Traffic Operations Study

Mount Rushmore Road
Rapid City, South Dakota

Kadrmas Lee & Jackson
Engineers Surveyors Planners

Prepared for
Rapid City Area Metropolitan Planning Organization
And the South Dakota Department of Transportation

Prepared by
Kadrmas, Lee & Jackson, Inc.
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CERTIFICATION

This report was funded in part through grant[s] from the Federal Highway Administration, U.S. Department of Transportation. The views and opinions of the authors [or agency] expressed herein do not necessarily state or reflect those of the U. S. Department of Transportation.

This document(s) was originally issued and sealed by Robert Shannon, 8530 on June 1, 2009 and the original documents are stored at Kadrmas, Lee & Jackson, Bismarck, ND. This media should not be considered a certified document.

I hereby certify that this traffic operations report for the Mount Rushmore Road Corridor Study report was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the State of South Dakota.

Robert Shannon /s/ **06/01/2009**

Robert Shannon P.E. Date

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EXECUTIVE SUMMARY

The purpose of this report is to determine if any geometric or operational revisions will be needed to accommodate year 2030 traffic projections. This report documents the results of a traffic operations study conducted for Mount Rushmore Road in Rapid City, SD. This report only considers the effects of motor vehicles and crashes on the corridor. Consideration of bicycle and pedestrian provisions should be addressed in the overall Mount Rushmore Corridor Study Report.

The southern limit of the study area is the intersection of Mount Rushmore Road and Cathedral Drive. The northern limit of the study area is the intersection of Mount Rushmore Road and Omaha Street in downtown Rapid City.

The 2030 baseline traffic volumes were developed from the 2030 Forecast Volumes map provided by the city of Rapid City. Where gaps existed in the 2030 forecast volumes, the 2025 Forecast Volumes map and reasonable engineering judgment were used to develop the 2030 AADTs (Average Annual Daily Traffic). Minor side street traffic was estimated to be similar to the current AADTs. The growth of side street traffic was estimated to be minimal due to the fully developed nature of the corridor. Traffic projections were created for the following scenarios:

- 2030 AADT AM Peak Traffic
- 2030 AADT PM Peak Traffic
- 2030 Tourism Peak PM Peak Traffic

The current roadway geometry will provide a LOS (Level Of Service) C or better at most intersections in this corridor. Longer storage lengths and additional lanes will be required to facilitate the projected future traffic at these intersections:

- Main Street – northbound double left turn lanes with 200 feet of storage
- Kansas City Street – increase all left turn lane storage lengths
- Quincy Street – increase northbound and southbound left turn storage lengths
- Columbus Street – increase all left turn lane storage lengths
- Franklin Street – increase northbound and southbound left turn storage lengths
- St Patrick Street – increase northbound, southbound, and westbound left turn lane storage lengths. Construct eastbound left turn lane.
- Cathedral Drive – construct southbound double left turn lanes with 200 feet of storage. Increase westbound left turn lane storage length.

<u>Arterial Level of Service</u>

An arterial level of service analysis was conducted on Mount Rushmore Road for the 2030 AM Peak Hour, the 2030 PM Peak Hour, and the 2030 PM Peak Season Peak Hour scenarios. These scenarios included all of the proposed recommendations. Chapter 15 of the Highway Capacity Manual 2000 defines a level of service dependent on the urban street class and the average travel speed. The arterial from Omaha Street to Columbus Street was classified as a class IV urban street and from Columbus Street to Cathedral Drive as a class III urban street. This division allows for different acceptable average travel speeds.

AM Peak
The central business district portion of the arterial could expect to receive a LOS C for northbound and LOS D for southbound traffic. The remaining portion of the arterial could expect to receive a LOS B for northbound and southbound traffic.

PM Peak
The central business district portion of the arterial could expect to receive a LOS C for northbound and LOS D for southbound traffic. The remaining portion of the arterial could expect to receive a LOS B for northbound and southbound traffic.

PM Peak, Peak Season
The central business district portion of the arterial could expect to receive a LOS C for northbound and LOS E for southbound traffic. The remaining portion of the arterial could expect to receive a LOS C for northbound and a LOS B for southbound traffic.

It is not recommended to add additional through lanes from Kansas City Street to Cathedral Drive as that portion of the arterial meets or exceeds a LOS C from both intersection capacity and arterial analysis standpoint. Additional through lanes may improve the capacity of the road from Kansas City Street to Omaha Street but is not recommended due to feasibility.

From a crash history perspective, the following recommendations are made to reduce the potential for collisions.

- Consolidate driveways to reduce access to Mount Rushmore Road from adjacent properties.
- Consider removing Safeway grocery store driveway from Mount Rushmore Road and utilize access from side streets.
- Evaluate the entire street lighting system for conformance to AASHTO lighting levels, in particular from St Patrick Street to St Andrew Street. A total of 10 night-time crashes occurred at these intersections or between them.

With the above geometric and operational recommendations, Mount Rushmore Road is recommended to continue to operate as a 4-lane roadway with appropriate turn lanes at intersections. A raised median is recommended to be considered at feasible locations to further minimize vehicular conflicts and potential crashes resulting from vehicles accessing adjacent private driveways.

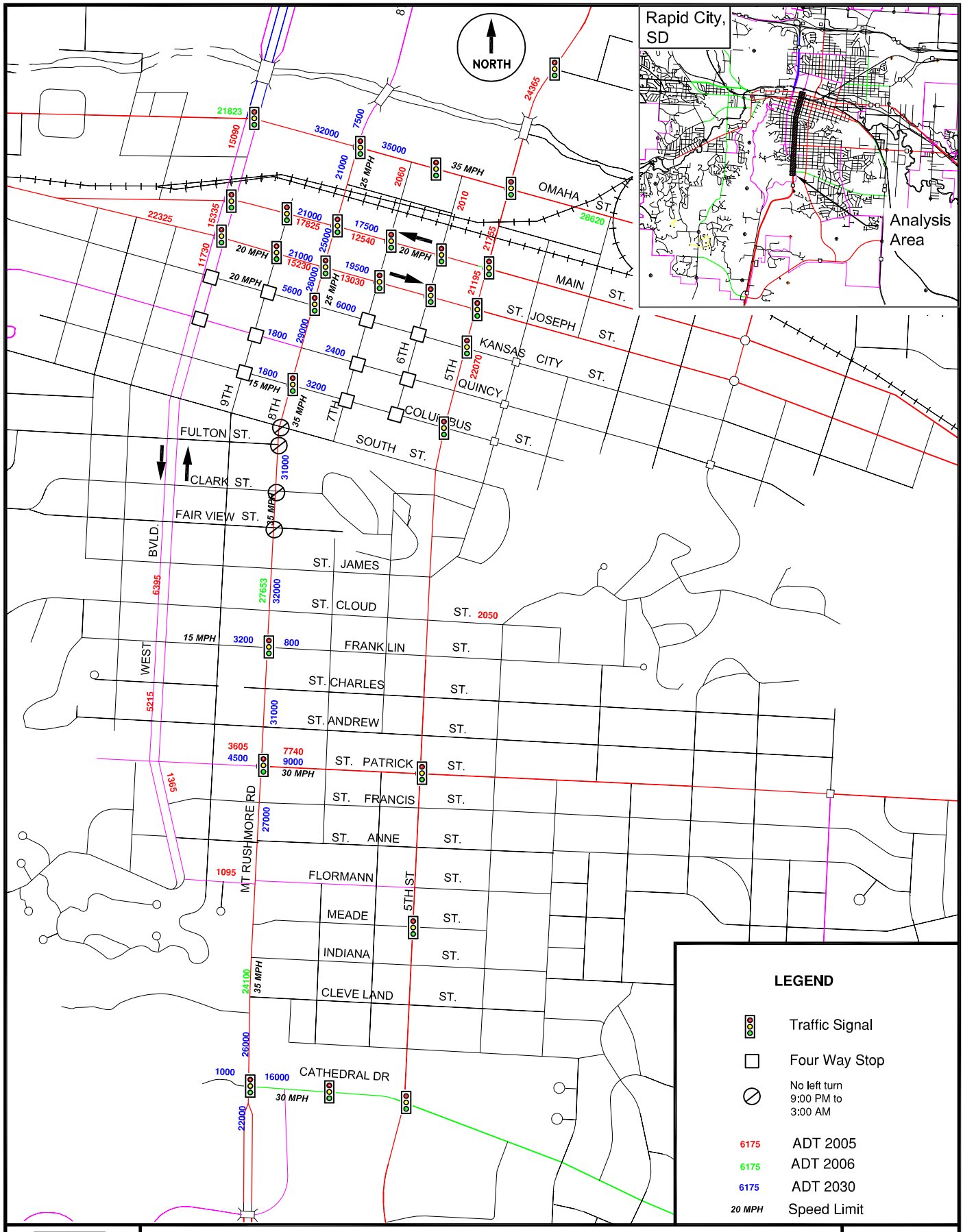
1.0 INTRODUCTION AND OBJECTIVE

The purpose of this report is to determine if any geometric or operational revisions will be needed to accommodate year 2030 traffic projections. This report documents the results of a traffic operations study conducted for Mount Rushmore Road in Rapid City, SD. This report only considers the effects of motor vehicles and crashes on the corridor. Consideration of bicycle and pedestrian provisions should be addressed in the overall Mount Rushmore Corridor Study Report.

The southern limit of the study area is the intersection of Mount Rushmore Road and Cathedral Drive. The northern limit of the study area is the intersection of Mount Rushmore Road and Omaha Street in downtown Rapid City. The study will analyze the existing conditions at nine intersections in terms of level of service (LOS) as well as arterial progression and safety throughout the corridor. The study will also develop and analyze future traffic volumes throughout the corridor and make recommendations to improve highway capacity and safety. Existing roadway classifications and traffic volumes for the study area are shown in **Figure 1.**

Signal warrant analysis and capacity analysis conducted at study intersections were based on the "Highway Capacity Manual" published Transportation Research Board and the "Manual of Uniform Traffic Control Devices" published by the Federal Highway Administration.

This report is intended to provide information to decision-makers and project stakeholders to address the traffic needs along the roadway.



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Traffic Volume Map
Mount Rushmore Road Traffic Study

Figure 1

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2.0 EXISTING CONDITIONS

2.1 Existing Roadways

Designated as a principal arterial, Mount Rushmore Road runs north-south through the south half of Rapid City. The roadway is also designated as US Highway 16. Six blocks of Mount Rushmore Road is located within the central business district (CBD) of Rapid City from Omaha Street to Columbus Street. Within the CBD, the roadway currently operates as a multi-lane urban arterial street with various turn lanes. Outside of the CBD, the roadway from Columbus Street to Cathedral Drive is currently designed as an urban, five-lane section including a TWLTL (two-way left turn lane), with many access points serving a variety of small and medium sized retail, service, hospitality, office and limited residential uses. South of Cathedral Drive, the roadway splits into a divided highway -- two lanes for each direction of traffic. Parking is prohibited throughout the corridor except where allowed for northbound vehicles from Clark Street to Fulton Street and southbound in other areas. Northbound left turns are prohibited onto Fairview Street, Clark Street, Fulton Street, and South Street from 9:00 PM to 3:00 AM. The turn prohibition is an attempt to minimize "cruising" traffic through the adjacent West Boulevard Historic District residential area. This report will focus on the urban portion of the corridor (from Cathedral Drive to West Omaha Street). The study intersections with Mount Rushmore Road are (from north to south):

Omaha Street & Mount Rushmore Road – Actuated Signalized intersection

North Approach: One left turn lane with 160 feet of storage, two through lanes, and one right turn lane with 100 feet of storage

South Approach: Two left turn lanes with 180 feet of storage, two through lanes, and one right turn lane with 180 feet of storage

East Approach: Two left turn lanes with 310 feet of storage, two through lanes, and one combined through/right turn lane

West Approach: Two left turn lanes with 285 feet of storage, three through lanes, and one right turn lane

The DM&E Railroad maintains a railroad crossing on Mount Rushmore Road between Omaha Street and Main Street. DM&E Railroad reported that they are typically running two (2) trains daily - 1 each to and from Belle Fourche (10 trains weekly) - 1 each to and from Pierre on Monday through Friday. This results in the railroad crossing being occupied four times per day Monday through Friday. The length of train varies from 10 to 100 cars depending on time of year and various factors such as weather delays. The average train length was reported to be 2500 feet (50 cars at 50 feet) with a speed of 10 mph. At a speed of 10 mph a 2500 foot long train would occupy the railroad crossing for 2 minutes 51 seconds. However, the impacts to vehicular progression on Mount Rushmore Road and other impacted roads may be felt for some time after a train has cleared the railroad crossing; potentially having negative impacts to emergency vehicle response times.

Main Street & Mount Rushmore Road – Pre-timed Signalized intersection

North Approach: One through lane, one combined through/right turn lane

South Approach: Two left turn lanes with 100 feet of storage, two through lanes

East Approach: Westbound one way - One combined through/left turn lane, one through lane, one combined through/right lane

St Joseph Street & Mount Rushmore Road – Pre-timed Signalized intersection
North Approach: Two through lanes, one left turn lane with 100 feet of storage
South Approach: Two through lanes, one combined through/right turn lane
West Approach: Eastbound one way - One combined through/left turn lane, one through lane, one combined through/right lane

Kansas City Street & Mount Rushmore Road – Actuated Signalized intersection
North Approach: One left turn lane with 50 feet of storage, one through lane, and one combined through/right turn lane
South Approach: One left turn lane with 50 feet of storage, two through lanes, and one combined through/right turn lane
East Approach: One TWLTL, one combined through/right turn lane
West Approach: One TWLTL, one combined through/right turn lane

Quincy Street & Mount Rushmore Road – Unsignalized intersection with stop control on Quincy Street
North Approach: One TWLTL, one through lane, one combined through/right turn lane
South Approach: One TWLTL, one through lane, one combined through/right turn lane
East Approach: One TWLTL, one combined through/right turn lane
West Approach: One TWLTL, one combined through/right turn lane

Columbus Street & Mount Rushmore Road – Actuated Signalized intersection
North Approach: One left turn lane with 100 feet of storage, one through lane, and one combined through/right turn lane
South Approach: One left turn lane with 100 feet of storage, one through lane, and one combined through/right turn lane
East Approach: One left turn lane with 70 feet of storage, one combined through/right turn lane
West Approach: One left turn lane with 70 feet of storage, one combined through/right turn lane

Franklin Street & Mount Rushmore Road – Actuated Signalized intersection
North Approach: One left turn lane with 60 feet of storage, one through lane, and one combined through/right turn lane
South Approach: One left turn lane with 50 feet of storage, one through lane, and one combined through/right turn lane
East Approach: One combined left/through/right turn lane
West Approach: One combined left/through/right turn lane

St Patrick Street & Mount Rushmore Road – Pre-timed Signalized intersection
North Approach: One left turn lane with 100 feet of storage, one through lane, and one combined through/right turn lane
South Approach: One left turn lane with 100 feet of storage, one through lane, and one combined through/right turn lane
East Approach: One left turn lane with 100 feet of storage, one combined through/right turn lane
West Approach: One combined left/through/right turn lane

Cathedral Drive & Mount Rushmore Road – Actuated Signalized intersection

North Approach: One left turn lane with 400 feet of storage, two through lanes, and one right turn lane with 170 feet of storage

South Approach: One left turn lane with 260 feet of storage, two through lanes, one channelized right turn lane with 270 feet of storage and free flow movement through the intersection.

East Approach: One left turn lane with 100 feet of storage, one combined through/right turn lane

West Approach: One left turn lane with 100 feet of storage, one through lane, and one right turn lane with 100 feet of storage

2.2 Existing Traffic Volumes

To understand the current traffic volumes on the area roadways, the latest traffic information was taken from several sources:

- AADT (Annual Average Daily Traffic) from the South Dakota Department of Transportation traffic volume maps in 2005 and 2006
- Raw count data from 2001-2006 from Rapid City MPO (Metropolitan Planning Organization)
- Peak hour turning movement count data – surveyed October/November 2007

2.3 2007 Capacity Analysis

Mount Rushmore Road was analyzed with existing geometry and the 2007 turning movement counts collected in October and November of 2007. The 2007 capacity analysis includes the following scenarios:

- 2007 AADT AM Traffic
- 2007 AADT PM Traffic
- 2007 Tourism Peak PM Traffic

The 2007 peak hours were multiplied by a factor of 0.97 to convert to equivalent AADT peak hours as directed by the city of Rapid City. These AADTs were divided by a factor of 0.86 to convert to Peak Summer Tourism ADTs as directed by the city of Rapid City. Each traffic signal's phases, timing, and offsets were not altered in order to reflect the current conditions. Each intersection was analyzed under each scenario and the results from the capacity analysis are shown in **Figures 2 through 10.** The 2007 capacity analysis worksheets can be found in **Appendix B**. An overview of each intersection's performance is below. If an approach received a LOS C or better it is not mentioned below.

Omaha Street & Mount Rushmore Road **(Figure 2)**
Overall LOS C may be expected under each scenario. Northbound and Southbound traffic on Mount Rushmore Road may expect LOS D in all scenarios.

Main Street & Mount Rushmore Road **(Figure 3)**
The westbound PM Peak Hour volume was roughly 1.7 times larger than the AM Peak Hour. This leads to a worsening of the LOS for the intersection in the PM. The PM Peak Hour during peak season may expect an overall intersection LOS D with the northbound approach on Mount Rushmore Road expecting a LOS E.

St Joseph Street & Mount Rushmore Road **(Figure 4)**
The eastbound AM Peak Hour volume was roughly 1.23 times larger than the PM Peak Hour. The intersection may expect to receive a LOS C for the AM scenario and a LOS B for the PM scenario. The eastbound approach may expect a LOS D during the peak season scenario, AM Peak Hour.

Kansas City Street & Mount Rushmore Road **(Figure 5)**
The overall LOS for this intersection under all scenarios was C or better. Under the PM Peak Hour, the eastbound approach received a LOS E and the westbound approach received a LOS C. Under the peak season scenario PM Peak Hour, the eastbound approach received a LOS F and the westbound approach received a LOS D.

Quincy Street & Mount Rushmore Road **(Figure 6)**
The northbound and southbound left-turning movement received a LOS B for the AM and PM peak hour scenarios. The eastbound and westbound approaches received a LOS F for the AM peak hour peak season. The 2007 traffic counts do not warrant a signal based on MUTCD signal warrants for traffic volumes.

Columbus Street & Mount Rushmore Road **(Figure 7)**
The overall LOS for this intersection under all scenarios was B or better. The east bound approach received a LOS D for the AM Peak Hour and peak season AM Peak Hour scenarios.

Franklin Street & Mount Rushmore Road **(Figure 8)**
The overall LOS for this intersection under all scenarios was A and each approach received a LOS of C or better.

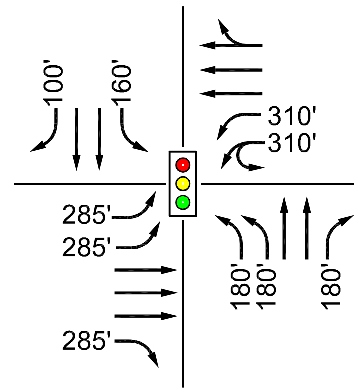
St Patrick Street & Mount Rushmore Road **(Figure 9)**
The overall LOS for this intersection under all scenarios was C. Under the peak season AM Peak Hour scenario, the westbound and eastbound approaches received a LOS D.

Cathedral Drive & Mount Rushmore Road **(Figure 10)**
Under the peak season AM Peak Hour scenario, the southbound approach received a LOS F, the westbound approach received a LOS E, and the overall intersection LOS was D.

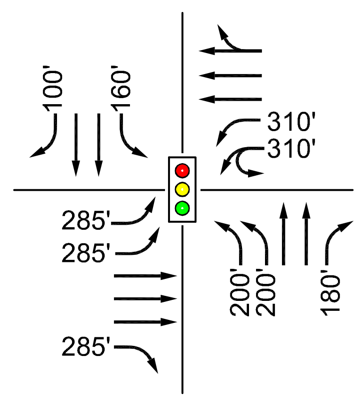
ANALYSIS SCENARIO	TURNING MOVEMENT VOLUMES	LEVEL OF SERVICE EXISTING GEOMETRY	LEVEL OF SERVICE RECOMMENED GEOMETRY
2007 AM Peak Hr	10 109 39 / 28 703 154 / 33 902 280 / 190 131 114	D; C C C; D	
2007 PM Peak Hr	31 164 39 / 12 844 219 / 58 878 209 / 296 178 184	D; C C C; D	
2007 PM Peak Hr Peak Season	35 189 45 / 12 984 256 / 67 1022 242 / 342 207 213	D; C C C; D	
2030 AM Peak Hr	30 200 50 / 40 770 290 / 30 940 250 / 230 180 320	C; C C C; C	
2030 PM Peak Hr	30 170 60 / 60 850 320 / 40 850 220 / 250 170 340	D; C C C; C	
2030 PM Peak Hr Peak Season	40 200 70 / 70 980 370 / 50 990 260 / 290 200 400	D; C C C; D	

INTERSECTION CONFIGURATION AND STORAGE LENGTHS

Existing Geometry



2030 Recommended Geometry



LEGEND

- B — Approach Level of Service
- C — Intersection Level of Service
- Traffic Signal
- 200' — Existing Storage Length
- 200'/200' — Minimum Storage Length / Recommended Length

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1: Omaha Street & Mt Rushmore Rd
Mount Rushmore Road Traffic Study

Figure 2

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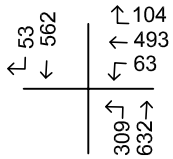
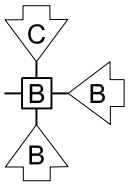
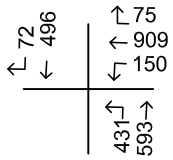
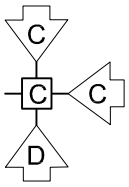
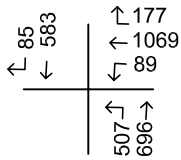
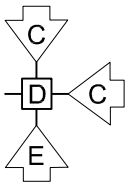
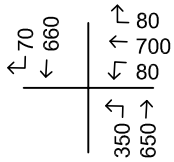
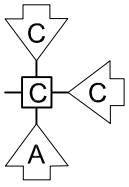
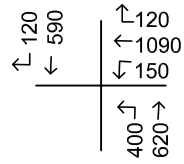
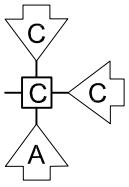
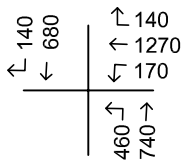
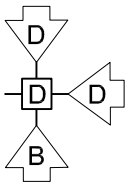
ANALYSIS SCENARIO	TURNING MOVEMENT VOLUMES	LEVEL OF SERVICE EXISTING GEOMETRY	LEVEL OF SERVICE RECOMMENED GEOMETRY	INTERSECTION CONFIGURATION AND STORAGE LENGTHS
2007 AM Peak Hr				
2007 PM Peak Hr				
2007 PM Peak Hr Peak Season				
2030 AM Peak Hr				
2030 PM Peak Hr				
2030 PM Peak Hr Peak Season				

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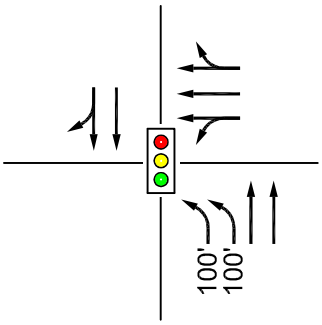

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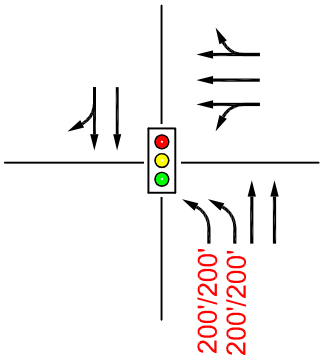

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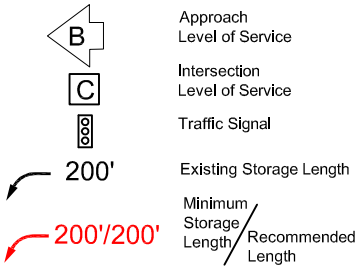

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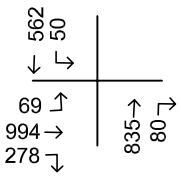
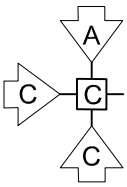
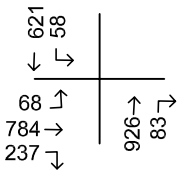
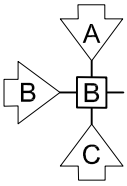
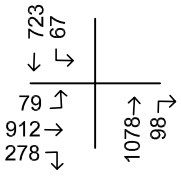
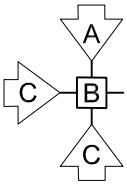
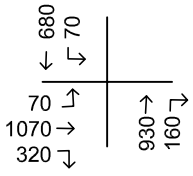
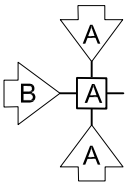
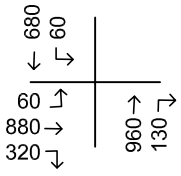
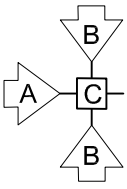
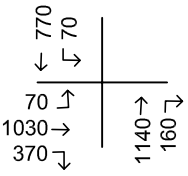
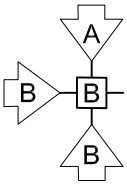
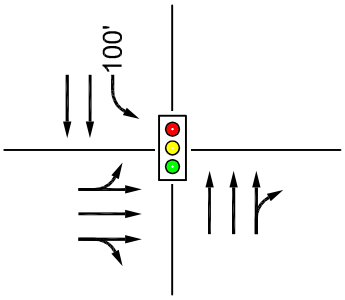
2. Main Street & Mt Rushmore Rd
Mount Rushmore Road Traffic Study

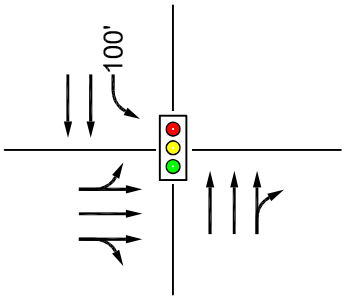
Figure 3

ANALYSIS SCENARIO	TURNING MOVEMENT VOLUMES	LEVEL OF SERVICE EXISTING GEOMETRY	LEVEL OF SERVICE RECOMMENED GEOMETRY	INTERSECTION CONFIGURATION AND STORAGE LENGTHS
2007 AM Peak Hr				
2007 PM Peak Hr				
2007 PM Peak Hr Peak Season				
2030 AM Peak Hr				
2030 PM Peak Hr				
2030 PM Peak Hr Peak Season				

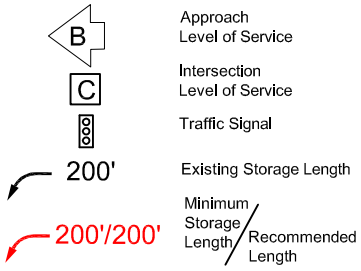
Existing Geometry



2030 Recommended Geometry



LEGEND



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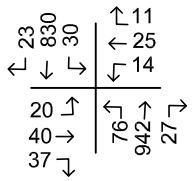
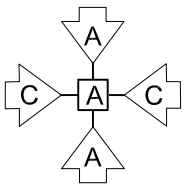
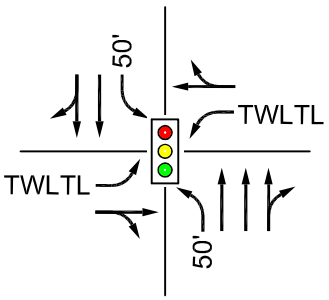
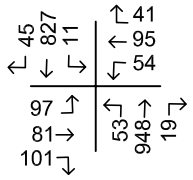
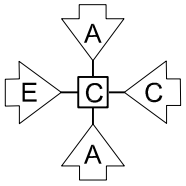
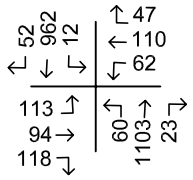
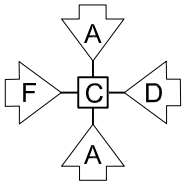
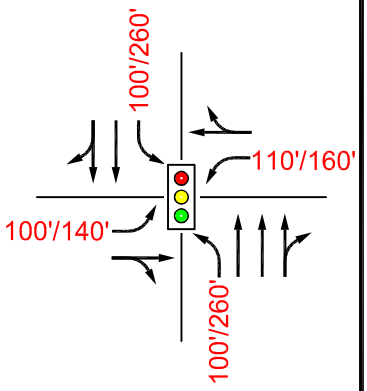
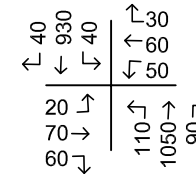
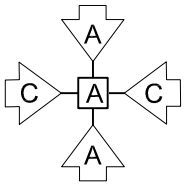
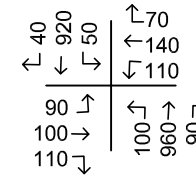
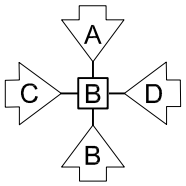
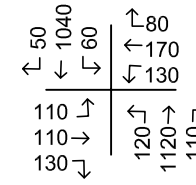
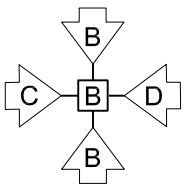
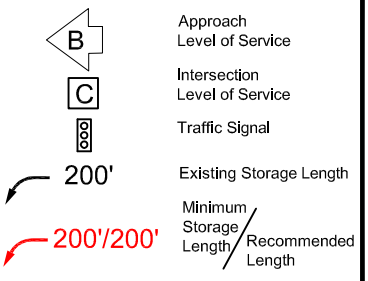
3. St. Joseph Street & Mt Rushmore Rd
Mount Rushmore Road Traffic Study

Figure 4

May 27, 2009 – 1:47pm – J:\trans\10406107\Traffic\Figures.dwg

ANALYSIS SCENARIO	TURNING MOVEMENT VOLUMES	LEVEL OF SERVICE EXISTING GEOMETRY	LEVEL OF SERVICE RECOMMENED GEOMETRY	INTERSECTION CONFIGURATION AND STORAGE LENGTHS
2007 AM Peak Hr				Existing Geometry 
2007 PM Peak Hr				
2007 PM Peak Hr Peak Season				
				2030 Recommended Geometry 
2030 AM Peak Hr				
2030 PM Peak Hr				
2030 PM Peak Hr Peak Season				LEGEND 

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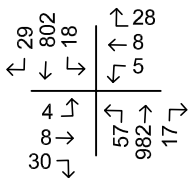
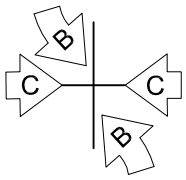
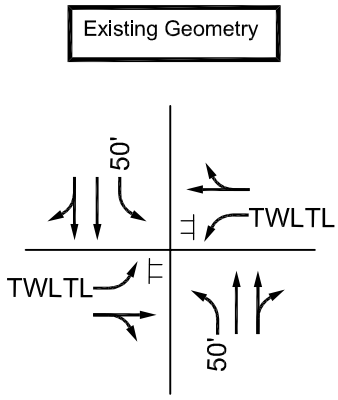
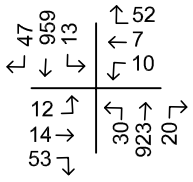
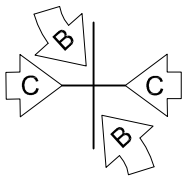
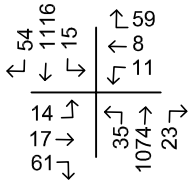
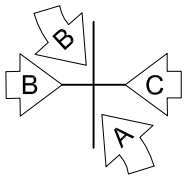
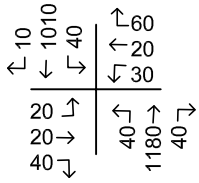
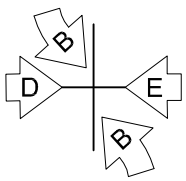
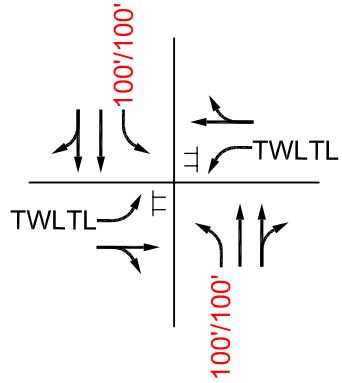
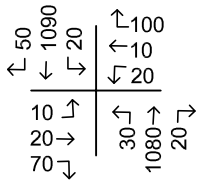
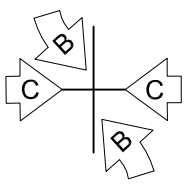
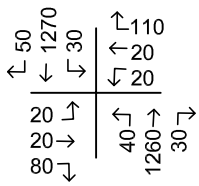
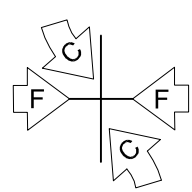
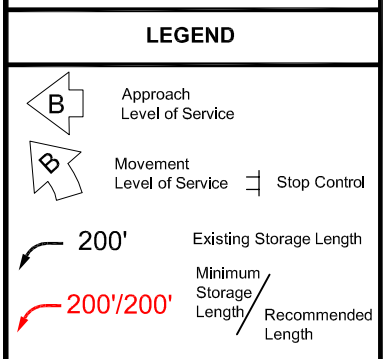
4. Kansas City Street & Mt Rushmore Rd
Mount Rushmore Road Traffic Study

Figure 5

May 27, 2009 – 1:47pm – J:\trans\10406107\Traffic\Figures.dwg

ANALYSIS SCENARIO	TURNING MOVEMENT VOLUMES	LEVEL OF SERVICE EXISTING GEOMETRY	LEVEL OF SERVICE RECOMMENED GEOMETRY	INTERSECTION CONFIGURATION AND STORAGE LENGTHS
2007 AM Peak Hr				
2007 PM Peak Hr				
2007 PM Peak Hr Peak Season				
2030 AM Peak Hr				
2030 PM Peak Hr				
2030 PM Peak Hr Peak Season				

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5. Quincy Street & Mt Rushmore Rd
Mount Rushmore Road Traffic Study

Figure 6

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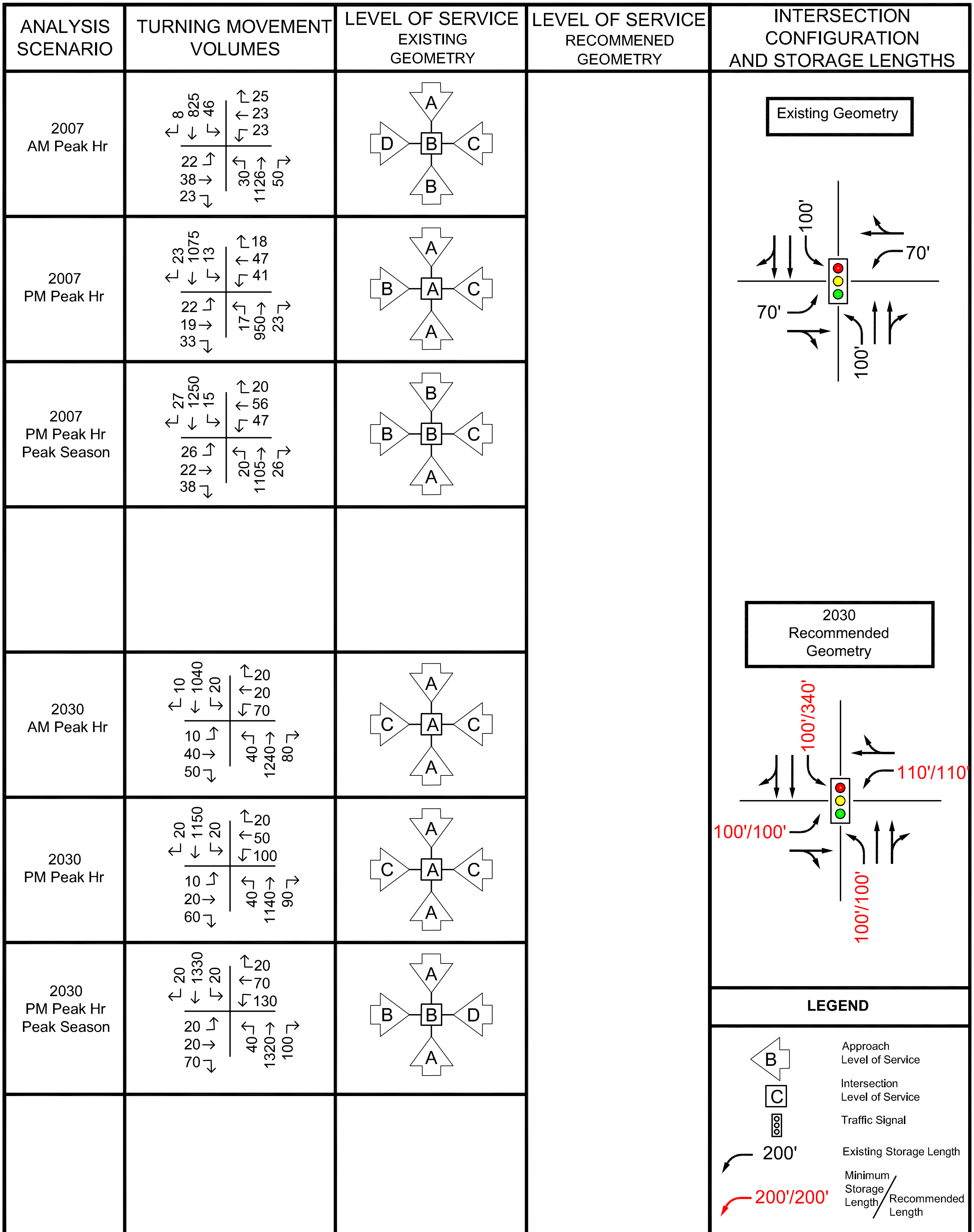

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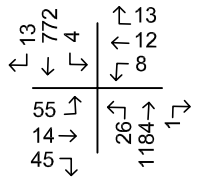
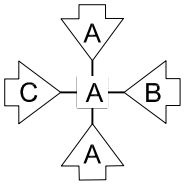
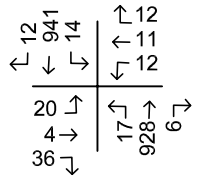
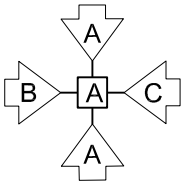
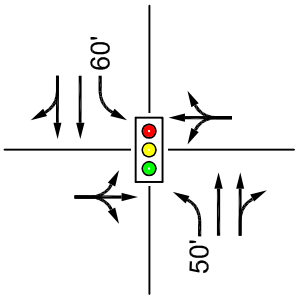
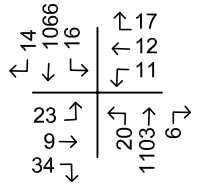
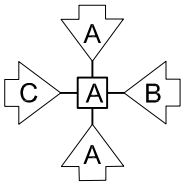
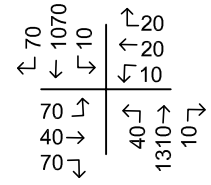
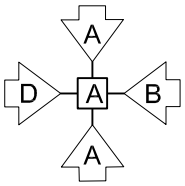
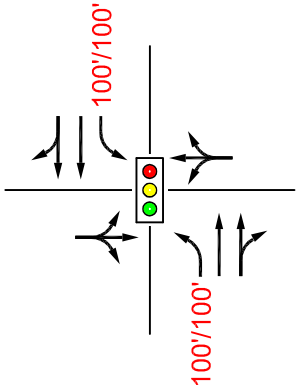
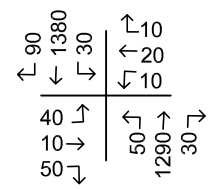
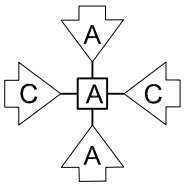
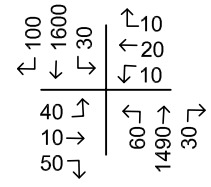
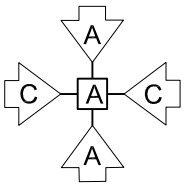
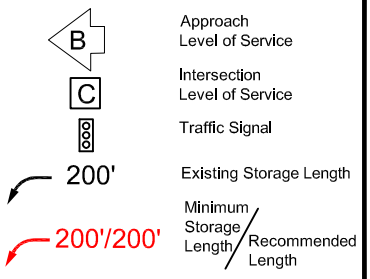
6. Columbus Street & Mt Rushmore Rd

Mount Rushmore Road Traffic Study

Figure 7

May 27, 2009 – 1:47pm – J:\trans\10406107\Traffic\Figures.dwg

ANALYSIS SCENARIO	TURNING MOVEMENT VOLUMES	LEVEL OF SERVICE EXISTING GEOMETRY	LEVEL OF SERVICE RECOMMENED GEOMETRY	INTERSECTION CONFIGURATION AND STORAGE LENGTHS
2007 AM Peak Hr				Existing Geometry
2007 PM Peak Hr				
2007 PM Peak Hr Peak Season				
				2030 Recommended Geometry
2030 AM Peak Hr				
2030 PM Peak Hr				
2030 PM Peak Hr Peak Season				**LEGEND** 

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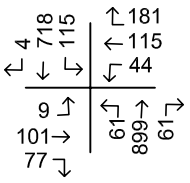
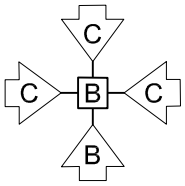
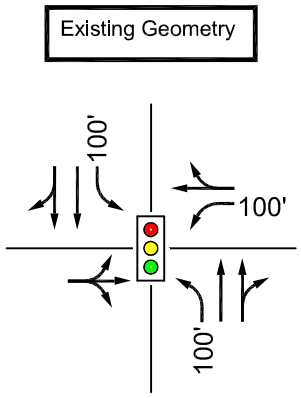
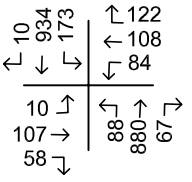
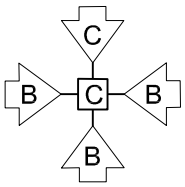
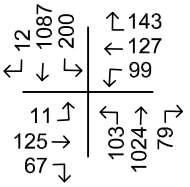
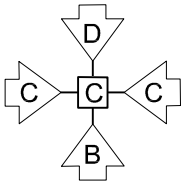
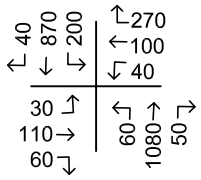
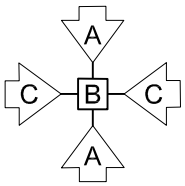
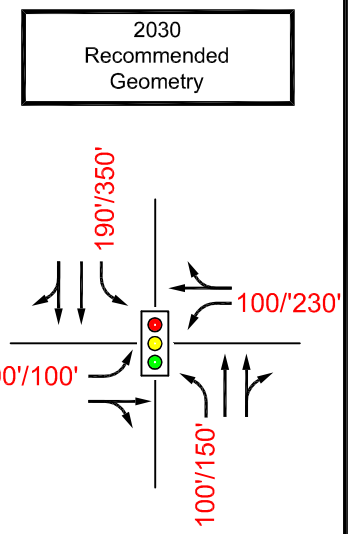
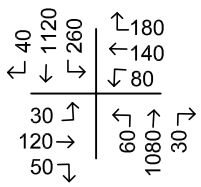
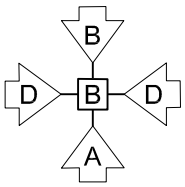
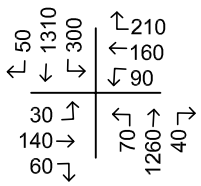
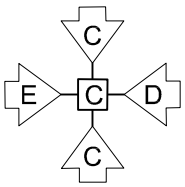
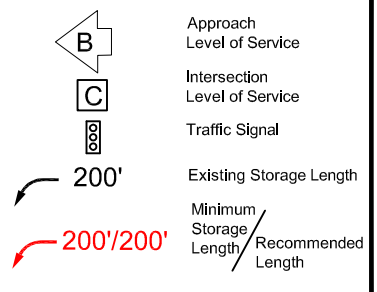
7. Franklin Street & Mt Rushmore Rd
Mount Rushmore Road Traffic Study

Figure 8

May 27, 2009 – 1:47pm – J:\trans\10406107\Traffic\Figures.dwg

ANALYSIS SCENARIO	TURNING MOVEMENT VOLUMES	LEVEL OF SERVICE EXISTING GEOMETRY	LEVEL OF SERVICE RECOMMENED GEOMETRY	INTERSECTION CONFIGURATION AND STORAGE LENGTHS
2007 AM Peak Hr				
2007 PM Peak Hr				
2007 PM Peak Hr Peak Season				
2030 AM Peak Hr				
2030 PM Peak Hr				
2030 PM Peak Hr Peak Season				

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8. St. Patrick St & Mt Rushmore Rd
Mount Rushmore Road Traffic Study

Figure 9

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ANALYSIS SCENARIO	TURNING MOVEMENT VOLUMES	LEVEL OF SERVICE EXISTING GEOMETRY	LEVEL OF SERVICE RECOMMENED GEOMETRY	INTERSECTION CONFIGURATION AND STORAGE LENGTHS
2007 AM Peak Hr	26 ↲ 214 ↓ 482 ↳ 4 ↳ 5 → 2 ↲ ↱ 526 ← 18 ↰ 138 ↰ 13 529 → 283 ↱	C C C C B		Existing Geometry 170' 400' 350' 100' 100' 100' 260' 270'
2007 PM Peak Hr	19 ↲ 455 ↓ 427 ↳ 21 ↳ 20 → 9 ↲ ↱ 417 ← 14 ↰ 192 ↰ 11 364 → 110 ↱	A C B C B		
2007 PM Peak Hr Peak Season	22 ↲ 528 ↓ 498 ↳ 24 ↳ 23 → 10 ↲ ↱ 484 ← 17 ↰ 224 ↰ 13 425 → 129 ↱	B C B C B		
2030 AM Peak Hr	10 ↲ 490 ↓ 420 ↳ 30 ↳ 30 → 90 ↲ ↱ 460 ← 40 ↰ 190 ↰ 50 730 → 370 ↱	B B B B B		2030 Recommended Geometry 170' 200'/200' 350' 180'/180' 100' 100' 100'/250' 100'/250'
2030 PM Peak Hr	10 ↲ 770 ↓ 440 ↳ 30 ↳ 60 → 30 ↲ ↱ 440 ← 20 ↰ 220 ↰ 20 670 → 240 ↱	B C B B C		
2030 PM Peak Hr Peak Season	10 ↲ 890 ↓ 510 ↳ 60 ↳ 60 → 30 ↲ ↱ 510 ← 20 ↰ 250 ↰ 20 780 → 280 ↱	A B B B B		LEGEND B Approach Level of Service C Intersection Level of Service Traffic Signal 200' Existing Storage Length 200'/200' Minimum Storage Length / Recommended Length

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9. Cathedral Dr & Mt Rushmore Rd
Mount Rushmore Road Traffic Study

Figure 10

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3.0 FUTURE CONDITIONS

The traffic analysis includes the following scenarios:

- 2030 AADT AM Peak Traffic
- 2030 AADT PM Peak Traffic
- 2030 Tourism Peak PM Peak Traffic

3.1 Assigned Volume Calculations

The 2030 baseline traffic volumes were developed from the 2030 Forecast Volumes map provided by the city of Rapid City. If the volumes were not indicated on the 2030 map, the 2025 Forecast Volumes map and reasonable engineering judgment were used to develop the 2030 AADTs (Average Annual Daily Traffic). The growth of side street traffic was estimated to be minimal due to the fully developed nature of the corridor and the topographical limitations to development to the west. Minor side street traffic was estimated as the current AADT on the west approach and minimal growth was applied to the east approach. To determine volumes for the Tourism Peak scenario, the 2030 AADTs were divided by a factor of 0.86 to derive Tourism Peak ADTs (Average Daily Traffic) as instructed by the city of Rapid City. The 2030 traffic volumes are displayed on **Figure 1**.

