.0%	0.7%	0.0%	0.7%	1.4%	1.5%	0.0%	0.0%	1.4%	0.8%

Leg Direction Start Time	I-29 SB Southbound				Dakota Dunes Blvd Westbound				Dakota Dunes Blvd Eastbound				Int Total
	Right	Left	U-Turn	App Total	Right	Thru	U-Turn	App Total	Thru	Left	U-Turn	App Total	
2017-03-07 06:45:00	14	30	0	<b>44</b>	1	61	0	<b>62</b>	27	0	0	<b>27</b>	<b>133</b>
2017-03-07 07:00:00	10	14	0	<b>24</b>	2	63	0	<b>65</b>	20	0	0	<b>20</b>	<b>109</b>
2017-03-07 07:15:00	21	15	0	<b>36</b>	3	76	0	<b>79</b>	50	0	0	<b>50</b>	<b>165</b>
2017-03-07 07:30:00	21	26	0	<b>47</b>	5	102	0	<b>107</b>	90	0	0	<b>90</b>	<b>244</b>
2017-03-07 07:45:00	39	42	0	<b>81</b>	4	180	0	<b>184</b>	135	0	0	<b>135</b>	<b>400</b>
2017-03-07 08:00:00	40	12	0	<b>52</b>	11	115	0	<b>126</b>	126	0	0	<b>126</b>	<b>304</b>
2017-03-07 08:15:00	56	7	0	<b>63</b>	4	104	0	<b>108</b>	39	0	0	<b>39</b>	<b>210</b>
2017-03-07 08:30:00	26	7	0	<b>33</b>	4	106	0	<b>110</b>	21	0	0	<b>21</b>	<b>164</b>
2017-03-07 16:00:00	32	1	0	<b>33</b>	49	100	0	<b>149</b>	34	0	0	<b>34</b>	<b>216</b>
2017-03-07 16:15:00	33	2	0	<b>35</b>	34	115	0	<b>149</b>	32	0	0	<b>32</b>	<b>216</b>
2017-03-07 16:30:00	35	1	0	<b>36</b>	78	128	0	<b>206</b>	33	0	0	<b>33</b>	<b>275</b>
2017-03-07 16:45:00	25	3	0	<b>28</b>	46	147	0	<b>193</b>	32	0	0	<b>32</b>	<b>253</b>
2017-03-07 17:00:00	24	1	0	<b>25</b>	201	176	0	<b>377</b>	53	0	0	<b>53</b>	<b>455</b>
2017-03-07 17:15:00	35	0	0	<b>35</b>	102	187	0	<b>289</b>	41	0	0	<b>41</b>	<b>365</b>
2017-03-07 17:30:00	28	3	0	<b>31</b>	55	122	0	<b>177</b>	42	0	0	<b>42</b>	<b>250</b>
2017-03-07 17:45:00	32	1	0	<b>33</b>	17	113	0	<b>130</b>	14	0	0	<b>14</b>	<b>177</b>
<b>Grand Total</b>	471	165	0	<b>636</b>	616	1895	0	<b>2511</b>	789	0	0	<b>789</b>	<b>3936</b>
<b>% Approach</b>	74.1%	25.9%	0.0%		24.5%	75.5%	0.0%		100.0%	0.0%	0.0%		
<b>% Total</b>	12.0%	4.2%	0.0%	<b>16.2%</b>	15.7%	48.1%	0.0%	<b>63.8%</b>	20.0%	0.0%	0.0%	<b>20.0%</b>	
<b>Lights</b>	466	165	0	<b>631</b>	614	1877	0	<b>2491</b>	774	0	0	<b>774</b>	<b>3896</b>
<b>% Lights</b>	98.9%	100.0%	0.0%	<b>99.2%</b>	99.7%	99.1%	0.0%	<b>99.2%</b>	98.1%	0.0%	0.0%	<b>98.1%</b>	<b>99.0%</b>
<b>Articulated Trucks</b>	0	0	0	<b>0</b>	0	1	0	<b>1</b>	0	0	0	<b>0</b>	<b>1</b>
