

## Appendix A: Study Review Committee, Focus Group, and DOT Management Meetings

The following notes and slides are included in Appendix A.

Meeting Type	Meeting Content	Date(s)
SRC #1	Project Kickoff	09-15-2021
SRC #2	Existing Conditions	10-29-2021
Focus Group #1	Kickoff & Existing Conditions	11-03-2021
SRC #3	Conditions & Strategies	03-08-2022
Focus Group #2	Conditions & Strategies	03-8/9-2022
SRC #4	Strategies	05-26-2022
SRC #5	Strategy Analysis	09-13-2022
Focus Group #3	Strategy Analysis	09-13/14-2022
SRC #6	Implementation	02-23-2023
NDDOT Management	Implementation & Recommendations	03-15-2023
MnDOT Management	Implementation & Recommendations	04-14-2023

# Meeting Notes

Project: Interstate Operations Analysis and Plan for Future Improvements

Subject: SRC #1 - Kickoff Meeting

Date: Wednesday, September 15, 2021

Location: Webex

## 1. Introductions

### a. Attendees:

- i. HDR - Brian Ray, Jason Carbee, Jacob Weiss, Brian King
- ii. Metro COG - Cindy Gray, Michael Maddox, Dan Farnworth
- iii. NDDOT - Wayne Zacher, Michael Johnson, Justin Schlosser, Jon Ketterling, Jason Thoronson, Bob Walton, Jack Smith
- iv. MnDOT - Mary Safgren, Eli Ramirez, Jerilyn Swenson
- v. Cass County - Jason Benson, Tom Soucy
- vi. West Fargo - Andrew Wrucke
- vii. Moorhead - Jonathan Atkins
- viii. ATAC - Diomo Motuba, Kshitij Sharma

## 2. Project Objectives / Anticipated Outcomes

### a. Presented already established objectives/outcomes:

- i. Determine the feasibility of potential ring routes
- ii. Present a clear menu of prioritized improvements
- iii. Provide operational and analytical data to assist with later project development phases
- iv. Have the study results that are intuitive and easy to interpret

### b. Other objectives/outcomes discussed:

- i. Cindy Gray – Metro COG
  1. Need to go beyond a feasibility study for the ring routes. Looking at pros and cons of routes - can traffic be relieved on the existing system?
- ii. Mary Safgren - MnDOT
  1. Interested in the ring route analysis, is expansion of the interstate system needed, what is required for the Red River Bridge. This study should provide the basis for those future needs.
  2. Note that MnDOT has improvements planned in the near future for the Minnesota side Interstates.
- iii. Michael Johnson – NDDOT
  1. Hoping for a menu of prioritized improvements - Recently developed Urban interstate priorities process for NDDOT is fed by studies like this one.

2. NDDOT's biggest concern is local traffic using the interstate system – need outcomes that don't necessary increase local trips. He's interested in tracking who uses system with improvements - local versus regional trips. Noted that in the past, some have thought that increases in capacity can lead to more local traffic using the system (not necessarily through trips).
  - iv. Bob Walton – NDDOT District
    1. Several initiatives have pushed traffic towards the interstate
    2. Main Ave Reduction & One-Way Conversion Feasibility Study both have potential for some additional local traffic on Interstate.
    3. Cindy noted that one-way conversion study is a concept and no analysis or feasibility recommendations have been completed yet, and that the name of the project is being changed to “corridor study”, in which two-way segments or an entire two-way conversion will be studied. We don't expect uniform support for a conversion.
    4. Jon Atkins via chat noted that “as long as the interstate is easier to use than going through town, it will be used for in town trips. Traffic is like water, flows the path of least resistance.
    5. Michael Johnson Replied that – “Agreed Jonathan, but if we resolve ourselves to that determination in the planning and project development process we aren't appropriately planning and building the Interstate system for its intended use and function.”
  - v. Andrew Wrucke – West Fargo
    1. Wondering about the western limits of study area and how it relates to the western limits of West Fargo. HDR noted it was 165th Ave / CR 15
3. Study Review Committee Roles & Responsibilities
    - a. No comments or questions from the SRC
  4. Focus Group Roles & Responsibility
    - a. No comments or questions from the SRC
  5. Project Scope Discussion
    - a. Kshitij Sharma asked about data collection in terms of use in microsimulation
      - i. HDR noted the traffic counts will include classification, but for lane usage data we'll use visual inspection / local observations in areas of poor lane connectivity.
    - b. Cindy Gray liked the idea of using StreetLight data to identify who is using truck stops along interstate as brief “stops”, since those trips could easily be substituted for a stop along ring route.

- c. Cindy Gray noted: that the Joint Water Commission could start selling back some of the land acquired for the diversion in 2022 – it will be important for us to identify if routes are feasible and beneficial before then.
  - d. Bob Walton wanted to identify that NDDOT puts a lot of money into pedestrian crossings – looking ahead to public meetings where a portion of people will be bike / ped advocacy groups.
    - i. HDR should use available connection data to demonstrate that concepts support pedestrian / bike crossings.
  - e. Mary Safgren noted: District Freight plan is being developed currently for MnDOT. Will share results with study team
  - f. Cindy Gray noted: City of Fargo has sub-area land use plans and growth management plans that have some growth assumptions – should confirm the assumed travel model growth is consistent with those.
    - i. Verify plan accommodates opportunities for collector street crossings of interstate.
    - ii. 64th Street and 76th Street interchange questions
  - g. Jerilyn Swenson noted: Red River Bridges are aging – need a plan long term if expansion is needed over the Red River.
  - h. Jon Atkins noted: Potential future new MN interchange between 34th Street and Hwy 336 is proposed to be located at weigh station and near airport. MnDOT/State Patrol have recently upgraded weigh station.
    - i. City of Moorhead had Growth Area Plan (GAP) for growth in this eastern area. Interchange was part of that plan to support access to the area.
    - ii. Interstate Operations Study should see if the interchange makes sense.
  - i. Mary Safgren noted: Priority of this interchange in relation to other statewide priorities was not certain.
  - j. Cindy Gray noted: Comments from SRC should be routed to HDR, but please copy Cindy and Metro COG on comments.
  - k. Brian Ray discussed in-person meetings, and it was discussed that we would try and make these in-person / on-line hybrids to accommodate pandemic uncertainties. HDR will coordinate with Metro COG on logistics of this.
6. Project Schedule Discussion
- a. No questions or comments from the SRC
7. Other Items
- a. No questions or comments from the SRC
8. Next Steps
- a. Finalize Data Collection
  - b. Develop Existing Conditions Assessment
  - c. Conduct Study Review Committee #2 – October 29, 2021, 10:00AM

# Interstate Operations Analysis and Plan for Future Improvements

Study Review Committee – Kickoff Meeting



- 01 Introductions
- 02 Project Objectives
- 03 Study Review Committee
- 04 Focus Group
- 05 Project Scope
- 06 Project Schedule
- 07 Other Items
- 08 Next Steps

## 01 Introductions

HDR Staff

Metro COG

NDDOT

MnDOT

Cass County

Clay County

City of Fargo

City of West Fargo

City of Moorhead

ATAC



## 02 Project Objectives/Anticipated Outcomes

- Determine the feasibility of potential ring routes
- Present a clear menu of prioritized improvements
- Provide operational and analytical data to assist with later project development phases
- Have the study results that are intuitive and easy to interpret
- Others???

## **03 Study Review Committee**

- Roles & Responsibilities
  - Establish Study Objectives
  - Provide Guidance at Key Milestones
- Key Milestone Meetings:
  - Kickoff Meeting
  - Baseline Conditions
  - Goals & Objectives (in person)
  - Strategy Identification
  - Initial Strategy Screening
  - Scenario Analysis (in person)
  - Implementation Plan
  - Draft Report

## **04 Focus Group**

- Members
  - Local Officials
  - First Responders
  - Freight Industry
- Roles & Responsibilities
  - Inform the Study
  - Provide Guidance at Key Milestones
- Key Milestone Meetings:
  - Baseline Conditions
  - Goals & Objectives (in person)
  - Strategy Identification
  - Scenario Analysis (in person)

## 05 Project Scope

### Task 1 – Project Management

### Task 2 – Data Collection - (Documentation of Existing Condition)

- 2.1 TRAFFIC COUNT DATA
- 2.2 PEAK TRAVEL TIME
- 2.4 SAFETY DATA
- 2.5 OTHER DATA
- 2.6 EXISTING CONDITIONS REPORT

### Task 3 – Public Engagement

- 3.1 PUBLIC PARTICIPATION PLAN
- 3.2 STUDY REVIEW COMMITTEE
- 3.3 FOCUS GROUPS
- 3.4 DRAFT PLAN VIRTUAL PRESENTATION MATERIALS & SURVEY
- 3.5 WEBSITE

## 05 Project Scope - Continued

### Task 4 – Future Traffic Projections

- 4.1 COORDINATION WITH ATAC
- 4.2 REVIEW DYNAMIC TRAFFIC ASSIGNMENT MODEL
- 4.3 VALIDATION OF TRAVEL DEMAND MODEL
- 4.4 DEVELOP TRAFFIC DEMAND MATRICES
- 4.5 FUTURE CONDITIONS REPORT

### Task 5 – Traffic Operations Analysis

- 5.1 ESTABLISH STUDY GOALS AND OBJECTIVES
- 5.2 NEEDS & POTENTIAL IMPROVEMENT
- 5.3 EVALUATE SCENARIOS
  - Travel Demand Model & Dynamic Traffic Assignment Analysis
  - Multi-Resolution Screening
    - *Traffic Operations Analysis*
      - Analytical Tools
      - Microsimulation Model
    - *Safety Analysis*
  - Planning Level Environmental Impacts
  - Implementation Plan



## 05 Project Scope - Continued

### Task 6 – Ring Route Analysis

- 6.1 IDENTIFY CORRIDORS
- 6.2 DEVELOP SCREENING CRITERIA
- 6.3 UPDATE COST ESTIMATES
- 6.4 PEER COMMUNITY RING ROUTE ANALYSIS
- 6.5 SCREEN RING ROUTE CORRIDORS

### Task 7 – Development of Planning Level Cost Estimates

### Task 8 – Development of Draft and Final Report

### Task 9 – Adoption Process

## 06 Project Schedule

Tasks	2021						2022												2023	
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	
<b>1. Project Management</b>																				
<b>2. Data Collection</b>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.1 - 2.5 Collect Data																				
2.6 Existing Conditions																				
<b>3. Public Engagement</b>																				
3.1 Public Participation Plan																				
3.2 Study Review Committee			O		O		O		O		O		O		O					
3.3 Focus Groups				O		O		O				O								
3.4 Draft Plan Presentation																				
3.5 Website																				
<b>4. Future Traffic Projections</b>																				
4.1 Coordination w/ ATAC																				
4.2 Review DTA Model																				
4.3 Validation of TDM																				
4.4 Develop Traffic Demand																				
4.5 Future Conditions Report																				
<b>5. Traffic Operations Analysis</b>																				
5.1 Goals and Objectives																				
5.2 Needs & Potential Improvements																				
5.3 Evaluate Scenarios																				
<b>6. Ring Route Analysis</b>																				
6.1 Identify Corridors																				
6.2 Develop Screening Criteria																				
6.3 Update Cost Estimates																				
6.4 Peer Community Analysis																				
6.5 Screen Ring Route Corridors																				
<b>7. Develop Planning Level Costs</b>																				
<b>8. Draft &amp; Final Report</b>																				
9. Adoption Process																				

X - Monthly Progress Meetings, O - Virtual Meetings, O In-Person Meetings

## 07 Other Items

## 08 Next Steps

- a. Finalize Data Collection
- b. Develop Existing Conditions Assessment
- c. Conduct Study Review Committee #2 –  
October 29, 2021, 10:00AM



# Meeting Notes

Project: Interstate Operations Analysis and Plan for Future Improvements

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Subject: SRC #2 – Existing Conditions Meeting

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Date: Friday, October 29, 2021

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Location: Webex

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## 1. Introductions

### a. Attendees:

- i. HDR - Brian Ray, Jason Carbee, Brian King
- ii. Metro COG - Cindy Gray, Michael Maddox, Dan Farnworth
- iii. NDDOT - Michael Johnson, Justin Schlosser, Jason Thoronson, Bob Walton, Jack Smith, Jon Ketterling
- iv. MnDOT - Mary Safgren, Jerilyn Swenson
- v. Cass County - Jason Benson, Tom Soucy
- vi. Fargo – Jeremy Gorden
- vii. West Fargo - Andrew Wrucke
- viii. Moorhead - Jonathan Atkins
- ix. ATAC - Diomo Motuba, Kshitij Sharma

## 2. Project Status Update

- a. Presented data collection efforts
- b. Discussed status of existing conditions assessment
  - i. Kshitij Sharma asked about the process of using the count data in developing the origin-destination matrix estimation for the model. Jason Carbee described the process and mentioned that we could setup an offline meeting to discuss the process in more detail.

## 3. Existing Conditions Discussion

- a. Presented the speed profile information
  - i. Michael Johnson asked about actual speeds on I-94 at I-29 EB at 7:45 AM. The overnight 50<sup>th</sup> percentile speed is around 56 mph and the 7:45 AM 50<sup>th</sup> percentile speed is around 48 mph.
  - ii. Jon Atkins confirmed the results of the I-94 EB AM peak speeds seemed reasonable.
  - iii. Michael Johnson asked if the data is for all lanes or individual lanes. The data represents all lanes combined.
  - iv. Bob Walton confirmed that there is no routine congestion on NB I-29 during the PM peak.
  - v. It was stated that the SB I-29 congestion at 12<sup>th</sup> Street is potentially due to truck operations from the industrial park.

- vi. Bob Walton asked how the speed data on the tri-level was represented. The tri-level speeds are combined with the other speed data on that segment. Jason Carbee explained the data is for the entire segment and the speeds on the tri-level are not extracted separately from the rest of the segment.
- vii. Poll Question #1: What other areas along the interstate system are experiencing routine congestion and during what times?
  - 1. Responses:
    - a. I-94 WB and University Dr Ramp
    - b. I-94 WB in the two or three right lanes between I-29 and 45th Street.
    - c. There's a northbound lane drop on I-29 somewhere north of I-94 (can't remember exactly where), but it always creates a merge issue that probably affects speed.
    - d. On southbound I-29 to eastbound I-94 (flyover) there is routine congestion during the PM peak. Speeds significantly reduced during PM peak.
    - e. No other locations or times that I am aware of.
    - f. I agree with most of your assessment. The I-94 stretch from I-29 to Veteran's Blvd is congested from 4:30 to 5:45 where the lanes and off ramps pose issues with congestions.
    - g. AM - Right lane, NB I-29, 32nd Ave S to I-94 AM - Right lane, WB I-94, 25th St to I-29 PM - Right lane, SB I-29, Main to 13th Ave off ramp
    - h. 25th St where the tri-level, NB ramp, and auxiliary lane merge just east of 29 for the PM peak. Also the right lane between 25th St and University Dr in the AM peak.
    - i. NB I-29 b/w Main & 12th during am
    - j. Northbound I-29, 0745-0800, Main Ave. to 12th Ave. N. NDSU traffic
    - k. The tri-level. I-94 SB to WB I-94 and SB to EB I-94.
- b. Presented Existing Crash Data
  - i. Kshitij Sharma asked about the crash types that were labeled "unknown". Brian Ray stated that we would need to dig into those crashes in more detail to see if we can determine why they were coded "unknown".
  - ii. Poll Question #2: What other areas along the interstate are experiencing safety concerns?
    - 1. Responses:
      - a. EB I-94 Main Ave on ramp loop due to speed differential
      - b. People exiting 52nd Ave S southbound complain about rear end crashes between through traffic and exiting traffic
      - c. On NB I-29, there are right lanes that continue for a long distance north of an on-ramp (such as an on-ramp from I-

29 or 13th Avenue S). The lanes continue until almost where the next off-ramp begins, so vehicles have to merge left when they are almost to the off-ramp, where people are merging right to exit. It's clumsy and awkward, and even when you drive it a lot, it doesn't seem necessary for all that dropping and adding.

- d. East bound I-94 at Sheyenne St where speed limit is 65mph and merge traffic is not getting up to 65mph as the speed limit changes to 55mph just east of the interchange.
- e. During evening peak.
- f. More recently, the offramp WB I-94 @ Veterans Blvd has been backing up almost to the 45 St onramp.
- g. None other that I'm aware of.

#### 4. Ring Route Discussion

- a. Presented the potential ring route information.
  - i. Michael Maddox mentioned that the rail crossing south and west of Horace on the southwest ring route will become inactive.
  - ii. Michael Maddox mentioned that the speeds at the 100<sup>th</sup> Ave S interchange are currently reduced due to the interchange design. He asked should we increase the speeds at the 100<sup>th</sup> Ave S interchange, assuming it gets improved? Jason Carbee said we can look at it both ways.
  - iii. Jason Benson said that the in the urban areas ring routes should be ¼ mile access spacing with speeds of around 45 mph. The study will look at trying to minimize the amount of access. There may be some urban areas with ¼ mile access spacing but will try to use ½ mile access spacing when possible. The rural portions of the corridor will have ½ mile or 1 mile access spacing.
  - iv. Mary Safgren asked about possibly improving Hwy 336 to Sabin.
  - v. It was discussed that the northeast ring route should move up to Harwood.
  - vi. The potential screening criteria was reviewed and it was suggested to add costs (and impacts) averted through interstate widening projects.