The volume of traffic during the peak hour compared to the 24-hour volume is known as the k-factor. The 2007 AM and PM peak hour volumes were compared to the 2006 24-hour counts compiled by the city of Rapid City in order to determine the existing k-factor. The study area k-factors are displayed below in **Table 1**.

Table 1 – Study Area k-factors

Street	Between B/C	2006 24-Hour Counts	AM Peak Hr Volume	PM Peak Hr Volume	AM k-factor	PM k-factor
Mount Rushmore Road	E North St/Omaha St	6664	350	482	0.05	0.07
	Omaha St/Main St	20399	1351	1250	0.07	0.06
	Main St/St Joseph St	23184	1566	1670	0.07	0.07
	St Joseph St/Columbus St	26859	2052	2101	0.08	0.08
	Columbus St/St Cloud St	28389	2041	2139	0.07	0.08
	St Cloud St/St Patrick St	24532	2036	2129	0.08	0.09
	St Patrick St/Flormann St	25470	1860	2111	0.07	0.08
	Flormann St/Cathedral Dr	25846	1781	1703	0.07	0.07
	Cathedral Dr/Skyline Dr	12915	1179	1141	0.09	0.09
Omaha Street	5th St/MRR	34262	1940	2176	0.06	0.06
Main Street	9th St/W Blvd**	16727	855	1412	0.05	0.08
	5th St/6th St**	14658	660	1134	0.05	0.08
St Joseph Street	9th St/W Blvd	18202	1341	1089	0.07	0.06
	5th St /6th St	15880	1124	925	0.07	0.06

The AM and PM k-factors in the study are range from 0.05 to 0.09. The 2030 k-factors are assumed to be similar to the existing k-factors. A k-factor of 0.07 was used for the AM peak hour in the CBD and 0.08 outside of the CBD on Mount Rushmore Road. A k-factor of 0.07 was used for the PM peak hour in the CBD and 0.09 outside of the CBD on Mount Rushmore Road.

Each approach's peak hour traffic was distributed as left turn movements, through movements, and right turn movements using similar proportions as the 2007 turning movements. Engineering judgment was used to adjust the volumes that did not appear consistent with the current turning movements and to balance the amount of vehicles exiting an intersection with the amount of vehicles entering an upstream intersection. The projected 2030 turning movements can be found in **Appendix C**.

3.2 Truck Traffic/ESALs

With the construction of the Southeast Connector (US Highway 16B) at the intersection of Mount Rushmore Road and Catron Boulevard approximately 3 miles south of Cathedral Drive, truck traffic through the Mount Rushmore Road corridor has been reduced. Traffic data from the 2007 peak hour counts calculated truck traffic as low as 0.6% to as high as 1.9% at each intersection. For Equivalent Single Axel Load (ESAL) calculations, the truck traffic was conservatively assessed as 3% of total traffic. **Table 2** below displays the calculations and the results.

Table 2: ESAL Calculations

VEHICLE CLASS	*% BY CLASS*	*VOLUME BY CLASS*	*FLEXIBLE ESAL RATE*	*FLEXIBLE ESALs BY CLASS*	*RIGID ESAL RATE*	*RIGID ESALs BY CLASS*
1-4	97	31040	-	-	-	-
5	0.60000	192	0.15	28.80	0.20	38.40
6	0.60000	192	0.45	86.40	0.68	130.56
7	0.60000	192	1.00	192.00	1.90	364.80
8	0.60000	192	0.40	76.80	0.45	86.40
9	0.30000	96	1.10	105.60	1.90	182.40
10	0.30000	96	0.78	74.88	1.40	134.40
11	0.00000	0	1.60	0.00	1.80	0.00
12	0.00000	0	1.20	0.00	1.40	0.00
13	0.00000	0	1.60	0.00	2.20	0.00
TOTALS	100	32000		564.48		936.96

AADT	%	**FLEXIBLE ESALs**	**RIGID ESALs**
YEAR 2030	TRUCKS	**YEAR 2030**	**YEAR 2030**
32000	3	**564**	**937**

3.3 2030 Signal Warrant Analysis

A signal warrant analysis was conducted at the intersection of Quincy Street and Mount Rushmore Road determined that a signal was not warranted for 2007 at this intersection based on capacity. Traffic counts were only taken for 3 hours in the AM and 3 hours in the PM but only the PM peak hour volume was above the threshold for Warrant 1B while no other hourly volumes met the minimums set for Warrants 1, 2 or 3. The 2030 AADT projects similar minor street volumes on Quincy Street; thus no signal may be warranted in the future due to these Warrants.

A signal warrant analysis was conducted at the intersection of Flormann Street and Mount Rushmore Road. The most recent traffic data available was from 2000. Those data indicate volume of traffic on the minor road did not satisfy the minimum threshold for any volume-based signal warrant. It is recommended to conduct traffic counts at this location to determine if a signal is warranted.

3.4 2030 Capacity Analysis

Mount Rushmore Road was analyzed with existing geometry and the 2030 projected traffic. The existing cycle length of 84 seconds was maintained in the CBD while all other intersections were assumed to operate as actuated/coordinated signals. Each traffic signal's phases, timing, and offsets were optimized for the 2030 volumes. Both leading and lagging left turns were implemented to improve traffic progression through the network. Intersection geometry and lane configuration was improved as needed to meet a LOS C for the intersection. The results from the capacity analysis based upon recommended geometry are shown in **Figures 2 through 10.** The capacity analysis worksheets can be found in **Appendix D**. The storage lengths are provided as both the minimum length required to store the turning vehicles and as the recommended length that considers the queue storage length of the adjacent through lane. The recommend length provides an opportunity for the turning vehicles to enter their respective turn lane without waiting for the through lane's standing queue to discharge through the intersection. The recommend lengths will be displayed below while the minimum lengths can be found in the corresponding figures. The following is a summary of each analyzed intersection.

Omaha Street & Mount Rushmore Road **(Figure 2)**
The current geometric lane configuration is adequate to achieve a LOS C in 2030. Adjustments to the intersection's phases, timing, and offsets may also be required.

Main Street & Mount Rushmore Road **(Figure 3)**
North Approach: No geometric changes needed.
South Approach: The northbound double left turn lanes may require 200 feet of storage.
East Approach: No geometric changes recommended.
West Approach: No geometric changes recommended.

St Joseph Street & Mount Rushmore Road **(Figure 4)**
North Approach: No geometric changes recommended.
South Approach: No geometric changes recommended.
East Approach: No geometric changes recommended.
West Approach: No geometric changes recommended.

Kansas City Street & Mount Rushmore Road **(Figure 5)**
North Approach: Increase the southbound left turn lane storage to 100 feet.
South Approach: Increase the northbound left turn lane storage to 260 feet.
East Approach: Increase the westbound left turn lane storage to 140 feet.
West Approach: Increase the eastbound left turn lane storage to 160 feet.

Quincy Street & Mount Rushmore Road **(Figure 6)**
Signal may not be warranted.
North Approach: Increase the southbound left turn lane storage to 100 feet.
South Approach: Increase the northbound left turn lane storage to 100 feet.
East Approach: No geometric changes recommended.
West Approach: No geometric changes recommended.

Columbus Street & Mount Rushmore Road (**Figure 7**)
North Approach: Increase the southbound left turn lane storage to 340 feet.
South Approach: Increase the northbound left turn lane storage to 100 feet.
East Approach: Increase the westbound left turn lane storage to 110 feet.
West Approach: Increase the eastbound left turn lane storage to 100 feet.

Franklin Street & Mount Rushmore Road (**Figure 8**)
North Approach: Increase the southbound left turn lane storage to 100 feet.
South Approach: Increase the northbound left turn lane storage to 100 feet.
East Approach: No geometric changes recommended.
West Approach: No geometric changes recommended.

St Patrick Street & Mount Rushmore Road (**Figure 9**)
North Approach: Increase the southbound left turn lane storage to 350 feet.
South Approach: Increase the northbound left turn lane storage to 150 feet.
East Approach: Increase the westbound left turn lane storage to 230 feet.
West Approach: Construct eastbound left turn lane with 100 feet of storage. Additional left turns are generated from a coffee shop located in the northwest quadrant of this intersection constructed after the turning movements were recorded. This lane will oppose the existing westbound left turn lane and may require reconstruction of curb and gutter to facilitate construction.
Install actuated coordinated controller to increase efficiency of the signal.

Cathedral Drive & Mount Rushmore Road (**Figure 10**)
North Approach: Construct southbound double left turn lanes with 200 feet of storage.
South Approach: Yield control on northbound channelized right turn lane.
East Approach: Increase the westbound left turn lane storage to 180 feet. Construct additional eastbound receiving lane.
West Approach: No geometric changes recommended.

Arterial Level of Service

An arterial level of service analysis was conducted for the 2030 AM Peak Season and the 2030 PM Peak Season scenarios. The worksheets can be found in **Appendix E**. These scenarios were analyzed with all of the proposed recommendations in place. Chapter 15 of the *Highway Capacity Manual 2000* gives outlines as to acceptable levels of service dependent on the urban street class and the average travel speed. The central business district from Omaha Street to Columbus Street was classified as a class IV urban street and Columbus Street to Cathedral Drive was classified as a class III urban street. This division allows for different acceptable average travel speeds.

AM Peak

The central business district portion of the arterial could expect to receive a LOS C for northbound and LOS D for southbound traffic. The remaining portion of the arterial could expect to receive a LOS B for northbound and southbound traffic.

PM Peak

The central business district portion of the arterial could expect to receive a LOS C for northbound and LOS D for southbound traffic. The remaining portion of the arterial could expect to receive a LOS B for northbound and southbound traffic.

PM Peak, Peak Season
The central business district portion of the arterial could expect to receive a LOS C for northbound and LOS E for southbound traffic. The remaining portion of the arterial could expect to receive a LOS C for northbound and a LOS B for southbound traffic.

3.5 2030 Progression Analysis

The existing cycle length of 84 seconds in the CBD was used at all signals for the 2030 progression analysis. All signals outside of the CBD were assumed to be actuated/coordinated. The master controller location would be chosen by the City of Rapid City.

AM Peak Hour
The progression analysis was completed with the AM peak hour traffic. Synchro assumes an arbitrary starting point of zero seconds and calculates the following offsets:

Mt Rushmore Rd/Omaha St:	Not coordinated – heavy traffic volume
Mt Rushmore Rd/Main St:	0 second offset, north-south beginning of green
Mt Rushmore Rd/St. Joseph St:	8 second offset, north-south beginning of green
Mt Rushmore Rd/Kansas City St:	8 second offset, north-south beginning of green
Mt Rushmore Rd/Columbus St:	39 second offset, north-south beginning of green
Mt Rushmore Rd/Franklin St:	83 second offset, north-south beginning of green
Mt Rushmore Rd/St Patrick St:	81 second offset, north-south beginning of green
Mt Rushmore Rd/Cathedral Dr:	20 second offset, north-south beginning of green

With these settings during 90th percentile traffic conditions, the northbound arterial band is 28 seconds and the southbound arterial band is 16 seconds.

PM Peak Hour
The progression analysis was completed with the PM peak hour traffic. Synchro assumes an arbitrary starting point of zero seconds and calculates the following offsets:

Mt Rushmore Rd/Omaha St:	Not coordinated – heavy traffic volume
Mt Rushmore Rd/Main St:	30 second offset, north-south beginning of green
Mt Rushmore Rd/St. Joseph St:	34 second offset, north-south beginning of green
Mt Rushmore Rd/Kansas City St:	39 second offset, north-south beginning of green
Mt Rushmore Rd/Columbus St:	67 second offset, north-south beginning of green
Mt Rushmore Rd/Franklin St:	26 second offset, north-south beginning of green
Mt Rushmore Rd/St Patrick St:	80 second offset, north-south beginning of green
Mt Rushmore Rd/Cathedral Dr:	27 second offset, north-south beginning of green

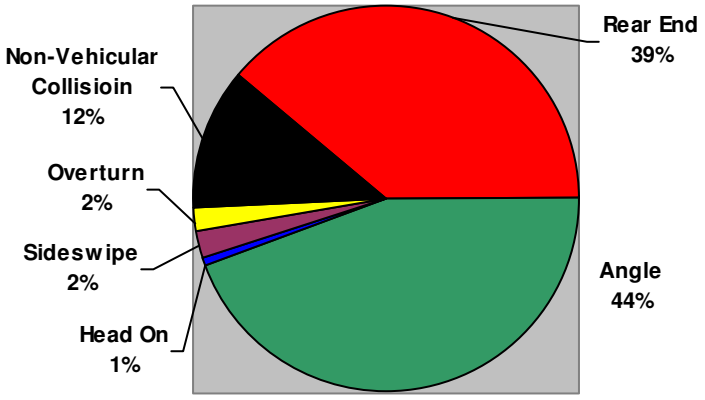
With these settings during average traffic conditions the northbound arterial band is 15 seconds, the southbound would have an arterial band of 26 seconds.

4.0 CRASH ANALYSIS

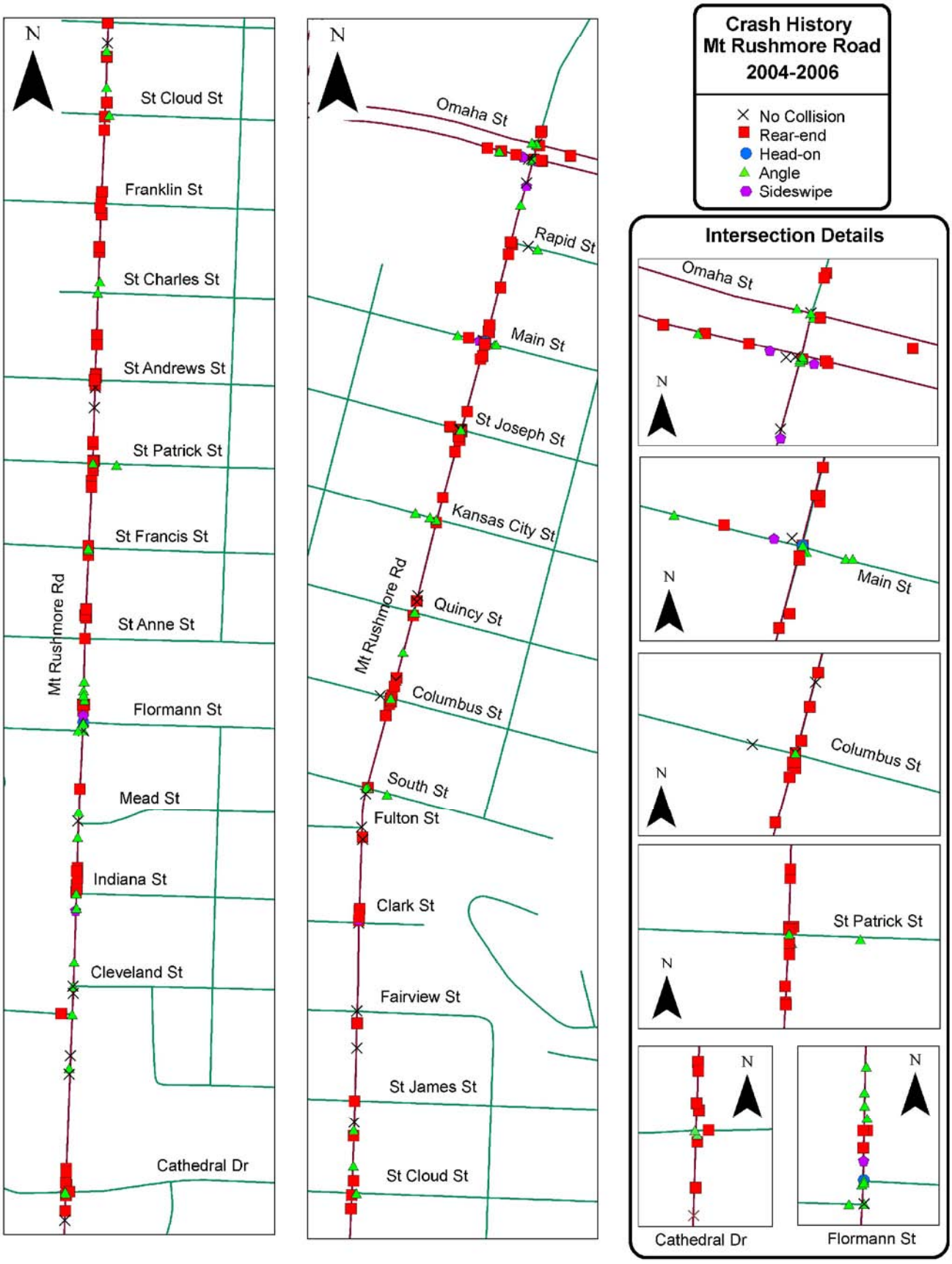
Crash data for Mount Rushmore Road from 2004 to 2006 was analyzed to determine crash trends and possible counter-measures to address these trends. **Figure 11 on the following page** displays each crash in the corridor graphically and symbolically displays the manner of collision.

- 323 crashes from January 1, 2004 to December 31 2006
- Crashes decreased from 126 in 2004, 105 in 2005 and 92 in 2006. This most likely can be attributed to the decrease in overall traffic along the corridor during this time period.
- Accident rate is 547 per hundred-million vehicle miles (HMVM) versus statewide average of 197 per HMVM for the years 2004 to 2006. Data was not readily available for South Dakota urban streets, but for comparative purposes Wisconsin DOT averaged 322 accidents per HMVM for their urban streets.
- 39% of all crashes were rear end collisions **Figure 12** below displays each crash type as a percentage of all crashes in the corridor.
- 44% of all crashes were angle collisions. The angle collisions can be broken down further as:
    - 18% of all crashes were left- turn collisions at intersections.
    - 14% of all crashes were right-angle collisions at intersections
    - 8% of all crashes occurred at driveways

Figure 12: Crash Type - Manner of Collision



- Only 4 crashes involved parking maneuvers on St Joseph and Main Street.
- 1 fatality along the corridor during the three year time period. This crash involved an intoxicated pedestrian stepping into the roadway and being struck by a vehicle. This crashed occurred at the intersection of St Cloud Street and Mount Rushmore Road. This crash occurred at night
- 28% of all crashes involved injuries. The South Dakota statewide average for US/State Highways in cities was 39% for 2004 to 2006.
- 7% of all crashes involved incapacitating injuries.
- 18% of all crashes occurred at night but under lit conditions.



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Crash Type Map
Mount Rushmore Road Traffic Study

Figure 11

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- 4% of all crashes involved alcohol which is below the statewide average of 6.8% of all crashes.
- A concentration of crashes occurred mid-block between Flormann Street and St Anne Street. This location is adjacent to Safeway grocery store driveway

4.1 Recommended Counter-Measures

- Consolidate driveways to reduce access to Mount Rushmore Road from adjacent properties.
- Consider removing Safeway grocery store driveway from Mount Rushmore Road and utilize access from side streets.
- Evaluate the entire street lighting system for conformance to AASHTO lighting levels, in particular from St Patrick Street to St Andrew Street. A total of 10 night-time crashes occurred at these intersections or between them.

Table 3 below displays the crash type for the crash study period.

Table 3 - Crash Summary Table												
	Accident Type											
Location	Rear Ends	Angle	Head On	Sideswipe	Overturn	Non-Vehicular Collision	Parked Car	Wild Animal	Other	Pedestrian	Pedcycle	Total
Divided Median up to	2					1		7				**10**
Cathedral Drive	13	7			1							**21**
Between		1					1	1				**3**
Highland Parks Drive	1	1										**2**
Between												**0**
Cleveland Street		1				1					1	**3**
Between		1										**1**
Indiana Street	6	3		1								**10**
Between												**0**
Meade Street		2			1			1				**4**
Between	1											**1**
Flormann Street		8	1						1			**10**
Between	3	4		1								**8**
St Anne Street		2										**2**
Between	4											**4**
St Francis Street	1	4							1			**6**
Between	4											**4**
St Patrick Street	6	12										**18**
Between	2				1							**3**
St Andrews Street	8	1				2						**11**
Between	2											**2**
St Charles Street		1										**1**
Between	4	2										**6**
Franklin Street	2	1				1						**4**
Between	2											**2**
St Cloud Street	1	1								1		**3**
Between	2	2						1				**5**
St James Street	1											**1**
Between	1								1			**2**
Fairview Street								1				**1**
Between												**0**
Clark Street	4				1					1		**6**
Between	1					1						**2**
Fulton Street						1						**1**
Between						1						**1**
South Street	1	4										**5**
Between												**0**
Columbus Street	12	3					1			1	1	**18**
Between		1										**1**
Quincy Street	3	5			1	1						**10**
Between												**0**
Kansas City Street	3	9										**12**
Between												**0**
St Joseph Street	10	11		1						1	2	**25**
Between												**0**
Main Street	11	29	1	2					1			**44**
Between	1											**1**
Rapid Street	3	3					1					**7**
Between		1		1		1						**3**
Omaha Street	10	23		2		1			1	1	1	**39**
Totals	**125**	**143**	**2**	**8**	**5**	**11**	**3**	**11**	**5**	**5**	**5**	**323**
Percentage of Total	39%	44%	1%	2%	2%	3%	1%	3%	2%	2%	2%	

5.0 SUMMARY AND RECOMMENDATIONS

The purpose of this report is to document the results of a traffic operations study conducted along Mount Rushmore Road from Omaha Street to Cathedral Drive in Rapid City, SD. A vicinity map is shown in **Figure 1**. The traffic study considers the impacts of year 2030 traffic volumes to the existing roadway network. The following intersections were analyzed with future traffic conditions.

- West Omaha Street
- Main Street
- St Joseph Street
- Kansas City Street
- Quincy Street
- Columbus Street
- Franklin Street
- St Patrick Street
- Cathedral Drive
- US Highway 16B (Truck Bypass) / Catron Boulevard

The recommendations below are needed to achieve a LOS C during the largest 2030 peak hour at each intersection. Each traffic signal's phases, timing, and offsets were optimized for the 2030 volumes. Leading and lagging left turns were considered to improve traffic flow through the network.

Omaha Street & Mount Rushmore Road **(Figure 2)**
The current geometric lane configuration is adequate to achieve a LOS C in 2030. Adjustments to the intersection's phases, timing, and offsets may also be required.

Main Street & Mount Rushmore Road **(Figure 3)**
North Approach: No geometric changes needed.
South Approach: The northbound double left turn lanes may require 200 feet of storage.
East Approach: No geometric changes recommended.
West Approach: No geometric changes recommended.

St Joseph Street & Mount Rushmore Road **(Figure 4)**
North Approach: No geometric changes recommended.
South Approach: No geometric changes recommended.
East Approach: No geometric changes recommended.
West Approach: No geometric changes recommended.

Kansas City Street & Mount Rushmore Road **(Figure 5)**
North Approach: Increase the southbound left turn lane storage to 100 feet.
South Approach: Increase the northbound left turn lane storage to 260 feet.
East Approach: Increase the westbound left turn lane storage to 140 feet.
West Approach: Increase the eastbound left turn lane storage to 160 feet.

Quincy Street & Mount Rushmore Road **(Figure 6)**
Signal may not be warranted.
North Approach: Increase the southbound left turn lane storage to 100 feet.
South Approach: Increase the northbound left turn lane storage to 100 feet.
East Approach: No geometric changes recommended.
West Approach: No geometric changes recommended.

Columbus Street & Mount Rushmore Road **(Figure 7)**
North Approach: Increase the southbound left turn lane storage to 340 feet.
South Approach: Increase the northbound left turn lane storage to 100 feet.
East Approach: Increase the westbound left turn lane storage to 110 feet.
West Approach: Increase the eastbound left turn lane storage to 100 feet.

Franklin Street & Mount Rushmore Road **(Figure 8)**
North Approach: Increase the southbound left turn lane storage to 100 feet.
South Approach: Increase the northbound left turn lane storage to 100 feet.
East Approach: No geometric changes recommended.
West Approach: No geometric changes recommended.

St Patrick Street & Mount Rushmore Road **(Figure 9)**
North Approach: Increase the southbound left turn lane storage to 350 feet.
South Approach: Increase the northbound left turn lane storage to 150 feet.
East Approach: Increase the westbound left turn lane storage to 230 feet.
West Approach: Construct eastbound left turn lane with 100 feet of storage. Additional left turns are generated from a coffee shop located in the northwest quadrant of this intersection constructed after the turning movements were recorded. This lane will oppose the existing westbound left turn lane and may require reconstruction of curb and gutter to facilitate construction.
Install actuated coordinated controller to increase efficiency of the signal.

Cathedral Drive & Mount Rushmore Road **(Figure 10)**
North Approach: Construct southbound double left turn lanes with 200 feet of storage.
South Approach: Yield control on northbound channelized right turn lane.
East Approach: Increase the westbound left turn lane storage to 180 feet. Construct additional eastbound receiving lane.
West Approach: No geometric changes recommended.

Arterial Level of Service

An arterial level of service analysis was conducted for the 2030 AM Peak Season and the 2030 PM Peak Season scenarios. The worksheets can be found in **Appendix E**. These scenarios were analyzed with all of the proposed recommendations in place. Chapter 15 of the *Highway Capacity Manual 2000* gives outlines as to acceptable levels of service dependent on the urban street class and the average travel speed. The central business district from Omaha Street to Columbus Street was classified as a class IV urban street and Columbus Street to Cathedral Drive was classified as a class III urban street. This division allows for different acceptable average travel speeds.

AM Peak

The central business district portion of the arterial could expect to receive a LOS C for northbound and LOS D for southbound traffic. The remaining portion of the arterial could expect to receive a LOS B for northbound and southbound traffic.

PM Peak

The central business district portion of the arterial could expect to receive a LOS C for northbound and LOS D for southbound traffic. The remaining portion of the arterial could expect to receive a LOS B for northbound and southbound traffic.

PM Peak, Peak Season

The central business district portion of the arterial could expect to receive a LOS C for northbound and LOS E for southbound traffic. The remaining portion of the arterial could expect to receive a LOS C for northbound and a LOS B for southbound traffic.

It is not recommended to add additional through lanes from Kansas City Street to Cathedral Drive as that portion of the arterial meets or exceeds a LOS C from both intersection capacity and arterial analysis standpoint. Additional through lanes may improve the capacity of the road from Kansas City Street to Omaha Street but is not recommended due to feasibility.

From a crash history perspective, the following recommendations are made to reduce the potential for collisions.

- Consolidate driveways to reduce access to Mount Rushmore Road from adjacent properties.
- Consider removing Safeway grocery store driveway from Mount Rushmore Road and utilize access from side streets.
- Evaluate the entire street lighting system for conformance to AASHTO lighting levels, in particular from St Patrick Street to St Andrew Street. A total of 10 night-time crashes occurred at these intersections or between them.

With the above geometric and operational recommendations, Mount Rushmore Road is recommended to continue to operate as a 4-lane roadway with appropriate turn lanes at intersections. A raised median is recommended to be considered at feasible locations to further minimize vehicular conflicts and potential crashes resulting from vehicles accessing adjacent private driveways.

APPENDIX A
2007 Raw and Factored Counts

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Raw Count Data

File Name : Omaha
Site Code : 1
Start Date : 11/29/2007
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

	RUSHMORE RD From North					OMAHA ST From East					RUSHMORE RD From South					OMAHA ST From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	0	11	2	1	14	2	56	11	0	69	4	2	9	0	15	20	61	0	0	81	179
06:15 AM	1	6	0	0	7	1	71	7	0	79	8	5	15	0	28	28	64	3	0	95	209
06:30 AM	2	15	1	0	18	0	96	17	0	113	11	12	29	0	52	40	101	2	0	143	326
06:45 AM	2	22	4	0	28	0	150	23	0	173	8	5	40	0	53	44	143	6	0	193	447
Total	5	54	7	1	67	3	373	58	0	434	31	24	93	0	148	132	369	11	0	512	1161
07:00 AM	8	10	0	0	18	4	94	21	0	119	12	10	30	0	52	30	146	2	0	178	367
07:15 AM	4	14	9	0	27	5	154	33	0	192	24	31	32	0	87	70	176	8	0	254	560
07:30 AM	3	40	11	0	54	8	189	27	1	225	18	34	56	0	108	78	221	6	0	305	692
07:45 AM	2	28	10	0	40	6	211	65	0	282	41	38	49	0	128	91	313	13	0	417	867
Total	17	92	30	0	139	23	648	146	1	818	95	113	167	0	375	269	856	29	0	1154	2486
08:00 AM	1	30	9	1	41	9	169	34	0	212	35	32	59	0	126	49	219	6	1	275	654
08:15 AM	3	23	13	0	39	4	131	35	0	170	25	24	29	0	78	45	207	1	0	253	540
08:30 AM	9	16	3	4	32	3	124	32	0	159	28	28	33	0	89	53	183	7	0	243	523
08:45 AM	3	22	8	2	35	7	154	30	0	191	29	20	36	0	85	55	178	6	1	240	551
Total	16	91	33	7	147	23	578	131	0	732	117	104	157	0	378	202	787	20	2	1011	2268
04:00 PM	6	57	14	3	80	2	218	84	1	305	33	49	65	0	147	66	262	14	4	346	878
04:15 PM	10	40	12	5	67	3	192	59	0	254	37	49	64	0	150	46	203	18	2	269	740
04:30 PM	4	48	14	1	67	3	209	61	0	273	49	41	84	1	175	48	235	16	0	299	814
04:45 PM	9	41	8	0	58	3	190	63	0	256	49	35	75	0	159	37	228	12	8	285	758
Total	29	186	48	9	272	11	809	267	1	1088	168	174	288	1	631	197	928	60	14	1199	3190
05:00 PM	8	39	5	1	53	3	279	43	0	325	54	58	81	1	194	83	239	13	2	337	909
05:15 PM	9	23	11	1	44	5	203	51	0	259	42	44	60	1	147	51	201	14	0	266	716
05:30 PM	6	40	14	1	61	3	174	52	0	229	34	60	47	0	141	32	170	14	1	217	648
05:45 PM	12	48	9	1	70	4	204	37	0	245	43	36	41	0	120	33	177	11	0	221	656
Total	35	150	39	4	228	15	860	183	0	1058	173	198	229	2	602	199	787	52	3	1041	2929
06:00 PM	9	29	7	0	45	0	207	46	0	253	25	24	39	0	88	41	144	10	0	195	581
06:15 PM	0	22	2	0	24	3	149	46	0	198	31	36	29	1	97	39	146	13	4	202	521
06:30 PM	3	18	4	0	25	4	142	43	0	189	31	31	31	0	93	29	88	12	0	129	436
06:45 PM	4	12	4	0	20	2	114	43	0	159	19	36	21	0	76	20	97	12	0	129	384
Total	16	81	17	0	114	9	612	178	0	799	106	127	120	1	354	129	475	47	4	655	1922
Grand Total	118	654	174	21	967	84	3880	963	2	4929	690	740	1054	4	2488	1128	4202	219	23	5572	13956
Apprch %	12.2	67.6	18	2.2		1.7	78.7	19.5	0		27.7	29.7	42.4	0.2		20.2	75.4	3.9	0.4		
Total %	0.8	4.7	1.2	0.2	6.9	0.6	27.8	6.9	0	35.3	4.9	5.3	7.6	0	17.8	8.1	30.1	1.6	0.2	39.9	
Unshifted	115	649	169	21	954	84	3807	940	2	4833	679	735	1023	4	2441	1093	4107	215	23	5438	13666
% Unshifted	97.5	99.2	97.1	100	98.7	100	98.1	97.6	100	98.1	98.4	99.3	97.1	100	98.1	96.9	97.7	98.2	100	97.6	97.9
Bank 1	3	5	5	0	13	0	73	23	0	96	11	5	31	0	47	35	95	4	0	134	290
% Bank 1	2.5	0.8	2.9	0	1.3	0	1.9	2.4	0	1.9	1.6	0.7	2.9	0	1.9	3.1	2.3	1.8	0	2.4	2.1
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Raw Counts

File Name : Main
Site Code : 2
Start Date : 11/28/2007
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

	RUSHMORE RD From North					MAIN ST From East					RUSHMORE RD From South					MAIN ST From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	1	35	0	0	36	1	22	2	0	25	0	22	17	0	39	0	0	0	0	0	100
06:15 AM	1	43	0	0	44	7	26	2	0	35	0	39	22	0	61	0	0	0	0	0	140
06:30 AM	1	46	0	1	48	7	59	11	3	80	0	62	36	1	99	0	0	0	1	1	228
06:45 AM	2	71	0	0	73	4	72	5	0	81	0	74	43	0	117	0	0	0	0	0	271
Total	5	195	0	1	201	19	179	20	3	221	0	197	118	1	316	0	0	0	1	1	739
07:00 AM	10	72	0	0	82	5	59	14	0	78	0	80	53	0	133	0	0	0	0	0	293
07:15 AM	7	107	0	2	116	25	96	3	1	125	6	135	61	0	202	0	0	0	0	0	443
07:30 AM	12	153	0	2	167	36	133	13	3	185	0	220	73	1	294	0	0	0	3	3	649
07:45 AM	23	219	0	0	242	27	162	27	4	220	0	202	102	2	306	0	0	0	0	0	768
Total	52	551	0	4	607	93	450	57	8	608	6	637	289	3	935	0	0	0	3	3	2153
08:00 AM	13	106	0	1	120	20	122	22	2	166	0	101	85	0	186	0	0	0	1	1	473
08:15 AM	9	85	0	0	94	11	111	16	1	139	0	94	73	0	167	0	0	0	0	0	400
08:30 AM	9	86	0	0	95	14	97	17	0	128	0	90	53	0	143	0	0	0	0	0	366
08:45 AM	4	97	0	3	104	20	127	24	2	173	0	105	58	0	163	0	0	0	0	0	440
Total	35	374	0	4	413	65	457	79	5	606	0	390	269	0	659	0	0	0	1	1	1679
04:00 PM	19	130	0	6	155	21	272	50	6	349	0	136	112	4	252	0	0	0	1	1	757
04:15 PM	25	128	0	2	155	23	190	39	1	253	0	152	97	0	249	0	0	0	0	0	657
04:30 PM	17	117	0	2	136	19	212	39	3	273	0	151	97	0	248	0	0	0	3	3	660
04:45 PM	19	127	0	1	147	27	220	41	3	291	0	133	112	2	247	0	0	0	7	7	692
Total	80	502	0	11	593	90	894	169	13	1166	0	572	418	6	996	0	0	0	11	11	2766
05:00 PM	23	147	0	5	175	14	304	50	2	370	0	181	127	1	309	0	0	0	4	4	858
05:15 PM	17	126	0	2	145	19	210	27	4	260	0	152	113	0	265	0	0	0	3	3	673
05:30 PM	18	127	0	3	148	16	205	38	2	261	1	123	80	4	208	0	0	0	9	9	626
05:45 PM	13	116	0	3	132	9	155	25	6	195	0	109	91	2	202	0	0	0	1	1	530
Total	71	516	0	13	600	58	874	140	14	1086	1	565	411	7	984	0	0	0	17	17	2687
06:00 PM	9	111	0	2	122	12	147	19	2	180	0	91	61	1	153	0	0	0	3	3	458
06:15 PM	18	104	0	4	126	10	166	26	5	207	0	88	63	5	156	0	0	0	6	6	495
06:30 PM	12	89	0	2	103	10	149	19	1	179	0	83	61	1	145	0	0	0	5	5	432
06:45 PM	12	70	0	1	83	9	119	20	0	148	0	94	61	1	156	0	0	0	5	5	392
Total	51	374	0	9	434	41	581	84	8	714	0	356	246	8	610	0	0	0	19	19	1777
Grand Total	294	2512	0	42	2848	366	3435	549	51	4401	7	2717	1751	25	4500	0	0	0	52	52	11801
Apprch %	10.3	88.2	0	1.5		8.3	78.1	12.5	1.2		0.2	60.4	38.9	0.6		0	0	0	100		
Total %	2.5	21.3	0	0.4	24.1	3.1	29.1	4.7	0.4	37.3	0.1	23	14.8	0.2	38.1	0	0	0	0.4	0.4	
Unshifted	290	2479	0	42	2811	365	3381	540	51	4337	7	2683	1727	25	4442	0	0	0	52	52	11642
% Unshifted	98.6	98.7	0	100	98.7	99.7	98.4	98.4	100	98.5	100	98.7	98.6	100	98.7	0	0	0	100	100	98.7
Bank 1	4	33	0	0	37	1	54	9	0	64	0	34	24	0	58	0	0	0	0	0	159
% Bank 1	1.4	1.3	0	0	1.3	0.3	1.6	1.6	0	1.5	0	1.3	1.4	0	1.3	0	0	0	0	0	1.3
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Raw Counts

File Name : StJoseph
Site Code : 3
Start Date : 11/27/2007
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