<b>% Articulated Trucks</b>	0.0%	0.0%	0.0%	<b>0.0%</b>	0.0%	0.1%	0.0%	<b>0.0%</b>	0.0%	0.0%	0.0%	<b>0.0%</b>	<b>0.0%</b>
<b>Buses and Single-Unit Trucks</b>	5	0	0	<b>5</b>	2	17	0	<b>19</b>	15	0	0	<b>15</b>	<b>39</b>
<b>% Buses and Single-Unit Trucks</b>	1.1%	0.0%	0.0%	<b>0.8%</b>	0.3%	0.9%	0.0%	<b>0.8%</b>	1.9%	0.0%	0.0%	<b>1.9%</b>	<b>1.0%</b>

Leg Direction Start Time	Dakota Dunes Blvd Southbound				App Total	Sioux Point Rd Westbound				App Total	Dakota Dunes Blvd Northbound				App Total	Sioux Point Rd Eastbound				App Total	Int Total
	Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		
2017-03-07 06:45:00	46	19	9	0	<b>74</b>	2	2	0	0	<b>4</b>	1	21	14	0	<b>36</b>	5	6	5	0	<b>16</b>	<b>130</b>
2017-03-07 07:00:00	41	29	6	0	<b>76</b>	1	3	0	0	<b>4</b>	4	16	17	0	<b>37</b>	8	11	5	0	<b>24</b>	<b>141</b>
2017-03-07 07:15:00	55	32	7	0	<b>94</b>	3	2	0	0	<b>5</b>	4	39	34	0	<b>77</b>	10	21	9	0	<b>40</b>	<b>216</b>
2017-03-07 07:30:00	82	28	10	0	<b>120</b>	7	5	0	0	<b>12</b>	2	76	41	0	<b>119</b>	19	36	7	0	<b>62</b>	<b>313</b>
2017-03-07 07:45:00	149	56	17	0	<b>222</b>	7	4	0	0	<b>11</b>	3	108	42	0	<b>153</b>	14	34	20	0	<b>68</b>	<b>454</b>
2017-03-07 08:00:00	92	63	9	0	<b>164</b>	7	4	0	0	<b>11</b>	3	112	33	0	<b>148</b>	9	25	7	0	<b>41</b>	<b>364</b>
2017-03-07 08:15:00	84	72	5	0	<b>161</b>	1	1	0	0	<b>2</b>	4	36	22	0	<b>62</b>	21	35	3	0	<b>59</b>	<b>284</b>
2017-03-07 08:30:00	78	48	4	0	<b>130</b>	0	3	0	0	<b>3</b>	1	14	19	0	<b>34</b>	19	41	6	0	<b>66</b>	<b>233</b>
2017-03-07 16:00:00	31	89	12	0	<b>132</b>	3	4	0	0	<b>7</b>	6	18	13	0	<b>37</b>	25	61	13	0	<b>99</b>	<b>275</b>
2017-03-07 16:15:00	41	102	10	0	<b>153</b>	2	4	0	0	<b>6</b>	11	18	19	0	<b>48</b>	34	54	11	0	<b>99</b>	<b>306</b>
2017-03-07 16:30:00	34	109	15	0	<b>158</b>	2	1	0	0	<b>3</b>	5	20	12	0	<b>37</b>	37	72	12	0	<b>121</b>	<b>319</b>
2017-03-07 16:45:00	38	125	10	0	<b>173</b>	1	6	0	0	<b>7</b>	9	19	19	0	<b>47</b>	23	61	11	0	<b>95</b>	<b>322</b>
2017-03-07 17:00:00	42	125	24	0	<b>191</b>	3	7	0	0	<b>10</b>	16	32	25	0	<b>73</b>	50	110	19	0	<b>179</b>	<b>453</b>
2017-03-07 17:15:00	63	144	18	1	<b>226</b>	1	1	0	0	<b>2</b>	7	33	25	0	<b>65</b>	64	57	6	0	<b>127</b>	<b>420</b>
