



Application

04775 - 2016 Roadway System Management

05218 - Advanced Transportation Management System (ATMS) on: CSAH 1, CSAH 3, CSAH 5, and CSAH 9

Regional Solicitation - Roadways Including Multimodal Elements

Status: Submitted

Submitted Date: 07/15/2016 11:10 AM

Primary Contact

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What Grant Programs are you most interested in? Regional Solicitation - Roadways Including Multimodal Elements

Organization Information

Name: HENNEPIN COUNTY

Jurisdictional Agency (if different):

Organization Type:

County Government

Organization Website:

Address:

DPT OF PUBLIC WORKS
1600 PRAIRIE DR

*

MEDINA

Minnesota

55340

City

State/Province

Postal Code/Zip

County:

Hennepin

Phone:*

763-745-7600

Ext.

Fax:

PeopleSoft Vendor Number

0000028004A9

Project Information

Project Name

Advanced Transportation Management System (ATMS) on:
CSAH 1, CSAH 3, CSAH 5, and CSAH 9

Primary County where the Project is Located

Hennepin

Jurisdictional Agency (If Different than the Applicant):

As part of its continued effort to implement Advanced Traffic Management System (ATMS) strategies, Hennepin County plans to install communications infrastructure along many of its critical north-south/east-west arterials. The proposed multi-corridor project will aid the utilization of ATMS tools such as adaptive traffic signal control systems, which rely on high-capacity data connections. The geographic extent of the project is defined by the following corridors:

1. On County State Aid Highway (CSAH) 9, from Old Rockford Road to CSAH 81 ("A" Minor Augmenter)
2. On CSAH 5, from US-169 to CSAH 17 ("A" Minor Reliever/Augmenter)
3. On CSAH 3, from CSAH 101 to CSAH 17 ("A" Minor Reliever/Augmenter/Expander)
4. On CSAH 1, from US-169 to Interstate (I) 494 ("A" Minor Expander/Reliever)

Brief Project Description (Limit 2,800 characters; approximately 400 words)

Installing communications infrastructure along these key regional transportation corridors will aid transportation and information management strategies identified in the County's Intelligent Information Management Plan (IIMP), completed in late 2014. This investment in efficient and powerful communications infrastructure will allow the County to more effectively monitor and control the real-time/adaptive signal control systems and network coordination, minimizing travel delay and air pollution emissions, while improving safety and reliability for all transportation users of the system.

Hennepin County is the state's most populous

county with nearly 1.2 million residents, and hosts over 875,000 employees at nearly 40,000 physical business establishments (U.S. Census 2015 American Community Survey 5-Year Estimates; 2014 County Business Patterns). This critical infrastructure investment will improve multimodal coordination and integration of the existing transportation network, facilitate greater mobility, reduce intersection crash rates, and contribute to a healthy environment. In summary, with the proposed improvements the four corridors identified in this project will:

- Allow for better connections to 40,500 manufacturing/distribution jobs
- Improve the movement of freight, linking multiple manufacturing and distribution centers
- Provide improved mobility and access to jobs for disadvantaged populations, including for areas of concentrated poverty and people of color
- Reduce vehicle delay and improve air quality
- Reduce the number of crashes
- Benefit transit operations with improved travel time reliability

Include location, road name/functional class, type of improvement, etc.

TIP Description Guidance (will be used in TIP if the project is selected for funding)

ON CSAH 1, FROM US 169 TO I-494 AND ON CSAH 3 FROM CSAH 101 TO CSAH 17 AND ON CSAH 5 FROM US 169 TO CSAH 17 AND ON CSAH 9 FROM OLD ROCKFORD RD TO CSAH 81

Project Length (Miles)

29.93

Project Funding

Are you applying for funds from another source(s) to implement this project?

No

If yes, please identify the source(s)

Federal Amount

\$1,760,000.00

Match Amount

\$440,000.00

Minimum of 20% of project total

Project Total \$2,200,000.00

Match Percentage 20.0%

Minimum of 20%

Compute the match percentage by dividing the match amount by the project total

Source of Match Funds Local funds

A minimum of 20% of the total project cost must come from non-federal sources; additional match funds over the 20% minimum can come from other federal sources

Preferred Program Year

Select one: 2020

For TDM projects, select 2018 or 2019. For Roadway, Transit, or Trail/Pedestrian projects, select 2020 or 2021.

Additional Program Years: 2018, 2019

Select all years that are feasible if funding in an earlier year becomes available.

Project Information: Roadway Projects

County, City, or Lead Agency Hennepin County

Functional Class of Road "A" Minor Arterials

Road System CSAH

TH, CSAH, MSAS, CO. RD., TWP. RD., CITY STREET

Road/Route No. 1359

i.e., 53 for CSAH 53

Name of Road OLD SHAKOPEE RD/98TH ST; EXCELSIOR BLVD; MINNETONKA BLVD; ROCKFORD RD/42nd AVE N

Example; 1st ST., MAIN AVE

Zip Code where Majority of Work is Being Performed 55343

(Approximate) Begin Construction Date 07/01/2020

(Approximate) End Construction Date 09/30/2021

TERMINI:(Termini listed must be within 0.3 miles of any work)

From: On CSAH 1 from US-169; on CSAH 3 from CSAH 101; on
(Intersection or Address) CSAH 5 from US-169; on CSAH 9 from Old Rockford R

To: On CSAH 1 to I-494; on CSAH 3 to CSAH 17; on CSAH 5 to
(Intersection or Address) CSAH 17; on CSAH 9 to CSAH 81

DO NOT INCLUDE LEGAL DESCRIPTION

Or At

Primary Types of Work COMMUNICATIONS INFRASTRUCTURE

Examples: GRADE, AGG BASE, BIT BASE, BIT SURF,
SIDEWALK, CURB AND GUTTER, STORM SEWER,
SIGNALS, LIGHTING, GUARDRAIL, BIKE PATH, PED RAMPS,
BRIDGE, PARK AND RIDE, ETC.

BRIDGE/CULVERT PROJECTS (IF APPLICABLE)

Old Bridge/Culvert No.:

New Bridge/Culvert No.:

Structure is Over/Under
(Bridge or culvert name):

Specific Roadway Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Mobilization (approx. 5% of total cost)	\$100,000.00
Removals (approx. 5% of total cost)	\$0.00
Roadway (grading, borrow, etc.)	\$0.00
Roadway (aggregates and paving)	\$0.00
Subgrade Correction (muck)	\$0.00
Storm Sewer	\$0.00
Ponds	\$0.00
Concrete Items (curb & gutter, sidewalks, median barriers)	\$0.00
Traffic Control	\$200,000.00
Striping	\$0.00
Signing	\$0.00
Lighting	\$0.00
Turf - Erosion & Landscaping	\$0.00
Bridge	\$0.00
Retaining Walls	\$0.00
Noise Wall (do not include in cost effectiveness measure)	\$0.00
Traffic Signals	\$0.00
Wetland Mitigation	\$0.00
Other Natural and Cultural Resource Protection	\$0.00
RR Crossing	\$0.00
Roadway Contingencies	\$0.00
Other Roadway Elements	\$1,900,000.00
Totals	\$2,200,000.00

Specific Bicycle and Pedestrian Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Path/Trail Construction	\$0.00
Sidewalk Construction	\$0.00
On-Street Bicycle Facility Construction	\$0.00
Right-of-Way	\$0.00
Pedestrian Curb Ramps (ADA)	\$0.00
Crossing Aids (e.g., Audible Pedestrian Signals, HAWK)	\$0.00
Pedestrian-scale Lighting	\$0.00
Streetscaping	\$0.00
Wayfinding	\$0.00
Bicycle and Pedestrian Contingencies	\$0.00
Other Bicycle and Pedestrian Elements	\$0.00
Totals	\$0.00

Specific Transit and TDM Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Fixed Guideway Elements	\$0.00
Stations, Stops, and Terminals	\$0.00
Support Facilities	\$0.00
Transit Systems (e.g. communications, signals, controls, fare collection, etc.)	\$0.00
Vehicles	\$0.00
Contingencies	\$0.00
Right-of-Way	\$0.00
Other Transit and TDM Elements	\$0.00
Totals	\$0.00

Transit Operating Costs

Number of Platform hours	0
Cost Per Platform hour (full loaded Cost)	\$0.00

Subtotal	\$0.00
Other Costs - Administration, Overhead,etc.	\$0.00

Totals

Total Cost	\$2,200,000.00
Construction Cost Total	\$2,200,000.00
Transit Operating Cost Total	\$0.00

Requirements - All Projects

All Projects

1. The project must be consistent with the goals and policies in these adopted regional plans: Thrive MSP 2040 (2014), the 2040 Transportation Policy Plan, the 2040 Regional Parks Policy Plan (2015), and the 2040 Water Resources Policy Plan (2015).

Check the box to indicate that the project meets this requirement. Yes

2. The project must be consistent with the 2040 Transportation Policy Plan. Reference the 2040 Transportation Plan objectives and strategies that relate to the project.

The project is consistent with the Metropolitan Council 2040 Transportation Policy Plan; the following goals, objectives, and strategies are addressed:

- Goal: Transportation System Stewardship
- Objectives: A and B
- Strategies: A1 and A2 (pg. 2.17-18)

- Goal: Safety and Security
- Objective: A
- Strategies: B1 and B3 (pg. 2.20-21)

- Goal: Access to Destinations

List the goals, objectives, strategies, and associated pages:

- Objectives: A, B, C, and E
- Strategies: C1 (pg. 2.24); C5 (pg. 2.29); C7 (pg. 2.30-31); C9 (pg. 2.32); C10 (pg. 2.32-33); C19 (pg. 2.37)

- Goal: Competitive Economy
- Objectives: A and C

- Strategies: D1 (pg. 2.38) and D5 (pg. 2.40-41)

- Goal: Healthy Environment

- Objectives: A and B

- Strategies: E1 (pg. 2.42) and E2 (pg. 2.43)

3. The project or the transportation problem/need that the project addresses must be in a local planning or programming document. Reference the name of the appropriate comprehensive plan, regional/statewide plan, capital improvement program, corridor study document [studies on trunk highway must be approved by the Minnesota Department of Transportation and the Metropolitan Council], or other official plan or program of the applicant agency [includes Safe Routes to School Plans] that the project is included in and/or a transportation problem/need that the project addresses.

The project needs and objectives are identified in two Hennepin County studies: the ITS Strategic Plan (2007), and the Intelligent Information Management Plan (IIMP), completed in late 2014. The Hennepin County IIMP is guided by the goals and strategies documented in the 2030 Hennepin County Transportation System Plan (TSP) [2011].

The use of Intelligent Transportation System (ITS) technologies is emphasized throughout the 2030 Hennepin County TSP (pg. 1-11, 4-14, 9-5, 10-8, 10-10, 10-15). The proposed project aligns with the following goals and strategies outlined in the TSP:

- Goal: Preserve and modernize the existing transportation system (pg. 1-10)

- Intersection signal life-cycle management (pg. 1-11)

- Implementation of Intelligent Transportation Systems (pg. 1-11)

- Goal: Improve safety for all users (pg. 1-11)

- Reduce intersection and segment crash rates, identifying lower cost/high benefit solutions (pg. 1-9, 1-11)

- Goal: Provide mobility and choice to meet the diversity of transportation needs as well as to support health objectives throughout the county (pg. 1-12)

- Integrate transit advantages and transit priority into traffic operations where appropriate (pg. 1-15)

- Intersection Level of Service (LOS) [pg. 1-9]

List the applicable documents and pages:

- Goal: Reduce the County's environmental footprint (pg. 1-18)

4. The project must exclude costs for studies, preliminary engineering, design, or construction engineering. Right-of-way costs are only eligible as part of bicycle/pedestrian projects, transit stations/stops, transit terminals, park-and-ride facilities, or pool-and-ride lots. Noise barriers, drainage projects, fences, landscaping, etc., are not eligible for funding as a standalone project, but can be included as part of the larger submitted project, which is otherwise eligible.

Check the box to indicate that the project meets this requirement. Yes

5. Applicants that are not cities or counties in the seven-county metro area with populations over 5,000 must contact the MnDOT Metro State Aid Office prior to submitting their application to determine if a public agency sponsor is required.

Check the box to indicate that the project meets this requirement. Yes

6. Applicants must not submit an application for the same project elements in more than one funding application category.

Check the box to indicate that the project meets this requirement. Yes

7. The requested funding amount must be more than or equal to the minimum award and less than or equal to the maximum award. The cost of preparing a project for funding authorization can be substantial. For that reason, minimum federal amounts apply. Other federal funds may be combined with the requested funds for projects exceeding the maximum award, but the source(s) must be identified in the application. Funding amounts by application category are listed below.

Roadway Expansion: \$1,000,000 to \$7,000,000

Roadway Reconstruction/ Modernization: \$1,000,000 to \$7,000,000

Roadway System Management \$250,000 to \$7,000,000

Bridges Rehabilitation/ Replacement: \$1,000,000 to \$7,000,000

Check the box to indicate that the project meets this requirement. Yes

8. The project must comply with the Americans with Disabilities Act.

Check the box to indicate that the project meets this requirement. Yes

9. The project must be accessible and open to the general public.

Check the box to indicate that the project meets this requirement. Yes

10. The owner/operator of the facility must operate and maintain the project for the useful life of the improvement.

Check the box to indicate that the project meets this requirement. Yes

11. The project must represent a permanent improvement with independent utility. The term independent utility means the project provides benefits described in the application by itself and does not depend on any construction elements of the project being funded from other sources outside the regional solicitation, excluding the required non-federal match. Projects that include traffic management or transit operating funds as part of a construction project are exempt from this policy.

Check the box to indicate that the project meets this requirement. Yes

12. The project must not be a temporary construction project. A temporary construction project is defined as work that must be replaced within five years and is ineligible for funding. The project must also not be staged construction where the project will be replaced as part of future stages. Staged construction is eligible for funding as long as future stages build on, rather than replace, previous work.

Check the box to indicate that the project meets this requirement. Yes

13. The project applicant must send written notification regarding the proposed project to all affected state and local units of government prior to submitting the application.

Check the box to indicate that the project meets this requirement. Yes

Roadways Including Multimodal Elements

1. All roadway and bridge projects must be identified as a Principal Arterial (Non-Freeway facilities only) or A-Minor Arterial as shown on the latest TAB approved roadway functional classification map.

Check the box to indicate that the project meets this requirement. Yes

Roadway Expansion and Reconstruction/Modernization projects only:

2. The project must be designed to meet 10-ton load limit standards.

Check the box to indicate that the project meets this requirement. Yes

Bridge Rehabilitation/Replacement projects only:

3. Projects requiring a grade-separated crossing of a Principal Arterial freeway must be limited to the federal share of those project costs identified as local (non-MnDOT) cost responsibility using MnDOT's Cost Participation for Cooperative Construction Projects and Maintenance Responsibilities manual. In the case of a federally funded trunk highway project, the policy guidelines should be read as if the funded trunk highway route is under local jurisdiction.

Check the box to indicate that the project meets this requirement.

4. The bridge must carry vehicular traffic. Bridges can carry traffic from multiple modes. However, bridges that are exclusively for bicycle or pedestrian traffic must apply under one of the Bicycle and Pedestrian Facilities application categories. Rail-only bridges are ineligible for funding.

Check the box to indicate that the project meets this requirement.

5. The length of the bridge must equal or exceed 20 feet.

Check the box to indicate that the project meets this requirement.

6. The bridge must have a sufficiency rating less than 80 for rehabilitation projects and less than 50 for replacement projects. Additionally, the bridge must also be classified as structurally deficient or functionally obsolete.

Check the box to indicate that the project meets this requirement.

Requirements - Roadways Including Multimodal Elements

Measure A: Functional Classification

Area	87.56
Project Length	29.93
Average Distance	2.9255
Upload Map	1468346178659_Hennepin Co Roadway System Management - 01A Roadway Area Definition.pdf

Measure B: Project Location Relative to Jobs, Manufacturing and Education

Existing Employment within 1 Mile:	63510.0
Existing Manufacturing/Distribution-Related Employment within 1 Mile:	14674.0
Existing Students:	16464.0

Measure C: Current Heavy Commercial Traffic

Location:	CSAH 1 west of CSAH 34
Current daily heavy commercial traffic volume:	3231
Date heavy commercial count taken:	6/28/16 and 6/29/16

Measure D: Freight Elements

Freight will benefit from the increased mobility and safety resulting from the project. Hennepin County incorporates truck freight movement on county roads as part of the planning, design, construction, operations, and maintenance of the system.

Each of the four project corridors are 10-ton pavement design roadways, facilitating the efficient movement to and from the regional highway system. The project corridors provide direct access to critical regional freight routes, including MN-100, US-169, I-35W, and I-494, the latter two of which are included in the National Highway Freight Network (NHFN). The project corridors are in proximity to rail right of way, and connect to centers of manufacturing and distribution activities, as defined in Thrive MSP 2040 (p. 85-86).

Response (Limit 1,400 characters; approximately 200 words)

The installation of communications infrastructure allows for greater utilization of elements such as railroad preemption (RRP) and advanced active warning at rail crossings to improve freight mobility and increase safety.

Measure A: Current Daily Person Throughput

Location	CSAH 1 west of I-35W
Current AADT Volume	32500.0

Existing Transit Routes on the Project

5, 54, 415, 444, 515, 535, 538, 539, 540, 542, 597, 903-
METRO Red Line

Upload Transit Map

1468346306899_Hennepin Co Roadway System Management
- 02A Transit Connections.pdf

Response - Daily Person Throughput

Average Annual Daily Transit Ridership	0
Current Daily Person Throughput	42250.0

Measure B: 2040 Forecast ADT

Use Metropolitan Council model to determine forecast (2040) ADT volume Yes

If checked, METC Staff will provide Forecast (2040) ADT volume

OR

Identify the approved county or city travel demand model to determine forecast (2040) ADT volume

Forecast (2040) ADT volume

Measure A: Project Location and Impact to Disadvantaged Populations

Select one:

Project located in Area of Concentrated Poverty with 50% or more of residents are people of color (ACP50): Yes

Project located in Area of Concentrated Poverty:

Projects census tracts are above the regional average for population in poverty or population of color:

Project located in a census tract that is below the regional average for population in poverty or populations of color or includes children, people with disabilities, or the elderly:

The installation of communications infrastructure will allow for greater coordination of the regional transportation network, while being more responsive to real-time traffic management needs. ATMS strategies such as adaptive traffic signal control systems will benefit passenger vehicle, heavy commercial, transit, bicycle, and pedestrian users in the project areas by optimizing movement patterns, eliminating conflicts, and reducing emissions. When traveling as pedestrians, children, people with disabilities, and the elderly will benefit from increased safety at intersection crossings. Moreover, this project lays the groundwork for transportation solutions that can address equity disparities in the region.

Response (Limit 2,800 characters; approximately 400 words)

Each of the four project corridors (CSAHs 1, 3, 5, and 9) intersect multiple Census tracts that are above the regional average for population in poverty or population of people of color. The CSAH 3 project corridor is located in an Area of Concentrated Poverty (APC), and the CSAH 1 project corridor is in an Area of Concentrated Poverty where 50% or more of residents are people of color (ACP50). Living in areas of concentrated poverty limits economic mobility. Improving mobility and providing greater access to employment opportunities for people living in areas of concentrated poverty - particularly for people of color - is an important factor in reducing the existing disparities that threaten the economic prosperity of our region.

Three of the four project corridors span two or more "Opportunity Clusters" in the Twin Cities (Choice, Place, and Opportunity, p. 4-5). This project will facilitate the movement of people from areas of low and moderate proximity to jobs to areas of high proximity to jobs. Moreover, each of the project corridors connects to one or more job and activity centers, as defined in Thrive MSP 2040 (p. 85-86);

many of which are centers of manufacturing and distribution activities.

This investment will require roadside construction activity, introducing the potential for temporary negative impacts on travelers, including disadvantaged populations. Mitigation plans will be created and project information shared through community engagement processes that seek to understand and address travel needs unique to the affected communities.

The response should address the benefits, impacts, and mitigation for the populations affected by the project.

Upload Map

1468346569164_Hennepin Co Roadway System Management - 03A Socio-Economic Conditions.pdf

Measure B: Affordable Housing

City/Township	Segment Length in Miles (Population)
Robbinsdale	0.91
Crystal	0.69
New Hope	1.48
Plymouth	3.72
Minnetonka	4.43
St. Louis Park	6.02
Hopkins	2.71
Eden Prairie	0.03
Bloomington	9.92
Fort Snelling	0.02
	30

Total Project Length

Total Project Length (Total Population) 29.93

Affordable Housing Scoring - To Be Completed By Metropolitan Council Staff

City/Township	Segment Length (Miles)	Total Length (Miles)	Score	Segment Length/Total Length	Housing Score Multiplied by Segment percent
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0 0 0 0

Affordable Housing Scoring - To Be Completed By Metropolitan Council Staff

Total Project Length (Miles) 29.93
Total Housing Score 0

Measure A: Equipment Improvements and Installation Year

Equipment to be Improved Traffic signal communications (see attachment)
Date of Equipment Installation (year) Exceeding useful life of 10 years: 93% of CSAH 1; 96% of CSAH 3; 90% of CSAH 5; 95% of CSAH 9

Measure A: Congestion Reduction/Air Quality

Total Peak Hour Delay Per Vehicle Without The Project	Total Peak Hour Delay Per Vehicle With The Project	Total Peak Hour Delay Per Vehicle Reduced by Project	Volume (Vehicles per hour)	Total Peak Hour Delay Reduced by the Project:	EXPLANATION of methodology used to calculate railroad crossing delay, if applicable.	Synchro or HCM Reports
969.0	858.0	111.0	113055	1.2549105E7		14685218195 62_Hennepin Co Roadway System Management - 05A 05B Congestion and Emissions.pdf

Total Delay

Total Peak Hour Delay Reduced 1.2549105E7

Measure B: Roadway projects that do not include new roadway segments or railroad grade-separation elements

Total (CO, NOX, and VOC) Peak Hour Emissions Per Vehicle without the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Per Vehicle with the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced Per Vehicle by the Project (Kilograms):	Volume (Vehicles Per Hour):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):
232.9	224.33	8.57	113055.0	968881.35
233	224		113055	968881

Total

Total Emissions Reduced: 968881.4

Upload Synchro Report

1468592673859_Hennepin Co Roadway System Management - 05A 05B Congestion and Emissions.pdf

Measure B: Roadway projects that are constructing new roadway segments, but do not include railroad grade-separation elements (for Roadway Expansion applications only):

Total (CO, NOX, and VOC) Peak Hour Emissions Per Vehicle without the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Per Vehicle with the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced Per Vehicle by the Project (Kilograms):	Volume (Vehicles Per Hour):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):
0	0		0	0

Total Parallel Roadways

Emissions Reduced on Parallel Roadways 0

Upload Synchro Report

New Roadway Portion:

Cruise speed in miles per hour with the project:	0
Vehicle miles traveled with the project:	0
Total delay in hours with the project:	0
Total stops in vehicles per hour with the project:	0
Fuel consumption in gallons:	0
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced or Produced on New Roadway (Kilograms):	0

EXPLANATION of methodology and assumptions used:(Limit 1,400 characters; approximately 200 words)

Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms): 0.0

Measure B: Roadway projects that include railroad grade-separation elements

Cruise speed in miles per hour without the project:	0
Vehicle miles traveled without the project:	0
Total delay in hours without the project:	0
Total stops in vehicles per hour without the project:	0
Cruise speed in miles per hour with the project:	0
Vehicle miles traveled with the project:	0
Total delay in hours with the project:	0
Total stops in vehicles per hour with the project:	0
Fuel consumption in gallons (F1)	0
Fuel consumption in gallons (F2)	0
Fuel consumption in gallons (F3)	0
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):	0

EXPLANATION of methodology and assumptions used:(Limit 1,400 characters; approximately 200 words)

Measure A: Roadway Projects that do not Include Railroad Grade-Separation Elements

Crash Modification Factor Used: 0.83

CMF ID: 6856, Install adaptive traffic signal control

Rationale for Crash Modification Selected:

Adaptive traffic signal control (ATSC) will be a primary traffic management strategy resulting from the investment in communications infrastructure along the identified corridors. The CMF used is the result of a study published in 2015, "Estimation of the Safety Effects of an Adaptive Traffic Signal Control System". The study found that all crash types were reduced and that ATSC installation, "can potentially reduce both total and "fatal and injury" crashes at highway intersections, and public agencies should consider both its safety and mobility benefits when justifying ATSC projects."

(Limit 1400 Characters; approximately 200 words)

Project Benefit (\$) from B/C Ratio

\$11,121,055.00

Worksheet Attachment

1468590293609_Hennepin Co Roadway System Management - 06A - Safety Crash Analysis.pdf

Roadway projects that include railroad grade-separation elements:

Current AADT volume:	0
Average daily trains:	0
Crash Risk Exposure eliminated:	0

Measure A: Multimodal Elements and Existing Connections

Beyond personal vehicles and freight, transit, bicyclists, and pedestrians will benefit from the proposed project due to the County's ability to better manage traffic as a result. Non-motorized traffic will be subject to fewer direct pollutants with improved operations, and benefit from improved intersection safety. Transit will benefit from reduced dwell time and improved travel time reliability.

The CSAH 1, CSAH 3, and CSAH 5 corridors contain or run directly parallel to Regional Bicycle Transportation Network (RBTN) Tier 1 Alignments. All four proposed project corridors intersect RBTN Tier 1 or Tier 2 Corridors. ATMS improvements along the identified project corridors is supportive to both the RBTN and the greater functional classification system. Movement through signalized intersections will be improved for vehicles as well as bicyclists and pedestrians.

Response (Limit 2,800 characters; approximately 400 words)

Signal coordination will benefit transit operations. This project allows for advanced integration of Transit Signal Priority (TSP) techniques, which will reduce signal delay and improve corridor travel times. Adaptive signal control will improve transit service reliability on routes within the four project corridors and on those that cross them. More reliable transit service may result in ridership growth and further alleviation of traffic congestion.

The project corridors connect to existing or planned regional transitway stations and multiple existing fixed bus transit routes. The CSAH 9 project corridor connects to the planned METRO Blue Line Extension - Robbinsdale Station, and the West Broadway transitway alignment. Nearby Robbinsdale Transit Center is served by five bus routes. In total, there are 20 existing or planned transit routes with a direct connection to the CSAH

9 project corridor.

CSAH 5 and CSAH 3 are within walking distance of the planned METRO Green Line Extension LRT. The planned West Lake Street Station is less than one-half-mile east of the intersection of CSAH 5 and CSAH 17, and Blake Road and Downtown Hopkins Stations are less than one-quarter-mile from CSAH 3. The CSAH 5 and CSAH 3 project corridors have direct connections to 16 and 21 existing or planned transit routes, respectively.

The CSAH 1 project corridor connects to the METRO Blue Line and METRO Red Line Mall of America stations. The Orange Line, Chicago-Fremont, and American Boulevard planned alignments connect to the CSAH 1 project corridor. Thirty-seven existing or planned transit routes are directly connected to the CSAH 1 project corridor, including five routes in Metro Transit's High Frequency Service Network.

Transit Projects Not Requiring Construction

If the applicant is completing a transit or TDM application that is operations only, check the box and do not complete the remainder of the form. These projects will receive full points for the Risk Assessment.

Park-and-Ride and other transit construction projects require completion of the Risk Assessment below.

[Check Here if Your Transit Project Does Not Require Construction](#)

Measure A: Risk Assessment

1) Project Scope (5 Percent of Points)

Meetings or contacts with stakeholders have occurred

100%

Stakeholders have been identified

Yes

40%

Stakeholders have not been identified or contacted

0%

2)Layout or Preliminary Plan (5 Percent of Points)

Layout or Preliminary Plan completed

100%

Layout or Preliminary Plan started

50%

Layout or Preliminary Plan has not been started

Yes

0%

Anticipated date or date of completion

10/01/2018

3)Environmental Documentation (5 Percent of Points)

EIS

EA

PM

Yes

Document Status:

Document approved (include copy of signed cover sheet)

100%

Document submitted to State Aid for review

75%

date submitted

Document in progress; environmental impacts identified; review request letters sent

50%

Document not started

Yes

0%

Anticipated date or date of completion/approval

04/01/2020

4)Review of Section 106 Historic Resources (10 Percent of Points)

No known historic properties eligible for or listed in the National Register of Historic Places are located in the project area, and project is not located on an identified historic bridge

100%

Historic/archeological review under way; determination of no historic properties affected or no adverse effect anticipated

Yes

80%

Historic/archaeological review under way; determination of adverse effect anticipated

40%

Unsure if there are any historic/archaeological resources in the project area

0%

Anticipated date or date of completion of historic/archeological review:

12/01/2019

Project is located on an identified historic bridge

5)Review of Section 4f/6f Resources (10 Percent of Points)

4(f) Does the project impacts any public parks, public wildlife refuges, public golf courses, wild & scenic rivers or public private historic properties?

6(f) Does the project impact any public parks, public wildlife refuges, public golf courses, wild & scenic rivers or historic property that was purchased or improved with federal funds?

No Section 4f/6f resources located in the project area Yes

100%

No impact to 4f property. The project is an independent bikeway/walkway project covered by the bikeway/walkway Negative Declaration statement; letter of support received

100%

Section 4f resources present within the project area, but no known adverse effects

80%

Project impacts to Section 4f/6f resources likely coordination/documentation has begun

50%

Project impacts to Section 4f/6f resources likely coordination/documentation has not begun

30%

Unsure if there are any impacts to Section 4f/6f resources in the project area

0%

6)Right-of-Way (15 Percent of Points)

Right-of-way, permanent or temporary easements not required Yes

100%

Right-of-way, permanent or temporary easements has/have been acquired

100%

Right-of-way, permanent or temporary easements required, offers made

75%

Right-of-way, permanent or temporary easements required, appraisals made

50%

Right-of-way, permanent or temporary easements required, parcels identified

25%

Right-of-way, permanent or temporary easements required, parcels not identified

0%

Right-of-way, permanent or temporary easements identification has not been completed

0%

Anticipated date or date of acquisition

7)Railroad Involvement (25 Percent of Points)

No railroad involvement on project

100%

Railroad Right-of-Way Agreement is executed (include signature page)

100%

Railroad Right-of-Way Agreement required; Agreement has been initiated

60%

Railroad Right-of-Way Agreement required; negotiations have begun

40%

Railroad Right-of-Way Agreement required; negotiations not begun

Yes

0%

Anticipated date or date of executed Agreement

11/01/2019

8)Interchange Approval (15 Percent of Points)*

**Please contact Karen Scheffing at MnDOT (Karen.Scheffing@state.mn.us or 651-234-7784) to determine if your project needs to go through the Metropolitan Council/MnDOT Highway Interchange Request Committee.*

Project does not involve construction of a new/expanded interchange or new interchange ramps

Yes

100%

Interchange project has been approved by the Metropolitan Council/MnDOT Highway Interchange Request Committee

100%

Interchange project has not been approved by the Metropolitan Council/MnDOT Highway Interchange Request Committee

0%

9)Construction Documents/Plan (10 Percent of Points)

Construction plans completed/approved (include signed title sheet)

100%

Construction plans submitted to State Aid for review

75%

Construction plans in progress; at least 30% completion

50%

Construction plans have not been started

Yes

0%

Anticipated date or date of completion 04/01/2020

10) Letting

Anticipated Letting Date 07/01/2020

Measure A: Cost Effectiveness

Total Project Cost (entered in Project Cost Form): \$2,200,000.00

Enter Amount of the Noise Walls: \$0.00

Total Project Cost subtract the amount of the noise walls: \$2,200,000.00

Points Awarded in Previous Criteria

Cost Effectiveness \$0.00

Other Attachments

File Name	Description	File Size
Hennepin Co Roadway System Management - 19 - 01 Roadways Overview.pdf	Map of the proposed improvements that labels the beginning and end of the project and roadways in the project area	2.5 MB
Hennepin Co Roadway System Management - 19 - 02 Bicycle Network Overview.pdf	Map of the project corridors and the Regional Bicycle Transportation Network (RBTN)	417 KB
Hennepin Co Roadway System Management - 19 - 03 Existing Conditions Overview.pdf	Google Street View screen captures showing the existing conditions along each of the project corridors	3.8 MB
Hennepin Co Roadway System Management - 20 - MnDOT Letter of Support.pdf	Letter of support from MnDOT	106 KB
Hennepin Co Roadway System Management - 21 - Signal Infrastructure Dates.pdf	Supplementary to question 4A: Table of signal infrastructure dates	249 KB

Roadway Area Definition

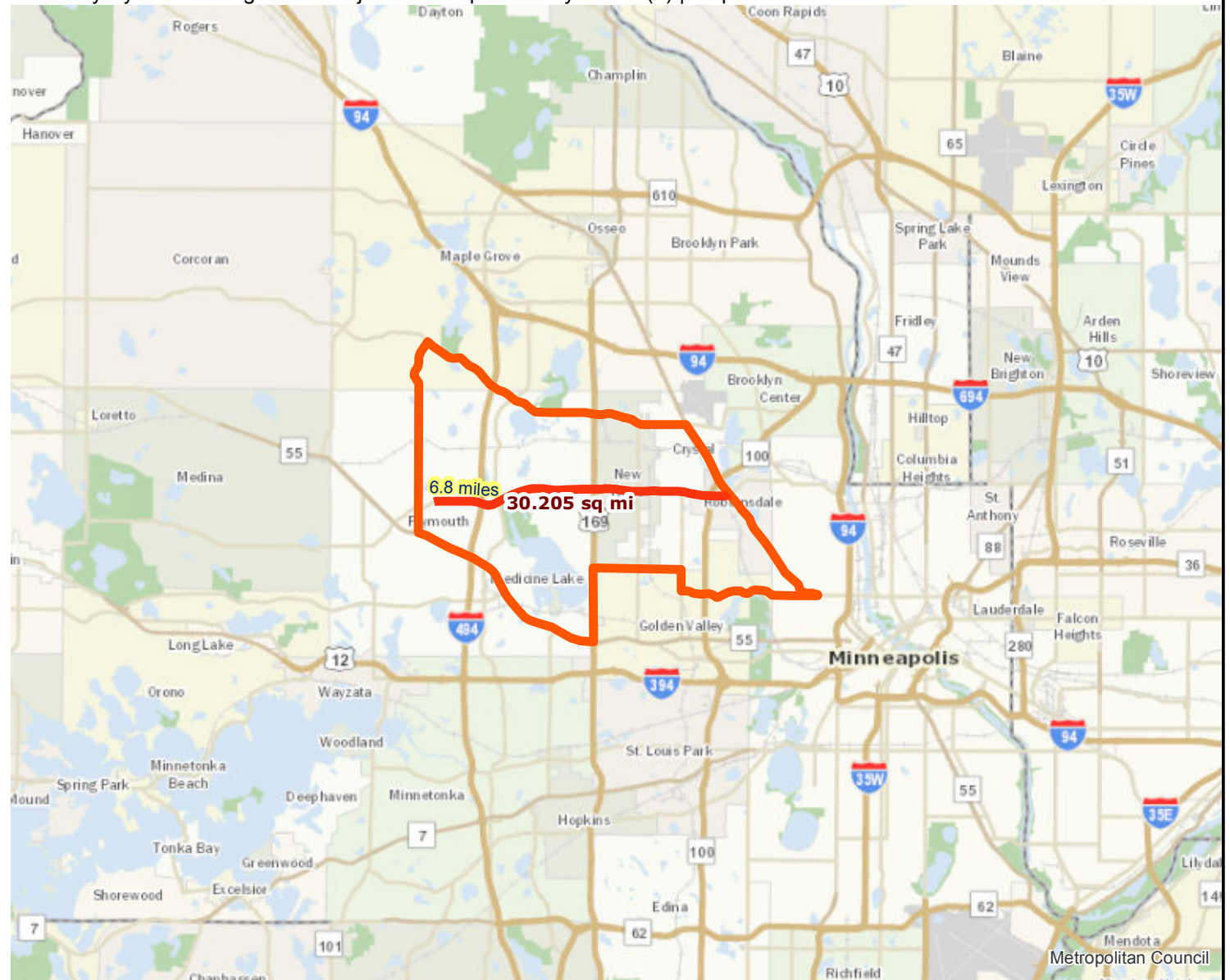
Roadway System Management Project: Hennepin County ATMS (1) | Map ID: 1466781359951

Corridor: CSAH 9
From: Old Rockford Rd
To: CSAH 81

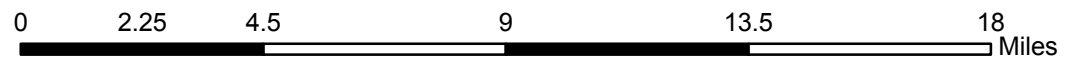
Results

Project Length: 6.8 miles

Project Area: 30.205 sq mi



-  Project
-  Project Area



Created: 6/24/2016
LandscapeRSA1



For complete disclaimer of accuracy, please visit
<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



Roadway Area Definition

Roadway System Management Project: Hennepin County ATMS (2) | Map ID: 1466712235415

Corridor: CSAH 5
From: US-169
To: CSAH 17

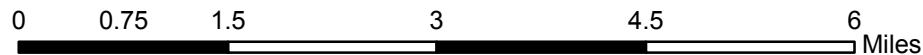
Results

Project Length: 3.604 miles

Project Area: 4.891 sq mi



- Project
- Project Area
- Principal Arterials
- A Minor Arterials
- Principal Arterials Planned
- A Minor Arterials Planned



Created: 6/23/2016
LandscapeRSA1



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Roadway Area Definition

Roadway System Management Project: Hennepin County ATMS (3) | Map ID: 1466713392920

Corridor: CSAH 3
From: CSAH 101
To: CSAH 17

Results

Project Length: 9.56 miles

Project Area: 22.841 sq mi



- Project
- Project Area



Created: 6/23/2016
LandscapeRSA1



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<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



Roadway Area Definition

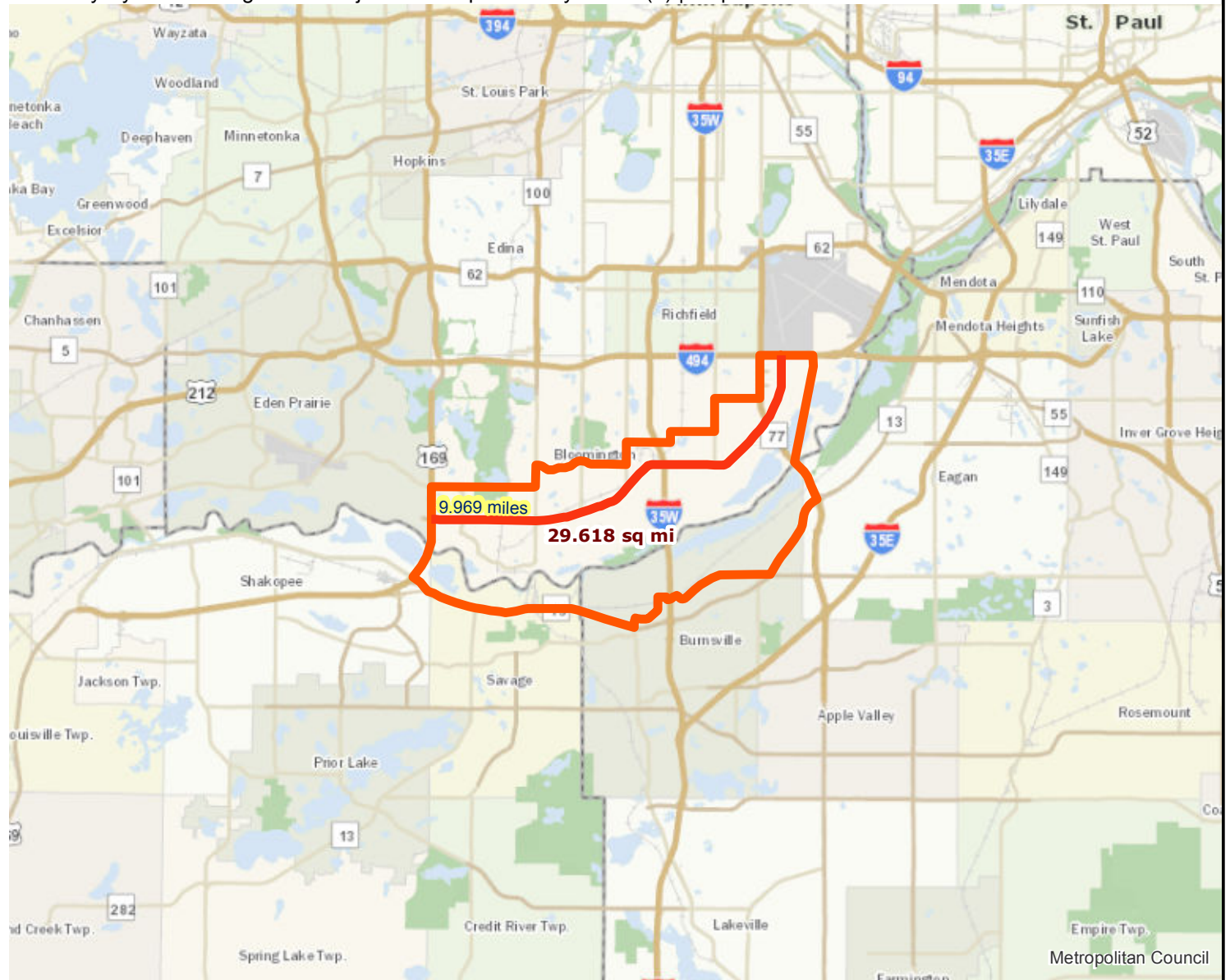
Roadway System Management Project: Hennepin County ATMS (4) | Map ID: 1466783381992

Corridor: CSAH 1
From: US-169
To: I-494

Results

Project Length: 9.969 miles

Project Area: 29.618 sq mi



Project

Project Area



Created: 6/24/2016
LandscapeRSA1



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Corridor	From	To	Roadway Area Definition		
			Length (mi)	Area (sqmi)	Avg. Dist. (mi)
CSAH 9	Old Rockford Rd	CSAH 81	6.8	30.2	4.4
CSAH 5	US-169	CSAH 17	3.6	4.9	1.3
CSAH 3	CSAH 101	CSAH 17	9.6	22.8	2.4
CSAH 1	US-169	I-494	10.0	29.6	3.0
			29.9	87.6	2.9

Regional Economy

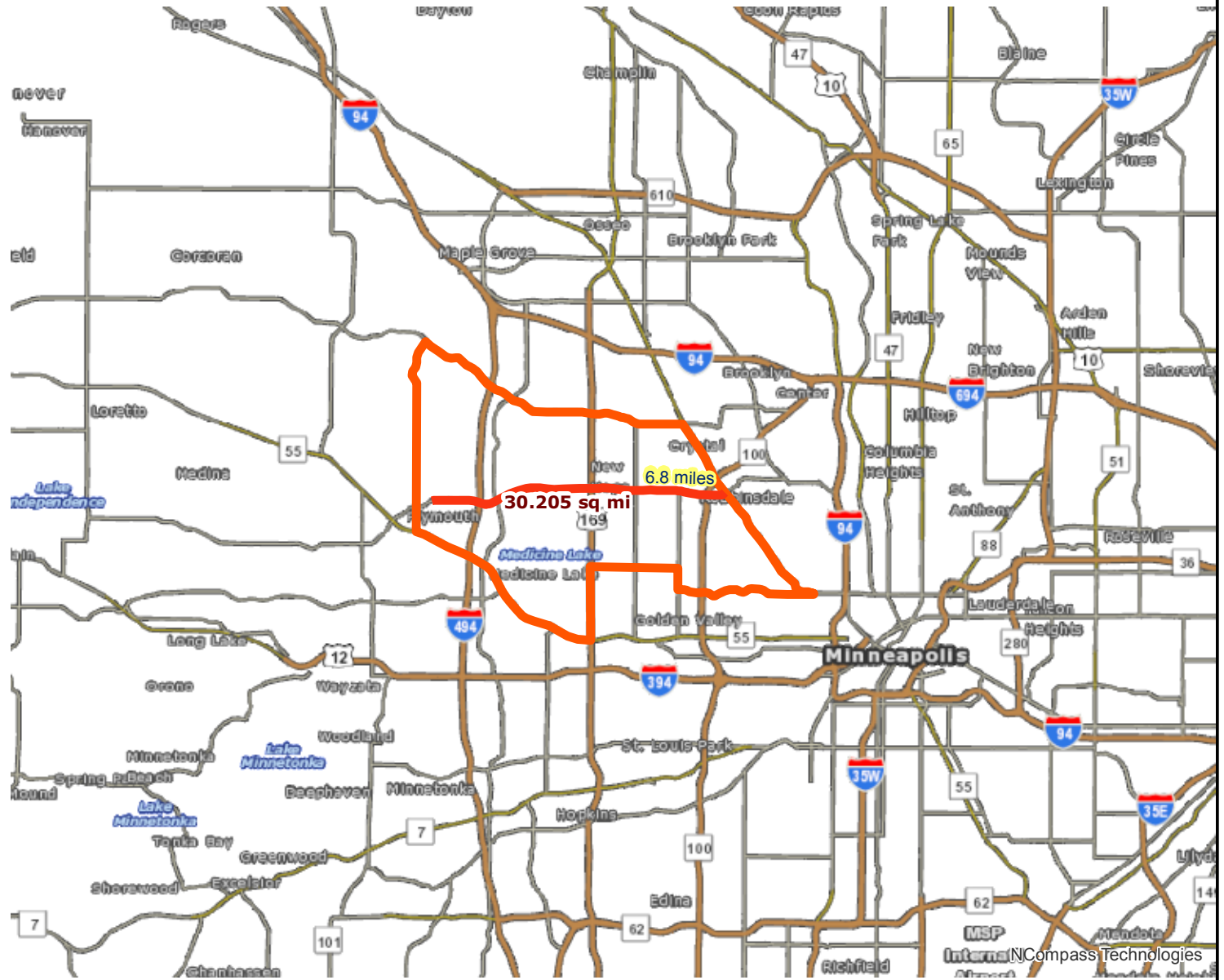
Corridor: CSAH 9
From: Old Rockford Rd
To: CSAH 81

Results

WITHIN ONE MI of project:

Total Population: 94902
Total Employment: 41494
Mfg and Dist Employment: 13025

Postsecondary Students:
0



-  Project
-  Project Area



Regional Economy

Roadway System Management Project: Hennepin County ATMS (2) | Map ID: 1466712235415

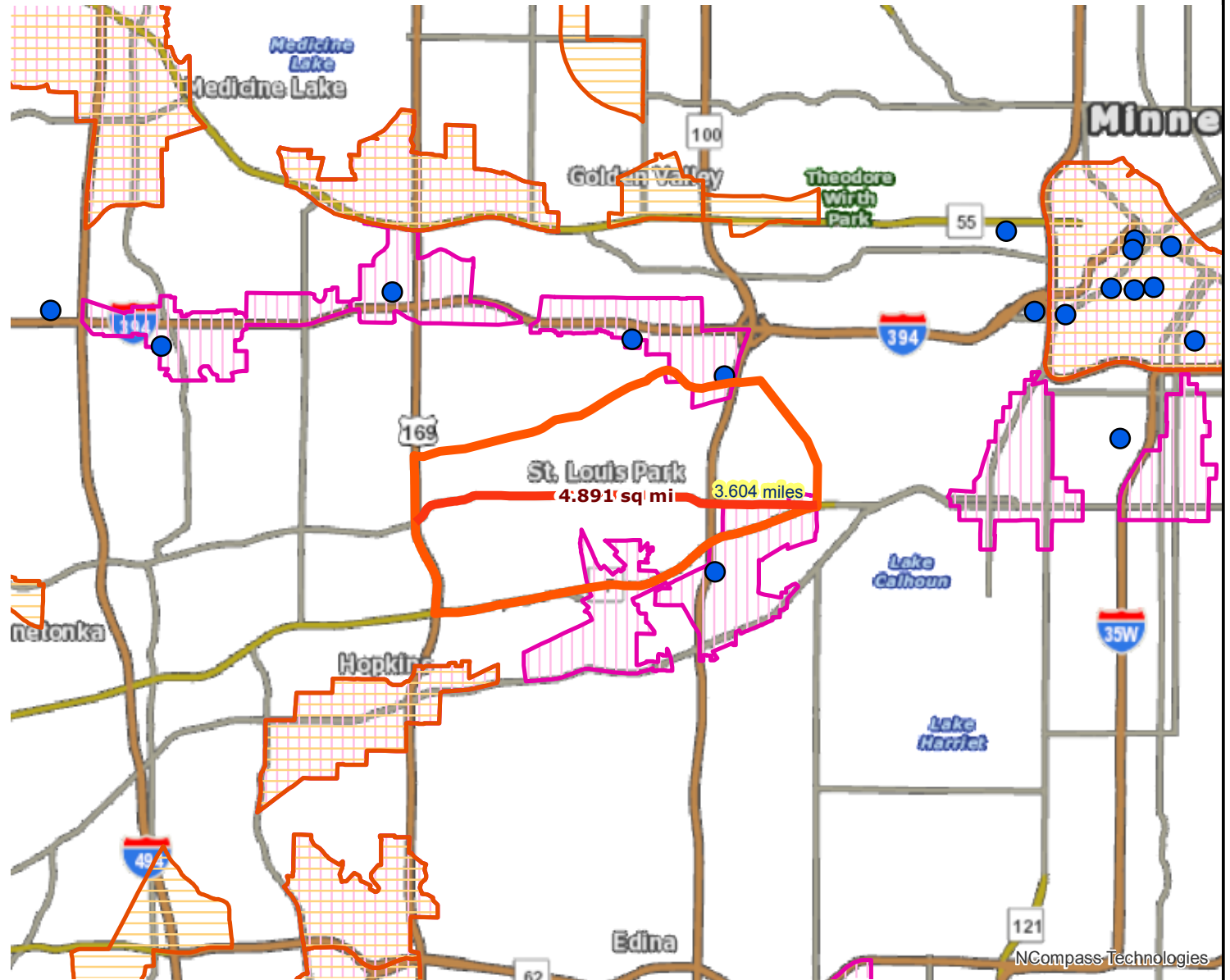
Corridor: CSAH 5
From: US-169
To: CSAH 17

Results

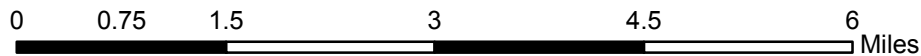
WITHIN ONE MI of project:

Total Population: 63282
Total Employment: 44419
Mfg and Dist Employment: 4301

Postsecondary Students:
779



- Project
- Project Area
- PostSecondary Education Centers
- Manufacturing/Distribution Centers
- Job Concentration Centers



Created: 6/23/2016
LandscapeRSA5



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<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



Regional Economy

Roadway System Management Project: Hennepin County ATMS (3) | Map ID: 1466713392920

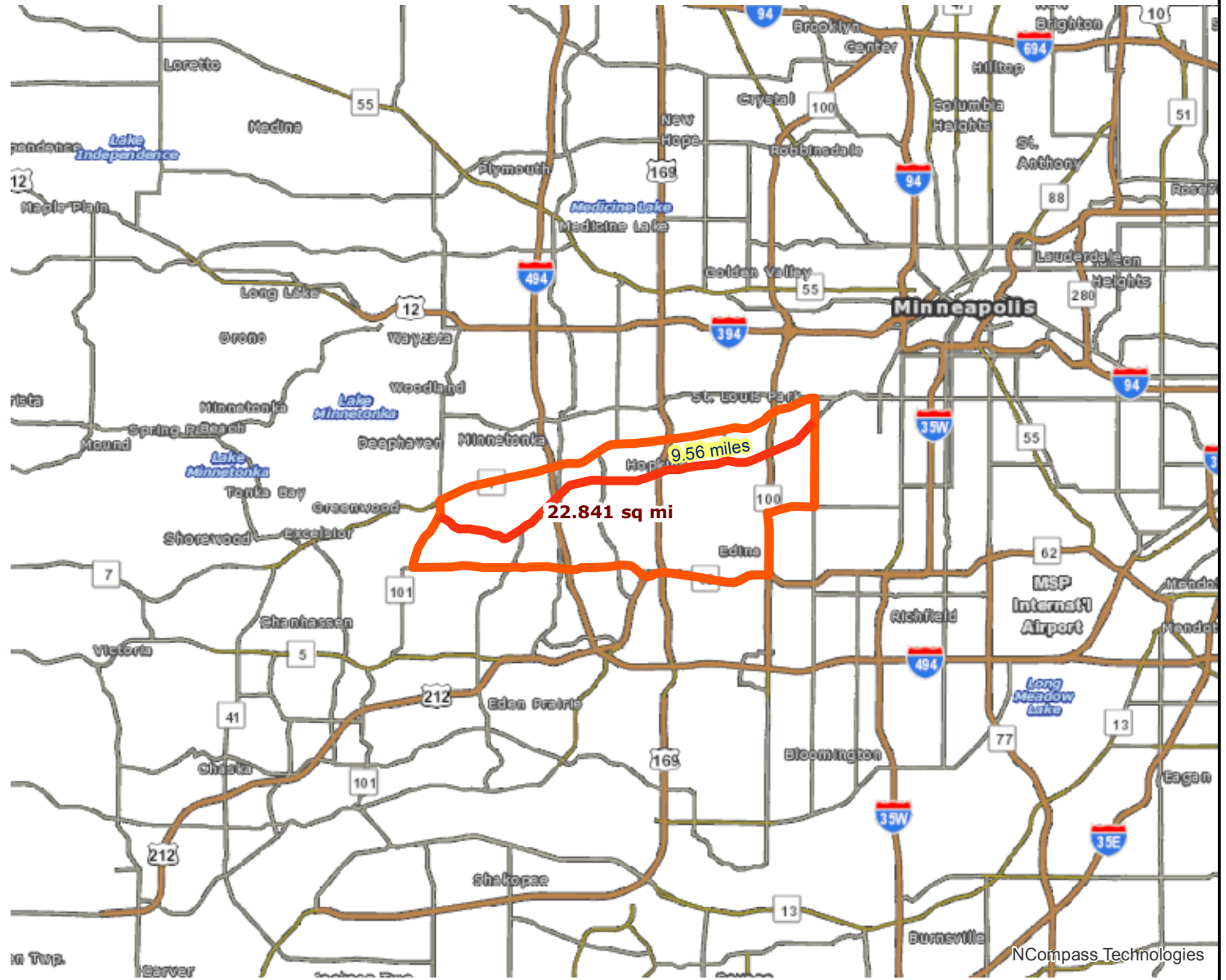
Corridor: CSAH 3
From: CSAH 101
To: CSAH 17

Results

WITHIN ONE MI of project:

Total Population: 104557
Total Employment: 60018
Mfg and Dist Employment: 8571

Postsecondary Students:
200



- Project
- Project Area



Created: 6/23/2016
LandscapeRSA5



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<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>

NCompass Technologies



Regional Economy

Roadway System Management Project: Hennepin County ATMS (4) | Map ID: 1466783381992

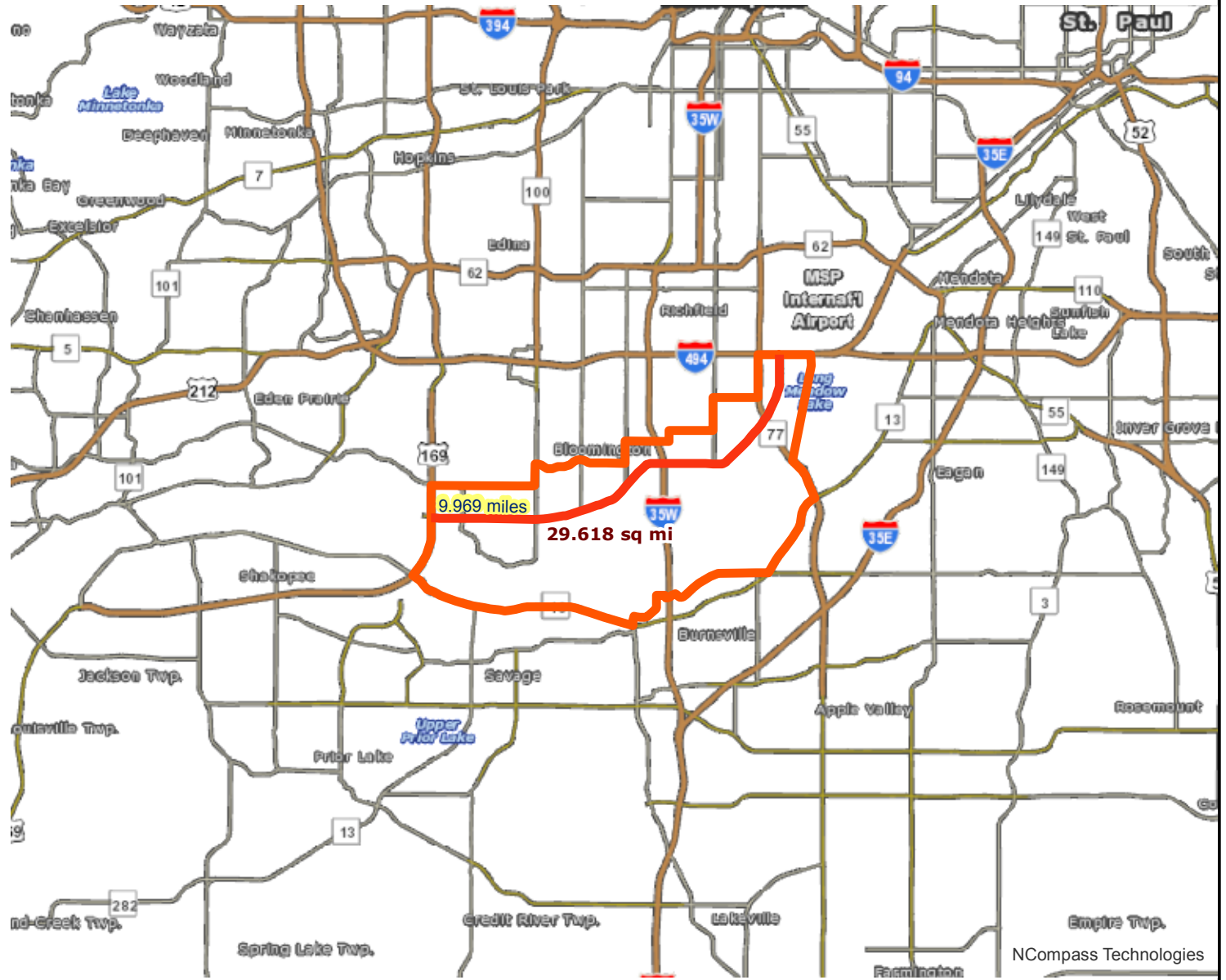
Corridor: CSAH 1
From: US-169
To: I-494

Results

WITHIN ONE MI of project:

Total Population: 73172
Total Employment: 63510
Mfg and Dist Employment: 14674

Postsecondary Students:
16464



— Project
□ Project Area



Created: 6/24/2016
LandscapeRSA5

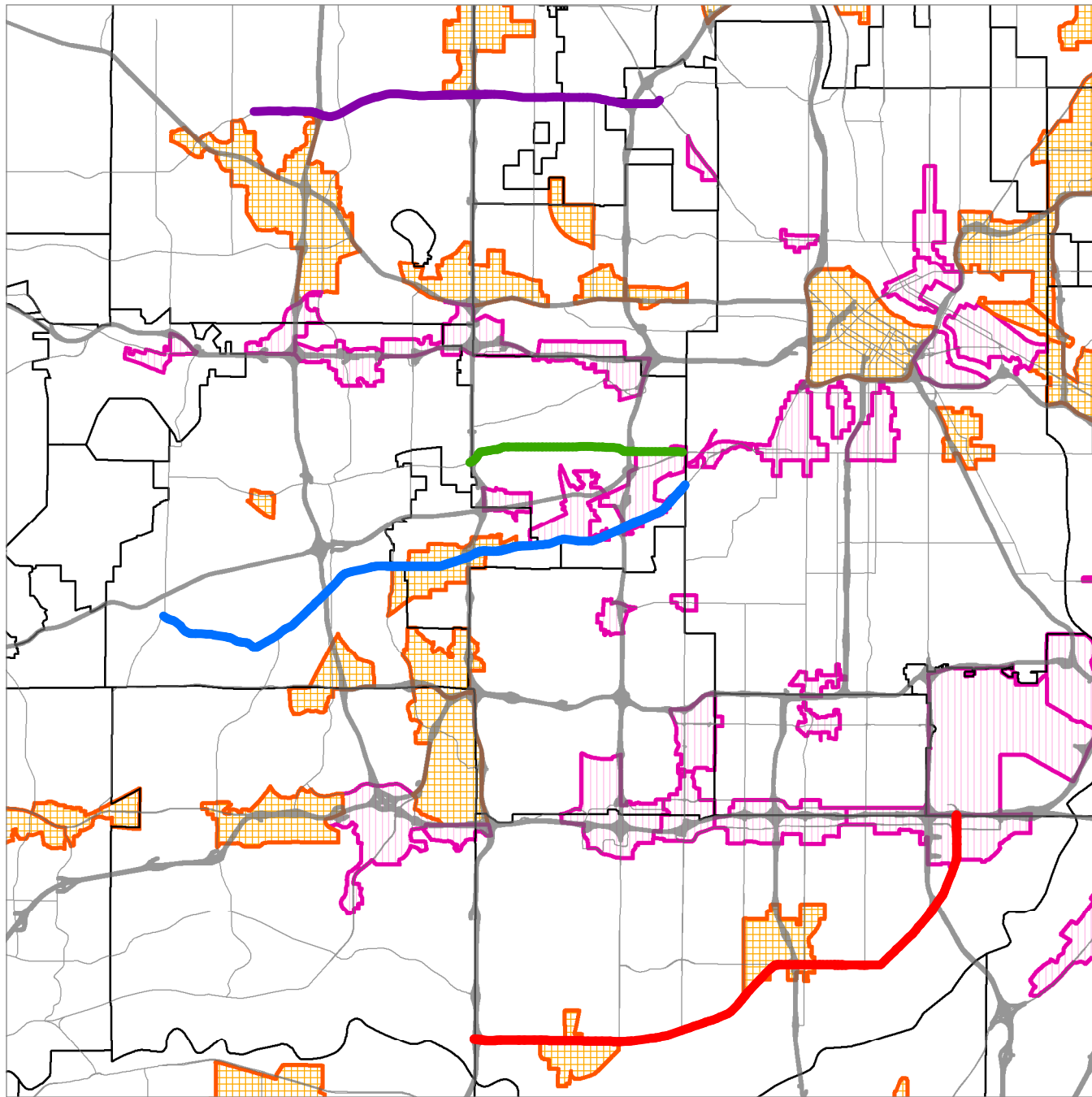


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<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



Regional Economy



Corridor	From	To	Total Pop.	Total Emp.	Mfg. & Dist. Emp.	Post. Students
CSAH 9	Old Rockford Rd	CSAH 81	94,902	41,494	13,025	0
CSAH 5	US-169	CSAH 17	63,282	44,419	4,301	779
CSAH 3	CSAH 101	CSAH 17	104,557	60,018	8,571	200
CSAH 1	US-169	I-494	73,172	63,510	14,674	16,464
			335,913	209,441	40,571	17,443







Project Overview Map: Regional Economy

2016 Regional Solicitation Grant Application
Roadway System Management,
Hennepin County



Job Centers

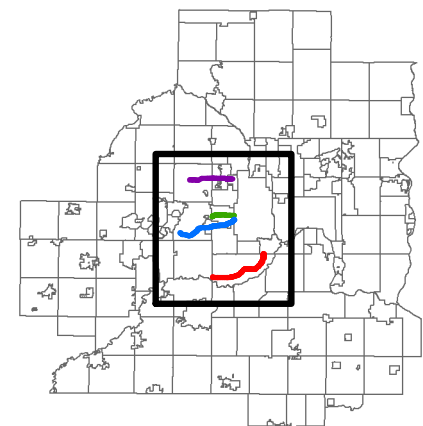
-  Manufacturing/Distribution Center
-  Job Concentration Centers

Project Corridors

-  CSAH 9: Old Rockford Rd to CSAH 81
-  CSAH 5: US-169 to CSAH 17
-  CSAH 3: CSAH 101 to CSAH 17
-  CSAH 1: US-169 to I-494