	RUSHMORE RD From North					SAINI JOSEPH From East					RUSHMORE RD From South					SAINI JOSEPH From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	0	42	1	0	43	0	0	0	0	0	2	41	0	0	43	25	49	1	0	75	161
06:15 AM	0	43	0	0	43	0	0	0	0	0	7	63	0	0	70	36	74	4	0	114	227
06:30 AM	0	76	0	0	76	0	0	0	1	1	13	90	0	1	104	45	120	7	1	173	354
06:45 AM	0	98	13	0	111	0	0	0	3	3	17	111	0	0	128	69	147	10	0	226	468
Total	0	259	14	0	273	0	0	0	4	4	39	305	0	1	345	175	390	22	1	588	1210
07:00 AM	0	80	7	0	87	0	0	0	1	1	13	108	0	1	122	45	134	11	1	191	401
07:15 AM	0	103	6	1	110	0	0	0	1	1	14	172	0	0	186	72	232	15	8	327	624
07:30 AM	0	184	10	1	195	0	0	0	1	1	18	234	0	0	252	68	249	9	0	326	774
07:45 AM	0	184	22	0	206	0	0	0	2	2	20	294	0	0	314	80	309	24	0	413	935
Total	0	551	45	2	598	0	0	0	5	5	65	808	0	1	874	265	924	59	9	1257	2734
08:00 AM	0	107	13	0	120	0	0	0	3	3	31	161	0	1	193	66	234	23	1	324	640
08:15 AM	0	83	9	0	92	0	0	0	0	0	27	119	0	0	146	69	196	6	1	272	510
08:30 AM	0	102	10	0	112	0	0	0	2	2	18	129	0	1	148	63	166	16	0	245	507
08:45 AM	0	114	10	0	124	0	0	0	1	1	25	147	0	0	172	66	186	10	2	264	561
Total	0	406	42	0	448	0	0	0	6	6	101	556	0	2	659	264	782	55	4	1105	2218
04:00 PM	0	157	27	2	186	0	0	0	6	6	27	208	0	5	240	79	234	25	1	339	771
04:15 PM	0	166	18	0	184	0	0	0	0	0	25	236	0	5	266	52	199	14	3	268	718
04:30 PM	0	135	17	0	152	0	0	0	2	2	23	211	0	0	234	61	172	16	1	250	638
04:45 PM	0	176	16	0	192	0	0	0	3	3	19	231	0	0	250	51	203	19	1	274	719
Total	0	634	78	2	714	0	0	0	11	11	94	886	0	10	990	243	808	74	6	1131	2846
05:00 PM	0	163	9	2	174	0	0	0	5	5	20	276	0	1	297	81	234	21	3	339	815
05:15 PM	0	172	7	2	181	0	0	0	2	2	18	230	0	2	250	63	189	19	2	273	706
05:30 PM	0	149	11	0	160	0	0	0	1	1	17	218	0	0	235	72	136	16	0	224	620
05:45 PM	0	132	5	2	139	0	0	0	0	0	16	178	0	0	194	65	151	19	0	235	568
Total	0	616	32	6	654	0	0	0	8	8	71	902	0	3	976	281	710	75	5	1071	2709
06:00 PM	0	122	6	1	129	0	0	0	3	3	20	160	0	0	180	58	140	22	4	224	536
06:15 PM	0	105	6	0	111	0	0	0	0	0	12	118	0	0	130	58	126	11	0	195	436
06:30 PM	0	78	6	0	84	0	0	0	1	1	12	131	0	0	143	37	127	17	0	181	409
06:45 PM	0	80	4	0	84	0	0	0	0	0	14	152	0	2	168	60	87	9	0	156	408
Total	0	385	22	1	408	0	0	0	4	4	58	561	0	2	621	213	480	59	4	756	1789
Grand Total	0	2851	233	11	3095	0	0	0	38	38	428	4018	0	19	4465	1441	4094	344	29	5908	13506
Apprch %	0	92.1	7.5	0.4		0	0	0	100		9.6	90	0	0.4		24.4	69.3	5.8	0.5		
Total %	0	21.1	1.7	0.1	22.9	0	0	0	0.3	0.3	3.2	29.7	0	0.1	33.1	10.7	30.3	2.5	0.2	43.7	
Unshifted	0	2802	230	11	3043	0	0	0	38	38	425	3982	0	19	4426	1435	4055	328	29	5847	13354
% Unshifted	0	98.3	98.7	100	98.3	0	0	0	100	100	99.3	99.1	0	100	99.1	99.6	99	95.3	100	99	98.9
Bank 1	0	49	3	0	52	0	0	0	0	0	3	36	0	0	39	6	39	16	0	61	152
% Bank 1	0	1.7	1.3	0	1.7	0	0	0	0	0	0.7	0.9	0	0	0.9	0.4	1	4.7	0	1	1.1
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Raw Counts

File Name : KansasCity
Site Code : 4
Start Date : 11/8/2007
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

	RUSHMORE RD From North					KANSAS CITY ST From East					RUSHMORE RD From South					KANSAS CITY ST From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	2	65	1	0	68	0	0	0	0	0	1	52	3	0	56	5	0	1	0	6	130
06:15 AM	1	83	1	0	85	0	0	1	0	1	2	63	5	0	70	3	0	1	1	5	161
06:30 AM	6	122	1	0	129	0	0	0	0	0	1	110	11	0	122	9	3	3	0	15	266
06:45 AM	3	146	0	0	149	0	3	0	0	3	0	137	11	1	149	2	0	2	0	4	305
Total	12	416	3	0	431	0	3	1	0	4	4	362	30	1	397	19	3	7	1	30	862
07:00 AM	6	123	0	1	130	1	1	0	0	2	3	146	9	0	158	5	3	1	0	9	299
07:15 AM	9	177	3	0	189	1	2	0	0	3	4	192	15	2	213	8	3	0	1	12	417
07:30 AM	2	237	8	3	250	3	6	2	3	14	6	295	17	1	319	10	12	6	0	28	611
07:45 AM	6	272	14	1	293	3	7	4	0	14	12	309	30	0	351	8	19	8	1	36	694
Total	23	809	25	5	862	8	16	6	3	33	25	942	71	3	1041	31	37	15	2	85	2021
08:00 AM	6	169	5	1	181	4	10	8	0	22	5	175	17	0	197	11	7	6	0	24	424
08:15 AM	4	168	3	1	176	7	5	4	0	16	10	149	12	2	173	11	6	3	1	21	386
08:30 AM	2	136	3	1	142	5	7	5	1	18	11	147	19	2	179	4	4	2	0	10	349
08:45 AM	7	152	4	0	163	5	11	8	0	24	5	155	11	3	174	13	3	5	0	21	382
Total	19	625	15	3	662	21	33	25	1	80	31	626	59	7	723	39	20	16	1	76	1541
04:00 PM	12	228	5	1	246	6	23	8	1	38	5	204	14	0	223	25	8	7	3	43	550
04:15 PM	10	164	6	1	181	12	27	21	0	60	5	232	15	2	254	26	13	6	7	52	547
04:30 PM	9	207	3	0	219	14	25	15	1	55	6	246	18	1	271	23	4	5	1	33	578
04:45 PM	18	169	2	0	189	11	25	8	0	44	4	217	16	1	238	31	43	53	7	134	605
Total	49	768	16	2	835	43	100	52	2	197	20	899	63	4	986	105	68	71	18	262	2280
05:00 PM	14	233	5	0	252	12	48	19	1	80	5	275	10	0	290	19	24	32	0	75	697
05:15 PM	5	243	1	2	251	4	0	13	4	21	4	238	10	2	254	32	12	10	1	55	581
05:30 PM	9	189	0	2	200	5	12	8	3	28	6	189	8	2	205	12	11	19	2	44	477
05:45 PM	12	158	3	0	173	5	8	7	0	20	6	179	8	0	193	18	4	8	2	32	418
Total	40	823	9	4	876	26	68	47	8	149	21	881	36	4	942	81	51	69	5	206	2173
06:00 PM	11	171	1	0	183	3	1	6	0	10	1	190	9	4	204	21	3	9	1	34	431
06:15 PM	4	149	2	0	155	6	9	5	0	20	6	168	8	0	182	10	1	3	0	14	371
06:30 PM	6	148	2	2	158	7	6	8	0	21	3	152	7	0	162	10	2	8	0	20	361
06:45 PM	7	118	1	2	128	2	1	2	0	5	2	184	11	0	197	8	4	4	0	16	346
Total	28	586	6	4	624	18	17	21	0	56	12	694	35	4	745	49	10	24	1	84	1509
Grand Total	171	4027	74	18	4290	116	237	152	14	519	113	4404	294	23	4834	324	189	202	28	743	10386
Apprch %	4	93.9	1.7	0.4		22.4	45.7	29.3	2.7		2.3	91.1	6.1	0.5		43.6	25.4	27.2	3.8		
Total %	1.6	38.8	0.7	0.2	41.3	1.1	2.3	1.5	0.1	5	1.1	42.4	2.8	0.2	46.5	3.1	1.8	1.9	0.3	7.2	
Unshifted	169	3982	74	18	4243	115	236	152	14	517	112	4351	293	23	4779	322	185	201	28	736	10275
% Unshifted	98.8	98.9	100	100	98.9	99.1	99.6	100	100	99.6	99.1	98.8	99.7	100	98.9	99.4	97.9	99.5	100	99.1	98.9
Bank 1	2	45	0	0	47	1	1	0	0	2	1	53	1	0	55	2	4	1	0	7	111
% Bank 1	1.2	1.1	0	0	1.1	0.9	0.4	0	0	0.4	0.9	1.2	0.3	0	1.1	0.6	2.1	0.5	0	0.9	1.1
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Raw Counts

File Name : Quincy
Site Code : 5
Start Date : 11/20/2007

Groups Printed- Unshifted - Bank 1 - Bank 2

	RUSHMORE RD From North					QUINCY ST From East					RUSHMORE RD From South					QUINCY ST From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	3	73	1	0	77	0	0	1	0	1	0	54	3	0	57	3	0	0	0	3	138
06:15 AM	1	71	1	0	73	0	0	1	0	1	0	72	1	0	73	5	1	1	0	7	154
06:30 AM	5	102	3	0	110	1	1	0	0	2	3	117	4	0	124	6	0	0	0	6	242
06:45 AM	6	123	8	0	137	1	3	0	0	4	1	131	10	0	142	2	0	0	0	2	285
Total	15	369	13	0	397	2	4	2	0	8	4	374	18	0	396	16	1	1	0	18	819
07:00 AM	1	107	5	0	113	0	0	0	1	1	4	137	9	0	150	5	4	0	0	9	273
07:15 AM	7	151	5	0	163	5	1	0	0	6	2	189	9	1	201	4	1	1	0	6	376
07:30 AM	8	209	6	0	223	7	1	1	0	9	5	278	8	0	291	6	2	1	0	9	532
07:45 AM	6	267	4	0	277	7	2	1	0	10	9	325	20	0	354	9	0	0	0	9	650
Total	22	734	20	0	776	19	4	2	1	26	20	929	46	1	996	24	7	2	0	33	1831
08:00 AM	9	193	2	0	204	9	3	2	0	14	3	227	20	0	250	8	4	1	0	13	481
08:15 AM	6	157	6	0	169	5	2	1	0	8	0	182	11	4	197	7	2	2	0	11	385
08:30 AM	11	155	3	0	169	5	2	2	0	9	5	171	10	0	186	5	1	1	0	7	371
08:45 AM	5	144	4	0	153	3	1	4	1	9	5	170	2	1	178	6	3	3	0	12	352
Total	31	649	15	0	695	22	8	9	1	40	13	750	43	5	811	26	10	7	0	43	1589
04:00 PM	7	235	4	0	246	10	0	4	0	14	4	241	11	1	257	7	3	4	0	14	531
04:15 PM	17	227	7	0	251	13	1	2	1	17	6	245	6	0	257	5	1	4	0	10	535
04:30 PM	16	220	2	0	238	14	1	4	0	19	3	228	6	1	238	9	1	5	0	15	510
04:45 PM	12	225	4	0	241	14	1	2	0	17	5	231	12	1	249	6	5	1	0	12	519
Total	52	907	17	0	976	51	3	12	1	67	18	945	35	3	1001	27	10	14	0	51	2095
05:00 PM	13	277	5	2	297	15	0	2	2	19	6	253	8	0	267	24	4	1	1	30	613
05:15 PM	6	266	2	0	274	9	5	2	0	16	6	239	4	0	249	15	4	5	0	24	563
05:30 PM	10	212	1	1	224	5	5	4	0	14	1	217	5	0	223	6	2	1	0	9	470
05:45 PM	5	210	3	0	218	10	0	1	2	13	2	182	2	0	186	9	2	3	0	14	431
Total	34	965	11	3	1013	39	10	9	4	62	15	891	19	0	925	54	12	10	1	77	2077
06:00 PM	4	193	3	1	201	6	1	2	0	9	2	194	3	0	199	6	4	2	0	12	421
06:15 PM	3	179	3	2	187	2	4	2	0	8	0	181	2	2	185	14	3	1	1	19	399
06:30 PM	2	167	7	0	176	2	1	3	0	6	3	120	4	3	130	5	1	1	0	7	319
06:45 PM	2	149	4	1	156	6	1	1	0	8	5	135	0	0	140	5	1	6	0	12	316
Total	11	688	17	4	720	16	7	8	0	31	10	630	9	5	654	30	9	10	1	50	1455
Grand Total	165	4312	93	7	4577	149	36	42	7	234	80	4519	170	14	4783	177	49	44	2	272	9866
Apprch %	3.6	94.2	2	0.2		63.7	15.4	17.9	3		1.7	94.5	3.6	0.3		65.1	18	16.2	0.7		
Total %	1.7	43.7	0.9	0.1	46.4	1.5	0.4	0.4	0.1	2.4	0.8	45.8	1.7	0.1	48.5	1.8	0.5	0.4	0	2.8	
Unshifted	162	4256	93	7	4518	147	36	42	7	232	80	4467	167	14	4728	176	49	43	2	270	9748
% Unshifted	98.2	98.7	100	100	98.7	98.7	100	100	100	99.1	100	98.8	98.2	100	98.9	99.4	100	97.7	100	99.3	98.8
Bank 1	3	56	0	0	59	2	0	0	0	2	0	52	3	0	55	1	0	1	0	2	118
% Bank 1	1.8	1.3	0	0	1.3	1.3	0	0	0	0.9	0	1.2	1.8	0	1.1	0.6	0	2.3	0	0.7	1.2
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Raw Counts

File Name : Columbus
Site Code : 6
Start Date : 11/7/2007
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

	RUSHMORE RD Southbound					COLUMBUS ST Westbound					RUSHMORE RD Northbound					COLUMBUS ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	0	64	0	0	64	1	0	1	0	2	0	47	1	1	49	4	0	0	0	4	119
06:15 AM	0	79	1	0	80	1	0	0	0	1	0	93	3	0	96	2	0	0	1	3	180
06:30 AM	1	99	0	1	101	0	0	0	0	0	0	142	0	0	142	3	0	1	0	4	247
06:45 AM	1	122	0	1	124	2	0	0	0	2	4	149	1	0	154	3	0	1	0	4	284
Total	2	364	1	2	369	4	0	1	0	5	4	431	5	1	441	12	0	2	1	15	830
07:00 AM	0	101	2	0	103	1	1	1	0	3	2	146	2	0	150	2	1	1	0	4	260
07:15 AM	2	191	6	0	199	7	0	3	2	12	4	226	2	2	234	6	3	0	0	9	454
07:30 AM	1	207	19	0	227	7	8	2	0	17	13	338	3	1	355	5	5	3	6	19	618
07:45 AM	4	269	17	0	290	9	10	11	2	32	25	343	13	1	382	8	23	13	5	49	753
Total	7	768	44	0	819	24	19	17	4	64	44	1053	20	4	1121	21	32	17	11	81	2085
08:00 AM	1	183	6	1	191	2	5	7	0	14	9	253	12	0	274	4	8	6	1	19	498
08:15 AM	3	173	4	0	180	5	4	2	0	11	2	187	4	0	193	8	4	4	0	16	400
08:30 AM	5	144	5	6	160	3	5	0	1	9	3	164	3	0	170	5	4	2	0	11	350
08:45 AM	1	153	2	0	156	3	3	2	0	8	3	178	6	2	189	4	2	3	0	9	362
Total	10	653	17	7	687	13	17	11	1	42	17	782	25	2	826	21	18	15	1	55	1610
04:00 PM	7	228	6	2	243	3	1	7	1	12	4	255	10	0	269	13	5	4	1	23	547
04:15 PM	4	202	3	1	210	7	5	12	1	25	4	224	5	1	234	7	6	4	1	18	487
04:30 PM	8	273	3	2	286	3	27	15	1	46	7	213	3	2	225	5	5	4	1	15	572
04:45 PM	6	254	2	0	262	6	4	5	0	15	7	236	5	0	248	3	6	7	1	17	542
Total	25	957	14	5	1001	19	37	39	3	98	22	928	23	3	976	28	22	19	4	73	2148
05:00 PM	5	305	4	0	314	8	12	14	1	35	7	272	5	0	284	18	6	6	2	32	665
05:15 PM	4	275	4	1	284	1	5	7	2	15	2	258	4	2	266	8	2	5	1	16	581
05:30 PM	0	248	2	2	252	3	6	8	0	17	0	230	0	2	232	10	0	2	1	13	514
05:45 PM	1	210	2	1	214	1	5	3	0	9	2	209	2	3	216	3	1	1	0	5	444
Total	10	1038	12	4	1064	13	28	32	3	76	11	969	11	7	998	39	9	14	4	66	2204
06:00 PM	1	188	0	0	189	0	2	8	0	10	4	188	2	0	194	2	5	1	0	8	401
06:15 PM	0	164	1	0	165	0	0	0	0	0	3	176	2	0	181	0	1	3	2	6	352
06:30 PM	1	156	3	0	160	4	1	4	0	9	3	155	1	1	160	2	0	0	0	2	331
06:45 PM	0	132	0	1	133	1	1	0	0	2	4	118	2	0	124	2	0	1	0	3	262
Total	2	640	4	1	647	5	4	12	0	21	14	637	7	1	659	6	6	5	2	19	1346
Grand Total	56	4420	92	19	4587	78	105	112	11	306	112	4800	91	18	5021	127	87	72	23	309	10223
Apprch %	1.2	96.4	2	0.4		25.5	34.3	36.6	3.6		2.2	95.6	1.8	0.4		41.1	28.2	23.3	7.4		
Total %	0.5	43.2	0.9	0.2	44.9	0.8	1	1.1	0.1	3	1.1	47	0.9	0.2	49.1	1.2	0.9	0.7	0.2	3	
Unshifted	55	4377	90	19	4541	76	101	111	11	299	110	4759	90	18	4977	126	85	71	23	305	10122
% Unshifted	98.2	99	97.8	100	99	97.4	96.2	99.1	100	97.7	98.2	99.1	98.9	100	99.1	99.2	97.7	98.6	100	98.7	99
Bank 1	1	43	2	0	46	2	4	1	0	7	2	41	1	0	44	1	2	1	0	4	101
% Bank 1	1.8	1	2.2	0	1	2.6	3.8	0.9	0	2.3	1.8	0.9	1.1	0	0.9	0.8	2.3	1.4	0	1.3	1
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Raw Counts

File Name : Franklin
Site Code : 7
Start Date : 11/1/2007
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

	RUSHMORE RD Southbound					FRANKLIN ST Westbound					RUSHMORE RD Northbound					FRANKLIN ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	0	67	0	0	67	1	0	1	0	2	0	49	1	0	50	1	1	0	1	3	122
06:15 AM	0	85	2	0	87	0	3	1	0	4	0	69	0	0	69	2	0	1	0	3	163
06:30 AM	0	117	0	0	117	0	1	1	0	2	0	119	2	0	121	3	0	2	0	5	245
06:45 AM	3	145	2	1	151	1	0	0	0	1	0	143	3	0	146	3	1	0	0	4	302
Total	3	414	4	1	422	2	4	3	0	9	0	380	6	0	386	9	2	3	1	15	832
07:00 AM	0	88	1	0	89	1	1	2	0	4	2	142	1	1	146	3	0	3	0	6	245
07:15 AM	0	154	1	0	155	1	1	1	0	3	0	213	2	0	215	6	0	4	4	14	387
07:30 AM	3	203	1	1	208	3	2	2	0	7	0	371	6	0	377	6	2	17	0	25	617
07:45 AM	7	254	1	1	263	6	6	5	1	18	0	372	10	2	384	21	7	21	1	50	715
Total	10	699	4	2	715	11	10	10	1	32	2	1098	19	3	1122	36	9	45	5	95	1964
08:00 AM	3	186	1	0	190	3	3	0	0	6	0	264	8	1	273	13	5	14	1	33	502
08:15 AM	1	172	1	0	174	0	1	1	2	4	1	185	6	0	192	4	2	2	0	8	378
08:30 AM	1	148	0	0	149	2	1	2	0	5	0	174	7	1	182	8	2	3	0	13	349
08:45 AM	0	178	2	0	180	2	1	0	0	3	1	197	10	2	210	2	1	2	0	5	398
Total	5	684	4	0	693	7	6	3	2	18	2	820	31	4	857	27	10	21	1	59	1627
04:00 PM	4	233	1	0	238	0	5	0	1	6	0	230	1	0	231	13	2	7	1	23	498
04:15 PM	2	228	3	1	234	4	3	2	1	10	1	258	6	1	266	6	4	5	0	15	525
04:30 PM	2	210	8	0	220	5	2	2	0	9	1	249	5	0	255	2	0	4	0	6	490
04:45 PM	3	239	2	0	244	3	2	2	0	7	1	220	0	1	222	9	2	3	3	17	490
Total	11	910	14	1	936	12	12	6	2	32	3	957	12	2	974	30	8	19	4	61	2003
05:00 PM	6	267	2	0	275	3	4	4	1	12	3	250	6	3	262	13	2	8	0	23	572
05:15 PM	3	254	0	0	257	1	3	4	0	8	1	237	6	0	244	12	0	5	0	17	526
05:30 PM	3	214	1	1	219	7	3	4	1	15	2	198	1	1	202	7	3	4	1	15	451
05:45 PM	8	226	2	1	237	1	2	1	0	4	2	210	0	6	218	8	3	5	8	24	483
Total	20	961	5	2	988	12	12	13	2	39	8	895	13	10	926	40	8	22	9	79	2032
06:00 PM	2	221	2	0	225	2	1	3	0	6	1	160	3	0	164	8	2	0	0	10	405
06:15 PM	3	174	0	3	180	0	3	0	0	3	0	144	7	2	153	8	0	0	0	8	344
06:30 PM	3	154	1	3	161	2	0	1	1	4	1	160	3	0	164	7	1	3	0	11	340
06:45 PM	2	132	2	1	137	0	0	1	4	5	1	181	5	0	187	10	3	4	0	17	346
Total	10	681	5	7	703	4	4	5	5	18	3	645	18	2	668	33	6	7	0	46	1435
Grand Total	59	4349	36	13	4457	48	48	40	12	148	18	4795	99	21	4933	175	43	117	20	355	9893
Apprch %	1.3	97.6	0.8	0.3		32.4	32.4	27	8.1		0.4	97.2	2	0.4		49.3	12.1	33	5.6		
Total %	0.6	44	0.4	0.1	45.1	0.5	0.5	0.4	0.1	1.5	0.2	48.5	1	0.2	49.9	1.8	0.4	1.2	0.2	3.6	
Unshifted	59	4301	34	13	4407	45	47	39	12	143	18	4739	96	21	4874	172	43	116	20	351	9775
% Unshifted	100	98.9	94.4	100	98.9	93.8	97.9	97.5	100	96.6	100	98.8	97	100	98.8	98.3	100	99.1	100	98.9	98.8
Bank 1	0	48	2	0	50	3	1	1	0	5	0	56	3	0	59	3	0	1	0	4	118
% Bank 1	0	1.1	5.6	0	1.1	6.2	2.1	2.5	0	3.4	0	1.2	3	0	1.2	1.7	0	0.9	0	1.1	1.2
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kadrmas, Lee & Jackson
128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Raw Counts

File Name : St Patrick
Site Code : 8
Start Date : 11/6/2007
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

	RUSHMORE RD Southbound					ST PATRICK ST Westbound					RUSHMORE RD Northbound					ST PATRICK ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	1	62	3	0	66	3	2	5	0	10	4	37	0	0	41	4	1	0	0	5	122
06:15 AM	0	69	4	0	73	7	0	4	0	11	4	66	2	1	73	4	8	1	2	15	172
06:30 AM	0	107	14	1	122	20	6	8	0	34	3	104	8	0	115	7	7	1	1	16	287
06:45 AM	1	122	17	0	140	18	27	7	0	52	7	118	11	0	136	15	16	1	0	32	360
Total	2	360	38	1	401	48	35	24	0	107	18	325	21	1	365	30	32	3	3	68	941
07:00 AM	0	84	14	0	98	18	12	5	0	35	8	143	10	0	161	15	11	0	0	26	320
07:15 AM	0	178	31	0	209	33	25	8	0	66	12	187	11	0	210	15	18	2	1	36	521
07:30 AM	1	181	29	0	211	47	31	12	0	90	15	294	27	0	336	20	29	4	1	54	691
07:45 AM	0	222	33	0	255	69	46	12	0	127	18	280	20	0	318	28	41	2	0	71	771
Total	1	665	107	0	773	167	114	37	0	318	53	904	68	0	1025	78	99	8	2	187	2303
08:00 AM	3	159	26	0	188	37	16	12	0	65	18	165	16	2	201	16	16	1	1	34	488
08:15 AM	2	137	16	0	155	19	9	10	0	38	18	176	20	0	214	20	20	1	0	41	448
08:30 AM	3	141	12	0	156	16	14	12	0	42	14	146	12	0	172	14	18	1	1	34	404
08:45 AM	0	145	33	0	178	21	11	16	0	48	9	157	17	0	183	17	16	5	0	38	447
Total	8	582	87	0	677	93	50	50	0	193	59	644	65	2	770	67	70	8	2	147	1787
04:00 PM	2	193	30	0	225	37	30	17	0	84	22	218	27	2	269	12	25	5	0	42	620
04:15 PM	1	187	46	1	235	35	10	16	0	61	15	196	25	0	236	18	20	2	0	40	572
04:30 PM	4	204	41	1	250	38	23	19	0	80	14	204	24	2	244	10	33	3	1	47	621
04:45 PM	1	213	55	0	269	30	35	26	0	91	21	224	25	6	276	20	22	1	0	43	679
Total	8	797	172	2	979	140	98	78	0	316	72	842	101	10	1025	60	100	11	1	172	2492
05:00 PM	4	270	42	0	316	28	33	23	0	84	17	269	27	3	316	15	33	6	0	54	770
05:15 PM	1	275	40	3	319	30	21	20	0	71	18	210	15	1	244	14	23	0	1	38	672
05:30 PM	2	212	33	0	247	37	30	18	1	86	17	190	22	1	230	9	18	3	0	30	593
05:45 PM	1	197	35	1	234	29	24	16	0	69	13	168	19	0	200	18	10	4	1	33	536
Total	8	954	150	4	1116	124	108	77	1	310	65	837	83	5	990	56	84	13	2	155	2571
06:00 PM	0	172	32	0	204	31	6	22	0	59	7	196	16	0	219	9	15	1	0	25	507
06:15 PM	0	138	21	0	159	30	10	20	0	60	9	170	13	0	192	9	10	4	0	23	434
06:30 PM	3	128	19	0	150	34	16	19	0	69	9	182	14	0	205	10	14	2	0	26	450
06:45 PM	0	101	20	0	121	22	9	10	0	41	13	182	3	0	198	6	4	3	0	13	373
Total	3	539	92	0	634	117	41	71	0	229	38	730	46	0	814	34	43	10	0	87	1764
Grand Total	30	3897	646	7	4580	689	446	337	1	1473	305	4282	384	18	4989	325	428	53	10	816	11858
Apprch %	0.7	85.1	14.1	0.2		46.8	30.3	22.9	0.1		6.1	85.8	7.7	0.4		39.8	52.5	6.5	1.2		
Total %	0.3	32.9	5.4	0.1	38.6	5.8	3.8	2.8	0	12.4	2.6	36.1	3.2	0.2	42.1	2.7	3.6	0.4	0.1	6.9	
Unshifted	30	3851	633	7	4521	682	444	333	1	1460	302	4234	377	18	4931	320	422	53	10	805	11717
% Unshifted	100	98.8	98	100	98.7	99	99.6	98.8	100	99.1	99	98.9	98.2	100	98.8	98.5	98.6	100	100	98.7	98.8
Bank 1	0	46	13	0	59	7	2	4	0	13	3	48	7	0	58	5	6	0	0	11	141
% Bank 1	0	1.2	2	0	1.3	1	0.4	1.2	0	0.9	1	1.1	1.8	0	1.2	1.5	1.4	0	0	1.3	1.2
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Raw Counts

File Name : Cathedral
Site Code : 9
Start Date : 10/31/2007
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

	RUSHMORE RD Southbound					CATHEDRAL DR Westbound					RUSHMORE RD Northbound					CATHEDRAL DR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	3	17	33	0	53	24	2	4	0	30	12	15	2	0	29	0	0	0	0	0	112
06:15 AM	11	17	47	0	75	28	1	4	0	33	19	32	0	0	51	0	0	0	0	0	159
06:30 AM	12	19	89	0	120	43	4	9	0	56	33	45	2	0	80	1	0	0	0	1	257
06:45 AM	30	34	89	0	153	57	12	18	0	87	40	64	2	0	106	0	0	2	0	2	348
Total	56	87	258	0	401	152	19	35	0	206	104	156	6	0	266	1	0	2	0	3	876
07:00 AM	4	37	59	0	100	75	6	6	0	87	30	85	2	0	117	1	1	0	0	2	306
07:15 AM	11	36	97	0	144	112	2	20	1	135	62	88	3	0	153	0	1	2	0	3	435
07:30 AM	5	42	128	0	175	167	4	32	0	203	85	151	0	0	236	1	1	1	0	3	617
07:45 AM	7	83	155	0	245	174	5	44	0	223	108	194	6	0	308	1	3	1	0	5	781
Total	27	198	439	0	664	528	17	102	1	648	285	518	11	0	814	3	6	4	0	13	2139
08:00 AM	3	59	118	0	180	89	7	46	0	142	37	112	4	0	153	0	0	0	0	0	475
08:15 AM	3	53	103	0	159	82	2	21	0	105	34	92	1	0	127	0	1	3	0	4	395
08:30 AM	1	58	82	0	141	68	1	14	0	83	22	77	0	0	99	2	1	0	0	3	326
08:45 AM	2	48	81	0	131	65	1	10	0	76	40	81	2	0	123	0	2	2	0	4	334
Total	9	218	384	0	611	304	11	91	0	406	133	362	7	0	502	2	4	5	0	11	1530
04:00 PM	5	82	82	0	169	127	6	48	0	181	23	98	1	0	122	5	10	11	0	26	498
04:15 PM	4	104	108	0	216	120	6	39	1	166	16	83	2	0	101	2	8	7	0	17	500
04:30 PM	7	112	101	2	222	103	1	35	0	139	32	102	1	0	135	0	6	3	4	13	509
04:45 PM	6	102	100	0	208	110	4	39	0	153	30	92	2	0	124	5	2	9	0	16	501
Total	22	400	391	2	815	460	17	161	1	639	101	375	6	0	482	12	26	30	4	72	2008
05:00 PM	2	140	121	0	263	115	5	70	0	190	31	98	4	1	134	2	6	4	0	12	599
05:15 PM	4	114	119	0	237	101	4	54	0	159	21	83	4	0	108	2	6	5	0	13	517
05:30 PM	7	92	86	0	185	104	2	44	0	150	23	84	1	0	108	3	2	6	0	11	454
05:45 PM	2	93	97	0	192	97	2	45	0	144	27	85	3	0	115	1	1	3	0	5	456
Total	15	439	423	0	877	417	13	213	0	643	102	350	12	1	465	8	15	18	0	41	2026
06:00 PM	4	79	88	0	171	105	2	38	0	145	20	66	1	0	87	5	3	3	0	11	414
06:15 PM	5	81	72	0	158	74	6	34	0	114	8	60	1	0	69	2	1	4	0	7	348
06:30 PM	2	64	80	0	146	72	4	36	0	112	16	67	0	0	83	0	1	6	0	7	348
06:45 PM	4	67	85	0	156	85	4	34	0	123	14	43	1	1	59	1	2	6	0	9	347
Total	15	291	325	0	631	336	16	142	0	494	58	236	3	1	298	8	7	19	0	34	1457
Grand Total	144	1633	2220	2	3999	2197	93	744	2	3036	783	1997	45	2	2827	34	58	78	4	174	10036
Apprch %	3.6	40.8	55.5	0.1		72.4	3.1	24.5	0.1		27.7	70.6	1.6	0.1		19.5	33.3	44.8	2.3		
Total %	1.4	16.3	22.1	0	39.8	21.9	0.9	7.4	0	30.3	7.8	19.9	0.4	0	28.2	0.3	0.6	0.8	0	1.7	
Unshifted	144	1620	2206	2	3972	2177	93	743	2	3015	775	1983	45	2	2805	34	58	78	4	174	9966
% Unshifted	100	99.2	99.4	100	99.3	99.1	100	99.9	100	99.3	99	99.3	100	100	99.2	100	100	100	100	100	99.3
Bank 1	0	13	14	0	27	20	0	1	0	21	8	14	0	0	22	0	0	0	0	0	70
% Bank 1	0	0.8	0.6	0	0.7	0.9	0	0.1	0	0.7	1	0.7	0	0	0.8	0	0	0	0	0	0.7
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Kadrmas, Lee & Jackson
128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Peak HR

File Name : Omaha
Site Code : 1
Start Date : 11/29/2007
Page No : 1

	RUSHMORE RD Southbound					OMAHA ST Westbound					RUSHMORE RD Northbound					OMAHA ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**4**	14	9	0	27	5	150	32	0	187	23	30	31	0	84	68	171	8	0	247	545
07:30 AM	3	**39**	**11**	0	**53**	8	184	26	**1**	219	17	33	54	0	104	76	214	6	0	296	672
07:45 AM	2	27	10	0	39	6	**205**	**63**	0	**274**	**40**	**37**	48	0	**125**	**88**	**304**	**13**	0	**405**	**843**
08:00 AM	1	29	9	**1**	40	**9**	164	33	0	206	34	31	**57**	0	122	48	213	6	**1**	268	636
Total Volume	10	109	39	1	159	28	703	154	1	886	114	131	190	0	435	280	902	33	1	1216	2696
% App. Total	6.3	68.6	24.5	0.6		3.2	79.3	17.4	0.1		26.2	30.1	43.7	0		23	74.2	2.7	0.1		
PHF	.625	.699	.886	.250	.750	.778	.857	.611	.250	.808	.713	.885	.833	.000	.870	.795	.742	.635	.250	.751	.800
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	**10**	39	12	**5**	**66**	**3**	186	57	0	246	36	48	62	0	146	45	197	**17**	2	261	719
04:30 PM	4	**47**	**14**	1	66	3	203	59	0	265	48	40	**82**	**1**	171	47	228	16	0	291	793
04:45 PM	9	40	8	0	57	3	184	**61**	0	248	48	34	73	0	155	36	221	12	**8**	277	737
05:00 PM	8	38	5	1	52	3	**271**	42	0	**316**	**52**	**56**	79	1	**188**	**81**	**232**	13	2	**328**	**884**
Total Volume	31	164	39	7	241	12	844	219	0	1075	184	178	296	2	660	209	878	58	12	1157	3133
% App. Total	12.9	68	16.2	2.9		1.1	78.5	20.4	0		27.9	27	44.8	0.3		18.1	75.9	5	1		
PHF	.775	.872	.696	.350	.913	1.000	.779	.898	.000	.850	.885	.795	.902	.500	.878	.645	.946	.853	.375	.882	.886

Kadrmas, Lee & Jackson
128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Peak HR

File Name : Main
Site Code : 2
Start Date : 11/28/2007
Page No : 1

	RUSHMORE RD Southbound					MAIN ST Westbound					RUSHMORE RD Northbound					MAIN ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	7	103	0	**2**	112	24	92	3	1	120	**6**	130	59	0	195	0	0	0	0	0	427
07:30 AM	12	147	0	2	161	**35**	128	13	3	179	0	**211**	70	1	282	0	0	0	**3**	**3**	625
07:45 AM	**22**	**210**	0	0	**232**	26	**156**	**26**	**4**	**212**	0	194	**98**	**2**	**294**	0	0	0	0	0	**738**
08:00 AM	12	102	0	1	115	19	117	21	2	159	0	97	82	0	179	0	0	0	1	1	454
Total Volume	53	562	0	5	620	104	493	63	10	670	6	632	309	3	950	0	0	0	4	4	2244
% App. Total	8.5	90.6	0	0.8		15.5	73.6	9.4	1.5		0.6	66.5	32.5	0.3		0	0	0	100		
PHF	.602	.669	.000	.625	.668	.743	.790	.606	.625	.790	.250	.749	.788	.375	.808	.000	.000	.000	.333	.333	.760
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	16	112	0	2	130	18	204	37	3	262	0	145	93	0	238	0	0	0	3	3	633
04:45 PM	18	122	0	1	141	**26**	211	39	3	279	0	128	108	**2**	238	0	0	0	**7**	**7**	665
05:00 PM	**22**	**141**	0	**5**	**168**	13	**292**	**48**	2	**355**	0	**174**	**122**	1	**297**	0	0	0	4	4	**824**
05:15 PM	16	121	0	2	139	18	202	26	**4**	250	0	146	108	0	254	0	0	0	3	3	646
Total Volume	72	496	0	10	578	75	909	150	12	1146	0	593	431	3	1027	0	0	0	17	17	2768
% App. Total	12.5	85.8	0	1.7		6.5	79.3	13.1	1		0	57.7	42	0.3		0	0	0	100		
PHF	.818	.879	.000	.500	.860	.721	.778	.781	.750	.807	.000	.852	.883	.375	.864	.000	.000	.000	.607	.607	.840

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Peak HR

File Name : StJoseph
Site Code : 3
Start Date : 11/27/2007
Page No : 1

	RUSHMORE RD Southbound					SAINI JOSEPH Westbound					RUSHMORE RD Northbound					SAINI JOSEPH Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	100	6	**1**	107	0	0	0	1	1	14	167	0	0	181	70	225	15	**8**	318	607
07:30 AM	0	**179**	10	1	190	0	0	0	1	1	17	227	0	0	244	66	242	9	0	317	752
07:45 AM	0	179	**21**	0	**200**	0	0	0	2	2	19	**285**	0	0	**304**	**78**	**300**	**23**	0	**401**	**907**
08:00 AM	0	104	13	0	117	0	0	0	**3**	**3**	**30**	156	0	**1**	187	64	227	22	1	314	621
Total Volume	0	562	50	2	614	0	0	0	7	7	80	835	0	1	916	278	994	69	9	1350	2887
% App. Total	0	91.5	8.1	0.3		0	0	0	100		8.7	91.2	0	0.1		20.6	73.6	5.1	0.7		
PHF	.000	.785	.595	.500	.768	.000	.000	.000	.583	.583	.667	.732	.000	.250	.753	.891	.828	.750	.281	.842	.796
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	161	**17**	0	178	0	0	0	0	0	**24**	229	0	**5**	258	50	193	14	**3**	260	696
04:30 PM	0	131	16	0	147	0	0	0	2	2	22	205	0	0	227	59	167	16	1	243	619
04:45 PM	0	**171**	16	0	**187**	0	0	0	3	3	18	224	0	0	242	49	197	18	1	265	697
05:00 PM	0	158	9	**2**	169	0	0	0	**5**	**5**	19	**268**	0	1	**288**	**79**	**227**	**20**	3	**329**	**791**
Total Volume	0	621	58	2	681	0	0	0	10	10	83	926	0	6	1015	237	784	68	8	1097	2803
% App. Total	0	91.2	8.5	0.3		0	0	0	100		8.2	91.2	0	0.6		21.6	71.5	6.2	0.7		
PHF	.000	.908	.853	.250	.910	.000	.000	.000	.500	.500	.865	.864	.000	.300	.881	.750	.863	.850	.667	.834	.886

Kadrmas, Lee & Jackson
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2007 Peak HR

File Name : KansasCity
Site Code : 4
Start Date : 11/8/2007
Page No : 1

	RUSHMORE RD Southbound					KANSAS CITY ST Westbound					RUSHMORE RD Northbound					KANSAS CITY ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**9**	172	3	0	184	1	2	0	0	3	4	186	15	**2**	207	8	3	0	**1**	12	406
07:30 AM	2	230	8	**3**	243	3	6	2	**3**	14	6	286	16	1	309	10	12	6	0	28	594
07:45 AM	6	**264**	**14**	1	**285**	3	7	4	0	14	**12**	**300**	**29**	0	**341**	8	**18**	**8**	1	**35**	**675**
08:00 AM	6	164	5	1	176	**4**	**10**	**8**	0	**22**	5	170	16	0	191	**11**	7	6	0	24	413
Total Volume	23	830	30	5	888	11	25	14	3	53	27	942	76	3	1048	37	40	20	2	99	2088
% App. Total	2.6	93.5	3.4	0.6		20.8	47.2	26.4	5.7		2.6	89.9	7.3	0.3		37.4	40.4	20.2	2		
PHF	.639	.786	.536	.417	.779	.688	.625	.438	.250	.602	.563	.785	.655	.375	.768	.841	.556	.625	.500	.707	.773
Peak Hour Analysis From 12:45 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	9	201	3	0	213	**14**	24	15	1	54	**6**	239	**17**	1	263	22	4	5	1	32	562
04:45 PM	**17**	164	2	0	183	11	24	8	0	43	4	211	16	1	232	30	**42**	**51**	**7**	**130**	588
05:00 PM	14	226	**5**	0	**245**	12	**47**	**18**	1	**78**	5	**267**	10	0	**282**	18	23	31	0	72	**677**
05:15 PM	5	**236**	1	**2**	244	4	0	13	**4**	21	4	231	10	**2**	247	**31**	12	10	1	54	566
Total Volume	45	827	11	2	885	41	95	54	6	196	19	948	53	4	1024	101	81	97	9	288	2393
% App. Total	5.1	93.4	1.2	0.2		20.9	48.5	27.6	3.1		1.9	92.6	5.2	0.4		35.1	28.1	33.7	3.1		
PHF	.662	.876	.550	.250	.903	.732	.505	.750	.375	.628	.792	.888	.779	.500	.908	.815	.482	.475	.321	.554	.884

Kadrmas, Lee & Jackson

128 Soo Line Drive
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2007 Peak HR

File Name : Quincy
Site Code : 5
Start Date : 11/20/2007
Page No : 1

	RUSHMORE RD Southbound					QUINCY ST Westbound					RUSHMORE RD Northbound					QUINCY ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	8	203	**6**	0	217	7	1	1	0	9	5	270	8	0	283	6	2	1	0	9	518
07:45 AM	6	**259**	4	0	**269**	7	2	1	0	10	**9**	**315**	**19**	0	**343**	**9**	0	0	0	9	**631**
08:00 AM	**9**	187	2	0	198	**9**	**3**	**2**	0	**14**	3	220	19	0	242	8	**4**	1	0	**13**	467
08:15 AM	6	153	6	0	165	5	2	1	0	8	0	177	11	**4**	192	7	2	**2**	0	11	376
Total Volume	29	802	18	0	849	28	8	5	0	41	17	982	57	4	1060	30	8	4	0	42	1992
% App. Total	3.4	94.5	2.1	0		68.3	19.5	12.2	0		1.6	92.6	5.4	0.4		71.4	19	9.5	0		
PHF	.806	.774	.750	.000	.789	.778	.667	.625	.000	.732	.472	.779	.750	.250	.773	.833	.500	.500	.000	.808	.789
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**16**	214	2	0	232	14	1	**4**	0	**19**	3	221	6	**1**	231	9	1	**5**	0	15	497
04:45 PM	12	218	4	0	234	14	1	2	0	17	5	224	**12**	1	242	6	**5**	1	0	12	505
05:00 PM	13	**269**	**5**	**2**	**289**	**15**	0	2	**2**	19	**6**	**246**	8	0	**260**	**23**	4	1	**1**	**29**	**597**
05:15 PM	6	258	2	0	266	9	**5**	2	0	16	6	232	4	0	242	15	4	5	0	24	548
Total Volume	47	959	13	2	1021	52	7	10	2	71	20	923	30	2	975	53	14	12	1	80	2147
% App. Total	4.6	93.9	1.3	0.2		73.2	9.9	14.1	2.8		2.1	94.7	3.1	0.2		66.2	17.5	15	1.2		
PHF	.734	.891	.650	.250	.883	.867	.350	.625	.250	.934	.833	.938	.625	.500	.938	.576	.700	.600	.250	.690	.899

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128 Soo Line Drive
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2007 Peak HR