#### 5. Next Steps

- a. Focus Group Meeting on November 3, 2021
- b. Finalize Existing Conditions Assessment
- c. Conduct Future Conditions Assessment
- d. Conduct Study Review Committee #3 - January 2022 (In-Person)

# Meeting Notes

Project: Interstate Operations Analysis and Plan for Future Improvements

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Subject: Focus Group #1 – Kickoff & Existing Conditions Meeting

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Date: Wednesday, November 03, 2021

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Location: Webex

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## 1. Introductions

### a. Attendees:

- i. HDR - Brian Ray, Jason Carbee, Brian King Ally Carson, Brenda Levos
- ii. Metro COG - Cindy Gray, Michael Maddox, Dan Farnworth
- iii. NDDOT - Michael Johnson, Justin Schlosser, Jason Thoronson, Bob Walton, Jack Smith, Jon Ketterling
- iv. Cass County – Grace Puppe, Dean Haaland, Tim Briggeman
- v. Clay County – Matthew Jacobson, Colin Jorgenson, Mark Empting
- vi. MATBUS – Julie Bommelman (Fargo)
- vii. Fargo – Craig Nelson, Ben Dow
- viii. West Fargo – Thomas Clark, Jason Dura, Matthew Andvik
- ix. Moorhead – Jeff Wallin
- x. Horace – Jim Dahlman
- xi. ND State Patrol – Brian Niewind
- xii. FM Economic Development – Joe Raso
- xiii. Sanford Health – Rick Cameron, Chad Mickelson
- xiv. RDO Equipment – Erin Albrecht

## 2. Project Objectives

- a. Presented project background and need
- b. Presented project purpose

## 3. Focus Group

- a. Discussed members, roles & responsibilities and key milestone meetings for the focus group

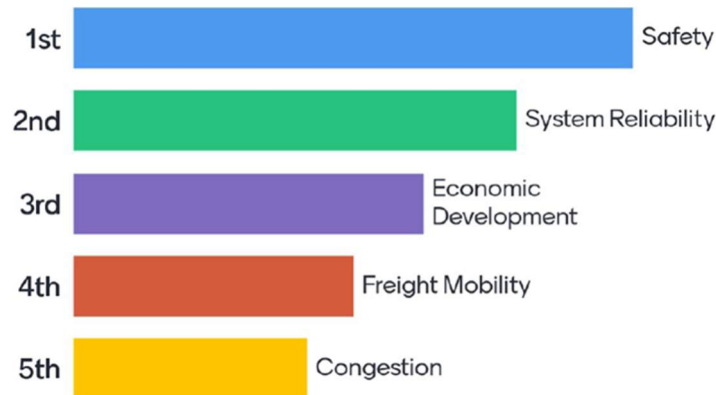
## 4. Project Scope and Schedule

- a. Presented the project scope and schedule

## 5. Breakout Groups: The focus group was split up into 2 breakout groups. Section 5.a. and section 5.b. provide a summary from each breakout group.

### a. **Group A – Planning, Transit and Economic Development**

- i. Question 1a: *What are the most important issues/opportunities to be addressed by the Interstate Operations Study?* Responses below:

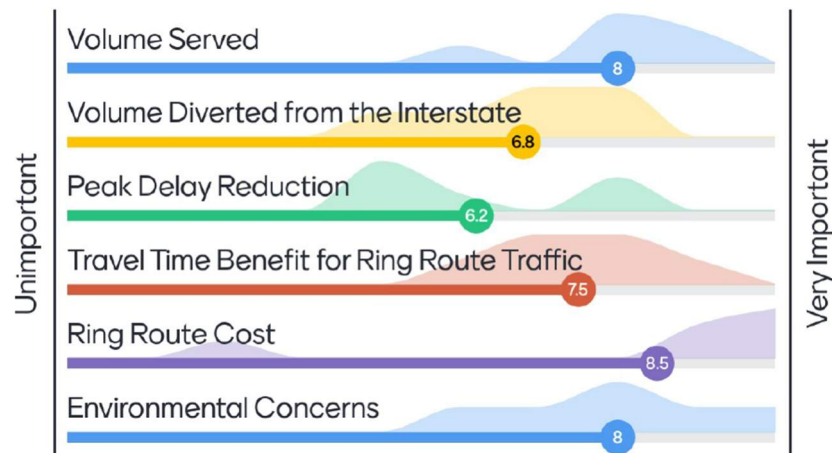


ii. Question 1b: *What other issues/opportunities could this study address?*

Responses below:

1. Aesthetics as a gateway to the community and the entry to each state
  2. Environmental considerations
  3. Interaction and consideration of multiple modes of transportation in the region.
  4. Consideration of new technologies likely to be part of the system – chargeable EV roadways.
  5. Aesthetics as people drive through – Des Moines has done a good job.
- iii. The potential ring route was presented and discussed.
1. It was mentioned that there was limited opportunity for economic development for North Dakota ring routes since they were outside the diversion.
  2. It was mentioned the diversion will limit growth for West Fargo and that the argument against the ring route is that it will drive economic development out and around the city rather than through. We should be looking at the ring route with more than just truck traffic in mind.
  3. It was mentioned there is concern from West Fargo regarding a ring route.
  4. It was mentioned that the Horace ring route is being perceived as a “Truck Route” by the community. They also have interest in an additional Sheyenne Diversion crossing
  5. It was noted that there was some interest in improving Wall Street/88Ave S.
  6. It was stated that the land along CR 11 has the most restrictive use policies in the county due to underground aquifers.
  7. It was mentioned that we aren’t dealing with a huge amount of traffic and wondered if developing a ring route was more expensive than just maintaining or adding a lane on current routes.

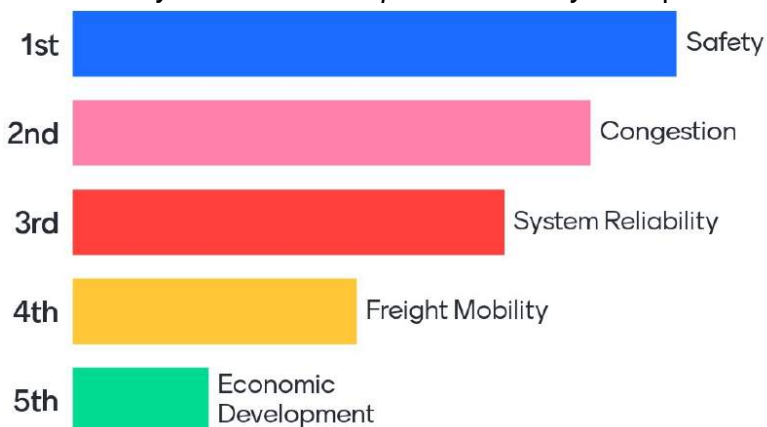
8. When the NE ring route was presented (Harwood to CR 11) it was noted that there is anecdotal evidence that it's currently used as a "bypass".
  9. It was discussed how the SE ring route could potentially move farther south and use 100th Ave S.
  10. It was discussed that one ring route measure that could be added is deferred investment costs due to the ring route (how much is saved in widening, etc.).
- iv. Question 2a: *Rate the importance of these ring route screening measures with 10 being very important and 1 being unimportant.* Responses below:



- v. Question 2b: *What other screening measures could we consider?*  
Responses below:
1. Noise impacts along interstate
  2. Economic growth and attractions to areas close to the ring route
  3. Incident alternate routes (public safety)
  4. Resource and costs to construct and maintain
  5. Overall system costs for upkeep in the entire region
  6. Construction cost and maintenance

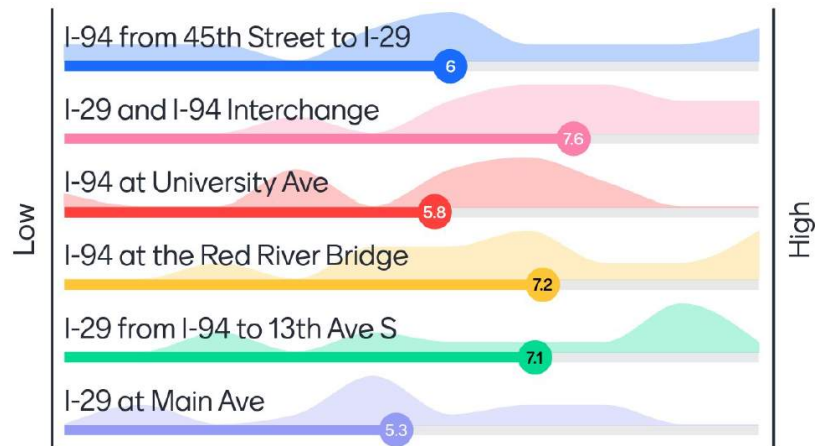
**b. Group B – Public Works, First Responders and Freight**

- i. Question 1a: *What are the most important issues/opportunities to be addressed by the Interstate Operations Study?* Responses below:





- ii. Question 1b: *What other issues/opportunities could this study address?*  
The only response was:
  - 1. The impact of automated vehicles on safety and congestion.
- iii. The existing crash data was presented.
- iv. Question 2a: *What is your level of concern at each of the following locations?* Responses below:



- v. Question 2b: *What other areas on the interstate have safety concerns?*  
Responses below:
  - 1. I-29 and 52<sup>nd</sup> Ave S
  - 2. I-94 and Veterans Blvd
  - 3. I-29 between 12<sup>th</sup> Ave N and 19<sup>th</sup> Ave N during events at the Fargodome
  - 4. I-29 and 32<sup>nd</sup> Ave S – EB to NB on-ramp and SB to EB off-ramp
- vi. The existing speed profiles for the AM and PM peak hours for I-29 and I-94 were presented.
- vii. Question 3: *Are there other locations along the interstate system experiencing recurring congestion?* The only response was
  - 1. There is congestion at the tri-level where I-29 SB ramp merges with I-94 EB ramp.

c. Next Steps

- i. Finalize the existing conditions assessment
- ii. Conduct future conditions assessment
- iii. Conduct Focus Group Meeting #2



## Interstate Operations Analysis & Plan for Future Improvements

SRC Meeting #2  
Existing Conditions



1

# AGENDA

- 01 Introductions
- 02 Project Status Update
- 03 Existing Conditions Discussion
- 04 Ring Route Discussion
- 05 Other Items
- 06 Next Steps

2

# 01

## Introductions

3

### 01 Introductions

HDR Staff

Metro COG

NDDOT

MnDOT

Cass County

Clay County

City of Fargo

City of West Fargo

City of Moorhead

ATAC



## **01 Project Objectives/Outcomes**

- Determine the pros/cons of potential ring routes in order to make recommendation
- Present a clear menu of prioritized improvements
- Provide operational and analytical data to assist with later project development phases
- Have the study results that are intuitive and easy to interpret

# **02**

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## **Project Status Update**

## Data Collection Efforts

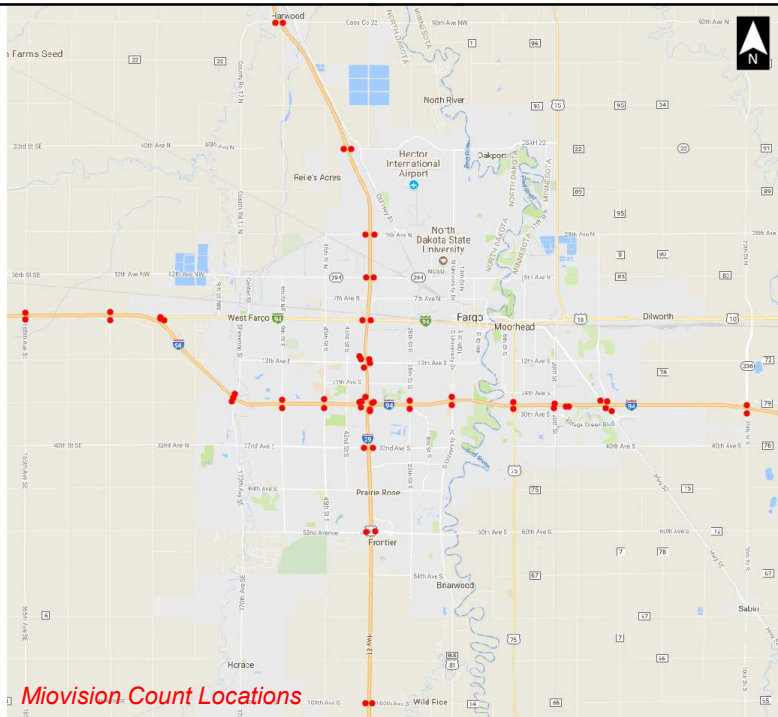
- ✓ Traffic
- ✓ Land Use
- ✓ Environmental
- ✓ Demographic
- ✓ Basemaps (GIS boundaries)
- ✓ Relevant Plans / Studies
- ✓ Travel Demand Model



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## Data Collection Traffic Counts

- FM COG's Traffic Count Program
- NDDOT's Count Program
- ATR Data
- **Miovision**
  - Collected Sept 14-16
  - Peak Period Counts



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## Existing Conditions Assessment



Speed Profiles



Crash Assessment



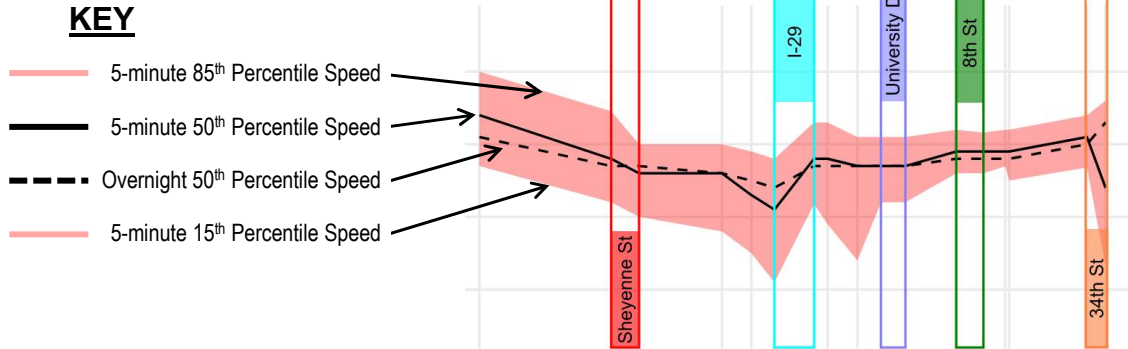
Origin-Destination Analysis

# 03

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## Existing Conditions Discussion

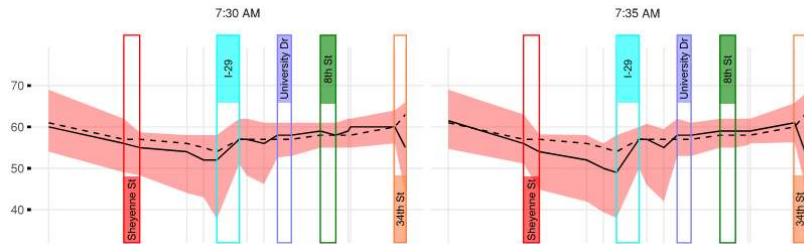
# Existing Conditions Speed Profiles



- 2019 NPMRDS Probe Data
- Monday – Thursday (Excluding Holidays)



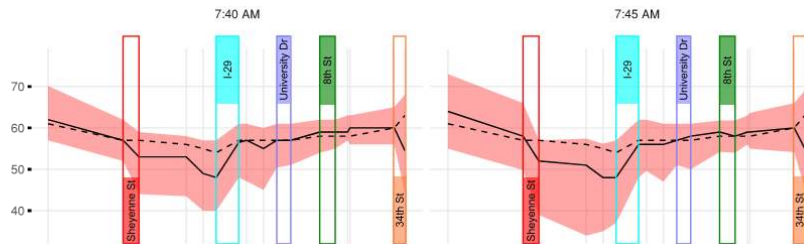
# Existing Conditions Speed Profiles



Direction of Travel



**Eastbound**  
**AM Peak**



## Existing Conditions Speed Profiles



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## Existing Conditions Speed Profiles

### Summary

- Congestion begins around 7:35 AM
- Congestion end around 7:55 AM
- Peak of AM congestion is 7:45 AM
- Congestion occurs between Sheyenne Street through I-29
- Peak area of congestion is between 45<sup>th</sup> Street to I-29 w/ around 8 MPH speed drop