Functional Class

-  Principal Arterial
-  "A" Minor Arterial



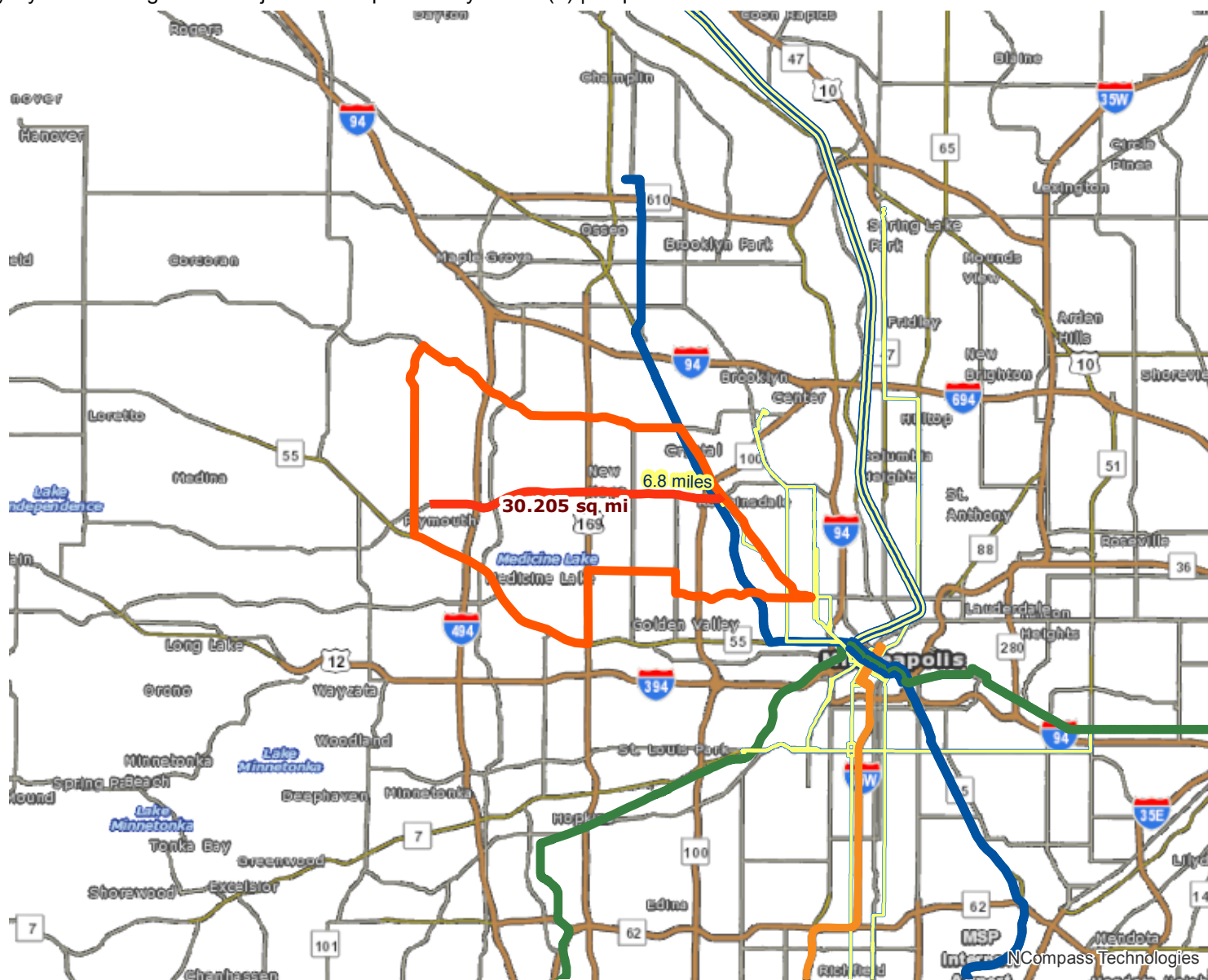
Corridor: CSAH 9
 From: Old Rockford Rd
 To: CSAH 81

Results

Transit with a Direct Connection to project:
 14 32 687 705 716 717 741 742 755 756 758
 764 772 777 790 791 793 795

- *West Broadway
- *Blue Line Extension
- *Blue Line Extension

*indicates Planned Alignments



Project	Transitway	Green Line	Planned Alignments	Light Rail, Blue Line Extension
Project Area	Blue / Green Line	Blue Line	Northstar Line	Light Rail, Green Line Extension
			Arterial BRT	
			BRT, Orange Line	



Created: 6/24/2016
 LandscapeRSA3



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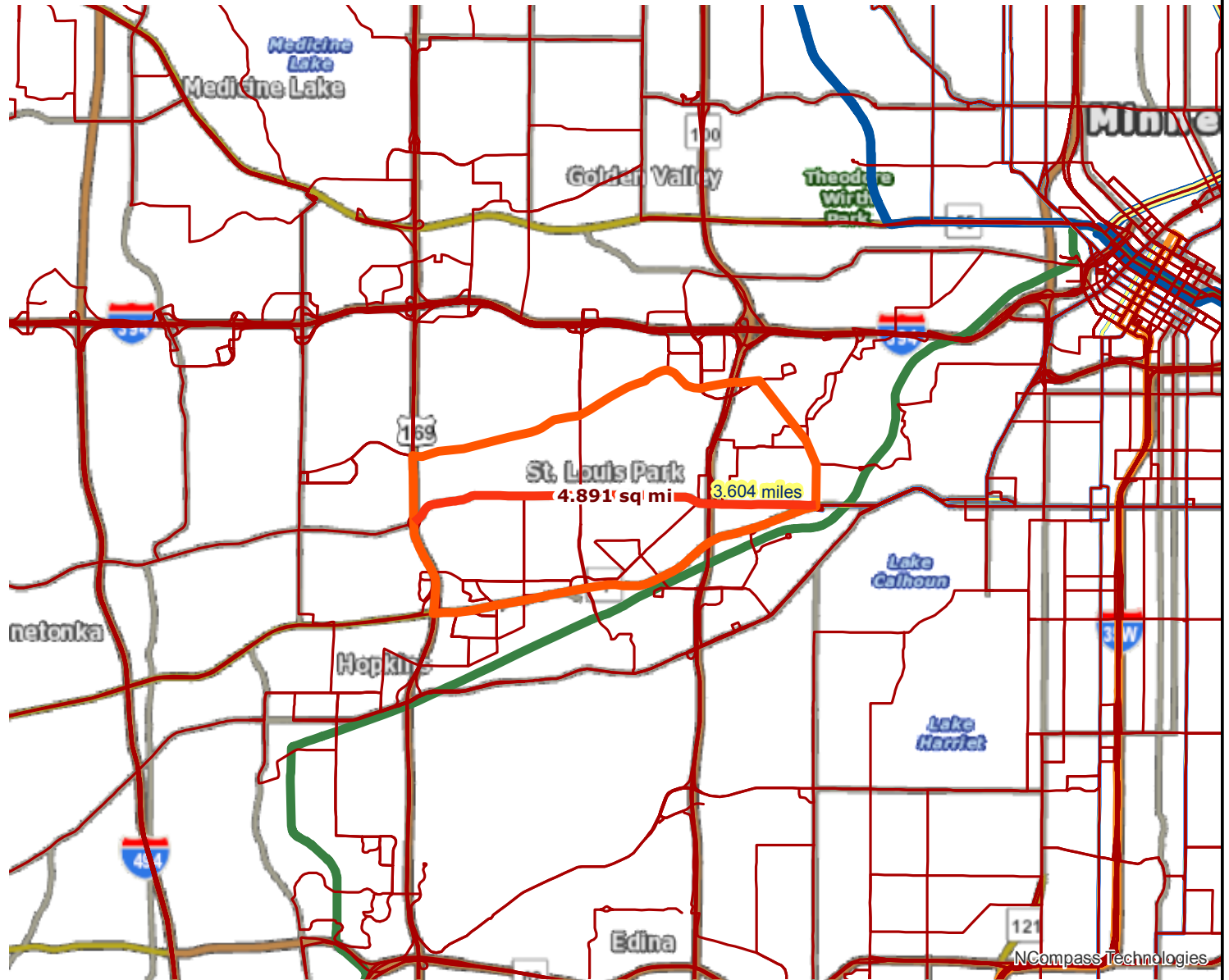


Corridor: CSAH 5
 From: US-169
 To: CSAH 17

Results

Transit with a Direct Connection to project:
 17 25 490 493 587 588 589 604 664 667 668
 670 671 687
 *Hennepin
 *Lake

*indicates Planned Alignments



Project	Transitway	Planned Alignments	Light Rail, Blue Line Extension
Project Area	Blue / Green Line	Arterial BRT	Light Rail, Green Line Extension
Transit Routes	Northstar Line	BRT, Orange Line	



Created: 6/23/2016
 LandscapeRSA3



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<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



NCompass Technologies

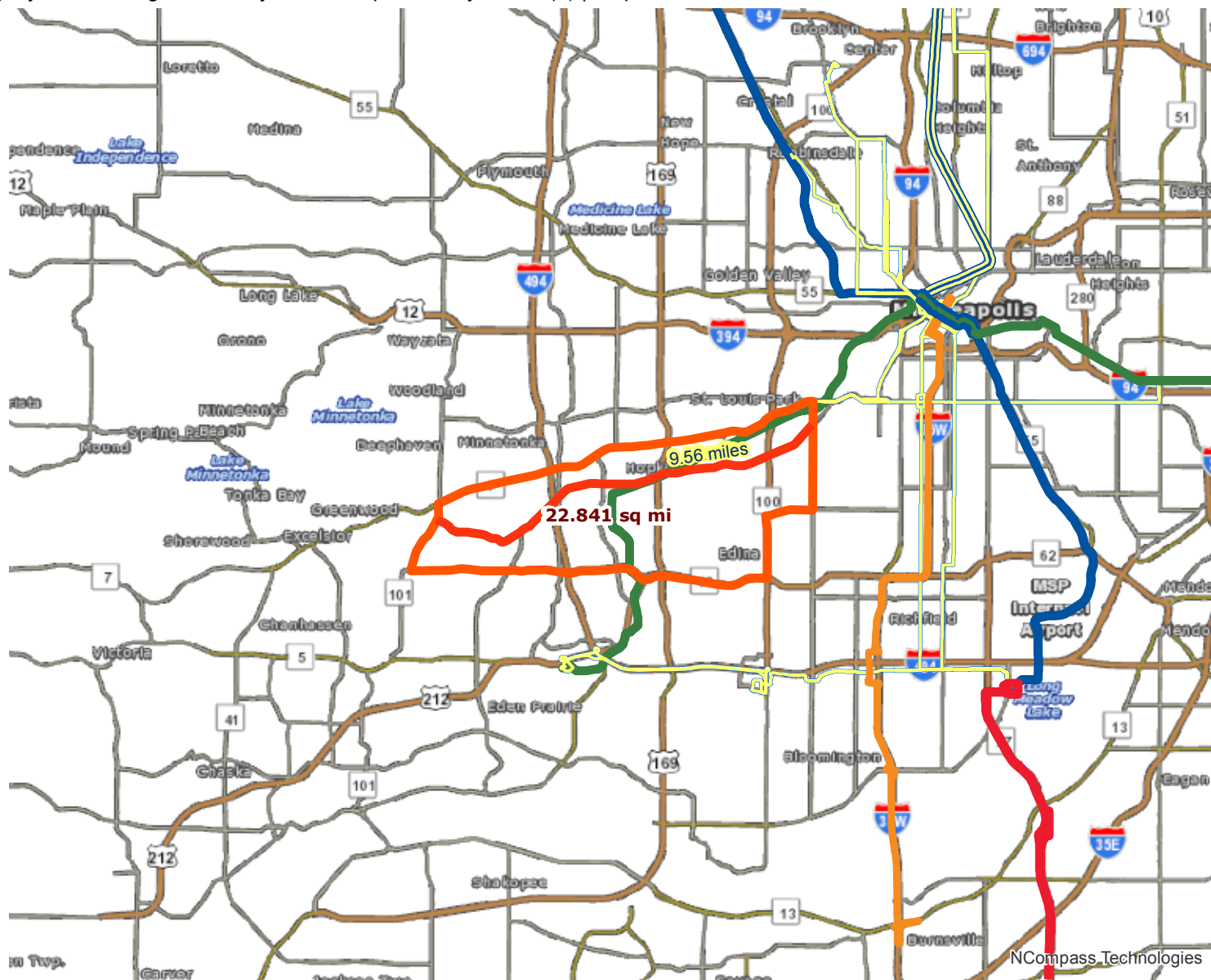
Corridor: CSAH 3
 From: CSAH 101
 To: CSAH 17

Results

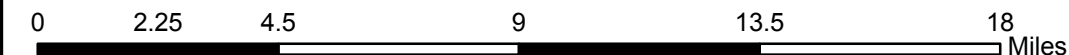
Transit with a Direct Connection to project:
 12 114 490 493 587 588 589 604 614 615 664
 667 670 687 690 691 692 697 698 699

*Green Line Extension

*indicates Planned Alignments



- ▬ Project
 - ▬ Blue Line
 - ▬ Green Line
 - ▬ Arterial BRT
 - ▬ Northstar Line
 - ▬ BRT, Orange Line
 - ▬ Light Rail, Blue Line Extension
 - ▬ Red Line
 - ▬ Light Rail, Green Line Extension
- Planned Alignments**



Created: 6/23/2016
 LandscapeRSA3



For complete disclaimer of accuracy, please visit
<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



NCompass Technologies

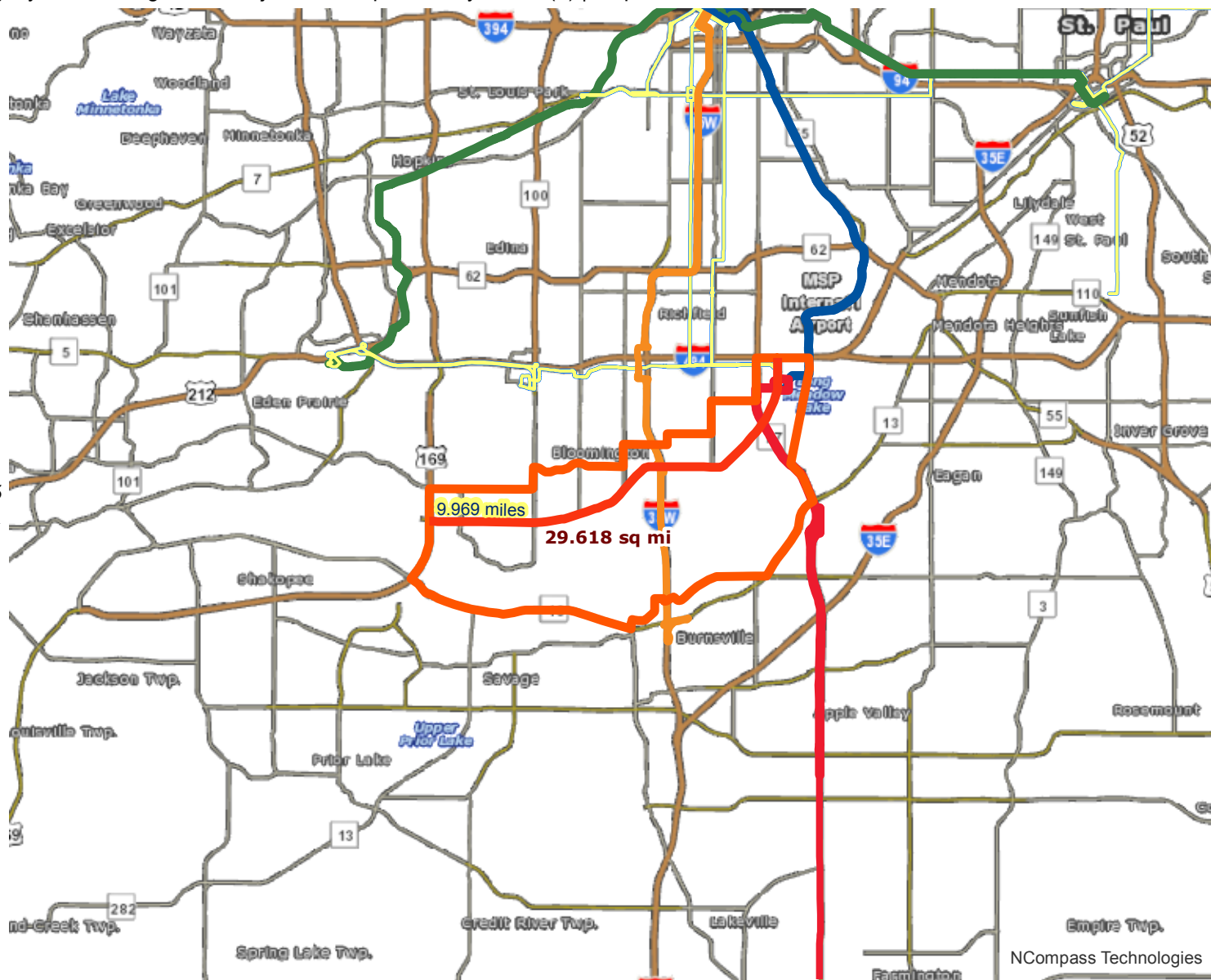
Corridor: CSAH 1
 From: US-169
 To: I-494

Results

Transit with a Direct Connection to project:
 5 18 54 415 440 444 460 464 465 467 470
 472 475 476 477 478 479 490 491 492 493 515
 535 538 539 540 542 552 553 554 589 597 901
 903

- *American
- *Chicago-Fremont
- *Orange Line
- *Orange Line

*indicates Planned Alignments



Project	Transitway	Green Line	Planned Alignments	BRT, Red Line - Phase 2
Project Area	Blue / Green Line	Red Line	Arterial BRT	Light Rail, Green Line Extension
	Blue Line	BRT, Orange Line		



Created: 6/24/2016
 LandscapeRSA3



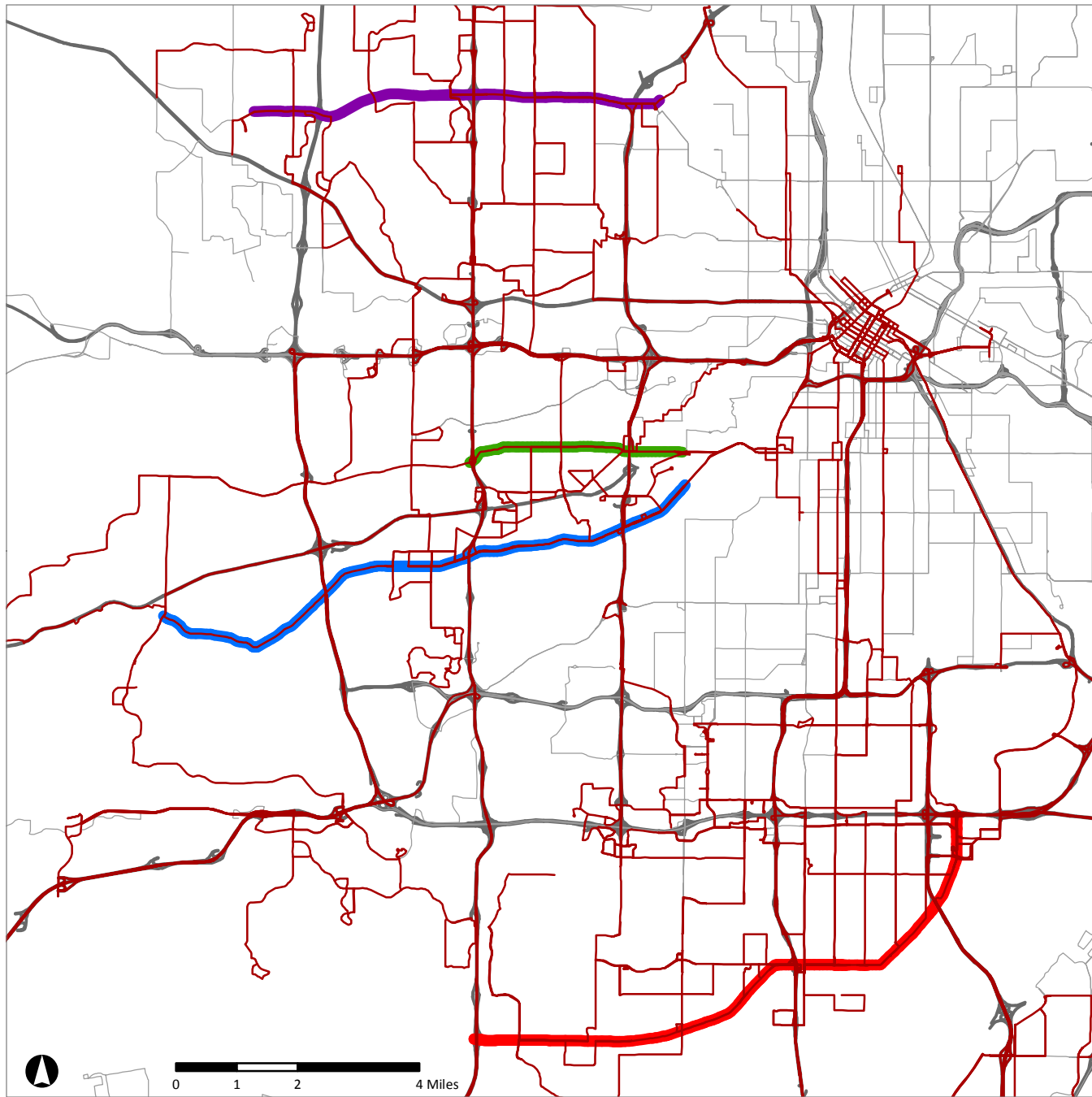
For complete disclaimer of accuracy, please visit
<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



NCompass Technologies

Transit Connections

Corridor	From	To	Bus Routes (n)	Transitways
CSAH 9	Old Rockford Rd	CSAH 81	18	West Broadway, METRO Blue Line Extension
CSAH 5	US-169	CSAH 17	14	Hennepin, Lake
CSAH 3	CSAH 101	CSAH 17	20	MERTRO Green Line Extension
CSAH 1	US-169	I-494	32	METRO Blue Line, METRO Red Line, METRO Orange Line, American, Chicago-Fremont



Project Overview Map: Transit Connections

2016 Regional Solicitation Grant Application
Roadway System Management,
Hennepin County

Transit Routes (existing, all modes)

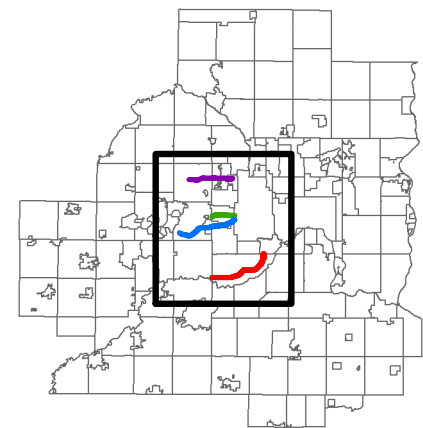
- Routes intersecting project (n=69)
- Other routes (n=147)

Project Corridors

- CSAH 9: Old Rockford Rd to CSAH 81
- CSAH 5: US-169 to CSAH 17
- CSAH 3: CSAH 101 to CSAH 17
- CSAH 1: US-169 to I-494

Functional Class

- Principal Arterial

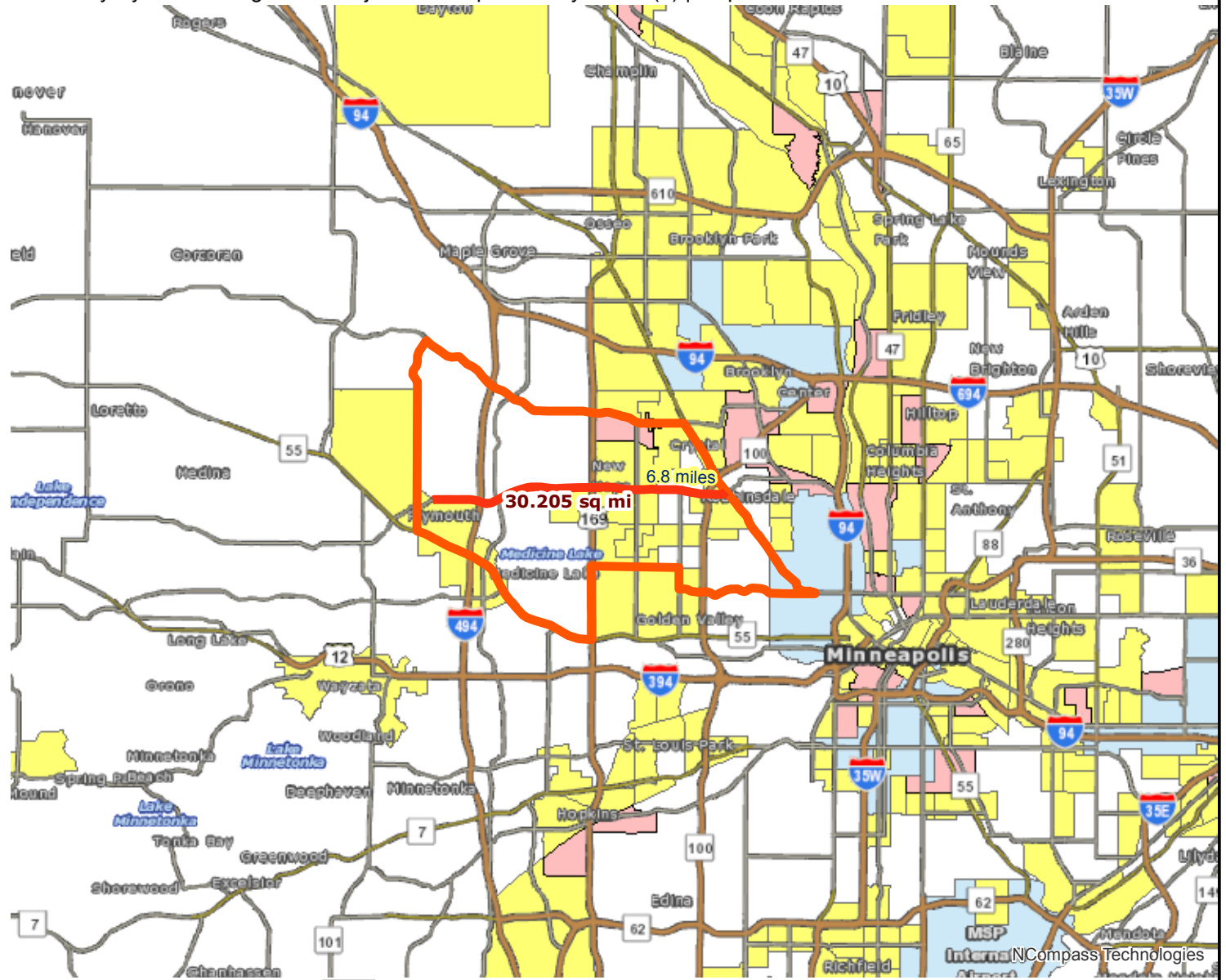


Socio-Economic Conditions Roadway System Management Project: Hennepin County ATMS (1) | Map ID: 1466781359951

Corridor: CSAH 9
From: Old Rockford Rd
To: CSAH 81

Results

Project census tracts are above the regional average for population in poverty or population of color:
(0 to 18 Points)



- Project
- Project Area
- Area of Concentrated Poverty > 50% residents of color

- Area of Concentrated Poverty
- Above reg'l avg conc of race/poverty



Created: 6/24/2016
LandscapeRSA2



For complete disclaimer of accuracy, please visit <http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



Socio-Economic Conditions

Roadway System Management Project: Hennepin County ATMS (2) | Map ID: 1466712235415

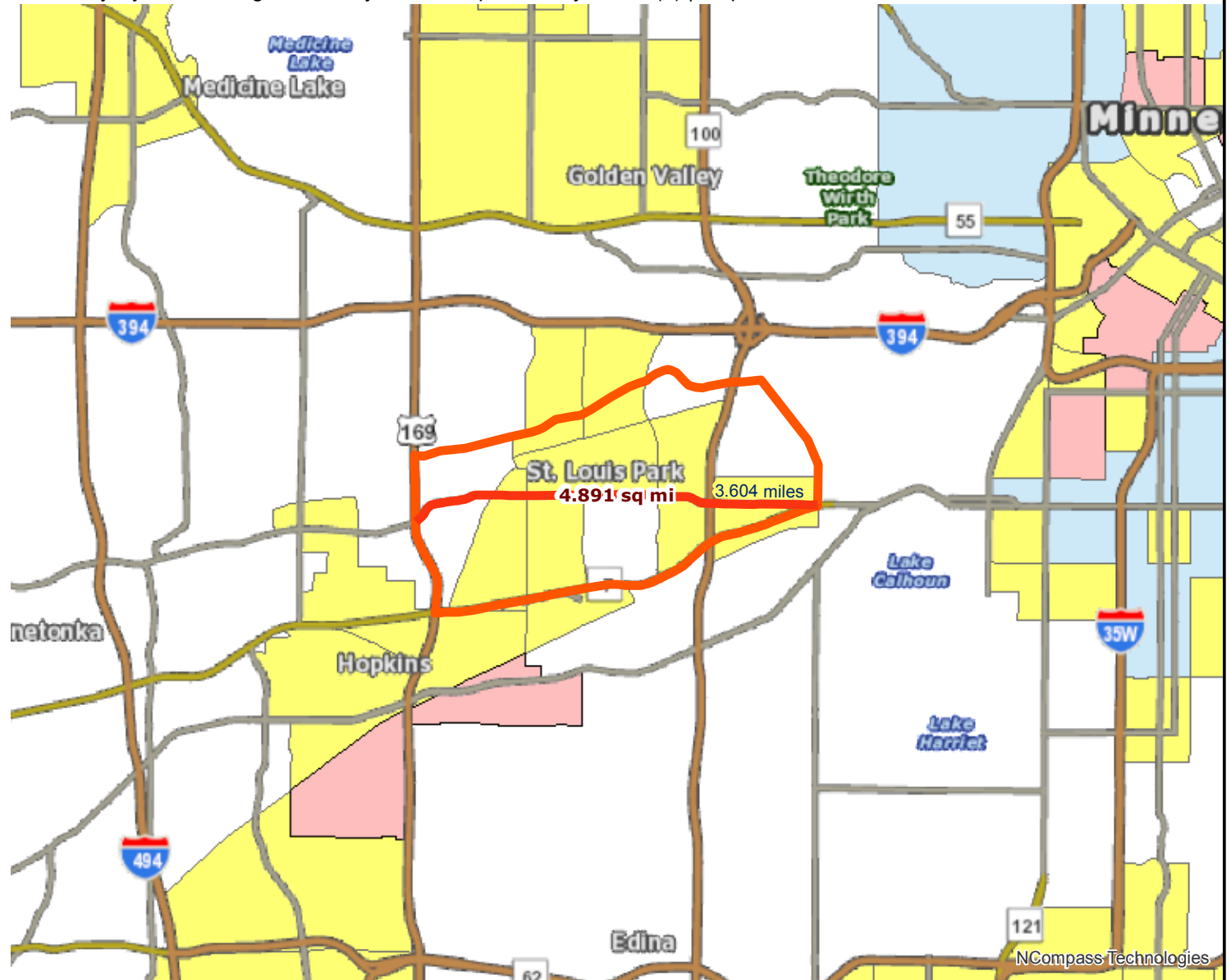
Corridor: CSAH 5




From: US-169



To: CSAH 17

Results

Project census tracts are above the regional average for population in poverty or population of color:
(0 to 18 Points)



-  Project
-  Project Area
-  Area of Concentrated Poverty > 50% residents of color

-  Area of Concentrated Poverty
-  Above reg'l avg conc of race/poverty



Created: 6/23/2016
LandscapeRSA2



For complete disclaimer of accuracy, please visit
<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>

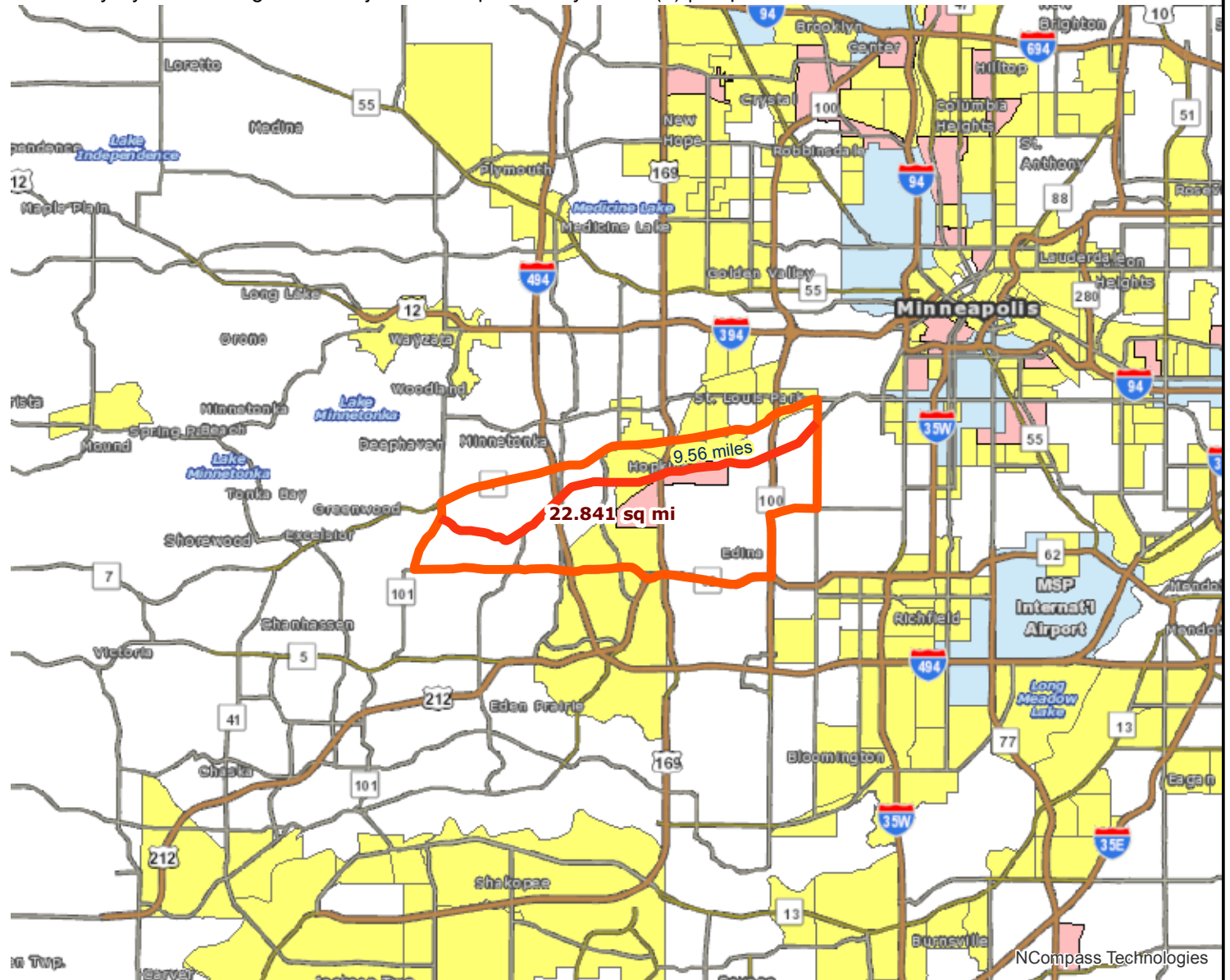


Socio-Economic Conditions Roadway System Management Project: Hennepin County ATMS (3) | Map ID: 1466713392920

Corridor: CSAH 3
From: CSAH 101
To: CSAH 17

Results

Project located IN
Area of Concentrated Poverty:
(0 to 24 Points)



- Project
- Project Area
- Area of Concentrated Poverty > 50% residents of color

- Area of Concentrated Poverty
- Above reg'l avg conc of race/poverty



Created: 6/23/2016
LandscapeRSA2



For complete disclaimer of accuracy, please visit
<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



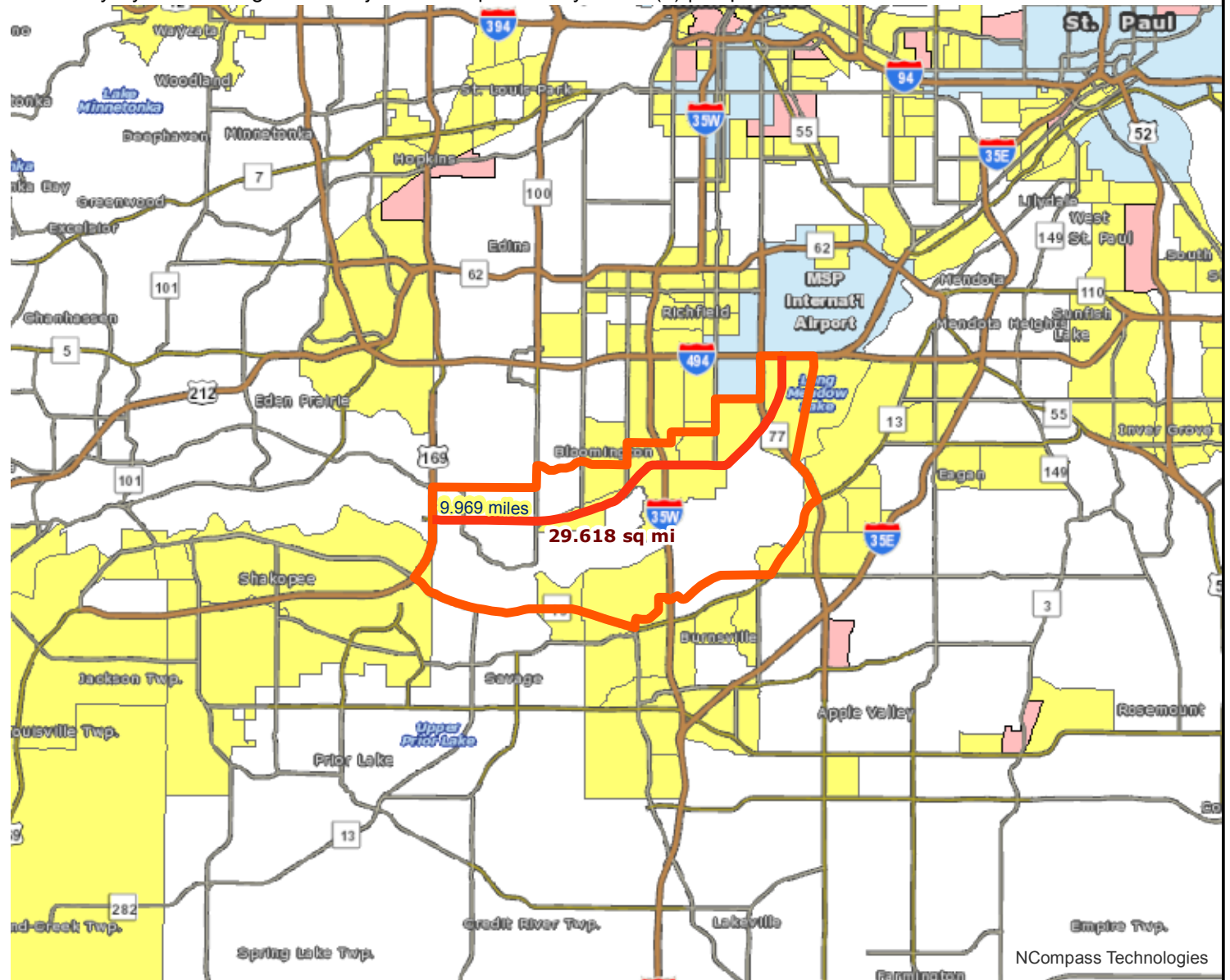
NCompass Technologies

Socio-Economic Conditions Roadway System Management Project: Hennepin County ATMS (4) | Map ID: 1466783381992

Corridor: CSAH 1
From: US-169
To: I-494

Results

Project located **IN**
Area of Concentrated Poverty
with 50% or more of residents
are people of color (ACP50):
(0 to 30 Points)



- Project
- Project Area
- Area of Concentrated Poverty > 50% residents of color

- Area of Concentrated Poverty
- Above reg'l avg conc of race/poverty

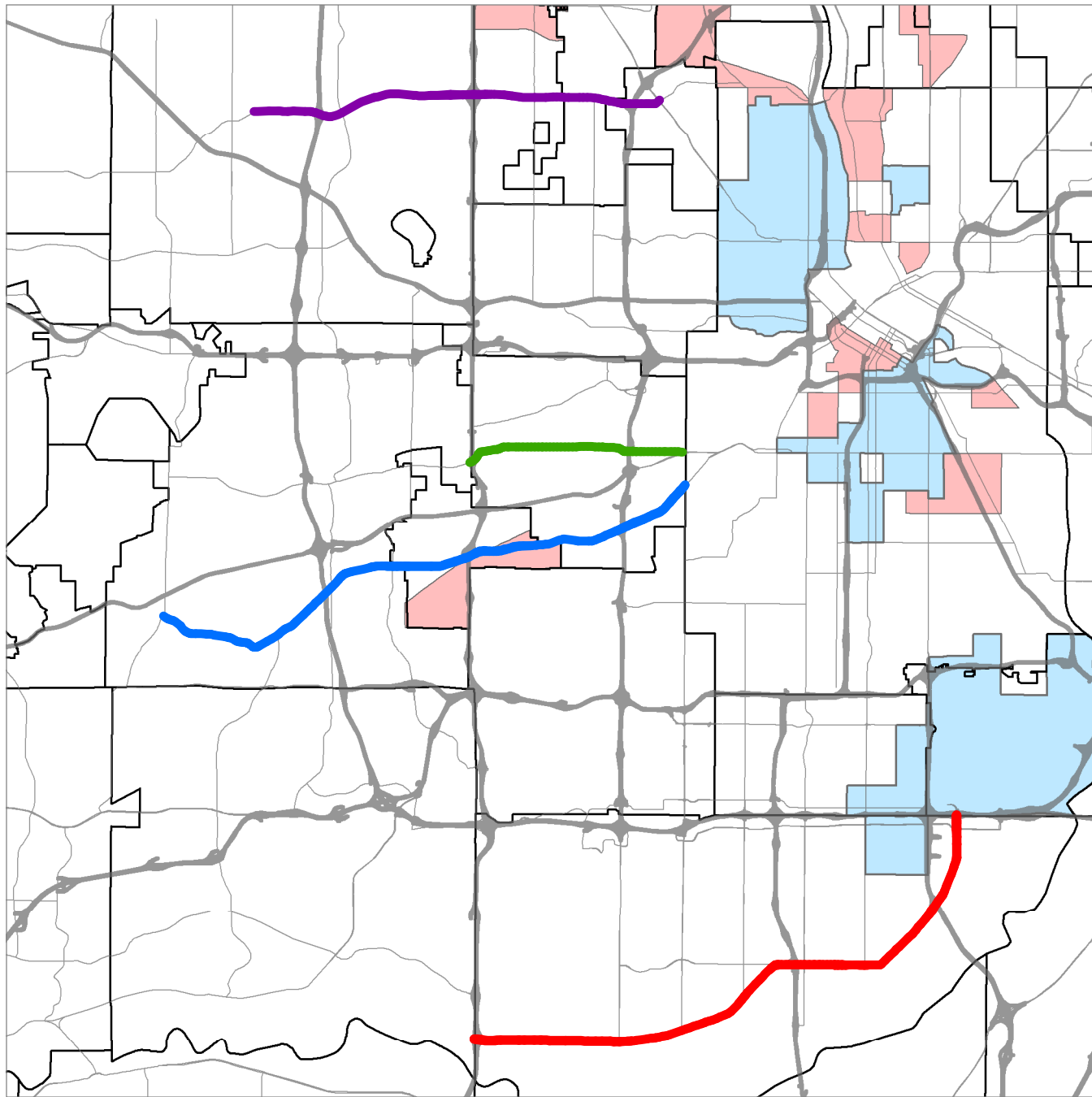


Created: 6/24/2016
LandscapeRSA2



For complete disclaimer of accuracy, please visit
<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>











Project Overview Map: Socio-Economic Conditions

2016 Regional Solicitation Grant Application
Roadway System Management,
Hennepin County



Poverty

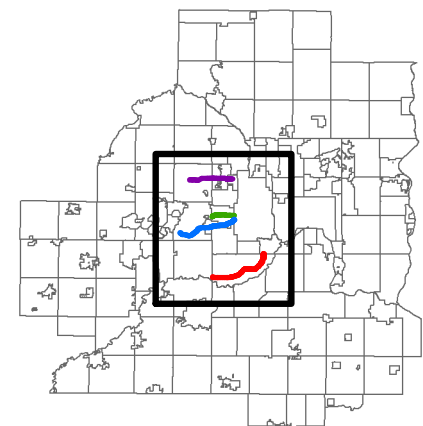
-  Area of Concentrated Poverty
> 50% residents of color
-  Area of Concentrated Poverty

Project Corridors

-  CSAH 9: Old Rockford Rd to CSAH 81
-  CSAH 5: US-169 to CSAH 17
-  CSAH 3: CSAH 101 to CSAH 17
-  CSAH 1: US-169 to I-494

Functional Class

-  Principal Arterial
-  "A" Minor Arterial



Hennepin County ATMS
Regional Solicitation

5A. Congestion Reduction/Air Quality: Vehicle Delay Reduction
5B. Emissions

Congestion Reduction Summary	2
Emissions Improvements Summary	3
CSAH 9 Existing	4
Timing Report	7
CSAH 9 Improved	18
Timing Report	21
CSAH 5 Existing	32
Timing Report	34
CSAH 5 Improved	42
Timing Report	44
CSAH 3 Existing	52
Timing Report	54
CSAH 3 Improved	62
Timing Report	64
CSAH 1 Existing	72
Timing Report	76
CSAH 1 Improved	90
Timing Report	94

Hennepin County ATMS

5A. Congestion Reduction

PM Peak - Select Intersections

The results from this analysis are conservative given the prescribed methodology for the grant application. It is assumed a higher benefit will be achieved through a detailed signal retiming analysis, which would not occur until the proposed project is completed.

The rows highlighted in yellow represent locations that are not seeing a benefit based on the current grant application methodology. However, these locations will likely see a future benefit after implementation.

Please note existing signal timings were used to evaluate existing conditions in order to see the benefit of the signal optimization .

Corridor	Intersection	Total Delay Per Vehicle (s/v)			Volume (vph)	Total Delay (s)
		Without	With	Reduced		Reduced
CSAH 9	Old Rockford Rd	18	17	1	1,995	1,995
CSAH 9	Fernbrook Ln	29	28	1	3,291	3,291
CSAH 9	Annapolis Ln	18	18	0	3,068	0
CSAH 9	I-494 West Ramps	43	26	17	3,227	54,859
CSAH 9	I-494 East Ramps	33	25	8	2,988	23,904
CSAH 9	Vinewood Ln	43	33	10	3,114	31,140
CSAH 9	Northwest Blvd	85	76	9	3,925	35,325
CSAH 9	Larch Ln	17	17	0	2,599	0
CSAH 9	Zachary Ln	41	40	1	2,841	2,841
CSAH 9	Nathan Ln	41	43	(2)	3,268	(6,536)
CSAH 5	Texas Ave	19	18	1	2,116	2,116
CSAH 5	Louisiana Ave	39	36	3	3,212	9,636
CSAH 5	Hampshire Ave	6	6	0	1,764	0
CSAH 5	Dakota Ave	12	13	(1)	2,044	(2,044)
CSAH 5	Lake St/Vernon Ave	76	36	40	2,760	110,400
CSAH 5	MN-100 East Ramp	9	12	(3)	2,808	(8,424)
CSAH 5	Ottawa Ave	24	16	8	2,300	18,400
CSAH 3	Shady Oak Rd	51	39	12	3,283	39,396
CSAH 3	17th Ave	7	7	0	2,223	0
CSAH 3	11th Ave	27	28	(1)	3,236	(3,236)
CSAH 3	8th Ave	8	8	0	2,637	0
CSAH 3	5th Ave	23	19	4	2,914	11,656
CSAH 3	US-169 West Ramps	12	11	1	3,341	3,341
CSAH 3	US-169 East Ramps	16	17	(1)	3,358	(3,358)
CSAH 3	Milwaukee St	30	29	1	3,306	3,306
CSAH 1	Normandale Blvd	31	30	1	4,230	4,230
CSAH 1	Nesbitt Ave	12	13	(1)	3,460	(3,460)
CSAH 1	Bloomington Ferry Rd	20	19	1	3,390	3,390
CSAH 1	Bush Lake Rd	18	18	0	3,277	0
CSAH 1	Hampshire Ave	10	10	0	3,303	0
CSAH 1	US-169 West Ramps	19	18	1	1,780	1,780
CSAH 1	US-169 East Ramps	6	7	(1)	2,726	(2,726)
CSAH 1	98th St	11	12	(1)	2,704	(2,704)
CSAH 1	I-35W West Ramps	12	13	(1)	3,159	(3,159)
CSAH 1	I-35W East Ramps	31	30	1	3,045	3,045
CSAH 1	Lyndale Ave	30	28	2	3,286	6,572
CSAH 1	Garfield Ave	7	8	(1)	2,179	(2,179)
CSAH 1	Grand Ave	12	12	0	2,325	0
CSAH 1	Nicollet Ave	23	22	1	2,573	2,573
Total		969	858	111	113,055	335,370

Hennepin County ATMS

5B. Emission Improvements

PM Peak - Select Intersections

The results from this analysis are conservative given the prescribed methodology for the grant application. It is assumed a higher benefit will be achieved through a detailed signal retiming analysis, which would not occur until the proposed project is completed.

The rows highlighted in yellow represent locations that are not seeing a benefit based on the current grant application methodology. However, these locations will likely see a future benefit after implementation.

Please note existing signal timings were used to evaluate existing conditions in order to see the benefit of the signal optimization.

Corridor	Intersection	CO (kg)			NOx (kg)			VOC (kg)			Total (kg)		
		Without	With	Reduced	Without	With	Reduced	Without	With	Reduced	Without	With	Reduced
CSAH 9	Old Rockford Rd	4.18	4.17	0.01	0.81	0.81	0.00	0.97	0.97	0.00	5.96	5.95	0.01
CSAH 9	Fernbrook Ln	5.63	5.54	0.09	1.09	1.08	0.01	1.30	1.28	0.02	8.02	7.90	0.12
CSAH 9	Annapolis Ln	3.11	3.17	(0.06)	0.30	0.62	(0.32)	0.72	0.74	(0.02)	4.13	4.53	(0.40)
CSAH 9	I-494 West Ramps	5.23	4.05	1.18	1.02	0.79	0.23	1.21	0.94	0.27	7.46	5.78	1.68
CSAH 9	I-494 East Ramps	3.68	3.15	0.53	0.72	0.61	0.11	0.85	0.73	0.12	5.25	4.49	0.76
CSAH 9	Vinewood Ln	4.78	3.67	1.11	0.93	0.71	0.22	1.11	0.85	0.26	6.82	5.23	1.59
CSAH 9	Northwest Blvd	10.35	10.02	0.33	2.01	1.95	0.06	2.40	2.32	0.08	14.76	14.29	0.47
CSAH 9	Larch Ln	5.61	5.58	0.03	1.09	1.09	0.00	1.30	1.29	0.01	8.00	7.96	0.04
CSAH 9	Zachary Ln	7.12	7.06	0.06	1.38	1.37	0.01	1.65	1.64	0.01	10.15	10.07	0.08
CSAH 9	Nathan Ln	6.43	6.53	(0.10)	1.25	1.27	(0.02)	1.49	1.51	(0.02)	9.17	9.31	(0.14)
CSAH 5	Texas Ave	3.10	3.06	0.04	0.60	0.60	0.00	0.72	0.71	0.01	4.42	4.37	0.05
CSAH 5	Louisiana Ave	5.45	5.23	0.22	1.06	1.02	0.04	1.26	1.21	0.05	7.77	7.46	0.31
CSAH 5	Hampshire Ave	1.69	1.58	0.11	0.33	0.31	0.02	0.39	0.37	0.02	2.41	2.26	0.15
CSAH 5	Dakota Ave	2.64	2.81	(0.17)	0.51	0.55	(0.04)	0.61	0.65	(0.04)	3.76	4.01	(0.25)
CSAH 5	Lake St/Vernon Ave	5.76	4.27	1.49	1.12	0.83	0.29	1.33	0.99	0.34	8.21	6.09	2.12
CSAH 5	MN-100 East Ramp	2.14	2.27	(0.13)	0.42	0.44	(0.02)	0.50	0.53	(0.03)	3.06	3.24	(0.18)
CSAH 5	Ottawa Ave	3.47	3.03	0.44	0.68	0.59	0.09	0.80	0.70	0.10	4.95	4.32	0.63
CSAH 3	Shady Oak Rd	7.46	6.83	0.63	1.45	1.33	0.12	1.73	1.58	0.15	10.64	9.74	0.90
CSAH 3	17th Ave	2.29	2.38	(0.09)	0.44	0.46	(0.02)	0.53	0.55	(0.02)	3.26	3.39	(0.13)
CSAH 3	11th Ave	4.49	4.51	(0.02)	0.87	0.88	(0.01)	1.04	1.05	(0.01)	6.40	6.44	(0.04)
CSAH 3	8th Ave	1.90	1.91	(0.01)	0.37	0.37	0.00	0.44	0.44	0.00	2.71	2.72	(0.01)
CSAH 3	5th Ave	3.26	2.89	0.37	0.63	0.56	0.07	0.76	0.67	0.09	4.65	4.12	0.53
CSAH 3	US-169 West Ramps	3.27	3.13	0.14	0.64	0.61	0.03	0.76	0.73	0.03	4.67	4.47	0.20
CSAH 3	US-169 East Ramps	3.28	3.37	(0.09)	0.64	0.66	(0.02)	0.76	0.78	(0.02)	4.68	4.81	(0.13)
CSAH 3	Milwaukee St	4.84	4.70	0.14	0.94	0.91	0.03	1.12	1.09	0.03	6.90	6.70	0.20
CSAH 1	Normandale Blvd	8.75	8.67	0.08	1.70	1.69	0.01	2.03	2.01	0.02	12.48	12.37	0.11
CSAH 1	Nesbitt Ave	4.91	5.17	(0.26)	0.96	1.01	(0.05)	1.14	1.20	(0.06)	7.01	7.38	(0.37)
CSAH 1	Bloomington Ferry Rd	5.54	5.32	0.22	1.08	1.04	0.04	1.28	1.23	0.05	7.90	7.59	0.31
CSAH 1	Bush Lake Rd	4.66	4.58	0.08	0.91	0.89	0.02	1.08	1.06	0.02	6.65	6.53	0.12
CSAH 1	Hampshire Ave	4.65	4.43	0.22	0.90	0.86	0.04	1.08	1.03	0.05	6.63	6.32	0.31
CSAH 1	US-169 West Ramps	2.13	2.08	0.05	0.41	0.40	0.01	0.49	0.48	0.01	3.03	2.96	0.07
CSAH 1	US-169 East Ramps	3.74	3.85	(0.11)	0.73	0.75	(0.02)	0.87	0.89	(0.02)	5.34	5.49	(0.15)
CSAH 1	98th St	2.24	2.28	(0.04)	0.44	0.44	0.00	0.52	0.53	(0.01)	3.20	3.25	(0.05)
CSAH 1	I-35W West Ramps	2.34	2.45	(0.11)	0.45	0.48	(0.03)	0.54	0.57	(0.03)	3.33	3.50	(0.17)
CSAH 1	I-35W East Ramps	3.27	3.21	0.06	0.64	0.62	0.02	0.76	0.74	0.02	4.67	4.57	0.10
CSAH 1	Lyndale Ave	3.76	3.65	0.11	0.73	0.71	0.02	0.87	0.85	0.02	5.36	5.21	0.15
CSAH 1	Garfield Ave	0.89	1.14	(0.25)	0.17	0.22	(0.05)	0.21	0.26	(0.05)	1.27	1.62	(0.35)
CSAH 1	Grand Ave	2.16	2.11	0.05	0.42	0.41	0.01	0.50	0.49	0.01	3.08	3.01	0.07
CSAH 1	Nicollet Ave	3.56	3.42	0.14	0.36	0.67	(0.31)	0.82	0.79	0.03	4.74	4.88	(0.14)
Total		163.76	157.27	6.49	31.20	30.61	0.59	37.94	36.45	1.49	232.90	224.33	8.57

31: Vicksburg Ln & Rockford Rd

Direction	All
Future Volume (vph)	2459
Total Delay / Veh (s/v)	31
CO Emissions (kg)	4.97
NOx Emissions (kg)	0.97
VOC Emissions (kg)	1.15

32: Polaris Ln/Old Rockford Rd & Rockford Rd

Direction	All
Future Volume (vph)	1995
Total Delay / Veh (s/v)	18
CO Emissions (kg)	4.18
NOx Emissions (kg)	0.81
VOC Emissions (kg)	0.97

41: Fernbrook Ln & Rockford Rd

Direction	All
Future Volume (vph)	3291
Total Delay / Veh (s/v)	29
CO Emissions (kg)	5.63
NOx Emissions (kg)	1.09
VOC Emissions (kg)	1.30

42: Annapolis Ln & Rockford Rd

Direction	All
Future Volume (vph)	3068
Total Delay / Veh (s/v)	18
CO Emissions (kg)	3.11
NOx Emissions (kg)	0.60
VOC Emissions (kg)	0.72

43: I-494 West Ramps & Rockford Rd

Direction	All
Future Volume (vph)	3227
Total Delay / Veh (s/v)	43
CO Emissions (kg)	5.23
NOx Emissions (kg)	1.02
VOC Emissions (kg)	1.21

44: I-494 East Ramp & Rockford Rd

Direction	All
Future Volume (vph)	2988
Total Delay / Veh (s/v)	33
CO Emissions (kg)	3.68
NOx Emissions (kg)	0.72
VOC Emissions (kg)	0.85

45: Vinewood Ln & Rockford Rd

Direction	All
Future Volume (vph)	3114
Total Delay / Veh (s/v)	43
CO Emissions (kg)	4.78
NOx Emissions (kg)	0.93
VOC Emissions (kg)	1.11

46: Northwest Blvd & Rockford Rd

Direction	All
Future Volume (vph)	3925
Total Delay / Veh (s/v)	85
CO Emissions (kg)	10.35
NOx Emissions (kg)	2.01
VOC Emissions (kg)	2.40

48: Larch Ln & Rockford Rd

Direction	All
Future Volume (vph)	2599
Total Delay / Veh (s/v)	17
CO Emissions (kg)	5.61
NOx Emissions (kg)	1.09
VOC Emissions (kg)	1.30

49: Zachary Ln & Rockford Rd

Direction	All
Future Volume (vph)	2841
Total Delay / Veh (s/v)	41
CO Emissions (kg)	7.12
NOx Emissions (kg)	1.38
VOC Emissions (kg)	1.65

50: Rockford Rd & Nathan Ln

Direction	All
Future Volume (vph)	3268
Total Delay / Veh (s/v)	41
CO Emissions (kg)	6.43
NOx Emissions (kg)	1.25
VOC Emissions (kg)	1.49

Rockford Road
2016 Existing PM

7/12/2016

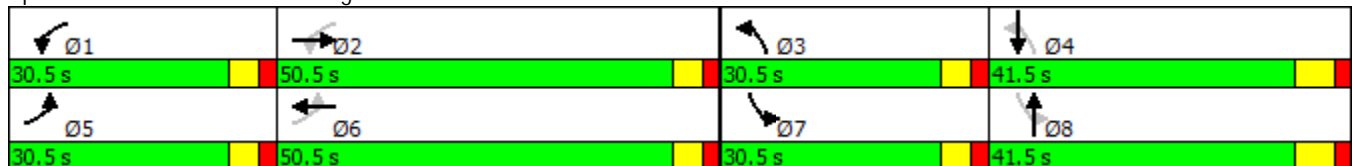


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	30.5	50.5	30.5	41.5	30.5	50.5	30.5	41.5
Maximum Split (%)	19.9%	33.0%	19.9%	27.1%	19.9%	33.0%	19.9%	27.1%
Minimum Split (s)	11.5	37	11.5	40.5	11.5	37	11.5	37
Yellow Time (s)	3.5	3.5	3.5	4.5	3.5	3.5	3.5	4.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Minimum Gap (s)	3.5	2.5	3.5	2.5	3.5	2.5	3.5	2.5
Time Before Reduce (s)	0	15	0	12	0	15	0	12
Time To Reduce (s)	0	15	0	12	0	15	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		27		23		22
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	No	Yes	No	Yes	No	Yes	No
Start Time (s)	0	30.5	81	111.5	0	30.5	81	111.5
End Time (s)	30.5	81	111.5	0	30.5	81	111.5	0
Yield/Force Off (s)	25	75.5	106	146.5	25	75.5	106	146.5
Yield/Force Off 170(s)	25	75.5	106	119.5	25	75.5	106	124.5
Local Start Time (s)	122.5	0	50.5	81	122.5	0	50.5	81
Local Yield (s)	147.5	45	75.5	116	147.5	45	75.5	116
Local Yield 170(s)	147.5	45	75.5	89	147.5	45	75.5	94

Intersection Summary

Cycle Length	153
Control Type	Actuated-Uncoordinated
Natural Cycle	105

Splits and Phases: 31: Vicksburg Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016



Phase Number	1	2	4	5	6	8
Movement	WBL	EBWB	SBTL	EBL	EBWB	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	20.5	51.5	36.5	20.5	51.5	26.5
Maximum Split (%)	18.9%	47.5%	33.6%	18.9%	47.5%	24.4%
Minimum Split (s)	11.5	32	17	11.5	32	35.5
Yellow Time (s)	3.5	4.5	4.5	3.5	4.5	4.5
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	6	12	10	6	12	10
Vehicle Extension (s)	3.5	4	4	3.5	4	4
Minimum Gap (s)	3.5	3	4	3.5	3	4
Time Before Reduce (s)	0	20	0	0	20	0
Time To Reduce (s)	0	20	0	0	20	0
Walk Time (s)		7				7
Flash Dont Walk (s)		15				22
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	No	No	No	No	No	No
Start Time (s)	0	20.5	72	0	20.5	72
End Time (s)	20.5	72	0	20.5	72	0
Yield/Force Off (s)	15	65.5	102	15	65.5	102
Yield/Force Off 170(s)	15	65.5	102	15	65.5	80
Local Start Time (s)	88	0	51.5	88	0	51.5
Local Yield (s)	103	45	81.5	103	45	81.5
Local Yield 170(s)	103	45	81.5	103	45	59.5

Intersection Summary

Cycle Length	108.5
Control Type	Actuated-Uncoordinated
Natural Cycle	80

Splits and Phases: 32: Polaris Ln/Old Rockford Rd & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

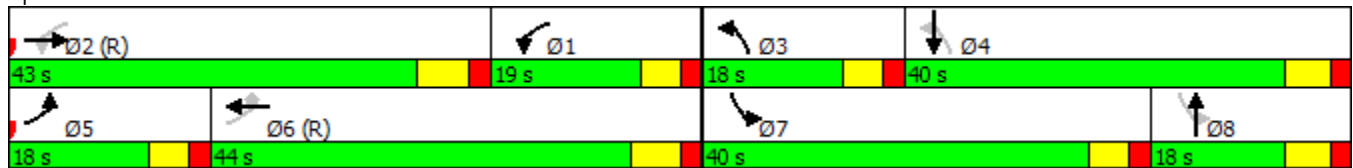


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	19	43	18	40	18	44	40	18
Maximum Split (%)	15.8%	35.8%	15.0%	33.3%	15.0%	36.7%	33.3%	15.0%
Minimum Split (s)	14	41.5	14	49	14	41.5	14	41
Yellow Time (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	4.5	3	3.5	3	4.5	3	3.5
Minimum Gap (s)	3	2.5	3	3.5	3	2.5	3	3.5
Time Before Reduce (s)	0	10	0	0	0	10	0	0
Time To Reduce (s)	0	10	0	0	0	10	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		28		36		28		28
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	90	47	109	7	47	65	109	29
End Time (s)	109	90	7	47	65	109	29	47
Yield/Force Off (s)	103.5	83.5	1.5	41	59.5	102.5	23.5	41
Yield/Force Off 170(s)	103.5	55.5	1.5	5	59.5	74.5	23.5	13
Local Start Time (s)	43	0	62	80	0	18	62	102
Local Yield (s)	56.5	36.5	74.5	114	12.5	55.5	96.5	114
Local Yield 170(s)	56.5	8.5	74.5	78	12.5	27.5	96.5	86

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	120
Offset: 47 (39%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green	

Splits and Phases: 41: Fernbrook Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

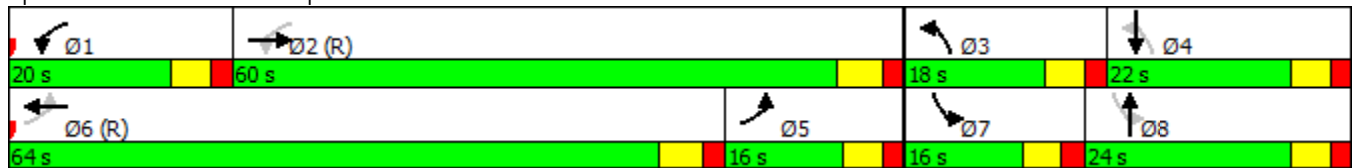


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	60	18	22	16	64	16	24
Maximum Split (%)	16.7%	50.0%	15.0%	18.3%	13.3%	53.3%	13.3%	20.0%
Minimum Split (s)	14	34	14	44.5	14	40	14	40.5
Yellow Time (s)	3.5	4	3.5	3.5	3.5	4	3.5	3.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	4	3	3.5	3	4	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		32		27		28
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	28	48	108	6	92	28	108	4
End Time (s)	48	108	6	28	108	92	4	28
Yield/Force Off (s)	42.5	102	0.5	22.5	102.5	86	118.5	22.5
Yield/Force Off 170(s)	42.5	81	0.5	110.5	102.5	59	118.5	114.5
Local Start Time (s)	0	20	80	98	64	0	80	96
Local Yield (s)	14.5	74	92.5	114.5	74.5	58	90.5	114.5
Local Yield 170(s)	14.5	53	92.5	82.5	74.5	31	90.5	86.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	135
Offset: 28 (23%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green	