2017-03-07 17:30:00	38	103	5	0	<b>146</b>	4	2	0	0	<b>6</b>	7	27	12	0	<b>46</b>	35	50	11	0	<b>96</b>	<b>294</b>
2017-03-07 17:45:00	44	103	9	0	<b>156</b>	0	1	0	0	<b>1</b>	3	14	12	0	<b>29</b>	35	31	0	0	<b>66</b>	<b>252</b>
<b>Grand Total</b>	958	1247	170	1	<b>2376</b>	44	50	0	0	<b>94</b>	86	603	359	0	<b>1048</b>	408	705	145	0	<b>1258</b>	<b>4776</b>
<b>% Approach</b>	40.3%	52.5%	7.2%	0.0%		46.8%	53.2%	0.0%	0.0%		8.2%	57.5%	34.3%	0.0%		32.4%	56.0%	11.5%	0.0%		
<b>% Total</b>	20.1%	26.1%	3.6%	0.0%	<b>49.7%</b>	0.9%	1.0%	0.0%	0.0%	<b>2.0%</b>	1.8%	12.6%	7.5%	0.0%	<b>21.9%</b>	8.5%	14.8%	3.0%	0.0%	<b>26.3%</b>	
<b>Lights</b>	953	1228	166	1	<b>2348</b>	42	49	0	0	<b>91</b>	80	593	358	0	<b>1031</b>	404	700	143	0	<b>1247</b>	<b>4717</b>
<b>% Lights</b>	99.5%	98.5%	97.6%	100.0%	<b>98.8%</b>	95.5%	98.0%	0.0%	0.0%	<b>96.8%</b>	93.0%	98.3%	99.7%	0.0%	<b>98.4%</b>	99.0%	99.3%	98.6%	0.0%	<b>99.1%</b>	<b>98.8%</b>
<b>Articulated Trucks</b>	0	4	0	0	<b>4</b>	0	0	0	0	<b>0</b>	2	0	0	0	<b>2</b>	0	0	0	0	<b>0</b>	<b>6</b>
<b>% Articulated Trucks</b>	0.0%	0.3%	0.0%	0.0%	<b>0.2%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	2.3%	0.0%	0.0%	0.0%	<b>0.2%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	<b>0.1%</b>
<b>Buses and Single-Unit Trucks</b>	5	15	4	0	<b>24</b>	2	1	0	0	<b>3</b>	4	10	1	0	<b>15</b>	4	5	2	0	<b>11</b>	<b>53</b>
<b>% Buses and Single-Unit Trucks</b>	0.5%	1.2%	2.4%	0.0%	<b>1.0%</b>	4.5%	2.0%	0.0%	0.0%	<b>3.2%</b>	4.7%	1.7%	0.3%	0.0%	<b>1.4%</b>	1.0%	0.7%	1.4%	0.0%	<b>0.9%</b>	<b>1.1%</b>

Leg Direction Start Time	Dakota Dunes Blvd Southbound				Courtyard Dr Westbound				Dakota Dunes Blvd Northbound				Courtyard Dr Eastbound				Int Total				
	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right	Thru	Left	U-Turn	App Total	Right		Thru	Left	U-Turn	App Total
2017-03-07 06:45:00	4	21	0	0	25	1	0	1	0	2	54	37	0	0	91	1	0	0	0	1	119
2017-03-07 07:00:00	1	28	4	0	33	4	0	1	0	5	62	38	0	1	101	0	0	0	0	0	139
2017-03-07 07:15:00	1	37	3	1	42	2	0	1	0	3	74	80	0	0	154	0	0	0	0	0	199
2017-03-07 07:30:00	4	35	5	0	44	2	0	1	0	3	118	126	0	0	244	0	2	0	0	2	293
2017-03-07 07:45:00	5	47	5	1	58	0	0	1	0	1	105	151	1	0	257	0	0	2	0	2	318