**INTERSTATE 94**  
**Eastbound**  
**AM Peak**



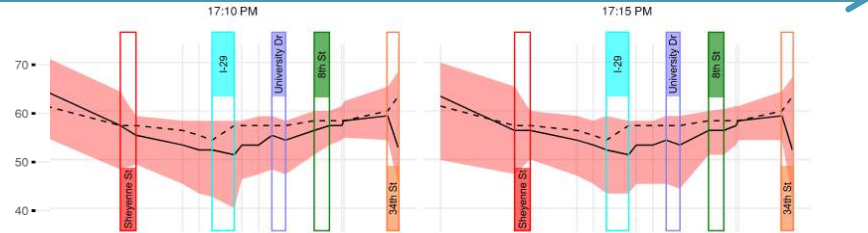
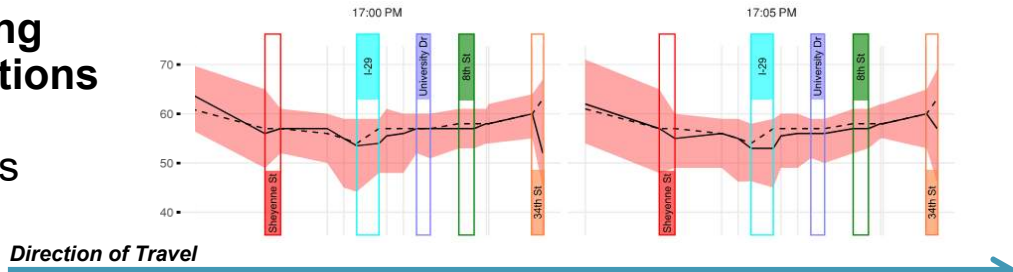
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# Existing Conditions Speed Profiles



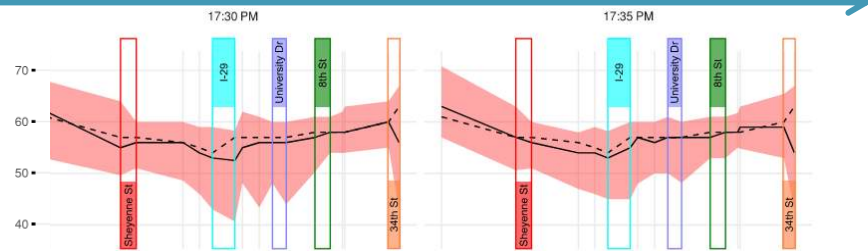
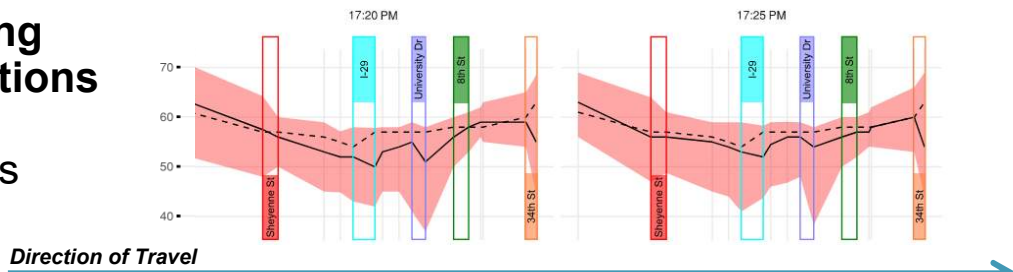
**Eastbound**  
**PM Peak**



# Existing Conditions Speed Profiles



**Eastbound**  
**PM Peak**



# Existing Conditions Speed Profiles

## Summary

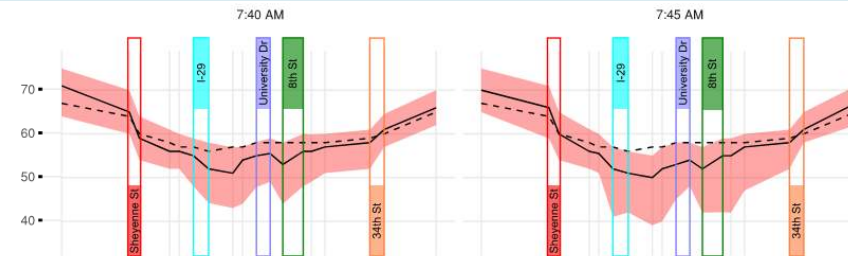
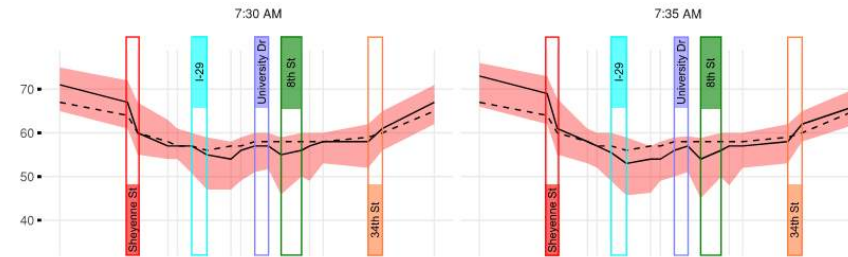
- Congestion begins around 5:10 PM
- Congestion end around 5:25 PM
- Peak of PM congestion is 5:15 PM
- Congestion occurs between Sheyenne Street through 8<sup>th</sup> Street
- Peak area of congestion is between I-29 to University w/ around 5 MPH speed drop



**Eastbound**  
**PM Peak**



# Existing Conditions Speed Profiles

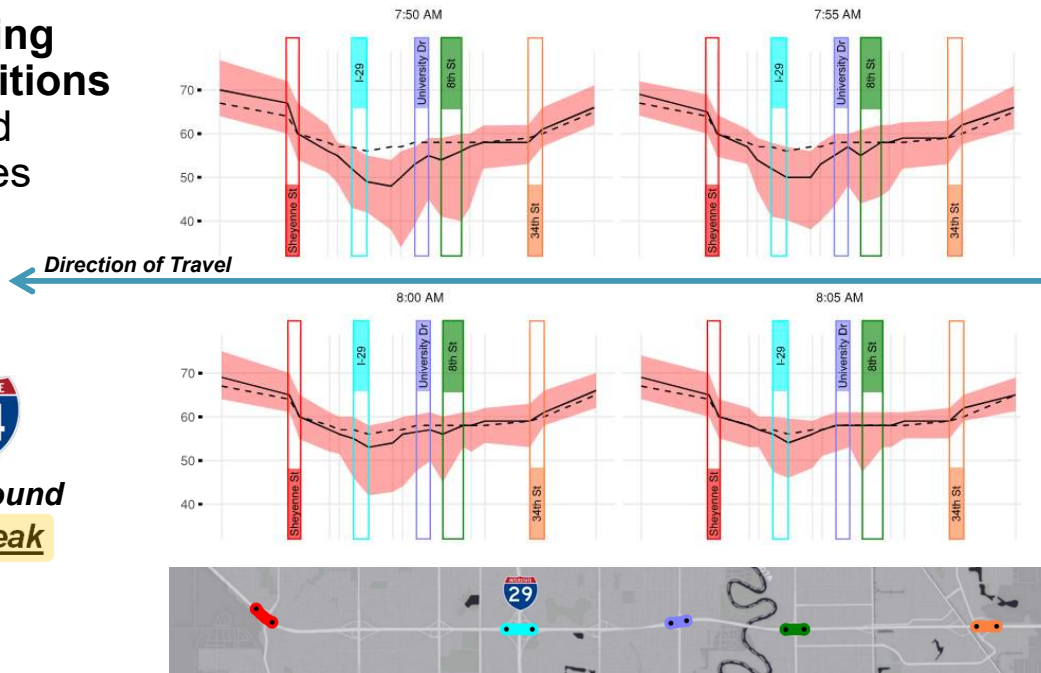


**Westbound**  
**AM Peak**



# Existing Conditions Speed Profiles

**Westbound**  
**AM Peak**



# Existing Conditions Speed Profiles

**Westbound**  
**AM Peak**

**Summary**

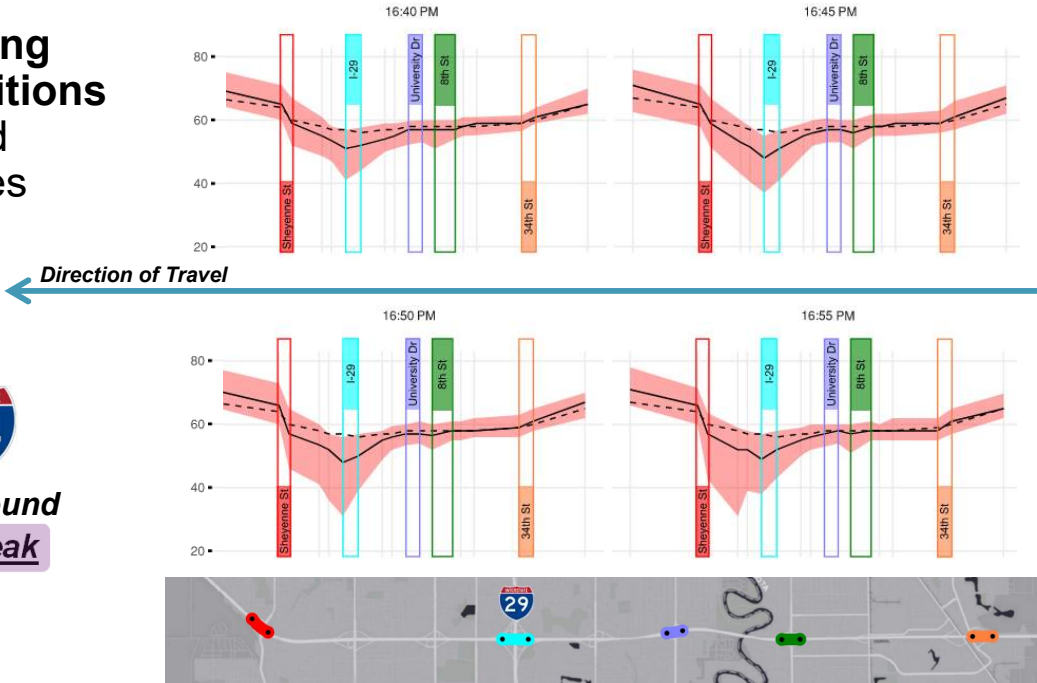
- Congestion begins around 7:35 AM
- Congestion end around 8:00 AM
- Peak of AM congestion is 7:50 AM
- Congestion occurs between 8<sup>th</sup> Street through 45<sup>th</sup> Street
- Peak area of congestion is between 25<sup>th</sup> Street to I-29 w/ around 9 MPH speed drop



# Existing Conditions Speed Profiles



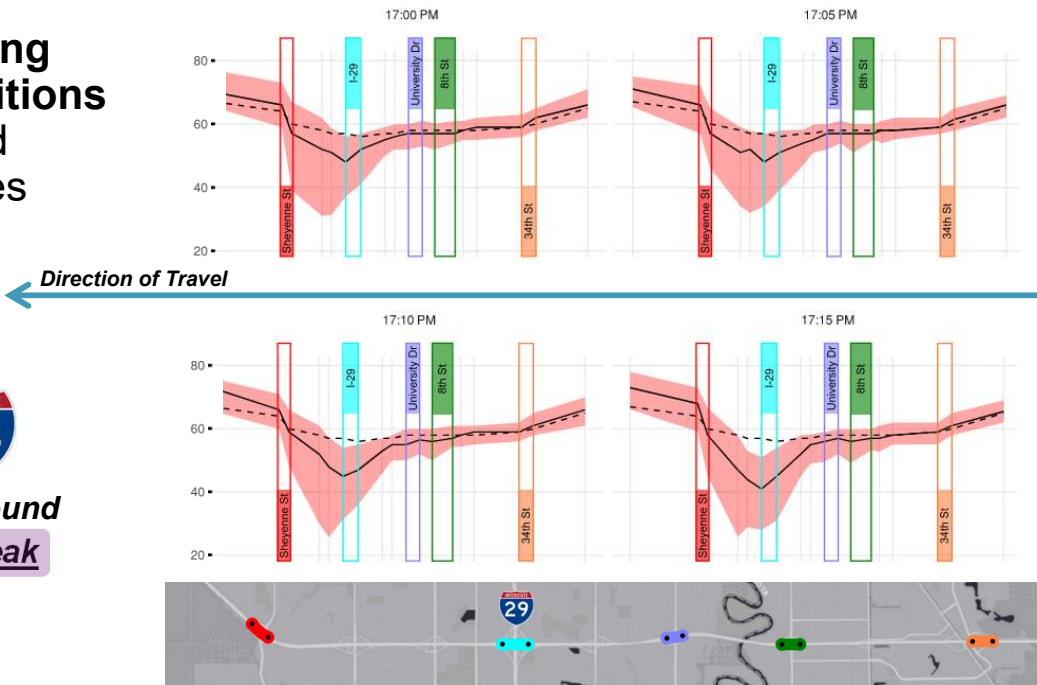
**Westbound**  
**PM Peak**



# Existing Conditions Speed Profiles

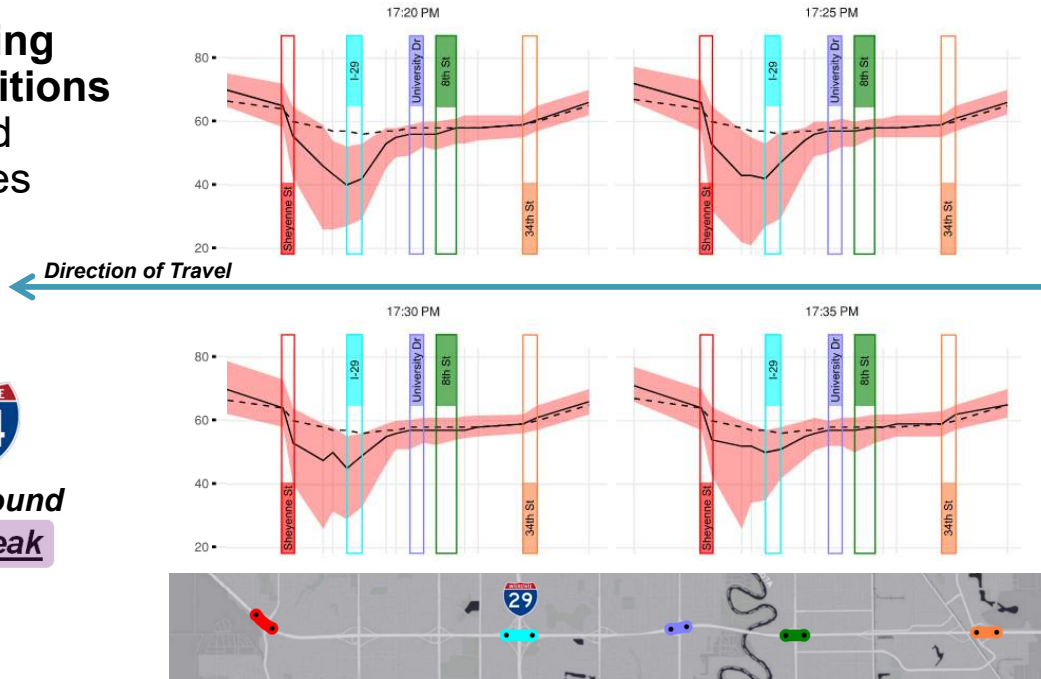


**Westbound**  
**PM Peak**



# Existing Conditions Speed Profiles

**INTERSTATE 94**  
**Westbound**  
**PM Peak**



# Existing Conditions Speed Profiles

**INTERSTATE 94**  
**Westbound**  
**PM Peak**

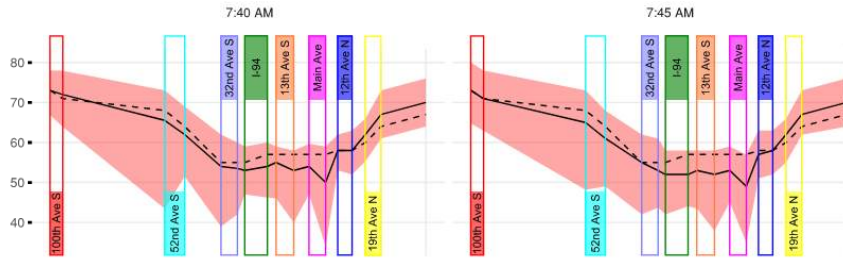
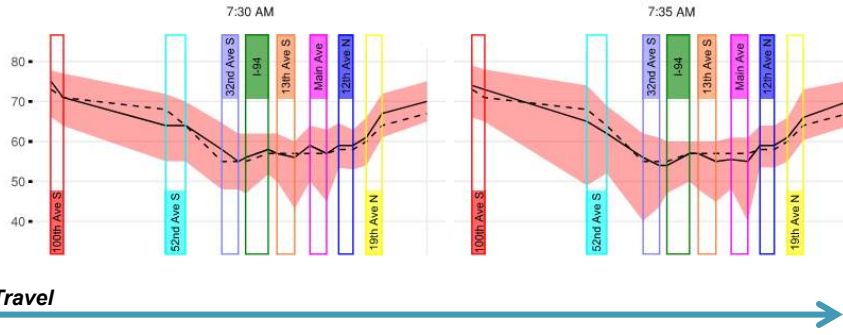
**Summary**

- Congestion begins around 4:45 PM
- Congestion end around 5:30 PM
- Peak of PM congestion is 5:20 PM
- Congestion occurs between 25th Street to Sheyenne Street
- Peak area of congestion is between 25<sup>th</sup> Street through 45<sup>th</sup> w/ around 16 MPH speed drop