Splits and Phases: 42: Annapolis Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

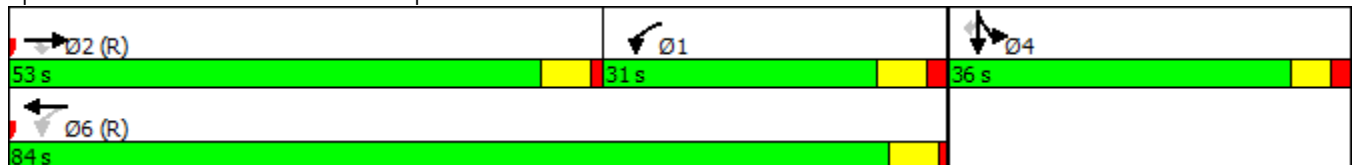


Phase Number	1	2	4	6
Movement	WBL	EBT	SBTL	WBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize				
Recall Mode	None	C-Max	None	C-Max
Maximum Split (s)	31	53	36	84
Maximum Split (%)	25.8%	44.2%	30.0%	70.0%
Minimum Split (s)	20	29.5	38.5	18
Yellow Time (s)	4.5	4.5	3.5	4.5
All-Red Time (s)	2	1	2	1
Minimum Initial (s)	7	10	7	10
Vehicle Extension (s)	3.5	4.5	3.5	3.5
Minimum Gap (s)	3.5	3	3.5	3
Time Before Reduce (s)	0	13	0	13
Time To Reduce (s)	0	13	0	13
Walk Time (s)		7	7	
Flash Dont Walk (s)		17	26	
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	77	24	108	24
End Time (s)	108	77	24	108
Yield/Force Off (s)	101.5	71.5	18.5	102.5
Yield/Force Off 170(s)	101.5	54.5	112.5	102.5
Local Start Time (s)	53	0	84	0
Local Yield (s)	77.5	47.5	114.5	78.5
Local Yield 170(s)	77.5	30.5	88.5	78.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 24 (20%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	

Splits and Phases: 43: I-494 West Ramps & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016



Phase Number	2	5	6	8
Movement	EBTL	EBL	WBT	NBTL
Lead/Lag		Lead	Lag	
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	93	25	68	27
Maximum Split (%)	77.5%	20.8%	56.7%	22.5%
Minimum Split (s)	20.5	20	18	30.5
Yellow Time (s)	4.5	4.5	4.5	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	10	7	10	7
Vehicle Extension (s)	5.5	3.5	5.5	3.5
Minimum Gap (s)	3	3.5	3	3.5
Time Before Reduce (s)	13	0	13	0
Time To Reduce (s)	13	0	13	0
Walk Time (s)	7			7
Flash Dont Walk (s)	7			18
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	60	60	85	33
End Time (s)	33	85	33	60
Yield/Force Off (s)	26.5	78.5	26.5	54.5
Yield/Force Off 170(s)	19.5	78.5	26.5	36.5
Local Start Time (s)	0	0	25	93
Local Yield (s)	86.5	18.5	86.5	114.5
Local Yield 170(s)	79.5	18.5	86.5	96.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	150
Offset: 60 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 44: I-494 East Ramp & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

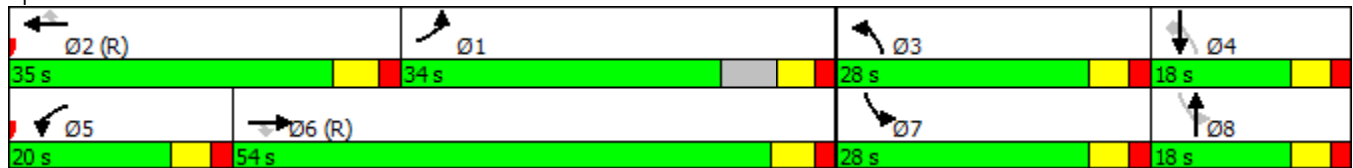


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	NBSB	WBL	EBT	SBL	NBSB
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	34	35	28	18	20	54	28	18
Maximum Split (%)	28.3%	29.2%	23.3%	15.0%	16.7%	45.0%	23.3%	15.0%
Minimum Split (s)	14	33	14	39.5	14	35	14	37.5
Yellow Time (s)	3.5	4	3.5	3.5	3.5	4	3.5	3.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	7	12	7	10	7	12	7	10
Vehicle Extension (s)	3	3.5	3	3.5	3	3.5	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	10	0	0	0	10	0	0
Time To Reduce (s)	0	10	0	0	0	10	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		20		27		22		25
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	5	90	44	72	90	110	44	72
End Time (s)	44	5	72	90	110	44	72	90
Yield/Force Off (s)	38.5	119	66.5	84.5	104.5	38	66.5	84.5
Yield/Force Off 170(s)	38.5	99	66.5	57.5	104.5	16	66.5	59.5
Local Start Time (s)	35	0	74	102	0	20	74	102
Local Yield (s)	68.5	29	96.5	114.5	14.5	68	96.5	114.5
Local Yield 170(s)	68.5	9	96.5	87.5	14.5	46	96.5	89.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	105
Offset: 90 (75%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 45: Vinewood Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

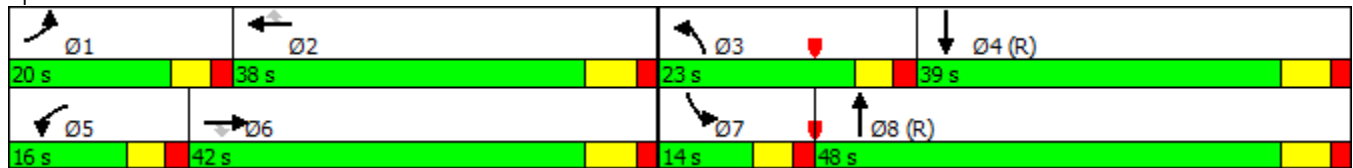


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	C-Max	None	Min	None	C-Max
Maximum Split (s)	20	38	23	39	16	42	14	48
Maximum Split (%)	16.7%	31.7%	19.2%	32.5%	13.3%	35.0%	11.7%	40.0%
Minimum Split (s)	14	34.5	14	35.5	14	35.5	14	35.5
Yellow Time (s)	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	7	12	7	12	7	12	7	12
Vehicle Extension (s)	3.5	4	3.5	4.5	3.5	4	3.5	4.5
Minimum Gap (s)	3.5	2.5	3.5	4.5	3.5	2.5	3.5	4.5
Time Before Reduce (s)	0	13	0	0	0	13	0	0
Time To Reduce (s)	0	13	0	0	0	13	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		22		22		22
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	88	108	26	49	88	104	26	40
End Time (s)	108	26	49	88	104	26	40	88
Yield/Force Off (s)	102.5	19.5	43.5	81.5	98.5	19.5	34.5	81.5
Yield/Force Off 170(s)	102.5	19.5	43.5	59.5	98.5	19.5	34.5	59.5
Local Start Time (s)	48	68	106	9	48	64	106	0
Local Yield (s)	62.5	99.5	3.5	41.5	58.5	99.5	114.5	41.5
Local Yield 170(s)	62.5	99.5	3.5	19.5	58.5	99.5	114.5	19.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	140
Offset: 40 (33%), Referenced to phase 4:SBT and 8:NBT, Start of 1st Green	

Splits and Phases: 46: Northwest Blvd & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

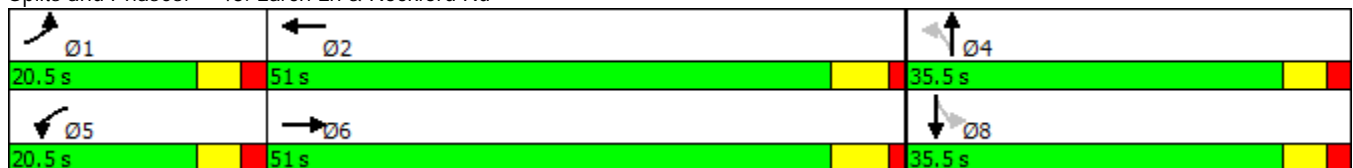


Phase Number	1	2	4	5	6	8
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	20.5	51	35.5	20.5	51	35.5
Maximum Split (%)	19.2%	47.7%	33.2%	19.2%	47.7%	33.2%
Minimum Split (s)	11.5	36	36.5	11.5	36	32.5
Yellow Time (s)	3.5	4.5	3.5	3.5	4.5	3.5
All-Red Time (s)	2	1.5	2	2	1.5	2
Minimum Initial (s)	6	30	8	6	30	8
Vehicle Extension (s)	3	5	3.5	3	5	3.5
Minimum Gap (s)	3	2.5	3.5	3	2.5	3.5
Time Before Reduce (s)	0	15	0	0	15	0
Time To Reduce (s)	0	15	0	0	15	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		19	24		18	20
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	20.5	71.5	0	20.5	71.5
End Time (s)	20.5	71.5	0	20.5	71.5	0
Yield/Force Off (s)	15	65.5	101.5	15	65.5	101.5
Yield/Force Off 170(s)	15	65.5	77.5	15	65.5	81.5
Local Start Time (s)	86.5	0	51	86.5	0	51
Local Yield (s)	101.5	45	81	101.5	45	81
Local Yield 170(s)	101.5	45	57	101.5	45	61

Intersection Summary

Cycle Length	107
Control Type	Actuated-Uncoordinated
Natural Cycle	85

Splits and Phases: 48: Larch Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

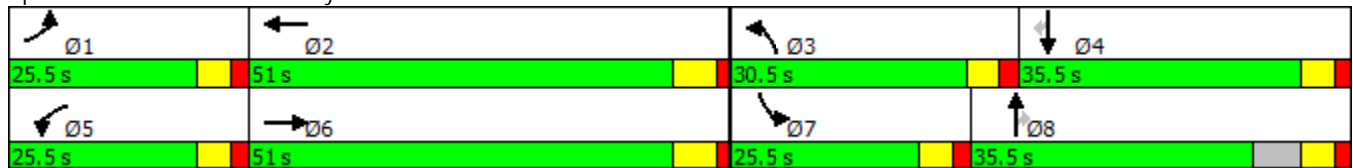


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	25.5	51	30.5	35.5	25.5	51	25.5	35.5
Maximum Split (%)	17.9%	35.8%	21.4%	24.9%	17.9%	35.8%	17.9%	24.9%
Minimum Split (s)	12.5	37	12.5	39.5	12.5	39	12.5	39.5
Yellow Time (s)	3.5	4.5	3.5	3.5	3.5	4.5	3.5	3.5
All-Red Time (s)	2	1.5	2	2	2	1.5	2	2
Minimum Initial (s)	7	30	7	8	7	30	7	8
Vehicle Extension (s)	3.5	5	4.5	3.5	3.5	5	3	3.5
Minimum Gap (s)	3.5	2.5	4.5	3.5	3.5	2.5	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		24		27		26		27
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	25.5	76.5	107	0	25.5	76.5	102
End Time (s)	25.5	76.5	107	0	25.5	76.5	102	0
Yield/Force Off (s)	20	70.5	101.5	137	20	70.5	96.5	137
Yield/Force Off 170(s)	20	70.5	101.5	110	20	70.5	96.5	110
Local Start Time (s)	117	0	51	81.5	117	0	51	76.5
Local Yield (s)	137	45	76	111.5	137	45	71	111.5
Local Yield 170(s)	137	45	76	84.5	137	45	71	84.5

Intersection Summary

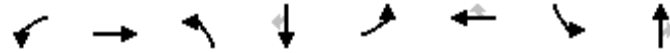
Cycle Length	142.5
Control Type	Actuated-Uncoordinated
Natural Cycle	115

Splits and Phases: 49: Zachary Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

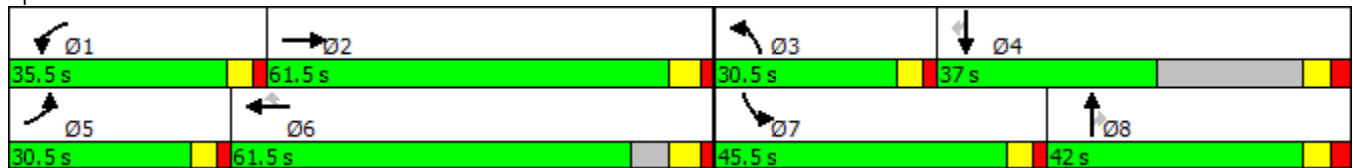


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	35.5	61.5	30.5	37	30.5	61.5	45.5	42
Maximum Split (%)	19.2%	33.3%	16.5%	20.1%	16.5%	33.3%	24.7%	22.8%
Minimum Split (s)	13.5	41.5	13.5	42	13.5	41.5	13.5	47
Yellow Time (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
All-Red Time (s)	2	2	2	3	2	2	2	3
Minimum Initial (s)	8	35	8	12	8	35	8	12
Vehicle Extension (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
Minimum Gap (s)	3.5	3	3.5	4	3.5	3	3.5	4
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		28		24		33
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	35.5	97	127.5	0	30.5	97	142.5
End Time (s)	35.5	97	127.5	0	30.5	97	142.5	0
Yield/Force Off (s)	30	90.5	122	177.5	25	90.5	137	177.5
Yield/Force Off 170(s)	30	90.5	122	149.5	25	90.5	137	144.5
Local Start Time (s)	149	0	61.5	92	149	179.5	61.5	107
Local Yield (s)	179	55	86.5	142	174	55	101.5	142
Local Yield 170(s)	179	55	86.5	114	174	55	101.5	109

Intersection Summary

Cycle Length	184.5
Control Type	Actuated-Uncoordinated
Natural Cycle	140

Splits and Phases: 50: Rockford Rd & Nathan Ln



31: Vicksburg Ln & Rockford Rd

Direction	All
Future Volume (vph)	2459
Total Delay / Veh (s/v)	30
CO Emissions (kg)	4.94
NOx Emissions (kg)	0.96
VOC Emissions (kg)	1.14

32: Polaris Ln/Old Rockford Rd & Rockford Rd

Direction	All
Future Volume (vph)	1995
Total Delay / Veh (s/v)	17
CO Emissions (kg)	4.17
NOx Emissions (kg)	0.81
VOC Emissions (kg)	0.97

41: Fernbrook Ln & Rockford Rd

Direction	All
Future Volume (vph)	3291
Total Delay / Veh (s/v)	28
CO Emissions (kg)	5.54
NOx Emissions (kg)	1.08
VOC Emissions (kg)	1.28

42: Annapolis Ln & Rockford Rd

Direction	All
Future Volume (vph)	3068
Total Delay / Veh (s/v)	18
CO Emissions (kg)	3.17
NOx Emissions (kg)	0.62
VOC Emissions (kg)	0.74

43: I-494 West Ramps & Rockford Rd

Direction	All
Future Volume (vph)	3227
Total Delay / Veh (s/v)	26
CO Emissions (kg)	4.05
NOx Emissions (kg)	0.79
VOC Emissions (kg)	0.94

44: I-494 East Ramp & Rockford Rd

Direction	All
Future Volume (vph)	2988
Total Delay / Veh (s/v)	25
CO Emissions (kg)	3.15
NOx Emissions (kg)	0.61
VOC Emissions (kg)	0.73

45: Vinewood Ln & Rockford Rd

Direction	All
Future Volume (vph)	3114
Total Delay / Veh (s/v)	33
CO Emissions (kg)	3.67
NOx Emissions (kg)	0.71
VOC Emissions (kg)	0.85

46: Northwest Blvd & Rockford Rd

Direction	All
Future Volume (vph)	3925
Total Delay / Veh (s/v)	76
CO Emissions (kg)	10.02
NOx Emissions (kg)	1.95
VOC Emissions (kg)	2.32

48: Larch Ln & Rockford Rd

Direction	All
Future Volume (vph)	2599
Total Delay / Veh (s/v)	17
CO Emissions (kg)	5.58
NOx Emissions (kg)	1.09
VOC Emissions (kg)	1.29

49: Zachary Ln & Rockford Rd

Direction	All
Future Volume (vph)	2841
Total Delay / Veh (s/v)	40
CO Emissions (kg)	7.06
NOx Emissions (kg)	1.37
VOC Emissions (kg)	1.64

50: Rockford Rd & Nathan Ln

Direction	All
Future Volume (vph)	3268
Total Delay / Veh (s/v)	43
CO Emissions (kg)	6.53
NOx Emissions (kg)	1.27
VOC Emissions (kg)	1.51

Rockford Road
2016 Improved PM

7/12/2016

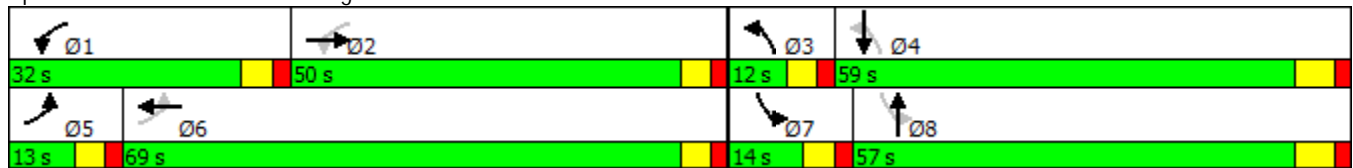


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	32	50	12	59	13	69	14	57
Maximum Split (%)	20.9%	32.7%	7.8%	38.6%	8.5%	45.1%	9.2%	37.3%
Minimum Split (s)	11.5	37	11.5	40.5	11.5	37	11.5	37
Yellow Time (s)	3.5	3.5	3.5	4.5	3.5	3.5	3.5	4.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Minimum Gap (s)	3.5	2.5	3.5	2.5	3.5	2.5	3.5	2.5
Time Before Reduce (s)	0	15	0	12	0	15	0	12
Time To Reduce (s)	0	15	0	12	0	15	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		27		23		22
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	No	Yes	No	Yes	No	Yes	No
Start Time (s)	0	32	82	94	0	13	82	96
End Time (s)	32	82	94	0	13	82	96	0
Yield/Force Off (s)	26.5	76.5	88.5	146.5	7.5	76.5	90.5	146.5
Yield/Force Off 170(s)	26.5	76.5	88.5	119.5	7.5	76.5	90.5	124.5
Local Start Time (s)	140	19	69	81	140	0	69	83
Local Yield (s)	13.5	63.5	75.5	133.5	147.5	63.5	77.5	133.5
Local Yield 170(s)	13.5	63.5	75.5	106.5	147.5	63.5	77.5	111.5

Intersection Summary

Cycle Length	153
Control Type	Actuated-Uncoordinated
Natural Cycle	105

Splits and Phases: 31: Vicksburg Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

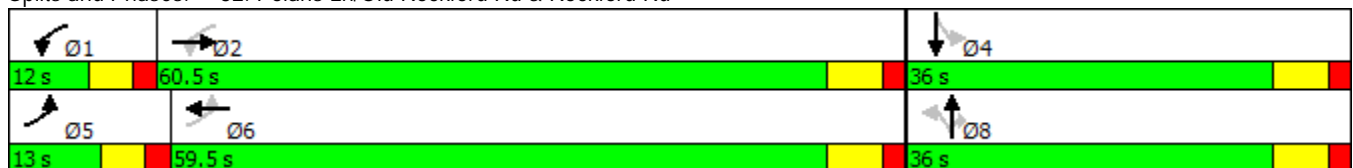


Phase Number	1	2	4	5	6	8
Movement	WBL	EBWB	SBTL	EBL	EBWB	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	12	60.5	36	13	59.5	36
Maximum Split (%)	11.1%	55.8%	33.2%	12.0%	54.8%	33.2%
Minimum Split (s)	11.5	32	17	11.5	32	35.5
Yellow Time (s)	3.5	4.5	4.5	3.5	4.5	4.5
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	6	12	10	6	12	10
Vehicle Extension (s)	3.5	4	4	3.5	4	4
Minimum Gap (s)	3.5	3	4	3.5	3	4
Time Before Reduce (s)	0	20	0	0	20	0
Time To Reduce (s)	0	20	0	0	20	0
Walk Time (s)		7				7
Flash Dont Walk (s)		15				22
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	No	No	No	No	No	No
Start Time (s)	0	12	72.5	0	13	72.5
End Time (s)	12	72.5	0	13	72.5	0
Yield/Force Off (s)	6.5	66	102	7.5	66	102
Yield/Force Off 170(s)	6.5	66	102	7.5	66	80
Local Start Time (s)	96.5	0	60.5	96.5	1	60.5
Local Yield (s)	103	54	90	104	54	90
Local Yield 170(s)	103	54	90	104	54	68

Intersection Summary

Cycle Length	108.5
Control Type	Actuated-Uncoordinated
Natural Cycle	80

Splits and Phases: 32: Polaris Ln/Old Rockford Rd & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

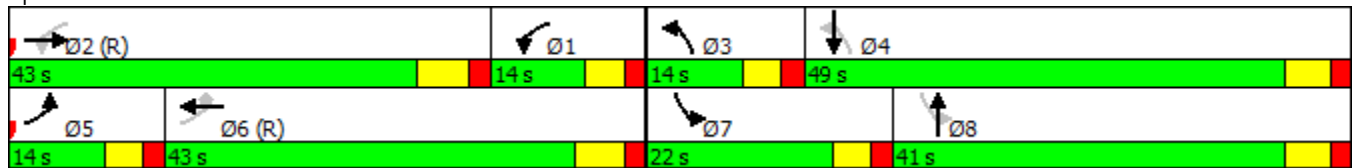


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	14	43	14	49	14	43	22	41
Maximum Split (%)	11.7%	35.8%	11.7%	40.8%	11.7%	35.8%	18.3%	34.2%
Minimum Split (s)	14	41.5	14	49	14	41.5	14	41
Yellow Time (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	4.5	3	3.5	3	4.5	3	3.5
Minimum Gap (s)	3	2.5	3	3.5	3	2.5	3	3.5
Time Before Reduce (s)	0	10	0	0	0	10	0	0
Time To Reduce (s)	0	10	0	0	0	10	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		28		36		28		28
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	99	56	113	7	56	70	113	15
End Time (s)	113	99	7	56	70	113	15	56
Yield/Force Off (s)	107.5	92.5	1.5	50	64.5	106.5	9.5	50
Yield/Force Off 170(s)	107.5	64.5	1.5	14	64.5	78.5	9.5	22
Local Start Time (s)	43	0	57	71	0	14	57	79
Local Yield (s)	51.5	36.5	65.5	114	8.5	50.5	73.5	114
Local Yield 170(s)	51.5	8.5	65.5	78	8.5	22.5	73.5	86

Intersection Summary

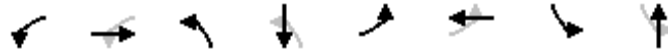
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	120
Offset: 56 (47%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green	

Splits and Phases: 41: Fernbrook Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

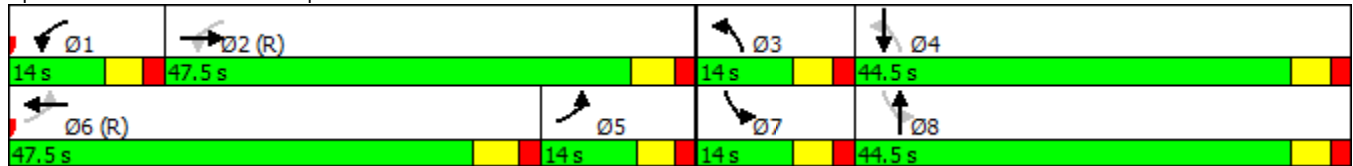


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	14	47.5	14	44.5	14	47.5	14	44.5
Maximum Split (%)	11.7%	39.6%	11.7%	37.1%	11.7%	39.6%	11.7%	37.1%
Minimum Split (s)	14	34	14	44.5	14	40	14	40.5
Yellow Time (s)	3.5	4	3.5	3.5	3.5	4	3.5	3.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	4	3	3.5	3	4	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		32		27		28
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	48	62	109.5	3.5	95.5	48	109.5	3.5
End Time (s)	62	109.5	3.5	48	109.5	95.5	3.5	48
Yield/Force Off (s)	56.5	103.5	118	42.5	104	89.5	118	42.5
Yield/Force Off 170(s)	56.5	82.5	118	10.5	104	62.5	118	14.5
Local Start Time (s)	0	14	61.5	75.5	47.5	0	61.5	75.5
Local Yield (s)	8.5	55.5	70	114.5	56	41.5	70	114.5
Local Yield 170(s)	8.5	34.5	70	82.5	56	14.5	70	86.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	135
Offset: 48 (40%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green	

Splits and Phases: 42: Annapolis Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

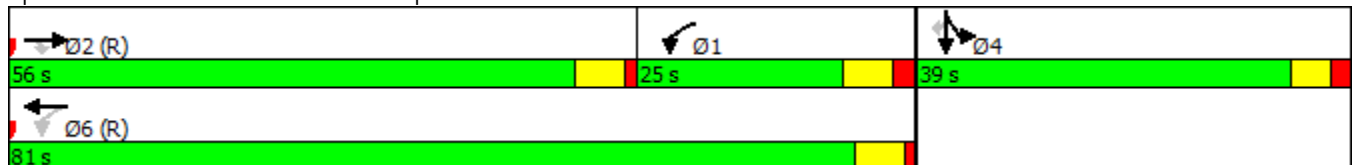


Phase Number	1	2	4	6
Movement	WBL	EBT	SBTL	WBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize				
Recall Mode	None	C-Max	None	C-Max
Maximum Split (s)	25	56	39	81
Maximum Split (%)	20.8%	46.7%	32.5%	67.5%
Minimum Split (s)	20	29.5	38.5	18
Yellow Time (s)	4.5	4.5	3.5	4.5
All-Red Time (s)	2	1	2	1
Minimum Initial (s)	7	10	7	10
Vehicle Extension (s)	3.5	4.5	3.5	3.5
Minimum Gap (s)	3.5	3	3.5	3
Time Before Reduce (s)	0	13	0	13
Time To Reduce (s)	0	13	0	13
Walk Time (s)		7	7	
Flash Dont Walk (s)		17	26	
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	17	81	42	81
End Time (s)	42	17	81	42
Yield/Force Off (s)	35.5	11.5	75.5	36.5
Yield/Force Off 170(s)	35.5	114.5	49.5	36.5
Local Start Time (s)	56	0	81	0
Local Yield (s)	74.5	50.5	114.5	75.5
Local Yield 170(s)	74.5	33.5	88.5	75.5

Intersection Summary

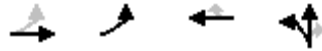
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 81 (68%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	

Splits and Phases: 43: I-494 West Ramps & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016



Phase Number	2	5	6	8
Movement	EBTL	EBL	WBT	NBTL
Lead/Lag		Lead	Lag	
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	89.4	20	69.4	30.6
Maximum Split (%)	74.5%	16.7%	57.8%	25.5%
Minimum Split (s)	20.5	20	18	30.5
Yellow Time (s)	4.5	4.5	4.5	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	10	7	10	7
Vehicle Extension (s)	5.5	3.5	5.5	3.5
Minimum Gap (s)	3	3.5	3	3.5
Time Before Reduce (s)	13	0	13	0
Time To Reduce (s)	13	0	13	0
Walk Time (s)	7			7
Flash Dont Walk (s)	7			18
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	60	60	80	29.4
End Time (s)	29.4	80	29.4	60
Yield/Force Off (s)	22.9	73.5	22.9	54.5
Yield/Force Off 170(s)	15.9	73.5	22.9	36.5
Local Start Time (s)	0	0	20	89.4
Local Yield (s)	82.9	13.5	82.9	114.5
Local Yield 170(s)	75.9	13.5	82.9	96.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	150
Offset: 60 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 44: I-494 East Ramp & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

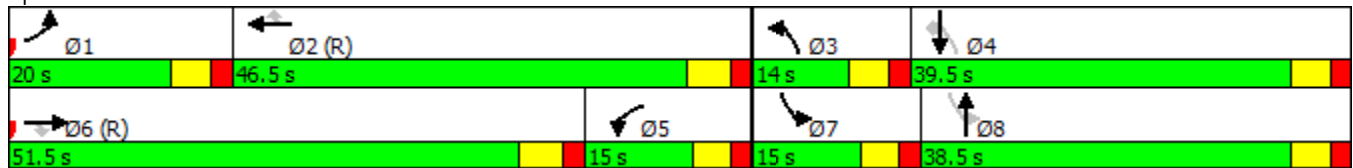


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	NBSB	WBL	EBT	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	46.5	14	39.5	15	51.5	15	38.5
Maximum Split (%)	16.7%	38.8%	11.7%	32.9%	12.5%	42.9%	12.5%	32.1%
Minimum Split (s)	14	33	14	39.5	14	35	14	37.5
Yellow Time (s)	3.5	4	3.5	3.5	3.5	4	3.5	3.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	7	12	7	10	7	12	7	10
Vehicle Extension (s)	3	3.5	3	3.5	3	3.5	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	10	0	0	0	10	0	0
Time To Reduce (s)	0	10	0	0	0	10	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		20		27		22		25
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	76	96	22.5	36.5	7.5	76	22.5	37.5
End Time (s)	96	22.5	36.5	76	22.5	7.5	37.5	76
Yield/Force Off (s)	90.5	16.5	31	70.5	17	1.5	32	70.5
Yield/Force Off 170(s)	90.5	116.5	31	43.5	17	99.5	32	45.5
Local Start Time (s)	0	20	66.5	80.5	51.5	0	66.5	81.5
Local Yield (s)	14.5	60.5	75	114.5	61	45.5	76	114.5
Local Yield 170(s)	14.5	40.5	75	87.5	61	23.5	76	89.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	105
Offset: 76 (63%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 45: Vinewood Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

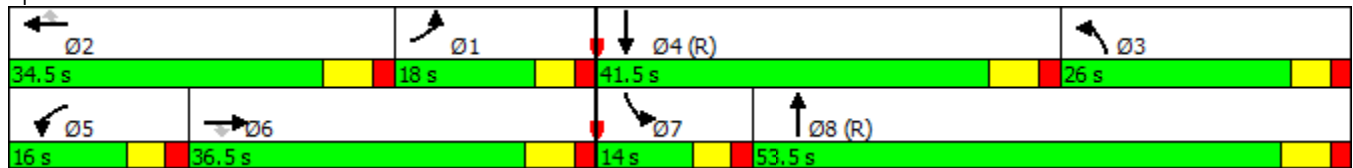


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	C-Max	None	Min	None	C-Max
Maximum Split (s)	18	34.5	26	41.5	16	36.5	14	53.5
Maximum Split (%)	15.0%	28.8%	21.7%	34.6%	13.3%	30.4%	11.7%	44.6%
Minimum Split (s)	14	34.5	14	35.5	14	35.5	14	35.5
Yellow Time (s)	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	7	12	7	12	7	12	7	12
Vehicle Extension (s)	3.5	4	3.5	4.5	3.5	4	3.5	4.5
Minimum Gap (s)	3.5	2.5	3.5	4.5	3.5	2.5	3.5	4.5
Time Before Reduce (s)	0	13	0	0	0	13	0	0
Time To Reduce (s)	0	13	0	0	0	13	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		22		22		22
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	119	84.5	58.5	17	84.5	100.5	17	31
End Time (s)	17	119	84.5	58.5	100.5	17	31	84.5
Yield/Force Off (s)	11.5	112.5	79	52	95	10.5	25.5	78
Yield/Force Off 170(s)	11.5	112.5	79	30	95	10.5	25.5	56
Local Start Time (s)	102	67.5	41.5	0	67.5	83.5	0	14
Local Yield (s)	114.5	95.5	62	35	78	113.5	8.5	61
Local Yield 170(s)	114.5	95.5	62	13	78	113.5	8.5	39

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	140
Offset: 17 (14%), Referenced to phase 4:SBT and 8:NBT, Start of 1st Green	

Splits and Phases: 46: Northwest Blvd & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016



Phase Number	1	2	4	5	6	8
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	16	54.4	36.6	12.8	57.6	36.6
Maximum Split (%)	15.0%	50.8%	34.2%	12.0%	53.8%	34.2%
Minimum Split (s)	11.5	36	36.5	11.5	36	32.5
Yellow Time (s)	3.5	4.5	3.5	3.5	4.5	3.5
All-Red Time (s)	2	1.5	2	2	1.5	2
Minimum Initial (s)	6	30	8	6	30	8
Vehicle Extension (s)	3	5	3.5	3	5	3.5
Minimum Gap (s)	3	2.5	3.5	3	2.5	3.5
Time Before Reduce (s)	0	15	0	0	15	0
Time To Reduce (s)	0	15	0	0	15	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		19	24		18	20
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	16	70.4	0	12.8	70.4
End Time (s)	16	70.4	0	12.8	70.4	0
Yield/Force Off (s)	10.5	64.4	101.5	7.3	64.4	101.5
Yield/Force Off 170(s)	10.5	64.4	77.5	7.3	64.4	81.5
Local Start Time (s)	91	0	54.4	91	103.8	54.4
Local Yield (s)	101.5	48.4	85.5	98.3	48.4	85.5
Local Yield 170(s)	101.5	48.4	61.5	98.3	48.4	65.5

Intersection Summary

Cycle Length	107
Control Type	Actuated-Uncoordinated
Natural Cycle	85

Splits and Phases: 48: Larch Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

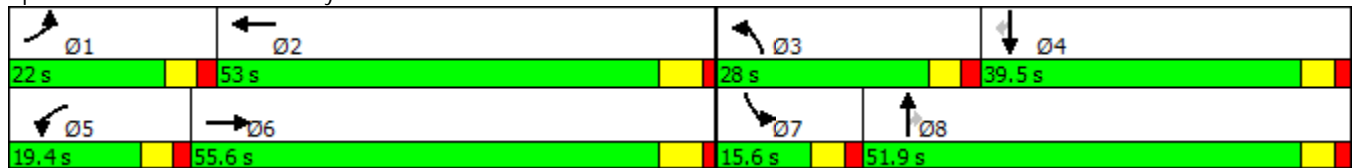


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	22	53	28	39.5	19.4	55.6	15.6	51.9
Maximum Split (%)	15.4%	37.2%	19.6%	27.7%	13.6%	39.0%	10.9%	36.4%
Minimum Split (s)	12.5	37	12.5	39.5	12.5	39	12.5	39.5
Yellow Time (s)	3.5	4.5	3.5	3.5	3.5	4.5	3.5	3.5
All-Red Time (s)	2	1.5	2	2	2	1.5	2	2
Minimum Initial (s)	7	30	7	8	7	30	7	8
Vehicle Extension (s)	3.5	5	4.5	3.5	3.5	5	3	3.5
Minimum Gap (s)	3.5	2.5	4.5	3.5	3.5	2.5	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		24		27		26		27
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	22	75	103	0	19.4	75	90.6
End Time (s)	22	75	103	0	19.4	75	90.6	0
Yield/Force Off (s)	16.5	69	97.5	137	13.9	69	85.1	137
Yield/Force Off 170(s)	16.5	69	97.5	110	13.9	69	85.1	110
Local Start Time (s)	120.5	0	53	81	120.5	139.9	53	68.6
Local Yield (s)	137	47	75.5	115	134.4	47	63.1	115
Local Yield 170(s)	137	47	75.5	88	134.4	47	63.1	88

Intersection Summary

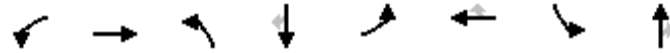
Cycle Length	142.5
Control Type	Actuated-Uncoordinated
Natural Cycle	115

Splits and Phases: 49: Zachary Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

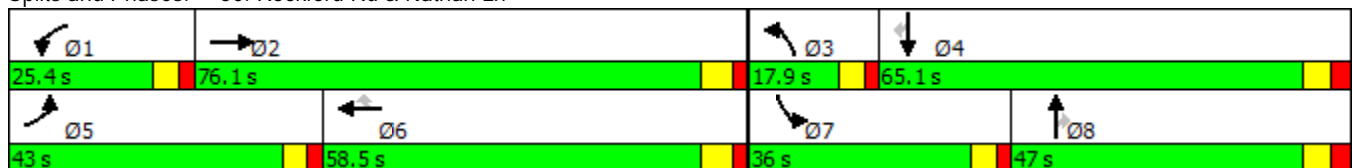


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	25.4	76.1	17.9	65.1	43	58.5	36	47
Maximum Split (%)	13.8%	41.2%	9.7%	35.3%	23.3%	31.7%	19.5%	25.5%
Minimum Split (s)	13.5	41.5	13.5	42	13.5	41.5	13.5	47
Yellow Time (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
All-Red Time (s)	2	2	2	3	2	2	2	3
Minimum Initial (s)	8	35	8	12	8	35	8	12
Vehicle Extension (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
Minimum Gap (s)	3.5	3	3.5	4	3.5	3	3.5	4
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		28		24		33
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	25.4	101.5	119.4	0	43	101.5	137.5
End Time (s)	25.4	101.5	119.4	0	43	101.5	137.5	0
Yield/Force Off (s)	19.9	95	113.9	177.5	37.5	95	132	177.5
Yield/Force Off 170(s)	19.9	95	113.9	149.5	37.5	95	132	144.5
Local Start Time (s)	141.5	166.9	58.5	76.4	141.5	0	58.5	94.5
Local Yield (s)	161.4	52	70.9	134.5	179	52	89	134.5
Local Yield 170(s)	161.4	52	70.9	106.5	179	52	89	101.5

Intersection Summary

Cycle Length	184.5
Control Type	Actuated-Uncoordinated
Natural Cycle	140

Splits and Phases: 50: Rockford Rd & Nathan Ln



201: Texas Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2116
Total Delay / Veh (s/v)	19
CO Emissions (kg)	3.10
NOx Emissions (kg)	0.60
VOC Emissions (kg)	0.72

202: Louisiana Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	3212
Total Delay / Veh (s/v)	39
CO Emissions (kg)	5.45
NOx Emissions (kg)	1.06
VOC Emissions (kg)	1.26

203: Hamshire Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	1764
Total Delay / Veh (s/v)	6
CO Emissions (kg)	1.69
NOx Emissions (kg)	0.33
VOC Emissions (kg)	0.39

204: Dakota Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2044
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.64
NOx Emissions (kg)	0.51
VOC Emissions (kg)	0.61

205: Lake St/Vernon Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2760
Total Delay / Veh (s/v)	76
CO Emissions (kg)	5.76
NOx Emissions (kg)	1.12
VOC Emissions (kg)	1.33

206: Minnetonka (CSAH 5) & TH 100 East Ramp

Direction	All
Future Volume (vph)	2808
Total Delay / Veh (s/v)	9
CO Emissions (kg)	2.14
NOx Emissions (kg)	0.42
VOC Emissions (kg)	0.50

207: Ottawa Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2300
Total Delay / Veh (s/v)	24
CO Emissions (kg)	3.47
NOx Emissions (kg)	0.68
VOC Emissions (kg)	0.80

208: TH 100 West Ramp & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2300
Total Delay / Veh (s/v)	7
CO Emissions (kg)	1.06
NOx Emissions (kg)	0.21
VOC Emissions (kg)	0.25

**Minnetonka Blvd
Existing PM**

7/12/2016

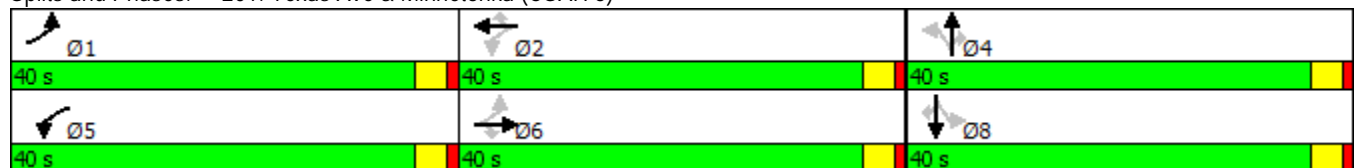


Phase Number	1	2	4	5	6	8
Movement	EBL	WBTL	NBTL	WBL	EBTL	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	40	40	40	40	40	40
Maximum Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Minimum Split (s)	9.5	30	30	9.5	30	30
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		10	10		10	10
Flash Dont Walk (s)		16	16		16	16
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	40	80	0	40	80
End Time (s)	40	80	0	40	80	0
Yield/Force Off (s)	36	76	116	36	76	116
Yield/Force Off 170(s)	36	76	100	36	76	100
Local Start Time (s)	80	0	40	80	0	40
Local Yield (s)	116	36	76	116	36	76
Local Yield 170(s)	116	36	60	116	36	60

Intersection Summary

Cycle Length	120
Control Type	Actuated-Uncoordinated
Natural Cycle	70

Splits and Phases: 201: Texas Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Existing PM**

7/12/2016

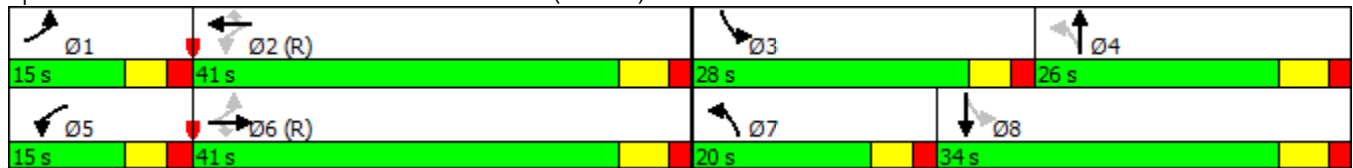


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	SBL	NBTL	WBL	EBTL	NBL	SBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	41	28	26	15	41	20	34
Maximum Split (%)	13.6%	37.3%	25.5%	23.6%	13.6%	37.3%	18.2%	30.9%
Minimum Split (s)	11.5	37	11.5	33	11.5	37	11.5	33
Yellow Time (s)	3.5	4	3.5	4	3.5	4	3.5	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	10	6	10	6	10	6	10
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		24		20		24		20
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	89	104	35	63	89	104	35	55
End Time (s)	104	35	63	89	104	35	55	89
Yield/Force Off (s)	98.5	29	57.5	83	98.5	29	49.5	83
Yield/Force Off 170(s)	98.5	5	57.5	63	98.5	5	49.5	63
Local Start Time (s)	95	0	41	69	95	0	41	61
Local Yield (s)	104.5	35	63.5	89	104.5	35	55.5	89
Local Yield 170(s)	104.5	11	63.5	69	104.5	11	55.5	69

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	95
Offset: 104 (95%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 202: Louisiana Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Existing PM**

7/12/2016

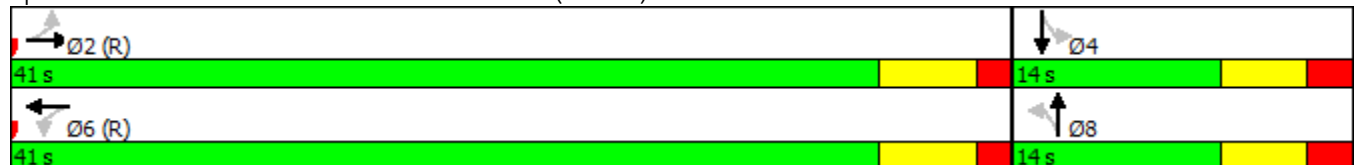


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	41	14	41	14
Maximum Split (%)	74.5%	25.5%	74.5%	25.5%
Minimum Split (s)	20.5	26.5	20	26.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	1.5	2	1.5	2
Minimum Initial (s)	10	8	10	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	10	5	10
Flash Dont Walk (s)	10	11	9	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	20	6	20	6
End Time (s)	6	20	6	20
Yield/Force Off (s)	0.5	14.5	0.5	14.5
Yield/Force Off 170(s)	45.5	3.5	46.5	3.5
Local Start Time (s)	0	41	0	41
Local Yield (s)	35.5	49.5	35.5	49.5
Local Yield 170(s)	25.5	38.5	26.5	38.5

Intersection Summary

Cycle Length	55
Control Type	Actuated-Coordinated
Natural Cycle	75
Offset: 20 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 203: Hamshire Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Existing PM**

7/12/2016

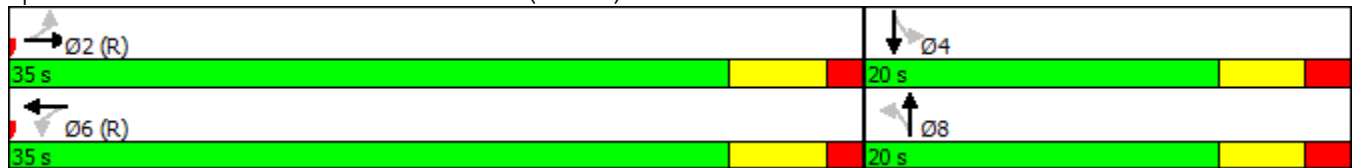


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	35	20	35	20
Maximum Split (%)	63.6%	36.4%	63.6%	36.4%
Minimum Split (s)	30.5	33.5	30.5	33.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	1.5	2	1.5	2
Minimum Initial (s)	22	8	22	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	8	8	8	8
Flash Dont Walk (s)	17	20	17	20
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	46	26	46	26
End Time (s)	26	46	26	46
Yield/Force Off (s)	20.5	40.5	20.5	40.5
Yield/Force Off 170(s)	3.5	20.5	3.5	20.5
Local Start Time (s)	0	35	0	35
Local Yield (s)	29.5	49.5	29.5	49.5
Local Yield 170(s)	12.5	29.5	12.5	29.5

Intersection Summary

Cycle Length	55
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 46 (84%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 204: Dakota Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Existing PM**

7/12/2016

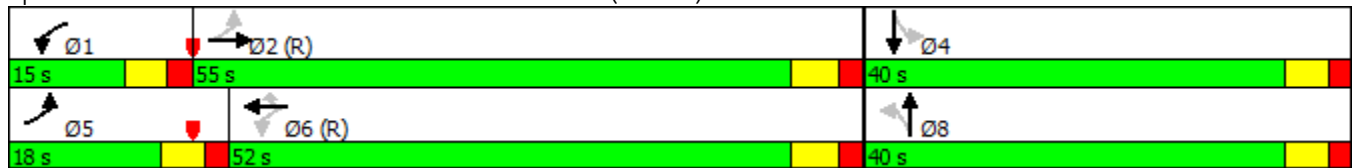


Phase Number	1	2	4	5	6	8
Movement	WBL	EBTL	SBTL	EBL	WBTL	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	15	55	40	18	52	40
Maximum Split (%)	13.6%	50.0%	36.4%	16.4%	47.3%	36.4%
Minimum Split (s)	11.5	39	21.5	11.5	36	42.5
Yellow Time (s)	3.5	4	3.5	3.5	4	3.5
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	6	13	10	6	13	10
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		10			10	10
Flash Dont Walk (s)		23			20	27
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	84	99	44	84	102	44
End Time (s)	99	44	84	102	44	84
Yield/Force Off (s)	93.5	38	78.5	96.5	38	78.5
Yield/Force Off 170(s)	93.5	15	78.5	96.5	18	51.5
Local Start Time (s)	95	0	55	95	3	55
Local Yield (s)	104.5	49	89.5	107.5	49	89.5
Local Yield 170(s)	104.5	26	89.5	107.5	29	62.5

Intersection Summary

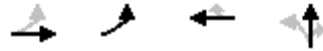
Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	125
Offset: 99 (90%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 205: Lake St/Vernon Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Existing PM

7/12/2016

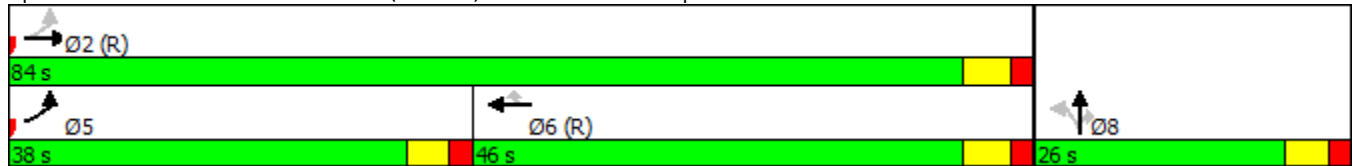


Phase Number	2	5	6	8
Movement	EBTL	EBL	WBT	NBTL
Lead/Lag		Lead	Lag	
Lead-Lag Optimize		Yes	Yes	
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	84	38	46	26
Maximum Split (%)	76.4%	34.5%	41.8%	23.6%
Minimum Split (s)	33	13.5	33	34.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	15	8	15	10
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7		7	7
Flash Dont Walk (s)	20		20	22
Dual Entry	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	85	85	13	59
End Time (s)	59	13	59	85
Yield/Force Off (s)	53	7.5	53	79.5
Yield/Force Off 170(s)	33	7.5	33	57.5
Local Start Time (s)	0	0	38	84
Local Yield (s)	78	32.5	78	104.5
Local Yield 170(s)	58	32.5	58	82.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 85 (77%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 206: Minnetonka (CSAH 5) & TH 100 East Ramp



Minnetonka Blvd
Existing PM

7/12/2016

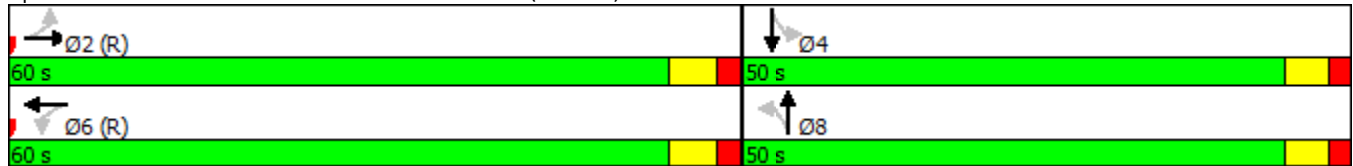


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	60	50	60	50
Maximum Split (%)	54.5%	45.5%	54.5%	45.5%
Minimum Split (s)	30	34.5	30	35.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	12	8	12	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	9	10	9	10
Flash Dont Walk (s)	15	19	15	20
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	75	25	75	25
End Time (s)	25	75	25	75
Yield/Force Off (s)	19	69.5	19	69.5
Yield/Force Off 170(s)	4	50.5	4	49.5
Local Start Time (s)	0	60	0	60
Local Yield (s)	54	104.5	54	104.5
Local Yield 170(s)	39	85.5	39	84.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 75 (68%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 207: Ottawa Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Existing PM

7/12/2016

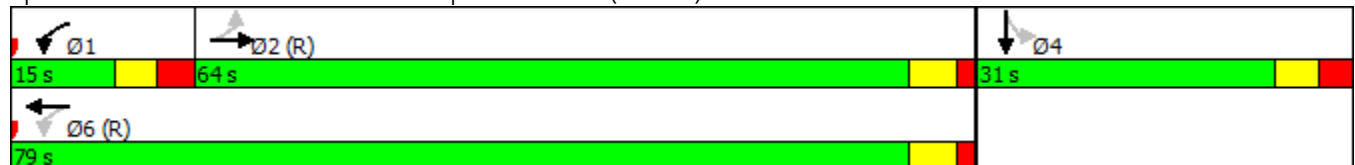


Phase Number	1	2	4	6
Movement	WBL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Max	None	C-Max
Maximum Split (s)	15	64	31	79
Maximum Split (%)	13.6%	58.2%	28.2%	71.8%
Minimum Split (s)	13.5	28.5	29.5	28.5
Yellow Time (s)	3.5	4	3.5	4
All-Red Time (s)	3	1.5	3	1.5
Minimum Initial (s)	7	12	10	12
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		16	16	16
Dual Entry	No	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	70	85	39	70
End Time (s)	85	39	70	39
Yield/Force Off (s)	78.5	33.5	63.5	33.5
Yield/Force Off 170(s)	78.5	17.5	47.5	17.5
Local Start Time (s)	0	15	79	0
Local Yield (s)	8.5	73.5	103.5	73.5
Local Yield 170(s)	8.5	57.5	87.5	57.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 70 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 208: TH 100 West Ramp & Minnetonka (CSAH 5)



201: Texas Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2116
Total Delay / Veh (s/v)	18
CO Emissions (kg)	3.06
NOx Emissions (kg)	0.60
VOC Emissions (kg)	0.71

202: Louisiana Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	3212
Total Delay / Veh (s/v)	36
CO Emissions (kg)	5.23
NOx Emissions (kg)	1.02
VOC Emissions (kg)	1.21

203: Hamshire Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	1764
Total Delay / Veh (s/v)	6
CO Emissions (kg)	1.58
NOx Emissions (kg)	0.31
VOC Emissions (kg)	0.37

204: Dakota Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2044
Total Delay / Veh (s/v)	13
CO Emissions (kg)	2.81
NOx Emissions (kg)	0.55
VOC Emissions (kg)	0.65

205: Lake St/Vernon Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2760
Total Delay / Veh (s/v)	36
CO Emissions (kg)	4.27
NOx Emissions (kg)	0.83
VOC Emissions (kg)	0.99

206: Minnetonka (CSAH 5) & TH 100 East Ramp

Direction	All
Future Volume (vph)	2808
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.27
NOx Emissions (kg)	0.44
VOC Emissions (kg)	0.53

207: Ottawa Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2300
Total Delay / Veh (s/v)	16
CO Emissions (kg)	3.03
NOx Emissions (kg)	0.59
VOC Emissions (kg)	0.70

208: TH 100 West Ramp & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2300
Total Delay / Veh (s/v)	7
CO Emissions (kg)	1.06
NOx Emissions (kg)	0.21
VOC Emissions (kg)	0.25

**Minnetonka Blvd
Improved PM**

7/12/2016

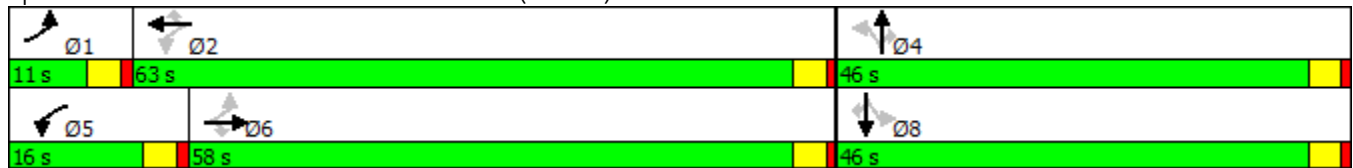


Phase Number	1	2	4	5	6	8
Movement	EBL	WBTL	NBTL	WBL	EBTL	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	11	63	46	16	58	46
Maximum Split (%)	9.2%	52.5%	38.3%	13.3%	48.3%	38.3%
Minimum Split (s)	9.5	30	30	9.5	30	30
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		10	10		10	10
Flash Dont Walk (s)		16	16		16	16
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	11	74	0	16	74
End Time (s)	11	74	0	16	74	0
Yield/Force Off (s)	7	70	116	12	70	116
Yield/Force Off 170(s)	7	70	100	12	70	100
Local Start Time (s)	109	0	63	109	5	63
Local Yield (s)	116	59	105	1	59	105
Local Yield 170(s)	116	59	89	1	59	89

Intersection Summary

Cycle Length	120
Control Type	Actuated-Uncoordinated
Natural Cycle	70

Splits and Phases: 201: Texas Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Improved PM**

7/12/2016

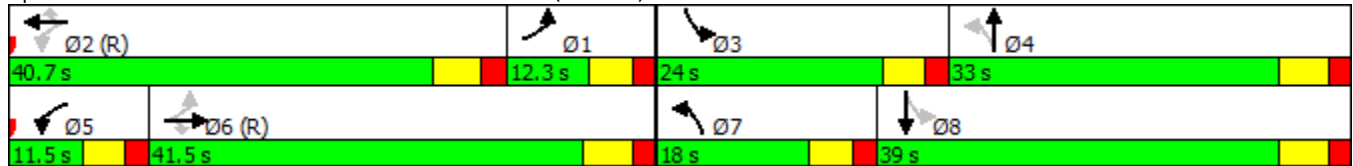


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	SBL	NBTL	WBL	EBTL	NBL	SBTL
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	12.3	40.7	24	33	11.5	41.5	18	39
Maximum Split (%)	11.2%	37.0%	21.8%	30.0%	10.5%	37.7%	16.4%	35.5%
Minimum Split (s)	11.5	37	11.5	33	11.5	37	11.5	33
Yellow Time (s)	3.5	4	3.5	4	3.5	4	3.5	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	10	6	10	6	10	6	10
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		24		20		24		20
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	25.7	95	38	62	95	106.5	38	56
End Time (s)	38	25.7	62	95	106.5	38	56	95
Yield/Force Off (s)	32.5	19.7	56.5	89	101	32	50.5	89
Yield/Force Off 170(s)	32.5	105.7	56.5	69	101	8	50.5	69
Local Start Time (s)	40.7	0	53	77	0	11.5	53	71
Local Yield (s)	47.5	34.7	71.5	104	6	47	65.5	104
Local Yield 170(s)	47.5	10.7	71.5	84	6	23	65.5	84

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	95
Offset: 95 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 202: Louisiana Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Improved PM**

7/12/2016

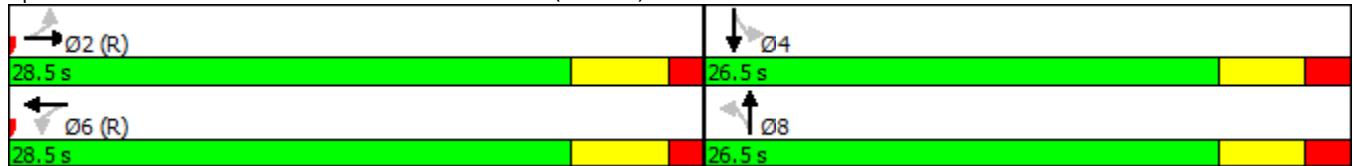


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	28.5	26.5	28.5	26.5
Maximum Split (%)	51.8%	48.2%	51.8%	48.2%
Minimum Split (s)	20.5	26.5	20	26.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	1.5	2	1.5	2
Minimum Initial (s)	10	8	10	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	10	5	10
Flash Dont Walk (s)	10	11	9	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	29	2.5	29	2.5
End Time (s)	2.5	29	2.5	29
Yield/Force Off (s)	52	23.5	52	23.5
Yield/Force Off 170(s)	42	12.5	43	12.5
Local Start Time (s)	0	28.5	0	28.5
Local Yield (s)	23	49.5	23	49.5
Local Yield 170(s)	13	38.5	14	38.5

Intersection Summary

Cycle Length	55
Control Type	Actuated-Coordinated
Natural Cycle	75
Offset: 29 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 203: Hamshire Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Improved PM**

7/12/2016

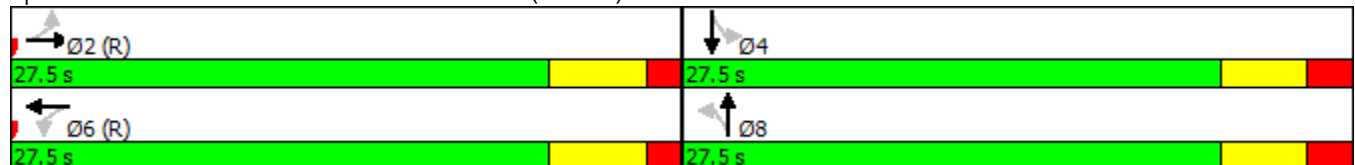


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	27.5	27.5	27.5	27.5
Maximum Split (%)	50.0%	50.0%	50.0%	50.0%
Minimum Split (s)	30.5	33.5	30.5	33.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	1.5	2	1.5	2
Minimum Initial (s)	22	8	22	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	8	8	8	8
Flash Dont Walk (s)	17	20	17	20
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	4	31.5	4	31.5
End Time (s)	31.5	4	31.5	4
Yield/Force Off (s)	26	53.5	26	53.5
Yield/Force Off 170(s)	9	33.5	9	33.5
Local Start Time (s)	0	27.5	0	27.5
Local Yield (s)	22	49.5	22	49.5
Local Yield 170(s)	5	29.5	5	29.5

Intersection Summary

Cycle Length	55
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 4 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 204: Dakota Ave & Minnetonka (CSAH 5)



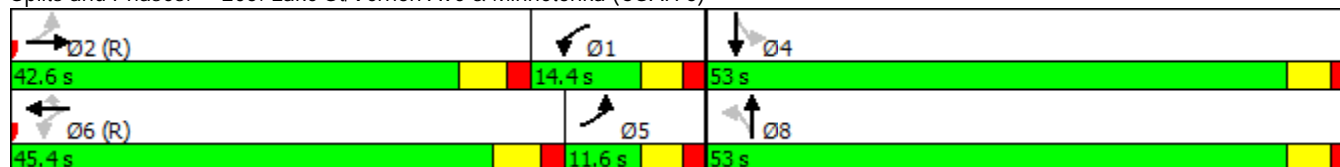


Phase Number	1	2	4	5	6	8
Movement	WBL	EBTL	SBTL	EBL	WBTL	NBTL
Lead/Lag	Lag	Lead		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	14.4	42.6	53	11.6	45.4	53
Maximum Split (%)	13.1%	38.7%	48.2%	10.5%	41.3%	48.2%
Minimum Split (s)	11.5	39	21.5	11.5	36	42.5
Yellow Time (s)	3.5	4	3.5	3.5	4	3.5
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	6	13	10	6	13	10
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		10			10	10
Flash Dont Walk (s)		23			20	27
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	31.6	99	46	34.4	99	46
End Time (s)	46	31.6	99	46	34.4	99
Yield/Force Off (s)	40.5	25.6	93.5	40.5	28.4	93.5
Yield/Force Off 170(s)	40.5	2.6	93.5	40.5	8.4	66.5
Local Start Time (s)	42.6	0	57	45.4	0	57
Local Yield (s)	51.5	36.6	104.5	51.5	39.4	104.5
Local Yield 170(s)	51.5	13.6	104.5	51.5	19.4	77.5

Intersection Summary

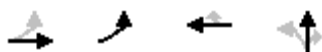
Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	125
Offset: 99 (90%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 205: Lake St/Vernon Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Improved PM

7/12/2016

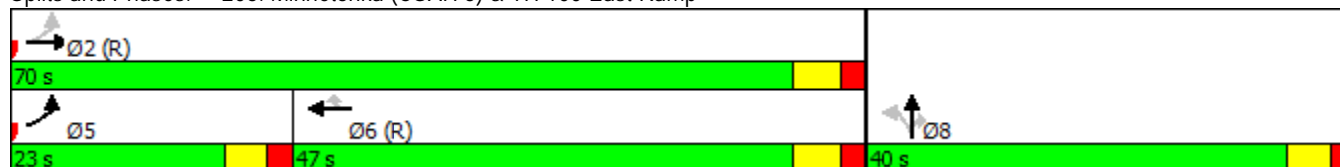


Phase Number	2	5	6	8
Movement	EBTL	EBL	WBT	NBTL
Lead/Lag		Lead	Lag	
Lead-Lag Optimize		Yes	Yes	
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	70	23	47	40
Maximum Split (%)	63.6%	20.9%	42.7%	36.4%
Minimum Split (s)	33	13.5	33	34.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	15	8	15	10
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7		7	7
Flash Dont Walk (s)	20		20	22
Dual Entry	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	87	87	0	47
End Time (s)	47	0	47	87
Yield/Force Off (s)	41	104.5	41	81.5
Yield/Force Off 170(s)	21	104.5	21	59.5
Local Start Time (s)	0	0	23	70
Local Yield (s)	64	17.5	64	104.5
Local Yield 170(s)	44	17.5	44	82.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 87 (79%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 206: Minnetonka (CSAH 5) & TH 100 East Ramp



**Minnetonka Blvd
Improved PM**

7/12/2016

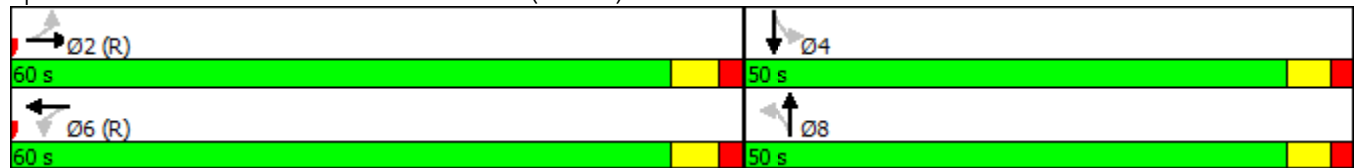


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	60	50	60	50
Maximum Split (%)	54.5%	45.5%	54.5%	45.5%
Minimum Split (s)	30	34.5	30	35.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	12	8	12	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	9	10	9	10
Flash Dont Walk (s)	15	19	15	20
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	21	81	21	81
End Time (s)	81	21	81	21
Yield/Force Off (s)	75	15.5	75	15.5
Yield/Force Off 170(s)	60	106.5	60	105.5
Local Start Time (s)	0	60	0	60
Local Yield (s)	54	104.5	54	104.5
Local Yield 170(s)	39	85.5	39	84.5