2017-03-07 08:00:00	7	49	5	0	61	3	0	1	0	4	67	147	0	0	214	0	0	1	0	1	280
2017-03-07 08:15:00	4	79	4	0	87	0	0	1	0	1	55	61	1	0	117	0	0	0	0	0	205
2017-03-07 08:30:00	4	59	2	0	65	0	0	0	0	0	47	29	1	0	77	0	0	1	0	1	143
2017-03-07 16:00:00	4	103	1	0	108	1	0	1	0	2	31	31	1	1	64	0	2	2	0	4	178
2017-03-07 16:15:00	0	126	3	1	130	0	0	3	0	3	30	43	0	0	73	1	1	5	0	7	213
2017-03-07 16:30:00	6	126	6	0	138	1	0	1	0	2	38	25	0	0	63	1	0	0	0	1	204
2017-03-07 16:45:00	1	144	5	0	150	2	0	3	0	5	37	38	0	0	75	0	1	5	0	6	236
2017-03-07 17:00:00	2	158	10	1	171	5	0	2	0	7	58	49	0	0	107	3	4	4	0	11	296
2017-03-07 17:15:00	1	206	12	0	219	1	0	1	0	2	44	59	0	0	103	0	5	4	1	10	334
2017-03-07 17:30:00	2	131	7	0	140	0	0	5	0	5	51	45	1	0	97	0	0	1	0	1	243
2017-03-07 17:45:00	3	132	2	0	137	2	0	1	0	3	29	23	0	0	52	0	1	1	0	2	194
<b>Grand Total</b>	<b>49</b>	<b>1481</b>	<b>74</b>	<b>4</b>	<b>1608</b>	<b>24</b>	<b>0</b>	<b>24</b>	<b>0</b>	<b>48</b>	<b>900</b>	<b>982</b>	<b>5</b>	<b>2</b>	<b>1889</b>	<b>6</b>	<b>16</b>	<b>26</b>	<b>1</b>	<b>49</b>	<b>3594</b>
<b>% Approach</b>	3.0%	92.1%	4.6%	0.2%		50.0%	0.0%	50.0%	0.0%		47.6%	52.0%	0.3%	0.1%		12.2%	32.7%	53.1%	2.0%		
<b>% Total</b>	1.4%	41.2%	2.1%	0.1%	<b>44.7%</b>	0.7%	0.0%	0.7%	0.0%	<b>1.3%</b>	25.0%	27.3%	0.1%	0.1%	<b>52.6%</b>	0.2%	0.4%	0.7%	0.0%	<b>1.4%</b>	
<b>Lights</b>	48	1461	74	4	<b>1587</b>	24	0	24	0	<b>48</b>	896	967	5	2	<b>1870</b>	5	16	26	1	<b>48</b>	<b>3553</b>
<b>% Lights</b>	98.0%	98.6%	100.0%	100.0%	<b>98.7%</b>	100.0%	0.0%	100.0%	0.0%	<b>100.0%</b>	99.6%	98.5%	100.0%	100.0%	<b>99.0%</b>	83.3%	100.0%	100.0%	100.0%	<b>98.0%</b>	<b>98.9%</b>
<b>Articulated Trucks</b>	0	3	0	0	<b>3</b>	0	0	0	0	<b>0</b>	0	4	0	0	<b>4</b>	0	0	0	0	<b>0</b>	<b>7</b>
<b>% Articulated Trucks</b>	0.0%	0.2%	0.0%	0.0%	<b>0.2%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	0.0%	0.4%	0.0%	0.0%	<b>0.2%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	<b>0.2%</b>
<b>Buses and Single-Unit Trucks</b>	1	17	0	0	<b>18</b>	0	0	0	0	<b>0</b>	4	11	0	0	<b>15</b>	1	0	0	0	<b>1</b>	<b>34</b>
<b>% Buses and Single-Unit Trucks</b>	2.0%	1.1%	0.0%	0.0%	<b>1.1%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	0.4%	1.1%	0.0%	0.0%	<b>0.8%</b>	16.7%	0.0%	0.0%	0.0%	<b>2.0%</b>	<b>0.9%</b>