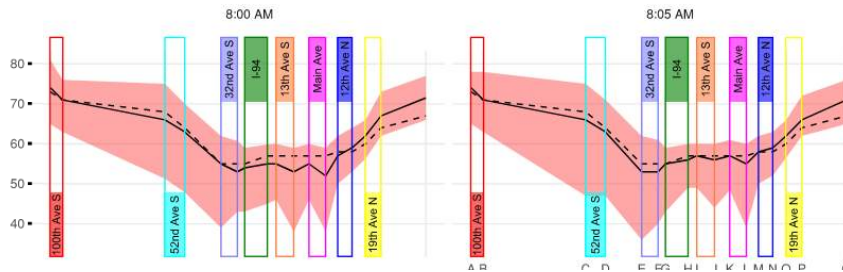
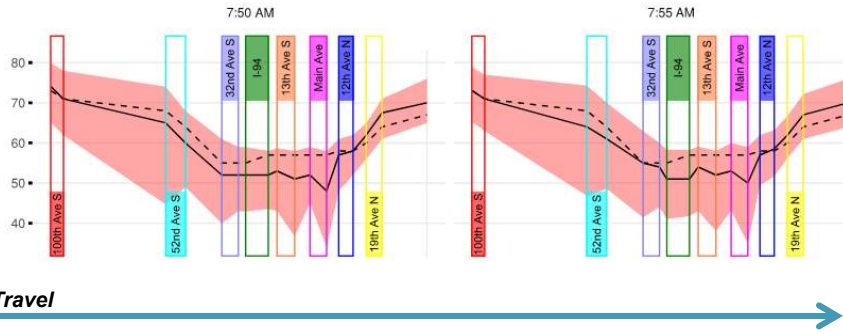
# Existing Conditions Speed Profiles

**INTERSTATE 29**  
**Northbound**  
**AM Peak**



# Existing Conditions Speed Profiles

**INTERSTATE 29**  
**Northbound**  
**AM Peak**



# Existing Conditions Speed Profiles

## Summary

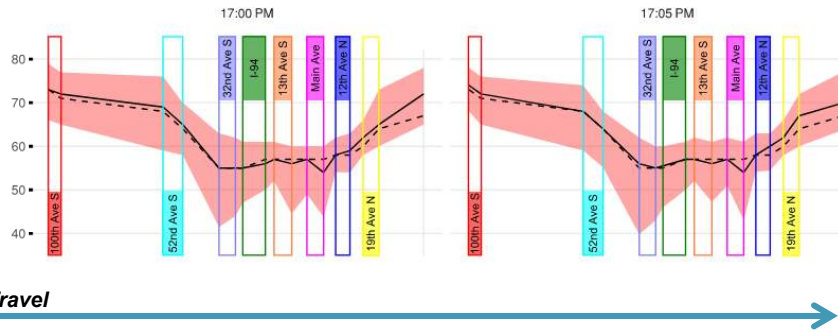
- Congestion begins around 7:40 AM
- Congestion end around 8:00 AM
- Peak of AM congestion is 7:50 AM
- Congestion occurs between 32<sup>nd</sup> Ave S through Main Ave
- Peak area of congestion at Main Ave w/ around 8 MPH speed drop



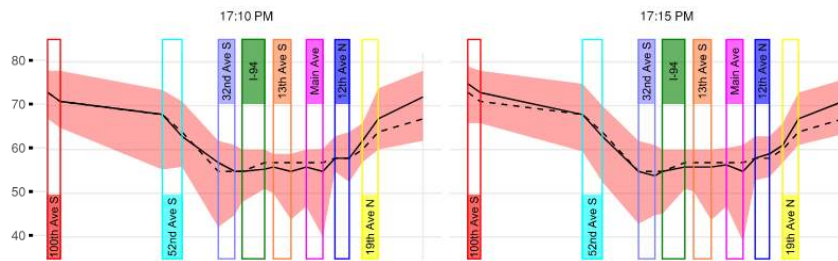
**Northbound**  
**AM Peak**



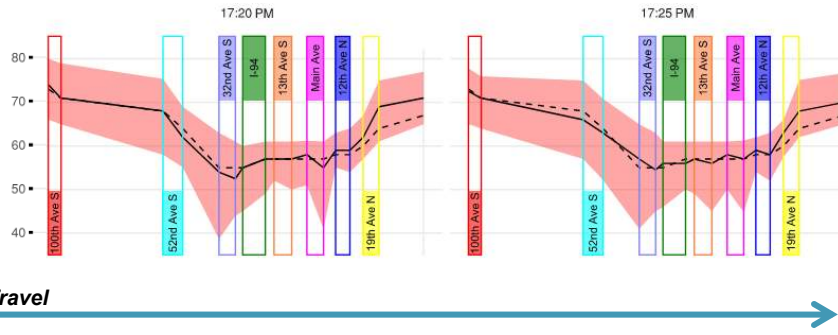
# Existing Conditions Speed Profiles



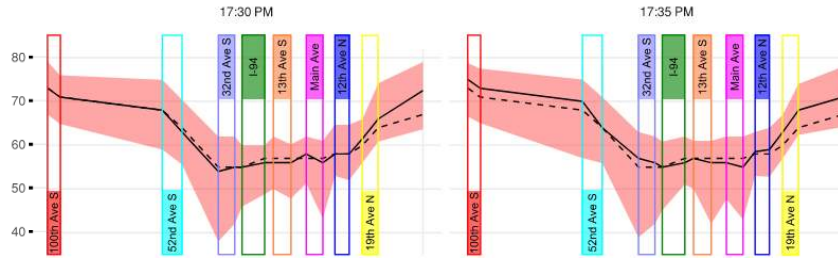
**Northbound**  
**PM Peak**



# Existing Conditions Speed Profiles



**INTERSTATE 29**  
**Northbound**  
**PM Peak**



# Existing Conditions Speed Profiles

Summary

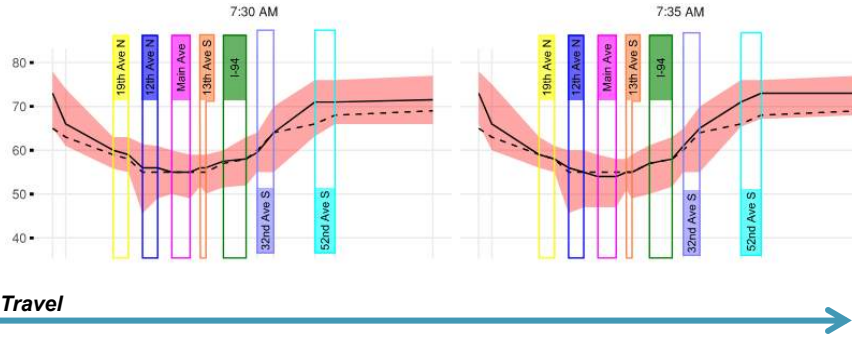
- No discernable congestion

**INTERSTATE 29**  
**Northbound**  
**PM Peak**



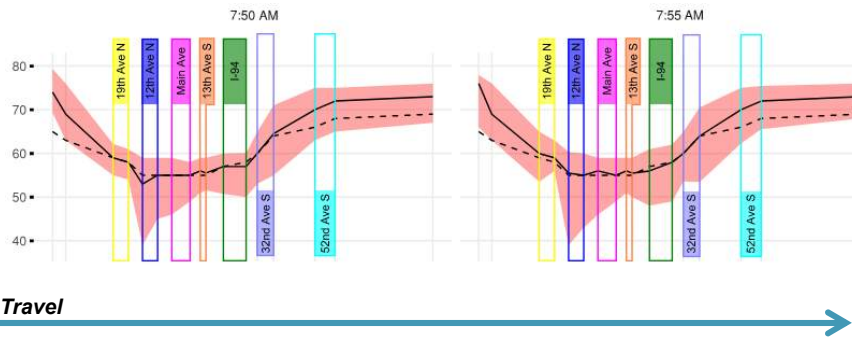


# Existing Conditions Speed Profiles



**Southbound**  
**AM Peak**

# Existing Conditions Speed Profiles



**Southbound**  
**AM Peak**

# Existing Conditions Speed Profiles

## Summary

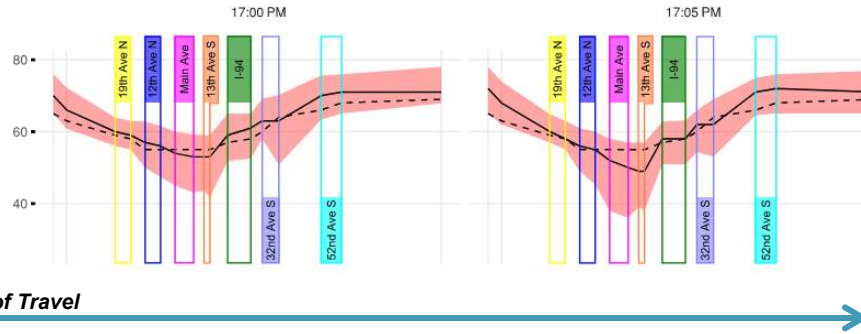
- Congestion at 12<sup>th</sup> Ave N at 7:45 AM w/ around a 5 MPH speed drop



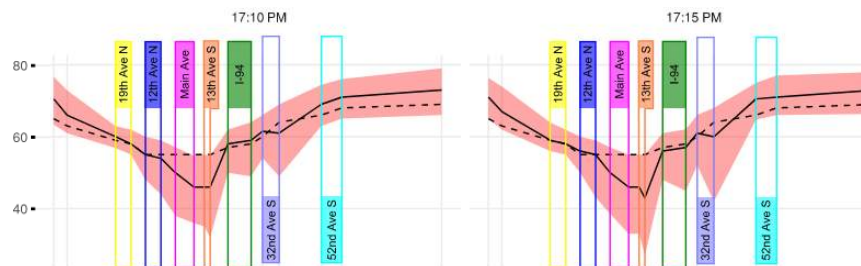
Southbound  
AM Peak



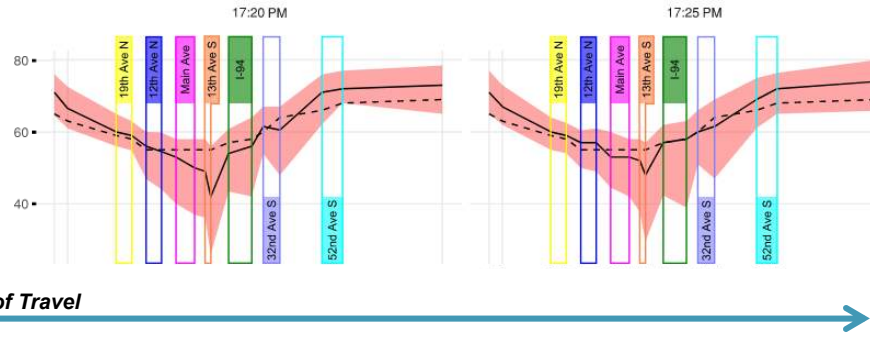
# Existing Conditions Speed Profiles



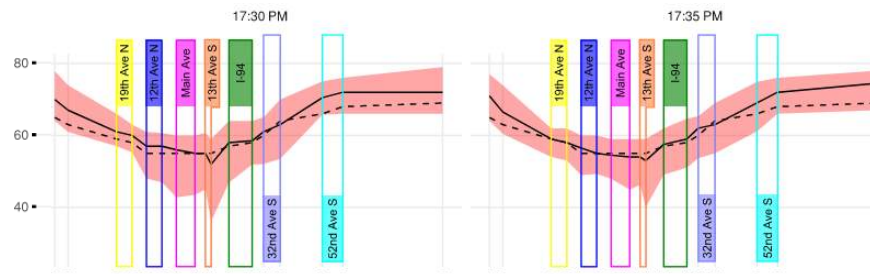
Southbound  
PM Peak



# Existing Conditions Speed Profiles



**INTERSTATE 29**  
**Southbound**  
**PM Peak**



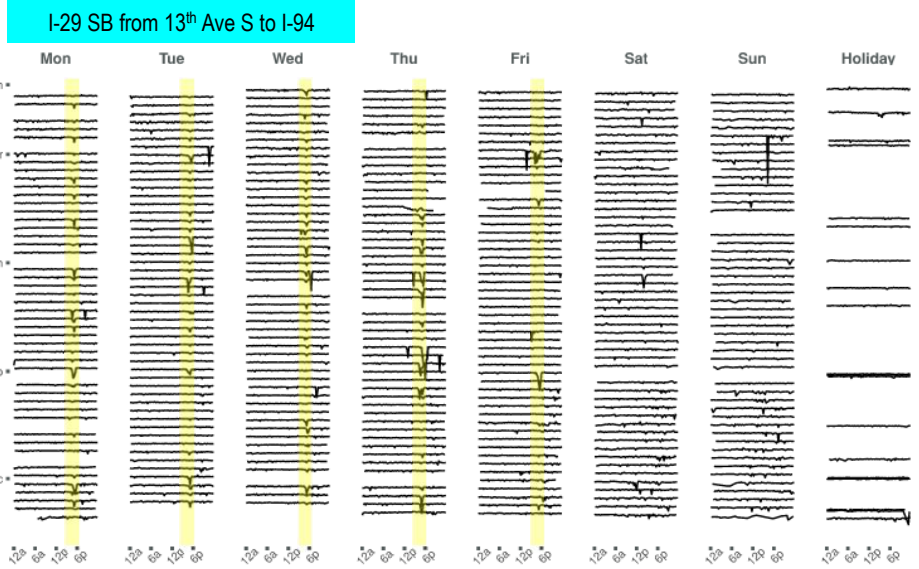
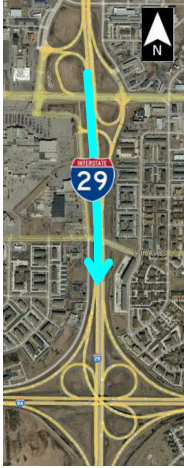
# Existing Conditions Speed Profiles

## Summary

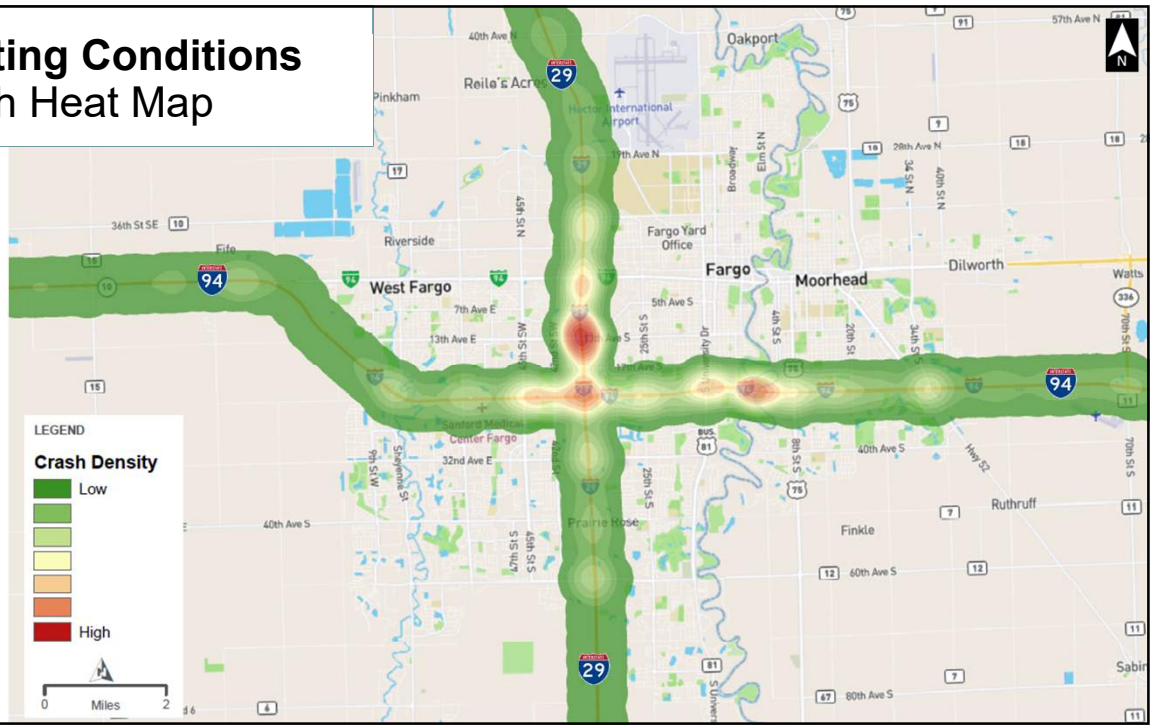
- Congestion begins around 5:05 PM
- Congestion end around 5:25 PM
- Peak of PM congestion is 5:15 PM
- Congestion occurs between 12<sup>th</sup> Ave N to I-94
- Peak area of congestion at 13<sup>th</sup> Ave S w/ around 11 MPH speed drop