Intersection Summary

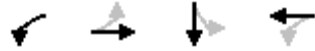
Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 21 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 207: Ottawa Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Improved PM

7/12/2016

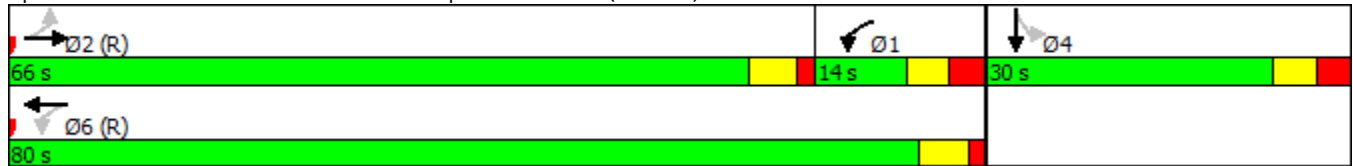


Phase Number	1	2	4	6
Movement	WBL	EBTL	SBTL	WBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Max	None	C-Max
Maximum Split (s)	14	66	30	80
Maximum Split (%)	12.7%	60.0%	27.3%	72.7%
Minimum Split (s)	13.5	28.5	29.5	28.5
Yellow Time (s)	3.5	4	3.5	4
All-Red Time (s)	3	1.5	3	1.5
Minimum Initial (s)	7	12	10	12
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		16	16	16
Dual Entry	No	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	38	82	52	82
End Time (s)	52	38	82	52
Yield/Force Off (s)	45.5	32.5	75.5	46.5
Yield/Force Off 170(s)	45.5	16.5	59.5	30.5
Local Start Time (s)	66	0	80	0
Local Yield (s)	73.5	60.5	103.5	74.5
Local Yield 170(s)	73.5	44.5	87.5	58.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 82 (75%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 208: TH 100 West Ramp & Minnetonka (CSAH 5)



41: Shady Oak Rd & Excelsior Blvd

Direction	All
Future Volume (vph)	3283
Total Delay / Veh (s/v)	51
CO Emissions (kg)	7.46
NOx Emissions (kg)	1.45
VOC Emissions (kg)	1.73

42: Excelsior Blvd & 17th Ave S

Direction	All
Future Volume (vph)	2223
Total Delay / Veh (s/v)	7
CO Emissions (kg)	2.29
NOx Emissions (kg)	0.44
VOC Emissions (kg)	0.53

43: 11th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	3236
Total Delay / Veh (s/v)	27
CO Emissions (kg)	4.49
NOx Emissions (kg)	0.87
VOC Emissions (kg)	1.04

44: 8th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	2637
Total Delay / Veh (s/v)	8
CO Emissions (kg)	1.90
NOx Emissions (kg)	0.37
VOC Emissions (kg)	0.44

45: 5th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	2914
Total Delay / Veh (s/v)	23
CO Emissions (kg)	3.26
NOx Emissions (kg)	0.63
VOC Emissions (kg)	0.76

46: Excelsior Blvd & TH 169 West Ramps

Direction	All
Future Volume (vph)	3341
Total Delay / Veh (s/v)	12
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

47: Excelsior Blvd & TH 169 East Ramps

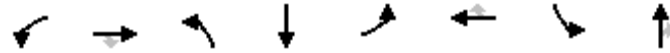
Direction	All
Future Volume (vph)	3358
Total Delay / Veh (s/v)	16
CO Emissions (kg)	3.28
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

48: Milwaukee St/St Louis St & Excelsior Blvd

Direction	All
Future Volume (vph)	3306
Total Delay / Veh (s/v)	30
CO Emissions (kg)	4.84
NOx Emissions (kg)	0.94
VOC Emissions (kg)	1.12

Excelsior Blvd
Existing PM

7/12/2016

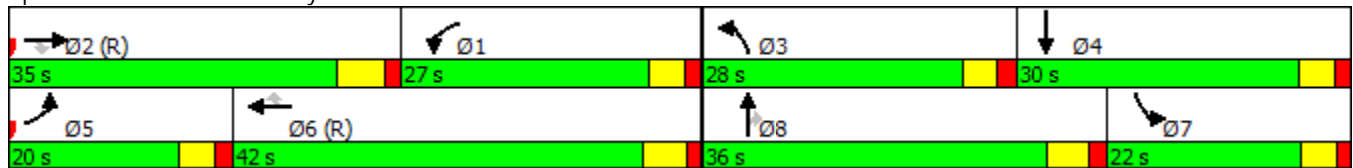


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	27	35	28	30	20	42	22	36
Maximum Split (%)	22.5%	29.2%	23.3%	25.0%	16.7%	35.0%	18.3%	30.0%
Minimum Split (s)	15	32	15	33	15	32	15	32
Yellow Time (s)	3.2	4.3	3.2	3.2	3.2	3.9	3.2	3.9
All-Red Time (s)	1.7	1.5	1.7	1.6	1.6	1.5	1.5	1.5
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Minimum Gap (s)	3.5	3	3.5	3	3.5	3	3.5	3
Time Before Reduce (s)	0	12	0	12	0	12	0	12
Time To Reduce (s)	0	12	0	12	0	12	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		18		20		19		19
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	85	27	55	85	105	63	27
End Time (s)	27	0	55	85	105	27	85	63
Yield/Force Off (s)	22.1	114.2	50.1	80.2	100.2	21.6	80.3	57.6
Yield/Force Off 170(s)	22.1	96.2	50.1	60.2	100.2	2.6	80.3	38.6
Local Start Time (s)	35	0	62	90	0	20	98	62
Local Yield (s)	57.1	29.2	85.1	115.2	15.2	56.6	115.3	92.6
Local Yield 170(s)	57.1	11.2	85.1	95.2	15.2	37.6	115.3	73.6

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	95
Offset: 85 (71%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 41: Shady Oak Rd & Excelsior Blvd



Excelsior Blvd
Existing PM

7/12/2016

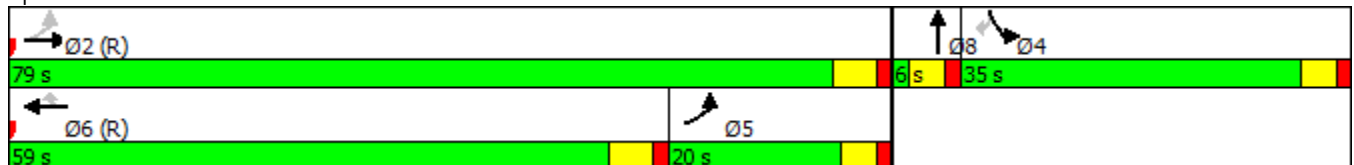


Phase Number	2	4	5	6	8
Movement	EBTL	SBL	EBL	WBT	NBT
Lead/Lag		Lag	Lag	Lead	Lead
Lead-Lag Optimize			Yes	Yes	Yes
Recall Mode	C-Max	None	None	C-Max	None
Maximum Split (s)	79	35	20	59	6
Maximum Split (%)	65.8%	29.2%	16.7%	49.2%	5.0%
Minimum Split (s)	20	33	14	25	6
Yellow Time (s)	3.9	3.2	3.2	3.9	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	12	10	6	12	1
Vehicle Extension (s)	5	4	3	5	3
Minimum Gap (s)	3	4	3	3	3
Time Before Reduce (s)	13	0	0	13	0
Time To Reduce (s)	13	0	0	13	0
Walk Time (s)		7		7	7
Flash Dont Walk (s)		20		12	19
Dual Entry	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	93	58	32	93	52
End Time (s)	52	93	52	32	58
Yield/Force Off (s)	46.6	88.3	47.3	26.6	53.3
Yield/Force Off 170(s)	46.6	68.3	47.3	14.6	34.3
Local Start Time (s)	0	85	59	0	79
Local Yield (s)	73.6	115.3	74.3	53.6	80.3
Local Yield 170(s)	73.6	95.3	74.3	41.6	61.3

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 93 (78%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 42: Excelsior Blvd & 17th Ave S



Excelsior Blvd
Existing PM

7/12/2016

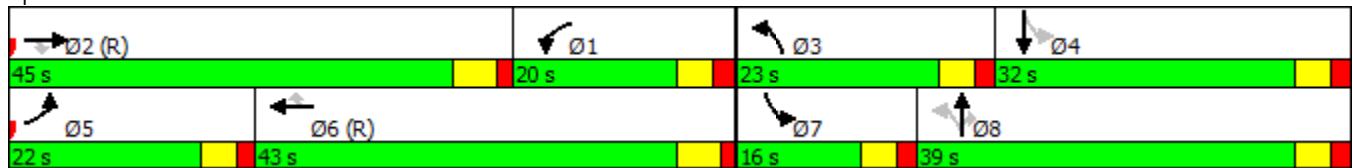


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBTL	EBL	WBT	SBL	NBTL
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes			Yes	Yes		
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	45	23	32	22	43	16	39
Maximum Split (%)	16.7%	37.5%	19.2%	26.7%	18.3%	35.8%	13.3%	32.5%
Minimum Split (s)	15	32	14	36	15	32	14	36
Yellow Time (s)	3.2	3.9	3.2	3.2	3.2	3.9	3.2	3.2
All-Red Time (s)	2.2	1.5	1.7	2	1.7	1.5	1.8	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	5	3	4	3	5	3	4
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	13	0	12	0	13	0	12
Time To Reduce (s)	0	13	0	12	0	13	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		19		23		19		23
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	72	27	92	115	27	49	92	108
End Time (s)	92	72	115	27	49	92	108	27
Yield/Force Off (s)	86.6	66.6	110.1	21.8	44.1	86.6	103	21.8
Yield/Force Off 170(s)	86.6	47.6	110.1	118.8	44.1	67.6	103	118.8
Local Start Time (s)	45	0	65	88	0	22	65	81
Local Yield (s)	59.6	39.6	83.1	114.8	17.1	59.6	76	114.8
Local Yield 170(s)	59.6	20.6	83.1	91.8	17.1	40.6	76	91.8

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 27 (23%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 43: 11th Ave S & Excelsior Blvd



Excelsior Blvd
Existing PM

7/12/2016



Phase Number	1	2	4	5	6	8
Movement	EBL	WBTL	SBTL	WBL	EBTL	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	64	40	15	65	40
Maximum Split (%)	13.3%	53.3%	33.3%	12.5%	54.2%	33.3%
Minimum Split (s)	14	25	35	14	30	39
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.2
All-Red Time (s)	1.6	1.5	1.8	1.5	1.5	1.8
Minimum Initial (s)	6	12	8	6	12	8
Vehicle Extension (s)	3	4.5	3.5	3	4.5	3.5
Minimum Gap (s)	3	3	3.5	3	3	3.5
Time Before Reduce (s)	0	13	0	0	13	0
Time To Reduce (s)	0	13	0	0	13	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	22		17	26
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	20	36	100	20	35	100
End Time (s)	36	100	20	35	100	20
Yield/Force Off (s)	31.2	94.6	15	30.3	94.6	15
Yield/Force Off 170(s)	31.2	82.6	113	30.3	77.6	109
Local Start Time (s)	105	1	65	105	0	65
Local Yield (s)	116.2	59.6	100	115.3	59.6	100
Local Yield 170(s)	116.2	47.6	78	115.3	42.6	74

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 35 (29%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 44: 8th Ave S & Excelsior Blvd



Excelsior Blvd
Existing PM

7/12/2016

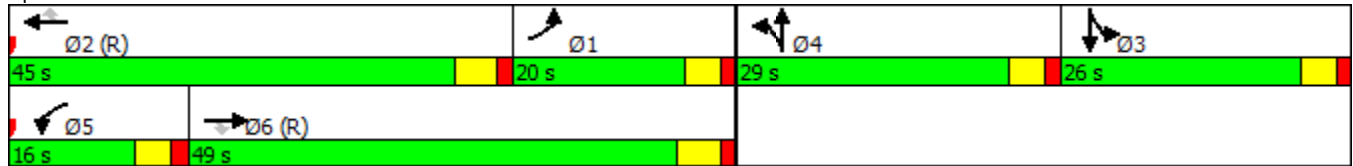


Phase Number	1	2	3	4	5	6
Movement	EBL	WBT	SBTL	NBTL	WBL	EBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max
Maximum Split (s)	20	45	26	29	16	49
Maximum Split (%)	16.7%	37.5%	21.7%	24.2%	13.3%	40.8%
Minimum Split (s)	15	29	34	36	16	29
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.9
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	6	10	8	8	8	10
Vehicle Extension (s)	3	3.5	3.5	3.5	5	3.5
Minimum Gap (s)	3	3	3.5	3.5	5	3
Time Before Reduce (s)	0	15	0	0	0	15
Time To Reduce (s)	0	15	0	0	0	15
Walk Time (s)		7	7	7		7
Flash Dont Walk (s)		16	21	20		16
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	70	25	119	90	25	41
End Time (s)	90	70	25	119	41	90
Yield/Force Off (s)	85.3	64.9	20.3	114.3	36.3	84.6
Yield/Force Off 170(s)	85.3	48.9	119.3	94.3	36.3	68.6
Local Start Time (s)	45	0	94	65	0	16
Local Yield (s)	60.3	39.9	115.3	89.3	11.3	59.6
Local Yield 170(s)	60.3	23.9	94.3	69.3	11.3	43.6

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	135
Offset: 25 (21%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 45: 5th Ave S & Excelsior Blvd



Excelsior Blvd
Existing PM

7/12/2016

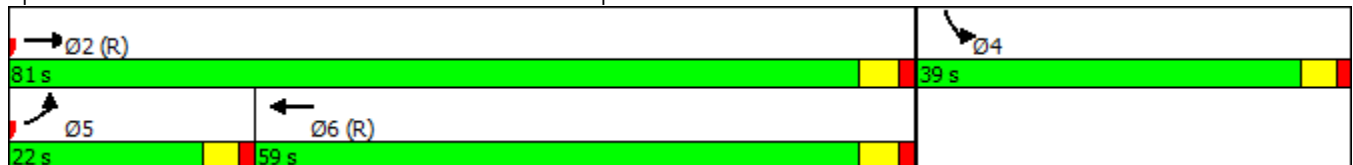


Phase Number	2	4	5	6
Movement	EBT	SBL	EBL	WBT
Lead/Lag			Lead	Lag
Lead-Lag Optimize			Yes	Yes
Recall Mode	C-Max	None	None	C-Max
Maximum Split (s)	81	39	22	59
Maximum Split (%)	67.5%	32.5%	18.3%	49.2%
Minimum Split (s)	20	18	15	31
Yellow Time (s)	3.6	3.2	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	12	10	6	12
Vehicle Extension (s)	4	3.5	3	4
Minimum Gap (s)	4	3.5	3	4
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)				7
Flash Dont Walk (s)				18
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	78	39	78	100
End Time (s)	39	78	100	39
Yield/Force Off (s)	33.9	73.3	95.3	33.9
Yield/Force Off 170(s)	33.9	73.3	95.3	15.9
Local Start Time (s)	0	81	0	22
Local Yield (s)	75.9	115.3	17.3	75.9
Local Yield 170(s)	75.9	115.3	17.3	57.9

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 78 (65%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 46: Excelsior Blvd & TH 169 West Ramps



Excelsior Blvd
Existing PM

7/12/2016

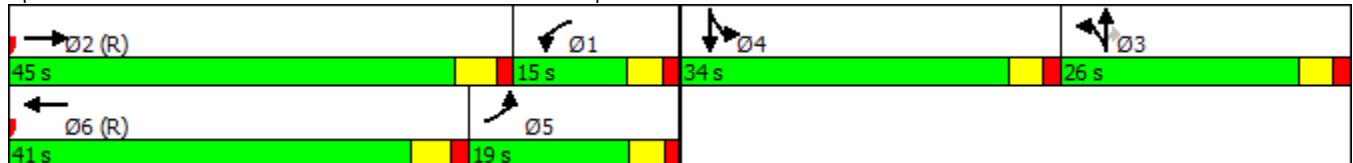


Phase Number	1	2	3	4	5	6
Movement	WBL	EBT	NBTL	SBTL	EBL	WBT
Lead/Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max
Maximum Split (s)	15	45	26	34	19	41
Maximum Split (%)	12.5%	37.5%	21.7%	28.3%	15.8%	34.2%
Minimum Split (s)	15	20	16	20	18	32
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.6
All-Red Time (s)	1.6	1.5	1.7	1.6	1.5	1.5
Minimum Initial (s)	6	12	7	12	10	12
Vehicle Extension (s)	3	4	4	4.5	3	4
Minimum Gap (s)	3	3	4	2	3	3
Time Before Reduce (s)	0	15	0	12	0	15
Time To Reduce (s)	0	15	0	12	0	15
Walk Time (s)			7	7		7
Flash Dont Walk (s)			28	26		19
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	21	96	70	36	17	96
End Time (s)	36	21	96	70	36	17
Yield/Force Off (s)	31.2	15.9	91.1	65.2	31.3	11.9
Yield/Force Off 170(s)	31.2	15.9	63.1	39.2	31.3	112.9
Local Start Time (s)	45	0	94	60	41	0
Local Yield (s)	55.2	39.9	115.1	89.2	55.3	35.9
Local Yield 170(s)	55.2	39.9	87.1	63.2	55.3	16.9

Intersection Summary

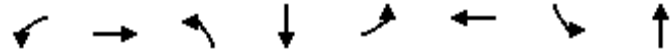
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 96 (80%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 47: Excelsior Blvd & TH 169 East Ramps



Excelsior Blvd
Existing PM

7/12/2016

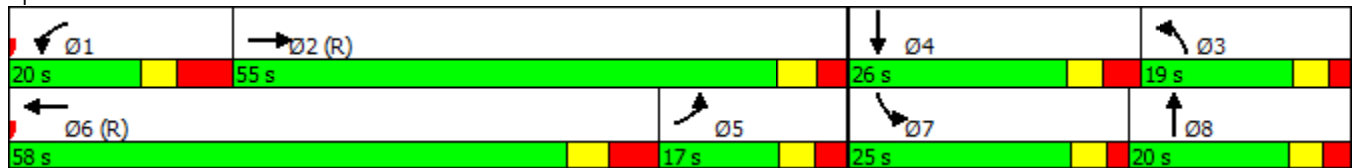


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	55	19	26	17	58	25	20
Maximum Split (%)	16.7%	45.8%	15.8%	21.7%	14.2%	48.3%	20.8%	16.7%
Minimum Split (s)	18	48	16	18	16	39	16	18
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.6	3.2	3.2
All-Red Time (s)	5	2.8	2.1	3.3	3.1	4.5	2	2.6
Minimum Initial (s)	8	15	8	10	8	14.9	8	10
Vehicle Extension (s)	3.5	5	3.5	3.5	3.5	5	3.5	3.5
Minimum Gap (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0	17	0	0	0	17	0	0
Time To Reduce (s)	0	17	0	0	0	17	0	0
Walk Time (s)		8				7		7
Flash Dont Walk (s)		33				23		28
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	71	91	52	26	9	71	26	51
End Time (s)	91	26	71	52	26	9	51	71
Yield/Force Off (s)	82.8	19.6	65.7	45.5	19.7	0.9	45.8	65.2
Yield/Force Off 170(s)	82.8	106.6	65.7	45.5	19.7	97.9	45.8	37.2
Local Start Time (s)	0	20	101	75	58	0	75	100
Local Yield (s)	11.8	68.6	114.7	94.5	68.7	49.9	94.8	114.2
Local Yield 170(s)	11.8	35.6	114.7	94.5	68.7	26.9	94.8	86.2

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 71 (59%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 48: Milwaukee St/St Louis St & Excelsior Blvd



41: Shady Oak Rd & Excelsior Blvd

Direction	All
Future Volume (vph)	3283
Total Delay / Veh (s/v)	39
CO Emissions (kg)	6.83
NOx Emissions (kg)	1.33
VOC Emissions (kg)	1.58

42: Excelsior Blvd & 17th Ave S

Direction	All
Future Volume (vph)	2223
Total Delay / Veh (s/v)	7
CO Emissions (kg)	2.38
NOx Emissions (kg)	0.46
VOC Emissions (kg)	0.55

43: 11th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	3236
Total Delay / Veh (s/v)	28
CO Emissions (kg)	4.51
NOx Emissions (kg)	0.88
VOC Emissions (kg)	1.05

44: 8th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	2637
Total Delay / Veh (s/v)	8
CO Emissions (kg)	1.91
NOx Emissions (kg)	0.37
VOC Emissions (kg)	0.44

45: 5th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	2914
Total Delay / Veh (s/v)	19
CO Emissions (kg)	2.89
NOx Emissions (kg)	0.56
VOC Emissions (kg)	0.67

46: Excelsior Blvd & TH 169 West Ramps

Direction	All
Future Volume (vph)	3341
Total Delay / Veh (s/v)	11
CO Emissions (kg)	3.13
NOx Emissions (kg)	0.61
VOC Emissions (kg)	0.73

47: Excelsior Blvd & TH 169 East Ramps

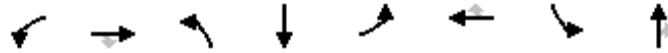
Direction	All
Future Volume (vph)	3358
Total Delay / Veh (s/v)	17
CO Emissions (kg)	3.37
NOx Emissions (kg)	0.66
VOC Emissions (kg)	0.78

48: Milwaukee St/St Louis St & Excelsior Blvd

Direction	All
Future Volume (vph)	3306
Total Delay / Veh (s/v)	29
CO Emissions (kg)	4.70
NOx Emissions (kg)	0.91
VOC Emissions (kg)	1.09

Excelsior Blvd
Improved PM

7/13/2016

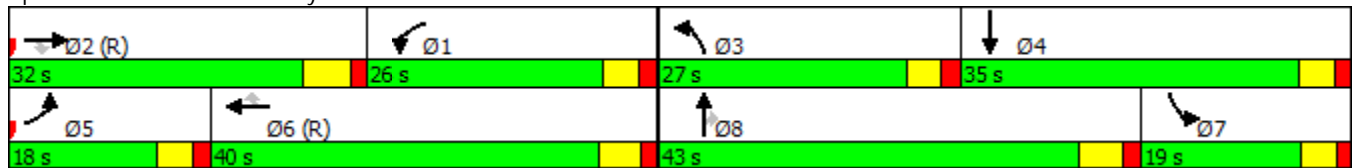


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	26	32	27	35	18	40	19	43
Maximum Split (%)	21.7%	26.7%	22.5%	29.2%	15.0%	33.3%	15.8%	35.8%
Minimum Split (s)	15	32	15	33	15	32	15	32
Yellow Time (s)	3.2	4.3	3.2	3.2	3.2	3.9	3.2	3.9
All-Red Time (s)	1.7	1.5	1.7	1.6	1.6	1.5	1.5	1.5
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Minimum Gap (s)	3.5	3	3.5	3	3.5	3	3.5	3
Time Before Reduce (s)	0	12	0	12	0	12	0	12
Time To Reduce (s)	0	12	0	12	0	12	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		18		20		19		19
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	111	79	17	44	79	97	60	17
End Time (s)	17	111	44	79	97	17	79	60
Yield/Force Off (s)	12.1	105.2	39.1	74.2	92.2	11.6	74.3	54.6
Yield/Force Off 170(s)	12.1	87.2	39.1	54.2	92.2	112.6	74.3	35.6
Local Start Time (s)	32	0	58	85	0	18	101	58
Local Yield (s)	53.1	26.2	80.1	115.2	13.2	52.6	115.3	95.6
Local Yield 170(s)	53.1	8.2	80.1	95.2	13.2	33.6	115.3	76.6

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	95
Offset: 79 (66%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 41: Shady Oak Rd & Excelsior Blvd



Excelsior Blvd
Improved PM

7/13/2016

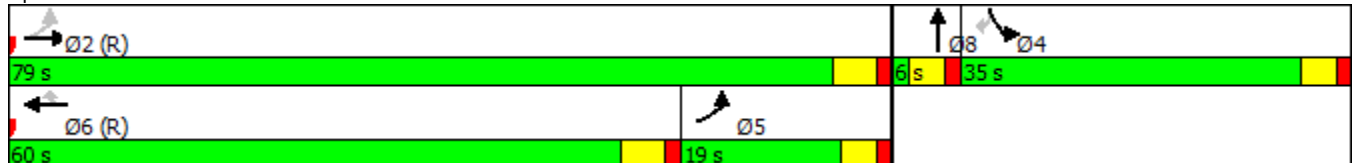


Phase Number	2	4	5	6	8
Movement	EBTL	SBL	EBL	WBT	NBT
Lead/Lag		Lag	Lag	Lead	Lead
Lead-Lag Optimize			Yes	Yes	Yes
Recall Mode	C-Max	None	None	C-Max	None
Maximum Split (s)	79	35	19	60	6
Maximum Split (%)	65.8%	29.2%	15.8%	50.0%	5.0%
Minimum Split (s)	20	33	14	25	6
Yellow Time (s)	3.9	3.2	3.2	3.9	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	12	10	6	12	1
Vehicle Extension (s)	5	4	3	5	3
Minimum Gap (s)	3	4	3	3	3
Time Before Reduce (s)	13	0	0	13	0
Time To Reduce (s)	13	0	0	13	0
Walk Time (s)		7		7	7
Flash Dont Walk (s)		20		12	19
Dual Entry	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	96	61	36	96	55
End Time (s)	55	96	55	36	61
Yield/Force Off (s)	49.6	91.3	50.3	30.6	56.3
Yield/Force Off 170(s)	49.6	71.3	50.3	18.6	37.3
Local Start Time (s)	0	85	60	0	79
Local Yield (s)	73.6	115.3	74.3	54.6	80.3
Local Yield 170(s)	73.6	95.3	74.3	42.6	61.3

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 96 (80%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 42: Excelsior Blvd & 17th Ave S



Excelsior Blvd
Improved PM

7/13/2016

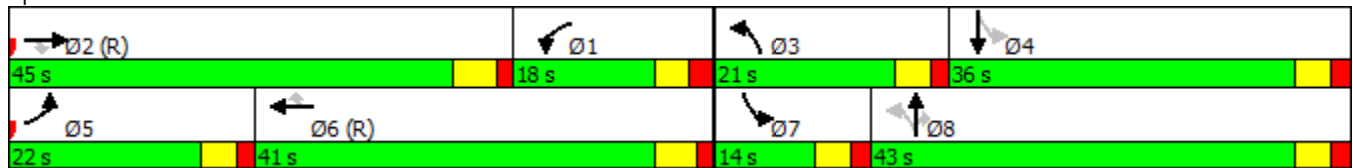


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBTL	EBL	WBT	SBL	NBTL
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes			Yes	Yes		
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	18	45	21	36	22	41	14	43
Maximum Split (%)	15.0%	37.5%	17.5%	30.0%	18.3%	34.2%	11.7%	35.8%
Minimum Split (s)	15	32	14	36	15	32	14	36
Yellow Time (s)	3.2	3.9	3.2	3.2	3.2	3.9	3.2	3.2
All-Red Time (s)	2.2	1.5	1.7	2	1.7	1.5	1.8	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	5	3	4	3	5	3	4
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	13	0	12	0	13	0	12
Time To Reduce (s)	0	13	0	12	0	13	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		19		23		19		23
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	65	20	83	104	20	42	83	97
End Time (s)	83	65	104	20	42	83	97	20
Yield/Force Off (s)	77.6	59.6	99.1	14.8	37.1	77.6	92	14.8
Yield/Force Off 170(s)	77.6	40.6	99.1	111.8	37.1	58.6	92	111.8
Local Start Time (s)	45	0	63	84	0	22	63	77
Local Yield (s)	57.6	39.6	79.1	114.8	17.1	57.6	72	114.8
Local Yield 170(s)	57.6	20.6	79.1	91.8	17.1	38.6	72	91.8

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 43: 11th Ave S & Excelsior Blvd



Excelsior Blvd
Improved PM

7/13/2016



Phase Number	1	2	4	5	6	8
Movement	EBL	WBTL	SBTL	WBL	EBTL	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	64	40	15	65	40
Maximum Split (%)	13.3%	53.3%	33.3%	12.5%	54.2%	33.3%
Minimum Split (s)	14	25	35	14	30	39
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.2
All-Red Time (s)	1.6	1.5	1.8	1.5	1.5	1.8
Minimum Initial (s)	6	12	8	6	12	8
Vehicle Extension (s)	3	4.5	3.5	3	4.5	3.5
Minimum Gap (s)	3	3	3.5	3	3	3.5
Time Before Reduce (s)	0	13	0	0	13	0
Time To Reduce (s)	0	13	0	0	13	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	22		17	26
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	11	27	91	11	26	91
End Time (s)	27	91	11	26	91	11
Yield/Force Off (s)	22.2	85.6	6	21.3	85.6	6
Yield/Force Off 170(s)	22.2	73.6	104	21.3	68.6	100
Local Start Time (s)	105	1	65	105	0	65
Local Yield (s)	116.2	59.6	100	115.3	59.6	100
Local Yield 170(s)	116.2	47.6	78	115.3	42.6	74

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 26 (22%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 44: 8th Ave S & Excelsior Blvd



Excelsior Blvd
Improved PM

7/13/2016

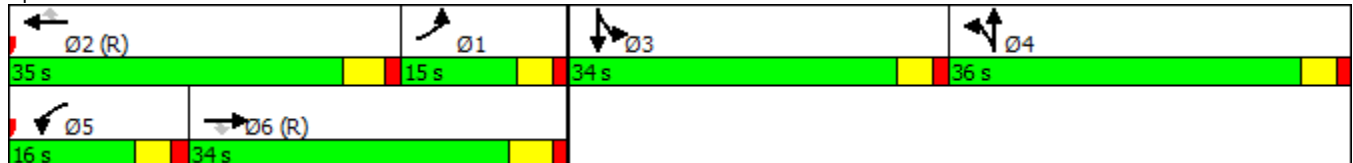


Phase Number	1	2	3	4	5	6
Movement	EBL	WBT	SBTL	NBTL	WBL	EBT
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max
Maximum Split (s)	15	35	34	36	16	34
Maximum Split (%)	12.5%	29.2%	28.3%	30.0%	13.3%	28.3%
Minimum Split (s)	15	29	34	36	16	29
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.9
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	6	10	8	8	8	10
Vehicle Extension (s)	3	3.5	3.5	3.5	5	3.5
Minimum Gap (s)	3	3	3.5	3.5	5	3
Time Before Reduce (s)	0	15	0	0	0	15
Time To Reduce (s)	0	15	0	0	0	15
Walk Time (s)		7	7	7		7
Flash Dont Walk (s)		16	21	20		16
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	65	30	80	114	30	46
End Time (s)	80	65	114	30	46	80
Yield/Force Off (s)	75.3	59.9	109.3	25.3	41.3	74.6
Yield/Force Off 170(s)	75.3	43.9	88.3	5.3	41.3	58.6
Local Start Time (s)	35	0	50	84	0	16
Local Yield (s)	45.3	29.9	79.3	115.3	11.3	44.6
Local Yield 170(s)	45.3	13.9	58.3	95.3	11.3	28.6

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	135
Offset: 30 (25%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 45: 5th Ave S & Excelsior Blvd



Excelsior Blvd
Improved PM

7/13/2016

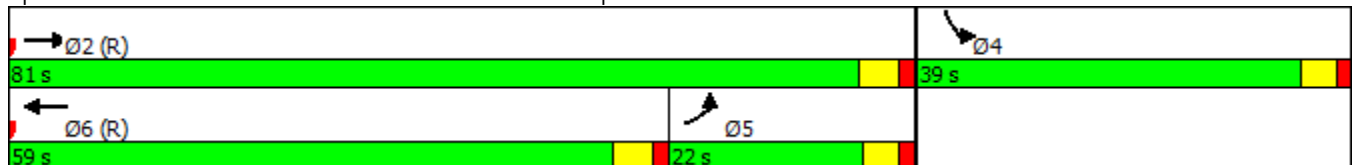


Phase Number	2	4	5	6
Movement	EBT	SBL	EBL	WBT
Lead/Lag			Lag	Lead
Lead-Lag Optimize			Yes	Yes
Recall Mode	C-Max	None	None	C-Max
Maximum Split (s)	81	39	22	59
Maximum Split (%)	67.5%	32.5%	18.3%	49.2%
Minimum Split (s)	20	18	15	31
Yellow Time (s)	3.6	3.2	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	12	10	6	12
Vehicle Extension (s)	4	3.5	3	4
Minimum Gap (s)	4	3.5	3	4
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)				7
Flash Dont Walk (s)				18
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	12	93	71	12
End Time (s)	93	12	93	71
Yield/Force Off (s)	87.9	7.3	88.3	65.9
Yield/Force Off 170(s)	87.9	7.3	88.3	47.9
Local Start Time (s)	0	81	59	0
Local Yield (s)	75.9	115.3	76.3	53.9
Local Yield 170(s)	75.9	115.3	76.3	35.9

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 12 (10%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 46: Excelsior Blvd & TH 169 West Ramps



Excelsior Blvd
Improved PM

7/13/2016

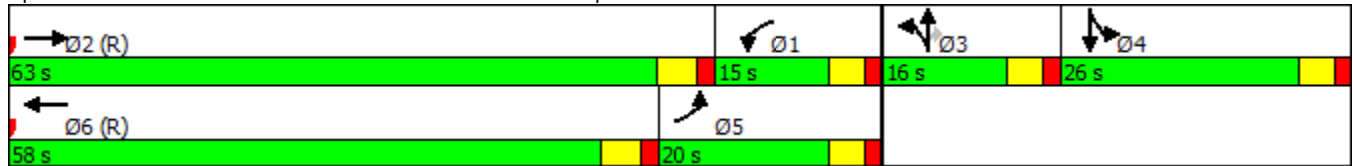


Phase Number	1	2	3	4	5	6
Movement	WBL	EBT	NBTL	SBTL	EBL	WBT
Lead/Lag	Lag	Lead	Lead	Lag	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max
Maximum Split (s)	15	63	16	26	20	58
Maximum Split (%)	12.5%	52.5%	13.3%	21.7%	16.7%	48.3%
Minimum Split (s)	15	20	16	20	18	32
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.6
All-Red Time (s)	1.6	1.5	1.7	1.6	1.5	1.5
Minimum Initial (s)	6	12	7	12	10	12
Vehicle Extension (s)	3	4	4	4.5	3	4
Minimum Gap (s)	3	3	4	2	3	3
Time Before Reduce (s)	0	15	0	12	0	15
Time To Reduce (s)	0	15	0	12	0	15
Walk Time (s)			7	7		7
Flash Dont Walk (s)			28	26		19
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	29	86	44	60	24	86
End Time (s)	44	29	60	86	44	24
Yield/Force Off (s)	39.2	23.9	55.1	81.2	39.3	18.9
Yield/Force Off 170(s)	39.2	23.9	27.1	55.2	39.3	119.9
Local Start Time (s)	63	0	78	94	58	0
Local Yield (s)	73.2	57.9	89.1	115.2	73.3	52.9
Local Yield 170(s)	73.2	57.9	61.1	89.2	73.3	33.9

Intersection Summary

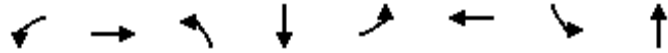
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 86 (72%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 47: Excelsior Blvd & TH 169 East Ramps



Excelsior Blvd
Improved PM

7/13/2016

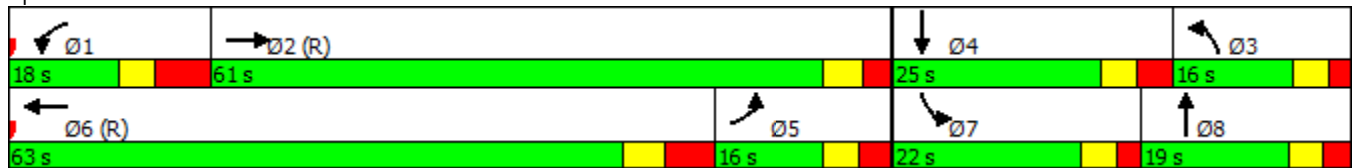


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	18	61	16	25	16	63	22	19
Maximum Split (%)	15.0%	50.8%	13.3%	20.8%	13.3%	52.5%	18.3%	15.8%
Minimum Split (s)	18	48	16	18	16	39	16	18
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.6	3.2	3.2
All-Red Time (s)	5	2.8	2.1	3.3	3.1	4.5	2	2.6
Minimum Initial (s)	8	15	8	10	8	14.9	8	10
Vehicle Extension (s)	3.5	5	3.5	3.5	3.5	5	3.5	3.5
Minimum Gap (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0	17	0	0	0	17	0	0
Time To Reduce (s)	0	17	0	0	0	17	0	0
Walk Time (s)		8				7		7
Flash Dont Walk (s)		33				23		28
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	72	90	56	31	15	72	31	53
End Time (s)	90	31	72	56	31	15	53	72
Yield/Force Off (s)	81.8	24.6	66.7	49.5	24.7	6.9	47.8	66.2
Yield/Force Off 170(s)	81.8	111.6	66.7	49.5	24.7	103.9	47.8	38.2
Local Start Time (s)	0	18	104	79	63	0	79	101
Local Yield (s)	9.8	72.6	114.7	97.5	72.7	54.9	95.8	114.2
Local Yield 170(s)	9.8	39.6	114.7	97.5	72.7	31.9	95.8	86.2

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 72 (60%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 48: Milwaukee St/St Louis St & Excelsior Blvd



135: Old Shakopee Rd & 98th St

Direction	All
Future Volume (vph)	2704
Total Delay / Veh (s/v)	11
CO Emissions (kg)	2.24
NOx Emissions (kg)	0.44
VOC Emissions (kg)	0.52

136: 98th St & 35W West Ramps

Direction	All
Future Volume (vph)	3159
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.34
NOx Emissions (kg)	0.45
VOC Emissions (kg)	0.54

137: 35W East Ramps & 98th St

Direction	All
Future Volume (vph)	3045
Total Delay / Veh (s/v)	31
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

138: Lyndale Ave & 98th St

Direction	All
Future Volume (vph)	3286
Total Delay / Veh (s/v)	30
CO Emissions (kg)	3.76
NOx Emissions (kg)	0.73
VOC Emissions (kg)	0.87

139: Garfield Ave & 98th St

Direction	All
Future Volume (vph)	2179
Total Delay / Veh (s/v)	7
CO Emissions (kg)	0.89
NOx Emissions (kg)	0.17
VOC Emissions (kg)	0.21

140: Grand Ave & 98th St

Direction	All
Future Volume (vph)	2325
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.16
NOx Emissions (kg)	0.42
VOC Emissions (kg)	0.50

141: Nicollet Ave & 98th St

Direction	All
Future Volume (vph)	2573
Total Delay / Veh (s/v)	23
CO Emissions (kg)	3.56
NOx Emissions (kg)	0.69
VOC Emissions (kg)	0.82

836: 35W SB Ramps & 98th St

Direction	All
Future Volume (vph)	2924
Total Delay / Veh (s/v)	0
CO Emissions (kg)	0.54
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

126: Normandale Blvd & Old Shakopee Rd

Direction	All
Future Volume (vph)	4230
Total Delay / Veh (s/v)	31
CO Emissions (kg)	8.75
NOx Emissions (kg)	1.70
VOC Emissions (kg)	2.03

127: Nesbitt Ave & Old Shakopee Rd

Direction	All
Future Volume (vph)	3460
Total Delay / Veh (s/v)	12
CO Emissions (kg)	4.91
NOx Emissions (kg)	0.96
VOC Emissions (kg)	1.14

129: Bloomington Ferry Rd & Old Shakopee Rd

Direction	All
Future Volume (vph)	3390
Total Delay / Veh (s/v)	20
CO Emissions (kg)	5.54
NOx Emissions (kg)	1.08
VOC Emissions (kg)	1.28

130: Bush Lake Rd & Old Shakopee Rd

Direction	All
Future Volume (vph)	3277
Total Delay / Veh (s/v)	18
CO Emissions (kg)	4.66
NOx Emissions (kg)	0.91
VOC Emissions (kg)	1.08

131: Hampshire Ave & Old Shakopee Rd

Direction	All
Future Volume (vph)	3303
Total Delay / Veh (s/v)	10
CO Emissions (kg)	4.65
NOx Emissions (kg)	0.90
VOC Emissions (kg)	1.08

203: TH 169 West Ramp & Old Shakopee Rd

Direction	All
Future Volume (vph)	1780
Total Delay / Veh (s/v)	19
CO Emissions (kg)	2.13
NOx Emissions (kg)	0.41
VOC Emissions (kg)	0.49

204: TH 169 East Ramp & Old Shakopee Rd

Direction	All
Future Volume (vph)	2726
Total Delay / Veh (s/v)	6
CO Emissions (kg)	3.74
NOx Emissions (kg)	0.73
VOC Emissions (kg)	0.87

CSAH 1 East
Existing PM

7/12/2016

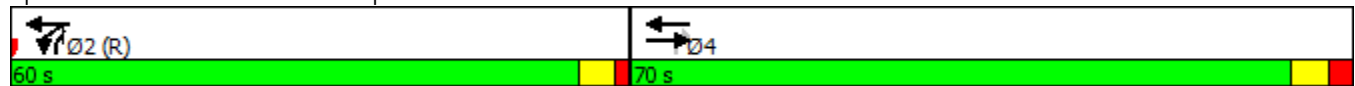


Phase Number	2	4
Movement	WBTL	WBEB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Min
Maximum Split (s)	60	70
Maximum Split (%)	46.2%	53.8%
Minimum Split (s)	20	25
Yellow Time (s)	3.6	3.6
All-Red Time (s)	1.5	2.5
Minimum Initial (s)	12	17
Vehicle Extension (s)	3	5.5
Minimum Gap (s)	3	5.5
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)		7
Flash Dont Walk (s)		9
Dual Entry	No	No
Inhibit Max	Yes	Yes
Start Time (s)	61	121
End Time (s)	121	61
Yield/Force Off (s)	115.9	54.9
Yield/Force Off 170(s)	115.9	54.9
Local Start Time (s)	0	60
Local Yield (s)	54.9	123.9
Local Yield 170(s)	54.9	123.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 61 (47%), Referenced to phase 2:WBTL, Start of 1st Green	

Splits and Phases: 135: Old Shakopee Rd & 98th St



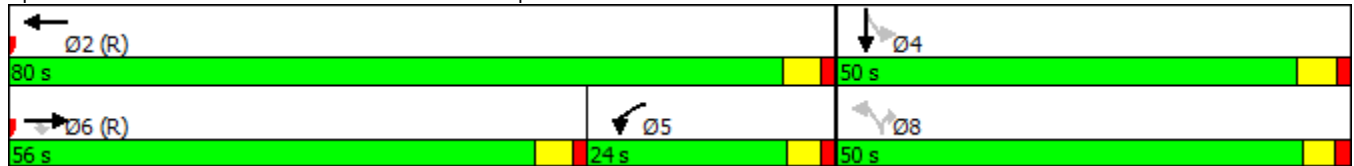


Phase Number	2	4	5	6	8
Movement	WBT	SBTL	WBL	EBT	NBL
Lead/Lag			Lag	Lead	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	C-Max	None	None	C-Max	None
Maximum Split (s)	80	50	24	56	50
Maximum Split (%)	61.5%	38.5%	18.5%	43.1%	38.5%
Minimum Split (s)	19.1	42	15	27	15
Yellow Time (s)	3.6	3.9	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	1.7
Minimum Initial (s)	10	7	7	10	7
Vehicle Extension (s)	4	3.5	3	4	3.5
Minimum Gap (s)	4	3.5	3	4	3.5
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	7	7		7	
Flash Dont Walk (s)	7	29		14	
Dual Entry	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	25	105	81	25	105
End Time (s)	105	25	105	81	25
Yield/Force Off (s)	99.9	19.6	100.3	75.9	20.1
Yield/Force Off 170(s)	92.9	120.6	100.3	61.9	20.1
Local Start Time (s)	0	80	56	0	80
Local Yield (s)	74.9	124.6	75.3	50.9	125.1
Local Yield 170(s)	67.9	95.6	75.3	36.9	125.1

Intersection Summary

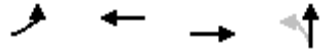
Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 25 (19%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 136: 98th St & 35W West Ramps



CSAH 1 East
Existing PM

7/12/2016



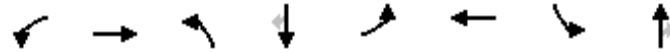
Phase Number	1	2	6	8
Movement	EBL	WBT	EBT	NBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None
Maximum Split (s)	44	45	89	41
Maximum Split (%)	33.8%	34.6%	68.5%	31.5%
Minimum Split (s)	15	27	19.1	38
Yellow Time (s)	3.2	3.6	3.6	3.9
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	7	10	10	7
Vehicle Extension (s)	3	4	4	3.5
Minimum Gap (s)	3	4	4	3.5
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		14	7	25
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	64	19	19	108
End Time (s)	108	64	108	19
Yield/Force Off (s)	103.3	58.9	102.9	13.6
Yield/Force Off 170(s)	103.3	44.9	95.9	118.6
Local Start Time (s)	45	0	0	89
Local Yield (s)	84.3	39.9	83.9	124.6
Local Yield 170(s)	84.3	25.9	76.9	99.6

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	110
Offset: 19 (15%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 137: 35W East Ramps & 98th St



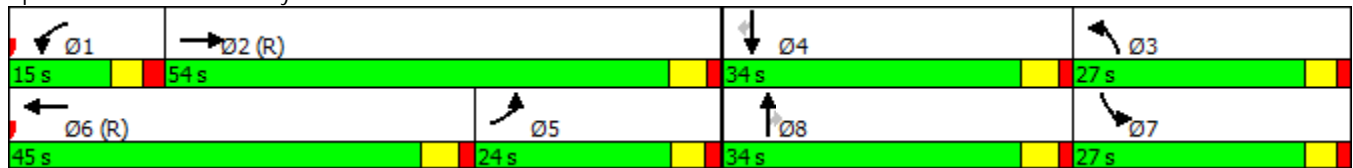


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	54	27	34	24	45	27	34
Maximum Split (%)	11.5%	41.5%	20.8%	26.2%	18.5%	34.6%	20.8%	26.2%
Minimum Split (s)	15	36	15	32	15	28	15	34
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6
All-Red Time (s)	2	1.5	1.5	1.5	1.7	1.5	1.5	1.5
Minimum Initial (s)	6	11	6	10	6	11	6	10
Vehicle Extension (s)	3	4	3	3.5	3	4	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		19		15		21
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	17	32	120	86	62	17	120	86
End Time (s)	32	86	17	120	86	62	17	120
Yield/Force Off (s)	26.8	80.9	12.3	114.9	81.1	56.9	12.3	114.9
Yield/Force Off 170(s)	26.8	57.9	12.3	95.9	81.1	41.9	12.3	93.9
Local Start Time (s)	0	15	103	69	45	0	103	69
Local Yield (s)	9.8	63.9	125.3	97.9	64.1	39.9	125.3	97.9
Local Yield 170(s)	9.8	40.9	125.3	78.9	64.1	24.9	125.3	76.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 17 (13%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 138: Lyndale Ave & 98th St





Phase Number	1	2	4	5	6	8
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	19	67	44	19	67	44
Maximum Split (%)	14.6%	51.5%	33.8%	14.6%	51.5%	33.8%
Minimum Split (s)	15	24	39	15	24	38
Yellow Time (s)	3.2	3.6	3.2	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	2	1.7	1.5	2
Minimum Initial (s)	6	10	10	6	10	10
Vehicle Extension (s)	3	3.5	3	3	4	3
Minimum Gap (s)	3	3.5	3	3	4	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		11	26		11	25
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	7	26	93	7	26	93
End Time (s)	26	93	7	26	93	7
Yield/Force Off (s)	21.3	87.9	1.8	21.1	87.9	1.8
Yield/Force Off 170(s)	21.3	76.9	105.8	21.1	76.9	106.8
Local Start Time (s)	111	0	67	111	0	67
Local Yield (s)	125.3	61.9	105.8	125.1	61.9	105.8
Local Yield 170(s)	125.3	50.9	79.8	125.1	50.9	80.8

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 26 (20%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 139: Garfield Ave & 98th St



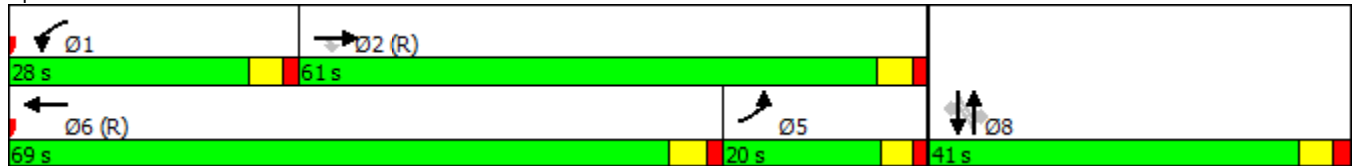


Phase Number	1	2	5	6	8
Movement	WBL	EBT	EBL	WBT	NBSB
Lead/Lag	Lead	Lag	Lag	Lead	
Lead-Lag Optimize	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	None	C-Max	None
Maximum Split (s)	28	61	20	69	41
Maximum Split (%)	21.5%	46.9%	15.4%	53.1%	31.5%
Minimum Split (s)	15	25	15	28	39
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	2
Minimum Initial (s)	7	10	7	10	7
Vehicle Extension (s)	3	4.5	3.5	4.5	3
Minimum Gap (s)	3	4.5	3.5	4.5	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		7		7	7
Flash Dont Walk (s)		12		15	26
Dual Entry	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	11	39	80	11	100
End Time (s)	39	100	100	80	11
Yield/Force Off (s)	34.3	94.9	95.3	74.9	5.8
Yield/Force Off 170(s)	34.3	82.9	95.3	59.9	109.8
Local Start Time (s)	0	28	69	0	89
Local Yield (s)	23.3	83.9	84.3	63.9	124.8
Local Yield 170(s)	23.3	71.9	84.3	48.9	98.8

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 11 (8%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 140: Grand Ave & 98th St



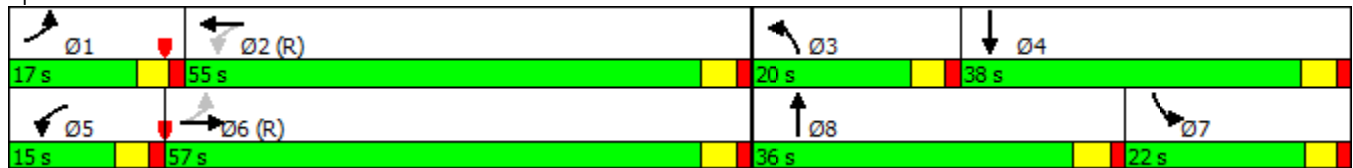


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBT	WBL	EBTL	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize			Yes	Yes			Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	17	55	20	38	15	57	22	36
Maximum Split (%)	13.1%	42.3%	15.4%	29.2%	11.5%	43.8%	16.9%	27.7%
Minimum Split (s)	15	36	15	38	15	37	15	36
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	7	12	7	10	7	12	7	10
Vehicle Extension (s)	3	4	3	4	3	4	3	4
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		25		24		23
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	77	94	19	39	77	92	55	19
End Time (s)	94	19	39	77	92	19	77	55
Yield/Force Off (s)	89.3	13.9	34.3	71.9	87.3	13.9	72.3	49.9
Yield/Force Off 170(s)	89.3	120.9	34.3	46.9	87.3	119.9	72.3	26.9
Local Start Time (s)	115	2	57	77	115	0	93	57
Local Yield (s)	127.3	51.9	72.3	109.9	125.3	51.9	110.3	87.9
Local Yield 170(s)	127.3	28.9	72.3	84.9	125.3	27.9	110.3	64.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	105
Offset: 92 (71%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 141: Nicollet Ave & 98th St



Normandale Corridor
2015 Optimized PM

7/12/2016

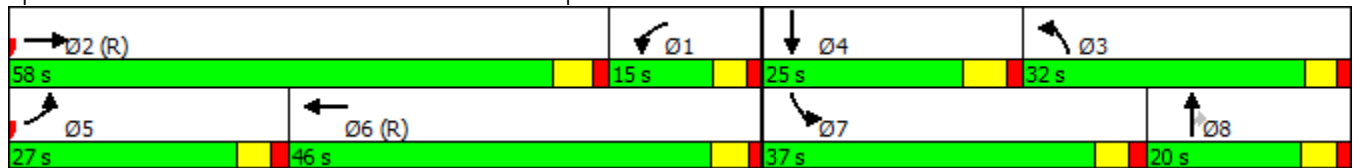


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Min	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	58	32	25	27	46	37	20
Maximum Split (%)	11.5%	44.6%	24.6%	19.2%	20.8%	35.4%	28.5%	15.4%
Minimum Split (s)	15	23	15	20	16	23	16	20
Yellow Time (s)	3.2	3.9	3.2	4.3	3.2	3.6	3.2	3.6
All-Red Time (s)	1.7	1.5	1.5	1.5	1.7	1.5	1.7	1.5
Minimum Initial (s)	6	15	6	12	8	15	8	12
Vehicle Extension (s)	3	4.5	3	4.5	4	4.5	4	4.5
Minimum Gap (s)	3	3	3	3	4	3	4	4.5
Time Before Reduce (s)	0	22	0	0	0	22	0	0
Time To Reduce (s)	0	22	0	0	0	22	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		20		19		20
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	47	119	87	62	119	16	62	99
End Time (s)	62	47	119	87	16	62	99	119
Yield/Force Off (s)	57.1	41.6	114.3	81.2	11.1	56.9	94.1	113.9
Yield/Force Off 170(s)	57.1	24.6	114.3	61.2	11.1	37.9	94.1	93.9
Local Start Time (s)	58	0	98	73	0	27	73	110
Local Yield (s)	68.1	52.6	125.3	92.2	22.1	67.9	105.1	124.9
Local Yield 170(s)	68.1	35.6	125.3	72.2	22.1	48.9	105.1	104.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 119 (92%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 126: Normandale Blvd & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016



Phase Number	1	2	4	5	6	8
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	24	77	29	19	82	29
Maximum Split (%)	18.5%	59.2%	22.3%	14.6%	63.1%	22.3%
Minimum Split (s)	16	22	16	15	22	16
Yellow Time (s)	3.2	3.9	3.6	3.2	3.9	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	8	14	8	5	14	8
Vehicle Extension (s)	3.5	6	3.5	2	6	3.5
Minimum Gap (s)	3.5	3	3.5	2	3	3.5
Time Before Reduce (s)	0	18	0	0	18	0
Time To Reduce (s)	0	18	0	0	18	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	19		12	20
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	38	62	9	120	38	9
End Time (s)	62	9	38	9	120	38
Yield/Force Off (s)	57.3	3.6	32.9	4.3	114.6	32.9
Yield/Force Off 170(s)	57.3	121.6	13.9	4.3	102.6	12.9
Local Start Time (s)	0	24	101	82	0	101
Local Yield (s)	19.3	95.6	124.9	96.3	76.6	124.9
Local Yield 170(s)	19.3	83.6	105.9	96.3	64.6	104.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 38 (29%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 127: Nesbitt Ave & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016

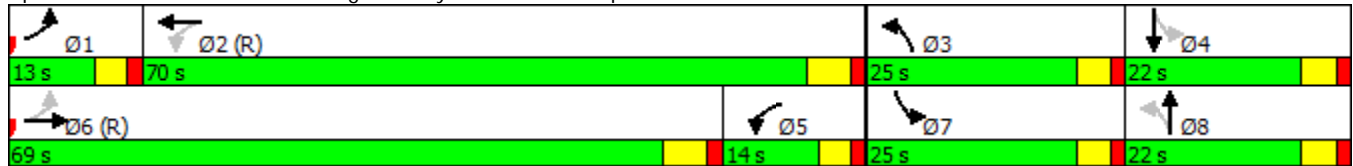


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	13	70	25	22	14	69	25	22
Maximum Split (%)	10.0%	53.8%	19.2%	16.9%	10.8%	53.1%	19.2%	16.9%
Minimum Split (s)	13	18	13	18	13	18	13	18
Yellow Time (s)	3.2	4.3	3.2	3.6	3.2	4.3	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	10	5	10	5	10	5	10
Vehicle Extension (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
Minimum Gap (s)	3.5	3.5	3.5	4	3.5	3.5	3.5	4
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		18		17		18
Dual Entry	No	Yes	No	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	127	10	80	105	66	127	80	105
End Time (s)	10	80	105	127	80	66	105	127
Yield/Force Off (s)	5.3	74.2	100.3	121.9	75.3	60.2	100.3	121.9
Yield/Force Off 170(s)	5.3	57.2	100.3	103.9	75.3	43.2	100.3	103.9
Local Start Time (s)	0	13	83	108	69	0	83	108
Local Yield (s)	8.3	77.2	103.3	124.9	78.3	63.2	103.3	124.9
Local Yield 170(s)	8.3	60.2	103.3	106.9	78.3	46.2	103.3	106.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 127 (98%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 129: Bloomington Ferry Rd & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016

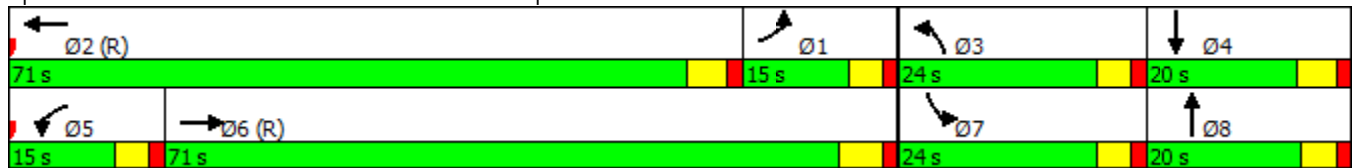


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	71	24	20	15	71	24	20
Maximum Split (%)	11.5%	54.6%	18.5%	15.4%	11.5%	54.6%	18.5%	15.4%
Minimum Split (s)	15	23	15	18	15	23	15	18
Yellow Time (s)	3.2	3.9	3.2	3.9	3.2	4.3	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	15	5	10	5	15	5	10
Vehicle Extension (s)	3.5	5.5	3.5	4.5	3.5	5.5	3.5	4
Minimum Gap (s)	3.5	3	3.5	4.5	3.5	3	3.5	4
Time Before Reduce (s)	0	13	0	0	0	13	0	0
Time To Reduce (s)	0	13	0	0	0	13	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		18		17		17
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	52	111	67	91	111	126	67	91
End Time (s)	67	52	91	111	126	67	91	111
Yield/Force Off (s)	62.3	46.6	86.3	105.6	121.3	61.2	86.3	105.9
Yield/Force Off 170(s)	62.3	29.6	86.3	87.6	121.3	44.2	86.3	88.9
Local Start Time (s)	71	0	86	110	0	15	86	110
Local Yield (s)	81.3	65.6	105.3	124.6	10.3	80.2	105.3	124.9
Local Yield 170(s)	81.3	48.6	105.3	106.6	10.3	63.2	105.3	107.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 111 (85%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 130: Bush Lake Rd & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016

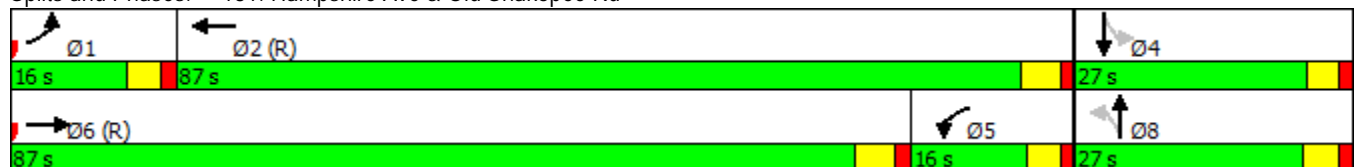


Phase Number	1	2	4	5	6	8
Movement	EBL	WBT	SBTL	WBL	EBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	87	27	16	87	27
Maximum Split (%)	12.3%	66.9%	20.8%	12.3%	66.9%	20.8%
Minimum Split (s)	15	20	15	15	20	15
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	12	7	5	12	7
Vehicle Extension (s)	3	4	3.5	3	4	3.5
Minimum Gap (s)	3	3	3.5	3	3	3.5
Time Before Reduce (s)	0	13	0	0	13	0
Time To Reduce (s)	0	13	0	0	13	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	18		12	18
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	46	62	19	3	46	19
End Time (s)	62	19	46	19	3	46
Yield/Force Off (s)	57.3	13.6	41.3	14.3	127.6	40.9
Yield/Force Off 170(s)	57.3	1.6	23.3	14.3	115.6	22.9
Local Start Time (s)	0	16	103	87	0	103
Local Yield (s)	11.3	97.6	125.3	98.3	81.6	124.9
Local Yield 170(s)	11.3	85.6	107.3	98.3	69.6	106.9

Intersection Summary

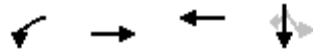
Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 46 (35%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 131: Hampshire Ave & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016



Phase Number	1	2	6	8
Movement	WBL	EBT	WBT	SBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize				
Recall Mode	C-Max	Min	C-Max	None
Maximum Split (s)	48	22	70	20
Maximum Split (%)	53.3%	24.4%	77.8%	22.2%
Minimum Split (s)	12.5	21.5	24.5	38
Yellow Time (s)	3	4.5	4.5	4
All-Red Time (s)	2.5	2	2	2
Minimum Initial (s)	7	15	15	8
Vehicle Extension (s)	3	5.5	5.5	5.5
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)			7	20
Flash Dont Walk (s)			10	12
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	18	86	86	66
End Time (s)	66	18	66	86
Yield/Force Off (s)	60.5	11.5	59.5	80
Yield/Force Off 170(s)	60.5	11.5	49.5	68
Local Start Time (s)	22	0	0	70
Local Yield (s)	64.5	15.5	63.5	84
Local Yield 170(s)	64.5	15.5	53.5	72

Intersection Summary

Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 86 (96%), Referenced to phase 1:WBL and 6:WBT, Start of 1st Green	

Splits and Phases: 203: TH 169 West Ramp & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016

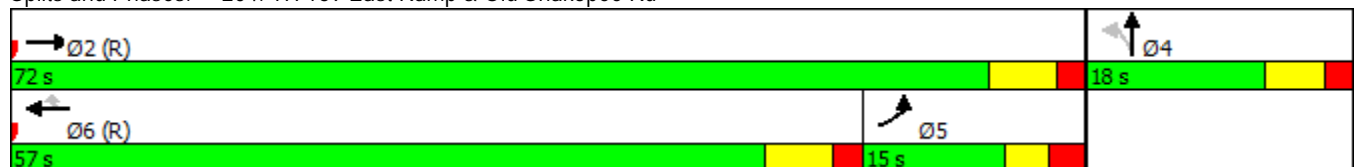


Phase Number	2	4	5	6
Movement	EBT	NBTL	EBL	WBT
Lead/Lag			Lag	Lead
Lead-Lag Optimize				
Recall Mode	C-Max	None	None	C-Max
Maximum Split (s)	72	18	15	57
Maximum Split (%)	80.0%	20.0%	16.7%	63.3%
Minimum Split (s)	16.5	37	12.5	23.5
Yellow Time (s)	4.5	4	3	4.5
All-Red Time (s)	2	2	2.5	2
Minimum Initial (s)	10	8	7	10
Vehicle Extension (s)	5.5	4	3	5.5
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		20		7
Flash Dont Walk (s)		8		10
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	80	62	47	80
End Time (s)	62	80	62	47
Yield/Force Off (s)	55.5	74	56.5	40.5
Yield/Force Off 170(s)	55.5	66	56.5	30.5
Local Start Time (s)	0	72	57	0
Local Yield (s)	65.5	84	66.5	50.5
Local Yield 170(s)	65.5	76	66.5	40.5

Intersection Summary

Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 80 (89%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 204: TH 169 East Ramp & Old Shakopee Rd



135: Old Shakopee Rd & 98th St

Direction	All
Future Volume (vph)	2704
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.28
NOx Emissions (kg)	0.44
VOC Emissions (kg)	0.53

136: 98th St & 35W West Ramps

Direction	All
Future Volume (vph)	3159
Total Delay / Veh (s/v)	13
CO Emissions (kg)	2.45
NOx Emissions (kg)	0.48
VOC Emissions (kg)	0.57

137: 35W East Ramps & 98th St

Direction	All
Future Volume (vph)	3045
Total Delay / Veh (s/v)	30
CO Emissions (kg)	3.21
NOx Emissions (kg)	0.62
VOC Emissions (kg)	0.74

138: Lyndale Ave & 98th St

Direction	All
Future Volume (vph)	3286
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.65
NOx Emissions (kg)	0.71
VOC Emissions (kg)	0.85

139: Garfield Ave & 98th St

Direction	All
Future Volume (vph)	2179
Total Delay / Veh (s/v)	8
CO Emissions (kg)	1.14
NOx Emissions (kg)	0.22
VOC Emissions (kg)	0.26

140: Grand Ave & 98th St

Direction	All
Future Volume (vph)	2325
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.11
NOx Emissions (kg)	0.41
VOC Emissions (kg)	0.49

141: Nicollet Ave & 98th St

Direction	All
Future Volume (vph)	2573
Total Delay / Veh (s/v)	22
CO Emissions (kg)	3.42
NOx Emissions (kg)	0.67
VOC Emissions (kg)	0.79