Leg Direction Start Time	Dakota Dunes Blvd Southbound				App Total	Meadows Blvd Westbound				App Total	Dakota Dunes Blvd Northbound				App Total	Meadows Blvd Eastbound				App Total	Int Total
	Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		Right	Thru	Left	U-Turn		
2017-03-07 06:45:00	0	18	1	0	<b>19</b>	17	0	0	0	<b>17</b>	0	44	0	0	<b>44</b>	1	0	9	0	<b>10</b>	<b>90</b>
2017-03-07 07:00:00	0	24	3	0	<b>27</b>	15	1	0	0	<b>16</b>	1	47	0	0	<b>48</b>	1	0	13	0	<b>14</b>	<b>105</b>
2017-03-07 07:15:00	1	26	3	0	<b>30</b>	23	2	0	0	<b>25</b>	0	61	1	0	<b>62</b>	0	0	16	0	<b>16</b>	<b>133</b>
2017-03-07 07:30:00	1	21	3	0	<b>25</b>	26	0	1	0	<b>27</b>	0	103	3	0	<b>106</b>	0	0	51	0	<b>51</b>	<b>209</b>
2017-03-07 07:45:00	3	30	5	0	<b>38</b>	34	3	0	0	<b>37</b>	1	122	1	0	<b>124</b>	4	2	40	0	<b>46</b>	<b>245</b>
2017-03-07 08:00:00	3	35	6	0	<b>44</b>	19	0	1	0	<b>20</b>	2	119	1	1	<b>123</b>	3	0	30	0	<b>33</b>	<b>220</b>
2017-03-07 08:15:00	6	53	5	0	<b>64</b>	14	1	1	0	<b>16</b>	1	59	0	0	<b>60</b>	2	0	23	0	<b>25</b>	<b>165</b>
2017-03-07 08:30:00	5	34	3	0	<b>42</b>	10	0	0	0	<b>10</b>	0	32	3	0	<b>35</b>	2	0	6	0	<b>8</b>	<b>95</b>
2017-03-07 16:00:00	15	56	13	0	<b>84</b>	5	4	1	0	<b>10</b>	5	38	5	0	<b>48</b>	1	1	10	0	<b>12</b>	<b>154</b>
2017-03-07 16:15:00	17	51	20	0	<b>88</b>	12	2	3	0	<b>17</b>	1	42	3	0	<b>46</b>	3	3	7	0	<b>13</b>	<b>164</b>
2017-03-07 16:30:00	18	56	19	0	<b>93</b>	10	2	1	0	<b>13</b>	3	32	4	0	<b>39</b>	2	2	7	0	<b>11</b>	<b>156</b>
2017-03-07 16:45:00	17	68	22	0	<b>107</b>	5	1	2	0	<b>8</b>	0	55	3	0	<b>58</b>	4	1	3	0	<b>8</b>	<b>181</b>
2017-03-07 17:00:00	20	72	29	0	<b>121</b>	14	0	2	0	<b>16</b>	2	53	3	0	<b>58</b>	3	1	16	0	<b>20</b>	<b>215</b>
2017-03-07 17:15:00	30	98	37	1	<b>166</b>	10	2	0	0	<b>12</b>	0	49	4	0	<b>53</b>	2	1	18	0	<b>21</b>	<b>252</b>
2017-03-07 17:30:00	22	68	16	0	<b>106</b>	13	1	0	0	<b>14</b>	1	49	5	0	<b>55</b>	4	0	12	0	<b>16</b>	<b>191</b>
2017-03-07 17:45:00	18	62	17	1	<b>98</b>	7	0	0	0	<b>7</b>	2	25	3	0	<b>30</b>	1	2	10	0	<b>13</b>	<b>148</b>
<b>Grand Total</b>	176	772	202	2	<b>1152</b>	234	19	12	0	<b>265</b>	19	930	39	1	<b>989</b>	33	13	271	0	<b>317</b>	<b>2723</b>