**INTERSTATE 29**  
**Southbound**  
**PM Peak**

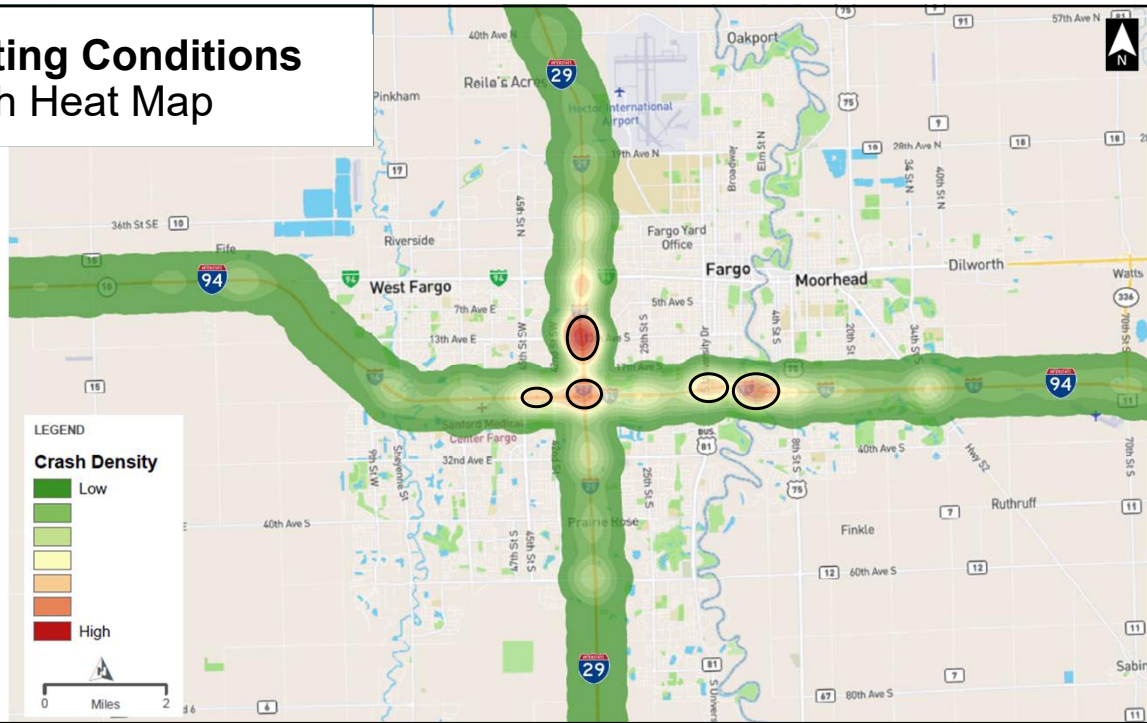
# Existing Conditions Speed Profiles



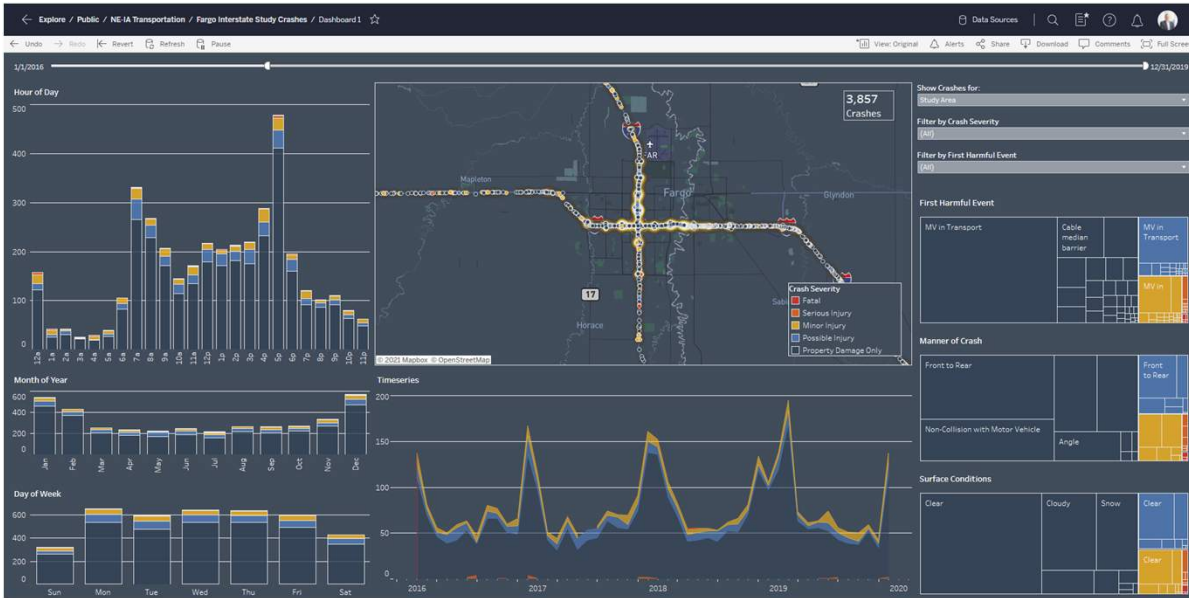
# Existing Conditions Crash Heat Map



# Existing Conditions Crash Heat Map

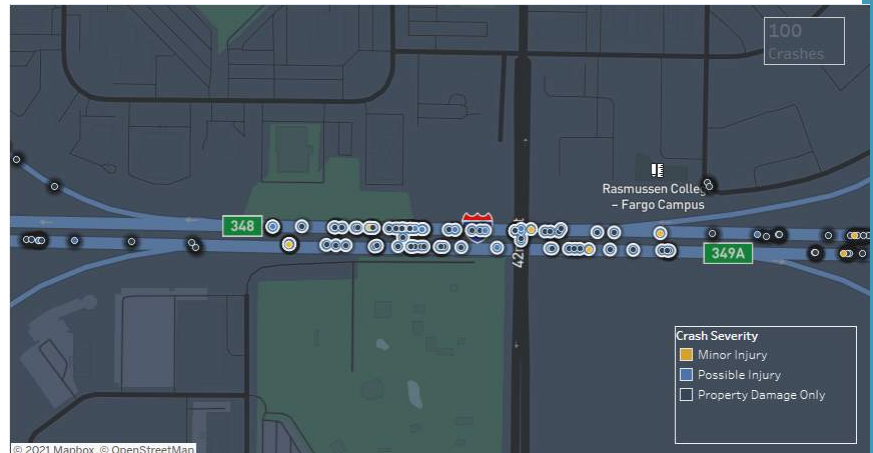


# Existing Conditions – Crash Dashboard (2016 – 2019)



## Crash Dashboard: I-94 (45<sup>th</sup> Street to I-29)

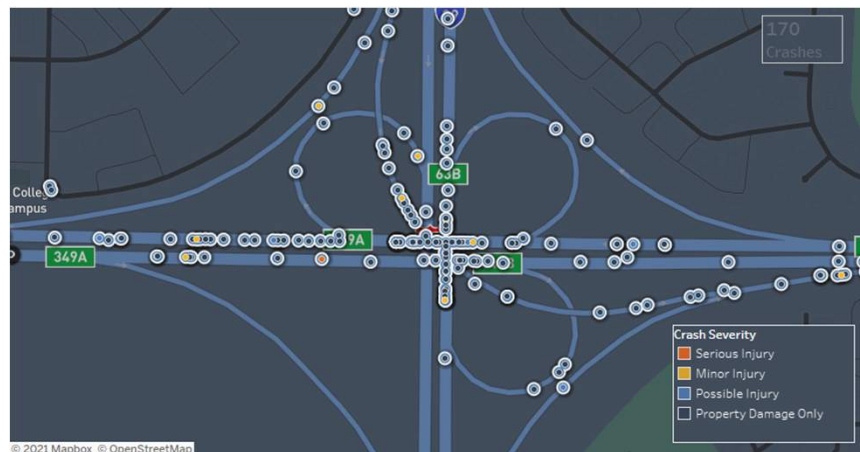
- Number of Crashes
  - 100 total
  - 42 EB (primarily 7AM/8AM)
  - 64 WB (primarily 4PM/5PM)
- Types of Crashes
  - 64 rear-end
  - 13 side-swipe



41

## Crash Dashboard: I-94 & I-29 System Interchange

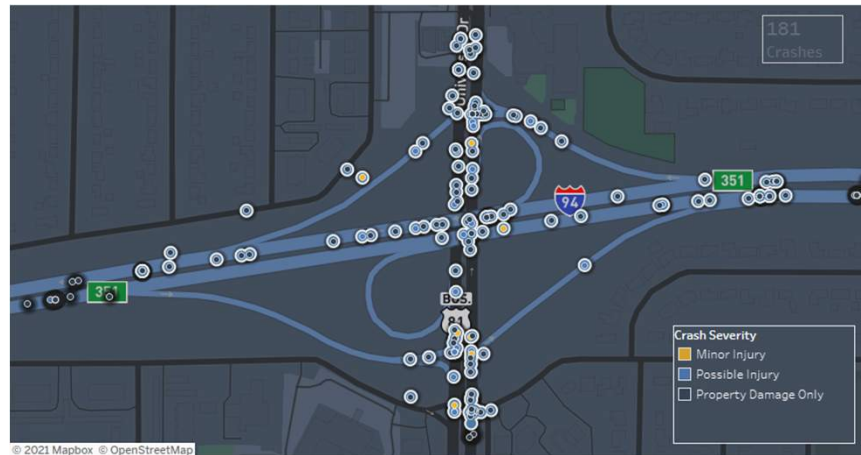
- Number of Crashes
  - 37 on I-94 WB (I-29 on-ramp to I-29 off-ramp) – primarily 5PM
  - 23 on I-29 NB (I-94 on-ramp to I-94 off-ramp) – primarily 7AM
  - 21 on tri-level – primarily 9am & January
- Types of Crashes
  - 58 rear-end
  - 56 non-collision w/ vehicle
  - 25 side-swipe



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## Crash Dashboard: I-94 & University Drive

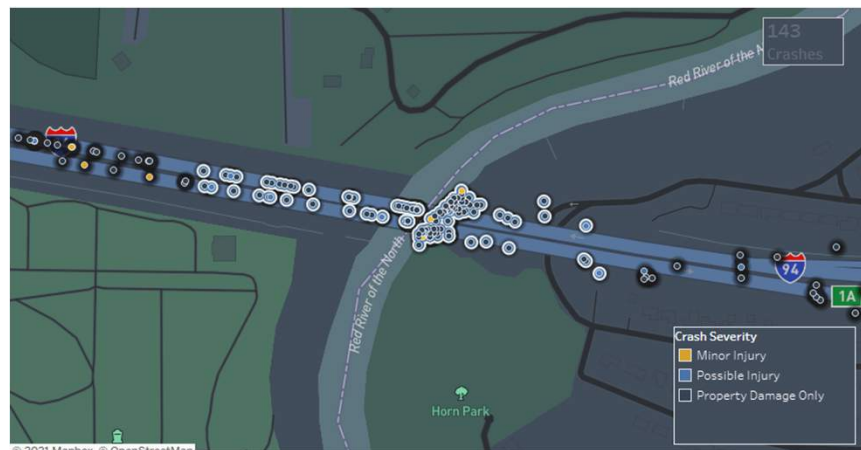
- Number of Crashes
  - 22 on I-94 WB (between NB on-ramp and SB on-ramp) primarily 8AM in Dec/Jan/Feb
- Types of Crashes
  - 8 non-collision w/ vehicle
  - 4 rear-end
  - 3 angle
  - 2 side-swipe



43

## Crash Dashboard: I-94 & Red River Bridge

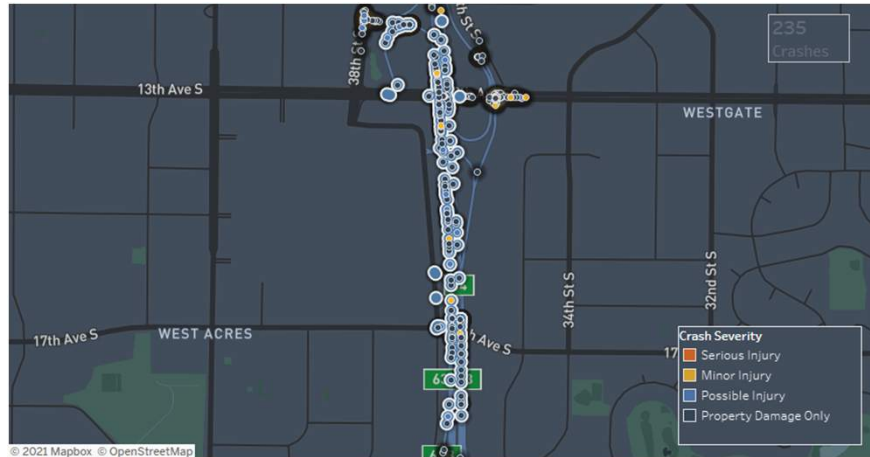
- Number of Crashes
  - 143 total – primarily 7AM/8AM/5PM in Dec/Jan/Feb
- Types of Crashes
  - 36 rear-end
  - 32 unknown
  - 30 non-collision w/ vehicle
  - 15 side-swipe



44

## Crash Dashboard: I-29 (I-94 to 13<sup>th</sup> Ave S)

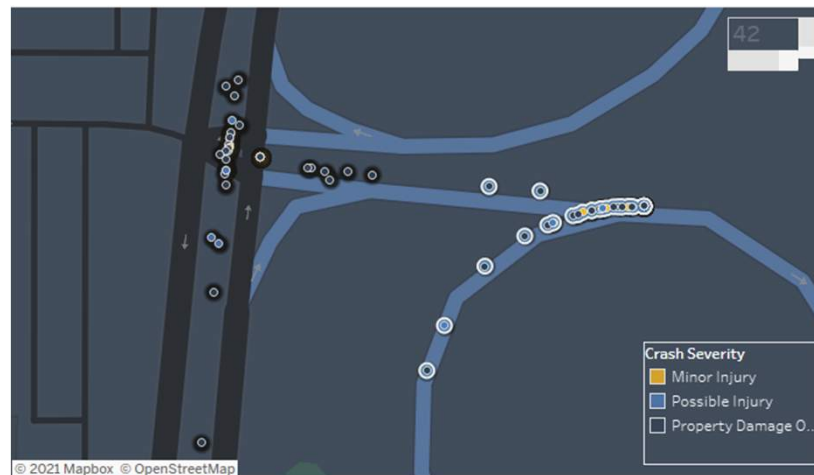
- Number of Crashes
  - 235 total crashes
- Types of Crashes
  - 113 rear-end
  - 69 non-collision w/ vehicle
  - 32 side-swipe
  - 11 property damage only



45

## Crash Dashboard: I-29 (13<sup>th</sup> Ave S SB On-Ramp Merge)

- 42 crashes
- Primarily during evening peak and lunch hour
- Types of Crashes
  - 42 rear-end

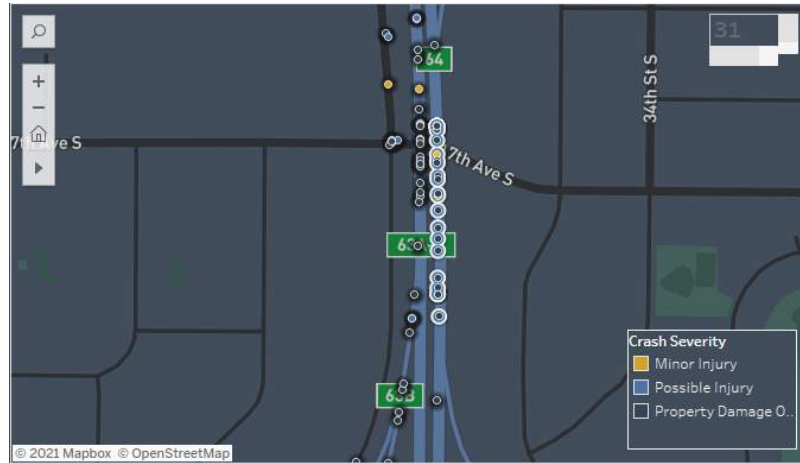


46



## Crash Dashboard: I-29 NB (I-94 to 13<sup>th</sup> Ave S)

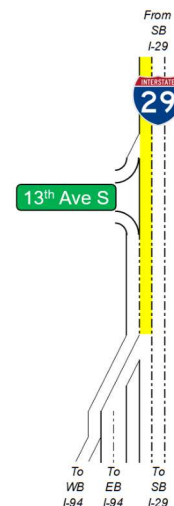
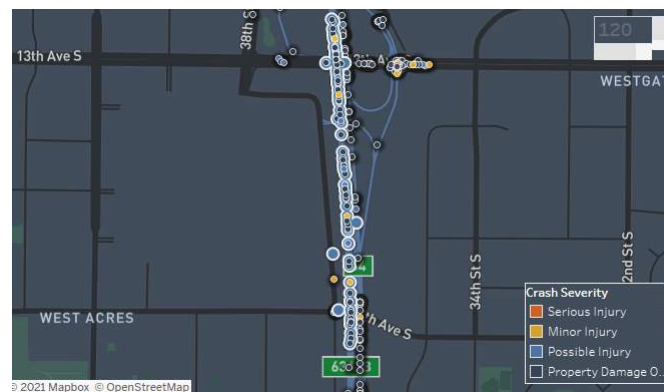
- 31 crashes
- Primarily at 7AM
- Primarily in January
- Types of Crashes
  - 13 non-collision w/ vehicle
  - 9 side swipe rear-end
  - 7 rear-end