836: 35W SB Ramps & 98th St

Direction	All
Future Volume (vph)	2924
Total Delay / Veh (s/v)	0
CO Emissions (kg)	0.54
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

126: Normandale Blvd & Old Shakopee Rd

Direction	All
Future Volume (vph)	4230
Total Delay / Veh (s/v)	30
CO Emissions (kg)	8.67
NOx Emissions (kg)	1.69
VOC Emissions (kg)	2.01

127: Nesbitt Ave & Old Shakopee Rd

Direction	All
Future Volume (vph)	3460
Total Delay / Veh (s/v)	13
CO Emissions (kg)	5.17
NOx Emissions (kg)	1.01
VOC Emissions (kg)	1.20

129: Bloomington Ferry Rd & Old Shakopee Rd

Direction	All
Future Volume (vph)	3390
Total Delay / Veh (s/v)	19
CO Emissions (kg)	5.32
NOx Emissions (kg)	1.04
VOC Emissions (kg)	1.23

130: Bush Lake Rd & Old Shakopee Rd

Direction	All
Future Volume (vph)	3277
Total Delay / Veh (s/v)	18
CO Emissions (kg)	4.58
NOx Emissions (kg)	0.89
VOC Emissions (kg)	1.06

131: Hampshire Ave & Old Shakopee Rd

Direction	All
Future Volume (vph)	3303
Total Delay / Veh (s/v)	10
CO Emissions (kg)	4.43
NOx Emissions (kg)	0.86
VOC Emissions (kg)	1.03

203: TH 169 West Ramp & Old Shakopee Rd

Direction	All
Future Volume (vph)	1780
Total Delay / Veh (s/v)	18
CO Emissions (kg)	2.08
NOx Emissions (kg)	0.40
VOC Emissions (kg)	0.48

204: TH 169 East Ramp & Old Shakopee Rd

Direction	All
Future Volume (vph)	2726
Total Delay / Veh (s/v)	7
CO Emissions (kg)	3.85
NOx Emissions (kg)	0.75
VOC Emissions (kg)	0.89



Phase Number	2	4
Movement	WBTL	WBEB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Min
Maximum Split (s)	97	33
Maximum Split (%)	74.6%	25.4%
Minimum Split (s)	20	25
Yellow Time (s)	3.6	3.6
All-Red Time (s)	1.5	2.5
Minimum Initial (s)	12	17
Vehicle Extension (s)	3	5.5
Minimum Gap (s)	3	5.5
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)		7
Flash Dont Walk (s)		9
Dual Entry	No	No
Inhibit Max	Yes	Yes
Start Time (s)	60	27
End Time (s)	27	60
Yield/Force Off (s)	21.9	53.9
Yield/Force Off 170(s)	21.9	53.9
Local Start Time (s)	0	97
Local Yield (s)	91.9	123.9
Local Yield 170(s)	91.9	123.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 60 (46%), Referenced to phase 2:WBTL, Start of 1st Green	

Splits and Phases: 135: Old Shakopee Rd & 98th St



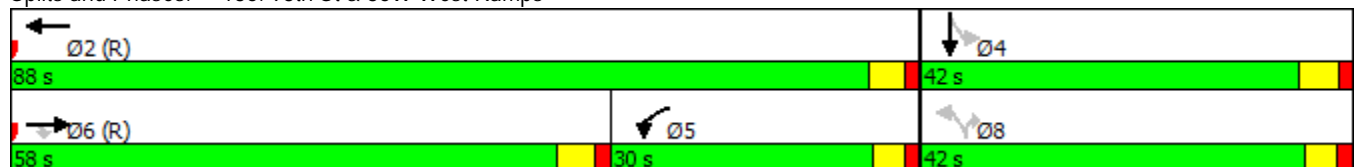


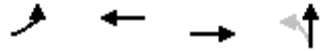
Phase Number	2	4	5	6	8
Movement	WBT	SBTL	WBL	EBT	NBL
Lead/Lag			Lag	Lead	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	C-Max	None	None	C-Max	None
Maximum Split (s)	88	42	30	58	42
Maximum Split (%)	67.7%	32.3%	23.1%	44.6%	32.3%
Minimum Split (s)	19.1	42	15	27	15
Yellow Time (s)	3.6	3.9	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	1.7
Minimum Initial (s)	10	7	7	10	7
Vehicle Extension (s)	4	3.5	3	4	3.5
Minimum Gap (s)	4	3.5	3	4	3.5
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	7	7		7	
Flash Dont Walk (s)	7	29		14	
Dual Entry	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	53	11	111	53	11
End Time (s)	11	53	11	111	53
Yield/Force Off (s)	5.9	47.6	6.3	105.9	48.1
Yield/Force Off 170(s)	128.9	18.6	6.3	91.9	48.1
Local Start Time (s)	0	88	58	0	88
Local Yield (s)	82.9	124.6	83.3	52.9	125.1
Local Yield 170(s)	75.9	95.6	83.3	38.9	125.1

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 53 (41%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 136: 98th St & 35W West Ramps



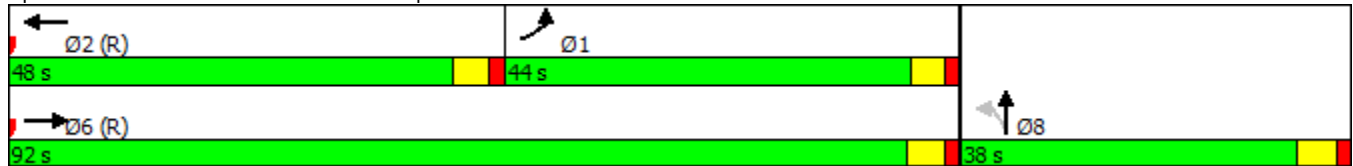


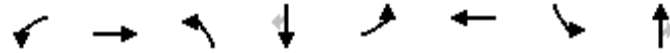
Phase Number	1	2	6	8
Movement	EBL	WBT	EBT	NBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None
Maximum Split (s)	44	48	92	38
Maximum Split (%)	33.8%	36.9%	70.8%	29.2%
Minimum Split (s)	15	27	19.1	38
Yellow Time (s)	3.2	3.6	3.6	3.9
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	7	10	10	7
Vehicle Extension (s)	3	4	4	3.5
Minimum Gap (s)	3	4	4	3.5
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		14	7	25
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	93	45	45	7
End Time (s)	7	93	7	45
Yield/Force Off (s)	2.3	87.9	1.9	39.6
Yield/Force Off 170(s)	2.3	73.9	124.9	14.6
Local Start Time (s)	48	0	0	92
Local Yield (s)	87.3	42.9	86.9	124.6
Local Yield 170(s)	87.3	28.9	79.9	99.6

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	110
Offset: 45 (35%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 137: 35W East Ramps & 98th St



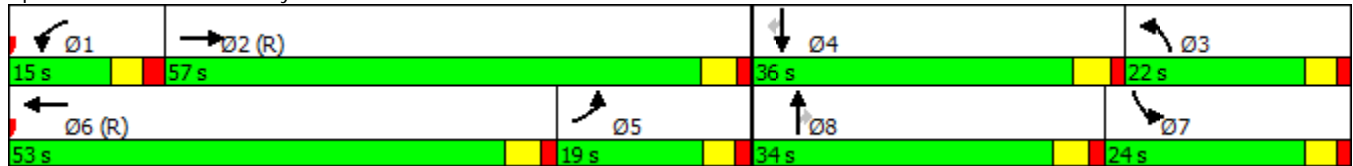


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	57	22	36	19	53	24	34
Maximum Split (%)	11.5%	43.8%	16.9%	27.7%	14.6%	40.8%	18.5%	26.2%
Minimum Split (s)	15	36	15	32	15	28	15	34
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6
All-Red Time (s)	2	1.5	1.5	1.5	1.7	1.5	1.5	1.5
Minimum Initial (s)	6	11	6	10	6	11	6	10
Vehicle Extension (s)	3	4	3	3.5	3	4	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		19		15		21
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	32	47	10	104	85	32	8	104
End Time (s)	47	104	32	10	104	85	32	8
Yield/Force Off (s)	41.8	98.9	27.3	4.9	99.1	79.9	27.3	2.9
Yield/Force Off 170(s)	41.8	75.9	27.3	115.9	99.1	64.9	27.3	111.9
Local Start Time (s)	0	15	108	72	53	0	106	72
Local Yield (s)	9.8	66.9	125.3	102.9	67.1	47.9	125.3	100.9
Local Yield 170(s)	9.8	43.9	125.3	83.9	67.1	32.9	125.3	79.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 32 (25%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 138: Lyndale Ave & 98th St





Phase Number	1	2	4	5	6	8
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	18	70	42	17	71	42
Maximum Split (%)	13.8%	53.8%	32.3%	13.1%	54.6%	32.3%
Minimum Split (s)	15	24	39	15	24	38
Yellow Time (s)	3.2	3.6	3.2	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	2	1.7	1.5	2
Minimum Initial (s)	6	10	10	6	10	10
Vehicle Extension (s)	3	3.5	3	3	4	3
Minimum Gap (s)	3	3.5	3	3	4	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		11	26		11	25
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	32	50	120	103	32	120
End Time (s)	50	120	32	120	103	32
Yield/Force Off (s)	45.3	114.9	26.8	115.1	97.9	26.8
Yield/Force Off 170(s)	45.3	103.9	0.8	115.1	86.9	1.8
Local Start Time (s)	0	18	88	71	0	88
Local Yield (s)	13.3	82.9	124.8	83.1	65.9	124.8
Local Yield 170(s)	13.3	71.9	98.8	83.1	54.9	99.8

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 32 (25%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 139: Garfield Ave & 98th St



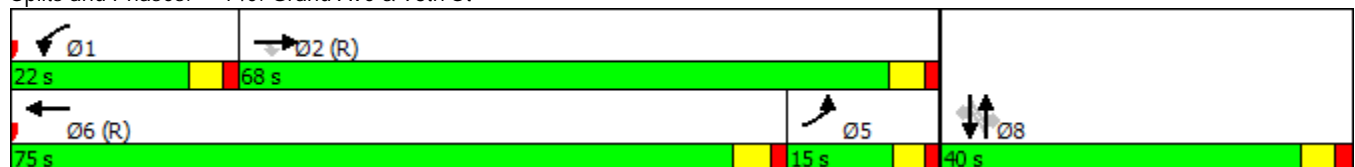


Phase Number	1	2	5	6	8
Movement	WBL	EBT	EBL	WBT	NBSB
Lead/Lag	Lead	Lag	Lag	Lead	
Lead-Lag Optimize	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	None	C-Max	None
Maximum Split (s)	22	68	15	75	40
Maximum Split (%)	16.9%	52.3%	11.5%	57.7%	30.8%
Minimum Split (s)	15	25	15	28	39
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	2
Minimum Initial (s)	7	10	7	10	7
Vehicle Extension (s)	3	4.5	3.5	4.5	3
Minimum Gap (s)	3	4.5	3.5	4.5	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		7		7	7
Flash Dont Walk (s)		12		15	26
Dual Entry	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	12	34	87	12	102
End Time (s)	34	102	102	87	12
Yield/Force Off (s)	29.3	96.9	97.3	81.9	6.8
Yield/Force Off 170(s)	29.3	84.9	97.3	66.9	110.8
Local Start Time (s)	0	22	75	0	90
Local Yield (s)	17.3	84.9	85.3	69.9	124.8
Local Yield 170(s)	17.3	72.9	85.3	54.9	98.8

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 12 (9%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 140: Grand Ave & 98th St



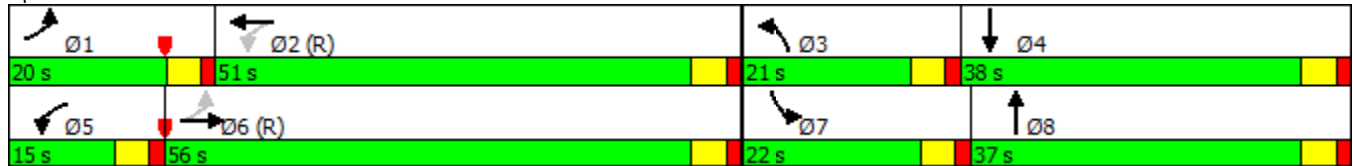


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBT	WBL	EBTL	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize			Yes	Yes			Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	51	21	38	15	56	22	37
Maximum Split (%)	15.4%	39.2%	16.2%	29.2%	11.5%	43.1%	16.9%	28.5%
Minimum Split (s)	15	36	15	38	15	37	15	36
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	7	12	7	10	7	12	7	10
Vehicle Extension (s)	3	4	3	4	3	4	3	4
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		25		24		23
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	78	98	19	40	78	93	19	41
End Time (s)	98	19	40	78	93	19	41	78
Yield/Force Off (s)	93.3	13.9	35.3	72.9	88.3	13.9	36.3	72.9
Yield/Force Off 170(s)	93.3	120.9	35.3	47.9	88.3	119.9	36.3	49.9
Local Start Time (s)	115	5	56	77	115	0	56	78
Local Yield (s)	0.3	50.9	72.3	109.9	125.3	50.9	73.3	109.9
Local Yield 170(s)	0.3	27.9	72.3	84.9	125.3	26.9	73.3	86.9

Intersection Summary

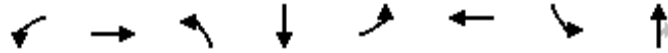
Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	105
Offset: 93 (72%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 141: Nicollet Ave & 98th St



Normandale Corridor
Improved PM

7/13/2016

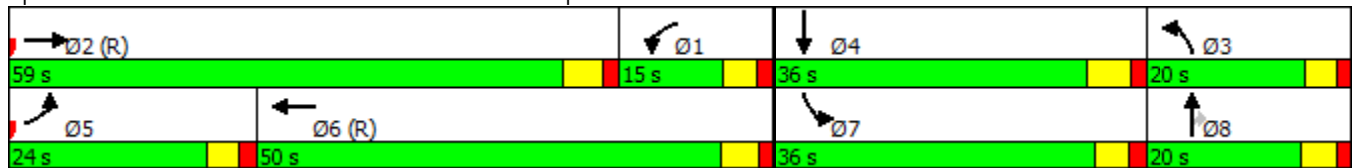


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Min	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	59	20	36	24	50	36	20
Maximum Split (%)	11.5%	45.4%	15.4%	27.7%	18.5%	38.5%	27.7%	15.4%
Minimum Split (s)	15	23	15	20	16	23	16	20
Yellow Time (s)	3.2	3.9	3.2	4.3	3.2	3.6	3.2	3.6
All-Red Time (s)	1.7	1.5	1.5	1.5	1.7	1.5	1.7	1.5
Minimum Initial (s)	6	15	6	12	8	15	8	12
Vehicle Extension (s)	3	4.5	3	4.5	4	4.5	4	4.5
Minimum Gap (s)	3	3	3	3	4	3	4	4.5
Time Before Reduce (s)	0	22	0	0	0	22	0	0
Time To Reduce (s)	0	22	0	0	0	22	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		20		19		20
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	47	118	98	62	118	12	62	98
End Time (s)	62	47	118	98	12	62	98	118
Yield/Force Off (s)	57.1	41.6	113.3	92.2	7.1	56.9	93.1	112.9
Yield/Force Off 170(s)	57.1	24.6	113.3	72.2	7.1	37.9	93.1	92.9
Local Start Time (s)	59	0	110	74	0	24	74	110
Local Yield (s)	69.1	53.6	125.3	104.2	19.1	68.9	105.1	124.9
Local Yield 170(s)	69.1	36.6	125.3	84.2	19.1	49.9	105.1	104.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 118 (91%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 126: Normandale Blvd & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016



Phase Number	1	2	4	5	6	8
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	85	29	16	85	29
Maximum Split (%)	12.3%	65.4%	22.3%	12.3%	65.4%	22.3%
Minimum Split (s)	16	22	16	15	22	16
Yellow Time (s)	3.2	3.9	3.6	3.2	3.9	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	8	14	8	5	14	8
Vehicle Extension (s)	3.5	6	3.5	2	6	3.5
Minimum Gap (s)	3.5	3	3.5	2	3	3.5
Time Before Reduce (s)	0	18	0	0	18	0
Time To Reduce (s)	0	18	0	0	18	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	19		12	20
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	41	57	12	126	41	12
End Time (s)	57	12	41	12	126	41
Yield/Force Off (s)	52.3	6.6	35.9	7.3	120.6	35.9
Yield/Force Off 170(s)	52.3	124.6	16.9	7.3	108.6	15.9
Local Start Time (s)	0	16	101	85	0	101
Local Yield (s)	11.3	95.6	124.9	96.3	79.6	124.9
Local Yield 170(s)	11.3	83.6	105.9	96.3	67.6	104.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 41 (32%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 127: Nesbitt Ave & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016

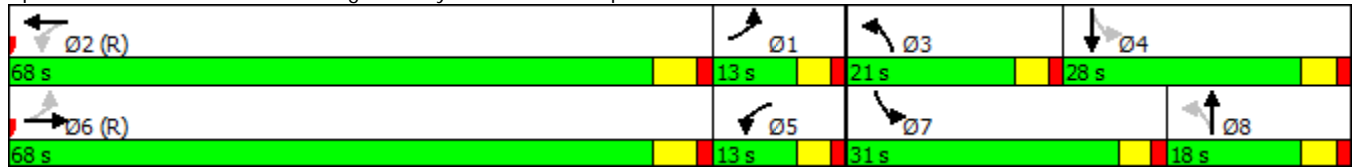


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	13	68	21	28	13	68	31	18
Maximum Split (%)	10.0%	52.3%	16.2%	21.5%	10.0%	52.3%	23.8%	13.8%
Minimum Split (s)	13	18	13	18	13	18	13	18
Yellow Time (s)	3.2	4.3	3.2	3.6	3.2	4.3	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	10	5	10	5	10	5	10
Vehicle Extension (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
Minimum Gap (s)	3.5	3.5	3.5	4	3.5	3.5	3.5	4
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		18		17		18
Dual Entry	No	Yes	No	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	71	3	84	105	71	3	84	115
End Time (s)	84	71	105	3	84	71	115	3
Yield/Force Off (s)	79.3	65.2	100.3	127.9	79.3	65.2	110.3	127.9
Yield/Force Off 170(s)	79.3	48.2	100.3	109.9	79.3	48.2	110.3	109.9
Local Start Time (s)	68	0	81	102	68	0	81	112
Local Yield (s)	76.3	62.2	97.3	124.9	76.3	62.2	107.3	124.9
Local Yield 170(s)	76.3	45.2	97.3	106.9	76.3	45.2	107.3	106.9

Intersection Summary

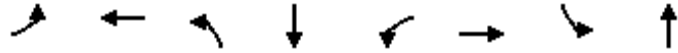
Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 3 (2%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 129: Bloomington Ferry Rd & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016



Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	68	17	30	15	68	29	18
Maximum Split (%)	11.5%	52.3%	13.1%	23.1%	11.5%	52.3%	22.3%	13.8%
Minimum Split (s)	15	23	15	18	15	23	15	18
Yellow Time (s)	3.2	3.9	3.2	3.9	3.2	4.3	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	15	5	10	5	15	5	10
Vehicle Extension (s)	3.5	5.5	3.5	4.5	3.5	5.5	3.5	4
Minimum Gap (s)	3.5	3	3.5	4.5	3.5	3	3.5	4
Time Before Reduce (s)	0	13	0	0	0	13	0	0
Time To Reduce (s)	0	13	0	0	0	13	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		18		17		17
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	50	112	95	65	112	127	65	94
End Time (s)	65	50	112	95	127	65	94	112
Yield/Force Off (s)	60.3	44.6	107.3	89.6	122.3	59.2	89.3	106.9
Yield/Force Off 170(s)	60.3	27.6	107.3	71.6	122.3	42.2	89.3	89.9
Local Start Time (s)	68	0	113	83	0	15	83	112
Local Yield (s)	78.3	62.6	125.3	107.6	10.3	77.2	107.3	124.9
Local Yield 170(s)	78.3	45.6	125.3	89.6	10.3	60.2	107.3	107.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 112 (86%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 130: Bush Lake Rd & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016



Phase Number	1	2	4	5	6	8
Movement	EBL	WBT	SBTL	WBL	EBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	87	27	17	86	27
Maximum Split (%)	12.3%	66.9%	20.8%	13.1%	66.2%	20.8%
Minimum Split (s)	15	20	15	15	20	15
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	12	7	5	12	7
Vehicle Extension (s)	3	4	3.5	3	4	3.5
Minimum Gap (s)	3	3	3.5	3	3	3.5
Time Before Reduce (s)	0	13	0	0	13	0
Time To Reduce (s)	0	13	0	0	13	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	18		12	18
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	40	56	13	126	40	13
End Time (s)	56	13	40	13	126	40
Yield/Force Off (s)	51.3	7.6	35.3	8.3	120.6	34.9
Yield/Force Off 170(s)	51.3	125.6	17.3	8.3	108.6	16.9
Local Start Time (s)	0	16	103	86	0	103
Local Yield (s)	11.3	97.6	125.3	98.3	80.6	124.9
Local Yield 170(s)	11.3	85.6	107.3	98.3	68.6	106.9

Intersection Summary

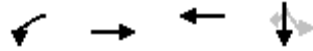
Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 40 (31%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 131: Hampshire Ave & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016



Phase Number	1	2	6	8
Movement	WBL	EBT	WBT	SBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize				
Recall Mode	C-Max	Min	C-Max	None
Maximum Split (s)	30.5	21.5	52	38
Maximum Split (%)	33.9%	23.9%	57.8%	42.2%
Minimum Split (s)	12.5	21.5	24.5	38
Yellow Time (s)	3	4.5	4.5	4
All-Red Time (s)	2.5	2	2	2
Minimum Initial (s)	7	15	15	8
Vehicle Extension (s)	3	5.5	5.5	5.5
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)			7	20
Flash Dont Walk (s)			10	12
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	9.5	78	78	40
End Time (s)	40	9.5	40	78
Yield/Force Off (s)	34.5	3	33.5	72
Yield/Force Off 170(s)	34.5	3	23.5	60
Local Start Time (s)	21.5	0	0	52
Local Yield (s)	46.5	15	45.5	84
Local Yield 170(s)	46.5	15	35.5	72

Intersection Summary

Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 78 (87%), Referenced to phase 1:WBL and 6:WBT, Start of 1st Green	

Splits and Phases: 203: TH 169 West Ramp & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016

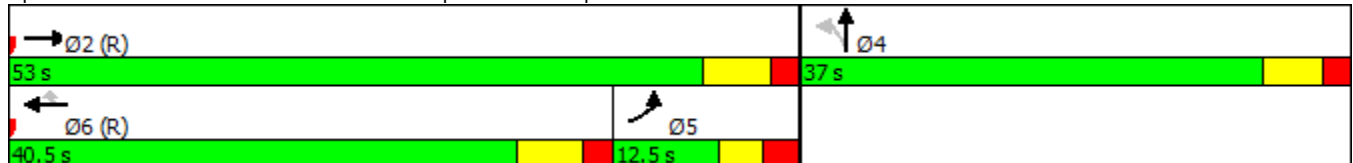


Phase Number	2	4	5	6
Movement	EBT	NBTL	EBL	WBT
Lead/Lag			Lag	Lead
Lead-Lag Optimize				
Recall Mode	C-Max	None	None	C-Max
Maximum Split (s)	53	37	12.5	40.5
Maximum Split (%)	58.9%	41.1%	13.9%	45.0%
Minimum Split (s)	16.5	37	12.5	23.5
Yellow Time (s)	4.5	4	3	4.5
All-Red Time (s)	2	2	2.5	2
Minimum Initial (s)	10	8	7	10
Vehicle Extension (s)	5.5	4	3	5.5
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		20		7
Flash Dont Walk (s)		8		10
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	80	43	30.5	80
End Time (s)	43	80	43	30.5
Yield/Force Off (s)	36.5	74	37.5	24
Yield/Force Off 170(s)	36.5	66	37.5	14
Local Start Time (s)	0	53	40.5	0
Local Yield (s)	46.5	84	47.5	34
Local Yield 170(s)	46.5	76	47.5	24

Intersection Summary

Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 80 (89%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 204: TH 169 East Ramp & Old Shakopee Rd



Hennepin County ATMS
Regional Solicitation

5A. Congestion Reduction/Air Quality: Vehicle Delay Reduction
5B. Emissions

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Hennepin County ATMS

5A. Congestion Reduction

PM Peak - Select Intersections

The results from this analysis are conservative given the prescribed methodology for the grant application. It is assumed a higher benefit will be achieved through a detailed signal retiming analysis, which would not occur until the proposed project is completed.

The rows highlighted in yellow represent locations that are not seeing a benefit based on the current grant application methodology. However, these locations will likely see a future benefit after implementation.

Please note existing signal timings were used to evaluate existing conditions in order to see the benefit of the signal optimization .

Corridor	Intersection	Total Delay Per Vehicle (s/v)			Volume (vph)	Total Delay (s)
		Without	With	Reduced		Reduced
CSAH 9	Old Rockford Rd	18	17	1	1,995	1,995
CSAH 9	Fernbrook Ln	29	28	1	3,291	3,291
CSAH 9	Annapolis Ln	18	18	0	3,068	0
CSAH 9	I-494 West Ramps	43	26	17	3,227	54,859
CSAH 9	I-494 East Ramps	33	25	8	2,988	23,904
CSAH 9	Vinewood Ln	43	33	10	3,114	31,140
CSAH 9	Northwest Blvd	85	76	9	3,925	35,325
CSAH 9	Larch Ln	17	17	0	2,599	0
CSAH 9	Zachary Ln	41	40	1	2,841	2,841
CSAH 9	Nathan Ln	41	43	(2)	3,268	(6,536)
CSAH 5	Texas Ave	19	18	1	2,116	2,116
CSAH 5	Louisiana Ave	39	36	3	3,212	9,636
CSAH 5	Hampshire Ave	6	6	0	1,764	0
CSAH 5	Dakota Ave	12	13	(1)	2,044	(2,044)
CSAH 5	Lake St/Vernon Ave	76	36	40	2,760	110,400
CSAH 5	MN-100 East Ramp	9	12	(3)	2,808	(8,424)
CSAH 5	Ottawa Ave	24	16	8	2,300	18,400
CSAH 3	Shady Oak Rd	51	39	12	3,283	39,396
CSAH 3	17th Ave	7	7	0	2,223	0
CSAH 3	11th Ave	27	28	(1)	3,236	(3,236)
CSAH 3	8th Ave	8	8	0	2,637	0
CSAH 3	5th Ave	23	19	4	2,914	11,656
CSAH 3	US-169 West Ramps	12	11	1	3,341	3,341
CSAH 3	US-169 East Ramps	16	17	(1)	3,358	(3,358)
CSAH 3	Milwaukee St	30	29	1	3,306	3,306
CSAH 1	Normandale Blvd	31	30	1	4,230	4,230
CSAH 1	Nesbitt Ave	12	13	(1)	3,460	(3,460)
CSAH 1	Bloomington Ferry Rd	20	19	1	3,390	3,390
CSAH 1	Bush Lake Rd	18	18	0	3,277	0
CSAH 1	Hampshire Ave	10	10	0	3,303	0
CSAH 1	US-169 West Ramps	19	18	1	1,780	1,780
CSAH 1	US-169 East Ramps	6	7	(1)	2,726	(2,726)
CSAH 1	98th St	11	12	(1)	2,704	(2,704)
CSAH 1	I-35W West Ramps	12	13	(1)	3,159	(3,159)
CSAH 1	I-35W East Ramps	31	30	1	3,045	3,045
CSAH 1	Lyndale Ave	30	28	2	3,286	6,572
CSAH 1	Garfield Ave	7	8	(1)	2,179	(2,179)
CSAH 1	Grand Ave	12	12	0	2,325	0
CSAH 1	Nicollet Ave	23	22	1	2,573	2,573
Total		969	858	111	113,055	335,370

Hennepin County ATMS

5B. Emission Improvements

PM Peak - Select Intersections

The results from this analysis are conservative given the prescribed methodology for the grant application. It is assumed a higher benefit will be achieved through a detailed signal retiming analysis, which would not occur until the proposed project is completed.

The rows highlighted in yellow represent locations that are not seeing a benefit based on the current grant application methodology. However, these locations will likely see a future benefit after implementation.

Please note existing signal timings were used to evaluate existing conditions in order to see the benefit of the signal optimization.

Corridor	Intersection	CO (kg)			NOx (kg)			VOC (kg)			Total (kg)		
		Without	With	Reduced	Without	With	Reduced	Without	With	Reduced	Without	With	Reduced
CSAH 9	Old Rockford Rd	4.18	4.17	0.01	0.81	0.81	0.00	0.97	0.97	0.00	5.96	5.95	0.01
CSAH 9	Fernbrook Ln	5.63	5.54	0.09	1.09	1.08	0.01	1.30	1.28	0.02	8.02	7.90	0.12
CSAH 9	Annapolis Ln	3.11	3.17	(0.06)	0.30	0.62	(0.32)	0.72	0.74	(0.02)	4.13	4.53	(0.40)
CSAH 9	I-494 West Ramps	5.23	4.05	1.18	1.02	0.79	0.23	1.21	0.94	0.27	7.46	5.78	1.68
CSAH 9	I-494 East Ramps	3.68	3.15	0.53	0.72	0.61	0.11	0.85	0.73	0.12	5.25	4.49	0.76
CSAH 9	Vinewood Ln	4.78	3.67	1.11	0.93	0.71	0.22	1.11	0.85	0.26	6.82	5.23	1.59
CSAH 9	Northwest Blvd	10.35	10.02	0.33	2.01	1.95	0.06	2.40	2.32	0.08	14.76	14.29	0.47
CSAH 9	Larch Ln	5.61	5.58	0.03	1.09	1.09	0.00	1.30	1.29	0.01	8.00	7.96	0.04
CSAH 9	Zachary Ln	7.12	7.06	0.06	1.38	1.37	0.01	1.65	1.64	0.01	10.15	10.07	0.08
CSAH 9	Nathan Ln	6.43	6.53	(0.10)	1.25	1.27	(0.02)	1.49	1.51	(0.02)	9.17	9.31	(0.14)
CSAH 5	Texas Ave	3.10	3.06	0.04	0.60	0.60	0.00	0.72	0.71	0.01	4.42	4.37	0.05
CSAH 5	Louisiana Ave	5.45	5.23	0.22	1.06	1.02	0.04	1.26	1.21	0.05	7.77	7.46	0.31
CSAH 5	Hampshire Ave	1.69	1.58	0.11	0.33	0.31	0.02	0.39	0.37	0.02	2.41	2.26	0.15
CSAH 5	Dakota Ave	2.64	2.81	(0.17)	0.51	0.55	(0.04)	0.61	0.65	(0.04)	3.76	4.01	(0.25)
CSAH 5	Lake St/Vernon Ave	5.76	4.27	1.49	1.12	0.83	0.29	1.33	0.99	0.34	8.21	6.09	2.12
CSAH 5	MN-100 East Ramp	2.14	2.27	(0.13)	0.42	0.44	(0.02)	0.50	0.53	(0.03)	3.06	3.24	(0.18)
CSAH 5	Ottawa Ave	3.47	3.03	0.44	0.68	0.59	0.09	0.80	0.70	0.10	4.95	4.32	0.63
CSAH 3	Shady Oak Rd	7.46	6.83	0.63	1.45	1.33	0.12	1.73	1.58	0.15	10.64	9.74	0.90
CSAH 3	17th Ave	2.29	2.38	(0.09)	0.44	0.46	(0.02)	0.53	0.55	(0.02)	3.26	3.39	(0.13)
CSAH 3	11th Ave	4.49	4.51	(0.02)	0.87	0.88	(0.01)	1.04	1.05	(0.01)	6.40	6.44	(0.04)
CSAH 3	8th Ave	1.90	1.91	(0.01)	0.37	0.37	0.00	0.44	0.44	0.00	2.71	2.72	(0.01)
CSAH 3	5th Ave	3.26	2.89	0.37	0.63	0.56	0.07	0.76	0.67	0.09	4.65	4.12	0.53
CSAH 3	US-169 West Ramps	3.27	3.13	0.14	0.64	0.61	0.03	0.76	0.73	0.03	4.67	4.47	0.20
CSAH 3	US-169 East Ramps	3.28	3.37	(0.09)	0.64	0.66	(0.02)	0.76	0.78	(0.02)	4.68	4.81	(0.13)
CSAH 3	Milwaukee St	4.84	4.70	0.14	0.94	0.91	0.03	1.12	1.09	0.03	6.90	6.70	0.20
CSAH 1	Normandale Blvd	8.75	8.67	0.08	1.70	1.69	0.01	2.03	2.01	0.02	12.48	12.37	0.11
CSAH 1	Nesbitt Ave	4.91	5.17	(0.26)	0.96	1.01	(0.05)	1.14	1.20	(0.06)	7.01	7.38	(0.37)
CSAH 1	Bloomington Ferry Rd	5.54	5.32	0.22	1.08	1.04	0.04	1.28	1.23	0.05	7.90	7.59	0.31
CSAH 1	Bush Lake Rd	4.66	4.58	0.08	0.91	0.89	0.02	1.08	1.06	0.02	6.65	6.53	0.12
CSAH 1	Hampshire Ave	4.65	4.43	0.22	0.90	0.86	0.04	1.08	1.03	0.05	6.63	6.32	0.31
CSAH 1	US-169 West Ramps	2.13	2.08	0.05	0.41	0.40	0.01	0.49	0.48	0.01	3.03	2.96	0.07
CSAH 1	US-169 East Ramps	3.74	3.85	(0.11)	0.73	0.75	(0.02)	0.87	0.89	(0.02)	5.34	5.49	(0.15)
CSAH 1	98th St	2.24	2.28	(0.04)	0.44	0.44	0.00	0.52	0.53	(0.01)	3.20	3.25	(0.05)
CSAH 1	I-35W West Ramps	2.34	2.45	(0.11)	0.45	0.48	(0.03)	0.54	0.57	(0.03)	3.33	3.50	(0.17)
CSAH 1	I-35W East Ramps	3.27	3.21	0.06	0.64	0.62	0.02	0.76	0.74	0.02	4.67	4.57	0.10
CSAH 1	Lyndale Ave	3.76	3.65	0.11	0.73	0.71	0.02	0.87	0.85	0.02	5.36	5.21	0.15
CSAH 1	Garfield Ave	0.89	1.14	(0.25)	0.17	0.22	(0.05)	0.21	0.26	(0.05)	1.27	1.62	(0.35)
CSAH 1	Grand Ave	2.16	2.11	0.05	0.42	0.41	0.01	0.50	0.49	0.01	3.08	3.01	0.07
CSAH 1	Nicollet Ave	3.56	3.42	0.14	0.36	0.67	(0.31)	0.82	0.79	0.03	4.74	4.88	(0.14)
Total		163.76	157.27	6.49	31.20	30.61	0.59	37.94	36.45	1.49	232.90	224.33	8.57

31: Vicksburg Ln & Rockford Rd

Direction	All
Future Volume (vph)	2459
Total Delay / Veh (s/v)	31
CO Emissions (kg)	4.97
NOx Emissions (kg)	0.97
VOC Emissions (kg)	1.15

32: Polaris Ln/Old Rockford Rd & Rockford Rd

Direction	All
Future Volume (vph)	1995
Total Delay / Veh (s/v)	18
CO Emissions (kg)	4.18
NOx Emissions (kg)	0.81
VOC Emissions (kg)	0.97

41: Fernbrook Ln & Rockford Rd

Direction	All
Future Volume (vph)	3291
Total Delay / Veh (s/v)	29
CO Emissions (kg)	5.63
NOx Emissions (kg)	1.09
VOC Emissions (kg)	1.30

42: Annapolis Ln & Rockford Rd

Direction	All
Future Volume (vph)	3068
Total Delay / Veh (s/v)	18
CO Emissions (kg)	3.11
NOx Emissions (kg)	0.60
VOC Emissions (kg)	0.72

43: I-494 West Ramps & Rockford Rd

Direction	All
Future Volume (vph)	3227
Total Delay / Veh (s/v)	43
CO Emissions (kg)	5.23
NOx Emissions (kg)	1.02
VOC Emissions (kg)	1.21

44: I-494 East Ramp & Rockford Rd

Direction	All
Future Volume (vph)	2988
Total Delay / Veh (s/v)	33
CO Emissions (kg)	3.68
NOx Emissions (kg)	0.72
VOC Emissions (kg)	0.85

45: Vinewood Ln & Rockford Rd

Direction	All
Future Volume (vph)	3114
Total Delay / Veh (s/v)	43
CO Emissions (kg)	4.78
NOx Emissions (kg)	0.93
VOC Emissions (kg)	1.11

46: Northwest Blvd & Rockford Rd

Direction	All
Future Volume (vph)	3925
Total Delay / Veh (s/v)	85
CO Emissions (kg)	10.35
NOx Emissions (kg)	2.01
VOC Emissions (kg)	2.40

48: Larch Ln & Rockford Rd

Direction	All
Future Volume (vph)	2599
Total Delay / Veh (s/v)	17
CO Emissions (kg)	5.61
NOx Emissions (kg)	1.09
VOC Emissions (kg)	1.30

49: Zachary Ln & Rockford Rd

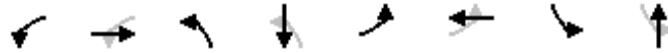
Direction	All
Future Volume (vph)	2841
Total Delay / Veh (s/v)	41
CO Emissions (kg)	7.12
NOx Emissions (kg)	1.38
VOC Emissions (kg)	1.65

50: Rockford Rd & Nathan Ln

Direction	All
Future Volume (vph)	3268
Total Delay / Veh (s/v)	41
CO Emissions (kg)	6.43
NOx Emissions (kg)	1.25
VOC Emissions (kg)	1.49

Rockford Road
2016 Existing PM

7/12/2016

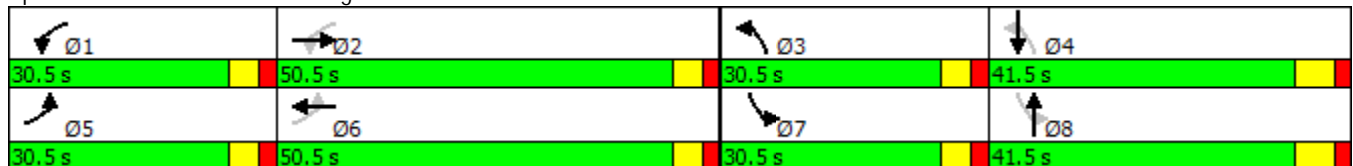


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	30.5	50.5	30.5	41.5	30.5	50.5	30.5	41.5
Maximum Split (%)	19.9%	33.0%	19.9%	27.1%	19.9%	33.0%	19.9%	27.1%
Minimum Split (s)	11.5	37	11.5	40.5	11.5	37	11.5	37
Yellow Time (s)	3.5	3.5	3.5	4.5	3.5	3.5	3.5	4.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Minimum Gap (s)	3.5	2.5	3.5	2.5	3.5	2.5	3.5	2.5
Time Before Reduce (s)	0	15	0	12	0	15	0	12
Time To Reduce (s)	0	15	0	12	0	15	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		27		23		22
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	No	Yes	No	Yes	No	Yes	No
Start Time (s)	0	30.5	81	111.5	0	30.5	81	111.5
End Time (s)	30.5	81	111.5	0	30.5	81	111.5	0
Yield/Force Off (s)	25	75.5	106	146.5	25	75.5	106	146.5
Yield/Force Off 170(s)	25	75.5	106	119.5	25	75.5	106	124.5
Local Start Time (s)	122.5	0	50.5	81	122.5	0	50.5	81
Local Yield (s)	147.5	45	75.5	116	147.5	45	75.5	116
Local Yield 170(s)	147.5	45	75.5	89	147.5	45	75.5	94

Intersection Summary

Cycle Length	153
Control Type	Actuated-Uncoordinated
Natural Cycle	105

Splits and Phases: 31: Vicksburg Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

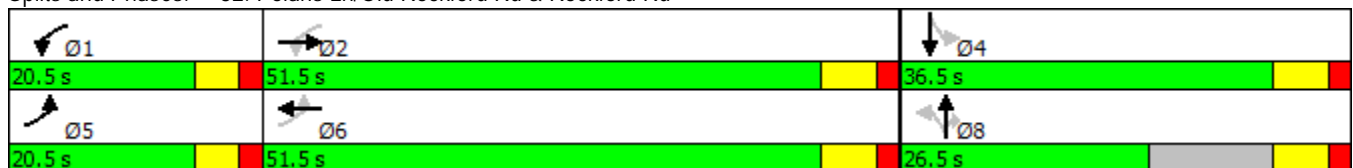


Phase Number	1	2	4	5	6	8
Movement	WBL	EBWB	SBTL	EBL	EBWB	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	20.5	51.5	36.5	20.5	51.5	26.5
Maximum Split (%)	18.9%	47.5%	33.6%	18.9%	47.5%	24.4%
Minimum Split (s)	11.5	32	17	11.5	32	35.5
Yellow Time (s)	3.5	4.5	4.5	3.5	4.5	4.5
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	6	12	10	6	12	10
Vehicle Extension (s)	3.5	4	4	3.5	4	4
Minimum Gap (s)	3.5	3	4	3.5	3	4
Time Before Reduce (s)	0	20	0	0	20	0
Time To Reduce (s)	0	20	0	0	20	0
Walk Time (s)		7				7
Flash Dont Walk (s)		15				22
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	No	No	No	No	No	No
Start Time (s)	0	20.5	72	0	20.5	72
End Time (s)	20.5	72	0	20.5	72	0
Yield/Force Off (s)	15	65.5	102	15	65.5	102
Yield/Force Off 170(s)	15	65.5	102	15	65.5	80
Local Start Time (s)	88	0	51.5	88	0	51.5
Local Yield (s)	103	45	81.5	103	45	81.5
Local Yield 170(s)	103	45	81.5	103	45	59.5

Intersection Summary

Cycle Length	108.5
Control Type	Actuated-Uncoordinated
Natural Cycle	80

Splits and Phases: 32: Polaris Ln/Old Rockford Rd & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

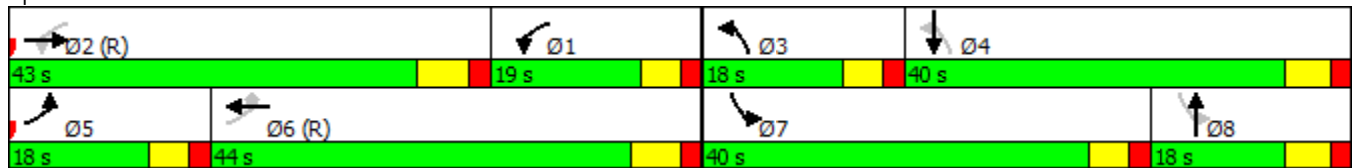


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	19	43	18	40	18	44	40	18
Maximum Split (%)	15.8%	35.8%	15.0%	33.3%	15.0%	36.7%	33.3%	15.0%
Minimum Split (s)	14	41.5	14	49	14	41.5	14	41
Yellow Time (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	4.5	3	3.5	3	4.5	3	3.5
Minimum Gap (s)	3	2.5	3	3.5	3	2.5	3	3.5
Time Before Reduce (s)	0	10	0	0	0	10	0	0
Time To Reduce (s)	0	10	0	0	0	10	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		28		36		28		28
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	90	47	109	7	47	65	109	29
End Time (s)	109	90	7	47	65	109	29	47
Yield/Force Off (s)	103.5	83.5	1.5	41	59.5	102.5	23.5	41
Yield/Force Off 170(s)	103.5	55.5	1.5	5	59.5	74.5	23.5	13
Local Start Time (s)	43	0	62	80	0	18	62	102
Local Yield (s)	56.5	36.5	74.5	114	12.5	55.5	96.5	114
Local Yield 170(s)	56.5	8.5	74.5	78	12.5	27.5	96.5	86

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	120
Offset: 47 (39%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green	

Splits and Phases: 41: Fernbrook Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

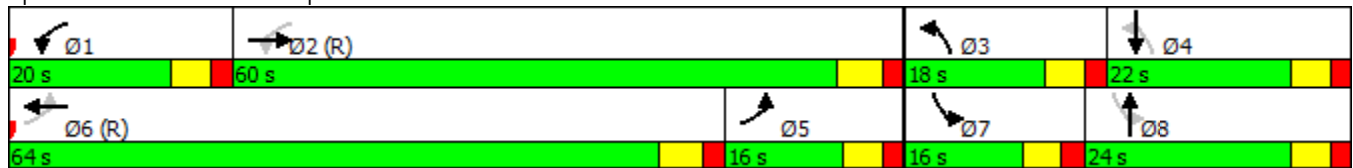


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	60	18	22	16	64	16	24
Maximum Split (%)	16.7%	50.0%	15.0%	18.3%	13.3%	53.3%	13.3%	20.0%
Minimum Split (s)	14	34	14	44.5	14	40	14	40.5
Yellow Time (s)	3.5	4	3.5	3.5	3.5	4	3.5	3.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	4	3	3.5	3	4	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		32		27		28
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	28	48	108	6	92	28	108	4
End Time (s)	48	108	6	28	108	92	4	28
Yield/Force Off (s)	42.5	102	0.5	22.5	102.5	86	118.5	22.5
Yield/Force Off 170(s)	42.5	81	0.5	110.5	102.5	59	118.5	114.5
Local Start Time (s)	0	20	80	98	64	0	80	96
Local Yield (s)	14.5	74	92.5	114.5	74.5	58	90.5	114.5
Local Yield 170(s)	14.5	53	92.5	82.5	74.5	31	90.5	86.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	135
Offset: 28 (23%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green	

Splits and Phases: 42: Annapolis Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

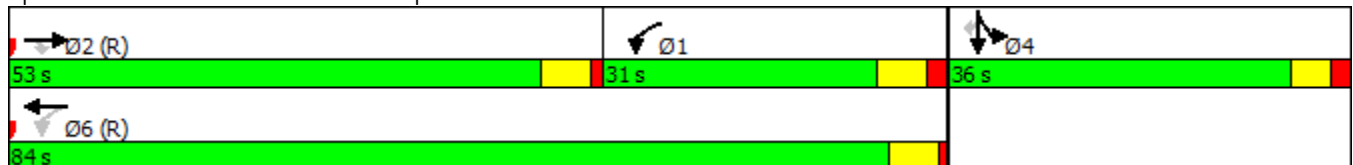


Phase Number	1	2	4	6
Movement	WBL	EBT	SBTL	WBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize				
Recall Mode	None	C-Max	None	C-Max
Maximum Split (s)	31	53	36	84
Maximum Split (%)	25.8%	44.2%	30.0%	70.0%
Minimum Split (s)	20	29.5	38.5	18
Yellow Time (s)	4.5	4.5	3.5	4.5
All-Red Time (s)	2	1	2	1
Minimum Initial (s)	7	10	7	10
Vehicle Extension (s)	3.5	4.5	3.5	3.5
Minimum Gap (s)	3.5	3	3.5	3
Time Before Reduce (s)	0	13	0	13
Time To Reduce (s)	0	13	0	13
Walk Time (s)		7	7	
Flash Dont Walk (s)		17	26	
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	77	24	108	24
End Time (s)	108	77	24	108
Yield/Force Off (s)	101.5	71.5	18.5	102.5
Yield/Force Off 170(s)	101.5	54.5	112.5	102.5
Local Start Time (s)	53	0	84	0
Local Yield (s)	77.5	47.5	114.5	78.5
Local Yield 170(s)	77.5	30.5	88.5	78.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 24 (20%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	

Splits and Phases: 43: I-494 West Ramps & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016



Phase Number	2	5	6	8
Movement	EBTL	EBL	WBT	NBTL
Lead/Lag		Lead	Lag	
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	93	25	68	27
Maximum Split (%)	77.5%	20.8%	56.7%	22.5%
Minimum Split (s)	20.5	20	18	30.5
Yellow Time (s)	4.5	4.5	4.5	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	10	7	10	7
Vehicle Extension (s)	5.5	3.5	5.5	3.5
Minimum Gap (s)	3	3.5	3	3.5
Time Before Reduce (s)	13	0	13	0
Time To Reduce (s)	13	0	13	0
Walk Time (s)	7			7
Flash Dont Walk (s)	7			18
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	60	60	85	33
End Time (s)	33	85	33	60
Yield/Force Off (s)	26.5	78.5	26.5	54.5
Yield/Force Off 170(s)	19.5	78.5	26.5	36.5
Local Start Time (s)	0	0	25	93
Local Yield (s)	86.5	18.5	86.5	114.5
Local Yield 170(s)	79.5	18.5	86.5	96.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	150
Offset: 60 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 44: I-494 East Ramp & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

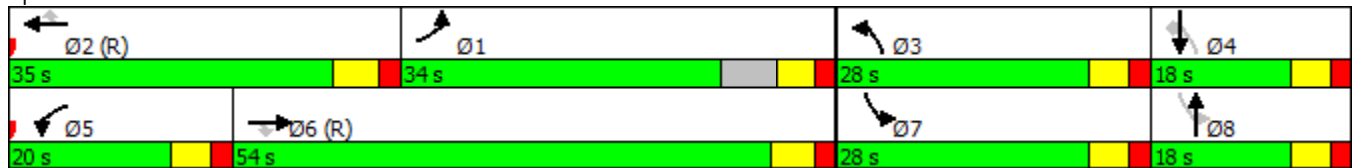


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	NBSB	WBL	EBT	SBL	NBSB
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	34	35	28	18	20	54	28	18
Maximum Split (%)	28.3%	29.2%	23.3%	15.0%	16.7%	45.0%	23.3%	15.0%
Minimum Split (s)	14	33	14	39.5	14	35	14	37.5
Yellow Time (s)	3.5	4	3.5	3.5	3.5	4	3.5	3.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	7	12	7	10	7	12	7	10
Vehicle Extension (s)	3	3.5	3	3.5	3	3.5	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	10	0	0	0	10	0	0
Time To Reduce (s)	0	10	0	0	0	10	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		20		27		22		25
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	5	90	44	72	90	110	44	72
End Time (s)	44	5	72	90	110	44	72	90
Yield/Force Off (s)	38.5	119	66.5	84.5	104.5	38	66.5	84.5
Yield/Force Off 170(s)	38.5	99	66.5	57.5	104.5	16	66.5	59.5
Local Start Time (s)	35	0	74	102	0	20	74	102
Local Yield (s)	68.5	29	96.5	114.5	14.5	68	96.5	114.5
Local Yield 170(s)	68.5	9	96.5	87.5	14.5	46	96.5	89.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	105
Offset: 90 (75%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 45: Vinewood Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

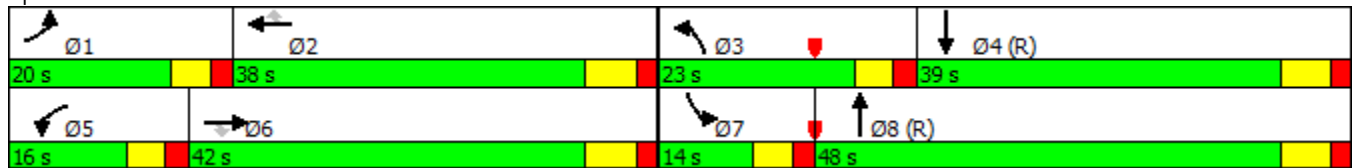


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	C-Max	None	Min	None	C-Max
Maximum Split (s)	20	38	23	39	16	42	14	48
Maximum Split (%)	16.7%	31.7%	19.2%	32.5%	13.3%	35.0%	11.7%	40.0%
Minimum Split (s)	14	34.5	14	35.5	14	35.5	14	35.5
Yellow Time (s)	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	7	12	7	12	7	12	7	12
Vehicle Extension (s)	3.5	4	3.5	4.5	3.5	4	3.5	4.5
Minimum Gap (s)	3.5	2.5	3.5	4.5	3.5	2.5	3.5	4.5
Time Before Reduce (s)	0	13	0	0	0	13	0	0
Time To Reduce (s)	0	13	0	0	0	13	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		22		22		22
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	88	108	26	49	88	104	26	40
End Time (s)	108	26	49	88	104	26	40	88
Yield/Force Off (s)	102.5	19.5	43.5	81.5	98.5	19.5	34.5	81.5
Yield/Force Off 170(s)	102.5	19.5	43.5	59.5	98.5	19.5	34.5	59.5
Local Start Time (s)	48	68	106	9	48	64	106	0
Local Yield (s)	62.5	99.5	3.5	41.5	58.5	99.5	114.5	41.5
Local Yield 170(s)	62.5	99.5	3.5	19.5	58.5	99.5	114.5	19.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	140
Offset: 40 (33%), Referenced to phase 4:SBT and 8:NBT, Start of 1st Green	

Splits and Phases: 46: Northwest Blvd & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016



Phase Number	1	2	4	5	6	8
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	20.5	51	35.5	20.5	51	35.5
Maximum Split (%)	19.2%	47.7%	33.2%	19.2%	47.7%	33.2%
Minimum Split (s)	11.5	36	36.5	11.5	36	32.5
Yellow Time (s)	3.5	4.5	3.5	3.5	4.5	3.5
All-Red Time (s)	2	1.5	2	2	1.5	2
Minimum Initial (s)	6	30	8	6	30	8
Vehicle Extension (s)	3	5	3.5	3	5	3.5
Minimum Gap (s)	3	2.5	3.5	3	2.5	3.5
Time Before Reduce (s)	0	15	0	0	15	0
Time To Reduce (s)	0	15	0	0	15	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		19	24		18	20
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	20.5	71.5	0	20.5	71.5
End Time (s)	20.5	71.5	0	20.5	71.5	0
Yield/Force Off (s)	15	65.5	101.5	15	65.5	101.5
Yield/Force Off 170(s)	15	65.5	77.5	15	65.5	81.5
Local Start Time (s)	86.5	0	51	86.5	0	51
Local Yield (s)	101.5	45	81	101.5	45	81
Local Yield 170(s)	101.5	45	57	101.5	45	61

Intersection Summary

Cycle Length	107
Control Type	Actuated-Uncoordinated
Natural Cycle	85

Splits and Phases: 48: Larch Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

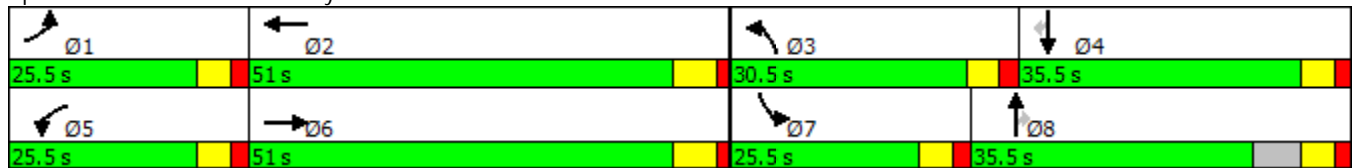


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	25.5	51	30.5	35.5	25.5	51	25.5	35.5
Maximum Split (%)	17.9%	35.8%	21.4%	24.9%	17.9%	35.8%	17.9%	24.9%
Minimum Split (s)	12.5	37	12.5	39.5	12.5	39	12.5	39.5
Yellow Time (s)	3.5	4.5	3.5	3.5	3.5	4.5	3.5	3.5
All-Red Time (s)	2	1.5	2	2	2	1.5	2	2
Minimum Initial (s)	7	30	7	8	7	30	7	8
Vehicle Extension (s)	3.5	5	4.5	3.5	3.5	5	3	3.5
Minimum Gap (s)	3.5	2.5	4.5	3.5	3.5	2.5	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		24		27		26		27
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	25.5	76.5	107	0	25.5	76.5	102
End Time (s)	25.5	76.5	107	0	25.5	76.5	102	0
Yield/Force Off (s)	20	70.5	101.5	137	20	70.5	96.5	137
Yield/Force Off 170(s)	20	70.5	101.5	110	20	70.5	96.5	110
Local Start Time (s)	117	0	51	81.5	117	0	51	76.5
Local Yield (s)	137	45	76	111.5	137	45	71	111.5
Local Yield 170(s)	137	45	76	84.5	137	45	71	84.5

Intersection Summary

Cycle Length	142.5
Control Type	Actuated-Uncoordinated
Natural Cycle	115

Splits and Phases: 49: Zachary Ln & Rockford Rd



Rockford Road
2016 Existing PM

7/12/2016

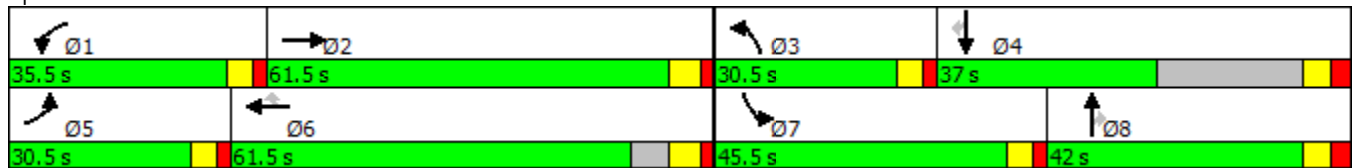


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	35.5	61.5	30.5	37	30.5	61.5	45.5	42
Maximum Split (%)	19.2%	33.3%	16.5%	20.1%	16.5%	33.3%	24.7%	22.8%
Minimum Split (s)	13.5	41.5	13.5	42	13.5	41.5	13.5	47
Yellow Time (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
All-Red Time (s)	2	2	2	3	2	2	2	3
Minimum Initial (s)	8	35	8	12	8	35	8	12
Vehicle Extension (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
Minimum Gap (s)	3.5	3	3.5	4	3.5	3	3.5	4
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		28		24		33
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	35.5	97	127.5	0	30.5	97	142.5
End Time (s)	35.5	97	127.5	0	30.5	97	142.5	0
Yield/Force Off (s)	30	90.5	122	177.5	25	90.5	137	177.5
Yield/Force Off 170(s)	30	90.5	122	149.5	25	90.5	137	144.5
Local Start Time (s)	149	0	61.5	92	149	179.5	61.5	107
Local Yield (s)	179	55	86.5	142	174	55	101.5	142
Local Yield 170(s)	179	55	86.5	114	174	55	101.5	109

Intersection Summary

Cycle Length	184.5
Control Type	Actuated-Uncoordinated
Natural Cycle	140

Splits and Phases: 50: Rockford Rd & Nathan Ln



31: Vicksburg Ln & Rockford Rd

Direction	All
Future Volume (vph)	2459
Total Delay / Veh (s/v)	30
CO Emissions (kg)	4.94
NOx Emissions (kg)	0.96
VOC Emissions (kg)	1.14

32: Polaris Ln/Old Rockford Rd & Rockford Rd

Direction	All
Future Volume (vph)	1995
Total Delay / Veh (s/v)	17
CO Emissions (kg)	4.17
NOx Emissions (kg)	0.81
VOC Emissions (kg)	0.97

41: Fernbrook Ln & Rockford Rd

Direction	All
Future Volume (vph)	3291
Total Delay / Veh (s/v)	28
CO Emissions (kg)	5.54
NOx Emissions (kg)	1.08
VOC Emissions (kg)	1.28

42: Annapolis Ln & Rockford Rd

Direction	All
Future Volume (vph)	3068
Total Delay / Veh (s/v)	18
CO Emissions (kg)	3.17
NOx Emissions (kg)	0.62
VOC Emissions (kg)	0.74

43: I-494 West Ramps & Rockford Rd

Direction	All
Future Volume (vph)	3227
Total Delay / Veh (s/v)	26
CO Emissions (kg)	4.05
NOx Emissions (kg)	0.79
VOC Emissions (kg)	0.94

44: I-494 East Ramp & Rockford Rd

Direction	All
Future Volume (vph)	2988
Total Delay / Veh (s/v)	25
CO Emissions (kg)	3.15
NOx Emissions (kg)	0.61
VOC Emissions (kg)	0.73

45: Vinewood Ln & Rockford Rd

Direction	All
Future Volume (vph)	3114
Total Delay / Veh (s/v)	33
CO Emissions (kg)	3.67
NOx Emissions (kg)	0.71
VOC Emissions (kg)	0.85

46: Northwest Blvd & Rockford Rd

Direction	All
Future Volume (vph)	3925
Total Delay / Veh (s/v)	76
CO Emissions (kg)	10.02
NOx Emissions (kg)	1.95
VOC Emissions (kg)	2.32

48: Larch Ln & Rockford Rd

Direction	All
Future Volume (vph)	2599
Total Delay / Veh (s/v)	17
CO Emissions (kg)	5.58
NOx Emissions (kg)	1.09
VOC Emissions (kg)	1.29

49: Zachary Ln & Rockford Rd

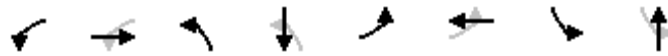
Direction	All
Future Volume (vph)	2841
Total Delay / Veh (s/v)	40
CO Emissions (kg)	7.06
NOx Emissions (kg)	1.37
VOC Emissions (kg)	1.64

50: Rockford Rd & Nathan Ln

Direction	All
Future Volume (vph)	3268
Total Delay / Veh (s/v)	43
CO Emissions (kg)	6.53
NOx Emissions (kg)	1.27
VOC Emissions (kg)	1.51

Rockford Road
2016 Improved PM

7/12/2016

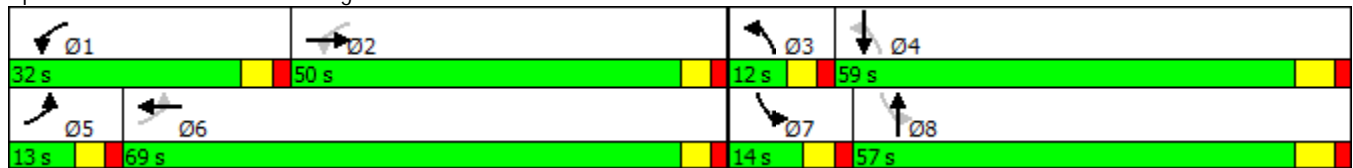


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	32	50	12	59	13	69	14	57
Maximum Split (%)	20.9%	32.7%	7.8%	38.6%	8.5%	45.1%	9.2%	37.3%
Minimum Split (s)	11.5	37	11.5	40.5	11.5	37	11.5	37
Yellow Time (s)	3.5	3.5	3.5	4.5	3.5	3.5	3.5	4.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
Minimum Gap (s)	3.5	2.5	3.5	2.5	3.5	2.5	3.5	2.5
Time Before Reduce (s)	0	15	0	12	0	15	0	12
Time To Reduce (s)	0	15	0	12	0	15	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		27		23		22
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	No	Yes	No	Yes	No	Yes	No
Start Time (s)	0	32	82	94	0	13	82	96
End Time (s)	32	82	94	0	13	82	96	0
Yield/Force Off (s)	26.5	76.5	88.5	146.5	7.5	76.5	90.5	146.5
Yield/Force Off 170(s)	26.5	76.5	88.5	119.5	7.5	76.5	90.5	124.5
Local Start Time (s)	140	19	69	81	140	0	69	83
Local Yield (s)	13.5	63.5	75.5	133.5	147.5	63.5	77.5	133.5
Local Yield 170(s)	13.5	63.5	75.5	106.5	147.5	63.5	77.5	111.5

Intersection Summary

Cycle Length	153
Control Type	Actuated-Uncoordinated
Natural Cycle	105

Splits and Phases: 31: Vicksburg Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

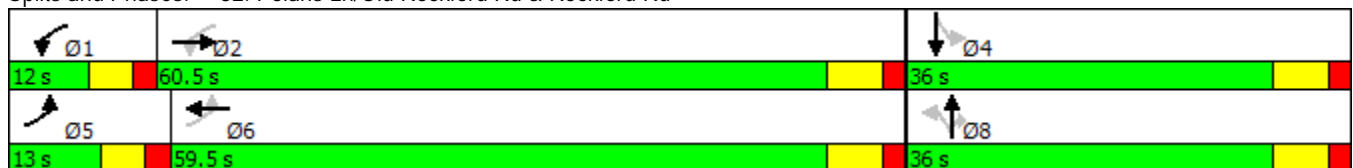


Phase Number	1	2	4	5	6	8
Movement	WBL	EBWB	SBTL	EBL	EBWB	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	12	60.5	36	13	59.5	36
Maximum Split (%)	11.1%	55.8%	33.2%	12.0%	54.8%	33.2%
Minimum Split (s)	11.5	32	17	11.5	32	35.5
Yellow Time (s)	3.5	4.5	4.5	3.5	4.5	4.5
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	6	12	10	6	12	10
Vehicle Extension (s)	3.5	4	4	3.5	4	4
Minimum Gap (s)	3.5	3	4	3.5	3	4
Time Before Reduce (s)	0	20	0	0	20	0
Time To Reduce (s)	0	20	0	0	20	0
Walk Time (s)		7				7
Flash Dont Walk (s)		15				22
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	No	No	No	No	No	No
Start Time (s)	0	12	72.5	0	13	72.5
End Time (s)	12	72.5	0	13	72.5	0
Yield/Force Off (s)	6.5	66	102	7.5	66	102
Yield/Force Off 170(s)	6.5	66	102	7.5	66	80
Local Start Time (s)	96.5	0	60.5	96.5	1	60.5
Local Yield (s)	103	54	90	104	54	90
Local Yield 170(s)	103	54	90	104	54	68