<b>% Approach</b>	15.3%	67.0%	17.5%	0.2%		88.3%	7.2%	4.5%	0.0%		1.9%	94.0%	3.9%	0.1%		10.4%	4.1%	85.5%	0.0%		
<b>% Total</b>	6.5%	28.4%	7.4%	0.1%	<b>42.3%</b>	8.6%	0.7%	0.4%	0.0%	<b>9.7%</b>	0.7%	34.2%	1.4%	0.0%	<b>36.3%</b>	1.2%	0.5%	10.0%	0.0%	<b>11.6%</b>	
<b>Lights</b>	173	760	198	2	<b>1133</b>	234	18	12	0	<b>264</b>	19	922	38	1	<b>980</b>	31	13	267	0	<b>311</b>	<b>2688</b>
<b>% Lights</b>	98.3%	98.4%	98.0%	100.0%	<b>98.4%</b>	100.0%	94.7%	100.0%	0.0%	<b>99.6%</b>	100.0%	99.1%	97.4%	100.0%	<b>99.1%</b>	93.9%	100.0%	98.5%	0.0%	<b>98.1%</b>	<b>98.7%</b>
<b>Articulated Trucks</b>	2	2	0	0	<b>4</b>	0	0	0	0	<b>0</b>	0	2	0	0	<b>2</b>	0	0	2	0	<b>2</b>	<b>8</b>
<b>% Articulated Trucks</b>	1.1%	0.3%	0.0%	0.0%	<b>0.3%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	0.0%	0.2%	0.0%	0.0%	<b>0.2%</b>	0.0%	0.0%	0.7%	0.0%	<b>0.6%</b>	<b>0.3%</b>
<b>Buses and Single-Unit Trucks</b>	1	10	4	0	<b>15</b>	0	1	0	0	<b>1</b>	0	6	1	0	<b>7</b>	2	0	2	0	<b>4</b>	<b>27</b>
<b>% Buses and Single-Unit Trucks</b>	0.6%	1.3%	2.0%	0.0%	<b>1.3%</b>	0.0%	5.3%	0.0%	0.0%	<b>0.4%</b>	0.0%	0.6%	2.6%	0.0%	<b>0.7%</b>	6.1%	0.0%	0.7%	0.0%	<b>1.3%</b>	<b>1.0%</b>

Leg Direction Start Time	Dakota Dunes Blvd Southbound				Pinehurst Trail Westbound				Dakota Dunes Blvd Northbound				Pinehurst Trail Eastbound				App Total	Int Total			
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn					
2017-03-07 06:45:00	1	16	2	0	<b>19</b>	9	0	0	0	<b>9</b>	0	28	0	0	<b>28</b>	1	0	7	0	<b>8</b>	<b>64</b>
2017-03-07 07:00:00	2	16	7	0	<b>25</b>	7	1	0	0	<b>8</b>	0	29	0	0	<b>29</b>	0	0	10	0	<b>10</b>	<b>72</b>
2017-03-07 07:15:00	4	13	8	0	<b>25</b>	15	0	1	0	<b>16</b>	1	34	0	0	<b>35</b>	0	0	16	0	<b>16</b>	<b>92</b>
2017-03-07 07:30:00	5	14	3	0	<b>22</b>	24	0	1	0	<b>25</b>	0	68	0	0	<b>68</b>	0	0	20	0	<b>20</b>	<b>135</b>
2017-03-07 07:45:00	5	17	11	2	<b>35</b>	28	0	0	0	<b>28</b>	0	75	0	0	<b>75</b>	0	0	23	0	<b>23</b>	<b>161</b>
2017-03-07 08:00:00	9	21	9	1	<b>40</b>	24	0	0	0	<b>24</b>	2	69	0	0	<b>71</b>	1	0	30	0	<b>31</b>	<b>166</b>
2017-03-07 08:15:00	17	29	10	0	<b>56</b>	14	0	0	0	<b>14</b>	0	29	0	0	<b>29</b>	0	1	15	0	<b>16</b>	<b>115</b>
2017-03-07 08:30:00	5	22	10	0	<b>37</b>	9	0	0	0	<b>9</b>	0	20	0	0	<b>20</b>	1	0	6	0	<b>7</b>	<b>73</b>