47

## Crash Dashboard: I-29 SB (13<sup>th</sup> Ave S to I-94)

- 120 crashes
- Primarily at 5PM
- Primarily Dec/Jan
- Types of Crashes
  - 51 rear-end
  - 38 non-collision w/ vehicle
  - 16 side swipe



48

# 04

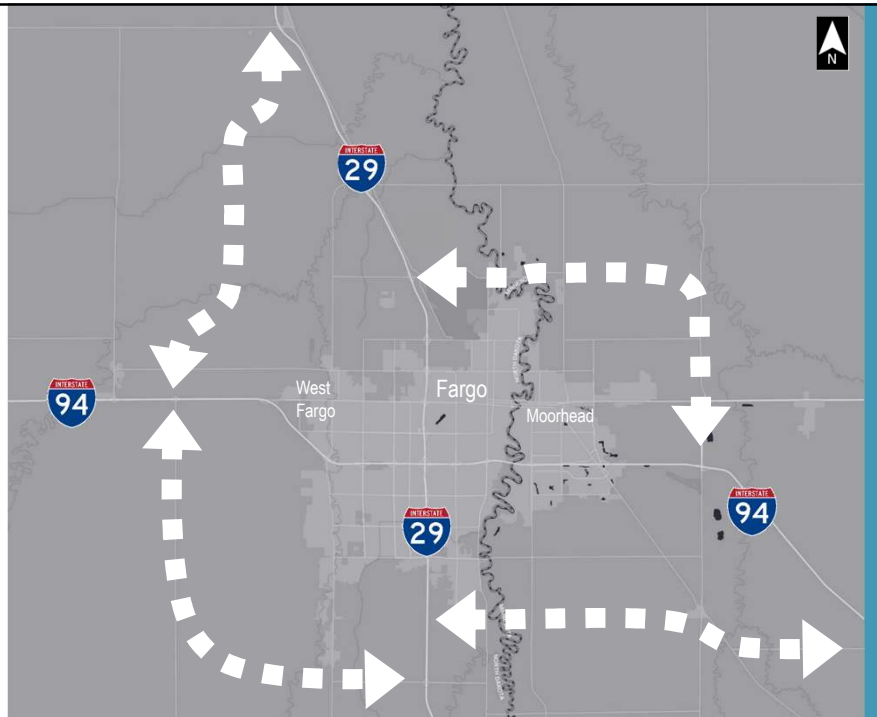
## Ring Route Discussion

49

### Ring Route Analysis

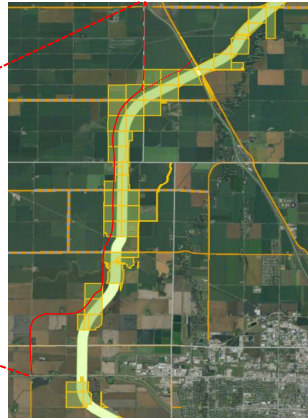
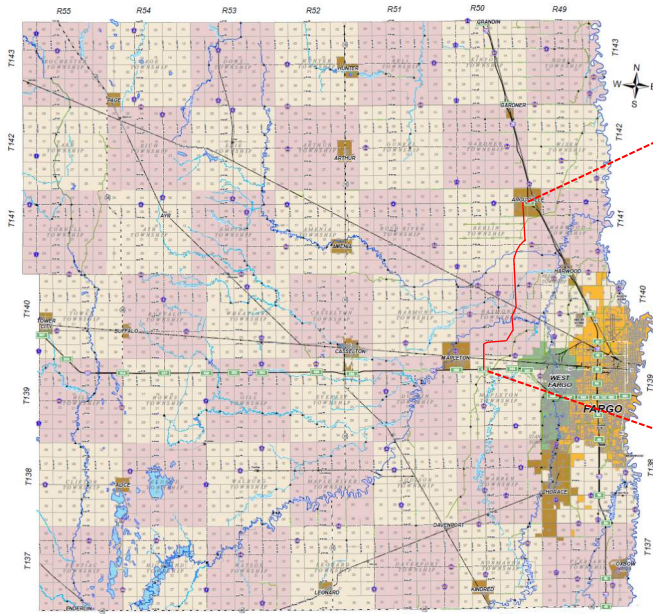
#### Questions for Discussion

- Roadway Alignment
- Facility Type
- Traffic Control
- Access Spacing
- Speeds
- Diversion Crossings



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# NW Ring Route



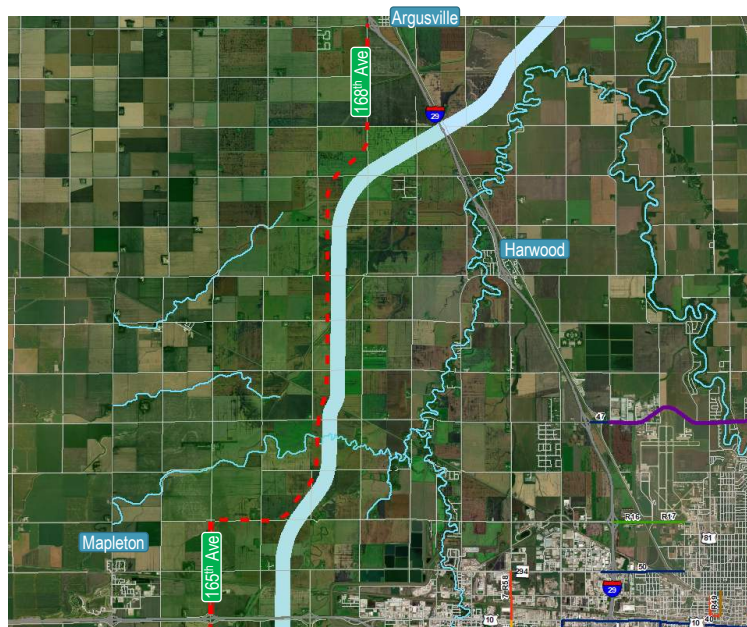
SOURCE: Cass County Highway Department

# NW Ring Route



## Baseline Assumptions

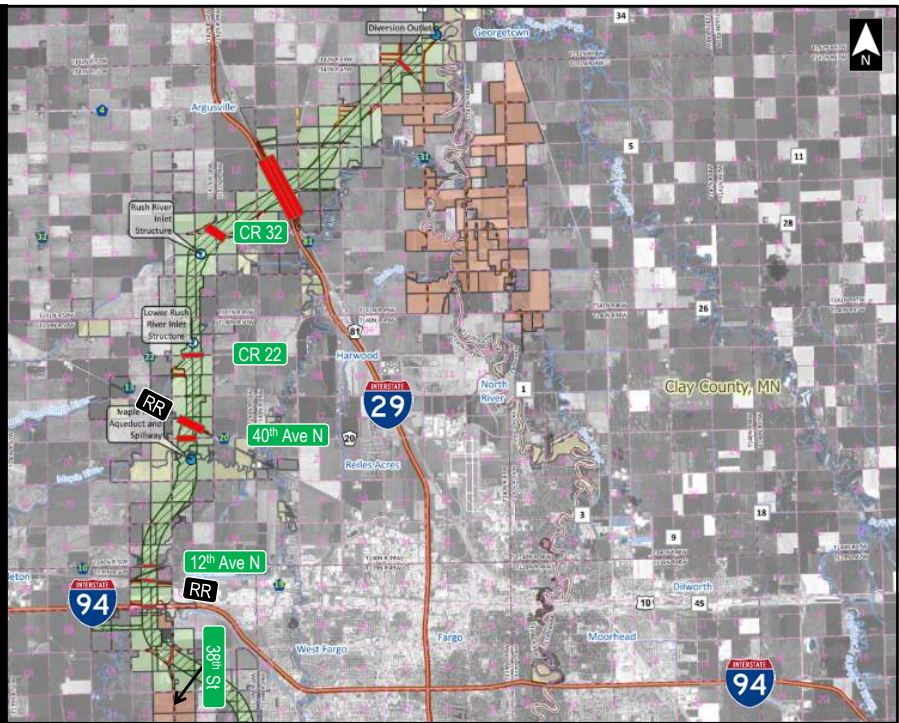
- Facility Type
  - 2-Lane with Shoulders
- Traffic Control
  - Free
- Access Spacing
  - At Diversion Crossings
- Speeds
  - 65 mph



# FM Area Diversion

## Northwest Quadrant

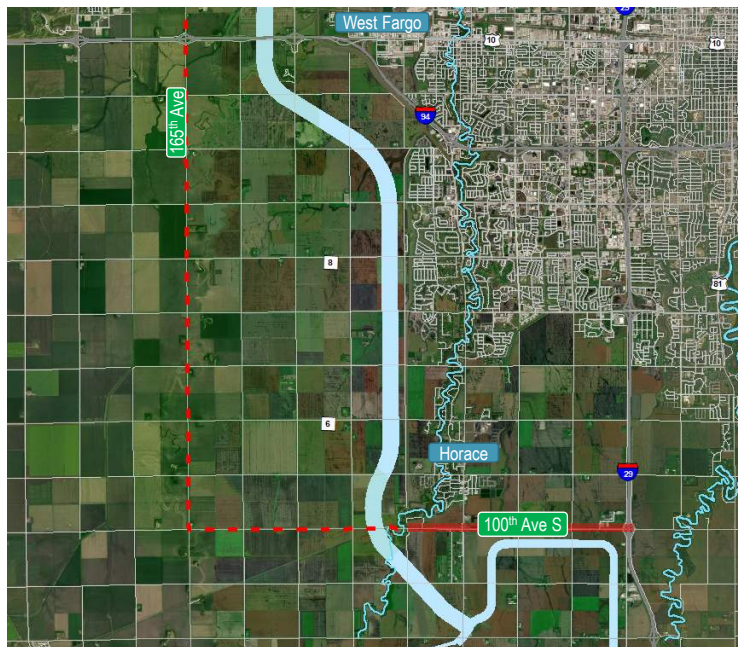
Diversion Crossings



# SW Ring Route

## Baseline Assumptions

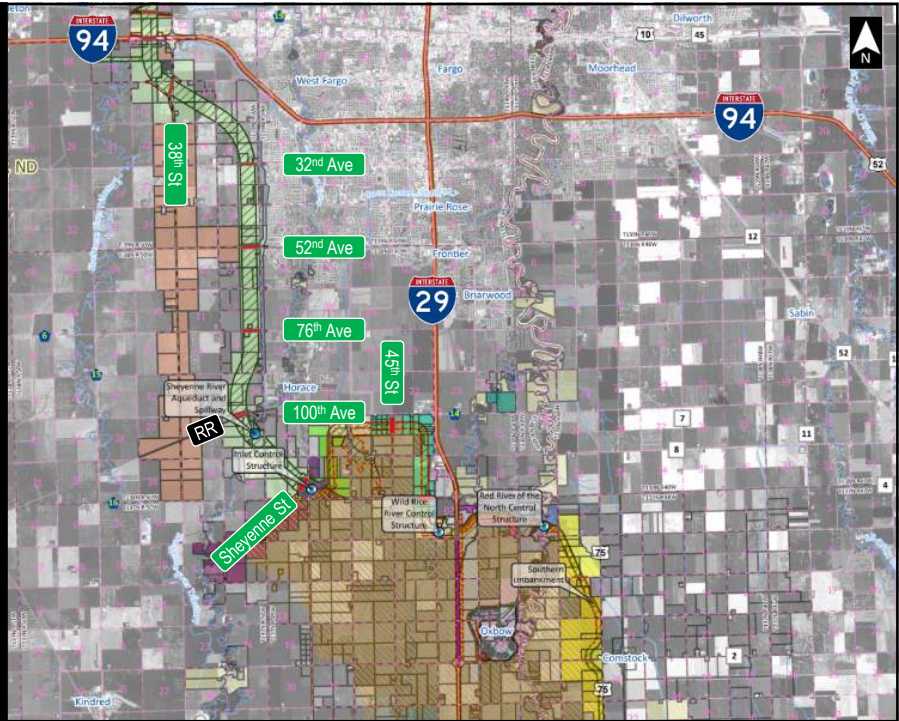
- Facility Type
  - 2-Lane with Shoulders
- Traffic Control
  - Free
- Access Spacing
  - At Diversion Crossings
- Speeds
  - 65 mph west of Diversion
  - 55 mph east of Diversion
    - Currently 40 mph at Interchange



# FM Area Diversion

## Southwest Quadrant

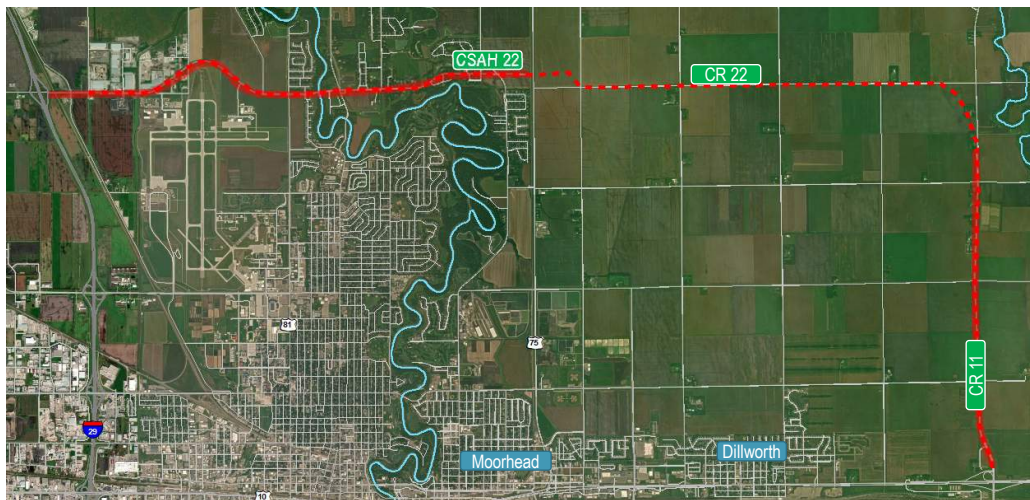
Diversion Crossings



# NE Ring Route

## Baseline Assumptions

- Facility Type
  - 2-Lane with Shoulders
- Traffic Control
  - Free in Rural
  - Signals and Driveways in Urban
- Access Spacing
  - Current Levels
- Speeds
  - 55 mph rural
  - 40 mph urban



## SE Ring Route

### Baseline Assumptions

- Facility Type
  - 2-Lane with Shoulders
- Traffic Control
  - Free in Rural
  - Signals and Driveways in Urban (South Fargo)
- Access Spacing
  - Current Levels
- Speeds
  - 55 mph rural
  - 40 mph urban



57

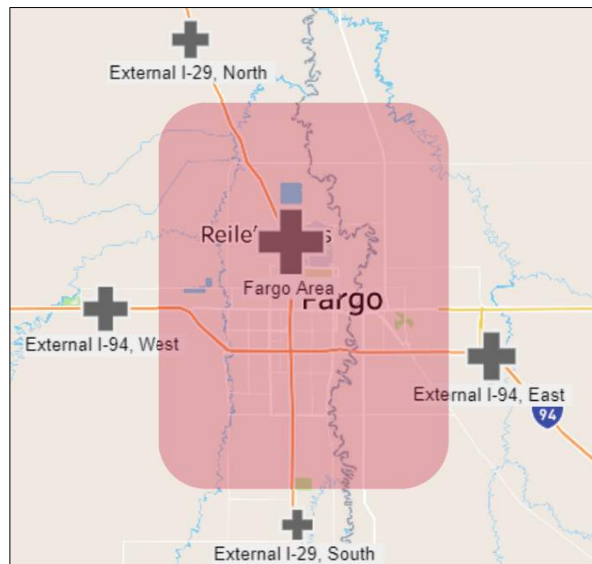
## Ring Route – Streetlight Results

### Externals

- I-94 West of CR 15 (165<sup>th</sup> Ave)
- I-94 East of MN 336
- I-29 North of Argusville (CR 4)
- I-29 South of CR 14 (100<sup>th</sup> Ave)

### Internal Zone

- Metro Area (shown in RED)