Intersection Summary

Cycle Length	108.5
Control Type	Actuated-Uncoordinated
Natural Cycle	80

Splits and Phases: 32: Polaris Ln/Old Rockford Rd & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

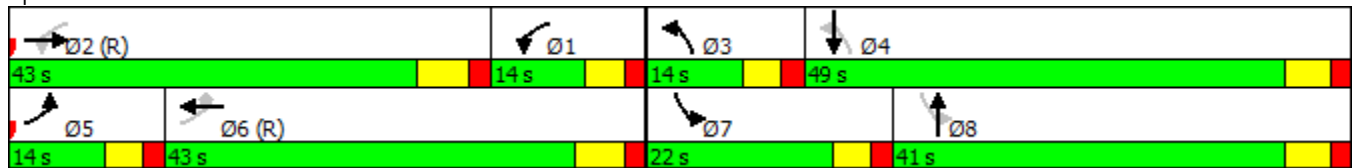


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	14	43	14	49	14	43	22	41
Maximum Split (%)	11.7%	35.8%	11.7%	40.8%	11.7%	35.8%	18.3%	34.2%
Minimum Split (s)	14	41.5	14	49	14	41.5	14	41
Yellow Time (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	4.5	3	3.5	3	4.5	3	3.5
Minimum Gap (s)	3	2.5	3	3.5	3	2.5	3	3.5
Time Before Reduce (s)	0	10	0	0	0	10	0	0
Time To Reduce (s)	0	10	0	0	0	10	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		28		36		28		28
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	99	56	113	7	56	70	113	15
End Time (s)	113	99	7	56	70	113	15	56
Yield/Force Off (s)	107.5	92.5	1.5	50	64.5	106.5	9.5	50
Yield/Force Off 170(s)	107.5	64.5	1.5	14	64.5	78.5	9.5	22
Local Start Time (s)	43	0	57	71	0	14	57	79
Local Yield (s)	51.5	36.5	65.5	114	8.5	50.5	73.5	114
Local Yield 170(s)	51.5	8.5	65.5	78	8.5	22.5	73.5	86

Intersection Summary

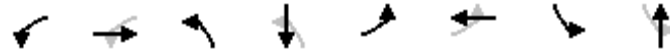
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	120
Offset: 56 (47%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green	

Splits and Phases: 41: Fernbrook Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

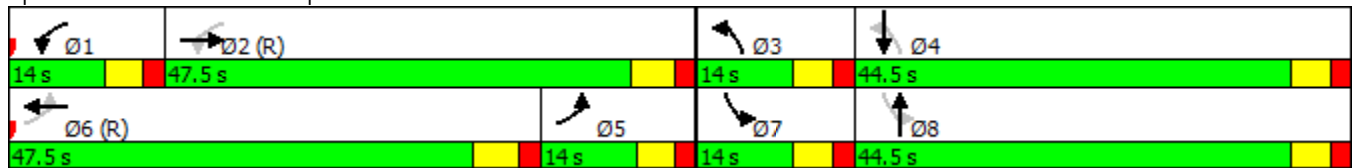


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBWB	NBL	NBSB	EBL	EBWB	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	14	47.5	14	44.5	14	47.5	14	44.5
Maximum Split (%)	11.7%	39.6%	11.7%	37.1%	11.7%	39.6%	11.7%	37.1%
Minimum Split (s)	14	34	14	44.5	14	40	14	40.5
Yellow Time (s)	3.5	4	3.5	3.5	3.5	4	3.5	3.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	4	3	3.5	3	4	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		32		27		28
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	48	62	109.5	3.5	95.5	48	109.5	3.5
End Time (s)	62	109.5	3.5	48	109.5	95.5	3.5	48
Yield/Force Off (s)	56.5	103.5	118	42.5	104	89.5	118	42.5
Yield/Force Off 170(s)	56.5	82.5	118	10.5	104	62.5	118	14.5
Local Start Time (s)	0	14	61.5	75.5	47.5	0	61.5	75.5
Local Yield (s)	8.5	55.5	70	114.5	56	41.5	70	114.5
Local Yield 170(s)	8.5	34.5	70	82.5	56	14.5	70	86.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	135
Offset: 48 (40%), Referenced to phase 2:EBWB and 6:EBWB, Start of 1st Green	

Splits and Phases: 42: Annapolis Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

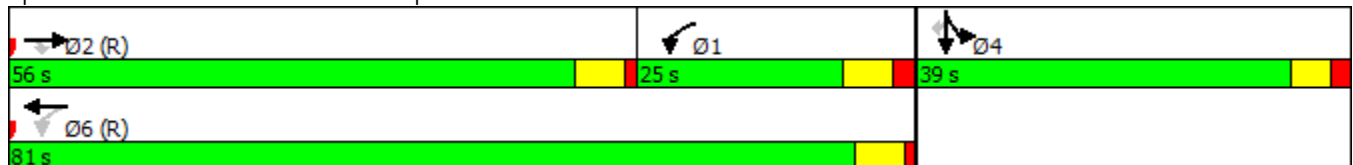


Phase Number	1	2	4	6
Movement	WBL	EBT	SBTL	WBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize				
Recall Mode	None	C-Max	None	C-Max
Maximum Split (s)	25	56	39	81
Maximum Split (%)	20.8%	46.7%	32.5%	67.5%
Minimum Split (s)	20	29.5	38.5	18
Yellow Time (s)	4.5	4.5	3.5	4.5
All-Red Time (s)	2	1	2	1
Minimum Initial (s)	7	10	7	10
Vehicle Extension (s)	3.5	4.5	3.5	3.5
Minimum Gap (s)	3.5	3	3.5	3
Time Before Reduce (s)	0	13	0	13
Time To Reduce (s)	0	13	0	13
Walk Time (s)		7	7	
Flash Dont Walk (s)		17	26	
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	17	81	42	81
End Time (s)	42	17	81	42
Yield/Force Off (s)	35.5	11.5	75.5	36.5
Yield/Force Off 170(s)	35.5	114.5	49.5	36.5
Local Start Time (s)	56	0	81	0
Local Yield (s)	74.5	50.5	114.5	75.5
Local Yield 170(s)	74.5	33.5	88.5	75.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 81 (68%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green	

Splits and Phases: 43: I-494 West Ramps & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016



Phase Number	2	5	6	8
Movement	EBTL	EBL	WBT	NBTL
Lead/Lag		Lead	Lag	
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	89.4	20	69.4	30.6
Maximum Split (%)	74.5%	16.7%	57.8%	25.5%
Minimum Split (s)	20.5	20	18	30.5
Yellow Time (s)	4.5	4.5	4.5	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	10	7	10	7
Vehicle Extension (s)	5.5	3.5	5.5	3.5
Minimum Gap (s)	3	3.5	3	3.5
Time Before Reduce (s)	13	0	13	0
Time To Reduce (s)	13	0	13	0
Walk Time (s)	7			7
Flash Dont Walk (s)	7			18
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	60	60	80	29.4
End Time (s)	29.4	80	29.4	60
Yield/Force Off (s)	22.9	73.5	22.9	54.5
Yield/Force Off 170(s)	15.9	73.5	22.9	36.5
Local Start Time (s)	0	0	20	89.4
Local Yield (s)	82.9	13.5	82.9	114.5
Local Yield 170(s)	75.9	13.5	82.9	96.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	150
Offset: 60 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 44: I-494 East Ramp & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

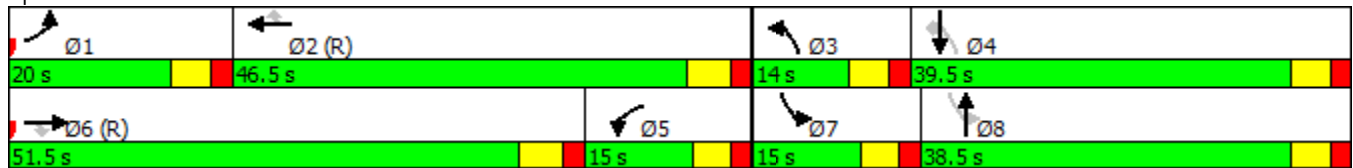


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	NBSB	WBL	EBT	SBL	NBSB
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	46.5	14	39.5	15	51.5	15	38.5
Maximum Split (%)	16.7%	38.8%	11.7%	32.9%	12.5%	42.9%	12.5%	32.1%
Minimum Split (s)	14	33	14	39.5	14	35	14	37.5
Yellow Time (s)	3.5	4	3.5	3.5	3.5	4	3.5	3.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	7	12	7	10	7	12	7	10
Vehicle Extension (s)	3	3.5	3	3.5	3	3.5	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	10	0	0	0	10	0	0
Time To Reduce (s)	0	10	0	0	0	10	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		20		27		22		25
Dual Entry	No	No	No	Yes	No	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	76	96	22.5	36.5	7.5	76	22.5	37.5
End Time (s)	96	22.5	36.5	76	22.5	7.5	37.5	76
Yield/Force Off (s)	90.5	16.5	31	70.5	17	1.5	32	70.5
Yield/Force Off 170(s)	90.5	116.5	31	43.5	17	99.5	32	45.5
Local Start Time (s)	0	20	66.5	80.5	51.5	0	66.5	81.5
Local Yield (s)	14.5	60.5	75	114.5	61	45.5	76	114.5
Local Yield 170(s)	14.5	40.5	75	87.5	61	23.5	76	89.5

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	105
Offset: 76 (63%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 45: Vinewood Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

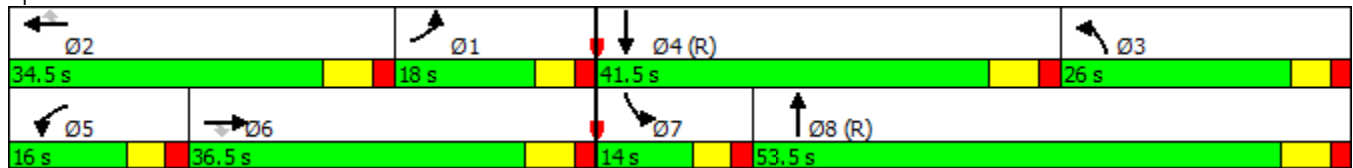


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	C-Max	None	Min	None	C-Max
Maximum Split (s)	18	34.5	26	41.5	16	36.5	14	53.5
Maximum Split (%)	15.0%	28.8%	21.7%	34.6%	13.3%	30.4%	11.7%	44.6%
Minimum Split (s)	14	34.5	14	35.5	14	35.5	14	35.5
Yellow Time (s)	3.5	4.5	3.5	4.5	3.5	4.5	3.5	4.5
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	7	12	7	12	7	12	7	12
Vehicle Extension (s)	3.5	4	3.5	4.5	3.5	4	3.5	4.5
Minimum Gap (s)	3.5	2.5	3.5	4.5	3.5	2.5	3.5	4.5
Time Before Reduce (s)	0	13	0	0	0	13	0	0
Time To Reduce (s)	0	13	0	0	0	13	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		22		22		22
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	119	84.5	58.5	17	84.5	100.5	17	31
End Time (s)	17	119	84.5	58.5	100.5	17	31	84.5
Yield/Force Off (s)	11.5	112.5	79	52	95	10.5	25.5	78
Yield/Force Off 170(s)	11.5	112.5	79	30	95	10.5	25.5	56
Local Start Time (s)	102	67.5	41.5	0	67.5	83.5	0	14
Local Yield (s)	114.5	95.5	62	35	78	113.5	8.5	61
Local Yield 170(s)	114.5	95.5	62	13	78	113.5	8.5	39

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	140
Offset: 17 (14%), Referenced to phase 4:SBT and 8:NBT, Start of 1st Green	

Splits and Phases: 46: Northwest Blvd & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016



Phase Number	1	2	4	5	6	8
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	16	54.4	36.6	12.8	57.6	36.6
Maximum Split (%)	15.0%	50.8%	34.2%	12.0%	53.8%	34.2%
Minimum Split (s)	11.5	36	36.5	11.5	36	32.5
Yellow Time (s)	3.5	4.5	3.5	3.5	4.5	3.5
All-Red Time (s)	2	1.5	2	2	1.5	2
Minimum Initial (s)	6	30	8	6	30	8
Vehicle Extension (s)	3	5	3.5	3	5	3.5
Minimum Gap (s)	3	2.5	3.5	3	2.5	3.5
Time Before Reduce (s)	0	15	0	0	15	0
Time To Reduce (s)	0	15	0	0	15	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		19	24		18	20
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	16	70.4	0	12.8	70.4
End Time (s)	16	70.4	0	12.8	70.4	0
Yield/Force Off (s)	10.5	64.4	101.5	7.3	64.4	101.5
Yield/Force Off 170(s)	10.5	64.4	77.5	7.3	64.4	81.5
Local Start Time (s)	91	0	54.4	91	103.8	54.4
Local Yield (s)	101.5	48.4	85.5	98.3	48.4	85.5
Local Yield 170(s)	101.5	48.4	61.5	98.3	48.4	65.5

Intersection Summary

Cycle Length	107
Control Type	Actuated-Uncoordinated
Natural Cycle	85

Splits and Phases: 48: Larch Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

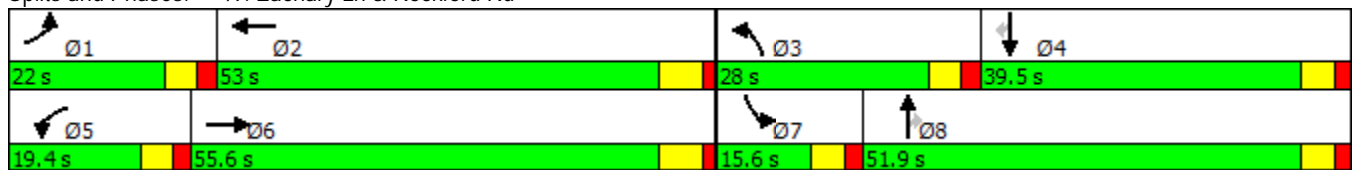


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	22	53	28	39.5	19.4	55.6	15.6	51.9
Maximum Split (%)	15.4%	37.2%	19.6%	27.7%	13.6%	39.0%	10.9%	36.4%
Minimum Split (s)	12.5	37	12.5	39.5	12.5	39	12.5	39.5
Yellow Time (s)	3.5	4.5	3.5	3.5	3.5	4.5	3.5	3.5
All-Red Time (s)	2	1.5	2	2	2	1.5	2	2
Minimum Initial (s)	7	30	7	8	7	30	7	8
Vehicle Extension (s)	3.5	5	4.5	3.5	3.5	5	3	3.5
Minimum Gap (s)	3.5	2.5	4.5	3.5	3.5	2.5	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		24		27		26		27
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	22	75	103	0	19.4	75	90.6
End Time (s)	22	75	103	0	19.4	75	90.6	0
Yield/Force Off (s)	16.5	69	97.5	137	13.9	69	85.1	137
Yield/Force Off 170(s)	16.5	69	97.5	110	13.9	69	85.1	110
Local Start Time (s)	120.5	0	53	81	120.5	139.9	53	68.6
Local Yield (s)	137	47	75.5	115	134.4	47	63.1	115
Local Yield 170(s)	137	47	75.5	88	134.4	47	63.1	88

Intersection Summary

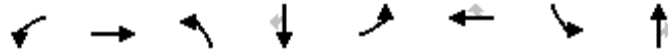
Cycle Length	142.5
Control Type	Actuated-Uncoordinated
Natural Cycle	115

Splits and Phases: 49: Zachary Ln & Rockford Rd



Rockford Road
2016 Improved PM

7/12/2016

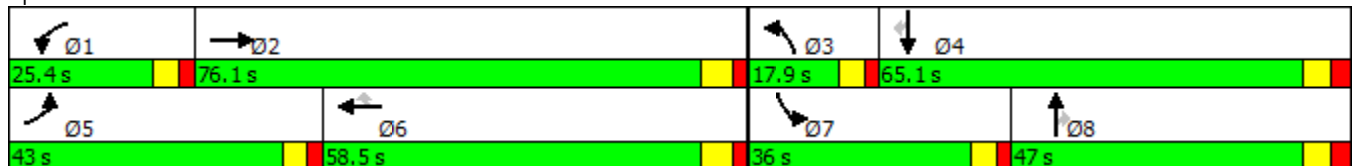


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min	None	None	None	Min	None	None
Maximum Split (s)	25.4	76.1	17.9	65.1	43	58.5	36	47
Maximum Split (%)	13.8%	41.2%	9.7%	35.3%	23.3%	31.7%	19.5%	25.5%
Minimum Split (s)	13.5	41.5	13.5	42	13.5	41.5	13.5	47
Yellow Time (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
All-Red Time (s)	2	2	2	3	2	2	2	3
Minimum Initial (s)	8	35	8	12	8	35	8	12
Vehicle Extension (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
Minimum Gap (s)	3.5	3	3.5	4	3.5	3	3.5	4
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		21		28		24		33
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	25.4	101.5	119.4	0	43	101.5	137.5
End Time (s)	25.4	101.5	119.4	0	43	101.5	137.5	0
Yield/Force Off (s)	19.9	95	113.9	177.5	37.5	95	132	177.5
Yield/Force Off 170(s)	19.9	95	113.9	149.5	37.5	95	132	144.5
Local Start Time (s)	141.5	166.9	58.5	76.4	141.5	0	58.5	94.5
Local Yield (s)	161.4	52	70.9	134.5	179	52	89	134.5
Local Yield 170(s)	161.4	52	70.9	106.5	179	52	89	101.5

Intersection Summary

Cycle Length	184.5
Control Type	Actuated-Uncoordinated
Natural Cycle	140

Splits and Phases: 50: Rockford Rd & Nathan Ln



201: Texas Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2116
Total Delay / Veh (s/v)	19
CO Emissions (kg)	3.10
NOx Emissions (kg)	0.60
VOC Emissions (kg)	0.72

202: Louisiana Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	3212
Total Delay / Veh (s/v)	39
CO Emissions (kg)	5.45
NOx Emissions (kg)	1.06
VOC Emissions (kg)	1.26

203: Hamshire Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	1764
Total Delay / Veh (s/v)	6
CO Emissions (kg)	1.69
NOx Emissions (kg)	0.33
VOC Emissions (kg)	0.39

204: Dakota Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2044
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.64
NOx Emissions (kg)	0.51
VOC Emissions (kg)	0.61

205: Lake St/Vernon Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2760
Total Delay / Veh (s/v)	76
CO Emissions (kg)	5.76
NOx Emissions (kg)	1.12
VOC Emissions (kg)	1.33

206: Minnetonka (CSAH 5) & TH 100 East Ramp

Direction	All
Future Volume (vph)	2808
Total Delay / Veh (s/v)	9
CO Emissions (kg)	2.14
NOx Emissions (kg)	0.42
VOC Emissions (kg)	0.50

207: Ottawa Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2300
Total Delay / Veh (s/v)	24
CO Emissions (kg)	3.47
NOx Emissions (kg)	0.68
VOC Emissions (kg)	0.80

208: TH 100 West Ramp & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2300
Total Delay / Veh (s/v)	7
CO Emissions (kg)	1.06
NOx Emissions (kg)	0.21
VOC Emissions (kg)	0.25

**Minnetonka Blvd
Existing PM**

7/12/2016

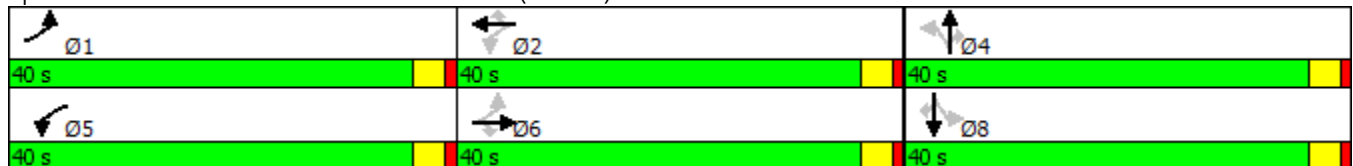


Phase Number	1	2	4	5	6	8
Movement	EBL	WBTL	NBTL	WBL	EBTL	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	40	40	40	40	40	40
Maximum Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Minimum Split (s)	9.5	30	30	9.5	30	30
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		10	10		10	10
Flash Dont Walk (s)		16	16		16	16
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	40	80	0	40	80
End Time (s)	40	80	0	40	80	0
Yield/Force Off (s)	36	76	116	36	76	116
Yield/Force Off 170(s)	36	76	100	36	76	100
Local Start Time (s)	80	0	40	80	0	40
Local Yield (s)	116	36	76	116	36	76
Local Yield 170(s)	116	36	60	116	36	60

Intersection Summary

Cycle Length	120
Control Type	Actuated-Uncoordinated
Natural Cycle	70

Splits and Phases: 201: Texas Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Existing PM**

7/12/2016

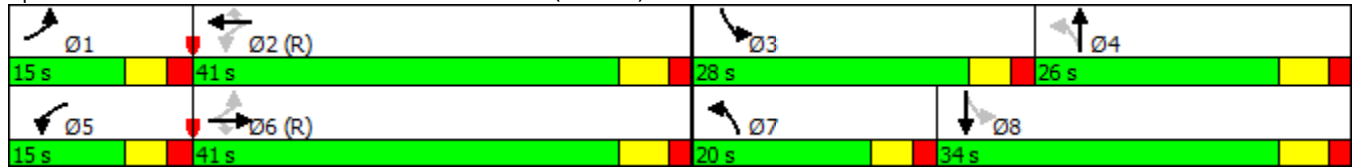


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	SBL	NBTL	WBL	EBTL	NBL	SBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	41	28	26	15	41	20	34
Maximum Split (%)	13.6%	37.3%	25.5%	23.6%	13.6%	37.3%	18.2%	30.9%
Minimum Split (s)	11.5	37	11.5	33	11.5	37	11.5	33
Yellow Time (s)	3.5	4	3.5	4	3.5	4	3.5	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	10	6	10	6	10	6	10
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		24		20		24		20
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	89	104	35	63	89	104	35	55
End Time (s)	104	35	63	89	104	35	55	89
Yield/Force Off (s)	98.5	29	57.5	83	98.5	29	49.5	83
Yield/Force Off 170(s)	98.5	5	57.5	63	98.5	5	49.5	63
Local Start Time (s)	95	0	41	69	95	0	41	61
Local Yield (s)	104.5	35	63.5	89	104.5	35	55.5	89
Local Yield 170(s)	104.5	11	63.5	69	104.5	11	55.5	69

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	95
Offset: 104 (95%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 202: Louisiana Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Existing PM**

7/12/2016

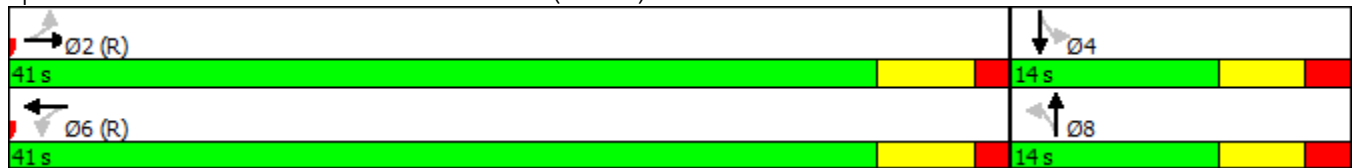


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	41	14	41	14
Maximum Split (%)	74.5%	25.5%	74.5%	25.5%
Minimum Split (s)	20.5	26.5	20	26.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	1.5	2	1.5	2
Minimum Initial (s)	10	8	10	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	10	5	10
Flash Dont Walk (s)	10	11	9	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	20	6	20	6
End Time (s)	6	20	6	20
Yield/Force Off (s)	0.5	14.5	0.5	14.5
Yield/Force Off 170(s)	45.5	3.5	46.5	3.5
Local Start Time (s)	0	41	0	41
Local Yield (s)	35.5	49.5	35.5	49.5
Local Yield 170(s)	25.5	38.5	26.5	38.5

Intersection Summary

Cycle Length	55
Control Type	Actuated-Coordinated
Natural Cycle	75
Offset: 20 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 203: Hamshire Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Existing PM**

7/12/2016

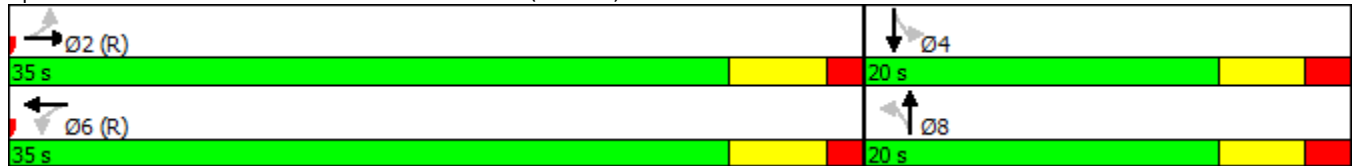


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	35	20	35	20
Maximum Split (%)	63.6%	36.4%	63.6%	36.4%
Minimum Split (s)	30.5	33.5	30.5	33.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	1.5	2	1.5	2
Minimum Initial (s)	22	8	22	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	8	8	8	8
Flash Dont Walk (s)	17	20	17	20
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	46	26	46	26
End Time (s)	26	46	26	46
Yield/Force Off (s)	20.5	40.5	20.5	40.5
Yield/Force Off 170(s)	3.5	20.5	3.5	20.5
Local Start Time (s)	0	35	0	35
Local Yield (s)	29.5	49.5	29.5	49.5
Local Yield 170(s)	12.5	29.5	12.5	29.5

Intersection Summary

Cycle Length	55
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 46 (84%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 204: Dakota Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Existing PM**

7/12/2016



Phase Number	1	2	4	5	6	8
Movement	WBL	EBTL	SBTL	EBL	WBTL	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	15	55	40	18	52	40
Maximum Split (%)	13.6%	50.0%	36.4%	16.4%	47.3%	36.4%
Minimum Split (s)	11.5	39	21.5	11.5	36	42.5
Yellow Time (s)	3.5	4	3.5	3.5	4	3.5
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	6	13	10	6	13	10
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		10			10	10
Flash Dont Walk (s)		23			20	27
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	84	99	44	84	102	44
End Time (s)	99	44	84	102	44	84
Yield/Force Off (s)	93.5	38	78.5	96.5	38	78.5
Yield/Force Off 170(s)	93.5	15	78.5	96.5	18	51.5
Local Start Time (s)	95	0	55	95	3	55
Local Yield (s)	104.5	49	89.5	107.5	49	89.5
Local Yield 170(s)	104.5	26	89.5	107.5	29	62.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	125
Offset: 99 (90%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 205: Lake St/Vernon Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Existing PM

7/12/2016



Phase Number	2	5	6	8
Movement	EBTL	EBL	WBT	NBTL
Lead/Lag		Lead	Lag	
Lead-Lag Optimize		Yes	Yes	
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	84	38	46	26
Maximum Split (%)	76.4%	34.5%	41.8%	23.6%
Minimum Split (s)	33	13.5	33	34.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	15	8	15	10
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7		7	7
Flash Dont Walk (s)	20		20	22
Dual Entry	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	85	85	13	59
End Time (s)	59	13	59	85
Yield/Force Off (s)	53	7.5	53	79.5
Yield/Force Off 170(s)	33	7.5	33	57.5
Local Start Time (s)	0	0	38	84
Local Yield (s)	78	32.5	78	104.5
Local Yield 170(s)	58	32.5	58	82.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 85 (77%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 206: Minnetonka (CSAH 5) & TH 100 East Ramp



**Minnetonka Blvd
Existing PM**

7/12/2016

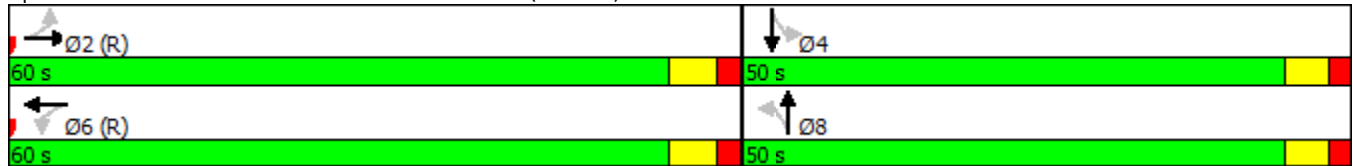


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	60	50	60	50
Maximum Split (%)	54.5%	45.5%	54.5%	45.5%
Minimum Split (s)	30	34.5	30	35.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	12	8	12	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	9	10	9	10
Flash Dont Walk (s)	15	19	15	20
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	75	25	75	25
End Time (s)	25	75	25	75
Yield/Force Off (s)	19	69.5	19	69.5
Yield/Force Off 170(s)	4	50.5	4	49.5
Local Start Time (s)	0	60	0	60
Local Yield (s)	54	104.5	54	104.5
Local Yield 170(s)	39	85.5	39	84.5

Intersection Summary

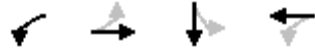
Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 75 (68%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 207: Ottawa Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Existing PM

7/12/2016

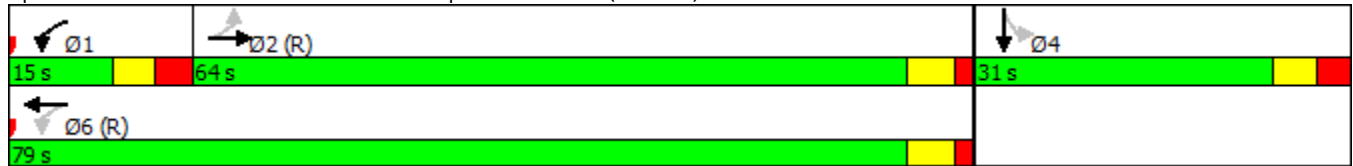


Phase Number	1	2	4	6
Movement	WBL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Max	None	C-Max
Maximum Split (s)	15	64	31	79
Maximum Split (%)	13.6%	58.2%	28.2%	71.8%
Minimum Split (s)	13.5	28.5	29.5	28.5
Yellow Time (s)	3.5	4	3.5	4
All-Red Time (s)	3	1.5	3	1.5
Minimum Initial (s)	7	12	10	12
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		16	16	16
Dual Entry	No	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	70	85	39	70
End Time (s)	85	39	70	39
Yield/Force Off (s)	78.5	33.5	63.5	33.5
Yield/Force Off 170(s)	78.5	17.5	47.5	17.5
Local Start Time (s)	0	15	79	0
Local Yield (s)	8.5	73.5	103.5	73.5
Local Yield 170(s)	8.5	57.5	87.5	57.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 70 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 208: TH 100 West Ramp & Minnetonka (CSAH 5)



201: Texas Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2116
Total Delay / Veh (s/v)	18
CO Emissions (kg)	3.06
NOx Emissions (kg)	0.60
VOC Emissions (kg)	0.71

202: Louisiana Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	3212
Total Delay / Veh (s/v)	36
CO Emissions (kg)	5.23
NOx Emissions (kg)	1.02
VOC Emissions (kg)	1.21

203: Hamshire Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	1764
Total Delay / Veh (s/v)	6
CO Emissions (kg)	1.58
NOx Emissions (kg)	0.31
VOC Emissions (kg)	0.37

204: Dakota Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2044
Total Delay / Veh (s/v)	13
CO Emissions (kg)	2.81
NOx Emissions (kg)	0.55
VOC Emissions (kg)	0.65

205: Lake St/Vernon Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2760
Total Delay / Veh (s/v)	36
CO Emissions (kg)	4.27
NOx Emissions (kg)	0.83
VOC Emissions (kg)	0.99

206: Minnetonka (CSAH 5) & TH 100 East Ramp

Direction	All
Future Volume (vph)	2808
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.27
NOx Emissions (kg)	0.44
VOC Emissions (kg)	0.53

207: Ottawa Ave & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2300
Total Delay / Veh (s/v)	16
CO Emissions (kg)	3.03
NOx Emissions (kg)	0.59
VOC Emissions (kg)	0.70

208: TH 100 West Ramp & Minnetonka (CSAH 5)

Direction	All
Future Volume (vph)	2300
Total Delay / Veh (s/v)	7
CO Emissions (kg)	1.06
NOx Emissions (kg)	0.21
VOC Emissions (kg)	0.25

Minnetonka Blvd
Improved PM

7/12/2016

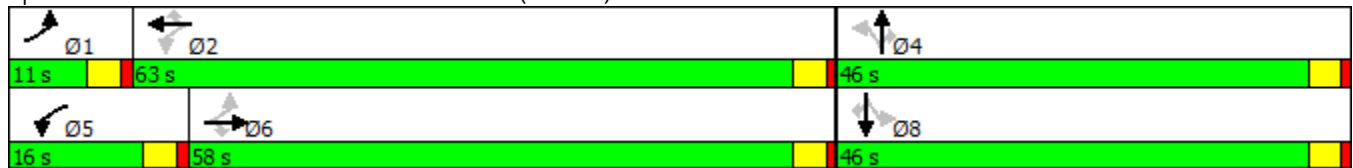


Phase Number	1	2	4	5	6	8
Movement	EBL	WBTL	NBTL	WBL	EBTL	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Min	None	None	Min	None
Maximum Split (s)	11	63	46	16	58	46
Maximum Split (%)	9.2%	52.5%	38.3%	13.3%	48.3%	38.3%
Minimum Split (s)	9.5	30	30	9.5	30	30
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		10	10		10	10
Flash Dont Walk (s)		16	16		16	16
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	11	74	0	16	74
End Time (s)	11	74	0	16	74	0
Yield/Force Off (s)	7	70	116	12	70	116
Yield/Force Off 170(s)	7	70	100	12	70	100
Local Start Time (s)	109	0	63	109	5	63
Local Yield (s)	116	59	105	1	59	105
Local Yield 170(s)	116	59	89	1	59	89

Intersection Summary

Cycle Length	120
Control Type	Actuated-Uncoordinated
Natural Cycle	70

Splits and Phases: 201: Texas Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Improved PM

7/12/2016

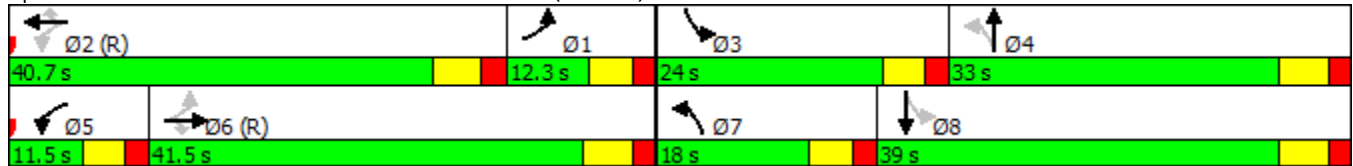


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	SBL	NBTL	WBL	EBTL	NBL	SBTL
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	12.3	40.7	24	33	11.5	41.5	18	39
Maximum Split (%)	11.2%	37.0%	21.8%	30.0%	10.5%	37.7%	16.4%	35.5%
Minimum Split (s)	11.5	37	11.5	33	11.5	37	11.5	33
Yellow Time (s)	3.5	4	3.5	4	3.5	4	3.5	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	10	6	10	6	10	6	10
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		24		20		24		20
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	25.7	95	38	62	95	106.5	38	56
End Time (s)	38	25.7	62	95	106.5	38	56	95
Yield/Force Off (s)	32.5	19.7	56.5	89	101	32	50.5	89
Yield/Force Off 170(s)	32.5	105.7	56.5	69	101	8	50.5	69
Local Start Time (s)	40.7	0	53	77	0	11.5	53	71
Local Yield (s)	47.5	34.7	71.5	104	6	47	65.5	104
Local Yield 170(s)	47.5	10.7	71.5	84	6	23	65.5	84

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	95
Offset: 95 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 202: Louisiana Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Improved PM**

7/12/2016

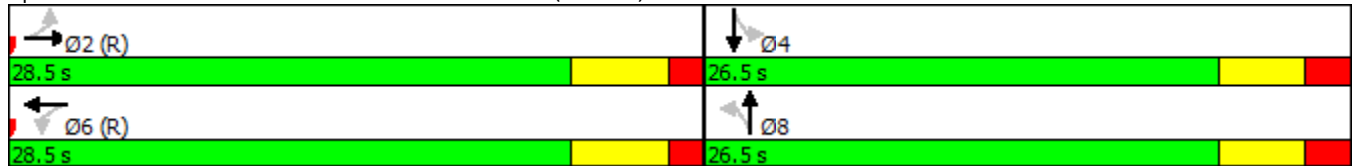


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	28.5	26.5	28.5	26.5
Maximum Split (%)	51.8%	48.2%	51.8%	48.2%
Minimum Split (s)	20.5	26.5	20	26.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	1.5	2	1.5	2
Minimum Initial (s)	10	8	10	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	10	5	10
Flash Dont Walk (s)	10	11	9	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	29	2.5	29	2.5
End Time (s)	2.5	29	2.5	29
Yield/Force Off (s)	52	23.5	52	23.5
Yield/Force Off 170(s)	42	12.5	43	12.5
Local Start Time (s)	0	28.5	0	28.5
Local Yield (s)	23	49.5	23	49.5
Local Yield 170(s)	13	38.5	14	38.5

Intersection Summary

Cycle Length	55
Control Type	Actuated-Coordinated
Natural Cycle	75
Offset: 29 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 203: Hamshire Ave & Minnetonka (CSAH 5)



**Minnetonka Blvd
Improved PM**

7/12/2016

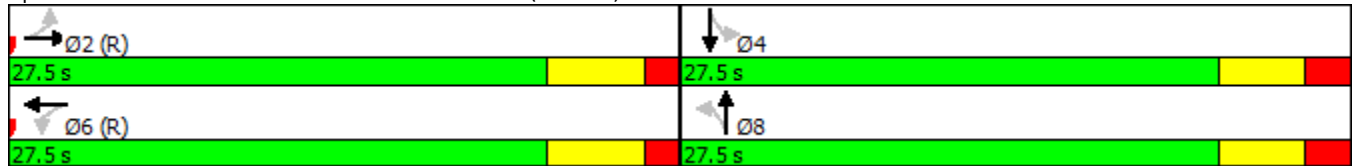


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	27.5	27.5	27.5	27.5
Maximum Split (%)	50.0%	50.0%	50.0%	50.0%
Minimum Split (s)	30.5	33.5	30.5	33.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	1.5	2	1.5	2
Minimum Initial (s)	22	8	22	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	8	8	8	8
Flash Dont Walk (s)	17	20	17	20
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	4	31.5	4	31.5
End Time (s)	31.5	4	31.5	4
Yield/Force Off (s)	26	53.5	26	53.5
Yield/Force Off 170(s)	9	33.5	9	33.5
Local Start Time (s)	0	27.5	0	27.5
Local Yield (s)	22	49.5	22	49.5
Local Yield 170(s)	5	29.5	5	29.5

Intersection Summary

Cycle Length	55
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 4 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 204: Dakota Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Improved PM

7/12/2016

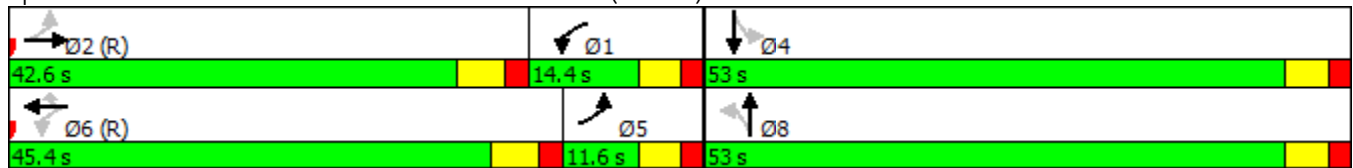


Phase Number	1	2	4	5	6	8
Movement	WBL	EBTL	SBTL	EBL	WBTL	NBTL
Lead/Lag	Lag	Lead		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	14.4	42.6	53	11.6	45.4	53
Maximum Split (%)	13.1%	38.7%	48.2%	10.5%	41.3%	48.2%
Minimum Split (s)	11.5	39	21.5	11.5	36	42.5
Yellow Time (s)	3.5	4	3.5	3.5	4	3.5
All-Red Time (s)	2	2	2	2	2	2
Minimum Initial (s)	6	13	10	6	13	10
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		10			10	10
Flash Dont Walk (s)		23			20	27
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	31.6	99	46	34.4	99	46
End Time (s)	46	31.6	99	46	34.4	99
Yield/Force Off (s)	40.5	25.6	93.5	40.5	28.4	93.5
Yield/Force Off 170(s)	40.5	2.6	93.5	40.5	8.4	66.5
Local Start Time (s)	42.6	0	57	45.4	0	57
Local Yield (s)	51.5	36.6	104.5	51.5	39.4	104.5
Local Yield 170(s)	51.5	13.6	104.5	51.5	19.4	77.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	125
Offset: 99 (90%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 205: Lake St/Vernon Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Improved PM

7/12/2016



Phase Number	2	5	6	8
Movement	EBTL	EBL	WBT	NBTL
Lead/Lag		Lead	Lag	
Lead-Lag Optimize		Yes	Yes	
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	70	23	47	40
Maximum Split (%)	63.6%	20.9%	42.7%	36.4%
Minimum Split (s)	33	13.5	33	34.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	15	8	15	10
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	7		7	7
Flash Dont Walk (s)	20		20	22
Dual Entry	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	87	87	0	47
End Time (s)	47	0	47	87
Yield/Force Off (s)	41	104.5	41	81.5
Yield/Force Off 170(s)	21	104.5	21	59.5
Local Start Time (s)	0	0	23	70
Local Yield (s)	64	17.5	64	104.5
Local Yield 170(s)	44	17.5	44	82.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 87 (79%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 206: Minnetonka (CSAH 5) & TH 100 East Ramp



**Minnetonka Blvd
Improved PM**

7/12/2016

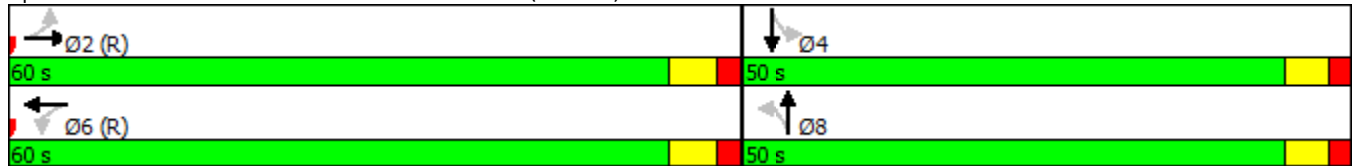


Phase Number	2	4	6	8
Movement	EBTL	SBTL	WBTL	NBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	C-Max	None	C-Max	None
Maximum Split (s)	60	50	60	50
Maximum Split (%)	54.5%	45.5%	54.5%	45.5%
Minimum Split (s)	30	34.5	30	35.5
Yellow Time (s)	4	3.5	4	3.5
All-Red Time (s)	2	2	2	2
Minimum Initial (s)	12	8	12	8
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	9	10	9	10
Flash Dont Walk (s)	15	19	15	20
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	21	81	21	81
End Time (s)	81	21	81	21
Yield/Force Off (s)	75	15.5	75	15.5
Yield/Force Off 170(s)	60	106.5	60	105.5
Local Start Time (s)	0	60	0	60
Local Yield (s)	54	104.5	54	104.5
Local Yield 170(s)	39	85.5	39	84.5

Intersection Summary

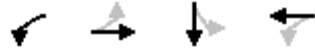
Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 21 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 207: Ottawa Ave & Minnetonka (CSAH 5)



Minnetonka Blvd
Improved PM

7/12/2016

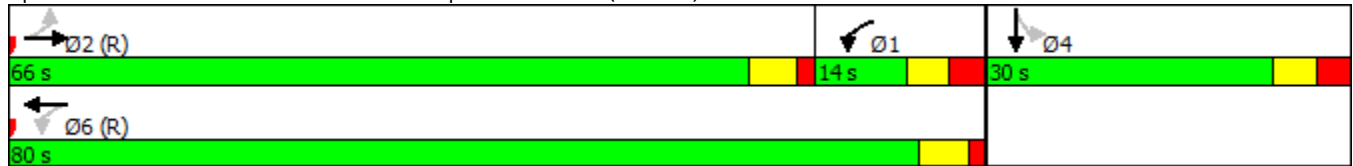


Phase Number	1	2	4	6
Movement	WBL	EBTL	SBTL	WBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Max	None	C-Max
Maximum Split (s)	14	66	30	80
Maximum Split (%)	12.7%	60.0%	27.3%	72.7%
Minimum Split (s)	13.5	28.5	29.5	28.5
Yellow Time (s)	3.5	4	3.5	4
All-Red Time (s)	3	1.5	3	1.5
Minimum Initial (s)	7	12	10	12
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		16	16	16
Dual Entry	No	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	38	82	52	82
End Time (s)	52	38	82	52
Yield/Force Off (s)	45.5	32.5	75.5	46.5
Yield/Force Off 170(s)	45.5	16.5	59.5	30.5
Local Start Time (s)	66	0	80	0
Local Yield (s)	73.5	60.5	103.5	74.5
Local Yield 170(s)	73.5	44.5	87.5	58.5

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 82 (75%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green	

Splits and Phases: 208: TH 100 West Ramp & Minnetonka (CSAH 5)



41: Shady Oak Rd & Excelsior Blvd

Direction	All
Future Volume (vph)	3283
Total Delay / Veh (s/v)	51
CO Emissions (kg)	7.46
NOx Emissions (kg)	1.45
VOC Emissions (kg)	1.73

42: Excelsior Blvd & 17th Ave S

Direction	All
Future Volume (vph)	2223
Total Delay / Veh (s/v)	7
CO Emissions (kg)	2.29
NOx Emissions (kg)	0.44
VOC Emissions (kg)	0.53

43: 11th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	3236
Total Delay / Veh (s/v)	27
CO Emissions (kg)	4.49
NOx Emissions (kg)	0.87
VOC Emissions (kg)	1.04

44: 8th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	2637
Total Delay / Veh (s/v)	8
CO Emissions (kg)	1.90
NOx Emissions (kg)	0.37
VOC Emissions (kg)	0.44

45: 5th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	2914
Total Delay / Veh (s/v)	23
CO Emissions (kg)	3.26
NOx Emissions (kg)	0.63
VOC Emissions (kg)	0.76

46: Excelsior Blvd & TH 169 West Ramps

Direction	All
Future Volume (vph)	3341
Total Delay / Veh (s/v)	12
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

47: Excelsior Blvd & TH 169 East Ramps

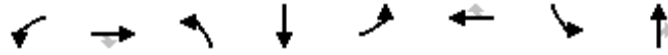
Direction	All
Future Volume (vph)	3358
Total Delay / Veh (s/v)	16
CO Emissions (kg)	3.28
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

48: Milwaukee St/St Louis St & Excelsior Blvd

Direction	All
Future Volume (vph)	3306
Total Delay / Veh (s/v)	30
CO Emissions (kg)	4.84
NOx Emissions (kg)	0.94
VOC Emissions (kg)	1.12

Excelsior Blvd
Existing PM

7/12/2016

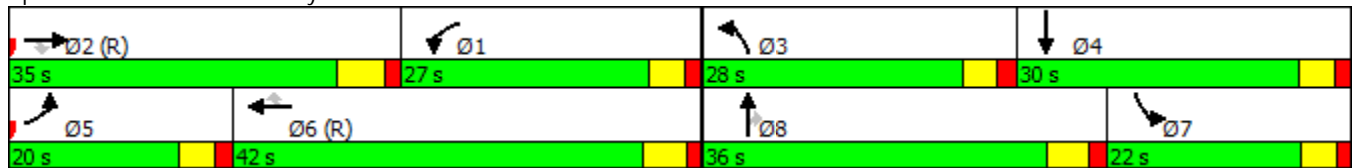


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	27	35	28	30	20	42	22	36
Maximum Split (%)	22.5%	29.2%	23.3%	25.0%	16.7%	35.0%	18.3%	30.0%
Minimum Split (s)	15	32	15	33	15	32	15	32
Yellow Time (s)	3.2	4.3	3.2	3.2	3.2	3.9	3.2	3.9
All-Red Time (s)	1.7	1.5	1.7	1.6	1.6	1.5	1.5	1.5
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Minimum Gap (s)	3.5	3	3.5	3	3.5	3	3.5	3
Time Before Reduce (s)	0	12	0	12	0	12	0	12
Time To Reduce (s)	0	12	0	12	0	12	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		18		20		19		19
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	85	27	55	85	105	63	27
End Time (s)	27	0	55	85	105	27	85	63
Yield/Force Off (s)	22.1	114.2	50.1	80.2	100.2	21.6	80.3	57.6
Yield/Force Off 170(s)	22.1	96.2	50.1	60.2	100.2	2.6	80.3	38.6
Local Start Time (s)	35	0	62	90	0	20	98	62
Local Yield (s)	57.1	29.2	85.1	115.2	15.2	56.6	115.3	92.6
Local Yield 170(s)	57.1	11.2	85.1	95.2	15.2	37.6	115.3	73.6

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	95
Offset: 85 (71%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 41: Shady Oak Rd & Excelsior Blvd



Excelsior Blvd
Existing PM

7/12/2016

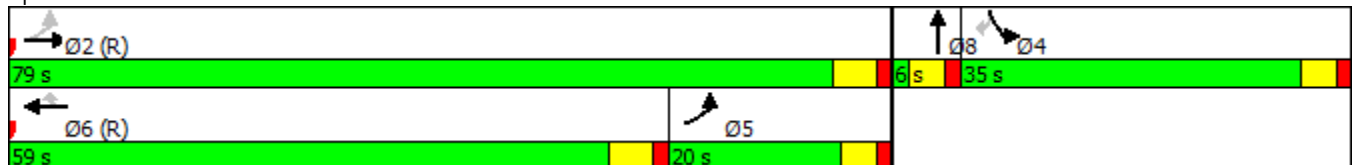


Phase Number	2	4	5	6	8
Movement	EBTL	SBL	EBL	WBT	NBT
Lead/Lag		Lag	Lag	Lead	Lead
Lead-Lag Optimize			Yes	Yes	Yes
Recall Mode	C-Max	None	None	C-Max	None
Maximum Split (s)	79	35	20	59	6
Maximum Split (%)	65.8%	29.2%	16.7%	49.2%	5.0%
Minimum Split (s)	20	33	14	25	6
Yellow Time (s)	3.9	3.2	3.2	3.9	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	12	10	6	12	1
Vehicle Extension (s)	5	4	3	5	3
Minimum Gap (s)	3	4	3	3	3
Time Before Reduce (s)	13	0	0	13	0
Time To Reduce (s)	13	0	0	13	0
Walk Time (s)		7		7	7
Flash Dont Walk (s)		20		12	19
Dual Entry	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	93	58	32	93	52
End Time (s)	52	93	52	32	58
Yield/Force Off (s)	46.6	88.3	47.3	26.6	53.3
Yield/Force Off 170(s)	46.6	68.3	47.3	14.6	34.3
Local Start Time (s)	0	85	59	0	79
Local Yield (s)	73.6	115.3	74.3	53.6	80.3
Local Yield 170(s)	73.6	95.3	74.3	41.6	61.3

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 93 (78%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 42: Excelsior Blvd & 17th Ave S



Excelsior Blvd
Existing PM

7/12/2016

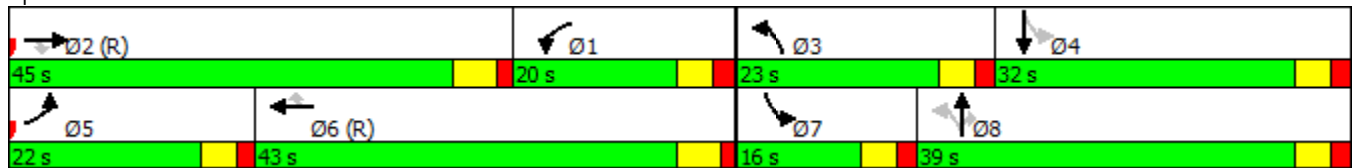


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBTL	EBL	WBT	SBL	NBTL
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes			Yes	Yes		
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	45	23	32	22	43	16	39
Maximum Split (%)	16.7%	37.5%	19.2%	26.7%	18.3%	35.8%	13.3%	32.5%
Minimum Split (s)	15	32	14	36	15	32	14	36
Yellow Time (s)	3.2	3.9	3.2	3.2	3.2	3.9	3.2	3.2
All-Red Time (s)	2.2	1.5	1.7	2	1.7	1.5	1.8	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	5	3	4	3	5	3	4
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	13	0	12	0	13	0	12
Time To Reduce (s)	0	13	0	12	0	13	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		19		23		19		23
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	72	27	92	115	27	49	92	108
End Time (s)	92	72	115	27	49	92	108	27
Yield/Force Off (s)	86.6	66.6	110.1	21.8	44.1	86.6	103	21.8
Yield/Force Off 170(s)	86.6	47.6	110.1	118.8	44.1	67.6	103	118.8
Local Start Time (s)	45	0	65	88	0	22	65	81
Local Yield (s)	59.6	39.6	83.1	114.8	17.1	59.6	76	114.8
Local Yield 170(s)	59.6	20.6	83.1	91.8	17.1	40.6	76	91.8

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 27 (23%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 43: 11th Ave S & Excelsior Blvd



Excelsior Blvd
Existing PM

7/12/2016



Phase Number	1	2	4	5	6	8
Movement	EBL	WBTL	SBTL	WBL	EBTL	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	64	40	15	65	40
Maximum Split (%)	13.3%	53.3%	33.3%	12.5%	54.2%	33.3%
Minimum Split (s)	14	25	35	14	30	39
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.2
All-Red Time (s)	1.6	1.5	1.8	1.5	1.5	1.8
Minimum Initial (s)	6	12	8	6	12	8
Vehicle Extension (s)	3	4.5	3.5	3	4.5	3.5
Minimum Gap (s)	3	3	3.5	3	3	3.5
Time Before Reduce (s)	0	13	0	0	13	0
Time To Reduce (s)	0	13	0	0	13	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	22		17	26
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	20	36	100	20	35	100
End Time (s)	36	100	20	35	100	20
Yield/Force Off (s)	31.2	94.6	15	30.3	94.6	15
Yield/Force Off 170(s)	31.2	82.6	113	30.3	77.6	109
Local Start Time (s)	105	1	65	105	0	65
Local Yield (s)	116.2	59.6	100	115.3	59.6	100
Local Yield 170(s)	116.2	47.6	78	115.3	42.6	74

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 35 (29%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 44: 8th Ave S & Excelsior Blvd



Excelsior Blvd
Existing PM

7/12/2016

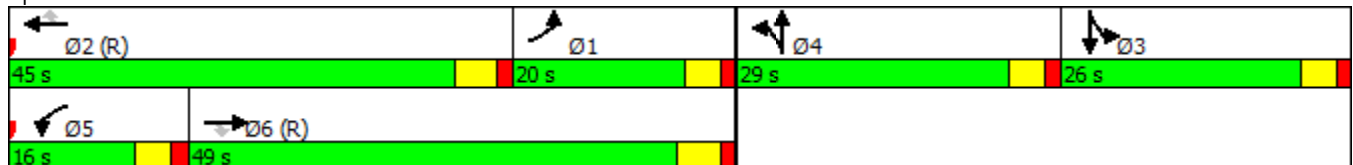


Phase Number	1	2	3	4	5	6
Movement	EBL	WBT	SBTL	NBTL	WBL	EBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max
Maximum Split (s)	20	45	26	29	16	49
Maximum Split (%)	16.7%	37.5%	21.7%	24.2%	13.3%	40.8%
Minimum Split (s)	15	29	34	36	16	29
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.9
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	6	10	8	8	8	10
Vehicle Extension (s)	3	3.5	3.5	3.5	5	3.5
Minimum Gap (s)	3	3	3.5	3.5	5	3
Time Before Reduce (s)	0	15	0	0	0	15
Time To Reduce (s)	0	15	0	0	0	15
Walk Time (s)		7	7	7		7
Flash Dont Walk (s)		16	21	20		16
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	70	25	119	90	25	41
End Time (s)	90	70	25	119	41	90
Yield/Force Off (s)	85.3	64.9	20.3	114.3	36.3	84.6
Yield/Force Off 170(s)	85.3	48.9	119.3	94.3	36.3	68.6
Local Start Time (s)	45	0	94	65	0	16
Local Yield (s)	60.3	39.9	115.3	89.3	11.3	59.6
Local Yield 170(s)	60.3	23.9	94.3	69.3	11.3	43.6

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	135
Offset: 25 (21%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 45: 5th Ave S & Excelsior Blvd



Excelsior Blvd
Existing PM

7/12/2016



Phase Number	2	4	5	6
Movement	EBT	SBL	EBL	WBT
Lead/Lag			Lead	Lag
Lead-Lag Optimize			Yes	Yes
Recall Mode	C-Max	None	None	C-Max
Maximum Split (s)	81	39	22	59
Maximum Split (%)	67.5%	32.5%	18.3%	49.2%
Minimum Split (s)	20	18	15	31
Yellow Time (s)	3.6	3.2	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	12	10	6	12
Vehicle Extension (s)	4	3.5	3	4
Minimum Gap (s)	4	3.5	3	4
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)				7
Flash Dont Walk (s)				18
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	78	39	78	100
End Time (s)	39	78	100	39
Yield/Force Off (s)	33.9	73.3	95.3	33.9
Yield/Force Off 170(s)	33.9	73.3	95.3	15.9
Local Start Time (s)	0	81	0	22
Local Yield (s)	75.9	115.3	17.3	75.9
Local Yield 170(s)	75.9	115.3	17.3	57.9

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 78 (65%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 46: Excelsior Blvd & TH 169 West Ramps



Excelsior Blvd
Existing PM

7/12/2016

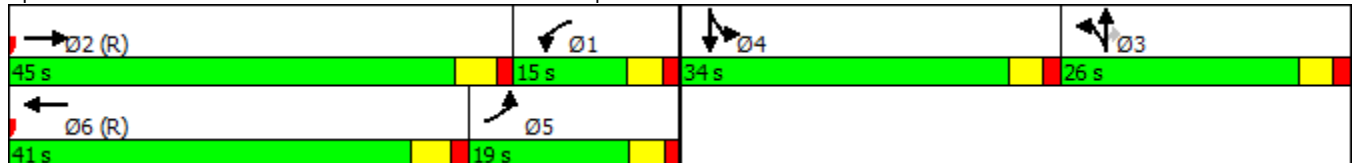


Phase Number	1	2	3	4	5	6
Movement	WBL	EBT	NBTL	SBTL	EBL	WBT
Lead/Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max
Maximum Split (s)	15	45	26	34	19	41
Maximum Split (%)	12.5%	37.5%	21.7%	28.3%	15.8%	34.2%
Minimum Split (s)	15	20	16	20	18	32
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.6
All-Red Time (s)	1.6	1.5	1.7	1.6	1.5	1.5
Minimum Initial (s)	6	12	7	12	10	12
Vehicle Extension (s)	3	4	4	4.5	3	4
Minimum Gap (s)	3	3	4	2	3	3
Time Before Reduce (s)	0	15	0	12	0	15
Time To Reduce (s)	0	15	0	12	0	15
Walk Time (s)			7	7		7
Flash Dont Walk (s)			28	26		19
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	21	96	70	36	17	96
End Time (s)	36	21	96	70	36	17
Yield/Force Off (s)	31.2	15.9	91.1	65.2	31.3	11.9
Yield/Force Off 170(s)	31.2	15.9	63.1	39.2	31.3	112.9
Local Start Time (s)	45	0	94	60	41	0
Local Yield (s)	55.2	39.9	115.1	89.2	55.3	35.9
Local Yield 170(s)	55.2	39.9	87.1	63.2	55.3	16.9

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 96 (80%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 47: Excelsior Blvd & TH 169 East Ramps



Excelsior Blvd
Existing PM

7/12/2016

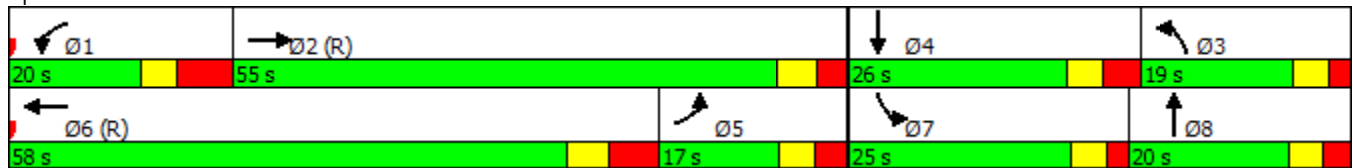


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	55	19	26	17	58	25	20
Maximum Split (%)	16.7%	45.8%	15.8%	21.7%	14.2%	48.3%	20.8%	16.7%
Minimum Split (s)	18	48	16	18	16	39	16	18
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.6	3.2	3.2
All-Red Time (s)	5	2.8	2.1	3.3	3.1	4.5	2	2.6
Minimum Initial (s)	8	15	8	10	8	14.9	8	10
Vehicle Extension (s)	3.5	5	3.5	3.5	3.5	5	3.5	3.5
Minimum Gap (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0	17	0	0	0	17	0	0
Time To Reduce (s)	0	17	0	0	0	17	0	0
Walk Time (s)		8				7		7
Flash Dont Walk (s)		33				23		28
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	71	91	52	26	9	71	26	51
End Time (s)	91	26	71	52	26	9	51	71
Yield/Force Off (s)	82.8	19.6	65.7	45.5	19.7	0.9	45.8	65.2
Yield/Force Off 170(s)	82.8	106.6	65.7	45.5	19.7	97.9	45.8	37.2
Local Start Time (s)	0	20	101	75	58	0	75	100
Local Yield (s)	11.8	68.6	114.7	94.5	68.7	49.9	94.8	114.2
Local Yield 170(s)	11.8	35.6	114.7	94.5	68.7	26.9	94.8	86.2

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 71 (59%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 48: Milwaukee St/St Louis St & Excelsior Blvd



41: Shady Oak Rd & Excelsior Blvd

Direction	All
Future Volume (vph)	3283
Total Delay / Veh (s/v)	39
CO Emissions (kg)	6.83
NOx Emissions (kg)	1.33
VOC Emissions (kg)	1.58

42: Excelsior Blvd & 17th Ave S

Direction	All
Future Volume (vph)	2223
Total Delay / Veh (s/v)	7
CO Emissions (kg)	2.38
NOx Emissions (kg)	0.46
VOC Emissions (kg)	0.55

43: 11th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	3236
Total Delay / Veh (s/v)	28
CO Emissions (kg)	4.51
NOx Emissions (kg)	0.88
VOC Emissions (kg)	1.05

44: 8th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	2637
Total Delay / Veh (s/v)	8
CO Emissions (kg)	1.91
NOx Emissions (kg)	0.37
VOC Emissions (kg)	0.44

45: 5th Ave S & Excelsior Blvd

Direction	All
Future Volume (vph)	2914
Total Delay / Veh (s/v)	19
CO Emissions (kg)	2.89
NOx Emissions (kg)	0.56
VOC Emissions (kg)	0.67

46: Excelsior Blvd & TH 169 West Ramps

Direction	All
Future Volume (vph)	3341
Total Delay / Veh (s/v)	11
CO Emissions (kg)	3.13
NOx Emissions (kg)	0.61
VOC Emissions (kg)	0.73

47: Excelsior Blvd & TH 169 East Ramps

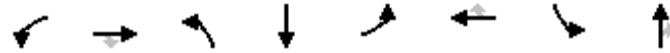
Direction	All
Future Volume (vph)	3358
Total Delay / Veh (s/v)	17
CO Emissions (kg)	3.37
NOx Emissions (kg)	0.66
VOC Emissions (kg)	0.78

48: Milwaukee St/St Louis St & Excelsior Blvd

Direction	All
Future Volume (vph)	3306
Total Delay / Veh (s/v)	29
CO Emissions (kg)	4.70
NOx Emissions (kg)	0.91
VOC Emissions (kg)	1.09

Excelsior Blvd
Improved PM

7/13/2016

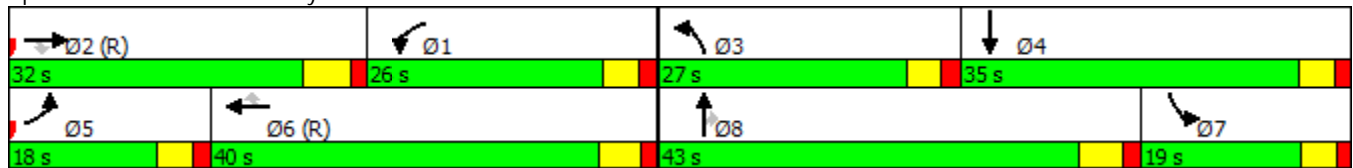


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	26	32	27	35	18	40	19	43
Maximum Split (%)	21.7%	26.7%	22.5%	29.2%	15.0%	33.3%	15.8%	35.8%
Minimum Split (s)	15	32	15	33	15	32	15	32
Yellow Time (s)	3.2	4.3	3.2	3.2	3.2	3.9	3.2	3.9
All-Red Time (s)	1.7	1.5	1.7	1.6	1.6	1.5	1.5	1.5
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Minimum Gap (s)	3.5	3	3.5	3	3.5	3	3.5	3
Time Before Reduce (s)	0	12	0	12	0	12	0	12
Time To Reduce (s)	0	12	0	12	0	12	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		18		20		19		19
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	111	79	17	44	79	97	60	17
End Time (s)	17	111	44	79	97	17	79	60
Yield/Force Off (s)	12.1	105.2	39.1	74.2	92.2	11.6	74.3	54.6
Yield/Force Off 170(s)	12.1	87.2	39.1	54.2	92.2	112.6	74.3	35.6
Local Start Time (s)	32	0	58	85	0	18	101	58
Local Yield (s)	53.1	26.2	80.1	115.2	13.2	52.6	115.3	95.6
Local Yield 170(s)	53.1	8.2	80.1	95.2	13.2	33.6	115.3	76.6