File Name : Columbus
Site Code : 6
Start Date : 11/7/2007
Page No : 1

	RUSHMORE RD Southbound					COLUMBUS ST Westbound					RUSHMORE RD Northbound					COLUMBUS ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	2	185	6	0	193	7	0	3	**2**	12	4	219	2	**2**	227	6	3	0	0	9	441
07:30 AM	1	201	**18**	0	220	7	8	2	0	17	13	328	3	1	345	5	5	3	**6**	19	601
07:45 AM	**4**	**261**	16	0	**281**	**9**	**10**	**11**	2	**32**	**24**	**333**	**13**	1	**371**	**8**	**22**	**13**	5	**48**	**732**
08:00 AM	1	178	6	**1**	186	2	5	7	0	14	9	246	12	0	267	4	8	6	1	19	486
Total Volume	8	825	46	1	880	25	23	23	4	75	50	1126	30	4	1210	23	38	22	12	95	2260
% App. Total	0.9	93.8	5.2	0.1		33.3	30.7	30.7	5.3		4.1	93.1	2.5	0.3		24.2	40	23.2	12.6		
PHF	.500	.790	.639	.250	.783	.694	.575	.523	.500	.586	.521	.845	.577	.500	.815	.719	.432	.423	.500	.495	.772
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**8**	265	3	**2**	278	3	**26**	**15**	1	**45**	**7**	207	3	**2**	219	5	5	4	1	15	557
04:45 PM	6	247	2	0	255	6	4	5	0	15	7	229	**5**	0	241	3	**6**	**7**	1	17	528
05:00 PM	5	**296**	**4**	0	**305**	**8**	12	14	1	35	7	**264**	5	0	**276**	**17**	6	6	**2**	**31**	**647**
05:15 PM	4	267	4	1	276	1	5	7	**2**	15	2	250	4	2	258	8	2	5	1	16	565
Total Volume	23	1075	13	3	1114	18	47	41	4	110	23	950	17	4	994	33	19	22	5	79	2297
% App. Total	2.1	96.5	1.2	0.3		16.4	42.7	37.3	3.6		2.3	95.6	1.7	0.4		41.8	24.1	27.8	6.3		
PHF	.719	.908	.813	.375	.913	.563	.452	.683	.500	.611	.821	.900	.850	.500	.900	.485	.792	.786	.625	.637	.888

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2007 Peak HR

File Name : Franklin
Site Code : 7
Start Date : 11/1/2007
Page No : 1

	RUSHMORE RD Southbound					FRANKLIN ST Westbound					RUSHMORE RD Northbound					FRANKLIN ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	149	**1**	0	150	1	1	1	0	3	0	207	2	0	209	6	0	4	**4**	14	376
07:30 AM	3	197	1	**1**	202	3	2	2	0	7	0	360	6	0	366	6	2	17	0	25	600
07:45 AM	**7**	**246**	1	1	**255**	**6**	**6**	**5**	**1**	**18**	0	**361**	**10**	**2**	**373**	**20**	**7**	**20**	1	**48**	**694**
08:00 AM	3	180	1	0	184	3	3	0	0	6	0	256	8	1	265	13	5	14	1	33	488
Total Volume	13	772	4	2	791	13	12	8	1	34	0	1184	26	3	1213	45	14	55	6	120	2158
% App. Total	1.6	97.6	0.5	0.3		38.2	35.3	23.5	2.9		0	97.6	2.1	0.2		37.5	11.7	45.8	5		
PHF	.464	.785	1.000	.500	.775	.542	.500	.400	.250	.472	.000	.820	.650	.375	.813	.563	.500	.688	.375	.625	.777
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	2	204	**8**	0	214	**5**	2	2	0	9	1	242	5	0	248	2	0	4	0	6	477
04:45 PM	3	232	2	0	237	3	2	2	0	7	1	213	0	1	215	9	**2**	3	**3**	17	476
05:00 PM	**6**	**259**	2	0	**267**	3	**4**	**4**	**1**	**12**	**3**	**243**	**6**	**3**	**255**	**13**	2	**8**	0	**23**	**557**
05:15 PM	3	246	0	0	249	1	3	4	0	8	1	230	6	0	237	12	0	5	0	17	511
Total Volume	14	941	12	0	967	12	11	12	1	36	6	928	17	4	955	36	4	20	3	63	2021
% App. Total	1.4	97.3	1.2	0		33.3	30.6	33.3	2.8		0.6	97.2	1.8	0.4		57.1	6.3	31.7	4.8		
PHF	.583	.908	.375	.000	.905	.600	.688	.750	.250	.750	.500	.955	.708	.333	.936	.692	.500	.625	.250	.685	.907

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2007 Peak HR

File Name : St Patrick
Site Code : 8
Start Date : 11/6/2007
Page No : 1

	RUSHMORE RD Southbound					ST PATRICK ST Westbound					RUSHMORE RD Northbound					ST PATRICK ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	173	30	0	203	32	24	8	0	64	12	182	11	0	205	15	17	2	**1**	35	507
07:30 AM	1	176	28	0	205	46	30	**12**	0	88	15	**285**	**26**	0	**326**	19	28	**4**	1	52	671
07:45 AM	0	**215**	**32**	0	**247**	**67**	**45**	12	0	**124**	**17**	272	19	0	308	**27**	**40**	2	0	**69**	**748**
08:00 AM	**3**	154	25	0	182	36	16	12	0	64	17	160	16	**2**	195	16	16	1	1	34	475
Total Volume	4	718	115	0	837	181	115	44	0	340	61	899	72	2	1034	77	101	9	3	190	2401
% App. Total	0.5	85.8	13.7	0		53.2	33.8	12.9	0		5.9	86.9	7	0.2		40.5	53.2	4.7	1.6		
PHF	.333	.835	.898	.000	.847	.675	.639	.917	.000	.685	.897	.789	.692	.250	.793	.713	.631	.563	.750	.688	.802
Peak Hour Analysis From 12:45 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**4**	198	40	1	243	**37**	22	18	0	77	14	198	23	2	237	10	**32**	3	**1**	46	603
04:45 PM	1	207	**53**	0	261	29	**34**	**25**	0	**88**	**20**	217	24	**6**	267	**19**	21	1	0	41	657
05:00 PM	4	262	41	0	307	27	32	22	0	81	16	**261**	**26**	3	**306**	15	32	**6**	0	**53**	**747**
05:15 PM	1	**267**	39	**3**	**310**	29	20	19	0	68	17	204	15	1	237	14	22	0	1	37	652
Total Volume	10	934	173	4	1121	122	108	84	0	314	67	880	88	12	1047	58	107	10	2	177	2659
% App. Total	0.9	83.3	15.4	0.4		38.9	34.4	26.8	0		6.4	84	8.4	1.1		32.8	60.5	5.6	1.1		
PHF	.625	.875	.816	.333	.904	.824	.794	.840	.000	.892	.838	.843	.846	.500	.855	.763	.836	.417	.500	.835	.890

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2007 Peak HR

File Name : Cathedral
Site Code : 9
Start Date : 10/31/2007
Page No : 1

	RUSHMORE RD Southbound					CATHEDRAL DR Westbound					RUSHMORE RD Northbound					CATHEDRAL DR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**11**	35	94	0	140	109	2	19	**1**	131	60	85	3	0	148	0	1	**2**	0	3	422
07:30 AM	5	41	124	0	170	162	4	31	0	197	82	147	0	0	229	**1**	1	1	0	3	599
07:45 AM	7	**81**	**150**	0	**238**	**169**	5	43	0	**217**	**105**	**188**	**6**	0	**299**	1	**3**	1	0	**5**	**759**
08:00 AM	3	57	114	0	174	86	**7**	**45**	0	138	36	109	4	0	149	0	0	0	0	0	461
Total Volume	26	214	482	0	722	526	18	138	1	683	283	529	13	0	825	2	5	4	0	11	2241
% App. Total	3.6	29.6	66.8	0		77	2.6	20.2	0.1		34.3	64.1	1.6	0		18.2	45.5	36.4	0		
PHF	.591	.660	.803	.000	.758	.778	.643	.767	.250	.787	.674	.703	.542	.000	.690	.500	.417	.500	.000	.550	.738
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**7**	109	98	**2**	216	100	1	34	0	135	**31**	**99**	1	0	**131**	0	**6**	3	**4**	13	495
04:45 PM	6	99	97	0	202	107	4	38	0	149	29	89	2	0	120	**5**	2	**9**	0	**16**	487
05:00 PM	2	**136**	**117**	0	**255**	**112**	**5**	**68**	0	**185**	30	95	**4**	**1**	130	2	6	4	0	12	**582**
05:15 PM	4	111	115	0	230	98	4	52	0	154	20	81	4	0	105	2	6	5	0	13	502
Total Volume	19	455	427	2	903	417	14	192	0	623	110	364	11	1	486	9	20	21	4	54	2066
% App. Total	2.1	50.4	47.3	0.2		66.9	2.2	30.8	0		22.6	74.9	2.3	0.2		16.7	37	38.9	7.4		
PHF	.679	.836	.912	.250	.885	.931	.700	.706	.000	.842	.887	.919	.688	.250	.927	.450	.833	.583	.250	.844	.887

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128 Soo Line Drive
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2007 Summer Peak HR
Factor 1.13

File Name : Omaha
Site Code : 1
Start Date : 11/29/2007
Page No : 1

	RUSHMORE RD Southbound					OMAHA ST Westbound					RUSHMORE RD Northbound					OMAHA ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	10	16	**5**	0	31	37	174	6	0	217	36	35	27	0	98	9	199	79	0	287	633
07:30 AM	**12**	**45**	3	0	**60**	30	214	9	**1**	254	63	38	20	0	121	7	249	89	0	345	780
07:45 AM	11	32	2	0	45	**73**	**238**	7	0	**318**	55	**43**	**46**	0	**144**	**15**	**354**	**102**	0	**471**	**978**
08:00 AM	10	34	1	**1**	46	38	191	**10**	0	239	**67**	36	40	0	143	7	248	55	**1**	311	739
Total Volume	43	127	11	1	182	178	817	32	1	1028	221	152	133	0	506	38	1050	325	1	1414	3130
% App. Total	23.6	69.8	6	0.5		17.3	79.5	3.1	0.1		43.7	30	26.3	0		2.7	74.3	23	0.1		
PHF	.896	.706	.550	.250	.758	.610	.858	.800	.250	.808	.825	.884	.723	.000	.878	.633	.742	.797	.250	.751	.800
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	14	45	**11**	**6**	**76**	67	217	**3**	0	287	72	55	42	0	169	**20**	229	52	2	303	835
04:30 PM	**16**	**54**	5	1	76	69	237	3	0	309	**95**	46	55	**1**	197	18	266	54	0	338	920
04:45 PM	9	46	10	0	65	**71**	215	3	0	289	84	40	55	0	179	14	257	42	**9**	322	855
05:00 PM	6	44	9	1	60	49	**315**	3	0	**367**	91	**66**	**61**	1	**219**	15	**270**	**94**	2	**381**	**1027**
Total Volume	45	189	35	8	277	256	984	12	0	1252	342	207	213	2	764	67	1022	242	13	1344	3637
% App. Total	16.2	68.2	12.6	2.9		20.4	78.6	1	0		44.8	27.1	27.9	0.3		5	76	18	1		
PHF	.703	.875	.795	.333	.911	.901	.781	1.000	.000	.853	.900	.784	.873	.500	.872	.838	.946	.644	.361	.882	.885

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Summer Peak HR
Factor 1.13

File Name : Main
Site Code : 2
Start Date : 11/28/2007
Page No : 1

	RUSHMORE RD Southbound					MAIN ST Westbound					RUSHMORE RD Northbound					MAIN ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	121	8	**2**	131	3	109	28	1	141	69	152	**7**	0	228	0	0	0	0	0	500
07:30 AM	0	172	14	2	188	15	150	**41**	3	209	82	**248**	0	1	331	0	0	0	**3**	**3**	731
07:45 AM	0	**248**	**26**	0	**274**	**31**	**183**	31	**5**	**250**	**115**	228	0	**2**	**345**	0	0	0	0	0	**869**
08:00 AM	0	120	15	1	136	25	138	23	2	188	96	114	0	0	210	0	0	0	1	1	535
Total Volume	0	661	63	5	729	74	580	123	11	788	362	742	7	3	1114	0	0	0	4	4	2635
% App. Total	0	90.7	8.6	0.7		9.4	73.6	15.6	1.4		32.5	66.6	0.6	0.3		0	0	0	100		
PHF	.000	.666	.606	.625	.665	.597	.792	.750	.550	.788	.787	.748	.250	.375	.807	.000	.000	.000	.333	.333	.758
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	132	19	2	153	44	239	21	3	307	109	170	0	0	279	0	0	0	3	3	742
04:45 PM	0	143	21	1	165	46	249	**31**	3	329	126	150	0	**2**	278	0	0	0	**8**	**8**	780
05:00 PM	0	**166**	**26**	**6**	**198**	**56**	**344**	16	2	**418**	**144**	**205**	0	1	**350**	0	0	0	5	5	**971**
05:15 PM	0	142	19	2	163	31	237	21	**5**	294	128	171	0	0	299	0	0	0	3	3	759
Total Volume	0	583	85	11	679	177	1069	89	13	1348	507	696	0	3	1206	0	0	0	19	19	3252
% App. Total	0	85.9	12.5	1.6		13.1	79.3	6.6	1		42	57.7	0	0.2		0	0	0	100		
PHF	.000	.878	.817	.458	.857	.790	.777	.718	.650	.806	.880	.849	.000	.375	.861	.000	.000	.000	.594	.594	.837

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Summer Peak HR
Factor 1.13

File Name : StJoseph
Site Code : 3
Start Date : 11/27/2007

	RUSHMORE RD Southbound					SAINI JOSEPH Westbound					RUSHMORE RD Northbound					SAINI JOSEPH Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	7	116	0	**1**	124	0	0	0	1	1	0	195	16	0	211	17	262	81	**9**	369	705
07:30 AM	11	**208**	0	1	220	0	0	0	1	1	0	265	20	0	285	10	281	77	0	368	874
07:45 AM	**25**	208	0	0	**233**	0	0	0	2	2	0	**332**	23	0	**355**	**27**	**349**	**90**	0	**466**	**1056**
08:00 AM	15	121	0	0	136	0	0	0	**3**	**3**	0	182	**35**	**1**	218	26	265	75	1	367	724
Total Volume	58	653	0	2	713	0	0	0	7	7	0	974	94	1	1069	80	1157	323	10	1570	3359
% App. Total	8.1	91.6	0	0.3		0	0	0	100		0	91.1	8.8	0.1		5.1	73.7	20.6	0.6		
PHF	.580	.785	.000	.500	.765	.000	.000	.000	.583	.583	.000	.733	.671	.250	.753	.741	.829	.897	.278	.842	.795
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	**20**	188	0	0	208	0	0	0	0	0	0	267	**28**	**6**	301	16	225	59	**3**	303	812
04:30 PM	19	152	0	0	171	0	0	0	2	2	0	238	26	0	264	18	194	69	1	282	719
04:45 PM	18	**199**	0	0	**217**	0	0	0	3	3	0	261	21	0	282	21	229	58	1	309	811
05:00 PM	10	184	0	**2**	196	0	0	0	**6**	**6**	0	**312**	23	1	**336**	**24**	**264**	**92**	3	**383**	**921**
Total Volume	67	723	0	2	792	0	0	0	11	11	0	1078	98	7	1183	79	912	278	8	1277	3263
% App. Total	8.5	91.3	0	0.3		0	0	0	100		0	91.1	8.3	0.6		6.2	71.4	21.8	0.6		
PHF	.838	.908	.000	.250	.912	.000	.000	.000	.458	.458	.000	.864	.875	.292	.880	.823	.864	.755	.667	.834	.886

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Summer Peak HR
Factor 1.13

File Name : KansasCity
Site Code : 4
Start Date : 11/8/2007
Page No : 1

	RUSHMORE RD Southbound					KANSAS CITY ST Westbound					RUSHMORE RD Northbound					KANSAS CITY ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	3	200	**10**	0	213	0	2	1	0	3	17	217	4	**2**	240	0	3	9	**1**	13	469
07:30 AM	9	268	2	**3**	282	2	7	3	**3**	15	19	333	7	1	360	7	14	11	0	32	689
07:45 AM	**16**	**308**	7	1	**332**	5	8	3	0	16	**34**	**350**	**14**	0	**398**	**9**	**21**	9	1	**40**	**786**
08:00 AM	6	191	7	1	205	**9**	**11**	**5**	0	**25**	19	197	6	0	222	7	8	**12**	0	27	479
Total Volume	34	967	26	5	1032	16	28	12	3	59	89	1097	31	3	1220	23	46	41	2	112	2423
% App. Total	3.3	93.7	2.5	0.5		27.1	47.5	20.3	5.1		7.3	89.9	2.5	0.2		20.5	41.1	36.6	1.8		
PHF	.531	.785	.650	.417	.777	.444	.636	.600	.250	.590	.654	.784	.554	.375	.766	.639	.548	.854	.500	.700	.771
Peak Hour Analysis From 12:45 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	3	234	10	0	247	17	28	**16**	1	62	**20**	278	**7**	1	306	6	5	26	1	38	653
04:45 PM	2	191	**20**	0	213	9	28	12	0	49	18	245	5	1	269	**60**	**48**	35	**8**	**151**	682
05:00 PM	**6**	263	16	0	**285**	**21**	**54**	14	1	**90**	11	**311**	6	0	**328**	36	27	21	0	84	**787**
05:15 PM	1	**274**	6	**3**	284	15	0	5	**5**	25	11	269	5	**2**	287	11	14	**36**	1	62	658
Total Volume	12	962	52	3	1029	62	110	47	7	226	60	1103	23	4	1190	113	94	118	10	335	2780
% App. Total	1.2	93.5	5.1	0.3		27.4	48.7	20.8	3.1		5	92.7	1.9	0.3		33.7	28.1	35.2	3		
PHF	.500	.878	.650	.250	.903	.738	.509	.734	.350	.628	.750	.887	.821	.500	.907	.471	.490	.819	.313	.555	.883

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Summer Peak HR
Factor 1.13

File Name : Quincy
Site Code : 5
Start Date : 11/20/2007

	RUSHMORE RD Southbound					QUINCY ST Westbound					RUSHMORE RD Northbound					QUINCY ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**7**	236	9	0	252	1	1	8	0	10	9	314	6	0	329	1	2	7	0	10	601
07:45 AM	5	**302**	7	0	**314**	1	2	8	0	11	**23**	**367**	**10**	0	**400**	0	0	**10**	0	10	**735**
08:00 AM	2	218	**10**	0	230	**2**	**3**	**10**	0	**15**	23	256	3	0	282	1	**5**	9	0	**15**	542
08:15 AM	7	177	7	0	191	1	2	6	0	9	12	206	0	**5**	223	**2**	2	8	0	12	435
Total Volume	21	933	33	0	987	5	8	32	0	45	67	1143	19	5	1234	4	9	34	0	47	2313
% App. Total	2.1	94.5	3.3	0		11.1	17.8	71.1	0		5.4	92.6	1.5	0.4		8.5	19.1	72.3	0		
PHF	.750	.772	.825	.000	.786	.625	.667	.800	.000	.750	.728	.779	.475	.250	.771	.500	.450	.850	.000	.783	.787
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	2	249	**18**	0	269	**5**	1	16	0	**22**	7	258	3	**1**	269	**6**	1	10	0	17	577
04:45 PM	5	254	14	0	273	2	1	16	0	19	**14**	261	6	1	282	1	**6**	7	0	14	588
05:00 PM	**6**	**313**	15	**2**	**336**	2	0	**17**	**2**	21	9	**285**	**7**	0	**301**	1	5	**27**	**1**	**34**	**692**
05:15 PM	2	300	7	0	309	2	**6**	10	0	18	5	270	7	0	282	6	5	17	0	28	637
Total Volume	15	1116	54	2	1187	11	8	59	2	80	35	1074	23	2	1134	14	17	61	1	93	2494
% App. Total	1.3	94	4.5	0.2		13.8	10	73.8	2.5		3.1	94.7	2	0.2		15.1	18.3	65.6	1.1		
PHF	.625	.891	.750	.250	.883	.550	.333	.868	.250	.909	.625	.942	.821	.500	.942	.583	.708	.565	.250	.684	.901

Kadrmas, Lee & Jackson
128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Summer Peak HR
Factor 1.13

File Name : Columbus
Site Code : 6
Start Date : 11/7/2007

	RUSHMORE RD Southbound					COLUMBUS ST Westbound					RUSHMORE RD Northbound					COLUMBUS ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	7	216	2	0	225	3	0	8	**2**	13	2	255	5	**2**	264	0	3	7	0	10	512
07:30 AM	**21**	234	1	0	256	2	9	8	0	19	3	382	15	1	401	3	6	6	**7**	22	698
07:45 AM	19	**304**	**5**	0	**328**	**12**	**11**	**10**	2	**35**	**15**	**387**	**28**	1	**431**	**15**	**26**	**9**	6	**56**	**850**
08:00 AM	7	207	1	**1**	216	8	6	2	0	16	14	285	10	0	309	7	9	5	1	22	563
Total Volume	54	961	9	1	1025	25	26	28	4	83	34	1309	58	4	1405	25	44	27	14	110	2623
% App. Total	5.3	93.8	0.9	0.1		30.1	31.3	33.7	4.8		2.4	93.2	4.1	0.3		22.7	40	24.5	12.7		
PHF	.643	.790	.450	.250	.781	.521	.591	.700	.500	.593	.567	.846	.518	.500	.815	.417	.423	.750	.500	.491	.771
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	3	308	**9**	**2**	322	**17**	**31**	3	1	**52**	3	241	**8**	**2**	254	5	6	6	1	18	646
04:45 PM	2	287	7	0	296	6	5	7	0	18	**6**	266	8	0	280	**8**	**7**	3	1	19	613
05:00 PM	**5**	**344**	6	0	**355**	16	14	**9**	1	40	6	**307**	8	0	**321**	7	7	**20**	**2**	**36**	**752**
05:15 PM	5	311	5	1	322	8	6	1	**2**	17	5	291	2	2	300	6	2	9	1	18	657
Total Volume	15	1250	27	3	1295	47	56	20	4	127	20	1105	26	4	1155	26	22	38	5	91	2668
% App. Total	1.2	96.5	2.1	0.2		37	44.1	15.7	3.1		1.7	95.7	2.3	0.3		28.6	24.2	41.8	5.5		
PHF	.750	.908	.750	.375	.912	.691	.452	.556	.500	.611	.833	.900	.813	.500	.900	.813	.786	.475	.625	.632	.887

Kadrmas, Lee & Jackson
128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Summer Peak HR
Factor 1.13

File Name : Franklin
Site Code : 7
Start Date : 11/1/2007
Page No : 1

	RUSHMORE RD Southbound					FRANKLIN ST Westbound					RUSHMORE RD Northbound					FRANKLIN ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**1**	174	0	0	175	1	1	1	0	3	2	241	0	0	243	5	0	7	**5**	17	438
07:30 AM	1	230	3	**1**	235	2	2	3	0	7	7	**420**	0	0	427	19	2	7	0	28	697
07:45 AM	1	**287**	**8**	1	**297**	**6**	**7**	**7**	**1**	**21**	**11**	420	0	**2**	**433**	**24**	**8**	**24**	1	**57**	**808**
08:00 AM	1	210	3	0	214	0	3	3	0	6	9	299	0	1	309	16	6	15	1	38	567
Total Volume	4	901	14	2	921	9	13	14	1	37	29	1380	0	3	1412	64	16	53	7	140	2510
% App. Total	0.4	97.8	1.5	0.2		24.3	35.1	37.8	2.7		2.1	97.7	0	0.2		45.7	11.4	37.9	5		
PHF	1.000	.785	.438	.500	.775	.375	.464	.500	.250	.440	.659	.821	.000	.375	.815	.667	.500	.552	.350	.614	.777
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	3	258	2	**1**	264	2	3	5	**1**	11	**7**	**292**	1	1	**301**	6	**5**	7	0	18	594
04:30 PM	**9**	237	2	0	248	2	2	**6**	0	10	6	281	1	0	288	5	0	2	0	7	553
04:45 PM	2	270	3	0	275	2	2	3	0	7	0	248	1	1	250	3	2	10	**3**	18	550
05:00 PM	2	**301**	**7**	0	**310**	**5**	**5**	3	1	**14**	7	282	**3**	**3**	295	**9**	2	**15**	0	**26**	**645**
Total Volume	16	1066	14	1	1097	11	12	17	2	42	20	1103	6	5	1134	23	9	34	3	69	2342
% App. Total	1.5	97.2	1.3	0.1		26.2	28.6	40.5	4.8		1.8	97.3	0.5	0.4		33.3	13	49.3	4.3		
PHF	.444	.885	.500	.250	.885	.550	.600	.708	.500	.750	.714	.944	.500	.417	.942	.639	.450	.567	.250	.663	.908

Kadrmas, Lee & Jackson
128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Summer Peak HR
Factor 1.13

File Name : Cathedral
Site Code : 9
Start Date : 10/31/2007
Page No : 1

	RUSHMORE RD Southbound					CATHEDRAL DR Westbound					RUSHMORE RD Northbound					CATHEDRAL DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	109	41	**12**	0	162	23	2	127	**1**	153	3	99	70	0	172	**2**	1	0	0	3	490
07:30 AM	145	47	6	0	198	36	5	189	0	230	0	170	96	0	266	1	1	**1**	0	3	697
07:45 AM	**175**	**94**	8	0	**277**	50	6	**197**	0	**253**	**7**	**219**	**122**	0	**348**	1	**3**	1	0	**5**	**883**
08:00 AM	133	67	3	0	203	**52**	**8**	100	0	160	5	127	42	0	174	0	0	0	0	0	537
Total Volume	562	249	29	0	840	161	21	613	1	796	15	615	330	0	960	4	5	2	0	11	2607
% App. Total	66.9	29.6	3.5	0		20.2	2.6	77	0.1		1.6	64.1	34.4	0		36.4	45.5	18.2	0		
PHF	.803	.662	.604	.000	.758	.774	.656	.778	.250	.787	.536	.702	.676	.000	.690	.500	.417	.500	.000	.550	.738
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	114	126	**8**	**2**	250	40	1	116	0	157	1	**116**	**36**	0	**153**	3	**7**	0	**5**	15	575
04:45 PM	113	115	7	0	235	44	5	124	0	173	2	104	34	0	140	**10**	2	**6**	0	**18**	566
05:00 PM	**137**	**158**	2	0	**297**	**79**	**6**	**130**	0	**215**	**5**	111	35	**1**	152	5	7	2	0	14	**678**
05:15 PM	134	129	5	0	268	61	5	114	0	180	5	94	24	0	123	6	7	2	0	15	586
Total Volume	498	528	22	2	1050	224	17	484	0	725	13	425	129	1	568	24	23	10	5	62	2405
% App. Total	47.4	50.3	2.1	0.2		30.9	2.3	66.8	0		2.3	74.8	22.7	0.2		38.7	37.1	16.1	8.1		
PHF	.909	.835	.688	.250	.884	.709	.708	.931	.000	.843	.650	.916	.896	.250	.928	.600	.821	.417	.250	.861	.887

Kadrmas, Lee & Jackson

128 Soo Line Drive
PO Box 1157
Bismarck, ND 58502

2007 Summer Peak HR
Factor 1.13

File Name : St Patrick
Site Code : 8
Start Date : 11/6/2007
Page No : 1

	RUSHMORE RD Southbound					ST PATRICK ST Westbound					RUSHMORE RD Northbound					ST PATRICK ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	35	201	0	0	236	9	28	37	0	74	12	212	14	0	238	2	20	17	**1**	40	588
07:30 AM	33	205	1	0	239	13	35	53	0	101	**30**	**332**	17	0	**379**	**5**	33	23	1	62	781
07:45 AM	**37**	**251**	0	0	**288**	**14**	**52**	**78**	0	**144**	22	316	**20**	0	358	2	**46**	**32**	0	**80**	**870**
08:00 AM	29	180	**3**	0	212	14	18	42	0	74	18	187	20	**2**	227	1	18	18	1	38	551
Total Volume	134	837	4	0	975	50	133	210	0	393	82	1047	71	2	1202	10	117	90	3	220	2790
% App. Total	13.7	85.8	0.4	0		12.7	33.8	53.4	0		6.8	87.1	5.9	0.2		4.5	53.2	40.9	1.4		
PHF	.905	.834	.333	.000	.846	.893	.639	.673	.000	.682	.683	.788	.888	.250	.793	.500	.636	.703	.750	.688	.802
Peak Hour Analysis From 12:45 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	46	231	**5**	1	283	21	26	**43**	0	90	27	230	16	2	275	3	**37**	11	**1**	52	700
04:45 PM	**62**	241	1	0	304	**29**	**40**	34	0	**103**	28	253	**24**	**7**	312	1	25	**23**	0	49	768
05:00 PM	47	305	5	0	357	26	37	32	0	95	**31**	**304**	19	3	**357**	**7**	37	17	0	**61**	**870**
05:15 PM	45	**310**	1	**3**	**359**	23	24	34	0	81	17	237	20	1	275	0	26	16	1	43	758
Total Volume	200	1087	12	4	1303	99	127	143	0	369	103	1024	79	13	1219	11	125	67	2	205	3096
% App. Total	15.3	83.4	0.9	0.3		26.8	34.4	38.8	0		8.4	84	6.5	1.1		5.4	61	32.7	1		
PHF	.806	.877	.600	.333	.907	.853	.794	.831	.000	.896	.831	.842	.823	.464	.854	.393	.845	.728	.500	.840	.890

APPENDIX B

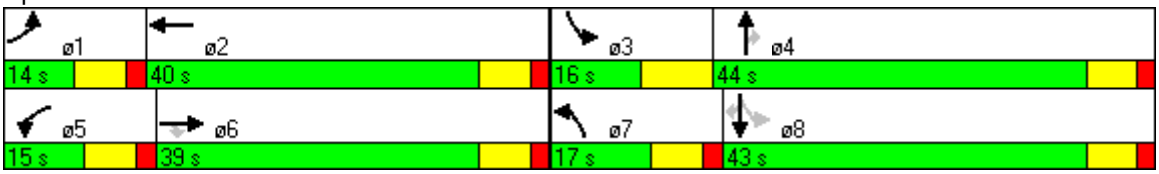
2007 Highway Capacity Worksheets
(AM, PM, PM Peak)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	3090	4577	1411	3090	4549	0	3060	3217	1425	1577	3217	1425
Flt Permitted	0.950			0.950			0.950			0.659		
Satd. Flow (perm)	3087	4577	1411	3089	4549	0	3060	3217	1425	1093	3217	1425
Satd. Flow (RTOR)			350		6				161			16
Volume (vph)	33	902	280	154	703	28	190	131	114	39	109	10
Confl. Peds. (#/hr)	1			1						1		
Peak Hour Factor	0.64	0.74	0.80	0.61	0.86	0.78	0.83	0.89	0.71	0.89	0.70	0.62
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	3%	1%	2%	3%	1%	2%
Lane Group Flow (vph)	52	1219	350	252	853	0	229	147	161	44	156	16
Turn Type	Prot		Perm	Prot			Prot		Perm	pm+pt		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6						4	8		8
Total Split (s)	14.0	39.0	39.0	15.0	40.0	0.0	17.0	44.0	44.0	16.0	43.0	43.0
Act Effct Green (s)	11.4	50.9	50.9	19.9	62.1		13.0	19.2	19.2	24.8	14.3	14.3
Actuated g/C Ratio	0.10	0.45	0.45	0.17	0.54		0.11	0.17	0.17	0.22	0.13	0.13
v/c Ratio	0.17	0.60	0.42	0.47	0.34		0.66	0.27	0.43	0.16	0.39	0.08
Uniform Delay, d1	48.1	24.9	0.0	42.3	16.1		48.3	41.3	0.0	30.1	44.5	0.0
Control Delay	47.7	26.2	4.1	44.7	16.0		58.1	43.0	8.0	31.5	45.8	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.7	26.2	4.2	44.7	16.0		58.1	43.0	8.0	31.5	45.8	18.8
LOS	D	C	A	D	B		E	D	A	C	D	B
Approach Delay		22.1			22.6			38.9			40.9	
Approach LOS		C			C			D			D	

Intersection Summary

Cycle Length: 114
Actuated Cycle Length: 114
Offset: 28 (25%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 26.0 — Intersection LOS: C
Intersection Capacity Utilization 47.8% — ICU Level of Service A
Analysis Period (min) 15

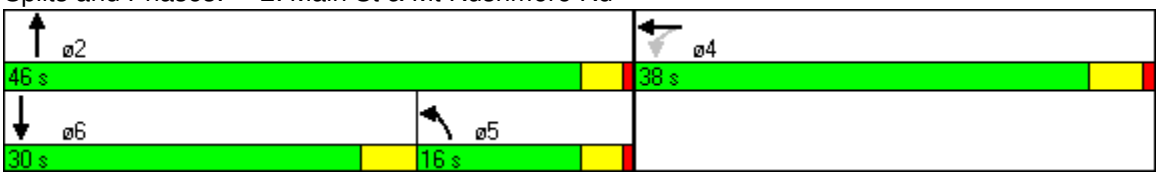
Splits and Phases: 1: Omaha St & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	0	0	0	4470	0	3090	3185	0	0	3170	0
Flt Permitted					0.994		0.950					
Satd. Flow (perm)	0	0	0	0	4470	0	3090	3185	0	0	3170	0
Satd. Flow (RTOR)					57						12	
Volume (vph)	0	0	0	63	493	104	309	632	0	0	562	53
Confl. Peds. (#/hr)			4			10			3			5
Peak Hour Factor	0.25	0.25	0.25	0.61	0.79	0.74	0.79	0.75	0.25	0.25	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	0%	0%	1%	1%
Lane Group Flow (vph)	0	0	0	0	868	0	391	843	0	0	669	0
Turn Type				Perm			Prot					
Protected Phases					4		5	2			6	
Permitted Phases				4								
Total Split (s)	0.0	0.0	0.0	38.0	38.0	0.0	16.0	46.0	0.0	0.0	30.0	0.0
Act Effct Green (s)					34.0		12.0	42.0			26.0	
Actuated g/C Ratio					0.40		0.14	0.50			0.31	
v/c Ratio					0.47		0.89	0.53			0.68	
Uniform Delay, d1					17.0		35.3	14.3			24.8	
Control Delay					18.1		34.1	1.9			28.9	
Queue Delay					0.0		0.0	0.5			0.0	
Total Delay					18.1		34.1	2.4			28.9	
LOS					B		C	A			C	
Approach Delay					18.1			12.4			28.9	
Approach LOS					B			B			C	

Intersection Summary		
Cycle Length: 84		
Actuated Cycle Length: 84		
Offset: 82 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green		
Control Type: Pretimed		
Maximum v/c Ratio: 0.89		
Intersection Signal Delay: 18.2	Intersection LOS: B	
Intersection Capacity Utilization 72.5%	ICU Level of Service C	
Analysis Period (min) 15		

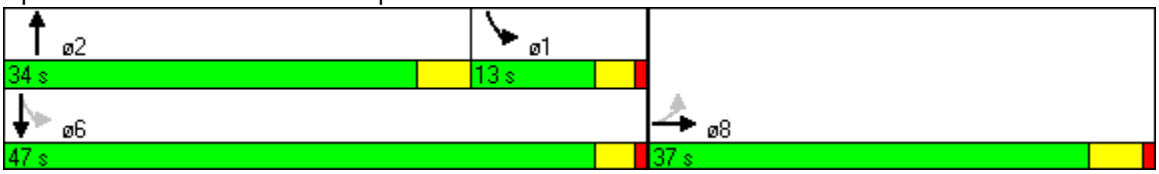
Splits and Phases: 2: Main St & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	4448	0	0	0	0	0	4552	0	1608	3185	0
Flt Permitted		0.997								0.118		
Satd. Flow (perm)	0	4448	0	0	0	0	0	4552	0	200	3185	0
Satd. Flow (RTOR)		80						23				
Volume (vph)	69	994	278	0	0	0	0	835	80	50	562	0
Confl. Peds. (#/hr)			9			7			1			2
Peak Hour Factor	0.75	0.83	0.89	0.92	0.92	0.92	0.92	0.73	0.67	0.59	0.79	0.25
Heavy Vehicles (%)	5%	1%	1%	0%	0%	0%	0%	1%	1%	1%	2%	0%
Lane Group Flow (vph)	0	1602	0	0	0	0	0	1263	0	85	711	0
Turn Type	Perm									pm+pt		
Protected Phases		8						2		1	6	
Permitted Phases	8									6		
Total Split (s)	37.0	37.0	0.0	0.0	0.0	0.0	0.0	34.0	0.0	13.0	47.0	0.0
Act Effct Green (s)		33.0						30.0		43.0	43.0	
Actuated g/C Ratio		0.39						0.36		0.51	0.51	
v/c Ratio		0.89						0.77		0.34	0.44	
Uniform Delay, d1		22.6						23.4		17.4	12.9	
Control Delay		26.1						27.7		12.9	4.5	
Queue Delay		0.0						2.3		0.0	0.0	
Total Delay		26.1						30.1		12.9	4.5	
LOS		C						C		B	A	
Approach Delay		26.1						30.1			5.4	
Approach LOS		C						C			A	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 82 (98%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 23.0	Intersection LOS: C
Intersection Capacity Utilization 72.5%	ICU Level of Service C
Analysis Period (min) 15	

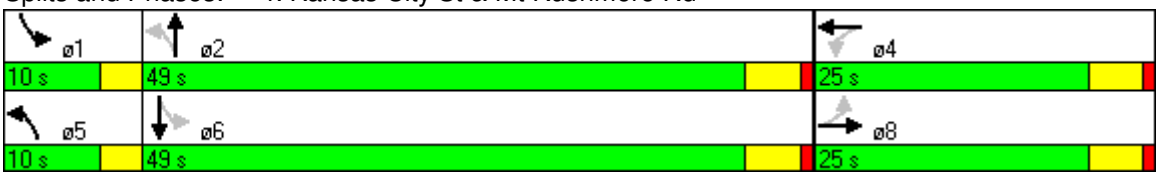
Splits and Phases: 3: St Joseph & Mt Rushmore Rd

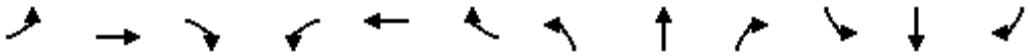


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1608	1578	0	1608	1612	0	1608	4590	0	1608	3198	0
Flt Permitted	0.720			0.673			0.171			0.170		
Satd. Flow (perm)	1219	1578	0	1139	1612	0	290	4590	0	288	3198	0
Satd. Flow (RTOR)		35			16			11			6	
Volume (vph)	20	40	37	14	25	11	76	942	27	30	830	23
Confl. Peds. (#/hr)			2			3			3			5
Peak Hour Factor	0.62	0.56	0.84	0.44	0.63	0.69	0.65	0.79	0.56	0.56	0.77	0.64
Heavy Vehicles (%)	1%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Lane Group Flow (vph)	32	115	0	32	56	0	117	1240	0	54	1114	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	10.0	49.0	0.0	10.0	49.0	0.0
Act Effct Green (s)	11.5	11.5		11.5	11.5		65.8	61.6		61.9	58.0	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.78	0.73		0.74	0.69	
v/c Ratio	0.19	0.47		0.21	0.24		0.34	0.37		0.18	0.50	
Uniform Delay, d1	33.2	23.8		33.3	23.7		2.1	5.2		2.4	7.3	
Control Delay	31.4	24.5		31.6	24.5		7.2	6.9		2.4	4.2	
Queue Delay	0.0	0.0		0.0	0.0		0.9	0.0		0.0	0.4	
Total Delay	31.4	24.5		31.6	24.5		8.1	6.9		2.4	4.6	
LOS	C	C		C	C		A	A		A	A	
Approach Delay		26.0			27.1			7.0			4.5	
Approach LOS		C			C			A			A	

Intersection Summary		
Cycle Length: 84		
Actuated Cycle Length: 84		
Offset: 79 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.50		
Intersection Signal Delay: 7.6	Intersection LOS: A	
Intersection Capacity Utilization 49.2%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 4: Kansas City St & Mt Rushmore Rd





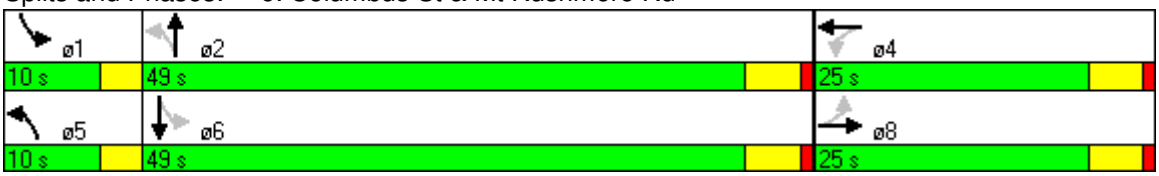
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Satd. Flow (prot)	1593	1517	0	1608	1503	0	1593	3204	0	1608	3200	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1593	1517	0	1608	1503	0	1593	3204	0	1608	3200	0
Volume (vph)	4	8	30	5	8	28	57	982	17	18	802	29
Confl. Peds. (#/hr)									4			
Peak Hour Factor	0.50	0.50	0.83	0.62	0.67	0.78	0.75	0.78	0.47	0.75	0.77	0.81
Heavy Vehicles (%)	2%	1%	1%	1%	1%	1%	2%	1%	1%	1%	1%	2%
Lane Group Flow (vph)	8	52	0	8	48	0	76	1295	0	24	1078	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 48.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1608	1602	0	1608	1521	0	1608	3177	0	1593	3209	0
Flt Permitted	0.708			0.660			0.178			0.089		
Satd. Flow (perm)	1199	1602	0	1117	1521	0	301	3177	0	149	3209	0
Satd. Flow (RTOR)		20			36			14			3	
Volume (vph)	22	38	23	23	23	25	30	1160	51	48	850	8
Confl. Peds. (#/hr)			12			4			4			1
Peak Hour Factor	0.43	0.42	0.72	0.52	0.57	0.69	0.58	0.84	0.51	0.63	0.79	0.50
Heavy Vehicles (%)	1%	2%	1%	1%	4%	3%	1%	1%	2%	2%	1%	2%
Lane Group Flow (vph)	51	122	0	44	76	0	52	1481	0	76	1092	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	10.0	49.0	0.0	10.0	49.0	0.0
Act Effct Green (s)	11.4	11.4		11.6	11.6		62.8	59.3		65.0	61.7	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.75	0.71		0.77	0.73	
v/c Ratio	0.31	0.52		0.29	0.32		0.17	0.66		0.35	0.46	
Uniform Delay, d1	33.7	28.9		33.6	17.5		2.3	8.1		2.1	5.8	
Control Delay	32.7	29.0		32.5	19.8		4.3	11.8		13.4	6.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.1	0.0	
Total Delay	32.7	29.0		32.5	19.9		4.3	11.8		13.5	6.1	
LOS	C	C		C	B		A	B		B	A	
Approach Delay		30.1			24.5			11.5			6.6	
Approach LOS		C			C			B			A	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 11.2	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Columbus St & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	1715	0	0	1712	0	1752	3574	0	1703	3558	0
Flt Permitted		0.845			0.898		0.245			0.125		
Satd. Flow (perm)	0	1480	0	0	1559	0	452	3574	0	224	3558	0
Satd. Flow (RTOR)		50			24						8	
Volume (vph)	55	14	45	8	12	13	26	1184	0	4	772	13
Confl. Peds. (#/hr)			6			1			3			2
Peak Hour Factor	0.69	0.50	0.56	0.40	0.50	0.54	0.65	0.82	0.92	0.92	0.79	0.46
Heavy Vehicles (%)	1%	1%	2%	3%	2%	6%	3%	1%	1%	6%	1%	1%
Lane Group Flow (vph)	0	188	0	0	68	0	40	1444	0	4	1005	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Total Split (s)	21.0	21.0	0.0	21.0	21.0	0.0	49.0	49.0	0.0	49.0	49.0	0.0
Act Effct Green (s)		12.4			12.4		49.6	49.6		49.6	49.6	
Actuated g/C Ratio		0.18			0.18		0.71	0.71		0.71	0.71	
v/c Ratio		0.62			0.23		0.12	0.57		0.03	0.40	
Uniform Delay, d1		19.2			15.8		3.2	5.0		3.0	4.1	
Control Delay		22.6			17.3		3.3	3.5		4.8	5.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		22.6			17.3		3.3	3.5		4.8	5.2	
LOS		C			B		A	A		A	A	
Approach Delay		22.6			17.3			3.5			5.1	
Approach LOS		C			B			A			A	