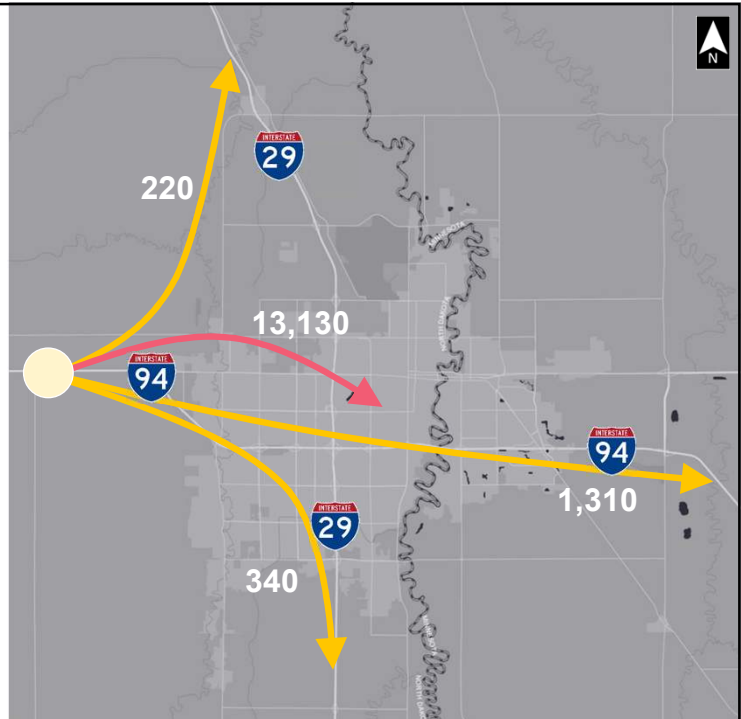


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## Ring Route Streetlight Results

- West External
- All Vehicles

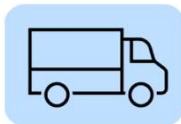
*~88% of Vehicles have an  
Origin / Destination in the  
Metro Area*



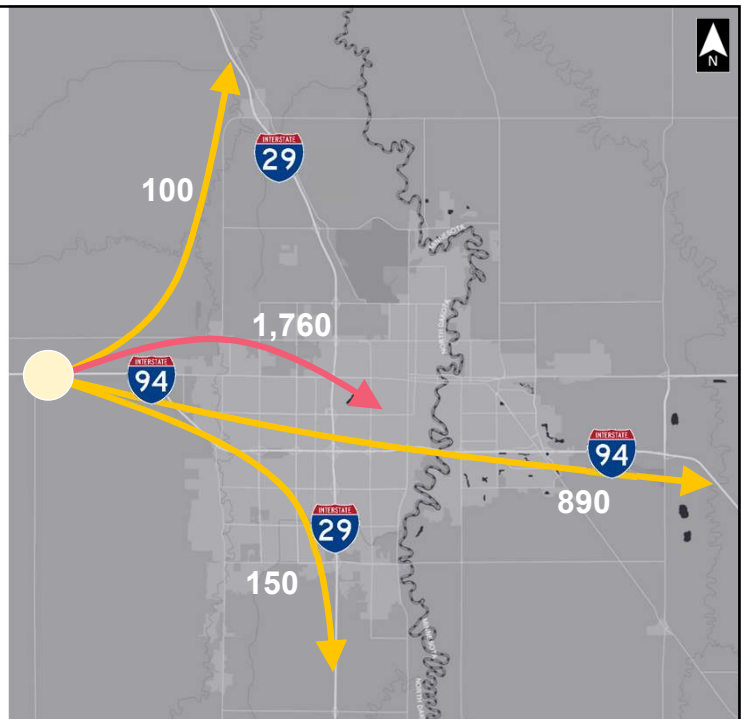
59

## Ring Route Streetlight Results

- West External
- Trucks

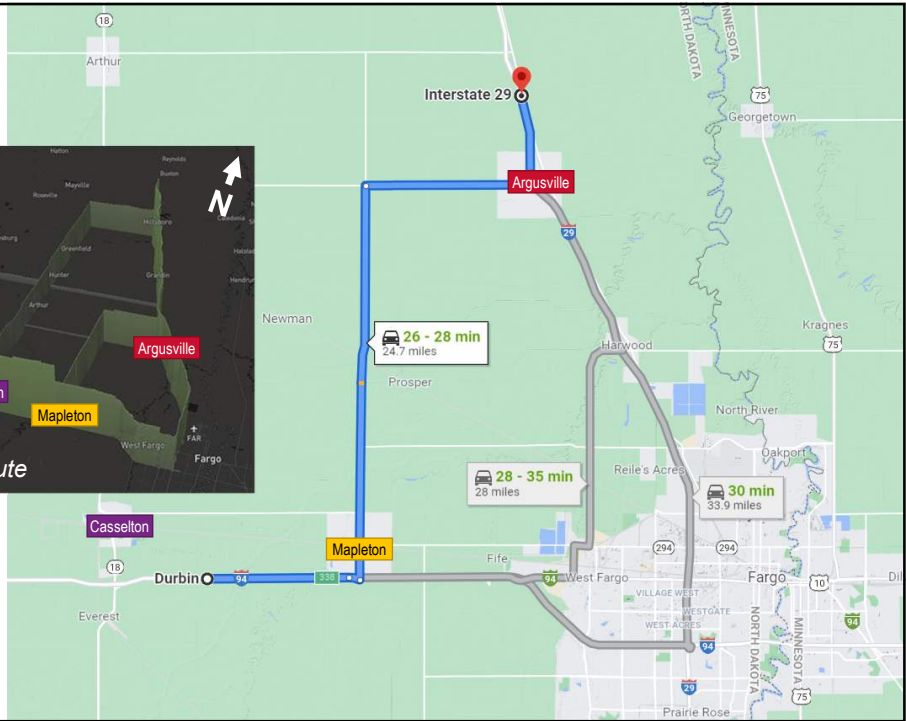


*~61% of Trucks have an  
Origin / Destination in the  
Metro Area*



60

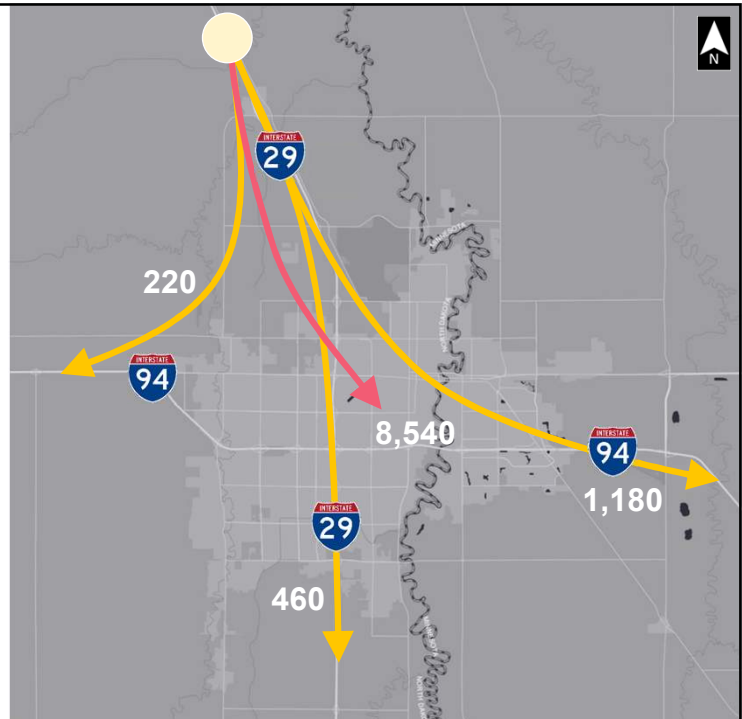
# Ring Route Google Maps



# Ring Route Streetlight Results

- North External
- All Vehicles

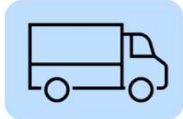
*~82% of Vehicles have an Origin / Destination in the Metro Area*



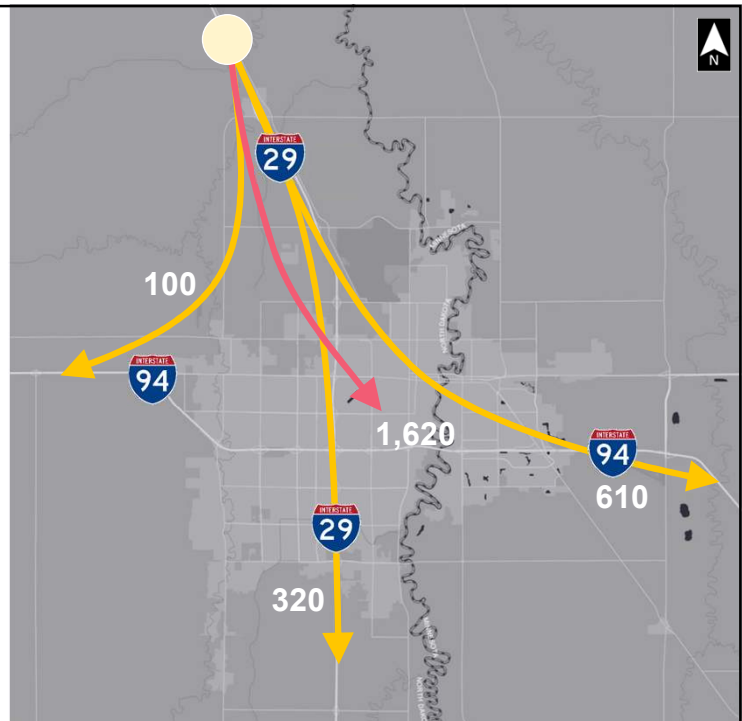


## Ring Route Streetlight Results

- North External
- Trucks



*~61% of Trucks have an Origin / Destination in the Metro Area*

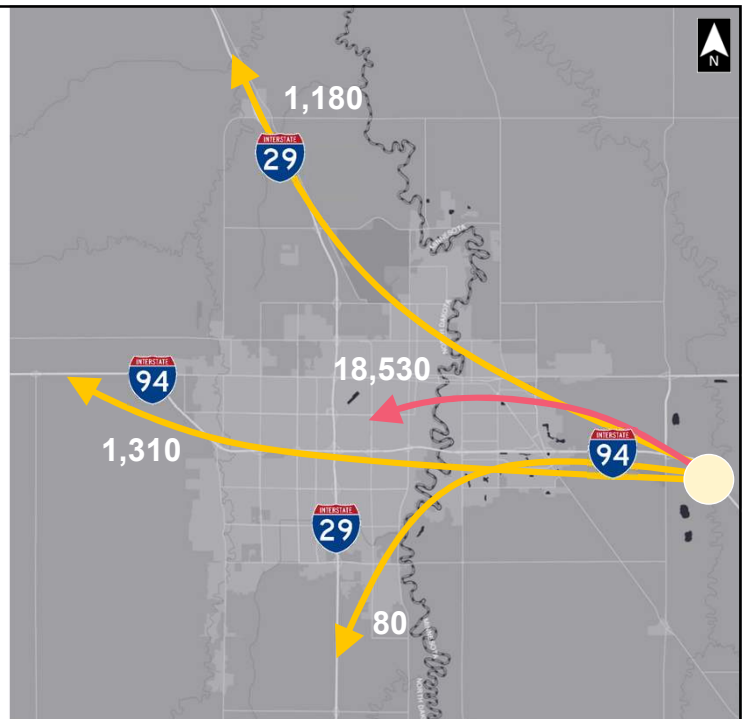


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## Ring Route Streetlight Results

- East External
- All Vehicles

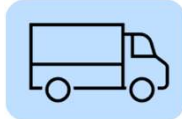
*~88% of Vehicles have an Origin / Destination in the Metro Area*



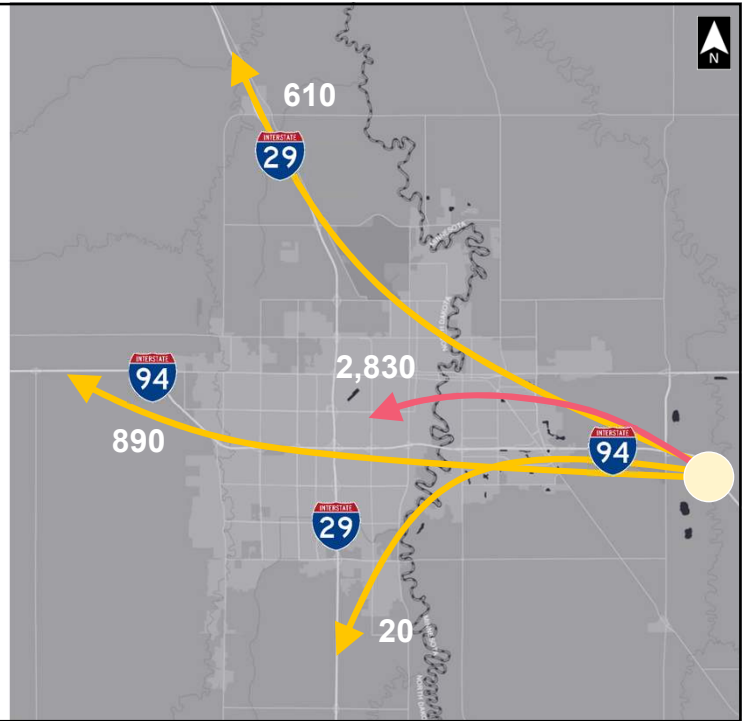
64

## Ring Route Streetlight Results

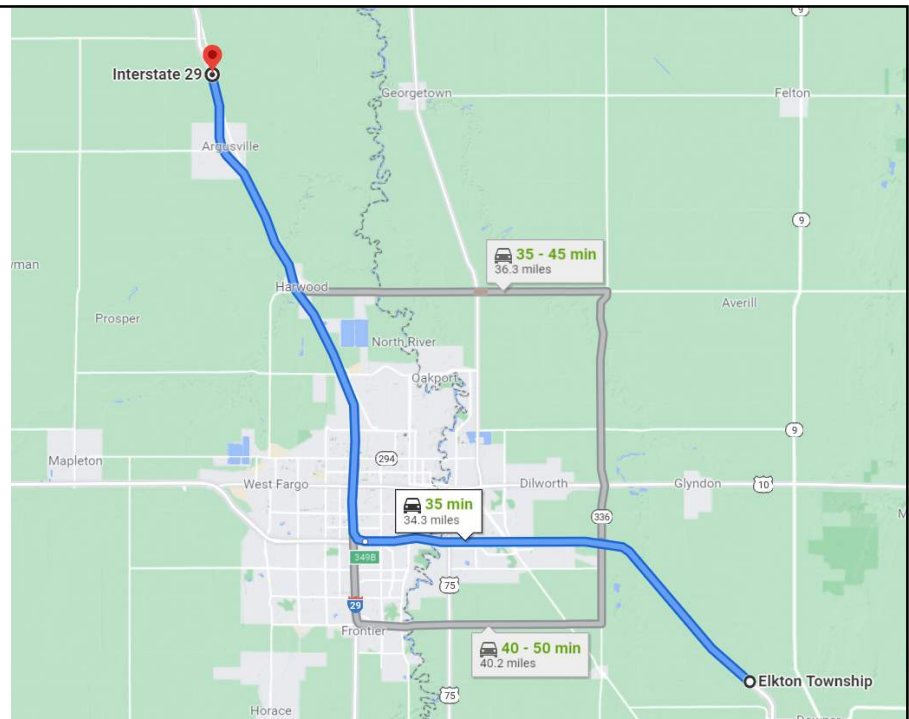
- East External
- Trucks



*~65% of Trucks have an Origin / Destination in the Metro Area*



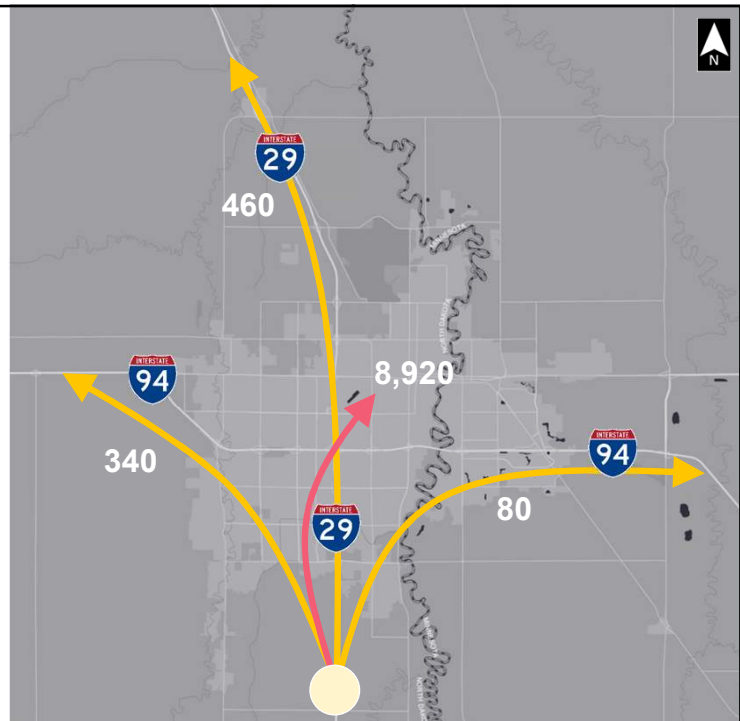
## Ring Route Google Maps



## Ring Route Streetlight Results

- South External
- All Vehicles

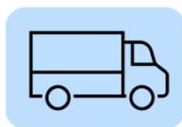
*~91% of Vehicles have an  
Origin / Destination in the  
Metro Area*