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	95
Offset: 79 (66%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 41: Shady Oak Rd & Excelsior Blvd



Excelsior Blvd
Improved PM

7/13/2016

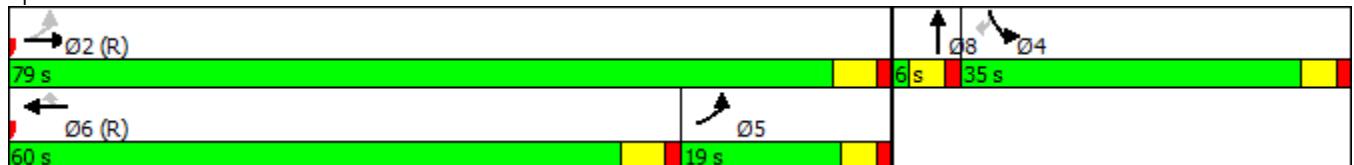


Phase Number	2	4	5	6	8
Movement	EBTL	SBL	EBL	WBT	NBT
Lead/Lag		Lag	Lag	Lead	Lead
Lead-Lag Optimize			Yes	Yes	Yes
Recall Mode	C-Max	None	None	C-Max	None
Maximum Split (s)	79	35	19	60	6
Maximum Split (%)	65.8%	29.2%	15.8%	50.0%	5.0%
Minimum Split (s)	20	33	14	25	6
Yellow Time (s)	3.9	3.2	3.2	3.9	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	12	10	6	12	1
Vehicle Extension (s)	5	4	3	5	3
Minimum Gap (s)	3	4	3	3	3
Time Before Reduce (s)	13	0	0	13	0
Time To Reduce (s)	13	0	0	13	0
Walk Time (s)		7		7	7
Flash Dont Walk (s)		20		12	19
Dual Entry	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	96	61	36	96	55
End Time (s)	55	96	55	36	61
Yield/Force Off (s)	49.6	91.3	50.3	30.6	56.3
Yield/Force Off 170(s)	49.6	71.3	50.3	18.6	37.3
Local Start Time (s)	0	85	60	0	79
Local Yield (s)	73.6	115.3	74.3	54.6	80.3
Local Yield 170(s)	73.6	95.3	74.3	42.6	61.3

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 96 (80%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green	

Splits and Phases: 42: Excelsior Blvd & 17th Ave S



Excelsior Blvd
Improved PM

7/13/2016

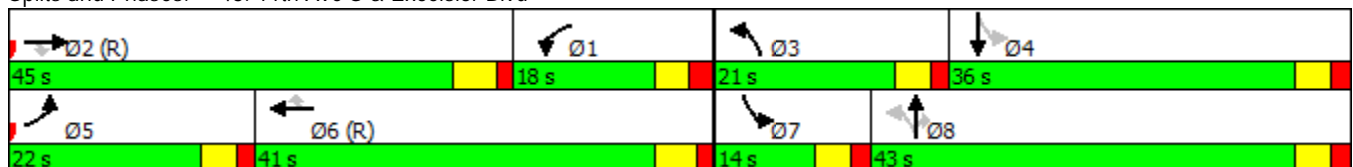


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBTL	EBL	WBT	SBL	NBTL
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes			Yes	Yes		
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	18	45	21	36	22	41	14	43
Maximum Split (%)	15.0%	37.5%	17.5%	30.0%	18.3%	34.2%	11.7%	35.8%
Minimum Split (s)	15	32	14	36	15	32	14	36
Yellow Time (s)	3.2	3.9	3.2	3.2	3.2	3.9	3.2	3.2
All-Red Time (s)	2.2	1.5	1.7	2	1.7	1.5	1.8	2
Minimum Initial (s)	6	12	6	10	6	12	6	10
Vehicle Extension (s)	3	5	3	4	3	5	3	4
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	13	0	12	0	13	0	12
Time To Reduce (s)	0	13	0	12	0	13	0	12
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		19		23		19		23
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	65	20	83	104	20	42	83	97
End Time (s)	83	65	104	20	42	83	97	20
Yield/Force Off (s)	77.6	59.6	99.1	14.8	37.1	77.6	92	14.8
Yield/Force Off 170(s)	77.6	40.6	99.1	111.8	37.1	58.6	92	111.8
Local Start Time (s)	45	0	63	84	0	22	63	77
Local Yield (s)	57.6	39.6	79.1	114.8	17.1	57.6	72	114.8
Local Yield 170(s)	57.6	20.6	79.1	91.8	17.1	38.6	72	91.8

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 43: 11th Ave S & Excelsior Blvd



Excelsior Blvd
Improved PM

7/13/2016



Phase Number	1	2	4	5	6	8
Movement	EBL	WBTL	SBTL	WBL	EBTL	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	64	40	15	65	40
Maximum Split (%)	13.3%	53.3%	33.3%	12.5%	54.2%	33.3%
Minimum Split (s)	14	25	35	14	30	39
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.2
All-Red Time (s)	1.6	1.5	1.8	1.5	1.5	1.8
Minimum Initial (s)	6	12	8	6	12	8
Vehicle Extension (s)	3	4.5	3.5	3	4.5	3.5
Minimum Gap (s)	3	3	3.5	3	3	3.5
Time Before Reduce (s)	0	13	0	0	13	0
Time To Reduce (s)	0	13	0	0	13	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	22		17	26
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	11	27	91	11	26	91
End Time (s)	27	91	11	26	91	11
Yield/Force Off (s)	22.2	85.6	6	21.3	85.6	6
Yield/Force Off 170(s)	22.2	73.6	104	21.3	68.6	100
Local Start Time (s)	105	1	65	105	0	65
Local Yield (s)	116.2	59.6	100	115.3	59.6	100
Local Yield 170(s)	116.2	47.6	78	115.3	42.6	74

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 26 (22%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 44: 8th Ave S & Excelsior Blvd



Excelsior Blvd
Improved PM

7/13/2016

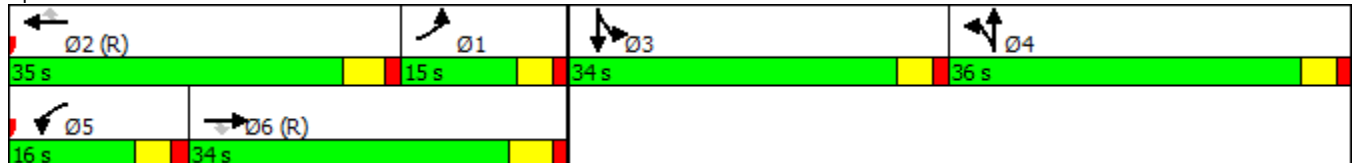


Phase Number	1	2	3	4	5	6
Movement	EBL	WBT	SBTL	NBTL	WBL	EBT
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max
Maximum Split (s)	15	35	34	36	16	34
Maximum Split (%)	12.5%	29.2%	28.3%	30.0%	13.3%	28.3%
Minimum Split (s)	15	29	34	36	16	29
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.9
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	6	10	8	8	8	10
Vehicle Extension (s)	3	3.5	3.5	3.5	5	3.5
Minimum Gap (s)	3	3	3.5	3.5	5	3
Time Before Reduce (s)	0	15	0	0	0	15
Time To Reduce (s)	0	15	0	0	0	15
Walk Time (s)		7	7	7		7
Flash Dont Walk (s)		16	21	20		16
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	65	30	80	114	30	46
End Time (s)	80	65	114	30	46	80
Yield/Force Off (s)	75.3	59.9	109.3	25.3	41.3	74.6
Yield/Force Off 170(s)	75.3	43.9	88.3	5.3	41.3	58.6
Local Start Time (s)	35	0	50	84	0	16
Local Yield (s)	45.3	29.9	79.3	115.3	11.3	44.6
Local Yield 170(s)	45.3	13.9	58.3	95.3	11.3	28.6

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	135
Offset: 30 (25%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 45: 5th Ave S & Excelsior Blvd



Excelsior Blvd
Improved PM

7/13/2016

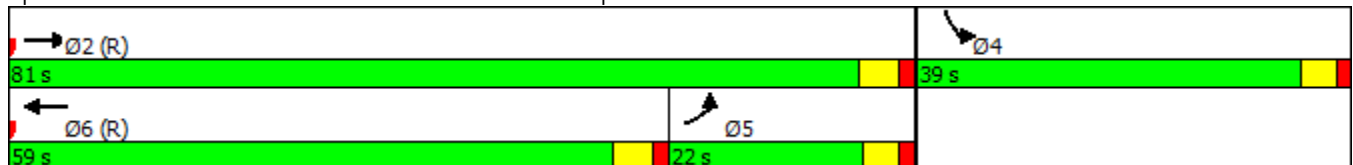


Phase Number	2	4	5	6
Movement	EBT	SBL	EBL	WBT
Lead/Lag			Lag	Lead
Lead-Lag Optimize			Yes	Yes
Recall Mode	C-Max	None	None	C-Max
Maximum Split (s)	81	39	22	59
Maximum Split (%)	67.5%	32.5%	18.3%	49.2%
Minimum Split (s)	20	18	15	31
Yellow Time (s)	3.6	3.2	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	12	10	6	12
Vehicle Extension (s)	4	3.5	3	4
Minimum Gap (s)	4	3.5	3	4
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)				7
Flash Dont Walk (s)				18
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	12	93	71	12
End Time (s)	93	12	93	71
Yield/Force Off (s)	87.9	7.3	88.3	65.9
Yield/Force Off 170(s)	87.9	7.3	88.3	47.9
Local Start Time (s)	0	81	59	0
Local Yield (s)	75.9	115.3	76.3	53.9
Local Yield 170(s)	75.9	115.3	76.3	35.9

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	65
Offset: 12 (10%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 46: Excelsior Blvd & TH 169 West Ramps



Excelsior Blvd
Improved PM

7/13/2016

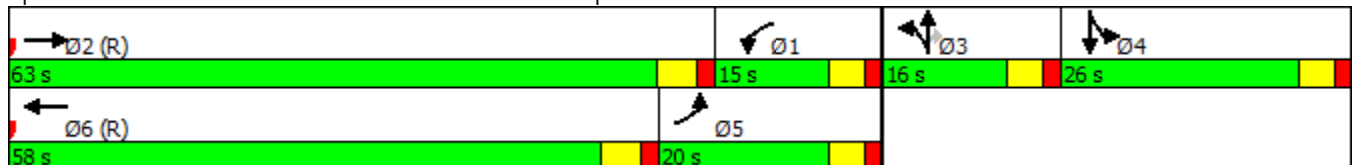


Phase Number	1	2	3	4	5	6
Movement	WBL	EBT	NBTL	SBTL	EBL	WBT
Lead/Lag	Lag	Lead	Lead	Lag	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max
Maximum Split (s)	15	63	16	26	20	58
Maximum Split (%)	12.5%	52.5%	13.3%	21.7%	16.7%	48.3%
Minimum Split (s)	15	20	16	20	18	32
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.6
All-Red Time (s)	1.6	1.5	1.7	1.6	1.5	1.5
Minimum Initial (s)	6	12	7	12	10	12
Vehicle Extension (s)	3	4	4	4.5	3	4
Minimum Gap (s)	3	3	4	2	3	3
Time Before Reduce (s)	0	15	0	12	0	15
Time To Reduce (s)	0	15	0	12	0	15
Walk Time (s)			7	7		7
Flash Dont Walk (s)			28	26		19
Dual Entry	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	29	86	44	60	24	86
End Time (s)	44	29	60	86	44	24
Yield/Force Off (s)	39.2	23.9	55.1	81.2	39.3	18.9
Yield/Force Off 170(s)	39.2	23.9	27.1	55.2	39.3	119.9
Local Start Time (s)	63	0	78	94	58	0
Local Yield (s)	73.2	57.9	89.1	115.2	73.3	52.9
Local Yield 170(s)	73.2	57.9	61.1	89.2	73.3	33.9

Intersection Summary

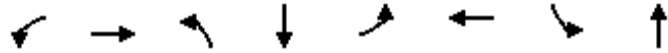
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 86 (72%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 47: Excelsior Blvd & TH 169 East Ramps



Excelsior Blvd
Improved PM

7/13/2016

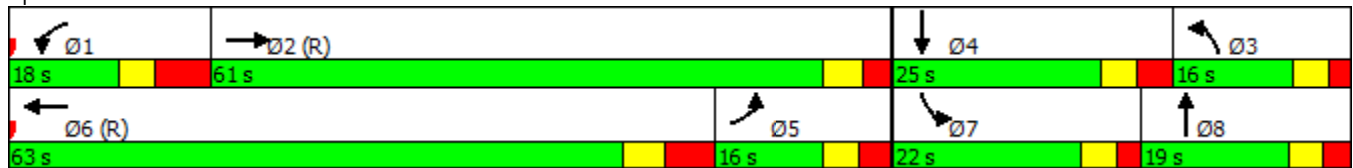


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	18	61	16	25	16	63	22	19
Maximum Split (%)	15.0%	50.8%	13.3%	20.8%	13.3%	52.5%	18.3%	15.8%
Minimum Split (s)	18	48	16	18	16	39	16	18
Yellow Time (s)	3.2	3.6	3.2	3.2	3.2	3.6	3.2	3.2
All-Red Time (s)	5	2.8	2.1	3.3	3.1	4.5	2	2.6
Minimum Initial (s)	8	15	8	10	8	14.9	8	10
Vehicle Extension (s)	3.5	5	3.5	3.5	3.5	5	3.5	3.5
Minimum Gap (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0	17	0	0	0	17	0	0
Time To Reduce (s)	0	17	0	0	0	17	0	0
Walk Time (s)		8				7		7
Flash Dont Walk (s)		33				23		28
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	72	90	56	31	15	72	31	53
End Time (s)	90	31	72	56	31	15	53	72
Yield/Force Off (s)	81.8	24.6	66.7	49.5	24.7	6.9	47.8	66.2
Yield/Force Off 170(s)	81.8	111.6	66.7	49.5	24.7	103.9	47.8	38.2
Local Start Time (s)	0	18	104	79	63	0	79	101
Local Yield (s)	9.8	72.6	114.7	97.5	72.7	54.9	95.8	114.2
Local Yield 170(s)	9.8	39.6	114.7	97.5	72.7	31.9	95.8	86.2

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 72 (60%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 48: Milwaukee St/St Louis St & Excelsior Blvd



135: Old Shakopee Rd & 98th St

Direction	All
Future Volume (vph)	2704
Total Delay / Veh (s/v)	11
CO Emissions (kg)	2.24
NOx Emissions (kg)	0.44
VOC Emissions (kg)	0.52

136: 98th St & 35W West Ramps

Direction	All
Future Volume (vph)	3159
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.34
NOx Emissions (kg)	0.45
VOC Emissions (kg)	0.54

137: 35W East Ramps & 98th St

Direction	All
Future Volume (vph)	3045
Total Delay / Veh (s/v)	31
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

138: Lyndale Ave & 98th St

Direction	All
Future Volume (vph)	3286
Total Delay / Veh (s/v)	30
CO Emissions (kg)	3.76
NOx Emissions (kg)	0.73
VOC Emissions (kg)	0.87

139: Garfield Ave & 98th St

Direction	All
Future Volume (vph)	2179
Total Delay / Veh (s/v)	7
CO Emissions (kg)	0.89
NOx Emissions (kg)	0.17
VOC Emissions (kg)	0.21

140: Grand Ave & 98th St

Direction	All
Future Volume (vph)	2325
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.16
NOx Emissions (kg)	0.42
VOC Emissions (kg)	0.50

141: Nicollet Ave & 98th St

Direction	All
Future Volume (vph)	2573
Total Delay / Veh (s/v)	23
CO Emissions (kg)	3.56
NOx Emissions (kg)	0.69
VOC Emissions (kg)	0.82

836: 35W SB Ramps & 98th St

Direction	All
Future Volume (vph)	2924
Total Delay / Veh (s/v)	0
CO Emissions (kg)	0.54
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

126: Normandale Blvd & Old Shakopee Rd

Direction	All
Future Volume (vph)	4230
Total Delay / Veh (s/v)	31
CO Emissions (kg)	8.75
NOx Emissions (kg)	1.70
VOC Emissions (kg)	2.03

127: Nesbitt Ave & Old Shakopee Rd

Direction	All
Future Volume (vph)	3460
Total Delay / Veh (s/v)	12
CO Emissions (kg)	4.91
NOx Emissions (kg)	0.96
VOC Emissions (kg)	1.14

129: Bloomington Ferry Rd & Old Shakopee Rd

Direction	All
Future Volume (vph)	3390
Total Delay / Veh (s/v)	20
CO Emissions (kg)	5.54
NOx Emissions (kg)	1.08
VOC Emissions (kg)	1.28

130: Bush Lake Rd & Old Shakopee Rd

Direction	All
Future Volume (vph)	3277
Total Delay / Veh (s/v)	18
CO Emissions (kg)	4.66
NOx Emissions (kg)	0.91
VOC Emissions (kg)	1.08

131: Hampshire Ave & Old Shakopee Rd

Direction	All
Future Volume (vph)	3303
Total Delay / Veh (s/v)	10
CO Emissions (kg)	4.65
NOx Emissions (kg)	0.90
VOC Emissions (kg)	1.08

203: TH 169 West Ramp & Old Shakopee Rd

Direction	All
Future Volume (vph)	1780
Total Delay / Veh (s/v)	19
CO Emissions (kg)	2.13
NOx Emissions (kg)	0.41
VOC Emissions (kg)	0.49

204: TH 169 East Ramp & Old Shakopee Rd

Direction	All
Future Volume (vph)	2726
Total Delay / Veh (s/v)	6
CO Emissions (kg)	3.74
NOx Emissions (kg)	0.73
VOC Emissions (kg)	0.87

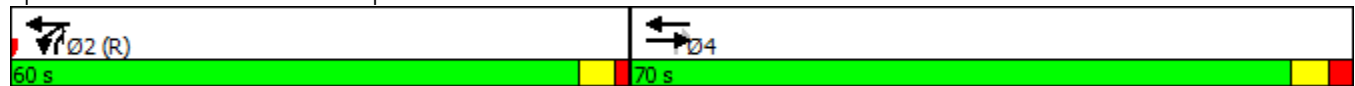


Phase Number	2	4
Movement	WBTL	WBEB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Min
Maximum Split (s)	60	70
Maximum Split (%)	46.2%	53.8%
Minimum Split (s)	20	25
Yellow Time (s)	3.6	3.6
All-Red Time (s)	1.5	2.5
Minimum Initial (s)	12	17
Vehicle Extension (s)	3	5.5
Minimum Gap (s)	3	5.5
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)		7
Flash Dont Walk (s)		9
Dual Entry	No	No
Inhibit Max	Yes	Yes
Start Time (s)	61	121
End Time (s)	121	61
Yield/Force Off (s)	115.9	54.9
Yield/Force Off 170(s)	115.9	54.9
Local Start Time (s)	0	60
Local Yield (s)	54.9	123.9
Local Yield 170(s)	54.9	123.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 61 (47%), Referenced to phase 2:WBTL, Start of 1st Green	

Splits and Phases: 135: Old Shakopee Rd & 98th St



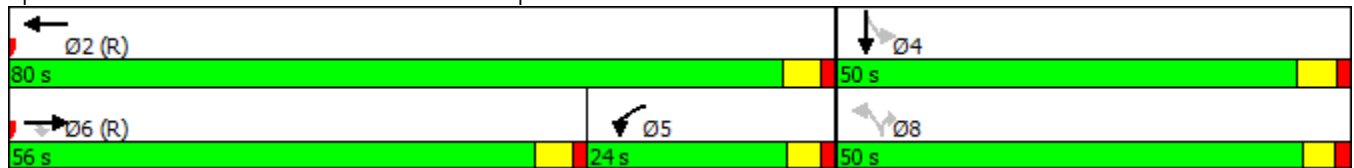


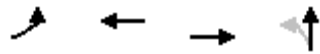
Phase Number	2	4	5	6	8
Movement	WBT	SBTL	WBL	EBT	NBL
Lead/Lag			Lag	Lead	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	C-Max	None	None	C-Max	None
Maximum Split (s)	80	50	24	56	50
Maximum Split (%)	61.5%	38.5%	18.5%	43.1%	38.5%
Minimum Split (s)	19.1	42	15	27	15
Yellow Time (s)	3.6	3.9	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	1.7
Minimum Initial (s)	10	7	7	10	7
Vehicle Extension (s)	4	3.5	3	4	3.5
Minimum Gap (s)	4	3.5	3	4	3.5
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	7	7		7	
Flash Dont Walk (s)	7	29		14	
Dual Entry	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	25	105	81	25	105
End Time (s)	105	25	105	81	25
Yield/Force Off (s)	99.9	19.6	100.3	75.9	20.1
Yield/Force Off 170(s)	92.9	120.6	100.3	61.9	20.1
Local Start Time (s)	0	80	56	0	80
Local Yield (s)	74.9	124.6	75.3	50.9	125.1
Local Yield 170(s)	67.9	95.6	75.3	36.9	125.1

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 25 (19%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 136: 98th St & 35W West Ramps





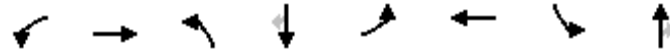
Phase Number	1	2	6	8
Movement	EBL	WBT	EBT	NBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None
Maximum Split (s)	44	45	89	41
Maximum Split (%)	33.8%	34.6%	68.5%	31.5%
Minimum Split (s)	15	27	19.1	38
Yellow Time (s)	3.2	3.6	3.6	3.9
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	7	10	10	7
Vehicle Extension (s)	3	4	4	3.5
Minimum Gap (s)	3	4	4	3.5
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		14	7	25
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	64	19	19	108
End Time (s)	108	64	108	19
Yield/Force Off (s)	103.3	58.9	102.9	13.6
Yield/Force Off 170(s)	103.3	44.9	95.9	118.6
Local Start Time (s)	45	0	0	89
Local Yield (s)	84.3	39.9	83.9	124.6
Local Yield 170(s)	84.3	25.9	76.9	99.6

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	110
Offset: 19 (15%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 137: 35W East Ramps & 98th St



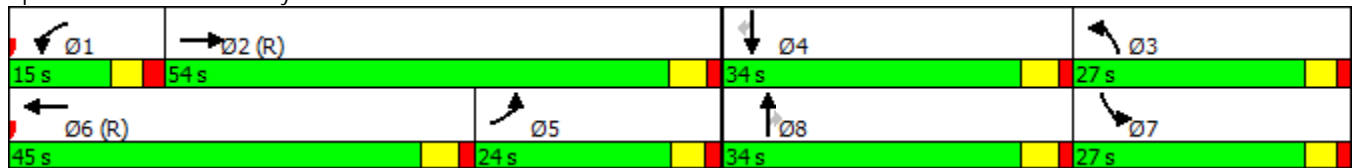


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	54	27	34	24	45	27	34
Maximum Split (%)	11.5%	41.5%	20.8%	26.2%	18.5%	34.6%	20.8%	26.2%
Minimum Split (s)	15	36	15	32	15	28	15	34
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6
All-Red Time (s)	2	1.5	1.5	1.5	1.7	1.5	1.5	1.5
Minimum Initial (s)	6	11	6	10	6	11	6	10
Vehicle Extension (s)	3	4	3	3.5	3	4	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		19		15		21
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	17	32	120	86	62	17	120	86
End Time (s)	32	86	17	120	86	62	17	120
Yield/Force Off (s)	26.8	80.9	12.3	114.9	81.1	56.9	12.3	114.9
Yield/Force Off 170(s)	26.8	57.9	12.3	95.9	81.1	41.9	12.3	93.9
Local Start Time (s)	0	15	103	69	45	0	103	69
Local Yield (s)	9.8	63.9	125.3	97.9	64.1	39.9	125.3	97.9
Local Yield 170(s)	9.8	40.9	125.3	78.9	64.1	24.9	125.3	76.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 17 (13%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 138: Lyndale Ave & 98th St



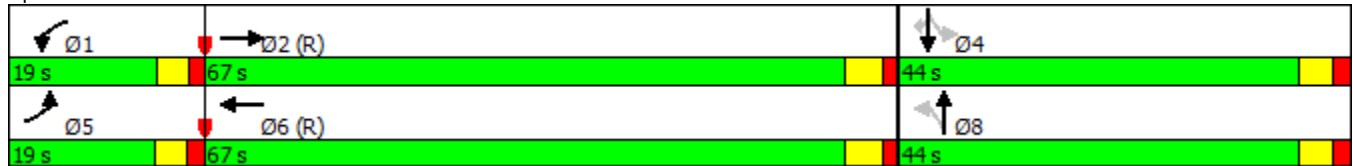


Phase Number	1	2	4	5	6	8
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	19	67	44	19	67	44
Maximum Split (%)	14.6%	51.5%	33.8%	14.6%	51.5%	33.8%
Minimum Split (s)	15	24	39	15	24	38
Yellow Time (s)	3.2	3.6	3.2	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	2	1.7	1.5	2
Minimum Initial (s)	6	10	10	6	10	10
Vehicle Extension (s)	3	3.5	3	3	4	3
Minimum Gap (s)	3	3.5	3	3	4	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		11	26		11	25
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	7	26	93	7	26	93
End Time (s)	26	93	7	26	93	7
Yield/Force Off (s)	21.3	87.9	1.8	21.1	87.9	1.8
Yield/Force Off 170(s)	21.3	76.9	105.8	21.1	76.9	106.8
Local Start Time (s)	111	0	67	111	0	67
Local Yield (s)	125.3	61.9	105.8	125.1	61.9	105.8
Local Yield 170(s)	125.3	50.9	79.8	125.1	50.9	80.8

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 26 (20%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 139: Garfield Ave & 98th St



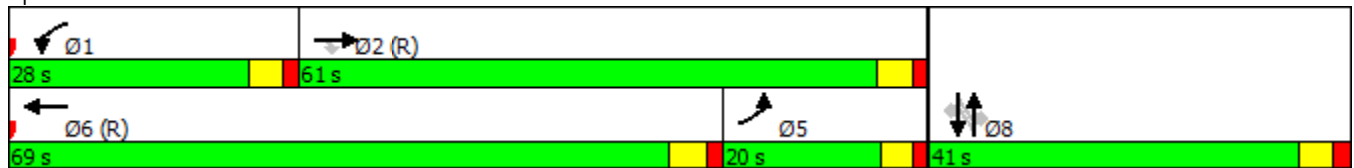


Phase Number	1	2	5	6	8
Movement	WBL	EBT	EBL	WBT	NBSB
Lead/Lag	Lead	Lag	Lag	Lead	
Lead-Lag Optimize	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	None	C-Max	None
Maximum Split (s)	28	61	20	69	41
Maximum Split (%)	21.5%	46.9%	15.4%	53.1%	31.5%
Minimum Split (s)	15	25	15	28	39
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	2
Minimum Initial (s)	7	10	7	10	7
Vehicle Extension (s)	3	4.5	3.5	4.5	3
Minimum Gap (s)	3	4.5	3.5	4.5	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		7		7	7
Flash Dont Walk (s)		12		15	26
Dual Entry	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	11	39	80	11	100
End Time (s)	39	100	100	80	11
Yield/Force Off (s)	34.3	94.9	95.3	74.9	5.8
Yield/Force Off 170(s)	34.3	82.9	95.3	59.9	109.8
Local Start Time (s)	0	28	69	0	89
Local Yield (s)	23.3	83.9	84.3	63.9	124.8
Local Yield 170(s)	23.3	71.9	84.3	48.9	98.8

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 11 (8%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 140: Grand Ave & 98th St



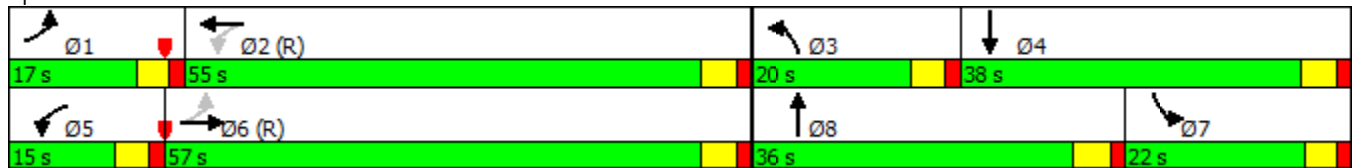


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBT	WBL	EBTL	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize			Yes	Yes			Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	17	55	20	38	15	57	22	36
Maximum Split (%)	13.1%	42.3%	15.4%	29.2%	11.5%	43.8%	16.9%	27.7%
Minimum Split (s)	15	36	15	38	15	37	15	36
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	7	12	7	10	7	12	7	10
Vehicle Extension (s)	3	4	3	4	3	4	3	4
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		25		24		23
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	77	94	19	39	77	92	55	19
End Time (s)	94	19	39	77	92	19	77	55
Yield/Force Off (s)	89.3	13.9	34.3	71.9	87.3	13.9	72.3	49.9
Yield/Force Off 170(s)	89.3	120.9	34.3	46.9	87.3	119.9	72.3	26.9
Local Start Time (s)	115	2	57	77	115	0	93	57
Local Yield (s)	127.3	51.9	72.3	109.9	125.3	51.9	110.3	87.9
Local Yield 170(s)	127.3	28.9	72.3	84.9	125.3	27.9	110.3	64.9

Intersection Summary

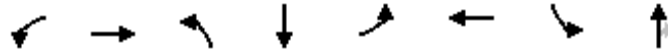
Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	105
Offset: 92 (71%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 141: Nicollet Ave & 98th St



Normandale Corridor
2015 Optimized PM

7/12/2016

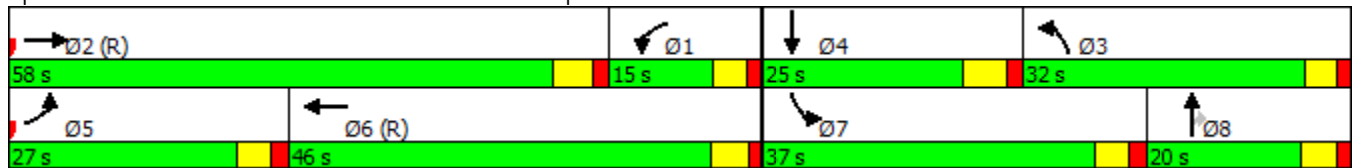


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Min	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	58	32	25	27	46	37	20
Maximum Split (%)	11.5%	44.6%	24.6%	19.2%	20.8%	35.4%	28.5%	15.4%
Minimum Split (s)	15	23	15	20	16	23	16	20
Yellow Time (s)	3.2	3.9	3.2	4.3	3.2	3.6	3.2	3.6
All-Red Time (s)	1.7	1.5	1.5	1.5	1.7	1.5	1.7	1.5
Minimum Initial (s)	6	15	6	12	8	15	8	12
Vehicle Extension (s)	3	4.5	3	4.5	4	4.5	4	4.5
Minimum Gap (s)	3	3	3	3	4	3	4	4.5
Time Before Reduce (s)	0	22	0	0	0	22	0	0
Time To Reduce (s)	0	22	0	0	0	22	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		20		19		20
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	47	119	87	62	119	16	62	99
End Time (s)	62	47	119	87	16	62	99	119
Yield/Force Off (s)	57.1	41.6	114.3	81.2	11.1	56.9	94.1	113.9
Yield/Force Off 170(s)	57.1	24.6	114.3	61.2	11.1	37.9	94.1	93.9
Local Start Time (s)	58	0	98	73	0	27	73	110
Local Yield (s)	68.1	52.6	125.3	92.2	22.1	67.9	105.1	124.9
Local Yield 170(s)	68.1	35.6	125.3	72.2	22.1	48.9	105.1	104.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 119 (92%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 126: Normandale Blvd & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016



Phase Number	1	2	4	5	6	8
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	24	77	29	19	82	29
Maximum Split (%)	18.5%	59.2%	22.3%	14.6%	63.1%	22.3%
Minimum Split (s)	16	22	16	15	22	16
Yellow Time (s)	3.2	3.9	3.6	3.2	3.9	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	8	14	8	5	14	8
Vehicle Extension (s)	3.5	6	3.5	2	6	3.5
Minimum Gap (s)	3.5	3	3.5	2	3	3.5
Time Before Reduce (s)	0	18	0	0	18	0
Time To Reduce (s)	0	18	0	0	18	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	19		12	20
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	38	62	9	120	38	9
End Time (s)	62	9	38	9	120	38
Yield/Force Off (s)	57.3	3.6	32.9	4.3	114.6	32.9
Yield/Force Off 170(s)	57.3	121.6	13.9	4.3	102.6	12.9
Local Start Time (s)	0	24	101	82	0	101
Local Yield (s)	19.3	95.6	124.9	96.3	76.6	124.9
Local Yield 170(s)	19.3	83.6	105.9	96.3	64.6	104.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 38 (29%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 127: Nesbitt Ave & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016

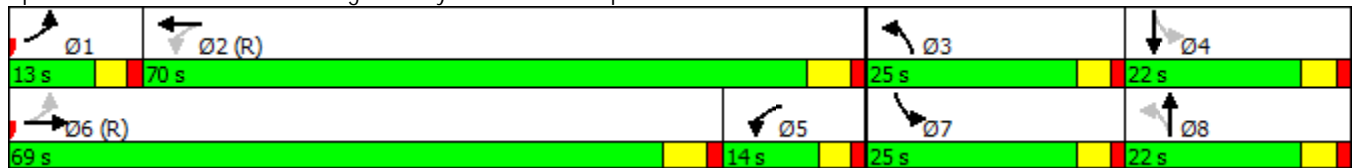


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	13	70	25	22	14	69	25	22
Maximum Split (%)	10.0%	53.8%	19.2%	16.9%	10.8%	53.1%	19.2%	16.9%
Minimum Split (s)	13	18	13	18	13	18	13	18
Yellow Time (s)	3.2	4.3	3.2	3.6	3.2	4.3	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	10	5	10	5	10	5	10
Vehicle Extension (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
Minimum Gap (s)	3.5	3.5	3.5	4	3.5	3.5	3.5	4
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		18		17		18
Dual Entry	No	Yes	No	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	127	10	80	105	66	127	80	105
End Time (s)	10	80	105	127	80	66	105	127
Yield/Force Off (s)	5.3	74.2	100.3	121.9	75.3	60.2	100.3	121.9
Yield/Force Off 170(s)	5.3	57.2	100.3	103.9	75.3	43.2	100.3	103.9
Local Start Time (s)	0	13	83	108	69	0	83	108
Local Yield (s)	8.3	77.2	103.3	124.9	78.3	63.2	103.3	124.9
Local Yield 170(s)	8.3	60.2	103.3	106.9	78.3	46.2	103.3	106.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 127 (98%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 129: Bloomington Ferry Rd & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016

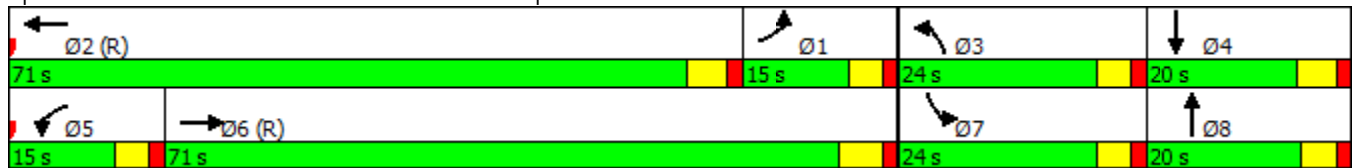


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	71	24	20	15	71	24	20
Maximum Split (%)	11.5%	54.6%	18.5%	15.4%	11.5%	54.6%	18.5%	15.4%
Minimum Split (s)	15	23	15	18	15	23	15	18
Yellow Time (s)	3.2	3.9	3.2	3.9	3.2	4.3	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	15	5	10	5	15	5	10
Vehicle Extension (s)	3.5	5.5	3.5	4.5	3.5	5.5	3.5	4
Minimum Gap (s)	3.5	3	3.5	4.5	3.5	3	3.5	4
Time Before Reduce (s)	0	13	0	0	0	13	0	0
Time To Reduce (s)	0	13	0	0	0	13	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		18		17		17
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	52	111	67	91	111	126	67	91
End Time (s)	67	52	91	111	126	67	91	111
Yield/Force Off (s)	62.3	46.6	86.3	105.6	121.3	61.2	86.3	105.9
Yield/Force Off 170(s)	62.3	29.6	86.3	87.6	121.3	44.2	86.3	88.9
Local Start Time (s)	71	0	86	110	0	15	86	110
Local Yield (s)	81.3	65.6	105.3	124.6	10.3	80.2	105.3	124.9
Local Yield 170(s)	81.3	48.6	105.3	106.6	10.3	63.2	105.3	107.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 111 (85%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 130: Bush Lake Rd & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016

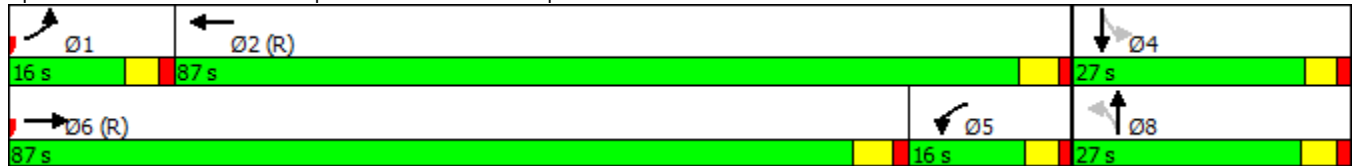


Phase Number	1	2	4	5	6	8
Movement	EBL	WBT	SBTL	WBL	EBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	87	27	16	87	27
Maximum Split (%)	12.3%	66.9%	20.8%	12.3%	66.9%	20.8%
Minimum Split (s)	15	20	15	15	20	15
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	12	7	5	12	7
Vehicle Extension (s)	3	4	3.5	3	4	3.5
Minimum Gap (s)	3	3	3.5	3	3	3.5
Time Before Reduce (s)	0	13	0	0	13	0
Time To Reduce (s)	0	13	0	0	13	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	18		12	18
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	46	62	19	3	46	19
End Time (s)	62	19	46	19	3	46
Yield/Force Off (s)	57.3	13.6	41.3	14.3	127.6	40.9
Yield/Force Off 170(s)	57.3	1.6	23.3	14.3	115.6	22.9
Local Start Time (s)	0	16	103	87	0	103
Local Yield (s)	11.3	97.6	125.3	98.3	81.6	124.9
Local Yield 170(s)	11.3	85.6	107.3	98.3	69.6	106.9

Intersection Summary

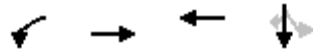
Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 46 (35%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 131: Hampshire Ave & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016

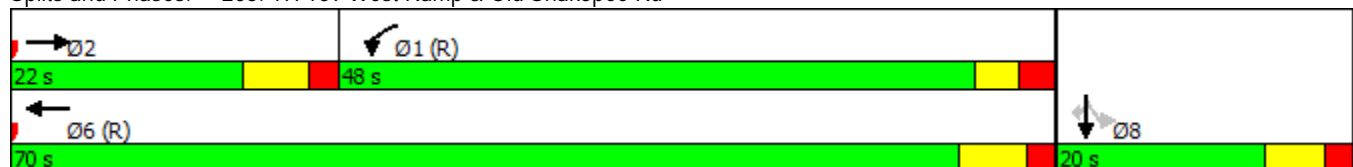


Phase Number	1	2	6	8
Movement	WBL	EBT	WBT	SBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize				
Recall Mode	C-Max	Min	C-Max	None
Maximum Split (s)	48	22	70	20
Maximum Split (%)	53.3%	24.4%	77.8%	22.2%
Minimum Split (s)	12.5	21.5	24.5	38
Yellow Time (s)	3	4.5	4.5	4
All-Red Time (s)	2.5	2	2	2
Minimum Initial (s)	7	15	15	8
Vehicle Extension (s)	3	5.5	5.5	5.5
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)			7	20
Flash Dont Walk (s)			10	12
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	18	86	86	66
End Time (s)	66	18	66	86
Yield/Force Off (s)	60.5	11.5	59.5	80
Yield/Force Off 170(s)	60.5	11.5	49.5	68
Local Start Time (s)	22	0	0	70
Local Yield (s)	64.5	15.5	63.5	84
Local Yield 170(s)	64.5	15.5	53.5	72

Intersection Summary

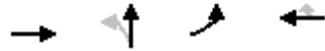
Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 86 (96%), Referenced to phase 1:WBL and 6:WBT, Start of 1st Green	

Splits and Phases: 203: TH 169 West Ramp & Old Shakopee Rd



Normandale Corridor
2015 Optimized PM

7/12/2016



Phase Number	2	4	5	6
Movement	EBT	NBTL	EBL	WBT
Lead/Lag			Lag	Lead
Lead-Lag Optimize				
Recall Mode	C-Max	None	None	C-Max
Maximum Split (s)	72	18	15	57
Maximum Split (%)	80.0%	20.0%	16.7%	63.3%
Minimum Split (s)	16.5	37	12.5	23.5
Yellow Time (s)	4.5	4	3	4.5
All-Red Time (s)	2	2	2.5	2
Minimum Initial (s)	10	8	7	10
Vehicle Extension (s)	5.5	4	3	5.5
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		20		7
Flash Dont Walk (s)		8		10
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	80	62	47	80
End Time (s)	62	80	62	47
Yield/Force Off (s)	55.5	74	56.5	40.5
Yield/Force Off 170(s)	55.5	66	56.5	30.5
Local Start Time (s)	0	72	57	0
Local Yield (s)	65.5	84	66.5	50.5
Local Yield 170(s)	65.5	76	66.5	40.5

Intersection Summary

Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 80 (89%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 204: TH 169 East Ramp & Old Shakopee Rd



135: Old Shakopee Rd & 98th St

Direction	All
Future Volume (vph)	2704
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.28
NOx Emissions (kg)	0.44
VOC Emissions (kg)	0.53

136: 98th St & 35W West Ramps

Direction	All
Future Volume (vph)	3159
Total Delay / Veh (s/v)	13
CO Emissions (kg)	2.45
NOx Emissions (kg)	0.48
VOC Emissions (kg)	0.57

137: 35W East Ramps & 98th St

Direction	All
Future Volume (vph)	3045
Total Delay / Veh (s/v)	30
CO Emissions (kg)	3.21
NOx Emissions (kg)	0.62
VOC Emissions (kg)	0.74

138: Lyndale Ave & 98th St

Direction	All
Future Volume (vph)	3286
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.65
NOx Emissions (kg)	0.71
VOC Emissions (kg)	0.85

139: Garfield Ave & 98th St

Direction	All
Future Volume (vph)	2179
Total Delay / Veh (s/v)	8
CO Emissions (kg)	1.14
NOx Emissions (kg)	0.22
VOC Emissions (kg)	0.26

140: Grand Ave & 98th St

Direction	All
Future Volume (vph)	2325
Total Delay / Veh (s/v)	12
CO Emissions (kg)	2.11
NOx Emissions (kg)	0.41
VOC Emissions (kg)	0.49

141: Nicollet Ave & 98th St

Direction	All
Future Volume (vph)	2573
Total Delay / Veh (s/v)	22
CO Emissions (kg)	3.42
NOx Emissions (kg)	0.67
VOC Emissions (kg)	0.79

836: 35W SB Ramps & 98th St

Direction	All
Future Volume (vph)	2924
Total Delay / Veh (s/v)	0
CO Emissions (kg)	0.54
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

126: Normandale Blvd & Old Shakopee Rd

Direction	All
Future Volume (vph)	4230
Total Delay / Veh (s/v)	30
CO Emissions (kg)	8.67
NOx Emissions (kg)	1.69
VOC Emissions (kg)	2.01

127: Nesbitt Ave & Old Shakopee Rd

Direction	All
Future Volume (vph)	3460
Total Delay / Veh (s/v)	13
CO Emissions (kg)	5.17
NOx Emissions (kg)	1.01
VOC Emissions (kg)	1.20

129: Bloomington Ferry Rd & Old Shakopee Rd

Direction	All
Future Volume (vph)	3390
Total Delay / Veh (s/v)	19
CO Emissions (kg)	5.32
NOx Emissions (kg)	1.04
VOC Emissions (kg)	1.23

130: Bush Lake Rd & Old Shakopee Rd

Direction	All
Future Volume (vph)	3277
Total Delay / Veh (s/v)	18
CO Emissions (kg)	4.58
NOx Emissions (kg)	0.89
VOC Emissions (kg)	1.06

131: Hampshire Ave & Old Shakopee Rd

Direction	All
Future Volume (vph)	3303
Total Delay / Veh (s/v)	10
CO Emissions (kg)	4.43
NOx Emissions (kg)	0.86
VOC Emissions (kg)	1.03

203: TH 169 West Ramp & Old Shakopee Rd

Direction	All
Future Volume (vph)	1780
Total Delay / Veh (s/v)	18
CO Emissions (kg)	2.08
NOx Emissions (kg)	0.40
VOC Emissions (kg)	0.48

204: TH 169 East Ramp & Old Shakopee Rd

Direction	All
Future Volume (vph)	2726
Total Delay / Veh (s/v)	7
CO Emissions (kg)	3.85
NOx Emissions (kg)	0.75
VOC Emissions (kg)	0.89



Phase Number	2	4
Movement	WBTL	WBEB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Max	Min
Maximum Split (s)	97	33
Maximum Split (%)	74.6%	25.4%
Minimum Split (s)	20	25
Yellow Time (s)	3.6	3.6
All-Red Time (s)	1.5	2.5
Minimum Initial (s)	12	17
Vehicle Extension (s)	3	5.5
Minimum Gap (s)	3	5.5
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)		7
Flash Dont Walk (s)		9
Dual Entry	No	No
Inhibit Max	Yes	Yes
Start Time (s)	60	27
End Time (s)	27	60
Yield/Force Off (s)	21.9	53.9
Yield/Force Off 170(s)	21.9	53.9
Local Start Time (s)	0	97
Local Yield (s)	91.9	123.9
Local Yield 170(s)	91.9	123.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 60 (46%), Referenced to phase 2:WBTL, Start of 1st Green	

Splits and Phases: 135: Old Shakopee Rd & 98th St



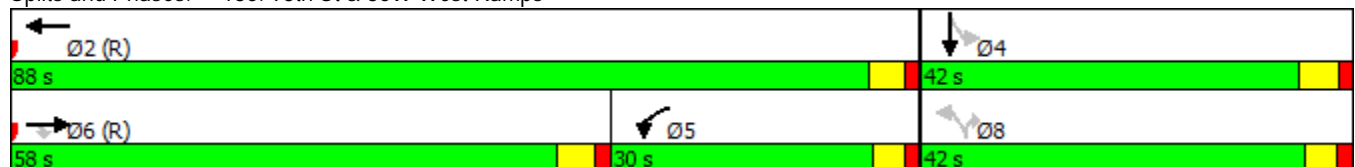


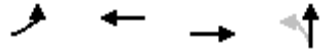
Phase Number	2	4	5	6	8
Movement	WBT	SBTL	WBL	EBT	NBL
Lead/Lag			Lag	Lead	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	C-Max	None	None	C-Max	None
Maximum Split (s)	88	42	30	58	42
Maximum Split (%)	67.7%	32.3%	23.1%	44.6%	32.3%
Minimum Split (s)	19.1	42	15	27	15
Yellow Time (s)	3.6	3.9	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	1.7
Minimum Initial (s)	10	7	7	10	7
Vehicle Extension (s)	4	3.5	3	4	3.5
Minimum Gap (s)	4	3.5	3	4	3.5
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	7	7		7	
Flash Dont Walk (s)	7	29		14	
Dual Entry	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	53	11	111	53	11
End Time (s)	11	53	11	111	53
Yield/Force Off (s)	5.9	47.6	6.3	105.9	48.1
Yield/Force Off 170(s)	128.9	18.6	6.3	91.9	48.1
Local Start Time (s)	0	88	58	0	88
Local Yield (s)	82.9	124.6	83.3	52.9	125.1
Local Yield 170(s)	75.9	95.6	83.3	38.9	125.1

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 53 (41%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 136: 98th St & 35W West Ramps





Phase Number	1	2	6	8
Movement	EBL	WBT	EBT	NBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None
Maximum Split (s)	44	48	92	38
Maximum Split (%)	33.8%	36.9%	70.8%	29.2%
Minimum Split (s)	15	27	19.1	38
Yellow Time (s)	3.2	3.6	3.6	3.9
All-Red Time (s)	1.5	1.5	1.5	1.5
Minimum Initial (s)	7	10	10	7
Vehicle Extension (s)	3	4	4	3.5
Minimum Gap (s)	3	4	4	3.5
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		7	7	7
Flash Dont Walk (s)		14	7	25
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	93	45	45	7
End Time (s)	7	93	7	45
Yield/Force Off (s)	2.3	87.9	1.9	39.6
Yield/Force Off 170(s)	2.3	73.9	124.9	14.6
Local Start Time (s)	48	0	0	92
Local Yield (s)	87.3	42.9	86.9	124.6
Local Yield 170(s)	87.3	28.9	79.9	99.6

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	110
Offset: 45 (35%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 137: 35W East Ramps & 98th St



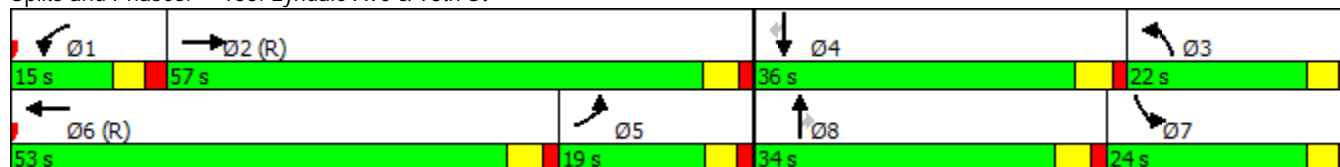


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	57	22	36	19	53	24	34
Maximum Split (%)	11.5%	43.8%	16.9%	27.7%	14.6%	40.8%	18.5%	26.2%
Minimum Split (s)	15	36	15	32	15	28	15	34
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6
All-Red Time (s)	2	1.5	1.5	1.5	1.7	1.5	1.5	1.5
Minimum Initial (s)	6	11	6	10	6	11	6	10
Vehicle Extension (s)	3	4	3	3.5	3	4	3	3.5
Minimum Gap (s)	3	3	3	3.5	3	3	3	3.5
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		19		15		21
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	32	47	10	104	85	32	8	104
End Time (s)	47	104	32	10	104	85	32	8
Yield/Force Off (s)	41.8	98.9	27.3	4.9	99.1	79.9	27.3	2.9
Yield/Force Off 170(s)	41.8	75.9	27.3	115.9	99.1	64.9	27.3	111.9
Local Start Time (s)	0	15	108	72	53	0	106	72
Local Yield (s)	9.8	66.9	125.3	102.9	67.1	47.9	125.3	100.9
Local Yield 170(s)	9.8	43.9	125.3	83.9	67.1	32.9	125.3	79.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	100
Offset: 32 (25%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 138: Lyndale Ave & 98th St



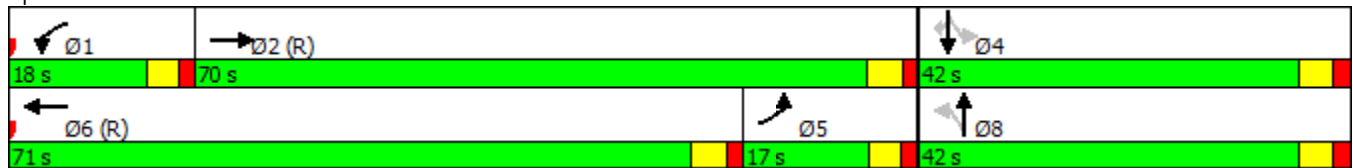


Phase Number	1	2	4	5	6	8
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	18	70	42	17	71	42
Maximum Split (%)	13.8%	53.8%	32.3%	13.1%	54.6%	32.3%
Minimum Split (s)	15	24	39	15	24	38
Yellow Time (s)	3.2	3.6	3.2	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	2	1.7	1.5	2
Minimum Initial (s)	6	10	10	6	10	10
Vehicle Extension (s)	3	3.5	3	3	4	3
Minimum Gap (s)	3	3.5	3	3	4	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		11	26		11	25
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	32	50	120	103	32	120
End Time (s)	50	120	32	120	103	32
Yield/Force Off (s)	45.3	114.9	26.8	115.1	97.9	26.8
Yield/Force Off 170(s)	45.3	103.9	0.8	115.1	86.9	1.8
Local Start Time (s)	0	18	88	71	0	88
Local Yield (s)	13.3	82.9	124.8	83.1	65.9	124.8
Local Yield 170(s)	13.3	71.9	98.8	83.1	54.9	99.8

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 32 (25%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 139: Garfield Ave & 98th St



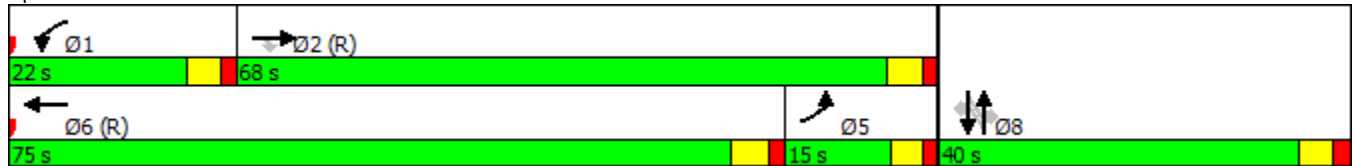


Phase Number	1	2	5	6	8
Movement	WBL	EBT	EBL	WBT	NBSB
Lead/Lag	Lead	Lag	Lag	Lead	
Lead-Lag Optimize	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	None	C-Max	None
Maximum Split (s)	22	68	15	75	40
Maximum Split (%)	16.9%	52.3%	11.5%	57.7%	30.8%
Minimum Split (s)	15	25	15	28	39
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2
All-Red Time (s)	1.5	1.5	1.5	1.5	2
Minimum Initial (s)	7	10	7	10	7
Vehicle Extension (s)	3	4.5	3.5	4.5	3
Minimum Gap (s)	3	4.5	3.5	4.5	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		7		7	7
Flash Dont Walk (s)		12		15	26
Dual Entry	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	12	34	87	12	102
End Time (s)	34	102	102	87	12
Yield/Force Off (s)	29.3	96.9	97.3	81.9	6.8
Yield/Force Off 170(s)	29.3	84.9	97.3	66.9	110.8
Local Start Time (s)	0	22	75	0	90
Local Yield (s)	17.3	84.9	85.3	69.9	124.8
Local Yield 170(s)	17.3	72.9	85.3	54.9	98.8

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	85
Offset: 12 (9%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 140: Grand Ave & 98th St



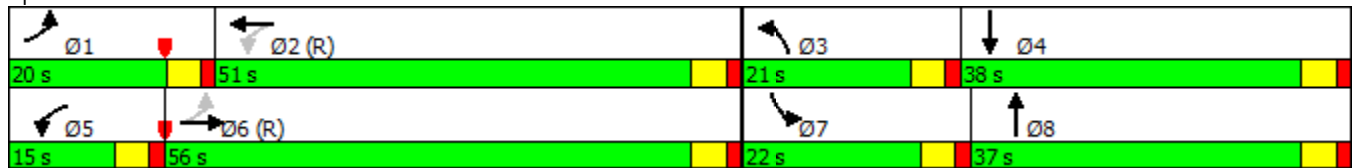


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBT	WBL	EBTL	SBL	NBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize			Yes	Yes			Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	20	51	21	38	15	56	22	37
Maximum Split (%)	15.4%	39.2%	16.2%	29.2%	11.5%	43.1%	16.9%	28.5%
Minimum Split (s)	15	36	15	38	15	37	15	36
Yellow Time (s)	3.2	3.6	3.2	3.6	3.2	3.6	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	7	12	7	10	7	12	7	10
Vehicle Extension (s)	3	4	3	4	3	4	3	4
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		23		25		24		23
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	78	98	19	40	78	93	19	41
End Time (s)	98	19	40	78	93	19	41	78
Yield/Force Off (s)	93.3	13.9	35.3	72.9	88.3	13.9	36.3	72.9
Yield/Force Off 170(s)	93.3	120.9	35.3	47.9	88.3	119.9	36.3	49.9
Local Start Time (s)	115	5	56	77	115	0	56	78
Local Yield (s)	0.3	50.9	72.3	109.9	125.3	50.9	73.3	109.9
Local Yield 170(s)	0.3	27.9	72.3	84.9	125.3	26.9	73.3	86.9

Intersection Summary

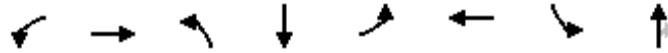
Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	105
Offset: 93 (72%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 141: Nicollet Ave & 98th St



Normandale Corridor
Improved PM

7/13/2016

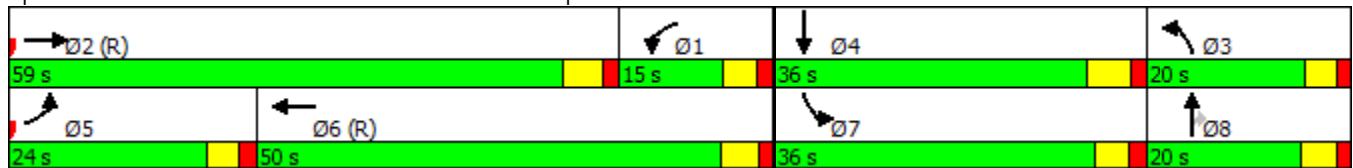


Phase Number	1	2	3	4	5	6	7	8
Movement	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Min	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	59	20	36	24	50	36	20
Maximum Split (%)	11.5%	45.4%	15.4%	27.7%	18.5%	38.5%	27.7%	15.4%
Minimum Split (s)	15	23	15	20	16	23	16	20
Yellow Time (s)	3.2	3.9	3.2	4.3	3.2	3.6	3.2	3.6
All-Red Time (s)	1.7	1.5	1.5	1.5	1.7	1.5	1.7	1.5
Minimum Initial (s)	6	15	6	12	8	15	8	12
Vehicle Extension (s)	3	4.5	3	4.5	4	4.5	4	4.5
Minimum Gap (s)	3	3	3	3	4	3	4	4.5
Time Before Reduce (s)	0	22	0	0	0	22	0	0
Time To Reduce (s)	0	22	0	0	0	22	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		20		19		20
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	47	118	98	62	118	12	62	98
End Time (s)	62	47	118	98	12	62	98	118
Yield/Force Off (s)	57.1	41.6	113.3	92.2	7.1	56.9	93.1	112.9
Yield/Force Off 170(s)	57.1	24.6	113.3	72.2	7.1	37.9	93.1	92.9
Local Start Time (s)	59	0	110	74	0	24	74	110
Local Yield (s)	69.1	53.6	125.3	104.2	19.1	68.9	105.1	124.9
Local Yield 170(s)	69.1	36.6	125.3	84.2	19.1	49.9	105.1	104.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 118 (91%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 126: Normandale Blvd & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016



Phase Number	1	2	4	5	6	8
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	85	29	16	85	29
Maximum Split (%)	12.3%	65.4%	22.3%	12.3%	65.4%	22.3%
Minimum Split (s)	16	22	16	15	22	16
Yellow Time (s)	3.2	3.9	3.6	3.2	3.9	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	8	14	8	5	14	8
Vehicle Extension (s)	3.5	6	3.5	2	6	3.5
Minimum Gap (s)	3.5	3	3.5	2	3	3.5
Time Before Reduce (s)	0	18	0	0	18	0
Time To Reduce (s)	0	18	0	0	18	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	19		12	20
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	41	57	12	126	41	12
End Time (s)	57	12	41	12	126	41
Yield/Force Off (s)	52.3	6.6	35.9	7.3	120.6	35.9
Yield/Force Off 170(s)	52.3	124.6	16.9	7.3	108.6	15.9
Local Start Time (s)	0	16	101	85	0	101
Local Yield (s)	11.3	95.6	124.9	96.3	79.6	124.9
Local Yield 170(s)	11.3	83.6	105.9	96.3	67.6	104.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	70
Offset: 41 (32%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 127: Nesbitt Ave & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016

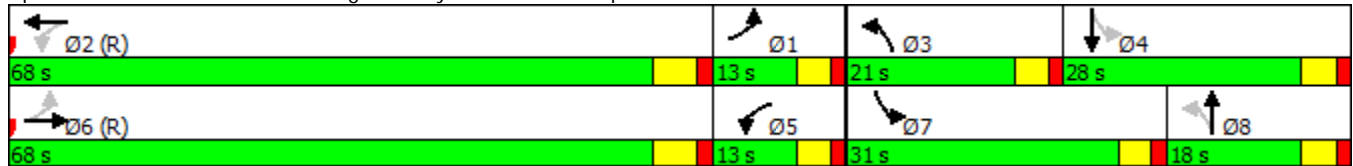


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	13	68	21	28	13	68	31	18
Maximum Split (%)	10.0%	52.3%	16.2%	21.5%	10.0%	52.3%	23.8%	13.8%
Minimum Split (s)	13	18	13	18	13	18	13	18
Yellow Time (s)	3.2	4.3	3.2	3.6	3.2	4.3	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	10	5	10	5	10	5	10
Vehicle Extension (s)	3.5	4.5	3.5	4	3.5	4.5	3.5	4
Minimum Gap (s)	3.5	3.5	3.5	4	3.5	3.5	3.5	4
Time Before Reduce (s)	0	15	0	0	0	15	0	0
Time To Reduce (s)	0	15	0	0	0	15	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		18		17		18
Dual Entry	No	Yes	No	No	No	Yes	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	71	3	84	105	71	3	84	115
End Time (s)	84	71	105	3	84	71	115	3
Yield/Force Off (s)	79.3	65.2	100.3	127.9	79.3	65.2	110.3	127.9
Yield/Force Off 170(s)	79.3	48.2	100.3	109.9	79.3	48.2	110.3	109.9
Local Start Time (s)	68	0	81	102	68	0	81	112
Local Yield (s)	76.3	62.2	97.3	124.9	76.3	62.2	107.3	124.9
Local Yield 170(s)	76.3	45.2	97.3	106.9	76.3	45.2	107.3	106.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	80
Offset: 3 (2%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	

Splits and Phases: 129: Bloomington Ferry Rd & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016

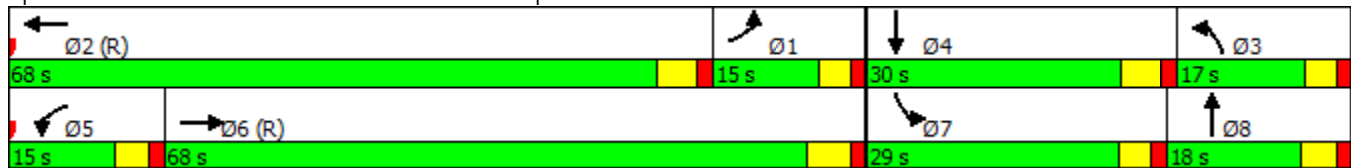


Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBT	NBL	SBT	WBL	EBT	SBL	NBT
Lead/Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None
Maximum Split (s)	15	68	17	30	15	68	29	18
Maximum Split (%)	11.5%	52.3%	13.1%	23.1%	11.5%	52.3%	22.3%	13.8%
Minimum Split (s)	15	23	15	18	15	23	15	18
Yellow Time (s)	3.2	3.9	3.2	3.9	3.2	4.3	3.2	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	15	5	10	5	15	5	10
Vehicle Extension (s)	3.5	5.5	3.5	4.5	3.5	5.5	3.5	4
Minimum Gap (s)	3.5	3	3.5	4.5	3.5	3	3.5	4
Time Before Reduce (s)	0	13	0	0	0	13	0	0
Time To Reduce (s)	0	13	0	0	0	13	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		17		18		17		17
Dual Entry	No	No	No	No	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	50	112	95	65	112	127	65	94
End Time (s)	65	50	112	95	127	65	94	112
Yield/Force Off (s)	60.3	44.6	107.3	89.6	122.3	59.2	89.3	106.9
Yield/Force Off 170(s)	60.3	27.6	107.3	71.6	122.3	42.2	89.3	89.9
Local Start Time (s)	68	0	113	83	0	15	83	112
Local Yield (s)	78.3	62.6	125.3	107.6	10.3	77.2	107.3	124.9
Local Yield 170(s)	78.3	45.6	125.3	89.6	10.3	60.2	107.3	107.9

Intersection Summary

Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 112 (86%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 130: Bush Lake Rd & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016



Phase Number	1	2	4	5	6	8
Movement	EBL	WBT	SBTL	WBL	EBT	NBTL
Lead/Lag	Lead	Lag		Lag	Lead	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None
Maximum Split (s)	16	87	27	17	86	27
Maximum Split (%)	12.3%	66.9%	20.8%	13.1%	66.2%	20.8%
Minimum Split (s)	15	20	15	15	20	15
Yellow Time (s)	3.2	3.9	3.2	3.2	3.9	3.6
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Minimum Initial (s)	5	12	7	5	12	7
Vehicle Extension (s)	3	4	3.5	3	4	3.5
Minimum Gap (s)	3	3	3.5	3	3	3.5
Time Before Reduce (s)	0	13	0	0	13	0
Time To Reduce (s)	0	13	0	0	13	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		12	18		12	18
Dual Entry	No	No	Yes	No	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	40	56	13	126	40	13
End Time (s)	56	13	40	13	126	40
Yield/Force Off (s)	51.3	7.6	35.3	8.3	120.6	34.9
Yield/Force Off 170(s)	51.3	125.6	17.3	8.3	108.6	16.9
Local Start Time (s)	0	16	103	86	0	103
Local Yield (s)	11.3	97.6	125.3	98.3	80.6	124.9
Local Yield 170(s)	11.3	85.6	107.3	98.3	68.6	106.9

Intersection Summary

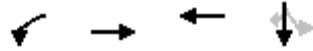
Cycle Length	130
Control Type	Actuated-Coordinated
Natural Cycle	60
Offset: 40 (31%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green	

Splits and Phases: 131: Hampshire Ave & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016



Phase Number	1	2	6	8
Movement	WBL	EBT	WBT	SBTL
Lead/Lag	Lag	Lead		
Lead-Lag Optimize				
Recall Mode	C-Max	Min	C-Max	None
Maximum Split (s)	30.5	21.5	52	38
Maximum Split (%)	33.9%	23.9%	57.8%	42.2%
Minimum Split (s)	12.5	21.5	24.5	38
Yellow Time (s)	3	4.5	4.5	4
All-Red Time (s)	2.5	2	2	2
Minimum Initial (s)	7	15	15	8
Vehicle Extension (s)	3	5.5	5.5	5.5
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)			7	20
Flash Dont Walk (s)			10	12
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	9.5	78	78	40
End Time (s)	40	9.5	40	78
Yield/Force Off (s)	34.5	3	33.5	72
Yield/Force Off 170(s)	34.5	3	23.5	60
Local Start Time (s)	21.5	0	0	52
Local Yield (s)	46.5	15	45.5	84
Local Yield 170(s)	46.5	15	35.5	72

Intersection Summary

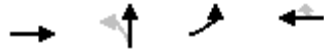
Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 78 (87%), Referenced to phase 1:WBL and 6:WBT, Start of 1st Green	

Splits and Phases: 203: TH 169 West Ramp & Old Shakopee Rd



Normandale Corridor
Improved PM

7/13/2016

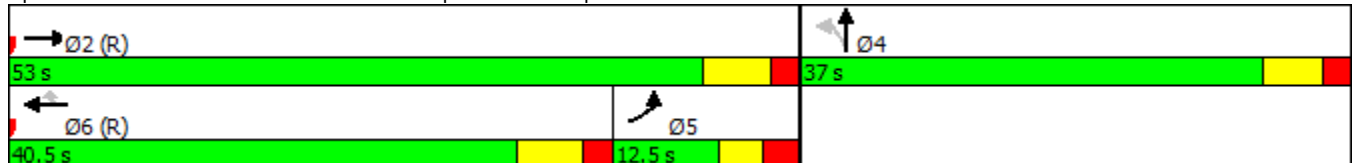


Phase Number	2	4	5	6
Movement	EBT	NBTL	EBL	WBT
Lead/Lag			Lag	Lead
Lead-Lag Optimize				
Recall Mode	C-Max	None	None	C-Max
Maximum Split (s)	53	37	12.5	40.5
Maximum Split (%)	58.9%	41.1%	13.9%	45.0%
Minimum Split (s)	16.5	37	12.5	23.5
Yellow Time (s)	4.5	4	3	4.5
All-Red Time (s)	2	2	2.5	2
Minimum Initial (s)	10	8	7	10
Vehicle Extension (s)	5.5	4	3	5.5
Minimum Gap (s)	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)		20		7
Flash Dont Walk (s)		8		10
Dual Entry	No	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	80	43	30.5	80
End Time (s)	43	80	43	30.5
Yield/Force Off (s)	36.5	74	37.5	24
Yield/Force Off 170(s)	36.5	66	37.5	14
Local Start Time (s)	0	53	40.5	0
Local Yield (s)	46.5	84	47.5	34
Local Yield 170(s)	46.5	76	47.5	24

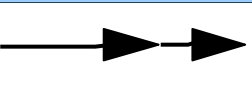
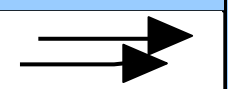


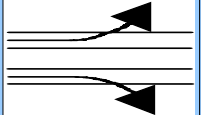
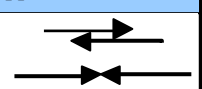
Intersection Summary

Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	90
Offset: 80 (89%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green	

Splits and Phases: 204: TH 169 East Ramp & Old Shakopee Rd



HSIP worksheet

Control Section		T.H. / Roadway	Location				Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends
		CSAH 1	Hennepin County						Hennepin County	1/1/2013	12/31/2015
Description of Proposed Work			Update Fiber Optic cables to provide for better singal interconnect								
Accident Diagram Codes	1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8, 9 Head On/ Sideswipe - Opposite Direction		6, 90, 99			
									Pedestrian	Other	Total
Study Period: Number of Crashes	Fatal	F									
	Personal Injury (PI)	A									
		B	20	1	3	4	2	1	1	1	33
		C	62	4	9	17	2	5	4	4	107
	Property Damage	PD	122	28	21	16	10	8		24	229
% Change in Crashes <small>*Use Crash Modification Factors Clearinghouse</small>	Fatal	F									
	PI	A									
		B	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
		C	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
	Property Damage	PD	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
Change in Crashes <small>= No. of crashes X % change in crashes</small>	Fatal	F									
	PI	A									
		B	-3.40	-0.17	-0.51	-0.68	-0.34	-0.17	-0.17	-0.17	-5.61
		C	-10.54	-0.68	-1.53	-2.89	-0.34	-0.85	-0.68	-0.68	-18.19
	Property Damage	PD	-20.74	-4.76	-3.57	-2.72	-1.70	-1.36		-4.08	-38.93
Year (Safety Improvement Construction)		2020									
Project Cost (exclude Right of Way)		\$ 2,200,000		Type of Crash	Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit			
Right of Way Costs (optional)				F			\$ 1,400,000				
Traffic Growth Factor		3%		A			\$ 570,000				
Capital Recovery				B	-5.61	-1.87	\$ 170,000	\$ 318,191			
1. Discount Rate		4.5%		C	-18.19	-6.07	\$ 83,000	\$ 503,717			
2. Project Service Life (n)		5		PD	-38.93	-12.99	\$ 7,600	\$ 98,713			
				Total			\$ 920,620				

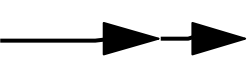



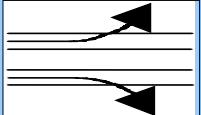
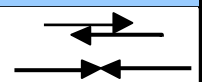
B/C= 2.03

Using present worth values,
B= \$ 4,472,837
C= \$ 2,200,000

See "Calculations" sheet for amortization.