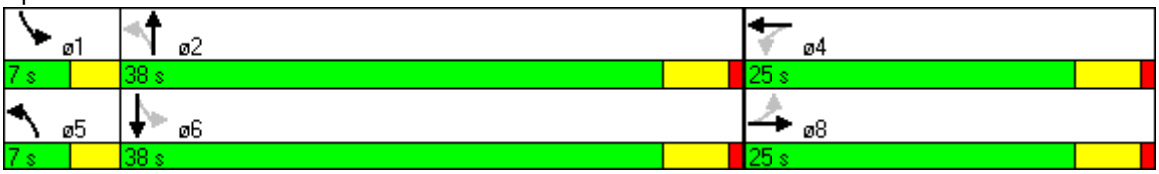
Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 5.8	Intersection LOS: A
Intersection Capacity Utilization 52.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Franklin St & Mt Rushmore Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	1763	0	1787	1714	0	1770	3541	0	1770	3567	0
Flt Permitted		0.836		0.454			0.244			0.126		
Satd. Flow (perm)	0	1478	0	854	1714	0	455	3541	0	235	3567	0
Satd. Flow (RTOR)		45			109			12			3	
Volume (vph)	9	101	77	44	115	181	72	899	61	115	718	4
Confl. Peds. (#/hr)			3						2			
Peak Hour Factor	0.56	0.63	0.71	0.92	0.64	0.68	0.69	0.79	0.90	0.90	0.83	0.33
Heavy Vehicles (%)	1%	1%	2%	1%	1%	1%	2%	1%	1%	2%	1%	1%
Lane Group Flow (vph)	0	284	0	48	446	0	104	1206	0	128	877	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	7.0	38.0	0.0	7.0	38.0	0.0
Act Effct Green (s)		21.0		21.0	21.0		37.0	34.0		37.0	34.0	
Actuated g/C Ratio		0.30		0.30	0.30		0.53	0.49		0.53	0.49	
v/c Ratio		0.60		0.19	0.75		0.35	0.70		0.67	0.51	
Uniform Delay, d1		17.3		18.2	16.4		6.5	13.8		6.7	12.2	
Control Delay		23.6		20.6	26.5		10.2	16.6		36.1	17.7	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		23.6		20.6	26.5		10.2	16.6		36.1	17.7	
LOS		C		C	C		B	B		D	B	
Approach Delay		23.6			25.9			16.1			20.0	
Approach LOS		C			C			B			C	

Intersection Summary		
Cycle Length: 70		
Actuated Cycle Length: 70		
Offset: 63 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Control Type: Pretimed		
Maximum v/c Ratio: 0.75		
Intersection Signal Delay: 19.6	Intersection LOS: B	
Intersection Capacity Utilization 64.4%	ICU Level of Service C	
Analysis Period (min) 15		

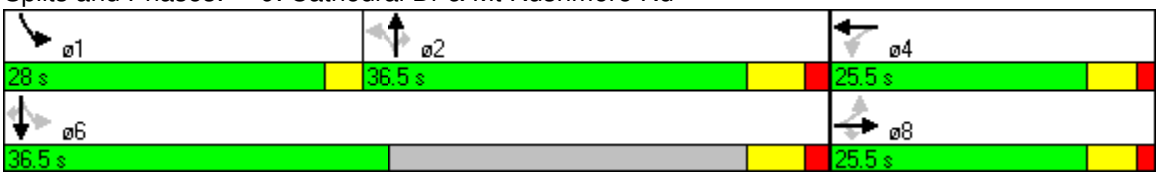
Splits and Phases: 8: St Patrick & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1787	1881	1599	1787	1590	0	1787	3574	1599	1787	3574	1599
Flt Permitted	0.186			0.750			0.556			0.202		
Satd. Flow (perm)	350	1881	1599	1411	1590	0	1046	3574	1599	380	3574	1599
Satd. Flow (RTOR)			4		532				416			44
Volume (vph)	4	5	2	138	18	526	13	529	283	482	214	26
Confl. Peds. (#/hr)						1						
Peak Hour Factor	0.50	0.42	0.50	0.77	0.64	0.78	0.54	0.70	0.68	0.80	0.66	0.59
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Lane Group Flow (vph)	8	12	4	179	702	0	24	756	416	602	324	44
Turn Type	Perm		Perm	Perm			Perm		Perm	pm+pt		Perm
Protected Phases		8			4			2		1	6	
Permitted Phases	8		8	4			2		2	6		6
Total Split (s)	25.5	25.5	25.5	25.5	25.5	0.0	36.5	36.5	36.5	28.0	36.5	36.5
Act Effct Green (s)	19.3	19.3	19.3	19.3	19.3		32.6	32.6	32.6	59.3	59.3	59.3
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22		0.38	0.38	0.38	0.68	0.68	0.68
v/c Ratio	0.10	0.03	0.01	0.57	0.91		0.06	0.56	0.48	0.96	0.13	0.04
Uniform Delay, d1	26.8	26.3	0.0	29.9	7.5		17.2	21.3	0.0	16.3	4.7	0.0
Control Delay	30.0	26.6	17.5	36.4	23.8		19.5	24.1	4.3	42.0	5.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.7		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	26.6	17.5	36.4	24.5		19.5	24.1	4.3	42.0	5.2	1.7
LOS	C	C	B	D	C		B	C	A	D	A	A
Approach Delay		26.2			26.9			17.1			27.9	
Approach LOS		C			C			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 86.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	

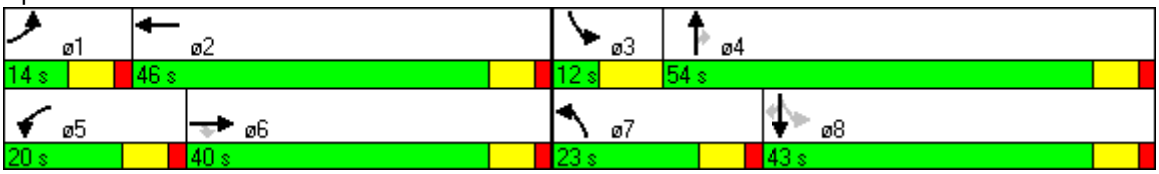
Splits and Phases: 9: Cathedral Dr & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	3090	4577	1411	3090	4568	0	3060	3217	1425	1577	3217	1425
Flt Permitted	0.950			0.950			0.950			0.613		
Satd. Flow (perm)	3090	4577	1371	3090	4568	0	3060	3217	1404	1018	3217	1397
Satd. Flow (RTOR)			322		1				207			40
Volume (vph)	58	878	209	219	844	12	296	178	184	39	164	31
Confl. Peds. (#/hr)			12						2			7
Peak Hour Factor	0.85	0.95	0.65	0.90	0.78	1.00	0.90	0.80	0.89	0.70	0.87	0.78
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	3%	1%	2%	3%	1%	2%
Lane Group Flow (vph)	68	924	322	243	1094	0	329	222	207	56	189	40
Turn Type	Prot		Perm	Prot			Prot		Perm	pm+pt		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6						4	8		8
Total Split (s)	14.0	40.0	40.0	20.0	46.0	0.0	23.0	54.0	54.0	12.0	43.0	43.0
Act Effct Green (s)	12.2	55.9	55.9	19.4	65.8		18.7	29.1	29.1	24.0	16.0	16.0
Actuated g/C Ratio	0.10	0.44	0.44	0.15	0.52		0.15	0.23	0.23	0.19	0.13	0.13
v/c Ratio	0.23	0.46	0.41	0.51	0.46		0.72	0.30	0.43	0.24	0.46	0.19
Uniform Delay, d1	53.8	25.4	0.0	48.9	20.6		51.2	40.0	0.0	31.4	49.7	0.0
Control Delay	53.8	26.3	4.4	52.2	21.0		60.6	40.8	6.4	34.0	51.0	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	26.3	4.4	52.2	21.0		60.6	40.8	6.4	34.0	51.0	14.4
LOS	D	C	A	D	C		E	D	A	C	D	B
Approach Delay		22.4			26.7			40.0			42.6	
Approach LOS		C			C			D			D	

Intersection Summary	
Cycle Length: 126	
Actuated Cycle Length: 126	
Offset: 28 (22%), Referenced to phase 2:WBT and 6:EBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 29.1	Intersection LOS: C
Intersection Capacity Utilization 61.9%	ICU Level of Service B
Analysis Period (min) 15	

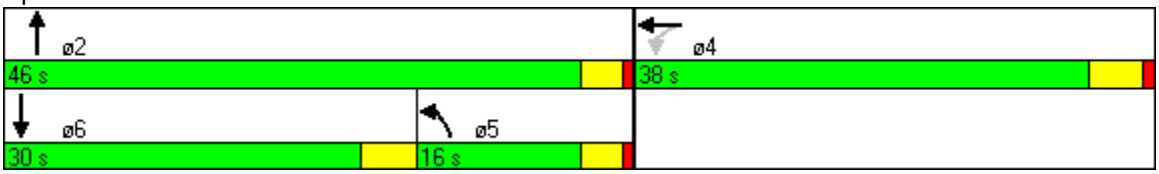
Splits and Phases: 1: Omaha St & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	0	0	0	4532	0	3090	3185	0	0	3143	0
Flt Permitted					0.993		0.950					
Satd. Flow (perm)	0	0	0	0	4532	0	3090	3185	0	0	3143	0
Satd. Flow (RTOR)					17						17	
Volume (vph)	0	0	0	150	909	75	431	593	0	0	496	72
Confl. Peds. (#/hr)			17			12			3			10
Peak Hour Factor	0.92	0.92	0.92	0.78	0.78	0.72	0.88	0.85	0.92	0.92	0.88	0.82
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	0%	0%	1%	1%
Lane Group Flow (vph)	0	0	0	0	1461	0	490	698	0	0	652	0
Turn Type				Perm			Prot					
Protected Phases					4		5	2			6	
Permitted Phases				4								
Total Split (s)	0.0	0.0	0.0	38.0	38.0	0.0	16.0	46.0	0.0	0.0	30.0	0.0
Act Effct Green (s)					34.0		12.0	42.0			26.0	
Actuated g/C Ratio					0.40		0.14	0.50			0.31	
v/c Ratio					0.79		1.11	0.44			0.66	
Uniform Delay, d1					21.6		36.0	13.4			24.4	
Control Delay					25.5		93.1	1.9			28.4	
Queue Delay					0.0		0.0	0.0			0.0	
Total Delay					25.5		93.1	1.9			28.4	
LOS					C		F	A			C	
Approach Delay					25.5			39.5			28.4	
Approach LOS					C			D			C	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 82 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 31.1	Intersection LOS: C
Intersection Capacity Utilization 72.8%	ICU Level of Service C
Analysis Period (min) 15	

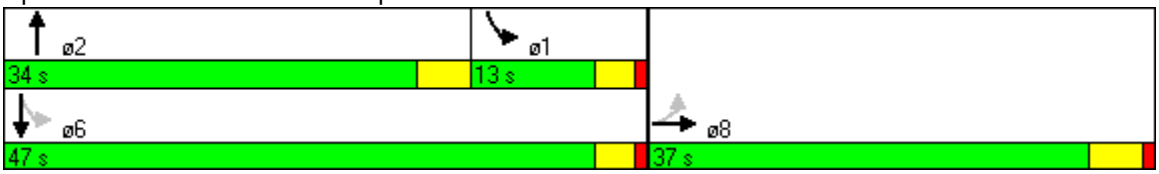
Splits and Phases: 2: Main St & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	4412	0	0	0	0	0	4560	0	1608	3185	0
Flt Permitted		0.997								0.142		
Satd. Flow (perm)	0	4412	0	0	0	0	0	4560	0	240	3185	0
Satd. Flow (RTOR)		113						19				
Volume (vph)	68	784	237	0	0	0	0	926	83	58	621	0
Confl. Peds. (#/hr)			8			10			6			2
Peak Hour Factor	0.85	0.86	0.75	0.92	0.92	0.92	0.92	0.86	0.86	0.85	0.91	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	0%	0%	0%	1%	1%	1%	2%	0%
Lane Group Flow (vph)	0	1308	0	0	0	0	0	1174	0	68	682	0
Turn Type	Perm									pm+pt		
Protected Phases		8						2		1	6	
Permitted Phases	8									6		
Total Split (s)	37.0	37.0	0.0	0.0	0.0	0.0	0.0	34.0	0.0	13.0	47.0	0.0
Act Effct Green (s)		33.0						30.0		43.0	43.0	
Actuated g/C Ratio		0.39						0.36		0.51	0.51	
v/c Ratio		0.73						0.72		0.25	0.42	
Uniform Delay, d1		19.6						22.9		14.0	12.7	
Control Delay		16.9						21.7		9.2	5.1	
Queue Delay		0.0						29.3		0.0	0.0	
Total Delay		16.9						51.0		9.2	5.1	
LOS		B						D		A	A	
Approach Delay		16.9						51.0			5.5	
Approach LOS		B						D			A	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 82 (98%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 26.6	Intersection LOS: C
Intersection Capacity Utilization 72.8%	ICU Level of Service C
Analysis Period (min) 15	

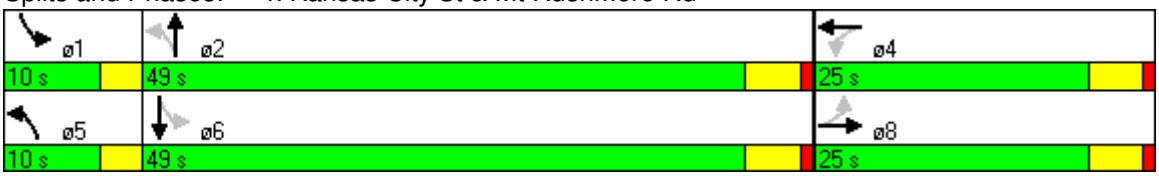
Splits and Phases: 3: St Joseph & Mt Rushmore Rd

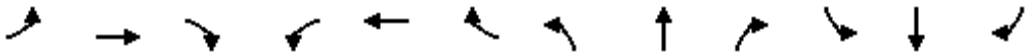


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1608	1556	0	1624	1629	0	1608	4605	0	1624	3180	0
Flt Permitted	0.451			0.361			0.210			0.214		
Satd. Flow (perm)	764	1556	0	617	1629	0	356	4605	0	366	3180	0
Satd. Flow (RTOR)		44			16			6			14	
Volume (vph)	97	80	101	52	94	40	52	937	19	11	818	44
Confl. Peds. (#/hr)			9			6			4			2
Peak Hour Factor	0.47	0.49	0.81	0.72	0.51	0.77	0.77	0.89	0.79	0.55	0.88	0.65
Heavy Vehicles (%)	1%	2%	1%	0%	1%	1%	1%	1%	1%	0%	1%	1%
Lane Group Flow (vph)	206	288	0	72	236	0	68	1077	0	20	998	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	10.0	49.0	0.0	10.0	49.0	0.0
Act Effct Green (s)	21.0	21.0		21.0	21.0		53.5	51.1		51.5	47.0	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.64	0.61		0.61	0.56	
v/c Ratio	1.08	0.68		0.47	0.56		0.22	0.38		0.06	0.56	
Uniform Delay, d1	31.5	23.9		26.7	25.5		5.2	9.3		5.3	12.0	
Control Delay	121.6	33.5		38.4	31.6		6.6	7.7		2.2	5.6	
Queue Delay	0.0	0.0		0.0	0.0		0.1	0.0		0.0	0.7	
Total Delay	121.6	33.5		38.4	31.6		6.6	7.7		2.2	6.2	
LOS	F	C		D	C		A	A		A	A	
Approach Delay		70.2			33.2			7.7			6.1	
Approach LOS		E			C			A			A	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 79 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 20.2	Intersection LOS: C
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Kansas City St & Mt Rushmore Rd





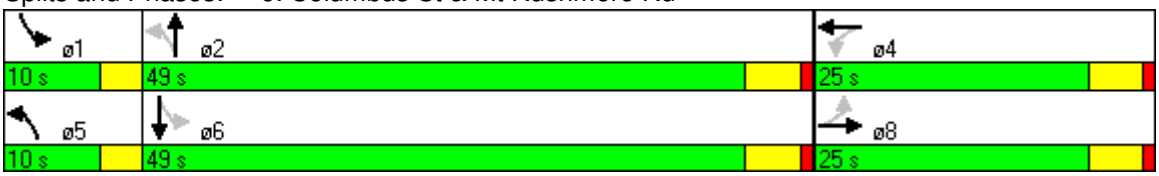
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Satd. Flow (prot)	1593	1485	0	1608	1505	0	1593	3204	0	1608	3189	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1593	1485	0	1608	1505	0	1593	3204	0	1608	3189	0
Volume (vph)	12	14	52	10	7	49	30	913	20	13	948	46
Confl. Peds. (#/hr)			1			2			2			2
Peak Hour Factor	0.60	0.70	0.56	0.62	0.35	0.88	0.62	0.94	0.83	0.65	0.89	0.77
Heavy Vehicles (%)	2%	1%	1%	1%	1%	1%	2%	1%	1%	1%	1%	2%
Lane Group Flow (vph)	20	113	0	16	76	0	48	995	0	20	1125	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 45.1%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1608	1477	0	1608	1585	0	1608	3201	0	1593	3201	0
Flt Permitted	0.624			0.695			0.132			0.171		
Satd. Flow (perm)	1056	1477	0	1177	1585	0	223	3201	0	287	3201	0
Satd. Flow (RTOR)		72			17			4			5	
Volume (vph)	22	19	34	41	48	18	17	979	23	13	1107	23
Confl. Peds. (#/hr)			5			4			4			3
Peak Hour Factor	0.79	0.79	0.47	0.68	0.44	0.56	0.82	0.90	0.85	0.81	0.91	0.72
Heavy Vehicles (%)	1%	2%	1%	1%	4%	3%	1%	1%	2%	2%	1%	2%
Lane Group Flow (vph)	28	96	0	60	141	0	21	1115	0	16	1248	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	10.0	49.0	0.0	10.0	49.0	0.0
Act Effct Green (s)	13.5	13.5		13.5	13.5		61.8	60.7		60.7	58.8	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.74	0.72		0.72	0.70	
v/c Ratio	0.16	0.32		0.32	0.52		0.09	0.48		0.06	0.56	
Uniform Delay, d1	30.4	7.5		31.1	28.2		2.8	6.0		3.1	7.1	
Control Delay	29.5	12.4		31.4	29.8		4.4	7.0		4.3	6.9	
Queue Delay	0.0	0.0		0.0	0.1		0.0	0.0		0.0	0.0	
Total Delay	29.5	12.4		31.4	29.8		4.4	7.0		4.3	6.9	
LOS	C	B		C	C		A	A		A	A	
Approach Delay		16.2			30.3			6.9			6.8	
Approach LOS		B			C			A			A	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 51.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Columbus St & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	1684	0	0	1700	0	1752	3566	0	1703	3564	0
Flt Permitted		0.904			0.921		0.227			0.250		
Satd. Flow (perm)	0	1549	0	0	1589	0	419	3566	0	448	3564	0
Satd. Flow (RTOR)		52			20			3			6	
Volume (vph)	20	4	36	12	11	12	17	928	6	12	941	14
Confl. Peds. (#/hr)			3			1			4			
Peak Hour Factor	0.62	0.50	0.69	0.75	0.69	0.60	0.71	0.95	0.50	0.38	0.91	0.58
Heavy Vehicles (%)	1%	1%	2%	3%	2%	6%	3%	1%	1%	6%	1%	1%
Lane Group Flow (vph)	0	92	0	0	52	0	24	989	0	32	1058	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Total Split (s)	21.0	21.0	0.0	21.0	21.0	0.0	49.0	49.0	0.0	49.0	49.0	0.0
Act Effct Green (s)		8.5			8.5		53.5	53.5		53.5	53.5	
Actuated g/C Ratio		0.12			0.12		0.76	0.76		0.76	0.76	
v/c Ratio		0.39			0.25		0.07	0.36		0.09	0.39	
Uniform Delay, d1		12.1			16.9		2.1	2.7		2.1	2.7	
Control Delay		15.8			19.5		2.1	2.0		3.3	3.5	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		15.8			19.5		2.1	2.0		3.3	3.5	
LOS		B			B		A	A		A	A	
Approach Delay		15.8			19.5			2.0			3.5	
Approach LOS		B			B			A			A	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 3.7 — Intersection LOS: A
Intersection Capacity Utilization 39.0% — ICU Level of Service A
Analysis Period (min) 15

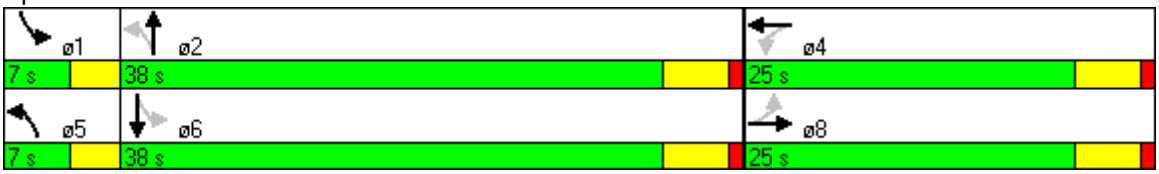
Splits and Phases: 7: Franklin St & Mt Rushmore Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	1773	0	1787	1734	0	1770	3526	0	1770	3566	0
Flt Permitted		0.948		0.533			0.167			0.150		
Satd. Flow (perm)	0	1689	0	1003	1734	0	311	3526	0	279	3566	0
Satd. Flow (RTOR)		37			80			16			3	
Volume (vph)	10	107	58	84	108	122	88	880	67	173	934	10
Confl. Peds. (#/hr)			2						12			4
Peak Hour Factor	0.42	0.84	0.76	0.84	0.79	0.82	0.85	0.84	0.84	0.82	0.88	0.62
Heavy Vehicles (%)	1%	1%	2%	1%	1%	1%	2%	1%	1%	2%	1%	1%
Lane Group Flow (vph)	0	227	0	100	286	0	104	1128	0	211	1077	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	7.0	38.0	0.0	7.0	38.0	0.0
Act Effct Green (s)		21.0		21.0	21.0		37.0	34.0		37.0	34.0	
Actuated g/C Ratio		0.30		0.30	0.30		0.53	0.49		0.53	0.49	
v/c Ratio		0.43		0.33	0.50		0.46	0.66		1.00	0.62	
Uniform Delay, d1		16.2		19.0	14.1		6.5	13.3		9.9	13.2	
Control Delay		19.3		22.9	17.7		13.7	15.6		83.8	15.5	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		19.3		22.9	17.7		13.7	15.6		83.8	15.5	
LOS		B		C	B		B	B		F	B	
Approach Delay		19.3			19.1			15.5			26.7	
Approach LOS		B			B			B			C	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 63 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 20.8 Intersection LOS: C
Intersection Capacity Utilization 79.3% ICU Level of Service D
Analysis Period (min) 15

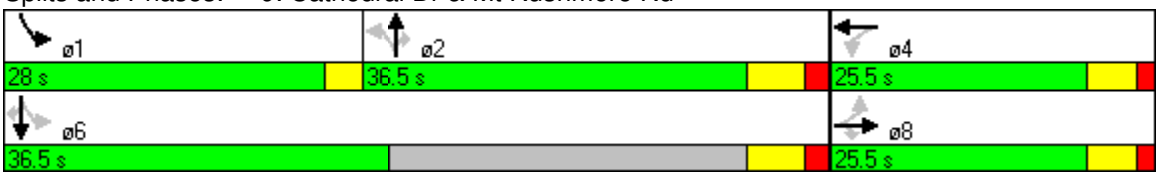
Splits and Phases: 8: St Patrick & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1787	1881	1599	1787	1610	0	1787	3574	1599	1787	3574	1599
Flt Permitted	0.186			0.742			0.443			0.403		
Satd. Flow (perm)	350	1881	1571	1396	1610	0	833	3574	1577	758	3574	1556
Satd. Flow (RTOR)			20		461				128			28
Volume (vph)	21	20	9	198	14	429	11	375	114	441	468	19
Confl. Peds. (#/hr)			4						1			2
Peak Hour Factor	0.58	0.83	0.45	0.71	0.70	0.93	0.69	0.92	0.89	0.91	0.84	0.68
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Lane Group Flow (vph)	36	24	20	279	481	0	16	408	128	485	557	28
Turn Type	Perm		Perm	Perm			Perm		Perm	pm+pt		Perm
Protected Phases		8			4			2		1	6	
Permitted Phases	8		8	4			2		2	6		6
Total Split (s)	25.5	25.5	25.5	25.5	25.5	0.0	36.5	36.5	36.5	28.0	36.5	36.5
Act Effct Green (s)	20.3	20.3	20.3	20.3	20.3		32.7	32.7	32.7	53.4	53.4	53.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25		0.40	0.40	0.40	0.65	0.65	0.65
v/c Ratio	0.41	0.05	0.05	0.80	0.64		0.05	0.29	0.18	0.69	0.24	0.03
Uniform Delay, d1	25.7	23.3	0.0	28.8	1.0		14.9	16.5	0.0	6.7	5.8	0.0
Control Delay	42.5	25.4	11.8	46.0	7.8		18.3	18.5	4.5	11.7	6.2	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.3		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.5	25.4	11.8	46.0	8.1		18.3	18.5	4.5	11.7	6.2	2.1
LOS	D	C	B	D	A		B	B	A	B	A	A
Approach Delay		29.7			22.0			15.2			8.6	
Approach LOS		C			C			B			A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 81.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 14.9	Intersection LOS: B
Intersection Capacity Utilization 74.2%	ICU Level of Service D
Analysis Period (min) 15	

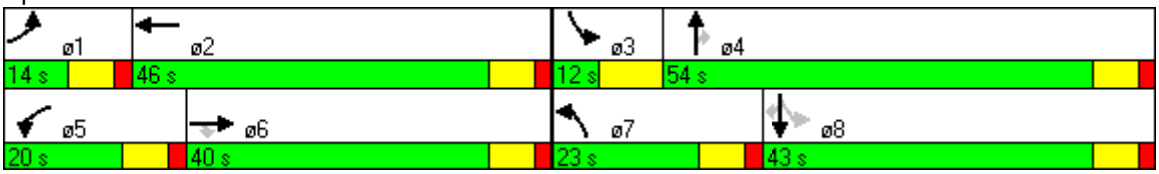
Splits and Phases: 9: Cathedral Dr & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	3090	4577	1411	3090	4572	0	3060	3217	1425	1577	3217	1425
Flt Permitted	0.950			0.950			0.950			0.588		
Satd. Flow (perm)	3090	4577	1369	3090	4572	0	3060	3217	1404	976	3217	1395
Satd. Flow (RTOR)			378		1				245			44
Volume (vph)	67	1022	242	256	984	12	342	207	213	45	189	35
Confl. Peds. (#/hr)			13						2			8
Peak Hour Factor	0.38	0.95	0.64	0.90	0.78	1.00	0.90	0.78	0.87	0.70	0.88	0.80
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	3%	1%	2%	3%	1%	2%
Lane Group Flow (vph)	176	1076	378	284	1274	0	380	265	245	64	215	44
Turn Type	Prot		Perm	Prot			Prot		Perm	pm+pt		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6						4	8		8
Total Split (s)	14.0	40.0	40.0	20.0	46.0	0.0	23.0	54.0	54.0	12.0	43.0	43.0
Act Effct Green (s)	17.0	52.7	52.7	21.3	57.1		19.0	30.3	30.3	25.0	16.9	16.9
Actuated g/C Ratio	0.13	0.42	0.42	0.17	0.45		0.15	0.24	0.24	0.20	0.13	0.13
v/c Ratio	0.42	0.56	0.48	0.54	0.62		0.82	0.34	0.47	0.28	0.50	0.19
Uniform Delay, d1	50.0	28.9	0.0	47.9	27.1		51.8	39.6	0.0	30.7	49.3	0.0
Control Delay	52.6	30.3	5.0	51.4	28.6		67.6	40.5	6.1	34.0	50.7	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	30.3	5.0	51.4	28.6		67.6	40.5	6.1	34.0	50.7	13.7
LOS	D	C	A	D	C		E	D	A	C	D	B
Approach Delay		26.8			32.8			42.6			42.3	
Approach LOS		C			C			D			D	

Intersection Summary	
Cycle Length: 126	
Actuated Cycle Length: 126	
Offset: 28 (22%), Referenced to phase 2:WBT and 6:EBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 33.3	Intersection LOS: C
Intersection Capacity Utilization 65.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Omaha St & Mt Rushmore Rd

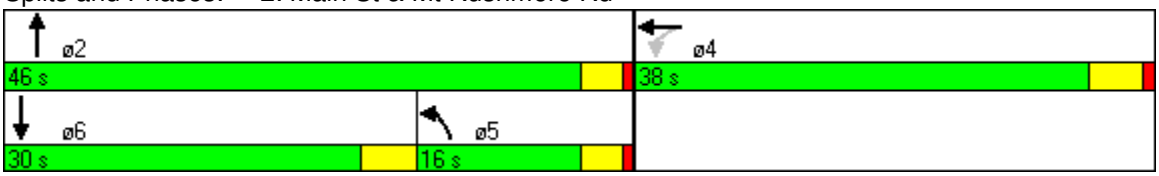


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	0	0	0	4532	0	3090	3185	0	0	3143	0
Flt Permitted					0.993		0.950					
Satd. Flow (perm)	0	0	0	0	4532	0	3090	3185	0	0	3143	0
Satd. Flow (RTOR)					18						8	
Volume (vph)	0	0	0	177	1069	89	507	696	0	0	583	85
Confl. Peds. (#/hr)			19			13			3			11
Peak Hour Factor	0.92	0.92	0.92	0.78	0.78	0.72	0.88	0.85	0.92	0.92	0.88	0.82
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	0%	0%	1%	1%
Lane Group Flow (vph)	0	0	0	0	1722	0	576	819	0	0	766	0
Turn Type				Perm			Prot					
Protected Phases					4		5	2			6	
Permitted Phases				4								
Total Split (s)	0.0	0.0	0.0	38.0	38.0	0.0	16.0	46.0	0.0	0.0	30.0	0.0
Act Effct Green (s)					34.0		12.0	42.0			26.0	
Actuated g/C Ratio					0.40		0.14	0.50			0.31	
v/c Ratio					0.93		1.31	0.51			0.78	
Uniform Delay, d1					23.6		36.0	14.1			26.1	
Control Delay					34.7		168.7	2.1			32.9	
Queue Delay					0.0		0.0	0.8			0.0	
Total Delay					34.7		168.7	2.9			32.9	
LOS					C		F	A			C	
Approach Delay					34.7			71.3			32.9	
Approach LOS					C			E			C	

Intersection Summary

Cycle Length: 84
Actuated Cycle Length: 84
Offset: 82 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.31
Intersection Signal Delay: 47.5 — Intersection LOS: D
Intersection Capacity Utilization 77.0% — ICU Level of Service D
Analysis Period (min) 15

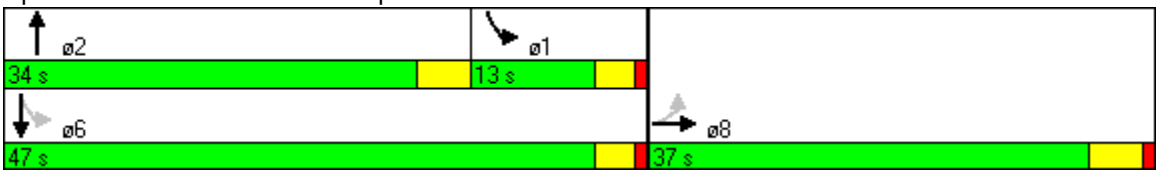
Splits and Phases: 2: Main St & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	4407	0	0	0	0	0	4556	0	1608	3185	0
Flt Permitted		0.997								0.118		
Satd. Flow (perm)	0	4407	0	0	0	0	0	4556	0	200	3185	0
Satd. Flow (RTOR)		114						20				
Volume (vph)	79	912	278	0	0	0	0	1078	98	69	723	0
Confl. Peds. (#/hr)			8			10			6			2
Peak Hour Factor	0.85	0.86	0.75	0.92	0.92	0.92	0.92	0.86	0.86	0.85	0.91	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	0%	0%	0%	1%	1%	1%	2%	0%
Lane Group Flow (vph)	0	1524	0	0	0	0	0	1367	0	81	795	0
Turn Type	Perm									pm+pt		
Protected Phases		8						2		1	6	
Permitted Phases	8									6		
Total Split (s)	37.0	37.0	0.0	0.0	0.0	0.0	0.0	34.0	0.0	13.0	47.0	0.0
Act Effct Green (s)		33.0						30.0		43.0	43.0	
Actuated g/C Ratio		0.39						0.36		0.51	0.51	
v/c Ratio		0.85						0.83		0.32	0.49	
Uniform Delay, d1		21.3						24.3		16.8	13.3	
Control Delay		21.0						26.6		11.4	4.7	
Queue Delay		0.0						39.0		0.0	1.9	
Total Delay		21.0						65.6		11.4	6.7	
LOS		C						E		B	A	
Approach Delay		21.0						65.6			7.1	
Approach LOS		C						E			A	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 82 (98%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 33.9	Intersection LOS: C
Intersection Capacity Utilization 77.0%	ICU Level of Service D
Analysis Period (min) 15	

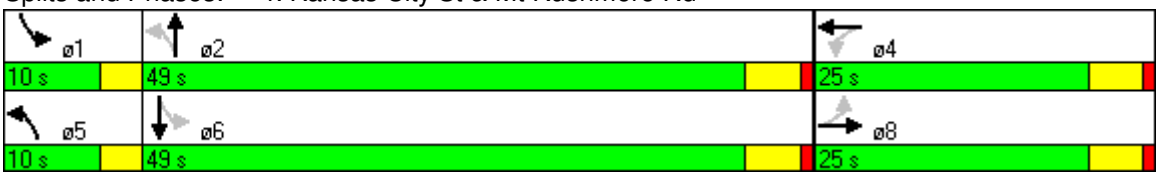
Splits and Phases: 3: St Joseph & Mt Rushmore Rd

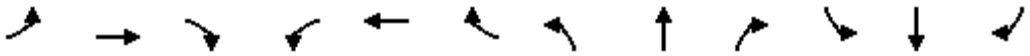


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1608	1556	0	1624	1629	0	1608	4605	0	1624	3180	0
Flt Permitted	0.380			0.277			0.153			0.163		
Satd. Flow (perm)	643	1556	0	474	1629	0	259	4605	0	279	3180	0
Satd. Flow (RTOR)		43			16			6			14	
Volume (vph)	113	94	118	62	110	47	60	1103	23	12	962	52
Confl. Peds. (#/hr)			9			6			4			2
Peak Hour Factor	0.47	0.49	0.81	0.72	0.51	0.77	0.77	0.89	0.79	0.55	0.88	0.65
Heavy Vehicles (%)	1%	2%	1%	0%	1%	1%	1%	1%	1%	0%	1%	1%
Lane Group Flow (vph)	240	338	0	86	277	0	78	1268	0	22	1173	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	10.0	49.0	0.0	10.0	49.0	0.0
Act Effct Green (s)	21.0	21.0		21.0	21.0		53.5	51.1		51.6	47.0	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.64	0.61		0.61	0.56	
v/c Ratio	1.49	0.80		0.72	0.66		0.30	0.45		0.08	0.66	
Uniform Delay, d1	31.5	25.6		28.8	26.5		5.3	9.9		5.4	13.1	
Control Delay	278.8	42.1		64.7	35.3		9.2	9.1		2.6	6.5	
Queue Delay	0.0	0.0		0.0	0.0		0.2	0.0		0.1	0.5	
Total Delay	278.8	42.1		64.7	35.3		9.4	9.1		2.7	7.0	
LOS	F	D		E	D		A	A		A	A	
Approach Delay		140.4			42.3			9.1			6.9	
Approach LOS		F			D			A			A	

Intersection Summary		
Cycle Length: 84		
Actuated Cycle Length: 84		
Offset: 79 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.49		
Intersection Signal Delay: 33.6	Intersection LOS: C	
Intersection Capacity Utilization 67.1%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 4: Kansas City St & Mt Rushmore Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Satd. Flow (prot)	1593	1485	0	1608	1503	0	1593	3204	0	1608	3039	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1593	1485	0	1608	1503	0	1593	3204	0	1608	3039	0
Volume (vph)	14	17	61	11	8	59	35	1074	23	15	116	54
Confl. Peds. (#/hr)			1			2			2			2
Peak Hour Factor	0.60	0.70	0.56	0.62	0.35	0.88	0.62	0.94	0.83	0.65	0.89	0.77
Heavy Vehicles (%)	2%	1%	1%	1%	1%	1%	2%	1%	1%	1%	1%	2%
Lane Group Flow (vph)	23	133	0	18	90	0	56	1171	0	23	200	0
Sign Control		Stop			Stop			Free			Free	

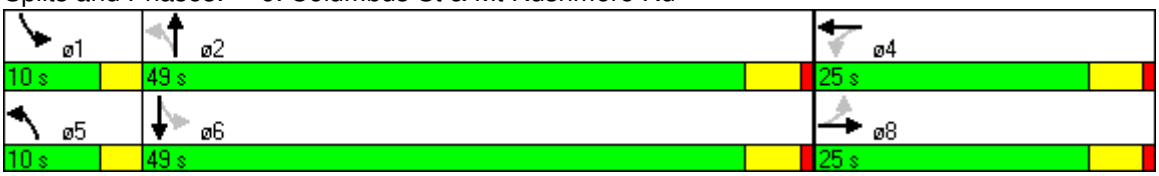
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 48.2%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1608	1479	0	1608	1587	0	1608	3201	0	1593	3201	0
Flt Permitted	0.583			0.685			0.091			0.129		
Satd. Flow (perm)	987	1479	0	1160	1587	0	154	3201	0	216	3201	0
Satd. Flow (RTOR)		81			16			5			5	
Volume (vph)	26	22	38	47	56	20	20	1105	26	15	1250	27
Confl. Peds. (#/hr)			5			4			4			3
Peak Hour Factor	0.79	0.79	0.47	0.68	0.44	0.56	0.82	0.90	0.85	0.81	0.91	0.72
Heavy Vehicles (%)	1%	2%	1%	1%	4%	3%	1%	1%	2%	2%	1%	2%
Lane Group Flow (vph)	33	109	0	69	163	0	24	1259	0	19	1412	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	10.0	49.0	0.0	10.0	49.0	0.0
Act Effct Green (s)	14.8	14.8		14.8	14.8		59.7	57.6		59.6	57.5	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.71	0.69		0.71	0.68	
v/c Ratio	0.19	0.33		0.34	0.56		0.12	0.57		0.08	0.64	
Uniform Delay, d1	29.5	7.5		30.4	28.4		3.2	7.8		3.2	8.4	
Control Delay	28.9	11.8		30.9	30.5		5.3	9.9		4.9	10.9	
Queue Delay	0.0	0.0		0.0	0.1		0.0	0.0		0.0	0.0	
Total Delay	28.9	11.8		30.9	30.5		5.3	9.9		4.9	10.9	
LOS	C	B		C	C		A	A		A	B	
Approach Delay		15.8			30.6			9.8			10.8	
Approach LOS		B			C			A			B	

Intersection Summary

Cycle Length: 84
Actuated Cycle Length: 84
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 12.1 Intersection LOS: B
Intersection Capacity Utilization 55.9% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Columbus St & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	1710	0	0	1679	0	1752	3566	0	1703	3564	0
Flt Permitted		0.895			0.934		0.186			0.193		
Satd. Flow (perm)	0	1557	0	0	1587	0	343	3566	0	346	3564	0
Satd. Flow (RTOR)		49			28			3			6	
Volume (vph)	23	9	34	11	12	17	20	1103	6	16	1066	14
Confl. Peds. (#/hr)			3			1			4			
Peak Hour Factor	0.62	0.50	0.69	0.75	0.69	0.60	0.71	0.95	0.50	0.38	0.91	0.58
Heavy Vehicles (%)	1%	1%	2%	3%	2%	6%	3%	1%	1%	6%	1%	1%
Lane Group Flow (vph)	0	104	0	0	60	0	28	1173	0	42	1195	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Total Split (s)	21.0	21.0	0.0	21.0	21.0	0.0	49.0	49.0	0.0	49.0	49.0	0.0
Act Effct Green (s)		9.1			9.1		52.9	52.9		52.9	52.9	
Actuated g/C Ratio		0.13			0.13		0.76	0.76		0.76	0.76	
v/c Ratio		0.42			0.26		0.11	0.43		0.16	0.44	
Uniform Delay, d1		14.5			14.4		2.3	3.1		2.4	3.1	
Control Delay		17.6			17.3		2.9	2.5		4.7	4.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		17.6			17.3		2.9	2.5		4.7	4.0	
LOS		B			B		A	A		A	A	
Approach Delay		17.6			17.3			2.5			4.0	
Approach LOS		B			B			A			A	

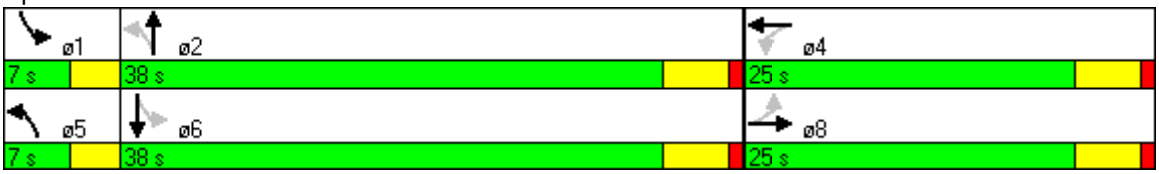
Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 4.2	Intersection LOS: A
Intersection Capacity Utilization 43.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Franklin St & Mt Rushmore Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	0	1773	0	1787	1734	0	1770	3526	0	1770	3566	0
Flt Permitted		0.945		0.487			0.118			0.118		
Satd. Flow (perm)	0	1684	0	916	1734	0	220	3526	0	220	3566	0
Satd. Flow (RTOR)		37			79			16			3	
Volume (vph)	11	125	67	99	127	143	103	1024	79	200	1087	12
Confl. Peds. (#/hr)			2						12			4
Peak Hour Factor	0.42	0.84	0.76	0.84	0.79	0.82	0.85	0.84	0.84	0.82	0.88	0.62
Heavy Vehicles (%)	1%	1%	2%	1%	1%	1%	2%	1%	1%	2%	1%	1%
Lane Group Flow (vph)	0	263	0	118	335	0	121	1313	0	244	1254	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	7.0	38.0	0.0	7.0	38.0	0.0
Act Effct Green (s)		21.0		21.0	21.0		37.0	34.0		37.0	34.0	
Actuated g/C Ratio		0.30		0.30	0.30		0.53	0.49		0.53	0.49	
v/c Ratio		0.50		0.43	0.58		0.66	0.76		1.33	0.72	
Uniform Delay, d1		17.1		19.7	15.5		6.7	14.5		8.7	14.2	
Control Delay		21.0		25.6	20.4		28.0	18.2		203.4	18.1	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.3	
Total Delay		21.0		25.6	20.4		28.0	18.2		203.4	18.4	
LOS		C		C	C		C	B		F	B	
Approach Delay		21.0			21.8			19.0			48.6	
Approach LOS		C			C			B			D	