2017-03-07 16:00:00	14	26	15	0	<b>55</b>	13	0	0	0	<b>13</b>	0	20	0	0	<b>20</b>	0	1	14	0	<b>15</b>	<b>103</b>
2017-03-07 16:15:00	6	43	9	0	<b>58</b>	18	1	0	0	<b>19</b>	0	22	1	0	<b>23</b>	0	0	8	0	<b>8</b>	<b>108</b>
2017-03-07 16:30:00	10	32	15	0	<b>57</b>	10	1	0	0	<b>11</b>	0	17	2	0	<b>19</b>	1	0	11	0	<b>12</b>	<b>99</b>
2017-03-07 16:45:00	18	39	17	0	<b>74</b>	20	1	0	0	<b>21</b>	0	29	1	0	<b>30</b>	1	0	9	0	<b>10</b>	<b>135</b>
2017-03-07 17:00:00	19	38	21	0	<b>78</b>	17	1	1	0	<b>19</b>	0	31	0	0	<b>31</b>	0	0	11	0	<b>11</b>	<b>139</b>
2017-03-07 17:15:00	17	61	23	0	<b>101</b>	10	3	1	0	<b>14</b>	1	30	0	0	<b>31</b>	0	2	13	0	<b>15</b>	<b>161</b>
2017-03-07 17:30:00	12	47	11	0	<b>70</b>	13	1	2	0	<b>16</b>	0	30	0	0	<b>30</b>	0	1	12	0	<b>13</b>	<b>129</b>
2017-03-07 17:45:00	10	35	19	0	<b>64</b>	1	0	0	0	<b>1</b>	1	21	0	0	<b>22</b>	0	0	7	0	<b>7</b>	<b>94</b>
<b>Grand Total</b>	154	469	190	3	<b>816</b>	232	9	6	0	<b>247</b>	5	552	4	0	<b>561</b>	5	5	212	0	<b>222</b>	<b>1846</b>
<b>% Approach</b>	18.9%	57.5%	23.3%	0.4%		93.9%	3.6%	2.4%	0.0%		0.9%	98.4%	0.7%	0.0%		2.3%	2.3%	95.5%	0.0%		
<b>% Total</b>	8.3%	25.4%	10.3%	0.2%	<b>44.2%</b>	12.6%	0.5%	0.3%	0.0%	<b>13.4%</b>	0.3%	29.9%	0.2%	0.0%	<b>30.4%</b>	0.3%	0.3%	11.5%	0.0%	<b>12.0%</b>	
<b>Lights</b>	151	462	187	3	<b>803</b>	227	9	6	0	<b>242</b>	5	547	4	0	<b>556</b>	5	5	212	0	<b>222</b>	<b>1823</b>
<b>% Lights</b>	98.1%	98.5%	98.4%	100.0%	<b>98.4%</b>	97.8%	100.0%	100.0%	0.0%	<b>98.0%</b>	100.0%	99.1%	100.0%	0.0%	<b>99.1%</b>	100.0%	100.0%	100.0%	0.0%	<b>100.0%</b>	<b>98.8%</b>
<b>Articulated Trucks</b>	0	1	1	0	<b>2</b>	1	0	0	0	<b>1</b>	0	1	0	0	<b>1</b>	0	0	0	0	<b>0</b>	<b>4</b>
<b>% Articulated Trucks</b>	0.0%	0.2%	0.5%	0.0%	<b>0.2%</b>	0.4%	0.0%	0.0%	0.0%	<b>0.4%</b>	0.0%	0.2%	0.0%	0.0%	<b>0.2%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	<b>0.2%</b>
<b>Buses and Single-Unit Trucks</b>	3	6	2	0	<b>11</b>	4	0	0	0	<b>4</b>	0	4	0	0	<b>4</b>	0	0	0	0	<b>0</b>	<b>19</b>
<b>% Buses and Single-Unit Trucks</b>	1.9%	1.3%	1.1%	0.0%	<b>1.3%</b>	1.7%	0.0%	0.0%	0.0%	<b>1.6%</b>	0.0%	0.7%	0.0%	0.0%	<b>0.7%</b>	0.0%	0.0%	0.0%	0.0%	<b>0.0%</b>	<b>1.0%</b>