HSIP worksheet

Control Section	T.H. / Roadway	Location				Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends
	CSAH 3	Hennepin County						Hennepin County	1/1/2013	12/31/2015
Description of Proposed Work		Update Fiber Optic cables to provide for better singal interconnect								

Accident Diagram Codes	1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8, 9 Head On/ Sideswipe - Opposite Direction	Pedestrian	Other	Total
									

Study Period: Number of Crashes	Fatal	F								
	Personal Injury (PI)	A	2		1			3		6
		B	11			3		1	2	19
		C	54	2	5	20	4	4	3	5
	Property Damage	PD	137	47	18	40	7	10		26

% Change in Crashes	Fatal	F	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
	PI	A	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
		B	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
		C	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
	Property Damage	PD	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%

**Use Crash Modification Factors Clearinghouse*

Change in Crashes <small>= No. of crashes X % change in crashes</small>	Fatal	F								
	PI	A	-0.34		-0.17			-0.51		-1.02
		B	-1.87			-0.51		-0.17	-0.34	-3.23
		C	-9.18	-0.34	-0.85	-3.40	-0.68	-0.68	-0.51	-0.85
	Property Damage	PD	-23.29	-7.99	-3.06	-6.80	-1.19	-1.70		-4.42

Year (Safety Improvement Construction) **2020**

Project Cost (exclude Right of Way)	Type of Crash	Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit
\$ 2,200,000	F			\$ 1,400,000	
Right of Way Costs (optional)	F			\$ 1,400,000	
Traffic Growth Factor	A	-1.02	-0.34	\$ 570,000	\$ 193,977
Capital Recovery	B	-3.23	-1.08	\$ 170,000	\$ 183,201
1. Discount Rate	C	-16.49	-5.50	\$ 83,000	\$ 456,640
2. Project Service Life (n)	PD	-48.45	-16.16	\$ 7,600	\$ 122,852
Total				\$ 956,670	

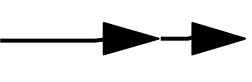



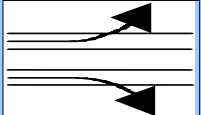
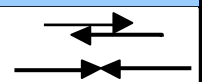
B/C= 2.11

Using present worth values,
B= \$ 4,647,988
C= \$ 2,200,000

See "Calculations" sheet for amortization.

HSIP worksheet

Control Section	T.H. / Roadway	Location				Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends
	CSAH 5	Hennepin County						Hennepin County	1/1/2013	12/31/2015
Description of Proposed Work		Update Fiber Optic cables to provide for better singal interconnect								

Accident Diagram Codes	1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8, 9 Head On/ Sideswipe - Opposite Direction	Pedestrian	Other	Total
									

Study Period: Number of Crashes	Fatal	F								
	Personal Injury (PI)	A								
		B	1			2		1	1	5
		C	4	1	1	8		3	5	22
	Property Damage	PD	19	8	8	21	1	4	4	65

% Change in Crashes	Fatal	F	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
	PI	A	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
		B	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
		C	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
	Property Damage	PD	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%

**Use Crash Modification Factors Clearinghouse*

Change in Crashes = No. of crashes X % change in crashes	Fatal	F								
	PI	A								
		B	-0.17			-0.34		-0.17	-0.17	-0.85
		C	-0.68	-0.17	-0.17	-1.36		-0.51	-0.85	-3.74
	Property Damage	PD	-3.23	-1.36	-1.36	-3.57	-0.17	-0.68	-0.68	-11.05

Year (Safety Improvement Construction) **2020**

Project Cost (exclude Right of Way)	Type of Crash	Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit
\$ 2,200,000	F			\$ 1,400,000	
Right of Way Costs (optional)	F			\$ 1,400,000	
Traffic Growth Factor	A			\$ 570,000	
Capital Recovery	B	-0.85	-0.28	\$ 170,000	\$ 48,211
1. Discount Rate	C	-3.74	-1.25	\$ 83,000	\$ 103,568
2. Project Service Life (n)	PD	-11.05	-3.69	\$ 7,600	\$ 28,019
Total				\$ 179,798	

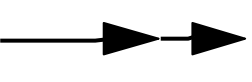



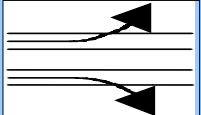
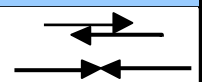
B/C= 0.40

Using present worth values,
B= \$ 873,547
C= \$ 2,200,000

See "Calculations" sheet for amortization.

HSIP worksheet

Control Section	T.H. / Roadway	Location			Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends
	CSAH 9	Hennepin County					Hennepin County	1/1/2013	12/31/2015
Description of Proposed Work		Update Fiber Optic cables to provide for better singal interconnect							

Accident Diagram Codes	1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8, 9 Head On/ Sideswipe - Opposite Direction	Pedestrian	Other	Total
									

Study Period: Number of Crashes	Fatal	F								
	Personal Injury (PI)	A	1							1
		B			1	1		1		3
		C	13		4	6	1	1	1	27
	Property Damage	PD	52	15	8	12	2	2	10	101

% Change in Crashes	Fatal	F	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
	PI	A	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
		B	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
		C	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%
	Property Damage	PD	-17%	-17%	-17%	-17%	-17%	-17%	-17%	-17%

**Use Crash Modification Factors Clearinghouse*

Change in Crashes <small>= No. of crashes X % change in crashes</small>	Fatal	F								
	PI	A	-0.17							-0.17
		B			-0.17	-0.17		-0.17		-0.51
		C	-2.21		-0.68	-1.02	-0.17	-0.17	-0.17	-4.59
	Property Damage	PD	-8.84	-2.55	-1.36	-2.04	-0.34	-0.34	-1.70	-17.17

Year (Safety Improvement Construction) **2020**

Project Cost (exclude Right of Way)	Type of Crash	Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit
\$ 2,200,000	F			\$ 1,400,000	
Right of Way Costs (optional)	F			\$ 1,400,000	
Traffic Growth Factor	A	-0.17	-0.06	\$ 570,000	\$ 32,330
Capital Recovery	B	-0.51	-0.17	\$ 170,000	\$ 28,926
1. Discount Rate	C	-4.59	-1.53	\$ 83,000	\$ 127,106
2. Project Service Life (n)	PD	-17.17	-5.73	\$ 7,600	\$ 43,537
Total				\$ 231,899	

B/C= 0.51

Using present worth values,
B= \$ 1,126,683
C= \$ 2,200,000

See "Calculations" sheet for amortization.



CMF / CRF Details

CMF ID: 6856

Install adaptive traffic signal control

Description: ATSC is a traffic management strategy in which traffic signal timings change, or adapt, based on observed traffic demand. These systems utilize increased detection to continually collect data on observed demand, and signal timings are then re-optimized based on current data.

Prior Condition: Intersections with regular traffic signals

Category: Intersection traffic control

Study: [Estimation of the Safety Effects of an Adaptive Traffic Signal Control System, Ma et al., 2015](#)

Star Quality Rating:  [View score details]

Crash Modification Factor (CMF)

Value: 0.83

Adjusted Standard Error:

Unadjusted Standard Error: 0.05

Crash Reduction Factor (CRF)

Value: 17 (This value indicates a **decrease** in crashes)

Adjusted Standard Error:

Unadjusted Standard Error: 5

Applicability

Crash Type: All

Crash Severity: All

Roadway Types: All

Number of Lanes:

Road Division Type:

Speed Limit:	
Area Type:	Urban and suburban
Traffic Volume:	
Time of Day:	All
<i>If countermeasure is intersection-based</i>	
Intersection Type:	Not specified
Intersection Geometry:	3-leg,4-leg
Traffic Control:	Signalized
Major Road Traffic Volume:	Minimum of 6667 to Maximum of 49384 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	Minimum of 387 to Maximum of 19010 Annual Average Daily Traffic (AADT)

Development Details	
Date Range of Data Used:	2006 to 2013
Municipality:	
State:	VA
Country:	
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	

Other Details	
Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	
Comments:	

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For more information, contact **Karen Scurry**, FHWA Office of Safety Programs 609-637-4207

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Crash Year	SPS Crash ID	Intersect Route ID	Intersect Element Code	Intersect Desc	Lag Direction	Lag Route ID	MPost Offset	Route Mileage	Crash Date	Crash Hour	ATP	County Name	City/Township Name	Crash Severity	Fatality Sum	Vehicle Involved Sum	Crash Diagram	Crash Type	First Event Location	Intersection Relation	Light Condition	Road Characteristics	Road Surface	Speed Limit	Weather Primary	Weather Secondary	Work Zone Location	Work Zone Type	Workers Present	Traffic Control Device	Traffic Device Working	Impaired User Focus Area	Inattentive Driver Focus Area	Speed Related Focus Area	Unbelted Occupants Focus Area	
2014	140490226	020000169	351	CSAH 1 EAST RAMP	Center	042700001	007+00.339	7.339	1/13/2014	17	M	HENNEPIN	BLOOMINGTON	Non-impairing Crash	0	2	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DARK - STREET LIGHTS ON	NOT SPECIFIED	SNOW	45	SNOW	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Specified	Traffic Signal	Not Specified	False	False	False	False	
2014	14110214	020000169	NV	OLD SHAGOPEE RD/CSAH 1	Center	042700001	007+00.339	7.339	11/6/2014	9	M	HENNEPIN	BLOOMINGTON	Non-impairing Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	# Legged Intersection	DAYLIGHT	CURVE AND GRADE	DRY	65	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Yield sign	Signal - Working OK	False	True	False	False	
2013	13176205	020000169	351	CSAH 1 EAST RAMP	Center	042700001	007+00.339	7.339	6/23/2013	16	M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	# Legged Intersection	DAYLIGHT	STRAIGHT AND LEVEL	DRY	40	CLEAR	CLEAR	NOT APPLICABLE	Not Applicable	No	Traffic Signal	Signal - Working OK	False	True	False	False	
2013	13086029	020000169	351	CSAH 1 EAST RAMP	Center	042700001	007+00.339	7.339	1/27/2013	17	M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	0	3	Rear End	Motor Vehicle in Transport	ON ROADWAY	Not in Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	DRY	45	CLOUDY	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	No	Not applicable	Not Applicable	False	False	False	True	
2013	13060627	020000169	351	CSAH 1 EAST RAMP	Center	042700001	007+00.339	7.339	12/4/2013	0	M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	0	2	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DARK - STREET LIGHTS ON	NOT SPECIFIED	DRY	45	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	No	Yield sign	Not Applicable	False	False	False	False	
2013	13060049	020000169	351	CSAH 1 EAST RAMP	Center	042700001	007+00.339	7.339	1/1/2013	10	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	1	Run Off Road - Left Side	Sign Pole	OFF ROADWAY ON MEDIAN	Interchange Entrance Ramp	DAYLIGHT	CURVE AND LEVEL	DRY	35	CLEAR	CLEAR	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not applicable	Not Applicable	False	True	False	False
2013	130432066	020000169	NV	OLD SHAGOPEE RD/CSAH 1	Center	042700001	007+00.339	7.339	11/17/2013	11	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	1	Run Off Road - Right Side	Overhead	ON ROADWAY	Not in Intersection or Junction	DAYLIGHT	CURVE AND GRADE	WET	40	CLOUDY	Wet	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not applicable	Not Applicable	False	False	True	True
2013	14008082	020000169	351	CSAH 1 EAST RAMP	Center	042700001	007+00.339	7.339	12/1/2013	17	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	3	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DARK - STREET LIGHTS ON	NOT SPECIFIED	WET	0	SLEET/HAUL/FREEZE-RAIN	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Specified	Not applicable	Not Specified	False	False	False	False	
2014	14080090	020000169	NV	OLD SHAGOPEE RD/CSAH 1	Center	042700001	007+00.339	7.339	2/20/2014	15	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DAYLIGHT	NOT SPECIFIED	SNOW	35	SNOW	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Specified	Traffic Signal	Not Specified	False	False	False	False	
2014	14370094	020000169	NV	OLD SHAGOPEE RD/CSAH 1	Center	042700001	007+00.339	7.339	11/20/2014	7	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DAYLIGHT	NOT SPECIFIED	DRY	40	CLEAR	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Specified	Yield sign	Not Specified	False	False	False	False	
2014	143060214	020000169	352	RIVERVIEW RD WEST RAMP	Center	042700001	007+00.339	7.339	12/3/2014	17	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	3	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DARK - STREET LIGHTS ON	NOT SPECIFIED	DRY	45	CLOUDY	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Specified	Traffic Signal	Not Specified	False	False	False	False	
2015	152460104	020000169	352	RIVERVIEW RD WEST RAMP	Center	042700001	007+00.339	7.339	6/17/2015	18	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	# Legged Intersection	DAYLIGHT	STRAIGHT AND LEVEL	WET	45	RAIN	CLOUDY	NOT SPECIFIED	Not Applicable	Not Specified	Traffic Signal	Signal - Working OK	False	True	True	False	

Intersect Route ID is equal to 020000169
 and
 Center Dist Code is equal to M
 and
 Intersect MPost Offset is between 117+00.813 and 117+00.854
 and
 Crash Year is equal to 2015, 2014, 2013

Crash Year	DPS Crash ID	Intersect Route ID	Intersect Element Code	Intersect Desc	Lag Direction	Lag Route ID	MPost Offset	Route Mileage	Crash Date	Crash Hour	ATF	County Name	City/Township Name	Crash Severity	Crash Diagram	Crash Type	First Event Location	Intersection Relation	Light Condition	Road Characteristics	Road Surface	Speed Limit	Weather Primary	Weather Secondary	Work Zone Location	Work Zone Type	Workers Present	Traffic Control Device	Traffic Device Working	Impaired User Focus Area	Inattentive Driver Focus Area	Speed Related Focus Area	Unbelted Occupants Focus Area
2015	15010018	0200000494	NV	24TH AVE S CSAH 1/BLOOMINGTON	South	0427000001	017-00.215	17.225	11/01/2015	7	M	HENNEPIN	BLOOMINGTON	Non-incorporating Crash	Sidewalk - Same Direction	Motor Vehicle in Transport	ON ROADWAY	T Intersection	DARK - STREET LIGHTS ON	STRAIGHT AND LEVEL	DRY	35 CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	True	False	False	False
2013	130870196	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	12/25/2013	18	M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	Rear End	Motor Vehicle in Transport	ON ROADWAY	4 Lugged Intersection	DAYLIGHT	STRAIGHT AND LEVEL	DRY	50 CLOUDY	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	True	False	False	False
2014	140900164	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	12/27/2014	21	M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	Rear End	Motor Vehicle in Transport	ON ROADWAY	5 Lugged Intersection	DARK - STREET LIGHTS ON	STRAIGHT AND LEVEL	DRY	35 CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	True	False	False	False
2013	132040063	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	12/23/2013	10	M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	Sidewalk - Same Direction	Motor Vehicle in Transport	ON ROADWAY	Other	DAYLIGHT	STRAIGHT AND LEVEL	DRY	35 CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	True	False	False	False
2014	140770087	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	12/15/2014	18	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	Not Coded	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	NOT SPECIFIED	NOT SPECIFIED	ICE/PACKED SNOW	0 NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	No	Not Specified	Not Specified	False	True	False	False	False
2014	140910058	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	12/17/2014	21	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	Not Coded	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	NOT SPECIFIED	NOT SPECIFIED	ICE/PACKED SNOW	0 NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	No	Not Specified	Not Specified	False	True	False	False	False
2014	141590202	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	11/11/2014	21	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	Ran Off Road - Left Side	Median Safety Barrier	ON ROADWAY	Not in Intersection or Junction	DARK - STREET LIGHTS ON	CURVE AND GRADE	WET	60 CLOUDY	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not applicable	Not Applicable	True	True	False	False	False
2013	131260184	0200000494	NV	24TH AVE S CSAH 1/BLOOMINGTON	East	0100000494	002-00.281	2.288	11/21/2013	17	M	HENNEPIN	RICHFIELD	Property Damage Only Crash	Rear End	Motor Vehicle in Transport	ON ROADWAY	Interchange Entrance Ramp	DAYLIGHT	CURVE AND LEVEL	DRY	60 CLOUDY	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not applicable	Not Applicable	False	True	False	False	False
2013	131530062	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	11/27/2013	15	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	NOT SPECIFIED	DRY	30 CLEAR	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Applicable	Not applicable	Not Specified	Not Specified	False	True	False	False	False
2014	140560182	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	11/25/2014	18	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DAYLIGHT	NOT SPECIFIED	ICE/PACKED SNOW	30 CLOUDY	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Specified	Traffic Signals	Not Specified	False	True	False	False	False
2011	112510246	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	11/14/2011	10	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	Rear End	Motor Vehicle in Transport	ON ROADWAY	4 Lugged Intersection	DAYLIGHT	STRAIGHT AND LEVEL	DRY	55 CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	True	False	False	False
2014	140910058	0200000494	309	24TH AVE SINGLEPOINT RAMP	Center	0427000001	017-00.290	17.290	12/17/2014	21	M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	Sidewalk - Same Direction	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DARK - STREET LIGHTS ON	NOT SPECIFIED	ICE/PACKED SNOW	30 CLEAR	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Specified	Traffic Signals	Not Specified	False	True	False	False	False

Intersect Route ID is equal to 0200000494
 Center Dist Code is equal to 1, 2, 3, 4, 5, 7, 8, M
 and
 Intersect MPost Offset is between 002-00.318 and 002-00.339
 and
 Crash Year is equal to 2015, 2014, 2013

2015	111870072	010000003W	BS2	98TH ST W RAMPS	Center	042700001	012-00-980	12.980	5/19/2015	13 M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	0	2	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DAYLIGHT	NOT SPECIFIED	DRY	0	CLEAR	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	No	Traffic Signals	Not Specified	False	False	False	
2015	111870076	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	7 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111870084	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	46 M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	0	4	Other	Motor Vehicle in Transport	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111280034	010000003W	BS2	98TH ST W RAMPS	Center	042700001	012-00-980	12.980	8/26/2015	6 M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	0	2	Right Angle	Motor Vehicle in Transport	ON ROADWAY	4-Logged Intersection	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLEAR	NOT SPECIFIED	ACTIVITY AREA	Lane Closure	No	Traffic Signals	Signal - Not Working OK	False	False	False	False
2015	111870078	010000003W	NW	98TH ST CSMA 1	Center	010000003W	006-00-208	6.236	8/19/2014	44 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111870083	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	43 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	WET	05	CLOUDY	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111870085	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	42 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Run Off Road - Right Side	Sign/Sign	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	WET	05	RAIN	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111870086	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	41 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	WET	05	RAIN	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111870087	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	41 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLOUDY	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111870088	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	40 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Side-swipe - Same Direction	Motor Vehicle in Transport	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111550079	010000003W	NW	98TH ST CSMA 1	Center	010000003W	006-00-208	6.236	7/2/2015	14 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DAYLIGHT	NOT SPECIFIED	DRY	0	CLEAR	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	No	Traffic Signals	Not Specified	False	False	False	False
2015	11190150	010000003W	NW	98TH ST CSMA 1	Center	010000003W	006-00-208	6.236	11/15/2015	14 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	4-Logged Intersection	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	False	False	False
2015	110440150	010000003W	NW	98TH ST CSMA 1	Center	042700001	012-00-980	12.980	1/19/2015	8 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DAYLIGHT	NOT SPECIFIED	ICE/PACKED SNOW	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Not Specified	False	False	False	False
2015	111247011	010000003W	BS1	98TH ST E RAMPS	Center	010000003W	001-00-206	6.136	8/24/2015	7 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Right Turn	Motor Vehicle in Transport	ON ROADWAY	4-Logged Intersection	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	False	False	False
2015	111870089	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	2 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	4	Run Off Road - Left Side	Other	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	WET	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111010104	010000003W	BS1	98TH ST E RAMPS	Center	042700001	012-00-980	12.980	9/27/2015	11 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Side-swipe - Same Direction	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DAYLIGHT	NOT SPECIFIED	DRY	05	CLEAR	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	No	Yield sign	Not Specified	False	False	False	False
2015	111230117	010000003W	BS1	98TH ST E RAMPS	Center	042700001	012-00-980	12.980	10/18/2015	13 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Side-swipe - Same Direction	Other Collision Type	NOT SPECIFIED	Not Coded	DAYLIGHT	NOT SPECIFIED	WET	05	CLEAR	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Specified	Traffic Signals	Not Specified	False	False	False	False
and		Consist Only Code is equal to M																																
and		Intersect MPAD Offset is between 006-00-208 and 006-00-209																																
and		Crash Year is equal to 2015, 2014, 2013																																
2015	111870086	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	7 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Side-swipe - Same Direction	Motor Vehicle in Transport	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	CURVE AND LEVEL	DRY	05	CLOUDY	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
2015	111870087	010000003W	NW	98TH ST CSMA 4	Center	010000003W	006-00-208	6.236	8/19/2014	6 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	Not Intersection or Junction	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLOUDY	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Specified	False	False	False	False
111890140	010000003W	BS1	98TH ST E RAMPS	Center	042700001	012-00-980	12.980	7/6/2014	15 M	HENNEPIN	BLOOMINGTON	Possible Injury Crash	0	3	Rear End	Motor Vehicle in Transport	ON ROADWAY	4-Logged Intersection	DAYLIGHT	STRAIGHT AND LEVEL	DRY	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	True	False	False	
111864050	010000003W	NW	98TH ST CSMA 1	Center	010000003W	006-00-208	6.236	12/16/2013	0 M	HENNEPIN	BLOOMINGTON	Property Damage Only Crash	0	1	Run Off Road - Left Side	Guardrail	OFF ROADWAY ON SHOULDER	Interchange Exit Ramp	DARK - STREET LIGHTS ON	STRAIGHT AND GRADE	DRY	05	CLEAR	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Not Applicable	Not Applicable	False	False	True	False	False

Intersect Route ID is
equal to 020000369
and
Crash Dist Code is equal
to M
and
Intersect MPPost Offset is
between 126+00.544 and
126+00.545
and
Crash Year is equal to
2015 , 2014 , 2013

Crash Year	DPS Crash ID	Intersect Route ID	Intersect Element Code	Intersect Desc	Leg Direction	Leg Route ID	MPost Offset	Route Mileage	Crash Date	Crash Hour	ATP	County Name	City/Township Name	Crash Severity	Fatality Sum	Vehicle Involved Sum	Crash Diagram	Crash Type	First Event Location	Intersection Relation	Light Condition	Road Characteristics	Road Surface	Speed Limit	Weather Primary	Weather Secondary	Work Zone Location	Work Zone Type	Workers Present	Traffic Control Device	Traffic Device Working	Impaired User Focus Area	Inattentive Driver Focus Area	Speed Related Focus Area	Unbelted Occupants Focus Area
2014	140990073	0200000169	352	CSAH 5 W RAMP	Center	0200000169	128-00.288	126.128	3/8/2014	11 M		HENNEPIN	ST LOUIS PARK	Property Damage Only Crash	0	2	Right Angle	Motor Vehicle in Transport	NOT SPECIFIED	Not Coded	DAYLIGHT	NOT SPECIFIED	WET	40	CLEAR	NOT SPECIFIED	NOT SPECIFIED	Not Applicable	Not Specified	Traffic Signals	Not Specified	False	False	False	False
2013	130990054	0200000169	352	CSAH 5 W RAMP	Center	0427000005	005-00.180	5.180	4/8/2013	15 M		HENNEPIN	ST LOUIS PARK	Property Damage Only Crash	0	2	Right Angle	Motor Vehicle in Transport	ON ROADWAY	Intersection-Related	DAYLIGHT	STRAIGHT AND LEVEL	DRY	40	CLOUDY	CLOUDY	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	False	False	False
2014	141580127	0200000169	352	CSAH 5 W RAMP	Center	0427000005	005-00.180	5.180	2/16/2014	8 M		HENNEPIN	ST LOUIS PARK	Possible Injury Crash	0	2	Rear End	Motor Vehicle in Transport	ON ROADWAY	4 Legged Intersection	DAYLIGHT	STRAIGHT AND LEVEL	SLUSH	20	SLUSHING SAND/DUST/SNOW	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	No	Traffic Signals	Signal - Working OK	False	False	False	False
2014	141580116	0200000169	351	CSAH 5 E RAMP	Center	0427000005	005-00.180	5.180	6/7/2014	16 M		HENNEPIN	ST LOUIS PARK	Property Damage Only Crash	0	2	Run Off Road - Left Side	Guardrail	OFF ROADWAY ON MEDIAN	Not an Intersection or Junction	DAYLIGHT	CURVE AND GRADE	DRY	35	CLOUDY	OTHER	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	False	False	False
2014	142090068	0200000169	351	CSAH 5 E RAMP	Center	0427000005	005-00.180	5.180	7/28/2014	9 M		HENNEPIN	ST LOUIS PARK	Possible Injury Crash	0	2	Right Angle	Motor Vehicle in Transport	ON ROADWAY	4 Legged Intersection	DAYLIGHT	CURVE AND GRADE	DRY	35	CLOUDY	NOT SPECIFIED	NOT APPLICABLE	Not Applicable	Not Applicable	Traffic Signals	Signal - Working OK	False	False	False	False

Intersect Route ID is equal to 0200000169

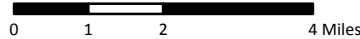
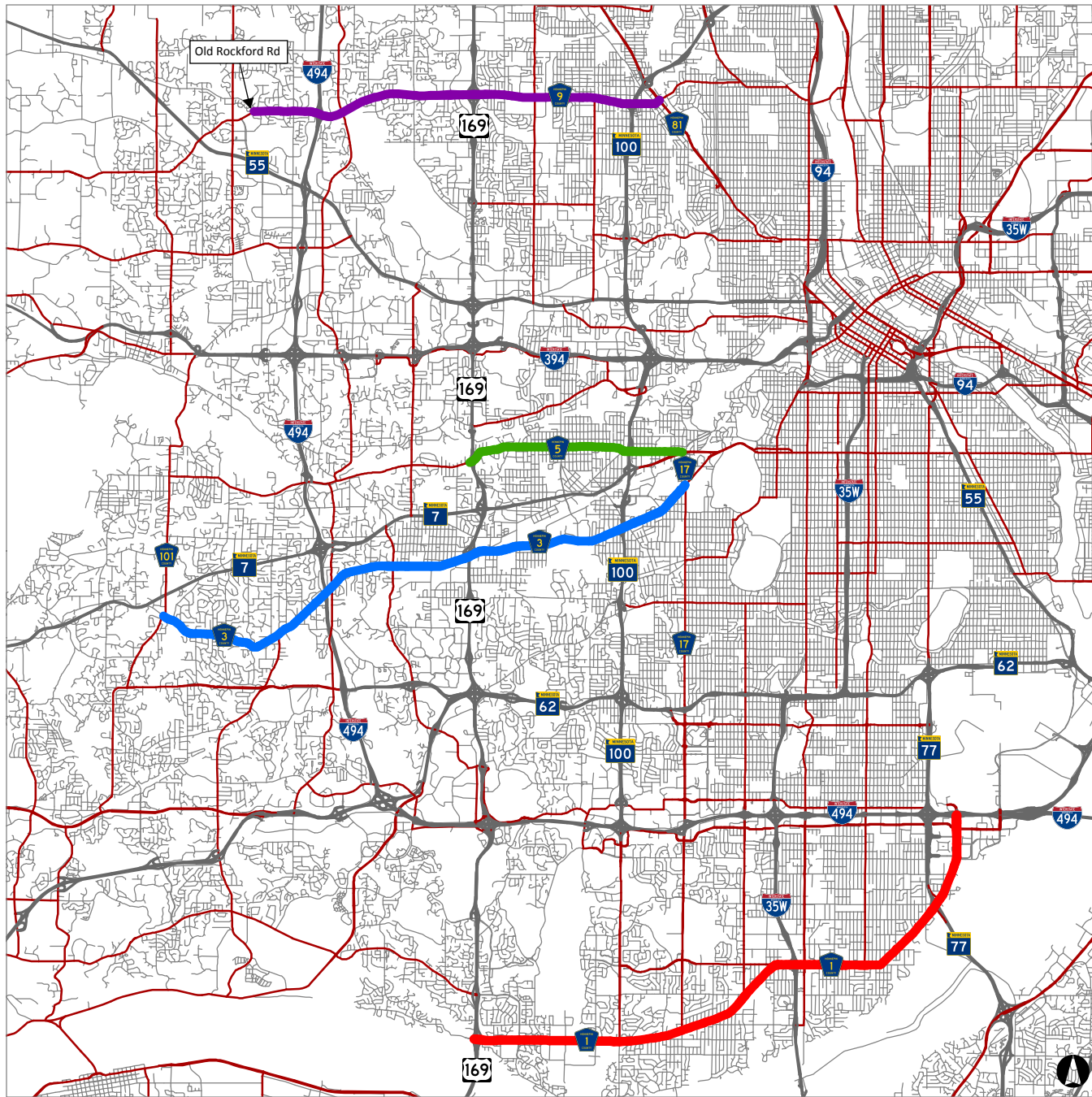
and Control Dist Code is equal to M

and Intersect MPost Offset is between 128-00.288 and 128-00.289

and Crash Year is equal to 2013, 2014, 2015

and Intersect Type is equal to Intersection within Interchange

Control Dist Code is equal to M



IV. Required Attachments

**Project Overview Map:
Roadways**

2016 Regional Solicitation Grant Application
Roadway System Management,
Hennepin County

— Roadways

Project Corridors

— CSAH 9: Old Rockford Rd to CSAH 81

— CSAH 5: US-169 to CSAH 17

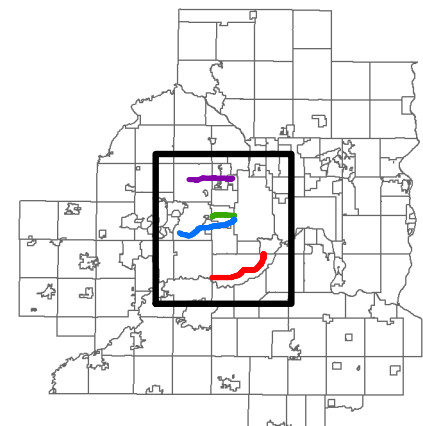
— CSAH 3: CSAH 101 to CSAH 17

— CSAH 1: US-169 to I-494

Functional Class

— Principal Arterial

— "A" Minor Arterial



IV. Required Attachments

Project Overview Map: Bicycle Network

2016 Regional Solicitation Grant Application
Roadway System Management,
Hennepin County

Regional Bicycle Transportation Network

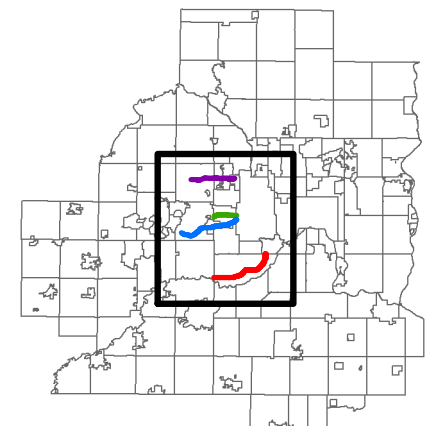
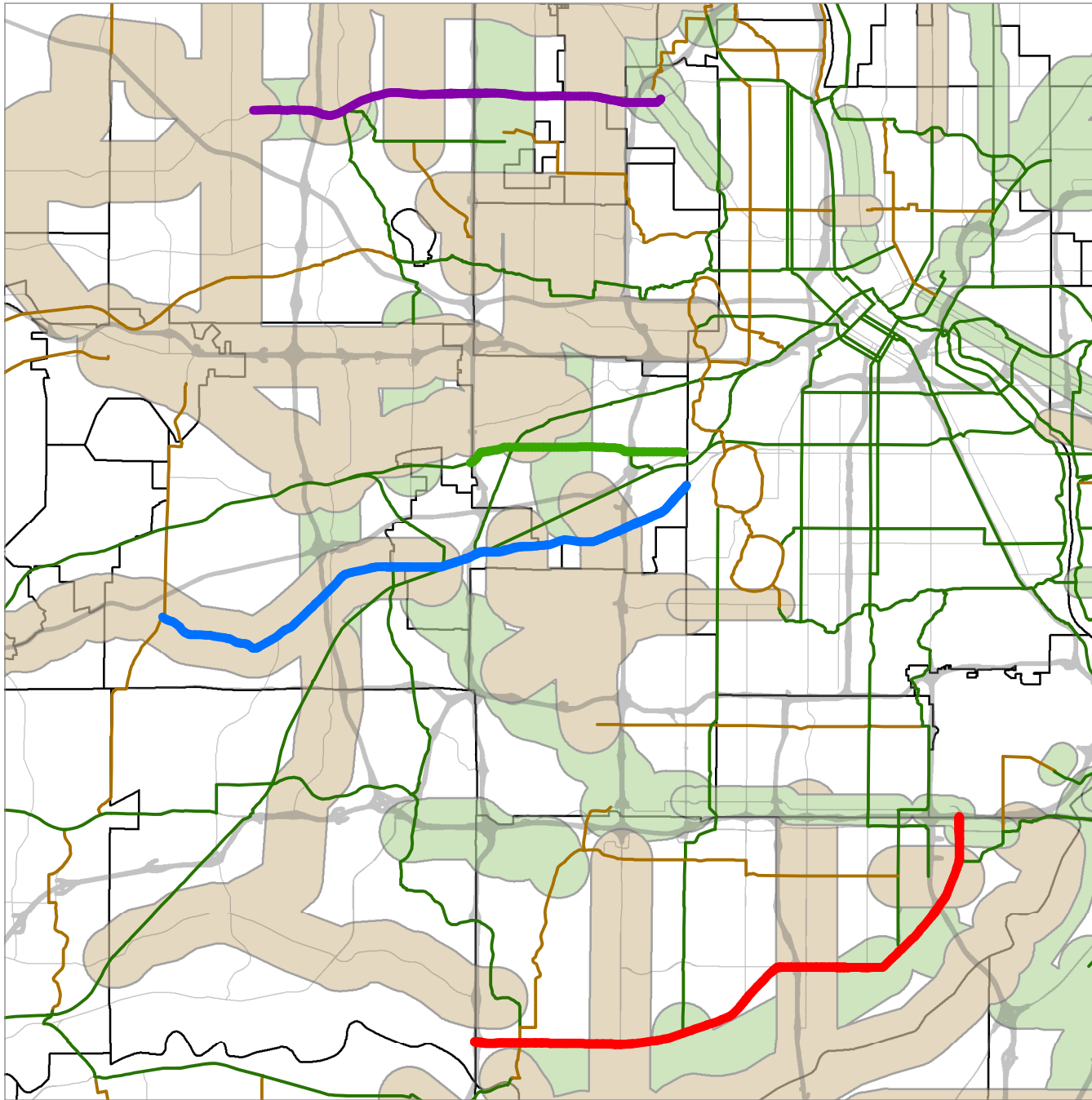
- Tier 1 Alignments
- Tier 2 Alignments
- Tier 1 Corridors
- Tier 2 Corridors

Project Corridors

- CSAH 9: Old Rockford Rd to CSAH 81
- CSAH 5: US-169 to CSAH 17
- CSAH 3: CSAH 101 to CSAH 17
- CSAH 1: US-169 to I-494

Functional Class

- Principal Arterial
- "A" Minor Arterial



IV. Required Attachments

EXISTING CONDITIONS

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

The following images capture the existing conditions at representative locations throughout each of the project area corridors.
Source: Google Street View

Project Corridors:

On **County State Aid Highway (CSAH) 9**, from Old Rockford Road to CSAH 81

On **CSAH 5**, from US-169 to CSAH 17

On **CSAH 3**, from CSAH 101 to CSAH 17

On **CSAH 1**, from US-169 to Interstate (I) 494

IV. Required Attachments

EXISTING CONDITIONS

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

The following images capture the existing conditions at representative locations throughout each of the project area corridors.
Source: Google Street View

Project Corridor:

On CSAH 9, from Old Rockford Road to CSAH 81



ON: CSAH 9 (WB)
AT: CSAH 81 [BOTTINEAU BLVD]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: CSAH 8 [W BROADWAY AVE]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: EAST OF MN-100

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: WEST OF MN-100

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: CSAH 102 [DOUGLAS AVE]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: CSAH 156 [WINNETKA AVE]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: NATHAN LN/LANCASTER LN [WEST OF US-169]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: CSAH 61 [NORTHWEST BLVD]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: EAST OF I-494

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: WEST OF I-494

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 9 (WB)
AT: OLD ROCKFORD RD

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View

IV. Required Attachments

EXISTING CONDITIONS

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

The following images capture the existing conditions at representative locations throughout each of the project area corridors.
Source: Google Street View

Project Corridor:

On CSAH 5, from US-169 to CSAH 17



ON: **CSAH 5 (WB)**

AT: **CSAH 17 [FRANCE AVE]**

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 5 (WB)
AT: OTTAWA AVE

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 5 (WB)
AT: TOLEDO AVE [EAST OF MN-100]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 5 (WB)
AT: LAKE ST

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 5 (WB)
AT: LOUISIANA AVE

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 5 (WB)
AT: TEXAS AVE

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 5 (WB)
AT: EAST OF US-169

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 5 (WB)
AT: WEST OF US-169

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View

IV. Required Attachments

EXISTING CONDITIONS

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

The following images capture the existing conditions at representative locations throughout each of the project area corridors.
Source: Google Street View

Project Corridor:

On [CSAH 3](#), from CSAH 101 to CSAH 17



ON: CSAH 3 (WB)

AT: CSAH 17 [FRANCE AVE]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 3 (WB)
AT: PARK CENTER BLVD [EAST OF MN-100]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 3 (WB)
AT: XENWOOD AVE [WEST OF MN-100]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 3 (WB)
AT: CSAH 20 [BLAKE RD]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 3 (WB)
AT: EAST OF US-169

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 3 (WB)
AT: WEST OF US-169

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 3 (WB)
AT: 17TH AVE

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 3 (WB)
AT: CSAH 61 [SHADY OAK RD]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 3 (WB)
AT: CSAH 60 [BAKER RD]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 3 (EB)

AT: CSAH 101

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View

IV. Required Attachments

EXISTING CONDITIONS

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

The following images capture the existing conditions at representative locations throughout each of the project area corridors.
Source: Google Street View

Project Corridor:

On **CSAH 1, from US-169 to I-494**



ON: CSAH 1 (WB/SB)
AT: I-494

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB/SB)
AT: AMERICAN BLVD

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB/SB)
AT: E 82ND ST

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB/SB)
AT: KILLEBREW DR

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB/SB)
AT: NORTH OF MN-77

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB/SB)
AT: OLD CEDAR AVE

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: CSAH 52 [NICOLLET AVE]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: LYNDAL AVE

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: EAST OF I-35W

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: WEST OF I-35W

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: W 98TH ST

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: CSAH 32 [PENN AVE]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)

AT: CSAH 17 [FRANCE AVE]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: CSAH 34 [NORMANDALE BLVD]

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: BLOOMINGTON FERRY RD

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: EAST OF US-169

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



ON: CSAH 1 (WB)
AT: WEST OF US-169

2016 Regional Solicitation Grant Application
Roadway System Management Project, Hennepin County

Source: Google Street View



Minnesota Department of Transportation

Metro District
1500 West County Road B-2
Roseville, MN 5511

July 8, 2016

Chris A. Sagsveen, P.E.
Department Director
Transportation Department (Roads and Bridges) - Operations
Hennepin County Public Works 1600 Prairie Drive
Medina, Minnesota 55340

RE: Letter of Support for Regional Solicitation Application
Hennepin County Roadway System Management

Dear Mr. Sagsveen:

Thank you for requesting a letter of support from MnDOT for the Metropolitan Council/Transportation Advisory Board (TAB) 2016 Regional Solicitation. Your application for Roadway Systems Management (RSM) on CSAH 1, CSAH 3, CSAH 5, and CSAH 9, impacts MnDOT right of way on Trunk Highways (TH) 55, TH 169, TH 494, TH 100, TH 494, and 35W.

MnDOT, as the agency with jurisdiction over the noted trunk highways, supports the application for RSM. Details of any future maintenance agreement with the county will be determined during project development.

This project has no funding from MnDOT. In addition, the Metro District currently has no discretionary funding in year 2020 of the State Transportation Improvement Program (STIP) or year 2021 of the Capital Highway Investment Plan (CHIP) to assist with construction or assist with MnDOT services such as the design or construction engineering of the project. Please continue to work with MnDOT Area staff to assist in identifying additional project funding.

Sincerely,

A handwritten signature in blue ink that reads "Scott McBride".

Scott McBride, P.E.
Metro District Engineer

Cc: Elaine Koustoukos, Metropolitan Council
John Griffith, MnDOT Metro District – West Area Manager

An Equal Opportunity Employer



2016 Regional Solicitation Grant Application
 Roadway Systems Management
 Hennepin County

Street	Street	Inter_ID	MNDOT_ID	Intersection Description	Ownership Description	Turn On Date	Previous Turn On Date	Municipality	SortID
CSAH 1	1	8012900		CSAH 1 (Old Shakopee Rd / 98th St) at CSAH 35 (Portland Ave)	Hennepin County Owned and Maintained Signals	7/16/1975		Bloomington	10001470
CSAH 1	1	9019700		CSAH 1 (Old Shakopee Rd / 24th Ave S) at Killebrew Dr/E Old Shakopee Rd	Hennepin County Owned Signals Maintained by Others	9/16/1980		Bloomington	10001740
CSAH 1	0	9014600		CSAH 1 (Old Shakopee Rd) at 88th St E	Municipal Owned Signals Maintained by Hennepin County Upon Request	9/29/1981		Bloomington	10001650
CSAH 1	1	8022400		CSAH 1 (Old Shakopee Rd) at Xerxes Ave S	Hennepin County Owned and Maintained Signals	10/25/1982		Bloomington	10000920
CSAH 1	1	9019900		CSAH 1 (Old Shakopee Rd) at Old Cedar Ave	Hennepin County Owned Signals Maintained by Others	10/11/1983		Bloomington	10001550
CSAH 1	1	8016500		CSAH 1 (Old Shakopee Rd / 98th St) at Garfield Ave	Hennepin County Owned and Maintained Signals	5/18/1987		Bloomington	10001310
CSAH 1	1	8031000		CSAH 1 (Old Shakopee Rd / 98th St) at Grand Ave	Hennepin County Owned and Maintained Signals	5/20/1987		Bloomington	10001360
CSAH 1	1	8020400		CSAH 1 (Old Shakopee Rd) at CSAH 32 (Penn Ave)	Hennepin County Owned and Maintained Signals	7/1/1987		Bloomington	10000970
CSAH 1	1	8004500		CSAH 1 (Old Shakopee Rd / 98th St) at Lyndale Ave	Hennepin County Owned and Maintained Signals	9/15/1987		Bloomington	10001260
CSAH 1	1	8029800		CSAH 1 (Old Shakopee Rd / 98th St) at I-35W W Ramp (Dupont Ave)	Hennepin County Owned and Maintained Signals	9/22/1987		Bloomington	10001140
CSAH 1	1	8029900		CSAH 1 (Old Shakopee Rd / 98th St) at I-35W E Ramp	Mn Dot Owned Signals Maintained by Hennepin County	9/22/1987		Bloomington	10001200
CSAH 1	1	8029700		CSAH 1 (Old Shakopee Rd) at 98th St W	Hennepin County Owned and Maintained Signals	12/9/1988		Bloomington	10001090
CSAH 1	1	9019800		CSAH 1 (Old Shakopee Rd) at 86th St E	Hennepin County Owned Signals Maintained by Others	1/31/1989		Bloomington	10001680
CSAH 1	1	9019300		CSAH 1 (24th Ave S) at 79th St E	Hennepin County Owned Signals Maintained by Others	1/31/1989		Bloomington	10002130
CSAH 1	1	8029500		CSAH 1 (Old Shakopee Rd) at Hampshire Ave	Hennepin County Owned and Maintained Signals	11/21/1989		Bloomington	10000720
CSAH 1	1	8029400		CSAH 1 (Old Shakopee Rd) at CSAH 28 (Bush Lake Rd)	Hennepin County Owned and Maintained Signals	11/28/1989		Bloomington	10000670
CSAH 1	1	8024900		CSAH 1 (Old Shakopee Rd) at Bloomington Ferry Rd	Hennepin County Owned and Maintained Signals	12/5/1989		Bloomington	10000620
CSAH 1	1	9019600		CSAH 1 (24th Ave S) at 82nd St E	Hennepin County Owned Signals Maintained by Others	12/18/1989		Bloomington	10001900
CSAH 1	1	9019400		CSAH 1 (24th Ave S) at American Blvd	Hennepin County Owned Signals Maintained by Others	2/7/1990		Bloomington	10002040
CSAH 1	1	8006600		CSAH 1 (Old Shakopee Rd / 98th St) at CSAH 52 (Niccollet Ave)	Hennepin County Owned and Maintained Signals	11/30/1990		Bloomington	10001420
CSAH 1	1	9020100		CSAH 1 (24th Ave S) at Transit Station (8300 - 24th Ave S)	Hennepin County Owned Signals Maintained by Others	7/15/1992		Bloomington	10001850
CSAH 1	1	8044600		CSAH 1 (Old Shakopee Rd) at Nesbitt Ave	Hennepin County Owned and Maintained Signals	12/18/1995		Bloomington	10000770
CSAH 1	1	8018400		CSAH 1 (Old Shakopee Rd) at CSAH 34 (Normandale Blvd)	Hennepin County Owned and Maintained Signals	9/23/2002		Bloomington	10000820
CSAH 1	1	8055700		CSAH 1 (Old Shakopee Rd) at Logan Ave S	Hennepin County Owned and Maintained Signals	10/31/2003		Bloomington	10001020
CSAH 1	1	8008400		CSAH 1 (Old Shakopee Rd) at CSAH 17 (France Ave)	Hennepin County Owned and Maintained Signals	2/10/2005		Bloomington	10000870
CSAH 1	1	8023500		CSAH 1 (Old Shakopee Rd) at 10th Ave S	Hennepin County Owned and Maintained Signals	8/24/2006		Bloomington	10001520
CSAH 1	1	9019500		CSAH 1 (24th Ave) at Lindau Ln	Hennepin County Owned Signals Maintained by Others	9/3/2014		Bloomington	10001975

2016 Regional Solicitation Grant Application
Roadway Systems Management
Hennepin County

Street	Street	Inter_ID	MNDOT_ID	Intersection Description	Ownership Description	Turn On Date	Previous Turn On Date	Municipality	SortID
CSAH 3	3	8006400		CSAH 3 (Excelsior Blvd) at CSAH 61 (Shady Oak Rd)	Hennepin County Owned and Maintained Signals	9/27/1973		Minnetonka	30000270
CSAH 3	3	8014400		CSAH 3 (Excelsior Blvd) at Louisiana Ave	Hennepin County Owned and Maintained Signals	12/3/1974		St. Louis Park	30000840
CSAH 3	3	8016600		CSAH 3 (Excelsior Blvd) at 5th Ave S	Hennepin County Owned and Maintained Signals	11/6/1979		Hopkins	30000470
CSAH 3	3	8022600		CSAH 3 (Excelsior Blvd) at US TH 169 W Ramp	Hennepin County Owned and Maintained Signals	10/15/1980		Hopkins	30000520
CSAH 3	3	8022500		CSAH 3 (Excelsior Blvd) at US TH 169 E Ramp	Hennepin County Owned and Maintained Signals	10/15/1980		Hopkins	30000580
CSAH 3	3	8023100		CSAH 3 (Excelsior Blvd) at 8th Ave S	Hennepin County Owned and Maintained Signals	9/24/1981		Hopkins	30000420
CSAH 3	3	8020300		CSAH 3 (Excelsior Blvd) at Meadowbrook Rd	Hennepin County Owned and Maintained Signals	12/2/1983		St. Louis Park	30000790
CSAH 3	3	8017500		CSAH 3 (Excelsior Blvd) at CSAH 4 (Beacon Hill Rd)	Hennepin County Owned and Maintained Signals	7/3/1986		Minnetonka	30000120
CSAH 3	3	8005600		CSAH 3 (Excelsior Blvd) at Hospital Dr	Hennepin County Owned and Maintained Signals	8/2/1986		St. Louis Park	30000890
CSAH 3	3	8043900		CSAH 3 (Excelsior Blvd) at Williston Rd	Hennepin County Owned and Maintained Signals	2/18/1994		Minnetonka	30000070
CSAH 3	3	8044200		CSAH 3 (Excelsior Blvd) at Park Nicollet Blvd	Hennepin County Owned and Maintained Signals	6/16/1994		St. Louis Park	30001170
CSAH 3	3	8044300		CSAH 3 (Excelsior Blvd) at TH 100 W Ramp / Xenwood Ave	Hennepin County Owned and Maintained Signals	8/10/1994		St. Louis Park	30000990
CSAH 3	3	8044100		CSAH 3 (Excelsior Blvd) at TH 100 E Ramp / Wooddale Ave	Hennepin County Owned and Maintained Signals	10/8/1994		St. Louis Park	30001050
CSAH 3	3	8033000		CSAH 3 (Excelsior Blvd) at Monterey Dr / 38th St W	Hennepin County Owned and Maintained Signals	1/17/1996		St. Louis Park	30001330
CSAH 3	3	8006800		CSAH 3 (Excelsior Blvd) at 11th Ave S	Hennepin County Owned and Maintained Signals	12/15/1998		Hopkins	30000370
CSAH 3	3	8023900		CSAH 3 (Excelsior Blvd) at 17th Ave S	Hennepin County Owned and Maintained Signals	12/21/1998		Hopkins	30000320
CSAH 3	3	8035600		CSAH 3 (Excelsior Blvd) at CSAH 17 (France Ave)	Hennepin County Owned and Maintained Signals	6/28/1999		St. Louis Park	30001380
CSAH 3	3	8032900		CSAH 3 (Excelsior Blvd) at Quentin Ave	Hennepin County Owned and Maintained Signals	8/3/1999		St. Louis Park	30001230
CSAH 3	3	8057910		CSAH 3 (Excelsior Blvd) at Natchez Ave	Hennepin County Owned and Maintained Signals	12/2/2002		St. Louis Park	30001280
CSAH 3	3	8056200		CSAH 3 (Excelsior Blvd) at Jackson Ave N / Milwaukee St	Hennepin County Owned and Maintained Signals	12/11/2003		Hopkins	30000635
CSAH 3	3	8002000		CSAH 3 (Excelsior Blvd) at CSAH 20 (Blake Rd)	Hennepin County Owned and Maintained Signals	10/7/2004		Hopkins	30000740
CSAH 3	3	8018200		CSAH 3 (Excelsior Blvd) at CSAH 60 (Baker Rd)	Hennepin County Owned and Maintained Signals	9/8/2005		Minnetonka	30000220
CSAH 3	3	8002100		CSAH 3 (Excelsior Blvd) at Brookside Ave / Alabama Ave S	Hennepin County Owned and Maintained Signals	12/20/2007		St. Louis Park	30000940
CSAH 3	3	8031900		CSAH 3 (Excelsior Blvd) at Woodland Rd	Hennepin County Owned and Maintained Signals	9/1/2014	9/2/1988	Minnetonka	30000020

2016 Regional Solicitation Grant Application
 Roadway Systems Management
 Hennepin County

Street	Street	Inter_ID	MNDOT_ID	Intersection Description	Ownership Description	Turn On Date	Previous Turn On Date	Municipality	SortID
CSAH 5	5	8001000		CSAH 5 (Minnetonka Blvd) at Texas Ave	Hennepin County Owned and Maintained Signals	12/19/1977		St. Louis Park	50000550
CSAH 5	5	8001200		CSAH 5 (Minnetonka Blvd) at Dakota Ave	Hennepin County Owned and Maintained Signals	12/23/1977		St. Louis Park	50000695
CSAH 5	5	8001400		CSAH 5 (Minnetonka Blvd) at Ottawa Ave	Hennepin County Owned and Maintained Signals	1/12/1978		St. Louis Park	50000900
CSAH 5	5	8033200		CSAH 5 (Minnetonka Blvd) at CSAH 25 (County Road 25)	Hennepin County Owned and Maintained Signals	11/23/1994		St. Louis Park	50001000
CSAH 5	5	8001100		CSAH 5 (Minnetonka Blvd) at Louisiana Ave	Hennepin County Owned and Maintained Signals	5/23/1997		St. Louis Park	50000600
CSAH 5	5	8005400		CSAH 5 (Minnetonka Blvd) at Hampshire Ave S	Hennepin County Owned and Maintained Signals	9/27/2007		St. Louis Park	50000650
CSAH 5	5	8016700		CSAH 5 (Minnetonka Blvd) at Inglewood Ave	Hennepin County Owned and Maintained Signals	12/19/2014	8/14/1992	St. Louis Park	50000945
CSAH 5	5	8001300	39704	CSAH 5 (Minnetonka Blvd) at TH 100 W Ramp / Lake St / Vernon Ave	Mn Dot Owned Signals Maintained by Hennepin County	11/1/2015	12/14/1970	St. Louis Park	50000720
CSAH 5	5	8018500	39526	CSAH 5 (Minnetonka Blvd) at TH 100 E Ramp / Toledo Ave	Mn Dot Owned Signals Maintained by Hennepin County	11/1/2015	1/13/1978	St. Louis Park	50000830
CSAH 5	5	8057945		CSAH 5 at TH 100 SB Ramp	Mn Dot Owned Signals Maintained by Hennepin County			St. Louis Park	50000788

2016 Regional Solicitation Grant Application
 Roadway Systems Management
 Hennepin County

Street	Street	Inter_ID	MNDOT_ID	Intersection Description	Ownership Description	Turn On Date	Previous Turn On Date	Municipality	SortID
CSAH 9	9	8012100		CSAH 9 (Rockford Rd / 42nd Ave) at Boone Ave	Hennepin County Owned and Maintained Signals	6/21/1972		New Hope	90000810
CSAH 9	9	8000300		CSAH 9 (Rockford / 42nd) at CSAH 102 (Douglas Dr)	Hennepin County Owned and Maintained Signals	7/27/1979		Crystal	90001060
CSAH 9	9	8007000		CSAH 9 (Rockford Rd / 42nd Ave) at Adair Ave	Hennepin County Owned and Maintained Signals	7/27/1979		Crystal/Robbinsdale	90001105
CSAH 9	9	8006200		CSAH 9 (Rockford Rd / 42nd Ave N) at CSAH 156 (Winnetka Ave)	Hennepin County Owned and Maintained Signals	8/31/1979		New Hope	90000910
CSAH 9	9	8020800		CSAH 9 (42nd Ave N) at Xylon Ave	Hennepin County Owned and Maintained Signals	11/7/1979		New Hope	90000860
CSAH 9	9	8025200		CSAH 9 (Rockford Rd) at Lancaster Ln / Nathan Ln	Hennepin County Owned and Maintained Signals	12/12/1984		Plymouth	90000710
CSAH 9	9	8024800		CSAH 9 (Rockford Rd) at Larch Ln	Hennepin County Owned and Maintained Signals	8/13/1987		Plymouth	90000610
CSAH 9	9	8020900		CSAH 9 (Rockford Rd) at Zachary Ln	Hennepin County Owned and Maintained Signals	8/19/1987		Plymouth	90000660
CSAH 9	9	8027000		CSAH 9 (Rockford Rd) at CSAH 61 (Northwest Blvd)	Hennepin County Owned and Maintained Signals	11/20/1987		Plymouth	90000560
CSAH 9	9	8056800		CSAH 9 (Rockford Rd) at I-494 W Ramp	Mn Dot Owned Signals Maintained by Hennepin County	1/21/1988		Plymouth	90000420
CSAH 9	9	8056850		CSAH 9 (Rockford Rd) at I-494 E Ramp	Mn Dot Owned Signals Maintained by Hennepin County	1/21/1988		Plymouth	90000460
CSAH 9	9	8019600		CSAH 9 (42nd Ave N) at Quebec Ave	Hennepin County Owned and Maintained Signals	12/14/1988		New Hope	90000960
CSAH 9	9	8035800		CSAH 9 (Rockford / 42nd) at Nevada Ave	Hennepin County Owned and Maintained Signals	12/14/1988		New Hope	90001010
CSAH 9	9	8036300		CSAH 9 (42nd Ave N) at Gettysburg Ln	Hennepin County Owned and Maintained Signals	6/12/1990		New Hope	90000760
CSAH 9	9	8038600		CSAH 9 (Rockford Rd) at Vinewood Ln	Hennepin County Owned and Maintained Signals	12/19/1990		Plymouth	90000510
CSAH 9	9	8032100		CSAH 9 (Rockford Rd) at Fernbrook Ln	Hennepin County Owned and Maintained Signals	10/16/1996		Plymouth	90000310
CSAH 9	9	8038700		CSAH 9 (Rockford Rd) at Annapolis Ln / Berkshire Ln	Hennepin County Owned and Maintained Signals	11/22/1996		Plymouth	90000370
CSAH 9	9	9029997	22432	CSAH 9 (Rockford / 42nd) at TH 100 W Ramp / Vera Cruz Ave N	Mn Dot Owned Signals Maintained by Hennepin County	11/21/2002		Robbinsdale	90001160
CSAH 9	9	9029996	21388	CSAH 9 (Rockford / 42nd) at TH 100 E Ramp	Mn Dot Owned Signals Maintained by Hennepin County	11/21/2002		Robbinsdale	90001202
CSAH 9	9	8055200		CSAH 9 (Rockford Rd) at Polaris Ln N	Hennepin County Owned and Maintained Signals	10/2/2003		Plymouth	90000160
CSAH 9	9	8034000		CSAH 9 (42nd Ave) at CSAH 81 (Bottineau Blvd)	Hennepin County Owned and Maintained Signals	8/14/2007		Robbinsdale	90001260