Intersection Summary		
Cycle Length: 70		
Actuated Cycle Length: 70		
Offset: 63 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Control Type: Pretimed		
Maximum v/c Ratio: 1.33		
Intersection Signal Delay: 31.6	Intersection LOS: C	
Intersection Capacity Utilization 87.4%	ICU Level of Service E	
Analysis Period (min) 15		

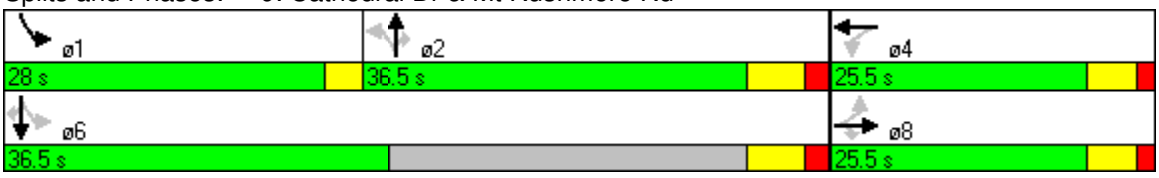
Splits and Phases: 8: St Patrick & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1787	1881	1599	1787	1612	0	1787	3574	1599	1787	3574	1599
Flt Permitted	0.186			0.739			0.413			0.367		
Satd. Flow (perm)	350	1881	1571	1390	1612	0	777	3574	1577	690	3574	1556
Satd. Flow (RTOR)			22		520				143			32
Volume (vph)	24	23	10	224	17	484	13	425	127	498	528	22
Confl. Peds. (#/hr)			4						1			2
Peak Hour Factor	0.58	0.83	0.45	0.71	0.70	0.93	0.69	0.92	0.89	0.91	0.84	0.68
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Lane Group Flow (vph)	41	28	22	315	544	0	19	462	143	547	629	32
Turn Type	Perm		Perm	Perm			Perm		Perm	pm+pt		Perm
Protected Phases		8			4			2		1	6	
Permitted Phases	8		8	4			2		2	6		6
Total Split (s)	25.5	25.5	25.5	25.5	25.5	0.0	36.5	36.5	36.5	28.0	36.5	36.5
Act Effct Green (s)	21.5	21.5	21.5	21.5	21.5		32.6	32.6	32.6	55.2	55.2	55.2
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25		0.38	0.38	0.38	0.65	0.65	0.65
v/c Ratio	0.46	0.06	0.05	0.89	0.68		0.06	0.34	0.21	0.79	0.27	0.03
Uniform Delay, d1	26.7	24.0	0.0	30.5	1.1		16.5	18.4	0.0	7.4	6.2	0.0
Control Delay	48.2	26.1	11.5	60.8	8.5		19.1	20.0	4.4	15.6	6.5	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.4		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	26.1	11.5	60.8	8.9		19.1	20.0	4.4	15.6	6.5	1.9
LOS	D	C	B	E	A		B	C	A	B	A	A
Approach Delay		32.5			27.9			16.4			10.5	
Approach LOS		C			C			B			B	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 84.8		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.89		
Intersection Signal Delay: 17.9	Intersection LOS: B	
Intersection Capacity Utilization 80.9%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 9: Cathedral Dr & Mt Rushmore Rd

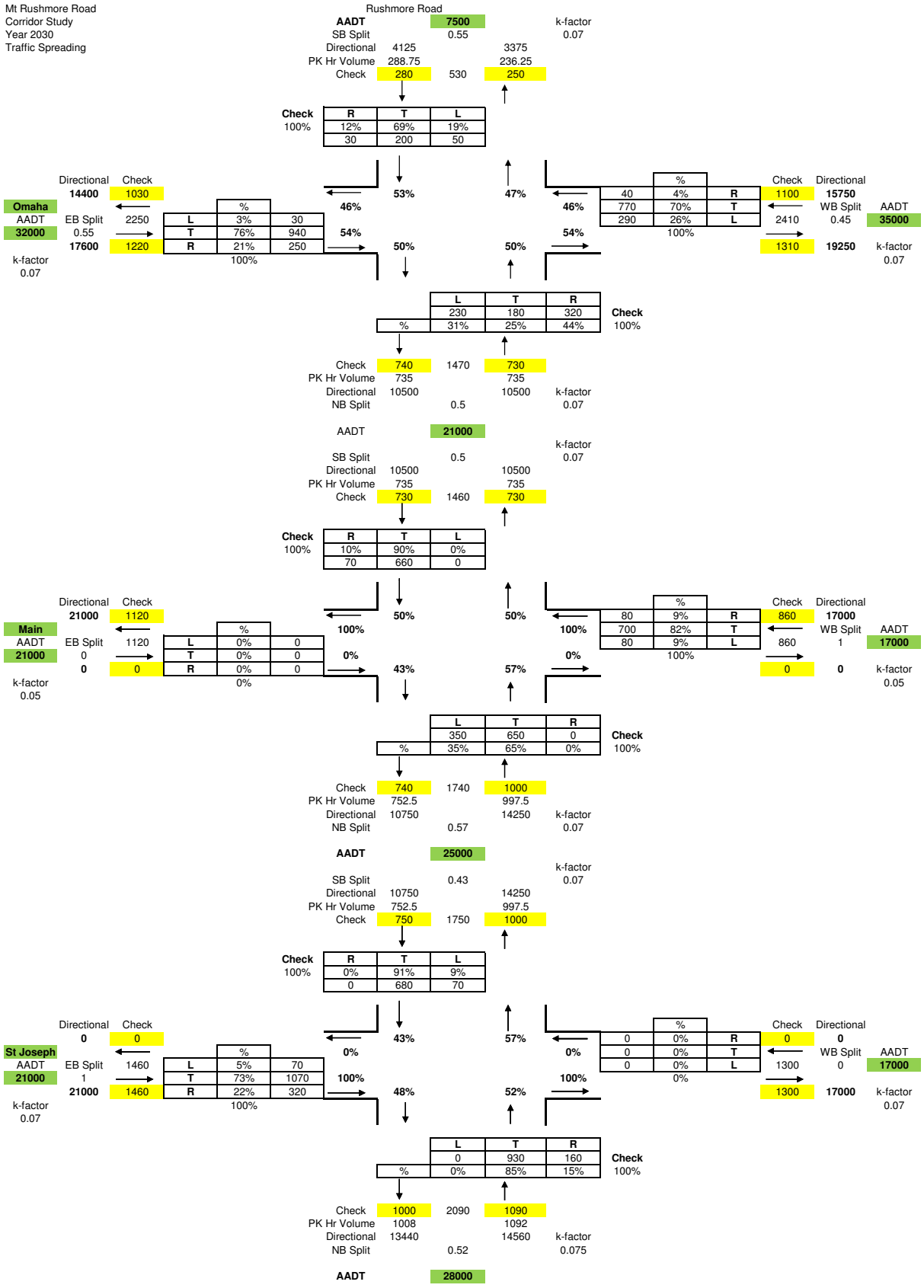


APPENDIX C

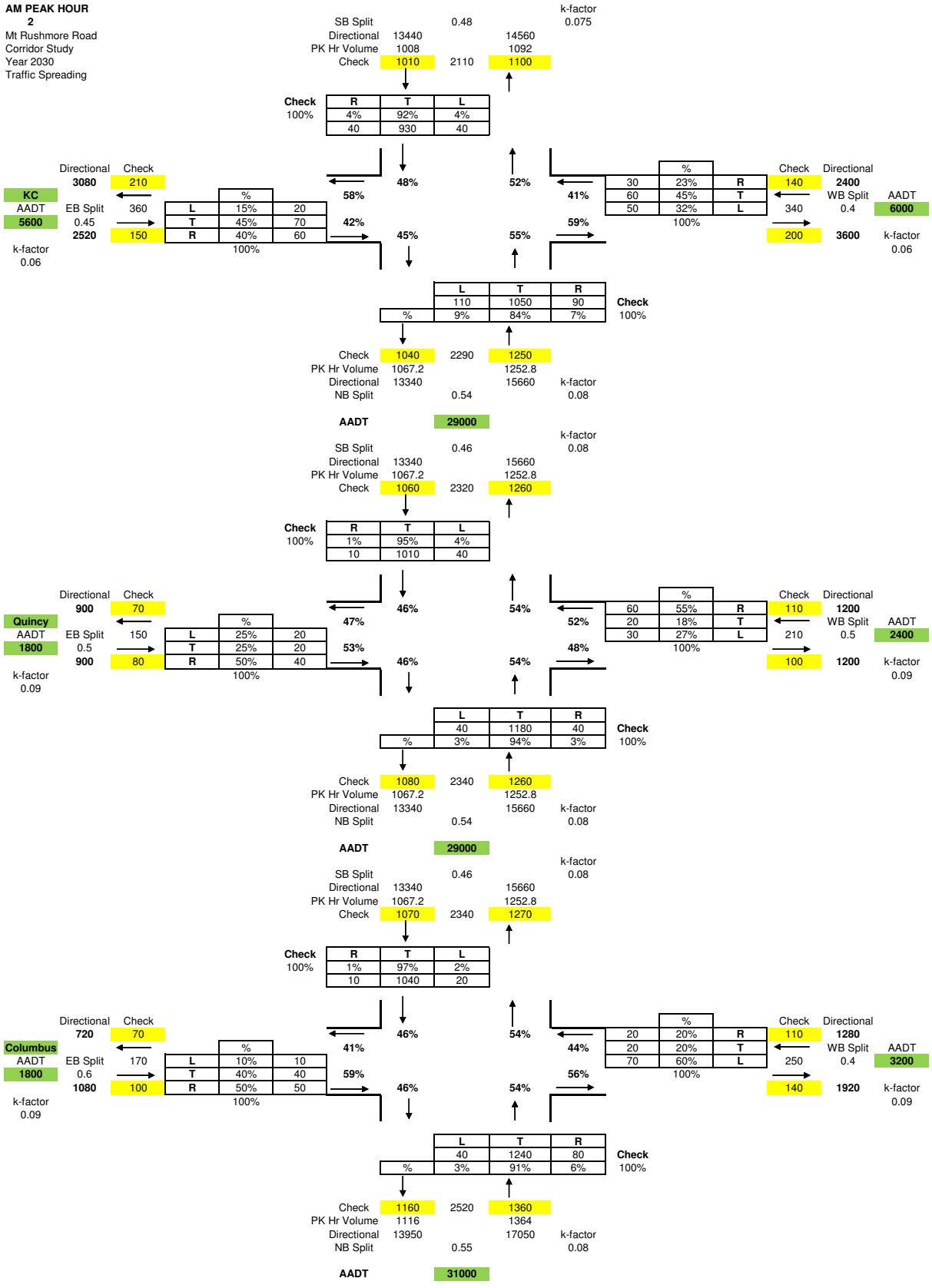
2030 Intersection Peak Hour Volumes
(AM, PM, PM Peak)

AM PEAK HOUR
1

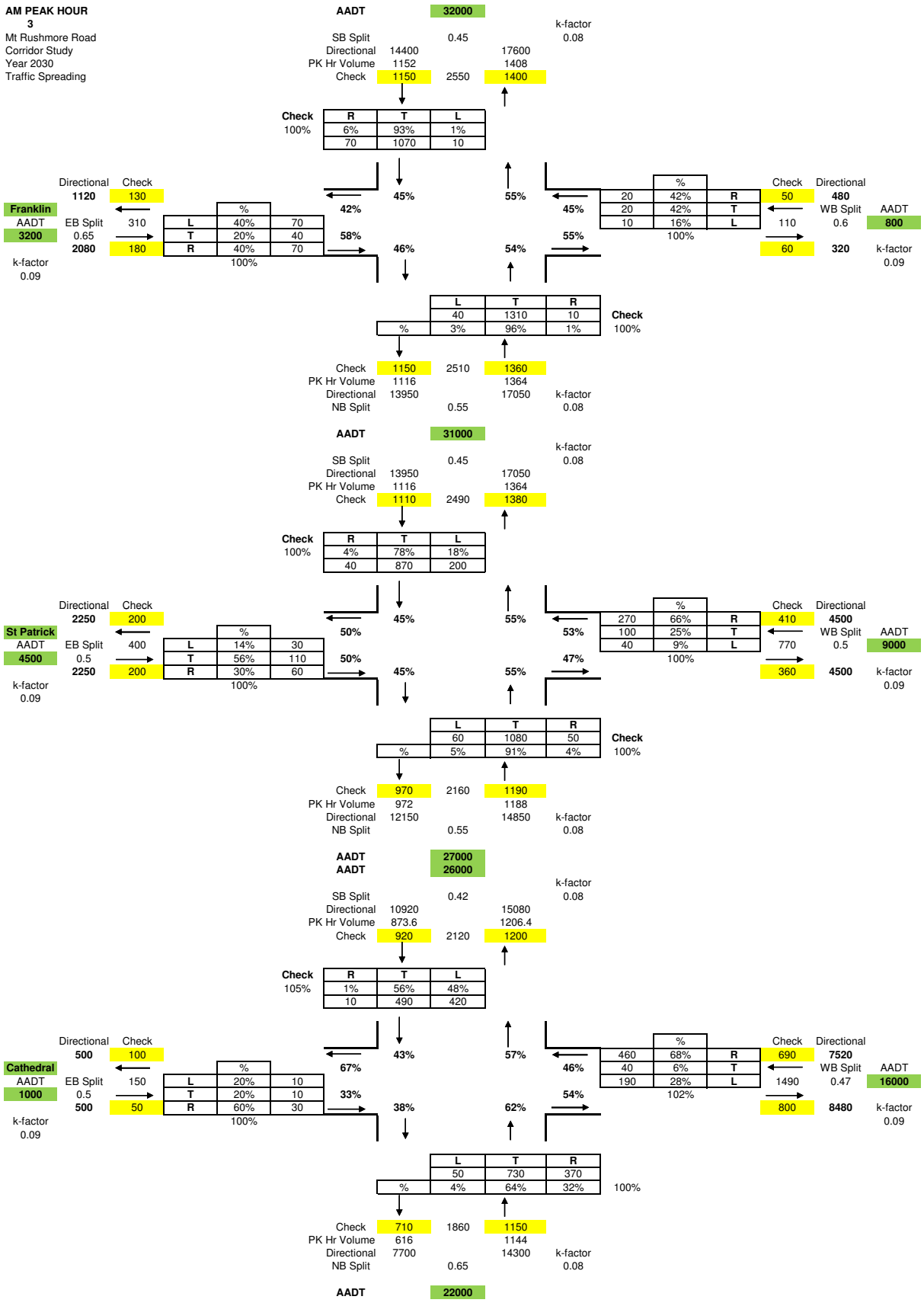
Mt Rushmore Road
Corridor Study
Year 2030
Traffic Spreading



AM PEAK HOUR
2
Mt Rushmore Road
Corridor Study
Year 2030
Traffic Spreading

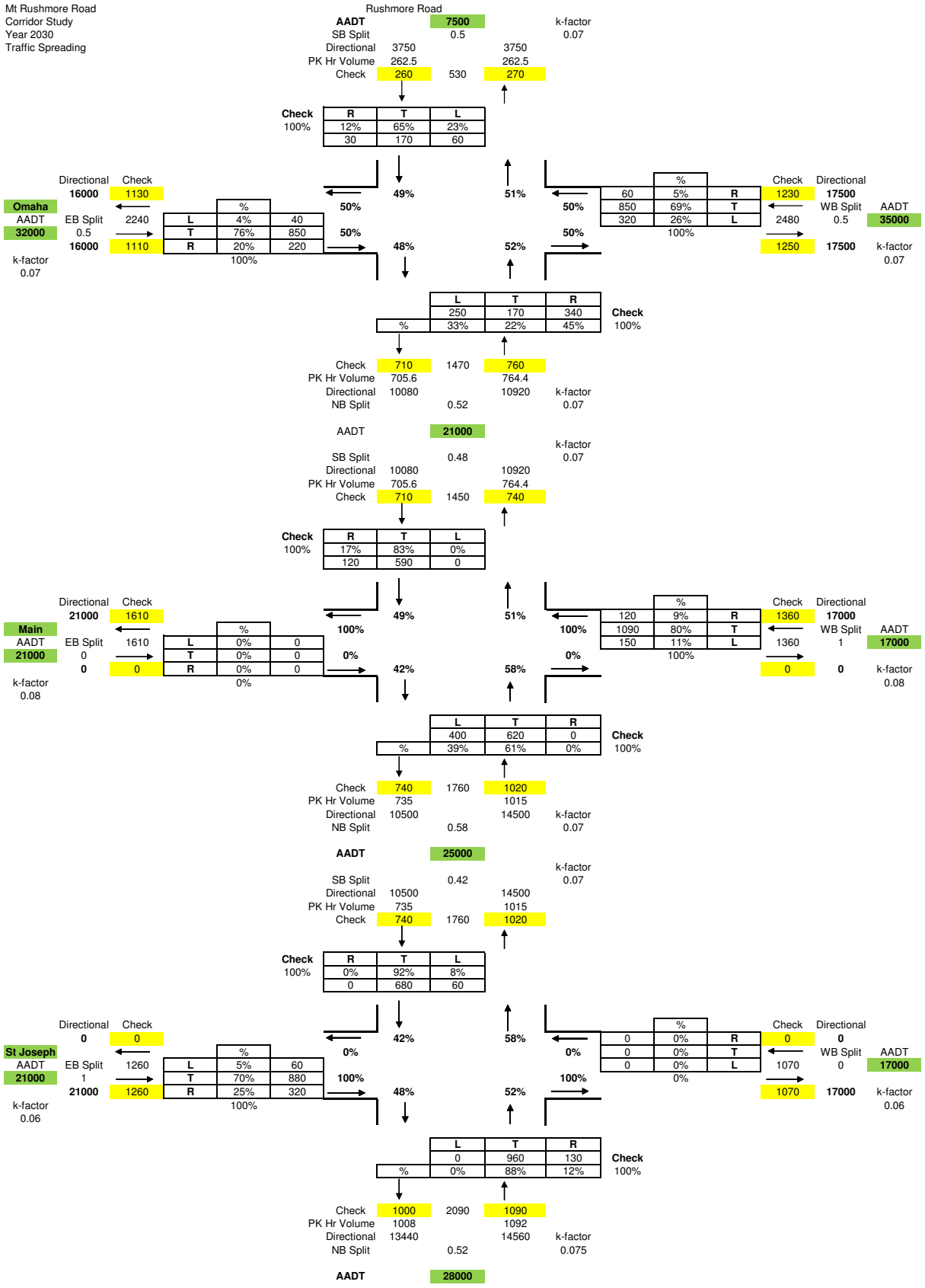


AM PEAK HOUR
3
Mt Rushmore Road
Corridor Study
Year 2030
Traffic Spreading

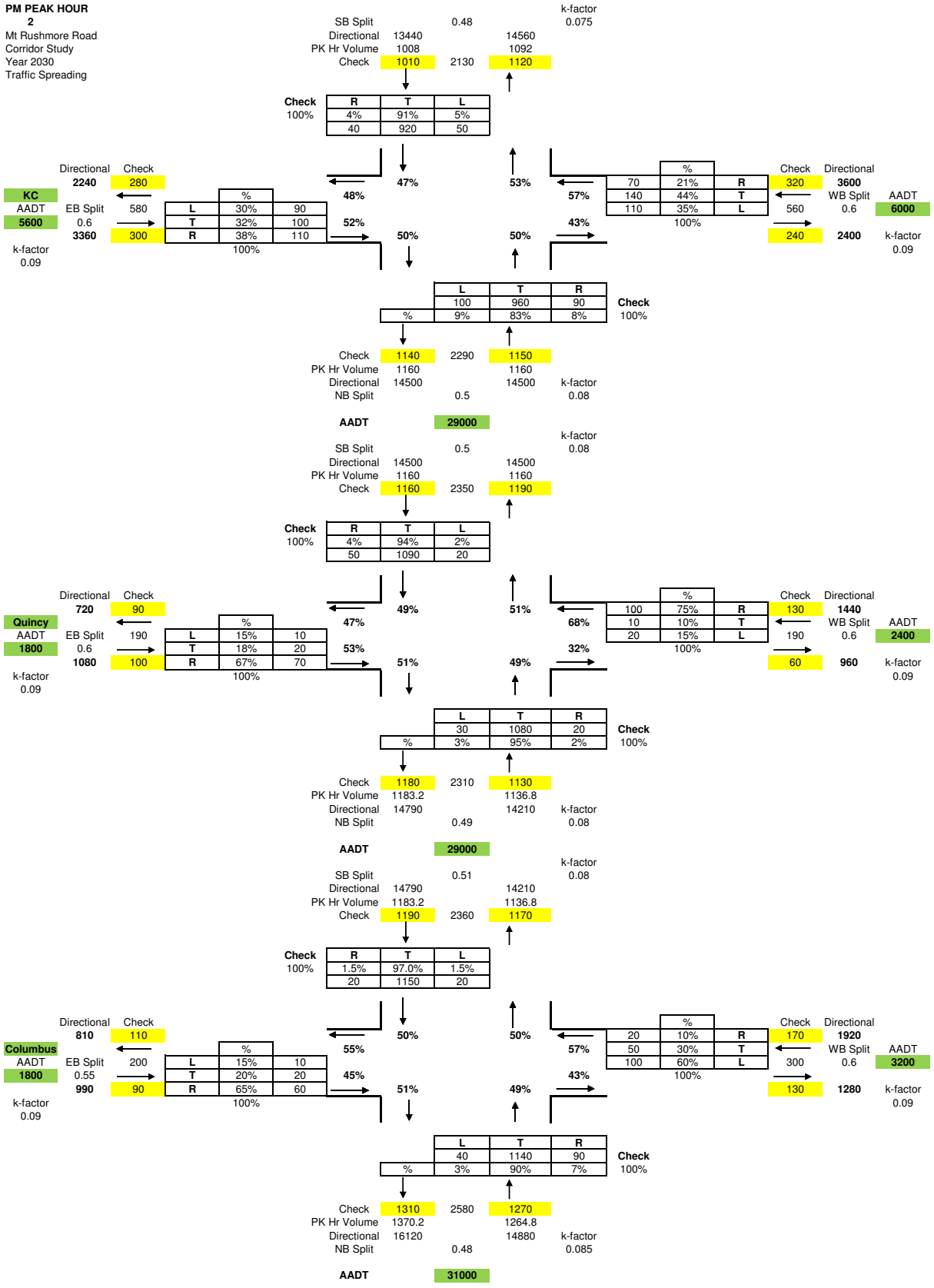


PM PEAK HOUR
1

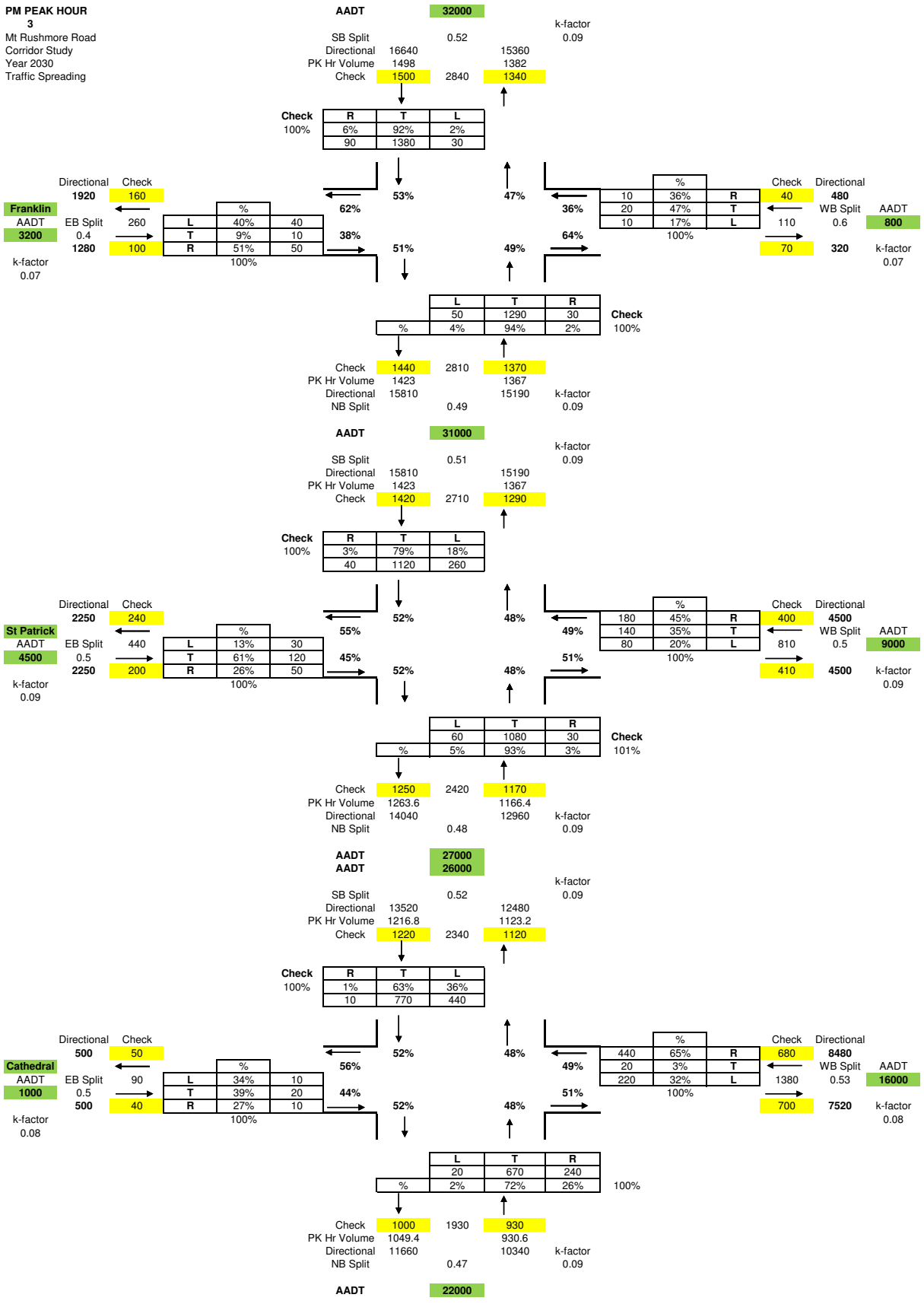
Mt Rushmore Road
Corridor Study
Year 2030
Traffic Spreading



PM PEAK HOUR
2
Mt Rushmore Road
Corridor Study
Year 2030
Traffic Spreading



PM PEAK HOUR
3
Mt Rushmore Road
Corridor Study
Year 2030
Traffic Spreading

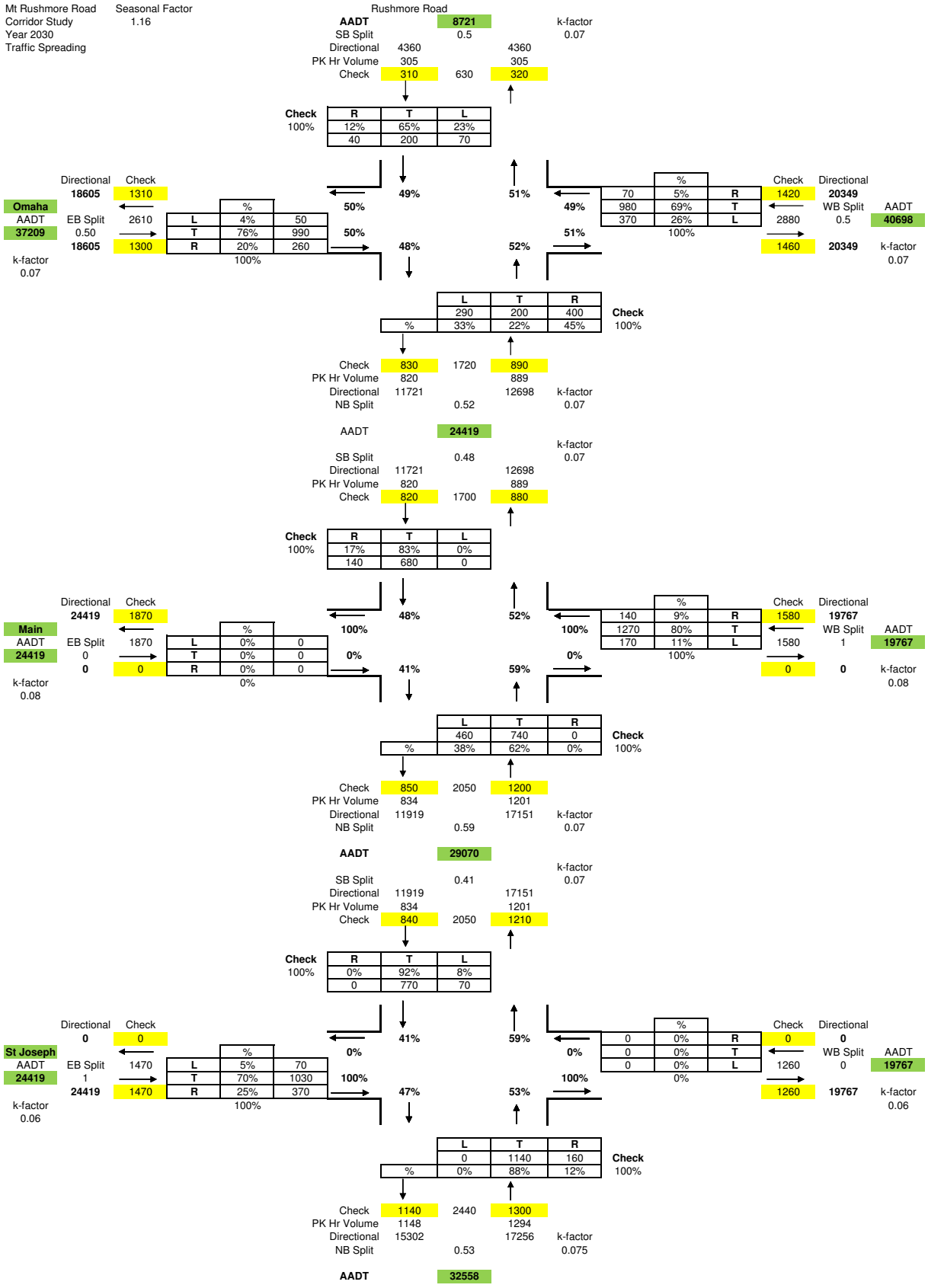


PM PEAK HOUR PEAK SEASON

1

Mt Rushmore Road
Corridor Study
Year 2030
Traffic Spreading

Seasonal Factor
1.16

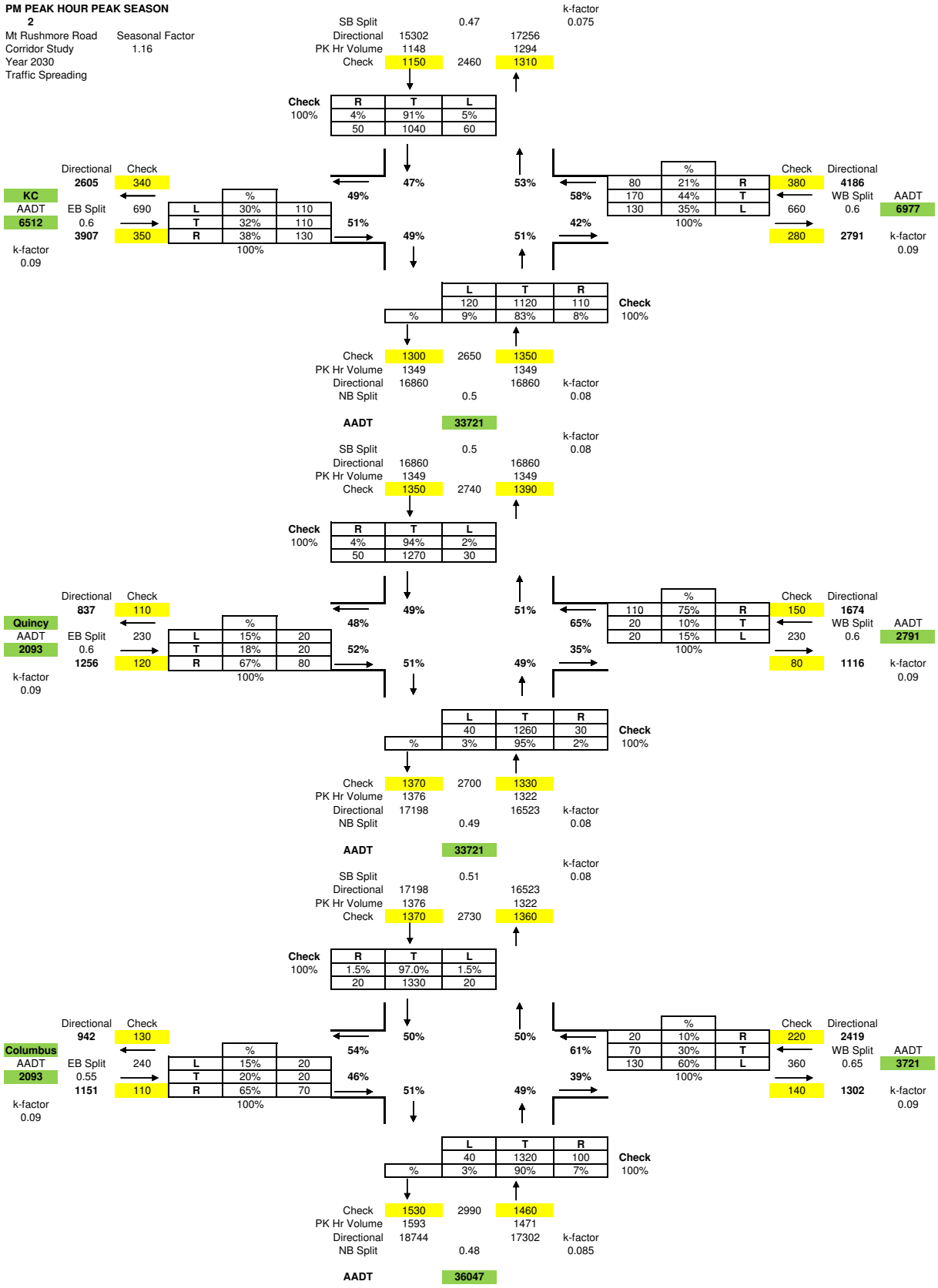


PM PEAK HOUR PEAK SEASON

2

Mt Rushmore Road
Corridor Study
Year 2030
Traffic Spreading

Seasonal Factor
1.16



PM PEAK HOUR PEAK SEASON
3
Mt Rushmore Road
Corridor Study
Year 2030
Traffic Spreading

Seasonal Factor
1.16

AADT **37209**
SB Split 0.52
Directional 19349 17860
PK Hr Volume 1741 1607
Check 1730 3270 1540

k-factor
0.09

Check	R	T	L
100%	6%	92%	2%
	100	1600	30

Franklin
AADT
3721
k-factor
0.07

Directional **2233** Check 180
EB Split 0.4
1488 100

		%	
L	40%	40	
T	9%	10	
R	51%	50	
	100%		

280

64% 53% 47% 36%
36% 51% 49% 64%

		%		
10	36%	R	40	Check
20	47%	T	110	
10	17%	L	70	
	100%			

Directional **558** Check 40
WB Split 0.6
372 70

AADT **930**
k-factor 0.07

	L	T	R	
	60	1490	30	Check
%	4%	94%	2%	100%

Check 1660 3240 1580
PK Hr Volume 1655 1590
Directional 18384 17663
NB Split 0.49

k-factor
0.09

AADT **36047**
SB Split 0.51
Directional 18384 17663
PK Hr Volume 1655 1590
Check 1660 3160 1500

k-factor
0.09

Check	R	T	L
100%	3%	79%	18%
	50	1310	300

St Patrick
AADT
5233
k-factor
0.09

Directional **2616** Check 280
EB Split 0.5
2616 230

		%	
L	13%	30	
T	61%	140	
R	26%	60	
	100%		

510

55% 53% 47% 45%
45% 52% 48% 55%

		%		
210	45%	R	460	Check
160	35%	T	940	
90	20%	L	480	
	100%			

Directional **5233** Check 460
WB Split 0.5
5233 480

AADT **10465**
k-factor 0.09

	L	T	R	
	70	1260	40	Check
%	5%	93%	3%	101%

Check 1460 2830 1370
PK Hr Volume 1469 1356
Directional 16326 15070
NB Split 0.48

k-factor
0.09

AADT **31395**
AADT **30233**
SB Split 0.52
Directional 15721 14512
PK Hr Volume 1415 1306
Check 1410 2720 1310

k-factor
0.09

Check	R	T	L
100%	1%	63%	36%
	10	890	510

Cathedral
AADT
1163
k-factor
0.08

Directional **581** Check 50
EB Split 0.5
581 50

		%	
L	34%	20	
T	39%	20	
R	27%	10	
	100%		

100

50% 52% 48% 50%
50% 52% 48% 51%

		%		
510	65%	R	780	Check
20	3%	T	1590	
250	32%	L	810	
	100%			

Directional **9860** Check 780
WB Split 0.53
8744 810

AADT **18605**
k-factor 0.08

v

	L	T	R	
	20	780	280	
%	2%	72%	26%	100%

Check 1150 2230 1080
PK Hr Volume 1220 1082
Directional 13558 12023
NB Split 0.47

k-factor
0.09

AADT **25581**

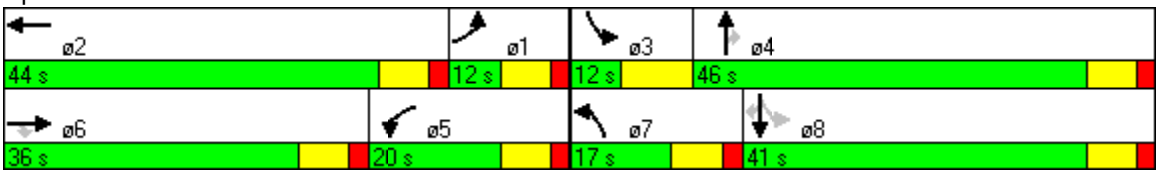
APPENDIX D

2030 Highway Capacity Worksheets
(AM, PM, PM Peak)

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	30	940	250	290	770	230	180	320	50	200	30
Turn Type	Prot		Perm	Prot		Prot		Perm	pm+pt		Perm
Protected Phases	1	6		5	2	7	4		3	8	
Permitted Phases			6					4	8		8
Detector Phases	1	6	6	5	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	34.0	34.0	12.0	29.0	12.0	37.0	37.0	12.0	40.0	40.0
Total Split (s)	12.0	36.0	36.0	20.0	44.0	17.0	46.0	46.0	12.0	41.0	41.0
Total Split (%)	10.5%	31.6%	31.6%	17.5%	38.6%	14.9%	40.4%	40.4%	10.5%	36.0%	36.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	12.8	30.5	30.5	15.6	38.7	13.0	24.5	24.5	24.8	16.7	16.7
Actuated g/C Ratio	0.13	0.33	0.33	0.17	0.42	0.14	0.27	0.27	0.26	0.18	0.18
v/c Ratio	0.08	0.69	0.43	0.61	0.47	0.59	0.23	0.61	0.18	0.38	0.11
Control Delay	37.4	30.0	5.4	42.4	22.6	44.8	28.7	13.1	21.2	35.0	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	30.0	5.4	42.4	22.6	44.8	28.7	13.1	21.2	35.0	11.5
LOS	D	C	A	D	C	D	C	B	C	D	B
Approach Delay		25.1			27.8		26.9			30.1	
Approach LOS		C			C		C			C	

Intersection Summary	
Cycle Length: 114	
Actuated Cycle Length: 91.9	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 26.8	Intersection LOS: C
Intersection Capacity Utilization 56.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Omaha St & Mt Rushmore Rd



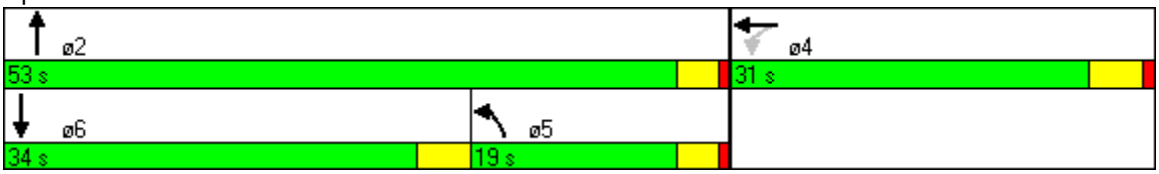
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	33	1044	278	322	900	256	200	356	56	222	33
v/c Ratio	0.08	0.69	0.43	0.61	0.47	0.59	0.23	0.61	0.18	0.38	0.11
Control Delay	37.4	30.0	5.4	42.4	22.6	44.8	28.7	13.1	21.2	35.0	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	30.0	5.4	42.4	22.6	44.8	28.7	13.1	21.2	35.0	11.5
Queue Length 50th (ft)	8	188	0	90	163	73	51	40	22	62	0
Queue Length 95th (ft)	25	277	58	151	214	127	80	130	47	95	24
Internal Link Dist (ft)		897			397		727			561	
Turn Bay Length (ft)	285		285	310		180		180	160		100
Base Capacity (vph)	408	1574	668	539	2055	436	1242	718	319	1065	494
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.66	0.42	0.60	0.44	0.59	0.16	0.50	0.18	0.21	0.07

Intersection Summary

Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	840	350	650	660
Turn Type		Prot		
Protected Phases	4	5	2	6
Permitted Phases				
Detector Phases	4	5	2	6
Minimum Initial (s)	1.0	12.0	42.0	26.0
Minimum Split (s)	30.0	16.0	46.0	30.0
Total Split (s)	31.0	19.0	53.0	34.0
Total Split (%)	36.9%	22.6%	63.1%	40.5%
Yellow Time (s)	4.0	3.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	0.0
Lead/Lag		Lag		Lead
Lead-Lag Optimize?		Yes		Yes
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	27.0	15.0	49.0	30.0
Actuated g/C Ratio	0.32	0.18	0.58	0.36
v/c Ratio	0.77	0.70	0.39	0.71
Control Delay	29.5	17.6	1.4	27.0
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	29.5	17.6	1.5	27.0
LOS	C	B	A	C
Approach Delay	29.5		7.1	27.0
Approach LOS	C		A	C

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 20.7	Intersection LOS: C
Intersection Capacity Utilization 72.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Main St & Mt Rushmore Rd



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1133	389	722	811
v/c Ratio	0.77	0.70	0.39	0.71
Control Delay	29.5	17.6	1.4	27.0
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	29.5	17.6	1.5	27.0
Queue Length 50th (ft)	191	100	12	187
Queue Length 95th (ft)	244	m105	m13	254
Internal Link Dist (ft)	408		314	727
Turn Bay Length (ft)		200		
Base Capacity (vph)	1471	552	1858	1140
Starvation Cap Reductn	0	0	164	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.77	0.70	0.43	0.71

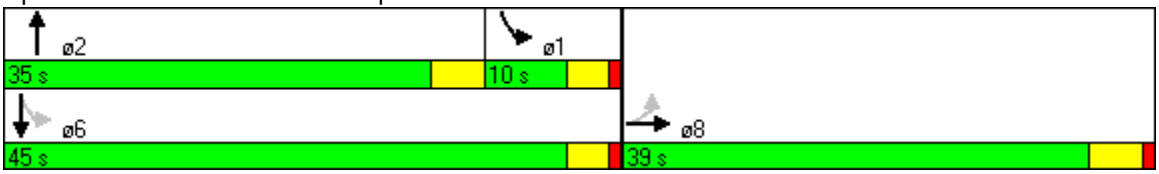
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	1070	930	70	680
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phases	8	2	1	6
Minimum Initial (s)	32.0	30.0	5.0	40.0
Minimum Split (s)	37.0	34.0	9.0	44.0
Total Split (s)	39.0	35.0	10.0	45.0
Total Split (%)	46.4%	41.7%	11.9%	53.6%
Yellow Time (s)	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	0.0	1.0	1.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	35.0	31.0	41.0	41.0
Actuated g/C Ratio	0.42	0.37	0.49	0.49
v/c Ratio	0.85	0.71	0.37	0.49
Control Delay	10.5	9.0	11.6	3.2
Queue Delay	0.0	0.1	0.0	0.4
Total Delay	10.5	9.1	11.6	3.6
LOS	B	A	B	A
Approach Delay	10.5	9.1		4.3
Approach LOS	B	A		A

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 8 (10%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 85	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 72.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: St Joseph & Mt Rushmore Rd



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	1623	1211	78	756
v/c Ratio	0.85	0.71	0.37	0.49
Control Delay	10.5	9.0	11.6	3.2
Queue Delay	0.0	0.1	0.0	0.4
Total Delay	10.5	9.1	11.6	3.6
Queue Length 50th (ft)	141	15	5	28
Queue Length 95th (ft)	157	20	m11	35
Internal Link Dist (ft)	941	317		314
Turn Bay Length (ft)			100	
Base Capacity (vph)	1908	1694	211	1555
Starvation Cap Reductn	0	25	0	351
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.85	0.73	0.37	0.63

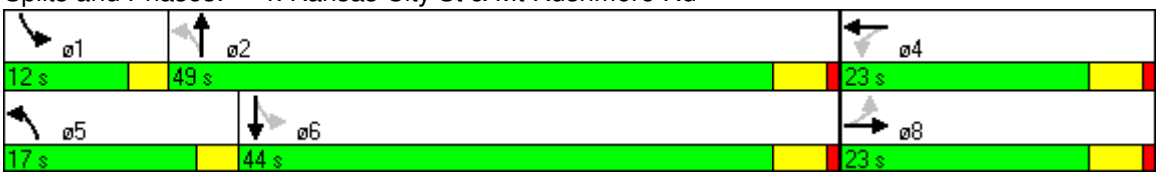
Intersection Summary

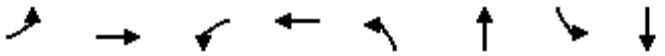
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	70	50	60	110	1050	40	930
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		8		4	5	2	1	6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	5	2	1	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	28.0	8.0	28.0
Total Split (s)	23.0	23.0	23.0	23.0	17.0	49.0	12.0	44.0
Total Split (%)	27.4%	27.4%	27.4%	27.4%	20.2%	58.3%	14.3%	52.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	12.5	12.5	12.5	12.5	62.8	57.6	58.2	53.6
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.75	0.69	0.69	0.64
v/c Ratio	0.13	0.53	0.37	0.38	0.39	0.40	0.14	0.53
Control Delay	30.5	28.4	37.6	27.1	8.1	6.6	2.0	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	28.4	37.6	27.1	8.1	6.6	2.0	4.0
LOS	C	C	D	C	A	A	A	A
Approach Delay		28.6		30.9		6.8		4.0
Approach LOS		C		C		A		A

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 8 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 8.3	Intersection LOS: A
Intersection Capacity Utilization 62.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Kansas City St & Mt Rushmore Rd

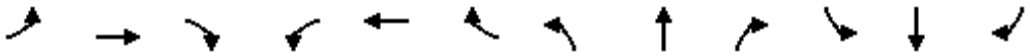




Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	145	56	100	122	1267	44	1077
v/c Ratio	0.13	0.53	0.37	0.38	0.39	0.40	0.14	0.53
Control Delay	30.5	28.4	37.6	27.1	8.1	6.6	2.0	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	28.4	37.6	27.1	8.1	6.6	2.0	4.0
Queue Length 50th (ft)	10	47	27	35	15	123	1	68
Queue Length 95th (ft)	29	97	58	75	m24	191	m3	m103
Internal Link Dist (ft)		415		409		313		317
Turn Bay Length (ft)	140		160		260		130	
Base Capacity (vph)	265	389	232	383	394	3132	346	2041
Starvation Cap Reductn	0	0	0	0	0	0	0	56
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.37	0.24	0.26	0.31	0.40	0.13	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	20	40	30	20	60	40	1180	40	40	1010	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	22	22	44	33	22	67	44	1311	44	44	1122	11
Pedestrians					4							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		1			1							
Upstream signal (ft)								391			393	
pX, platoon unblocked	0.85	0.85	0.83	0.85	0.85	0.77	0.83			0.77		
vC, conflicting volume	2039	2665	567	2132	2648	682	1133			1360		
vC1, stage 1 conf vol	1217	1217		1426	1426							
vC2, stage 2 conf vol	822	1448		706	1222							
vCu, unblocked vol	1450	2185	275	1559	2165	283	957			1166		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	81	74	93	66	77	88	93			90		
cM capacity (veh/h)	118	86	603	99	96	549	593			460		

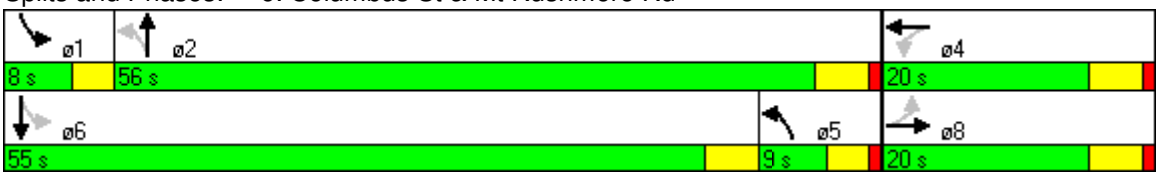
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	22	67	33	89	44	874	481	44	748	385
Volume Left	22	0	33	0	44	0	0	44	0	0
Volume Right	0	44	0	67	0	0	44	0	0	11
cSH	118	201	99	252	593	1700	1700	460	1700	1700
Volume to Capacity	0.19	0.33	0.34	0.35	0.07	0.51	0.28	0.10	0.44	0.23
Queue Length 95th (ft)	17	34	33	38	6	0	0	8	0	0
Control Delay (s)	42.5	31.6	58.8	26.9	11.6	0.0	0.0	13.7	0.0	0.0
Lane LOS	E	D	F	D	B			B		
Approach Delay (s)	34.3		35.6		0.4			0.5		
Approach LOS	D		E							

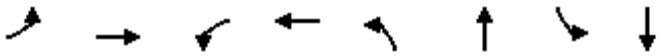
Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	52.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	10	40	70	20	40	1240	20	1040
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		8		4	5	2	1	6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	5	2	1	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	20.0	20.0	20.0	20.0	9.0	35.0	8.0	35.0
Total Split (s)	20.0	20.0	20.0	20.0	9.0	56.0	8.0	55.0
Total Split (%)	23.8%	23.8%	23.8%	23.8%	10.7%	66.7%	9.5%	65.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0
Lead/Lag					Lag	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	12.1	12.1	12.3	12.3	62.6	63.4	60.6	61.4
Actuated g/C Ratio	0.14	0.14	0.15	0.15	0.75	0.75	0.72	0.73
v/c Ratio	0.06	0.38	0.46	0.18	0.13	0.61	0.12	0.50
Control Delay	29.6	19.9	40.5	20.1	2.2	2.4	3.0	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	19.9	40.5	20.1	2.2	2.4	3.0	3.7
LOS	C	B	D	C	A	A	A	A
Approach Delay		20.8		33.2		2.4		3.7
Approach LOS		C		C		A		A

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 39 (46%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 4.9	Intersection LOS: A
Intersection Capacity Utilization 58.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Columbus St & Mt Rushmore Rd





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	100	78	44	44	1467	22	1167
v/c Ratio	0.06	0.38	0.46	0.18	0.13	0.61	0.12	0.50
Control Delay	29.6	19.9	40.5	20.1	2.2	2.4	3.0	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	19.9	40.5	20.1	2.2	2.4	3.0	3.7
Queue Length 50th (ft)	5	21	38	10	1	27	2	108
Queue Length 95th (ft)	19	62	78	37	m4	46	m1	142
Internal Link Dist (ft)		407		408		332		311
Turn Bay Length (ft)	100		110		100		335	
Base Capacity (vph)	235	334	223	306	347	2405	186	2351
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.30	0.35	0.14	0.13	0.61	0.12	0.50

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	70	40	10	20	40	1310	10	1070
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		8		4		2		6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	2	2	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0
Minimum Split (s)	21.0	21.0	21.0	21.0	30.0	30.0	30.0	30.0
Total Split (s)	30.0	30.0	30.0	30.0	54.0	54.0	54.0	54.0
Total Split (%)	35.7%	35.7%	35.7%	35.7%	64.3%	64.3%	64.3%	64.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		14.6		14.6	61.4	61.4	61.4	61.4
Actuated g/C Ratio		0.17		0.17	0.73	0.73	0.73	0.73
v/c Ratio		0.67		0.18	0.22	0.56	0.08	0.49
Control Delay		36.2		19.8	2.5	1.4	2.3	2.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		36.2		19.8	2.5	1.4	2.3	2.2
LOS		D		B	A	A	A	A
Approach Delay		36.2		19.8		1.4		2.2
Approach LOS		D		B		A		A

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 83 (99%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 4.4	Intersection LOS: A
Intersection Capacity Utilization 60.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: Franklin St & Mt Rushmore Rd

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	200	55	44	1467	11	1267
v/c Ratio	0.67	0.18	0.22	0.56	0.08	0.49
Control Delay	36.2	19.8	2.5	1.4	2.3	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	19.8	2.5	1.4	2.3	2.2
Queue Length 50th (ft)	79	15	1	16	0	31
Queue Length 95th (ft)	136	42	m3	51	m1	42
Internal Link Dist (ft)	404	495		1001		1962
Turn Bay Length (ft)			100		100	
Base Capacity (vph)	501	518	201	2610	134	2589
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.11	0.22	0.56	0.08	0.49

Intersection Summary

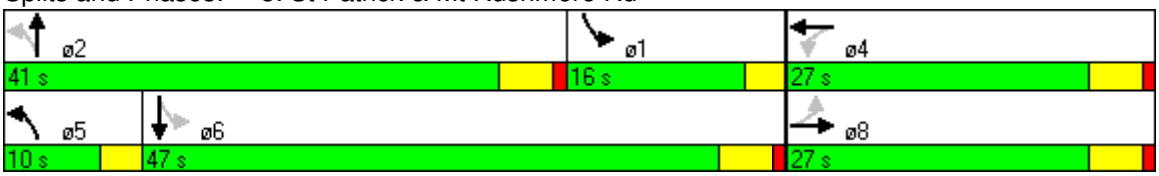
m Volume for 95th percentile queue is metered by upstream signal.

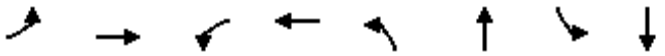
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	30	110	40	100	60	1080	200	870
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		8		4	5	2	1	6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
Minimum Split (s)	10.0	10.0	10.0	10.0	7.0	20.0	7.0	20.0
Total Split (s)	27.0	27.0	27.0	27.0	10.0	41.0	16.0	47.0
Total Split (%)	32.1%	32.1%	32.1%	32.1%	11.9%	48.8%	19.0%	56.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0
Lead/Lag					Lead	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	18.3	18.3	18.3	18.3	41.7	41.7	50.2	50.2
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.50	0.50	0.60	0.60
v/c Ratio	0.39	0.46	0.19	0.84	0.31	0.71	0.61	0.48
Control Delay	40.7	26.2	26.8	34.1	13.2	9.6	20.8	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	26.2	26.8	34.1	13.2	9.6	20.8	7.2
LOS	D	C	C	C	B	A	C	A
Approach Delay		28.3		33.4		9.8		9.6
Approach LOS		C		C		A		A

Intersection Summary

Cycle Length: 84
Actuated Cycle Length: 84
Offset: 81 (96%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 14.3 Intersection LOS: B
Intersection Capacity Utilization 81.1% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 8: St Patrick & Mt Rushmore Rd





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	33	189	44	411	67	1256	222	1011
v/c Ratio	0.39	0.46	0.19	0.84	0.31	0.71	0.61	0.48
Control Delay	40.7	26.2	26.8	34.1	13.2	9.6	20.8	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	26.2	26.8	34.1	13.2	9.6	20.8	7.2
Queue Length 50th (ft)	15	70	19	127	8	84	31	60
Queue Length 95th (ft)	42	124	44	224	m18	130	m#102	133
Internal Link Dist (ft)		396		493		3016		1001
Turn Bay Length (ft)			210		150		350	
Base Capacity (vph)	105	505	284	575	229	1762	362	2123
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.37	0.15	0.71	0.29	0.71	0.61	0.48

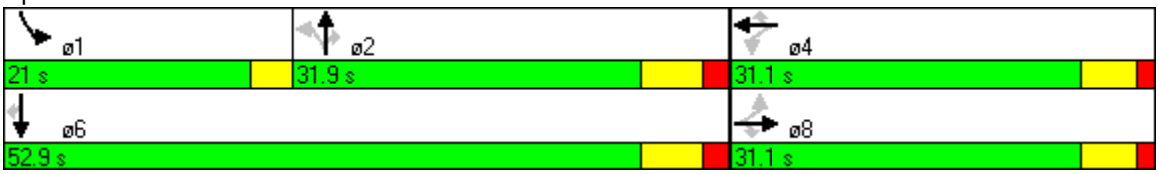
Intersection Summary

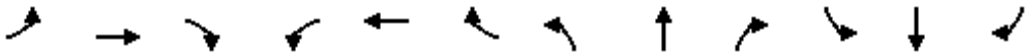
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	30	90	190	40	460	50	730	370	420	490	10
Turn Type	Perm		Perm	Perm		Perm	Perm		Perm	Prot		Perm
Protected Phases		8			4			2		1	6	
Permitted Phases	8		8	4		4	2		2			6
Detector Phases	8	8	8	4	4	4	2	2	2	1	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	15.0	15.0	15.0	6.0	15.0	15.0
Minimum Split (s)	12.5	12.5	12.5	12.5	12.5	12.5	21.5	21.5	21.5	9.0	21.5	21.5
Total Split (s)	31.1	31.1	31.1	31.1	31.1	31.1	31.9	31.9	31.9	21.0	52.9	52.9
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	37.0%	38.0%	38.0%	38.0%	25.0%	63.0%	63.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	20.8	20.8	20.8	20.8	20.8	20.8	35.7	35.7	35.7	15.5	55.2	55.2
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.42	0.42	0.42	0.18	0.66	0.66
v/c Ratio	0.10	0.07	0.21	0.62	0.09	0.68	0.16	0.53	0.45	0.73	0.23	0.01
Control Delay	22.4	21.9	5.9	35.1	22.2	8.5	20.0	21.3	4.1	25.4	8.3	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	21.9	5.9	35.1	22.2	8.5	20.0	21.3	4.1	25.4	8.3	5.2
LOS	C	C	A	D	C	A	C	C	A	C	A	A
Approach Delay		12.3			16.6			15.7			16.1	
Approach LOS		B			B			B			B	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 20 (24%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 15.9	Intersection LOS: B
Intersection Capacity Utilization 63.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 9: Cathedral Dr & Mt Rushmore Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	33	33	100	211	44	511	56	811	411	467	544	11
v/c Ratio	0.10	0.07	0.21	0.62	0.09	0.68	0.16	0.53	0.45	0.73	0.23	0.01
Control Delay	22.4	21.9	5.9	35.1	22.2	8.5	20.0	21.3	4.1	25.4	8.3	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	21.9	5.9	35.1	22.2	8.5	20.0	21.3	4.1	25.4	8.3	5.2
Queue Length 50th (ft)	13	13	0	98	18	14	18	167	0	91	75	1
Queue Length 95th (ft)	32	32	33	153	39	92	50	256	60	139	133	m2
Internal Link Dist (ft)		363			371			890			3016	
Turn Bay Length (ft)	100		100	180		350	260		270	400		170
Base Capacity (vph)	442	607	584	447	607	830	360	1521	917	712	2350	1055
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.05	0.17	0.47	0.07	0.62	0.16	0.53	0.45	0.66	0.23	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

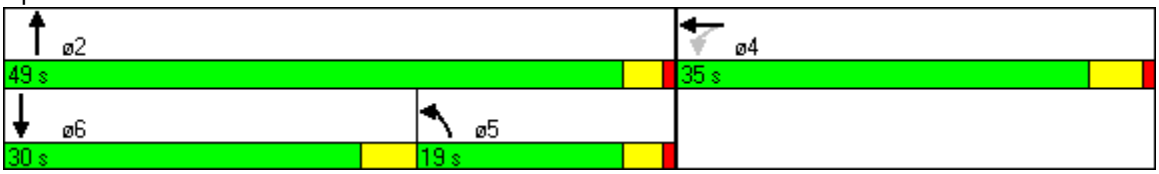
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	44	944	244	356	1011	278	189	378	67	189	33
v/c Ratio	0.22	0.47	0.33	0.68	0.40	0.65	0.26	0.64	0.28	0.46	0.16
Control Delay	59.0	26.7	4.2	56.5	16.9	59.1	41.8	10.7	35.4	54.2	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.0	26.7	4.2	56.5	16.9	59.1	41.8	10.7	35.4	54.2	16.6
Queue Length 50th (ft)	18	200	0	141	170	111	68	13	40	76	0
Queue Length 95th (ft)	38	253	52	194	218	159	101	108	74	112	31
Internal Link Dist (ft)		897			397		727			561	
Turn Bay Length (ft)	285		285	310		180		180	160		100
Base Capacity (vph)	196	2001	737	540	2547	437	1174	741	237	919	423
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.47	0.33	0.66	0.40	0.64	0.16	0.51	0.28	0.21	0.08

Intersection Summary

Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	1090	400	620	590
Turn Type		Prot		
Protected Phases	4	5	2	6
Permitted Phases				
Detector Phases	4	5	2	6
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	30.0	16.0	46.0	30.0
Total Split (s)	35.0	19.0	49.0	30.0
Total Split (%)	41.7%	22.6%	58.3%	35.7%
Yellow Time (s)	4.0	3.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	0.0
Lead/Lag		Lag		Lead
Lead-Lag Optimize?		Yes		Yes
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	31.0	15.0	45.0	26.0
Actuated g/C Ratio	0.37	0.18	0.54	0.31
v/c Ratio	0.90	0.80	0.40	0.81
Control Delay	33.2	21.7	1.3	33.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	33.2	21.7	1.3	33.7
LOS	C	C	A	C
Approach Delay	33.2		9.3	33.7
Approach LOS	C		A	C

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 30 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 25.4	Intersection LOS: C
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Main St & Mt Rushmore Rd



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1511	444	689	789
v/c Ratio	0.90	0.80	0.40	0.81
Control Delay	33.2	21.7	1.3	33.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	33.2	21.7	1.3	33.7
Queue Length 50th (ft)	266	121	10	195
Queue Length 95th (ft)	#361	m#183	11	#267
Internal Link Dist (ft)	408		314	727
Turn Bay Length (ft)		200		
Base Capacity (vph)	1686	552	1706	980
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.90	0.80	0.40	0.81

Intersection Summary

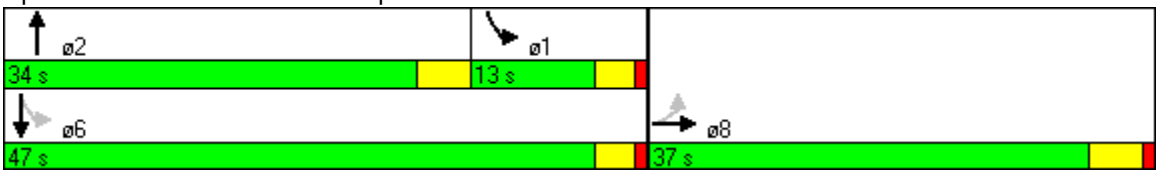
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	880	960	60	680
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phases	8	2	1	6
Minimum Initial (s)	32.0	30.0	9.0	43.0
Minimum Split (s)	37.0	34.0	13.0	47.0
Total Split (s)	37.0	34.0	13.0	47.0
Total Split (%)	44.0%	40.5%	15.5%	56.0%
Yellow Time (s)	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	0.0	1.0	1.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	33.0	30.0	43.0	43.0
Actuated g/C Ratio	0.39	0.36	0.51	0.51
v/c Ratio	0.78	0.74	0.25	0.46
Control Delay	9.8	10.7	8.2	4.0
Queue Delay	0.0	0.0	0.0	0.5
Total Delay	9.8	10.7	8.2	4.6
LOS	A	B	A	A
Approach Delay	9.8	10.7		4.8
Approach LOS	A	B		A

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 34 (40%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 85	
Control Type: Pretimed	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: St Joseph & Mt Rushmore Rd



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	1401	1211	67	756
v/c Ratio	0.78	0.74	0.25	0.46
Control Delay	9.8	10.7	8.2	4.0
Queue Delay	0.0	0.0	0.0	0.5
Total Delay	9.8	10.7	8.2	4.6
Queue Length 50th (ft)	80	64	7	46
Queue Length 95th (ft)	95	50	m7	m51
Internal Link Dist (ft)	935	317		314
Turn Bay Length (ft)			100	
Base Capacity (vph)	1805	1638	263	1630
Starvation Cap Reductn	0	12	0	441
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.78	0.74	0.25	0.64

Intersection Summary

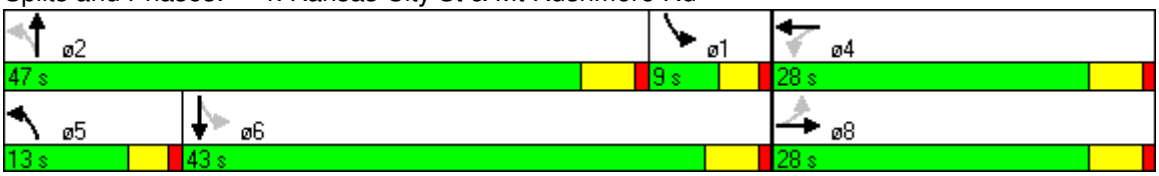
m Volume for 95th percentile queue is metered by upstream signal.

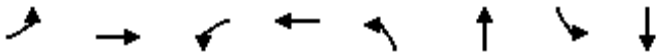
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	90	100	110	140	100	960	50	920
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		8		4	5	2	1	6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	5	2	1	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	25.0	25.0	25.0	25.0	9.0	33.0	9.0	33.0
Total Split (s)	28.0	28.0	28.0	28.0	13.0	47.0	9.0	43.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	15.5%	56.0%	10.7%	51.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	18.5	18.5	18.5	18.5	52.1	52.1	47.0	47.0
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.62	0.62	0.56	0.56
v/c Ratio	0.55	0.60	0.67	0.62	0.41	0.41	0.19	0.60
Control Delay	39.6	26.5	46.5	32.3	12.1	11.9	7.1	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	39.6	26.5	46.5	32.3	12.1	11.9	7.1	6.9
LOS	D	C	D	C	B	B	A	A
Approach Delay		30.4		37.2		12.0		6.9
Approach LOS		C		D		B		A

Intersection Summary

Cycle Length: 84
Actuated Cycle Length: 84
Offset: 39 (46%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 15.0 Intersection LOS: B
Intersection Capacity Utilization 70.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: Kansas City St & Mt Rushmore Rd

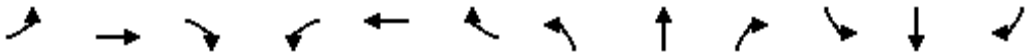




Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	100	233	122	234	111	1167	56	1066
v/c Ratio	0.55	0.60	0.67	0.62	0.41	0.41	0.19	0.60
Control Delay	39.6	26.5	46.5	32.3	12.1	11.9	7.1	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	39.6	26.5	46.5	32.3	12.1	11.9	7.1	6.9
Queue Length 50th (ft)	47	78	59	97	36	191	8	97
Queue Length 95th (ft)	91	139	110	158	m51	225	m16	122
Internal Link Dist (ft)		415		409		313		317
Turn Bay Length (ft)	140		160		260		130	
Base Capacity (vph)	235	485	238	478	280	2833	293	1789
Starvation Cap Reductn	0	0	0	0	0	0	0	66
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.48	0.51	0.49	0.40	0.41	0.19	0.62

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	20	70	20	10	100	30	1080	20	20	1090	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	22	78	22	11	111	33	1200	22	22	1211	56
Pedestrians		2			2			1			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		1			1							
Upstream signal (ft)								391			393	
pX, platoon unblocked	0.89	0.89	0.79	0.89	0.89	0.79	0.79			0.79		
vC, conflicting volume	2071	2576	636	2020	2593	615	1269			1224		
vC1, stage 1 conf vol	1285	1285		1280	1280							
vC2, stage 2 conf vol	785	1291		740	1313							
vCu, unblocked vol	1374	1939	274	1317	1958	245	1074			1017		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	81	86	83	90	81	93			96		
cM capacity (veh/h)	125	116	573	129	112	597	508			539		

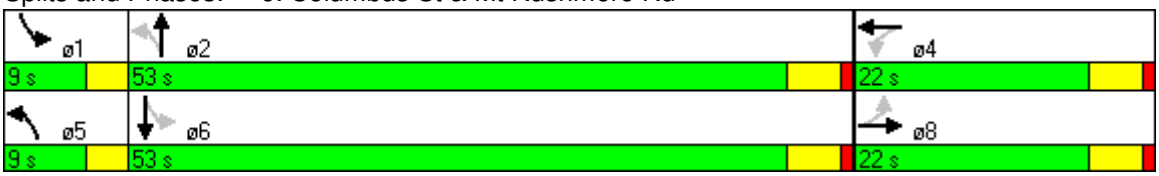
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	11	100	22	122	33	800	422	22	807	459
Volume Left	11	0	22	0	33	0	0	22	0	0
Volume Right	0	78	0	111	0	0	22	0	0	56
cSH	125	306	129	428	508	1700	1700	539	1700	1700
Volume to Capacity	0.09	0.33	0.17	0.29	0.07	0.47	0.25	0.04	0.47	0.27
Queue Length 95th (ft)	7	35	15	29	5	0	0	3	0	0
Control Delay (s)	36.5	22.4	38.5	16.7	12.6	0.0	0.0	12.0	0.0	0.0
Lane LOS	E	C	E	C	B			B		
Approach Delay (s)	23.8		20.1		0.3			0.2		
Approach LOS	C		C							

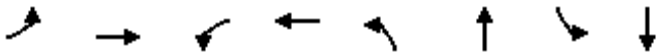
Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	50.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	10	20	100	50	40	1140	20	1150
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		8		4	5	2	1	6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	5	2	1	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	35.0	8.0	35.0
Total Split (s)	22.0	22.0	22.0	22.0	9.0	53.0	9.0	53.0
Total Split (%)	26.2%	26.2%	26.2%	26.2%	10.7%	63.1%	10.7%	63.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	13.8	13.8	14.1	14.1	62.8	61.7	61.8	59.9
Actuated g/C Ratio	0.16	0.16	0.17	0.17	0.75	0.73	0.74	0.71
v/c Ratio	0.06	0.30	0.56	0.28	0.18	0.59	0.10	0.57
Control Delay	27.7	13.7	42.2	24.7	2.6	4.1	2.4	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	13.7	42.2	24.7	2.6	4.1	2.4	5.7
LOS	C	B	D	C	A	A	A	A
Approach Delay		15.2		35.0		4.1		5.6
Approach LOS		B		C		A		A

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 67 (80%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 7.1	Intersection LOS: A
Intersection Capacity Utilization 57.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Columbus St & Mt Rushmore Rd





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	89	111	78	44	1367	22	1300
v/c Ratio	0.06	0.30	0.56	0.28	0.18	0.59	0.10	0.57
Control Delay	27.7	13.7	42.2	24.7	2.6	4.1	2.4	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	13.7	42.2	24.7	2.6	4.1	2.4	5.7
Queue Length 50th (ft)	5	10	54	26	1	20	1	158
Queue Length 95th (ft)	18	47	102	62	m4	47	m2	335
Internal Link Dist (ft)		407		408		332		311
Turn Bay Length (ft)	100		110		100		340	
Base Capacity (vph)	256	369	254	353	256	2334	231	2285
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.24	0.44	0.22	0.17	0.59	0.10	0.57

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	40	10	10	20	50	1290	30	1380
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		8		4		2		6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	2	2	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0
Minimum Split (s)	21.0	21.0	21.0	21.0	30.0	30.0	30.0	30.0
Total Split (s)	26.0	26.0	26.0	26.0	58.0	58.0	58.0	58.0
Total Split (%)	31.0%	31.0%	31.0%	31.0%	69.0%	69.0%	69.0%	69.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		10.1		10.1	65.9	65.9	65.9	65.9
Actuated g/C Ratio		0.12		0.12	0.78	0.78	0.78	0.78
v/c Ratio		0.50		0.21	0.39	0.52	0.20	0.56
Control Delay		29.1		28.0	8.8	1.9	3.8	2.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		29.1		28.0	8.8	1.9	3.8	2.4
LOS		C		C	A	A	A	A
Approach Delay		29.1		28.0		2.2		2.5
Approach LOS		C		C		A		A

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 26 (31%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 3.6	Intersection LOS: A
Intersection Capacity Utilization 58.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: Franklin St & Mt Rushmore Rd

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	111	44	56	1466	33	1566
v/c Ratio	0.50	0.21	0.39	0.52	0.20	0.56
Control Delay	29.1	28.0	8.8	1.9	3.8	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	28.0	8.8	1.9	3.8	2.4
Queue Length 50th (ft)	33	16	0	5	2	47
Queue Length 95th (ft)	78	44	m1	8	m4	66
Internal Link Dist (ft)	404	495		1001		1962
Turn Bay Length (ft)			100		22	
Base Capacity (vph)	434	445	142	2796	166	2799
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.10	0.39	0.52	0.20	0.56

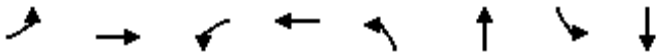
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	30	120	80	140	60	1080	260	1120
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		8		4	5	2	1	6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
Minimum Split (s)	25.0	25.0	25.0	25.0	7.0	20.0	7.0	20.0
Total Split (s)	26.0	26.0	26.0	26.0	9.0	39.0	19.0	49.0
Total Split (%)	31.0%	31.0%	31.0%	31.0%	10.7%	46.4%	22.6%	58.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0
Lead/Lag					Lag	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	18.7	18.7	18.7	18.7	40.9	40.9	50.1	50.1
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.49	0.49	0.60	0.60
v/c Ratio	0.30	0.46	0.39	0.81	0.25	0.71	0.77	0.61
Control Delay	33.2	27.4	32.0	38.9	8.9	10.1	24.2	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	27.4	32.0	38.9	8.9	10.1	24.2	12.5
LOS	C	C	C	D	A	B	C	B
Approach Delay		28.3		37.5		10.0		14.6
Approach LOS		C		D		B		B

Intersection Summary			
Cycle Length: 84			
Actuated Cycle Length: 84			
Offset: 80 (95%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 80.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: St Patrick & Mt Rushmore Rd



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	33	189	89	356	67	1233	289	1288
v/c Ratio	0.30	0.46	0.39	0.81	0.25	0.71	0.77	0.61
Control Delay	33.2	27.4	32.0	38.9	8.9	10.1	24.2	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	27.4	32.0	38.9	8.9	10.1	24.2	12.5
Queue Length 50th (ft)	14	73	39	139	9	98	66	309
Queue Length 95th (ft)	40	130	81	232	m19	146	#188	345
Internal Link Dist (ft)		396		493		3016		1001
Turn Bay Length (ft)			230		150		350	
Base Capacity (vph)	131	485	268	506	273	1734	420	2123
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.39	0.33	0.70	0.25	0.71	0.69	0.61

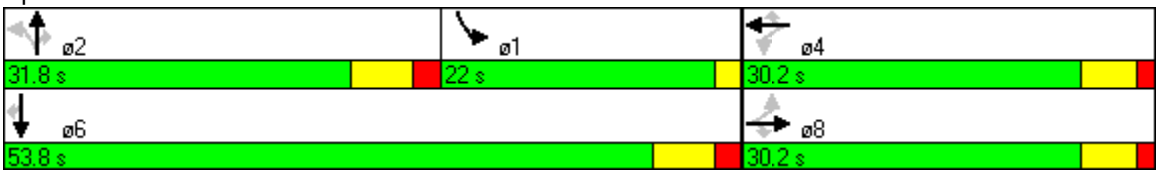
Intersection Summary

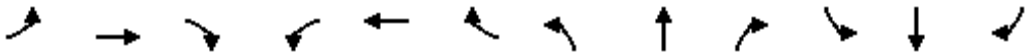
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	60	30	220	20	440	20	670	240	440	770	10
Turn Type	Perm		Perm	Perm		Perm	Perm		Perm	Prot		Perm
Protected Phases		8			4			2		1	6	
Permitted Phases	8		8	4		4	2		2			6
Detector Phases	8	8	8	4	4	4	2	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	6.0	6.0	6.0	13.0	13.0	13.0	6.0	4.0	4.0
Minimum Split (s)	12.5	12.5	12.5	12.5	12.5	12.5	19.5	19.5	19.5	8.0	13.5	13.5
Total Split (s)	30.2	30.2	30.2	30.2	30.2	30.2	31.8	31.8	31.8	22.0	53.8	53.8
Total Split (%)	36.0%	36.0%	36.0%	36.0%	36.0%	36.0%	37.9%	37.9%	37.9%	26.2%	64.0%	64.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	2.0	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lead	Lead	Lag		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	22.0	22.0	22.0	22.0	22.0	22.0	32.0	32.0	32.0	18.0	54.0	54.0
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26	0.26	0.38	0.38	0.38	0.21	0.64	0.64
v/c Ratio	0.09	0.14	0.08	0.70	0.04	0.65	0.13	0.55	0.35	0.66	0.37	0.01
Control Delay	21.9	22.5	8.0	38.2	21.0	8.2	21.9	23.2	4.2	21.4	1.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	22.5	8.0	38.2	21.0	8.2	21.9	23.2	4.2	21.4	1.4	0.2
LOS	C	C	A	D	C	A	C	C	A	C	A	A
Approach Delay		18.8			18.3			18.3			8.6	
Approach LOS		B			B			B			A	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 27 (32%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 61.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 9: Cathedral Dr & Mt Rushmore Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	33	67	33	244	22	489	22	744	267	489	856	11
v/c Ratio	0.09	0.14	0.08	0.70	0.04	0.65	0.13	0.55	0.35	0.66	0.37	0.01
Control Delay	21.9	22.5	8.0	38.2	21.0	8.2	21.9	23.2	4.2	21.4	1.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	22.5	8.0	38.2	21.0	8.2	21.9	23.2	4.2	21.4	1.4	0.2
Queue Length 50th (ft)	13	26	0	113	8	16	8	163	0	128	24	0
Queue Length 95th (ft)	33	54	20	185	25	95	27	232	50	153	25	m0
Internal Link Dist (ft)		363			371			890			3016	
Turn Bay Length (ft)	100		100	180		350	250		250	200		170
Base Capacity (vph)	436	587	508	418	587	806	174	1361	765	743	2297	999
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.11	0.06	0.58	0.04	0.61	0.13	0.55	0.35	0.66	0.37	0.01

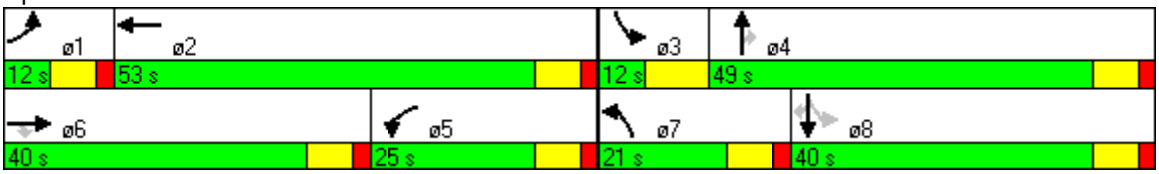
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	50	990	260	370	980	290	200	400	70	200	40
Turn Type	Prot		Perm	Prot		Prot		Perm	pm+pt		Perm
Protected Phases	1	6		5	2	7	4		3	8	
Permitted Phases			6					4	8		8
Detector Phases	1	6	6	5	2	7	4	4	3	8	8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	35.0	35.0	12.0	29.0	12.0	37.0	37.0	12.0	40.0	40.0
Total Split (s)	12.0	40.0	40.0	25.0	53.0	21.0	49.0	49.0	12.0	40.0	40.0
Total Split (%)	9.5%	31.7%	31.7%	19.8%	42.1%	16.7%	38.9%	38.9%	9.5%	31.7%	31.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None	None	None
Act Effct Green (s)	11.7	54.7	54.7	21.0	66.7	17.0	28.7	28.7	25.3	17.3	17.3
Actuated g/C Ratio	0.09	0.43	0.43	0.17	0.53	0.13	0.23	0.23	0.20	0.14	0.14
v/c Ratio	0.19	0.55	0.38	0.80	0.49	0.78	0.30	0.67	0.32	0.50	0.19
Control Delay	53.8	28.3	4.2	63.0	20.8	66.6	42.0	9.2	35.9	54.0	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	28.3	4.2	63.0	20.8	66.6	42.0	9.2	35.9	54.0	15.0
LOS	D	C	A	E	C	E	D	A	D	D	B
Approach Delay		24.5			31.8		35.3			44.9	
Approach LOS		C			C		D			D	

Intersection Summary	
Cycle Length: 126	
Actuated Cycle Length: 126	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 31.2	Intersection LOS: C
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Omaha St & Mt Rushmore Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	56	1100	289	411	1167	322	222	444	78	222	44
v/c Ratio	0.19	0.55	0.38	0.80	0.49	0.78	0.30	0.67	0.32	0.50	0.19
Control Delay	53.8	28.3	4.2	63.0	20.8	66.6	42.0	9.2	35.9	54.0	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	28.3	4.2	63.0	20.8	66.6	42.0	9.2	35.9	54.0	15.0
Queue Length 50th (ft)	22	240	0	168	221	132	81	0	47	89	0
Queue Length 95th (ft)	43	304	55	#238	291	#196	115	97	83	127	34
Internal Link Dist (ft)		897			397		727			561	
Turn Bay Length (ft)	285		285	310		180		180	160		100
Base Capacity (vph)	288	1986	758	515	2402	413	1149	787	240	919	431
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.55	0.38	0.80	0.49	0.78	0.19	0.56	0.33	0.24	0.10

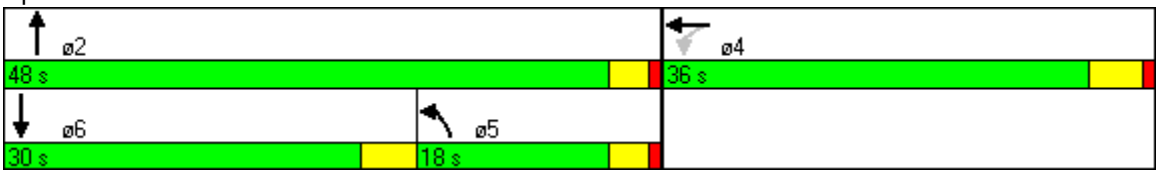
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBT	NBL	NBT	SBT
Lane Configurations				
Volume (vph)	1270	460	740	680
Turn Type		Prot		
Protected Phases	4	5	2	6
Permitted Phases				
Detector Phases	4	5	2	6
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	30.0	16.0	46.0	30.0
Total Split (s)	36.0	18.0	48.0	30.0
Total Split (%)	42.9%	21.4%	57.1%	35.7%
Yellow Time (s)	4.0	3.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	0.0
Lead/Lag		Lag		Lead
Lead-Lag Optimize?		Yes		Yes
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	32.0	14.0	44.0	26.0
Actuated g/C Ratio	0.38	0.17	0.52	0.31
v/c Ratio	1.01	0.99	0.49	0.94
Control Delay	51.6	42.1	2.8	47.3
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	51.6	42.1	2.9	47.3
LOS	D	D	A	D
Approach Delay	51.6		18.0	47.3
Approach LOS	D		B	D

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 75 (89%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 90	
Control Type: Pretimed	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 39.4	Intersection LOS: D
Intersection Capacity Utilization 85.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Main St & Mt Rushmore Rd



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1756	511	822	912
v/c Ratio	1.01	0.99	0.49	0.94
Control Delay	51.6	42.1	2.8	47.3
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	51.6	42.1	2.9	47.3
Queue Length 50th (ft)	~339	114	20	242
Queue Length 95th (ft)	#455	m#171	m32	#368
Internal Link Dist (ft)	408		314	727
Turn Bay Length (ft)		200		
Base Capacity (vph)	1734	515	1668	968
Starvation Cap Reductn	0	0	142	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.01	0.99	0.54	0.94

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

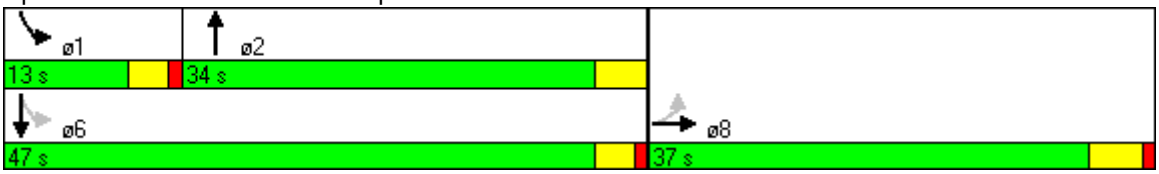
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	1030	1140	70	770
Turn Type			pm+pt	
Protected Phases	8	2	1	6
Permitted Phases			6	
Detector Phases	8	2	1	6
Minimum Initial (s)	32.0	30.0	9.0	43.0
Minimum Split (s)	37.0	34.0	13.0	47.0
Total Split (s)	37.0	34.0	13.0	47.0
Total Split (%)	44.0%	40.5%	15.5%	56.0%
Yellow Time (s)	4.0	4.0	3.0	3.0
All-Red Time (s)	1.0	0.0	1.0	1.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	33.0	30.0	43.0	43.0
Actuated g/C Ratio	0.39	0.36	0.51	0.51
v/c Ratio	0.91	0.88	0.31	0.53
Control Delay	15.3	16.7	15.2	3.1
Queue Delay	0.0	0.1	0.0	0.1
Total Delay	15.3	16.8	15.2	3.2
LOS	B	B	B	A
Approach Delay	15.3	16.8		4.2
Approach LOS	B	B		A

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 80 (95%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 85	
Control Type: Pretimed	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 85.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: St Joseph & Mt Rushmore Rd



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	1633	1445	78	856
v/c Ratio	0.91	0.88	0.31	0.53
Control Delay	15.3	16.7	15.2	3.1
Queue Delay	0.0	0.1	0.0	0.1
Total Delay	15.3	16.8	15.2	3.2
Queue Length 50th (ft)	78	51	6	27
Queue Length 95th (ft)	m#101	#69	m7	m40
Internal Link Dist (ft)	935	317		314
Turn Bay Length (ft)			100	
Base Capacity (vph)	1804	1639	253	1630
Starvation Cap Reductn	0	7	0	159
Spillback Cap Reductn	0	0	0	41
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.91	0.89	0.31	0.58

Intersection Summary

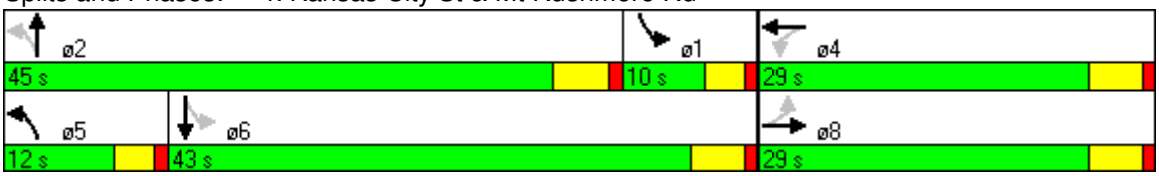
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

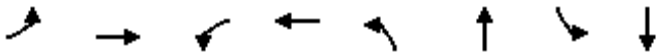
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	110	110	130	170	120	1120	60	1040
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		8		4	5	2	1	6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	5	2	1	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	25.0	25.0	25.0	25.0	9.0	33.0	9.0	33.0
Total Split (s)	29.0	29.0	29.0	29.0	12.0	45.0	10.0	43.0
Total Split (%)	34.5%	34.5%	34.5%	34.5%	14.3%	53.6%	11.9%	51.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag					Lead	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	20.7	20.7	20.7	20.7	47.3	47.3	42.7	42.7
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.56	0.56	0.51	0.51
v/c Ratio	0.68	0.62	0.77	0.67	0.51	0.53	0.26	0.74
Control Delay	47.3	25.9	54.7	32.9	15.7	12.5	12.9	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	47.3	25.9	54.7	32.9	15.7	12.5	12.9	13.5
LOS	D	C	D	C	B	B	B	B
Approach Delay		32.6		40.4		12.8		13.5
Approach LOS		C		D		B		B

Intersection Summary

Cycle Length: 84
Actuated Cycle Length: 84
Offset: 82 (98%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 18.4 — Intersection LOS: B
Intersection Capacity Utilization 78.5% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 4: Kansas City St & Mt Rushmore Rd

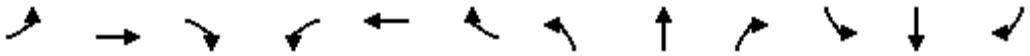




Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	122	266	144	278	133	1366	67	1212
v/c Ratio	0.68	0.62	0.77	0.67	0.51	0.53	0.26	0.74
Control Delay	47.3	25.9	54.7	32.9	15.7	12.5	12.9	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	47.3	25.9	54.7	32.9	15.7	12.5	12.9	13.5
Queue Length 50th (ft)	56	87	68	115	43	238	12	168
Queue Length 95th (ft)	#115	158	#147	188	m43	219	m20	m209
Internal Link Dist (ft)		415		409		313		317
Turn Bay Length (ft)	140		110		260		130	
Base Capacity (vph)	216	506	227	497	261	2573	254	1628
Starvation Cap Reductn	0	0	0	0	0	0	0	30
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.53	0.63	0.56	0.51	0.53	0.26	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	20	80	20	20	110	40	1260	30	30	1270	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	22	22	89	22	22	122	44	1400	33	33	1411	56
Pedestrians		2			2			1			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		1			1							
Upstream signal (ft)								391			393	
pX, platoon unblocked	0.83	0.83	0.71	0.83	0.83	0.68	0.71			0.68		
vC, conflicting volume	2432	3032	736	2381	3043	721	1469			1435		
vC1, stage 1 conf vol	1508	1508		1508	1508							
vC2, stage 2 conf vol	924	1524		873	1535							
vCu, unblocked vol	1481	2206	227	1419	2219	130	1255			1175		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	72	68	84	73	66	80	89			92		
cM capacity (veh/h)	80	70	554	83	66	613	392			407		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	22	111	22	144	44	933	500	33	941	526
Volume Left	22	0	22	0	44	0	0	33	0	0
Volume Right	0	89	0	122	0	0	33	0	0	56
cSH	80	232	83	270	392	1700	1700	407	1700	1700
Volume to Capacity	0.28	0.48	0.27	0.54	0.11	0.55	0.29	0.08	0.55	0.31
Queue Length 95th (ft)	25	60	24	73	10	0	0	7	0	0
Control Delay (s)	66.7	34.0	63.5	32.7	15.4	0.0	0.0	14.6	0.0	0.0
Lane LOS	F	D	F	D	C			B		
Approach Delay (s)	39.5		36.8		0.5			0.3		
Approach LOS	E		E							

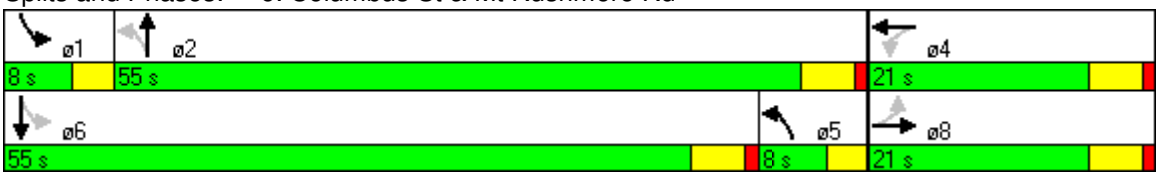
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	63.3%	ICU Level of Service	B	
Analysis Period (min)	15			

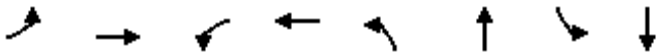
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	20	130	70	40	1320	20	1330
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		8		4	5	2	1	6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	5	2	1	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	35.0	8.0	35.0
Total Split (s)	21.0	21.0	21.0	21.0	8.0	55.0	8.0	55.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	9.5%	65.5%	9.5%	65.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0
Lead/Lag					Lag	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	15.2	15.2	15.2	15.2	57.6	57.6	56.0	56.0
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.69	0.69	0.67	0.67
v/c Ratio	0.10	0.30	0.68	0.33	0.21	0.72	0.13	0.70
Control Delay	28.8	12.8	48.8	27.9	5.4	6.6	4.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	12.8	48.8	27.9	5.4	6.6	4.2	6.8
LOS	C	B	D	C	A	A	A	A
Approach Delay		15.7		40.2		6.5		6.8
Approach LOS		B		D		A		A

Intersection Summary

Cycle Length: 84
Actuated Cycle Length: 84
Offset: 28 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 9.3 — Intersection LOS: A
Intersection Capacity Utilization 65.4% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 6: Columbus St & Mt Rushmore Rd





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	100	144	100	44	1578	22	1500
v/c Ratio	0.10	0.30	0.68	0.33	0.21	0.72	0.13	0.70
Control Delay	28.8	12.8	48.8	27.9	5.4	6.6	4.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	12.8	48.8	27.9	5.4	6.6	4.2	6.8
Queue Length 50th (ft)	10	9	70	38	1	15	1	48
Queue Length 95th (ft)	30	50	#142	82	m3	501	m3	203
Internal Link Dist (ft)		407		408		332		311
Turn Bay Length (ft)	100		110		100		340	
Base Capacity (vph)	237	359	237	333	209	2183	168	2142
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.28	0.61	0.30	0.21	0.72	0.13	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	40	10	10	20	60	1490	30	1600
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		8		4		2		6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	2	2	6	6
Minimum Initial (s)	6.0	6.0	6.0	6.0	20.0	20.0	20.0	20.0
Minimum Split (s)	21.0	21.0	21.0	21.0	30.0	30.0	30.0	30.0
Total Split (s)	21.0	21.0	21.0	21.0	63.0	63.0	63.0	63.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		10.5		10.5	65.5	65.5	65.5	65.5
Actuated g/C Ratio		0.12		0.12	0.78	0.78	0.78	0.78
v/c Ratio		0.50		0.20	0.68	0.61	0.25	0.68
Control Delay		30.9		27.4	31.2	1.4	4.6	2.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		30.9		27.4	31.2	1.4	4.6	2.1
LOS		C		C	C	A	A	A
Approach Delay		30.9		27.4		2.6		2.1
Approach LOS		C		C		A		A

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 60 (71%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 3.4	Intersection LOS: A
Intersection Capacity Utilization 66.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Franklin St & Mt Rushmore Rd

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	111	44	67	1689	33	1889
v/c Ratio	0.50	0.20	0.68	0.61	0.25	0.68
Control Delay	30.9	27.4	31.2	1.4	4.6	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	27.4	31.2	1.4	4.6	2.1
Queue Length 50th (ft)	37	16	2	6	1	30
Queue Length 95th (ft)	82	43	m8	m12	m3	65
Internal Link Dist (ft)	404	495		1001		1962
Turn Bay Length (ft)			100		100	
Base Capacity (vph)	336	344	98	2779	131	2766
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.13	0.68	0.61	0.25	0.68

Intersection Summary

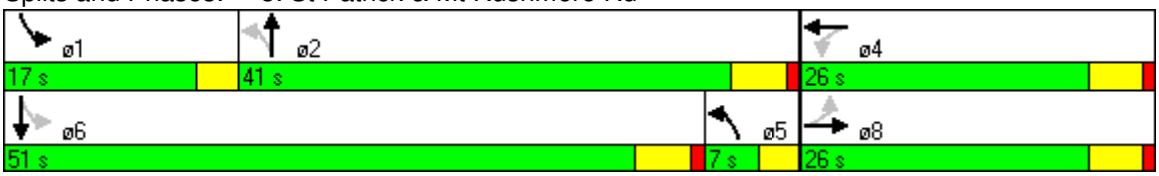
m Volume for 95th percentile queue is metered by upstream signal.

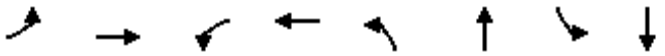
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	30	140	90	160	70	1260	300	1310
Turn Type	Perm		Perm		pm+pt		pm+pt	
Protected Phases		8		4	5	2	1	6
Permitted Phases	8		4		2		6	
Detector Phases	8	8	4	4	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
Minimum Split (s)	25.0	25.0	25.0	25.0	7.0	35.0	7.0	35.0
Total Split (s)	26.0	26.0	26.0	26.0	7.0	41.0	17.0	51.0
Total Split (%)	31.0%	31.0%	31.0%	31.0%	8.3%	48.8%	20.2%	60.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0
Lead/Lag					Lag	Lag	Lead	Lead
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	20.3	20.3	20.3	20.3	38.5	38.5	50.1	50.1
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.46	0.46	0.60	0.60
v/c Ratio	0.40	0.50	0.45	0.87	0.48	0.89	0.89	0.71
Control Delay	41.6	27.9	33.8	44.5	24.7	22.0	37.2	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	27.9	33.8	44.5	24.7	22.0	37.2	15.5
LOS	D	C	C	D	C	C	D	B
Approach Delay		29.7		42.4		22.1		19.4
Approach LOS		C		D		C		B

Intersection Summary

Cycle Length: 84
Actuated Cycle Length: 84
Offset: 36 (43%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 23.9 — Intersection LOS: C
Intersection Capacity Utilization 90.7% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 8: St Patrick & Mt Rushmore Rd





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	33	223	100	411	78	1444	333	1512
v/c Ratio	0.40	0.50	0.45	0.87	0.48	0.89	0.89	0.71
Control Delay	41.6	27.9	33.8	44.5	24.7	22.0	37.2	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	27.9	33.8	44.5	24.7	22.0	37.2	15.5
Queue Length 50th (ft)	14	87	44	167	16	210	97	400
Queue Length 95th (ft)	45	154	92	#316	m32	#521	#276	502
Internal Link Dist (ft)		396		493		3016		1001
Turn Bay Length (ft)			230		150		350	
Base Capacity (vph)	90	485	239	507	164	1631	378	2121
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.46	0.42	0.81	0.48	0.89	0.88	0.71

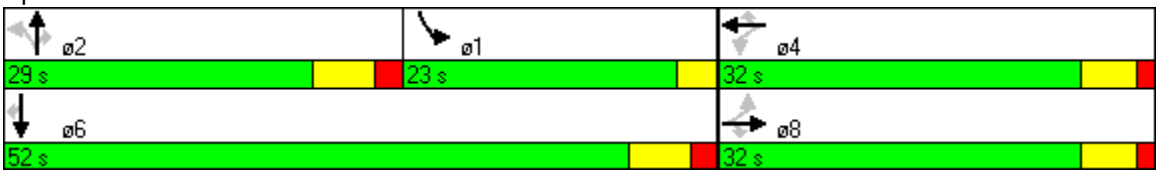
Intersection Summary

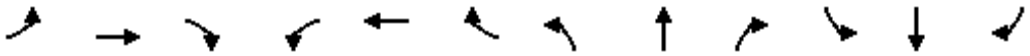
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	60	30	250	20	510	20	480	280	510	890	10
Turn Type	Perm		Perm	Perm		Perm	Perm		Perm	Prot		Perm
Protected Phases		8			4			2		1	6	
Permitted Phases	8		8	4		4	2		2			6
Detector Phases	8	8	8	4	4	4	2	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	6.0	6.0	6.0	13.0	13.0	13.0	6.0	4.0	4.0
Minimum Split (s)	12.5	12.5	12.5	12.5	12.5	12.5	19.5	19.5	19.5	9.0	13.5	13.5
Total Split (s)	32.0	32.0	32.0	32.0	32.0	32.0	29.0	29.0	29.0	23.0	52.0	52.0
Total Split (%)	38.1%	38.1%	38.1%	38.1%	38.1%	38.1%	34.5%	34.5%	34.5%	27.4%	61.9%	61.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lead	Lead	Lag		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	24.3	24.3	24.3	24.3	24.3	24.3	28.7	28.7	28.7	19.0	51.7	51.7
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.34	0.34	0.34	0.23	0.62	0.62
v/c Ratio	0.17	0.12	0.07	0.72	0.04	0.68	0.21	0.44	0.42	0.72	0.45	0.01
Control Delay	21.6	20.8	7.5	37.2	19.6	7.9	28.2	23.8	4.8	21.7	2.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	20.8	7.5	37.2	19.6	7.9	28.2	23.8	4.8	21.7	2.2	0.2
LOS	C	C	A	D	B	A	C	C	A	C	A	A
Approach Delay		18.5			17.6			17.1			9.2	
Approach LOS		B			B			B			A	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Offset: 74 (88%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 13.7	Intersection LOS: B
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: Cathedral Dr & Mt Rushmore Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	67	67	33	278	22	567	22	533	311	567	989	11
v/c Ratio	0.17	0.12	0.07	0.72	0.04	0.68	0.21	0.44	0.42	0.72	0.45	0.01
Control Delay	21.6	20.8	7.5	37.2	19.6	7.9	28.2	23.8	4.8	21.7	2.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	20.8	7.5	37.2	19.6	7.9	28.2	23.8	4.8	21.7	2.2	0.2
Queue Length 50th (ft)	25	25	0	125	8	17	9	118	0	145	31	0
Queue Length 95th (ft)	54	53	19	207	24	103	31	170	57	m169	m38	m0
Internal Link Dist (ft)		363			371			890			3016	
Turn Bay Length (ft)	100		100	180		350	250		250	200		170
Base Capacity (vph)	466	627	541	447	627	880	107	1221	743	784	2200	957
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.11	0.06	0.62	0.04	0.64	0.21	0.44	0.42	0.72	0.45	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

APPENDIX E
2030 Arterial Analysis Worksheets

Arterial Level of Service: NB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Columbus St	IV	35	56.7	2.4	59.1	0.46	28.3	A
Kansas City St	IV	25	26.7	6.6	33.3	0.15	16.1	C
St Joseph	IV	25	16.5	9.0	25.5	0.08	10.6	D
Main St	IV	25	19.8	1.4	21.2	0.07	12.7	D
Omaha St	IV	25	27.5	28.7	56.2	0.15	9.8	D
Total	IV		147.2	48.1	195.3	0.92	16.9	C

Arterial Level of Service: SB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Omaha St	IV	25	26.7	35.0	61.7	0.12	7.1	E
Main St	IV	25	27.5	27.0	54.5	0.15	10.1	D
St Joseph	IV	25	19.8	3.2	23.0	0.07	11.7	D
Kansas City St	IV	25	16.5	4.0	20.5	0.08	13.2	C
Columbus St	IV	25	26.7	3.7	30.4	0.15	17.6	C
Total	IV		117.2	72.9	190.1	0.57	10.8	D

Arterial Level of Service: NB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cathedral Dr	III	35	22.0	21.2	43.2	0.18	15.3	D
St Patrick	III	35	60.3	9.6	69.9	0.59	30.2	A
Franklin St	III	35	24.6	1.4	26.0	0.20	28.3	B
Total	III		106.9	32.2	139.1	0.97	25.2	B

Arterial Level of Service: SB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Franklin St	III	35	55.8	2.2	58.0	0.46	28.8	B
St Patrick	III	35	24.6	7.2	31.8	0.20	23.2	C
Cathedral Dr	III	35	60.3	8.2	68.5	0.59	30.8	A
Total	III		140.7	17.6	158.3	1.26	28.6	B

Arterial Level of Service: NB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Columbus St	IV	35	56.7	4.1	60.8	0.46	27.5	A
Kansas City St	IV	25	26.7	11.9	38.6	0.15	13.8	C
St Joseph	IV	25	16.5	10.7	27.2	0.08	10.0	D
Main St	IV	25	19.8	1.3	21.1	0.07	12.7	D
Omaha St	IV	25	27.5	41.8	69.3	0.15	7.9	E
Total	IV		147.2	69.8	217.0	0.92	15.2	C

Arterial Level of Service: SB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Omaha St	IV	35	20.0	54.2	74.2	0.12	5.9	F
Main St	IV	25	27.5	33.7	61.2	0.15	9.0	E
St Joseph	IV	25	19.8	4.0	23.8	0.07	11.3	D
Kansas City St	IV	25	16.5	6.8	23.3	0.08	11.6	D
Columbus St	IV	25	26.7	5.7	32.4	0.15	16.5	C
Total	IV		110.5	104.4	214.9	0.57	9.6	D

Arterial Level of Service: NB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cathedral Dr	III	35	22.0	23.0	45.0	0.18	14.7	D
St Patrick	III	35	60.3	10.0	70.3	0.59	30.0	A
Franklin St	III	35	24.6	1.9	26.5	0.20	27.8	B
Total	III		106.9	34.9	141.8	0.97	24.7	B

Arterial Level of Service: SB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Franklin St	III	35	55.8	2.4	58.2	0.46	28.7	B
St Patrick	III	35	24.6	12.5	37.1	0.20	19.9	C
Cathedral Dr	III	35	60.3	1.4	61.7	0.59	34.2	A
Total	III		140.7	16.3	157.0	1.26	28.8	B

Arterial Level of Service: NB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Columbus St	IV	35	56.7	6.6	63.3	0.46	26.4	A
Kansas City St	IV	25	26.7	12.5	39.2	0.15	13.6	C
St Joseph	IV	25	16.5	16.7	33.2	0.08	8.2	E
Main St	IV	25	19.8	2.8	22.6	0.07	11.9	D
Omaha St	IV	25	27.5	42.0	69.5	0.15	7.9	E
Total	IV		147.2	80.6	227.8	0.92	14.5	C

Arterial Level of Service: SB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Omaha St	IV	35	20.0	54.0	74.0	0.12	5.9	F
Main St	IV	25	27.5	47.3	74.8	0.15	7.4	E
St Joseph	IV	25	19.8	3.1	22.9	0.07	11.7	D
Kansas City St	IV	25	16.5	13.4	29.9	0.08	9.1	D
Columbus St	IV	25	26.7	6.8	33.5	0.15	16.0	C
Total	IV		110.5	124.6	235.1	0.57	8.8	E

Arterial Level of Service: NB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Cathedral Dr	III	35	22.0	23.5	45.5	0.18	14.5	D
St Patrick	III	35	60.3	23.0	83.3	0.59	25.3	B
Franklin St	III	35	24.6	1.4	26.0	0.20	28.3	B
Total	III		106.9	47.9	154.8	0.97	22.7	C

Arterial Level of Service: SB Mt Rushmore Rd

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Franklin St	III	35	55.8	2.1	57.9	0.46	28.9	B
St Patrick	III	35	24.6	16.2	40.8	0.20	18.1	C
Cathedral Dr	III	35	60.3	2.1	62.4	0.59	33.8	A
Total	III		140.7	20.4	161.1	1.26	28.1	B

APPENDIX F
Quincy Street Traffic Signal Warrants

Warrants Volume

Information

Analyst	Gabe Schell	Intersection	Quincy St/Mt Rushmore Rd
Agency/Co	Kadrmas, Lee & Jackosn	Jurisdiction	Rapid City, SD
Date Performed	1/24/2008	Units	U.S. Customary
Project ID	Mt Rushmore Rd Corridor Study	Time Period Analyzed	Peak Season Peak Hour
East/West Street	Quincy Street	North/South Street	Mt Rushmore Road
File Name	Quincy2007.xhy	Major Street	North-South

Project Description ***Mt Rushmore Rd Corridor Study***

Warrant 1

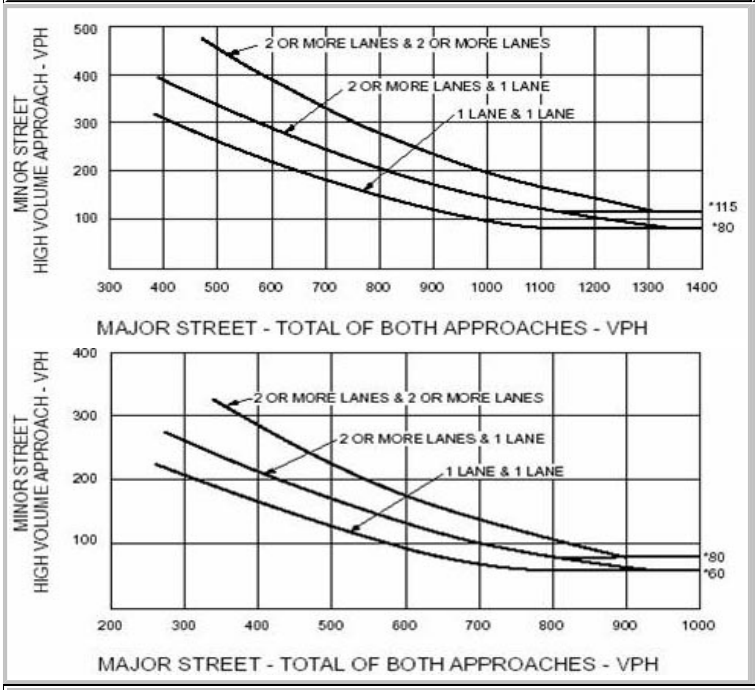
Condition A - Minimum Vehicular Volume

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

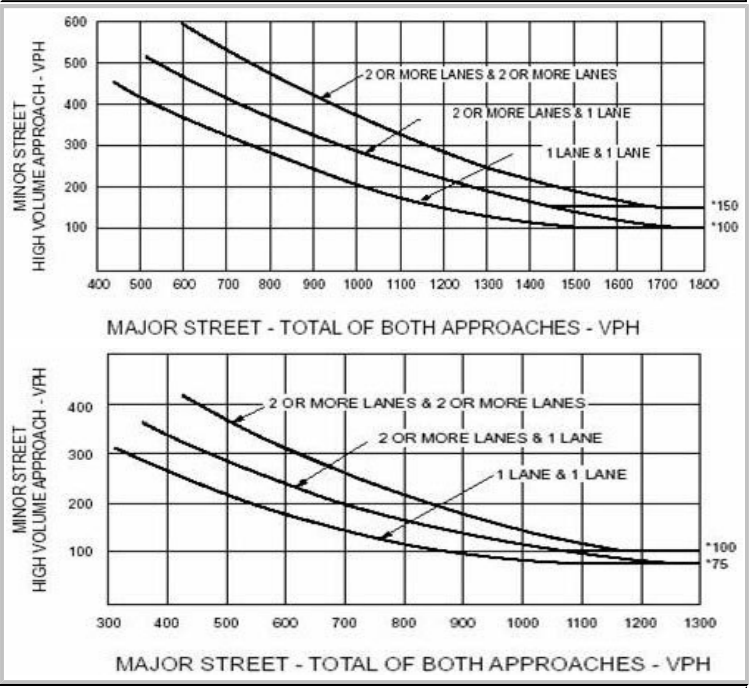
Condition B - Interruption of Continuous Traffic

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

Warrant 2



Warrant 3



Volume Summary

Major Street Lanes 2+ **Minor Street Lanes** 1 **Speed** 35 **Population** 10000+

Hours	Major Volume	Minor Volume	Total Volume	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (100%)
07-08	0	0	0	No	No	No	No	No	No	No
08-09	793	18	819	No	No	No	No	No	No	No
09-10	1771	33	1829	No	No	No	No	No	No	No
10-11	1501	43	1583	No	No	No	No	No	No	No
11-12	0	0	0	No	No	No	No	No	No	No
12-13	0	0	0	No	No	No	No	No	No	No
13-14	0	0	0	No	No	No	No	No	No	No
14-15	0	0	0	No	No	No	No	No	No	No
15-16	0	0	0	No	No	No	No	No	No	No
16-17	1974	66	2091	No	No	No	Yes	No	No	No
17-18	1935	76	2069	No	No	Yes	Yes	No	No	No
18-19	1365	49	1445	No	No	No	No	No	No	No
Totals	9339	285	9836	0	0	1	2	0	0	0

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Warrants Summary

Information			
Analyst	Gabe Schell	Intersection	Quincy St/Mt Rushmore Rd
Agency/Co	Kadrmas, Lee & Jackosn	Jurisdiction	Rapid City, SD
Date Performed	1/24/2008	Units	U.S. Customary
Project ID	Mt Rushmore Rd Corridor Study	Time Period Analyzed	Peak Season Peak Hour
East/West Street	Quincy Street	North/South Street	Mt Rushmore Road
File Name	Quincy2007.xhy	Major Street	North-South

Project Description ***Mt Rushmore Rd Corridor Study***

General				Roadway Network	
Major Street Speed (mph)	35	☐	Population < 10,000	Two Major Routes	☐
Nearest Signal (ft)	300	☐	Coordinated Signal System	Weekend Count	☐
Crashes (per year)	0	☐	Adequate Trials of Alternatives	5-yr Growth Factor	0

Geometry and Traffic	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	1	2	0	1	2	0
Lane usage		LTR			LTR		L	TR		L	TR	
Vehicle Volume Averages (vph)	3	4	14	3	3	12	14	376	6	7	359	13
Peds (ped/h) / Gaps (gaps/h)	--	/	--	--	/	--	--	/	--	--	/	--
Delay (s/veh) / (veh-hr)	--	/	--	--	/	--	--	/	--	--	/	--

Warrant 1: Eight-Hour Vehicular Volume	☐
1 A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	☐
1 B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	☐
1 80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 2: Four-Hour Vehicular Volume	☐
2 A. Four-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 3: Peak Hour	☐
3 A. Peak-Hour Conditions (Minor delay --and-- minor volume --and-- total volume) --or--	☐
3 B. Peak- Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 4: Pedestrian Volume	☐
4 A. Pedestrian Volumes (Four hours --or-- one hour) --and--	☐
4 B. Gaps Same Period (Four hours --or-- one hour)	☐
Warrant 5: School Crossing	☐
5. Student Volumes --and--	☐
5. Gaps Same Period	☐
Warrant 6: Coordinated Signal System	☐
6. Degree of Platooning (Predominant direction or both directions)	☐
Warrant 7: Crash Experience	☐
7 A. Adequate trials of alternatives, observance and enforcement failed --and--	☐
7 B. Reported crashes susceptible to correction by signal (12-month period) --and--	☐
7 C. 80% Volumes for Warrants 1A, 1B --or-- 4 are satisfied	☐

Warrant 8: Roadway Network	☐
8 A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2 or 3) --or--	☐
8 B. Weekend Volume (Five hours total)	☐

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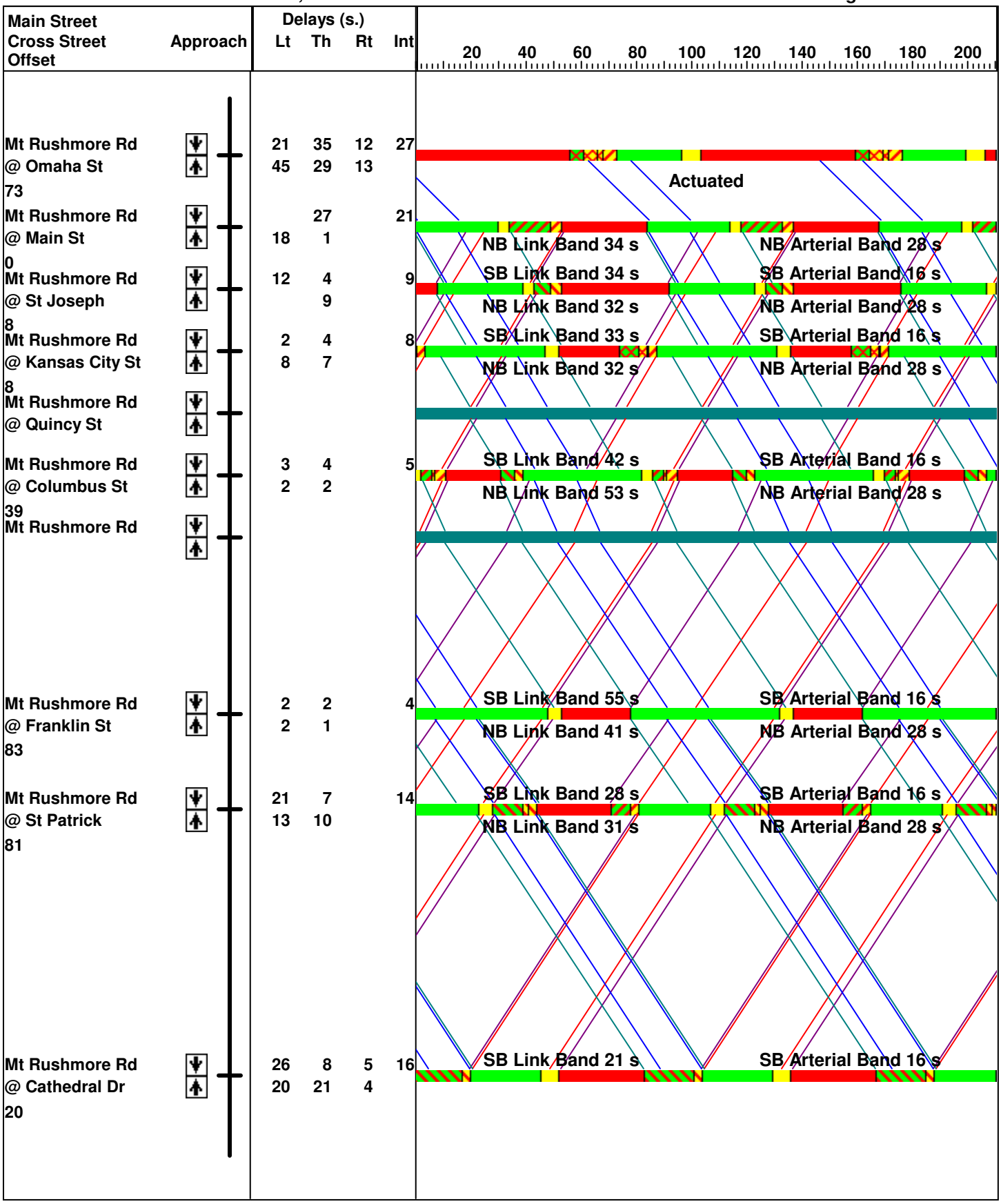
APPENDIX G
Progression Analysis

Time-Space Diagram - Mt Rushmore Rd

2030 AADT

Arterial and Link-Link Bandwidths, 90th Percentile Green Times

Timing Plan: AM PEAK



Rapid City, SD 2030 AADT

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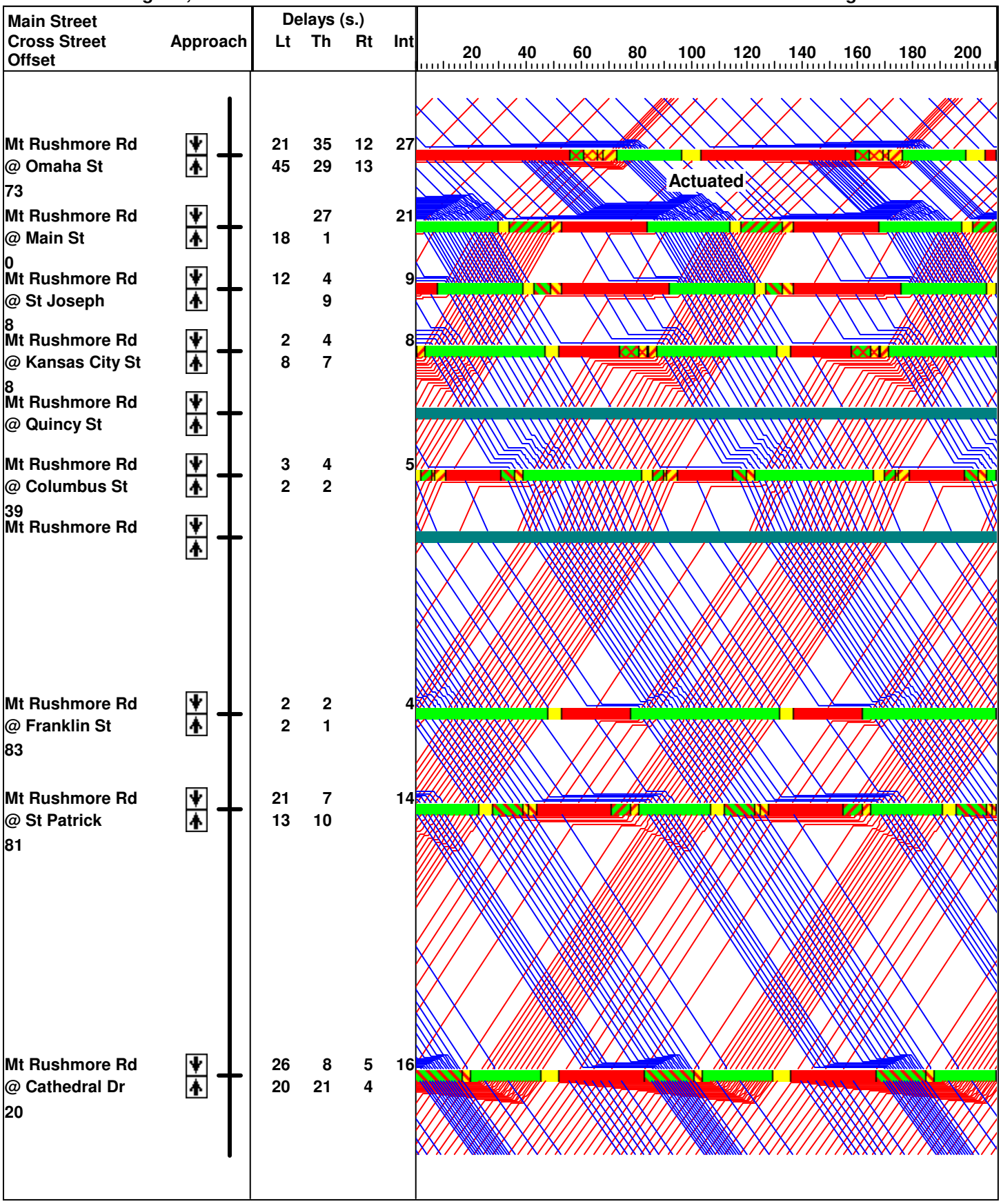
%user_name%

Time-Space Diagram - Mt Rushmore Rd
2030 AADT
Traffic Flow Diagram, 90th Percentile Flow and Green Times
Timing Plan: AM PEAK



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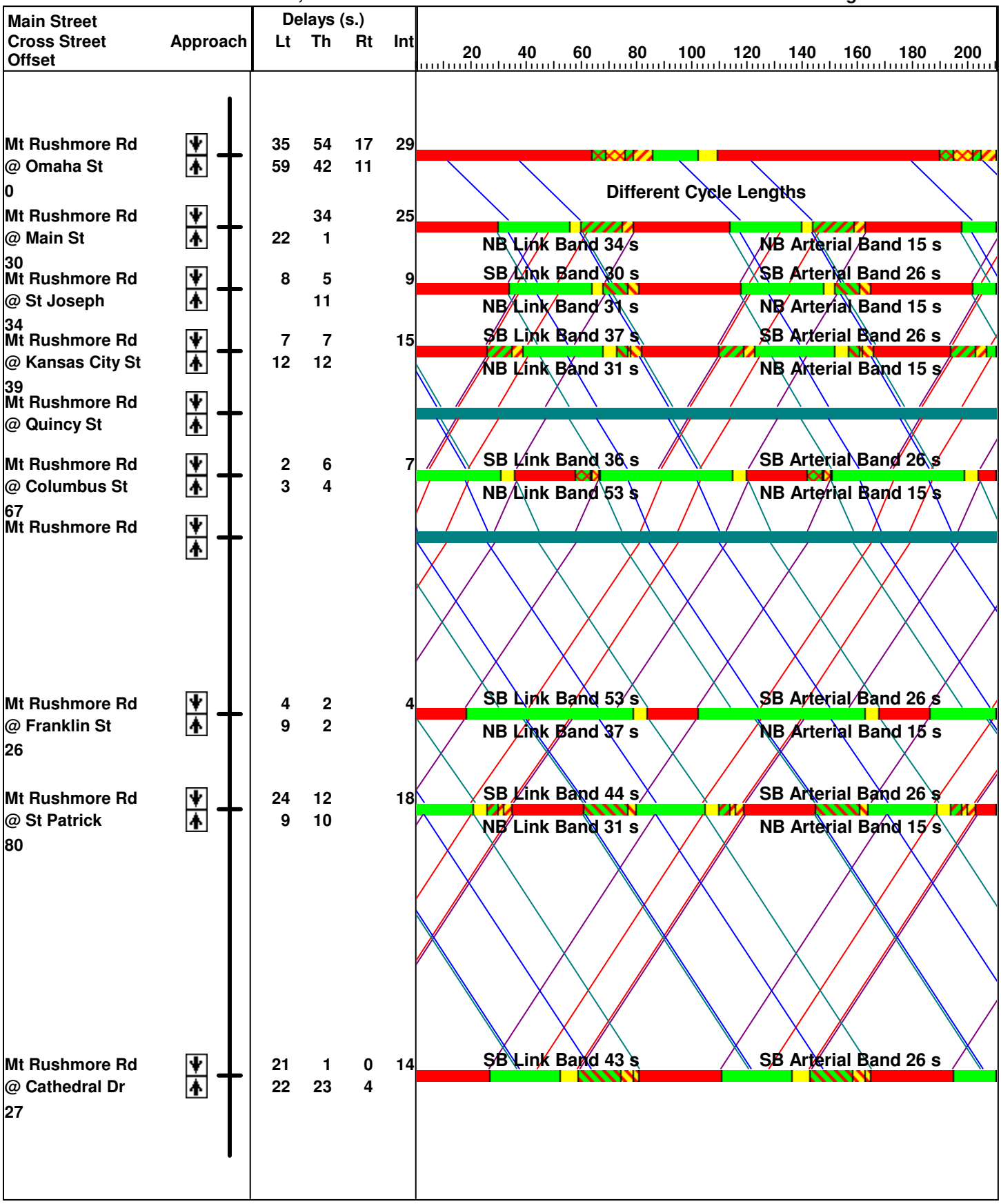
Time-Space Diagram - Mt Rushmore Rd

2030 AADT

Arterial and Link-Link Bandwidths, 90th Percentile Green Times

Timing Plan: PM PEAK



Rapid City, SD 2030 AADT

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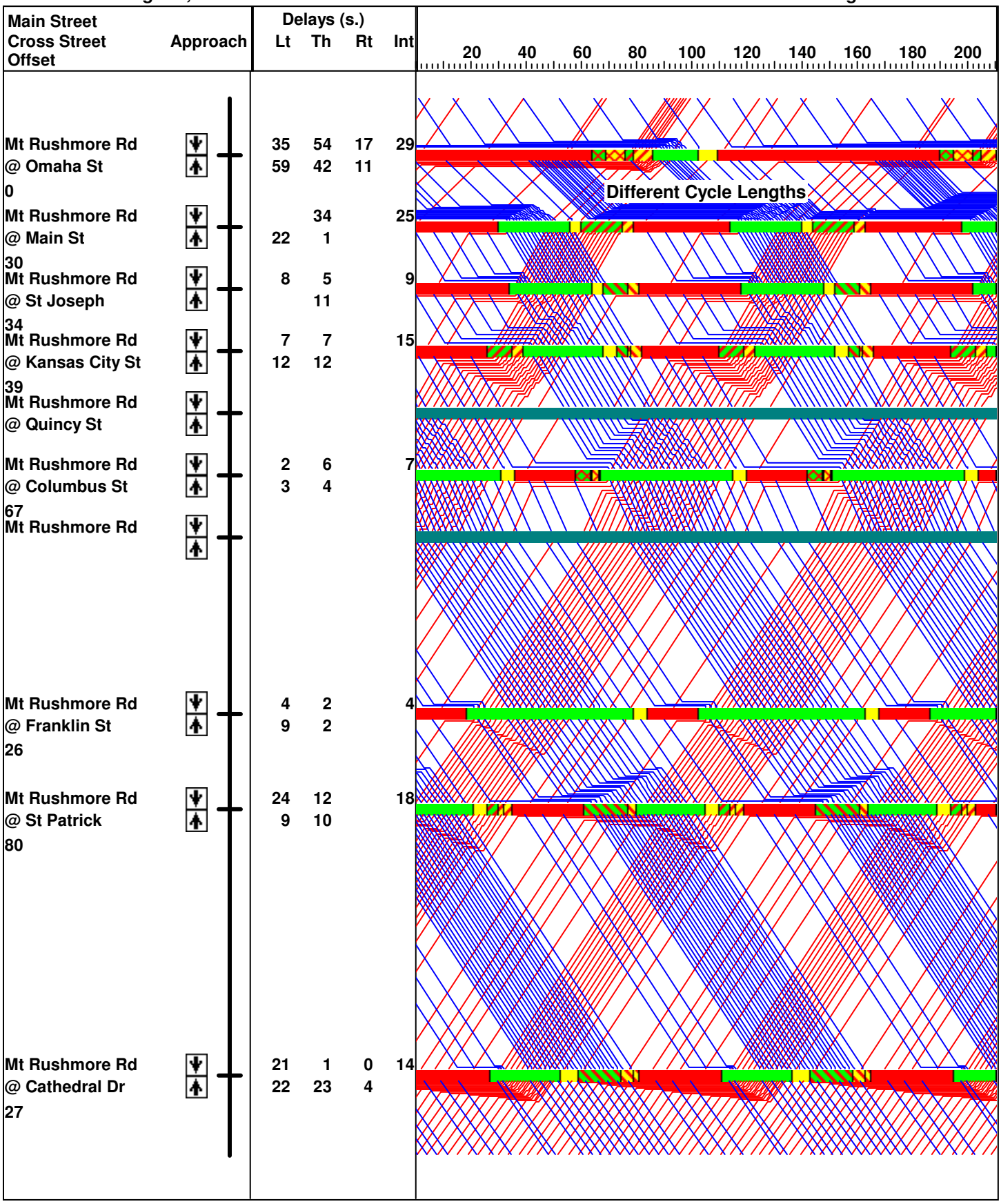
%user_name%

Time-Space Diagram - Mt Rushmore Rd
2030 AADT
Traffic Flow Diagram, 90th Percentile Flow and Green Times
Timing Plan: PM PEAK



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