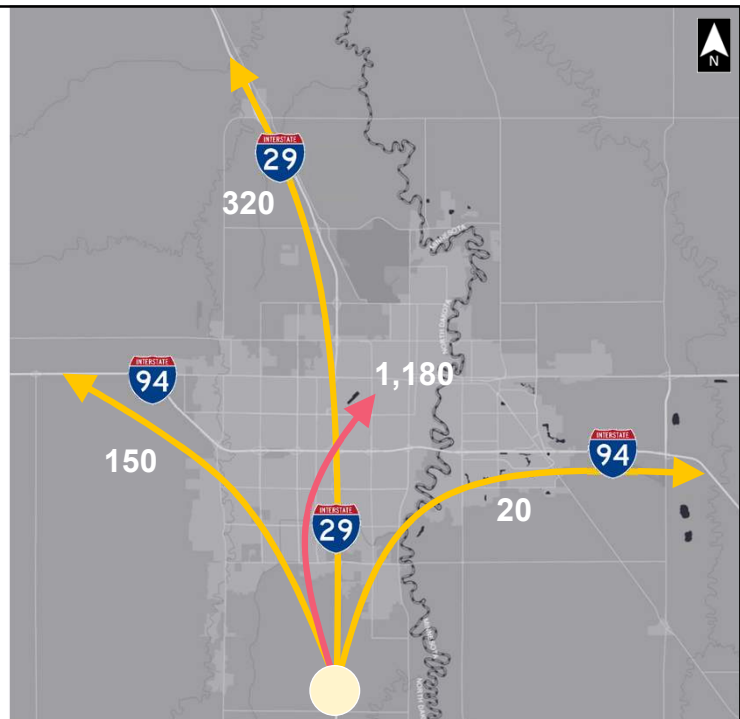
67

## Ring Route Streetlight Results

- South External
- Trucks









*~71% of Trucks have an  
Origin / Destination in the  
Metro Area*

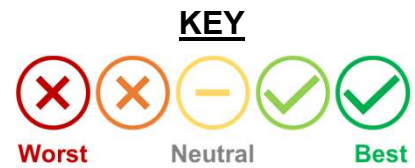


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## Ring Route Analysis

### Screening Measures

-  Volume Served
-  Volume Diverted from the Interstate
-  Peak Delay Reduction
-  Travel Time Benefit for Ring Route Traffic
-  Ring Route Cost
-  Environmental Concerns



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# 05

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## Other Items

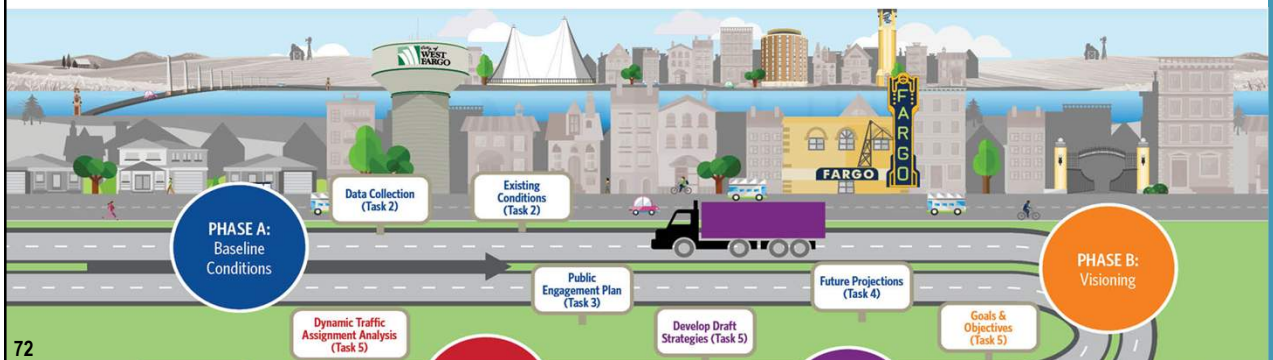
70

# 06

## Next Steps

### Next Steps

- Focus Group Meeting on November 3, 2021
- Finalize Existing Conditions Assessment
- Conduct Future Conditions Assessment
- Conduct Study Review Committee #3 - January 2022 (In-Person)



# Meeting Notes

Project: Interstate Operations Analysis and Plan for Future Improvements

Subject: SRC #3 – Conditions & Strategies

Date: Tuesday, March 08, 2022

Location: Hybrid: Webex & Metro COG

## 1. Introductions

- Attendees (in person attendees are highlighted)
  - i. HDR - Brian Ray, Jason Carbee, Matt Huettl, Jacob Weiss
  - ii. Metro COG - Cindy Gray, Michael Maddox, Dan Farnsworth
  - iii. NDDOT - Jason Thoronson, Bob Walton, Jon Ketterling, Wayne Zacher
  - iv. MnDOT - Mary Safgren, Jerilyn Swenson, Eli Ramirez
  - v. Cass County - Jason Benson, Tom Soucy
  - vi. Fargo - Jeremy Gorden
  - vii. West Fargo - Andrew Wrucke
  - viii. Moorhead - Jonathan Atkins
  - ix. ATAC - Diomo Motuba, Kshitij Sharma

## 2. Project Status Update

- Existing Conditions & Data Collection Report was distributed to SRC members March 2022.
- Discussed the status of the Microsimulation Model Development including model coding, demand development, and initial calibration.

## 3. Existing & Future Conditions

- HDR presented meeting handouts that set the stage for strategy discussion:
  - i. AM / PM Peak Hour Congestion (2021)
  - ii. AM / PM Peak Hour Congestion (2045)
  - iii. I-29 / I-94 System Interchange Traffic Growth
  - iv. Existing Crash Summary (2016-2019)

## 4. Ring Route Discussion

- HDR presented DRAFT future year model results for 4 potential ring routes (NW, SW, SE, and NE).
  - i. HDR noted that Streetlight Data was used to modify large external to external trip generators from I-94, I-29, and US 10 to give a more accurate estimate of potential ring route attractiveness and future year volumes.
  - ii. HDR also noted that the segment of ring route with the greatest potential to divert trips from the interstate was the SE ring route – likely due to the proposed future bridge over the Red River at 76<sup>th</sup> Ave S and the amount

of trips attracted to growth in SW Fargo that utilizes I-94 to and from the east.

- SRC Comments from Ring Route Analysis
  - i. Jason Benson asked if we are capturing the latest land use info for the analysis
    - Cindy noted industrial growth in North Fargo and additional growth in SW Fargo beyond 2045 MTP levels has been updated, such as additional development at the Air Cargo facility and the National Guard building along CR 20 on the north side of the airport. This includes Amazon, and some of the other industrial development for which a traffic impact study was recently completed. On the SW side, it includes updates to Horace and the Veterans Boulevard area that were recently completed as part of the Veterans Boulevard corridor extension study.
    - Cindy asked the group for input about amending the project scope to include a “Full Build Out” land use scenario to further investigate the ring route analysis. She cited the land use assumptions developed for the Northwest Metro Transportation Plan and some future land use scenarios developed for the 13<sup>th</sup> Avenue corridor study in West Fargo. She also asked about AUAR Growth Area Plans for Moorhead. The group agreed that it could benefit the ring route discussion
  - ii. Wayne Zacher noted that the ring routes don’t connect and the effectiveness may be increased if the ring routes connected at various locations (i.e. NW ring route to Harwood, SE ring route to 100<sup>th</sup>).
  - iii. Jeremy Gordon noted the NE route has some merit for an industrial truck route relief.
    - Cindy & Cass County noted that a ring route should be mindful of the location of the Harwood Elementary school, which is located south of CR 22, whereas the rest of the community is located north of CR 22.

## 5. Potential Strategies

- HDR presented a list of TSMO / ITS strategies that will be investigated as part of the Interstate Operations Study
  - i. Dan Farnsworth asked if Hard Shoulder Running works in northern climates
    - HDR noted that it has been done in some metro areas (like the twin cities) but requires more routine maintenance
  - ii. Jeremy Gordon stated he is a big advocate for ramp metering
  - iii. Michael Maddox asked if there are any metro areas that have an unmanaged ramp metering system
    - HDR noted that there may have been some in the past, but don’t know of any current systems that are not operated by a TMC

- iv. There was a large group discussion on the need for a Traffic Management Center
  - o Jason Benson noted the Red River Valley Dispatch is looking at a new facility & there might be an opportunity for a TMC location
  - o Bob Walton noted NDDOT is going to run the TMC in Bismarck and that any discussion of a TMC needs to include Moorhead.
  - o Bob mentioned the TMC / Smart Corridor Raise grant is for I-29 between Canada / South Dakota. I-94 is a separate contract.
  - o Bob also mentioned that an Interstate Only TMC might not make sense in the short term, but would in the long term as TSMO strategies need to be implemented
  - o Jon Atkins thinks there isn't necessarily a need for a combined TMC, but a need for ND and Mn to share data and information.
  - o West Fargo / Fargo / Moorhead talked about better coordination of some signal systems between jurisdictions.
  - o Cindy wants to identify which TMSO strategies are dependent on a TMC
  - o HDR noted they plan to look at a stepped approach to TSMO strategies & timing to benefit the system and potentially delay major geometric improvement investment
- v. Dan Farnsworth talked about his experience working for a TMC in Seattle – and how their ramp metering system would “flush” ramps if queues were approaching ramp terminal intersections
- HDR presented geometric improvement options in the metro area. HDR noted that most TSMO strategies will be implemented area wide, and the segment by segment look at strategies focus on geometric improvements only.
  - i. Jason Benson asked if there will be geometric guidance (i.e. number of lanes) for areas of congestion in the metro area
    - o HDR noted that location specific recommendations will be a deliverable of this study
  - ii. Jeremy Gordon noted auxiliary lanes would be beneficial between interchanges
  - iii. Cindy mentioned that due to the current plan for interchanges at 52<sup>nd</sup>, 64<sup>th</sup>, and 76<sup>th</sup> Ave S, we need to look at a CD road system or ramp braiding
- iv. Bob discussed the current status of the study NDDOT is working for the I-29 SB to I-94 EB flyover. The final draft is being reviewed by the city and the study shows that additional lane / aux lane provides safety benefits (rear end crash reduction).
  - o Michael Johnson noted that once the City of Fargo has approved the report, it will become available for Metro COG.
  - o NDDOT also noted an upcoming project for improved overhead signing for I-29 SB lanes at the I-94 System Interchange
- v. NDDOT noted a couple areas that are “set-up” for future expansion



- EB I-94 Exit Ramp at University is wide enough for 2 lanes
- EB I-94 over I-29 is wide enough for an additional lane
- I-94 at the Raymond Interchange has space for a loop ramp (SB to EB)
  - a. There was some discussion about the potential growth SE of the Raymond Interchange to the potential new town center near 13<sup>th</sup> Ave S.
  - b. Also, the Northwest Metro Transportation Plan identified a reconfigured interchange of I-94 and Main Ave that allows 26<sup>th</sup> Street to connect north and south at that location.

## 6. Next Steps

- Focus Group Meetings (March 8<sup>th</sup> & 9<sup>th</sup>)
- Testing of Future Year Strategies (Capacity, TSMO, Safety)

# Meeting Notes

Project: Interstate Operations Analysis and Plan for Future Improvements

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Subject: Focus Group(s) #2 – Conditions & Strategies

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Date: Tuesday & Wednesday, March 08 & 09, 2022

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Location: Hybrid: Webex & Metro COG

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## 1. Introductions

- Attendees – Focus Group A
  - i. Brian Ray, Jason Carbee, Matt Huettl, Jacob Weiss, Cindy Gray, Michael Maddox, Peyton Mastera, Cale Dunwoody, Joe Rasso, David Reed, Aaron Nelson, Grace Puppe, Matt Jacobson, Robin Huston, Jim Dahlman
- Attendees – Focus Group B
  - i. Brian Ray, Jason Carbee, Matt Huettl, Jacob Weiss, Cindy Gray, Michael Maddox, Dan Farnsworth, Brian Cheney, Dean Haaland, Tom Clark, Craig Nelson, Brian Niewind, Ben Dow, Randy Affield, Rick Cameron, Jeff Walin, Chad Mickelson, Kohl Skalin
- Attendees – Focus Group C
  - i. Brian Ray, Jason Carbee, Matt Huettl, Jacob Weiss, Cindy Gray, Michael Maddox, Dan Farnsworth, Julie Bommelman, Lori Van Beek, Bryan Wold, Brian Bjordal

## 2. Focus Group A Highlights

- Joe Rasso asked about various costs for freeway strategies / implementation.
  - i. HDR noted we are early in strategy development and costs have not been developed
- Joe Rasso supports Metro COG's plan to develop a "full build out" land use scenario for the ring route analysis TDM runs
- Joe Rasso supports auxiliary lanes on I-94
- Matt Jacobson noted that the 76<sup>th</sup> Red River crossing may impact parks
  - i. Cindy noted that the bridge crossing alignment shifts slightly south of the 76<sup>th</sup> Ave S alignment at the Red River to minimize impacts, and in that location, Cass County used local funds to purchase home buy-outs rather than FEMA funds that would prohibit structural improvements such as a bridge on the property in the future.
- Robin Huston updated the group on Moorhead's growth area plan – currently goes through 2045 and will be updated next year
- Joe Rasso noted slick conditions on loop ramps at Main Avenue

### 3. Focus Group B Highlights

- A truck route on the NE quadrant may impact recent expansion / investment in truck scales in Minnesota (i.e. provide an alternative route for trucks to avoid the scales)
- Growth potential was discussed, as the diversion will remove significant areas from the floodplain and allow development that is currently not feasible. This could result in significant growth in areas such as the NW quadrant, resulting in more demand for a ring route.
- Traffic Management Center in Bismarck was discussed
- The group asked if the study team has considered removing service interchange ramps to improve operations (i.e. EB exit at 25<sup>th</sup> Street)
  - i. HDR noted that it is very difficult to remove a movement completely
  - ii. Metro COG noted that, in the future, we could restrict the ability to make certain movements through CD roads or braided ramp configurations.
- MnDOT is pushing for more DMS for warnings and noted DMS messaging is still managed out of Roseville, MN.
- The group discussed challenges between MnDOT and NDDOT on closures, weather, consistent messaging
  - i. Minnesota Highway Patrol noted that they listen to scanners on the ND side to change message boards if there is an incident on WB I-94
  - ii. Currently no local control of messaging for either side of the river
  - iii. Blizzard warnings are only posted in counties with active warnings
- Currently no active traffic management committee. The group met during the TIM plan development but not since
- Red River Dispatch was discussed. When Interstate incidents occur, it gets called into Bismarck then to the district ND State Patrol office.
- Red River Bridge was discussed
  - i. Anti-icing system was installed ~10 years ago
  - ii. Improvements have been made to improve the system including high friction surface
  - iii. North Dakota controls EB anti-icing / Minnesota controls WB anti-icing
  - iv. The group noted certain conditions (i.e. high winds from various directions) reduces the effectiveness of the system

### 4. Focus Group C Highlights

- NE Ring Route Discussion
  - i. There is an at-grade crossing quiet zone along the active RR route that runs parallel to Old Hwy 81 and crosses CR 22 in Harwood
  - ii. The group discussed the school zone on CR 22 in Harwood and the constraints that development along CR 22 may have to the NE Ring Route.
  - iii. Currently some trucks take US 75 down to 28<sup>th</sup> Ave N as a “Ring Route” (shown in yellow)



- The group discussed the need for truck stops on / near ring routes to make them more attractive to users
  - i. The group noted some truckers prefer to stop outside of town due to oversized loads and to avoid congested interchanges / intersections (i.e. 32<sup>nd</sup> Ave S)
- Signage for truckers to use inside lanes and / or exclusive truck lanes was mentioned as a potential TSMO solution
- Bryan Wold provided a good example of an existing ring route: Crookston Bypass
- Michael Maddox recommended that diversion crossings / more detail on the ring route maps should be provided for final documentation
- Long Term park and ride was discussed connecting SW Fargo Growth to Downtown Businesses
- The group discussed options for Transit Priority.
- Brian Bjordal noted that a lot of the heavy / wide loads are generated within the metro area (i.e. they aren't just traveling through)
- The group discussed areas of congestion within the metro – focusing on areas around the I-29 / I-94 system interchange
- The group was in favor of auxiliary lanes between interchanges to allow trucks a longer distance to get up to speed.



## Interstate Operations Analysis & Plan for Future Improvements

SRC Meeting #3  
Conditions & Strategies



1

# AGENDA

- 01 Introductions
- 02 Project Status Update
- 03 Existing & Future Conditions
- 04 Ring Route Discussion
- 05 Potential Strategies
- 06 Next Steps

2

# 01

## Introductions

3

### 01 Introductions

HDR Staff

Metro COG

NDDOT

MnDOT

Cass County

Clay County

City of Fargo

City of West Fargo

City of Moorhead

ATAC



## **01 Project Objectives/Outcomes**




- Determine the pros/cons of potential ring routes in order to make recommendation
- Present a clear menu of prioritized improvements
- Provide operational and analytical data to assist with later project development phases
- Have the study results that are intuitive and easy to interpret

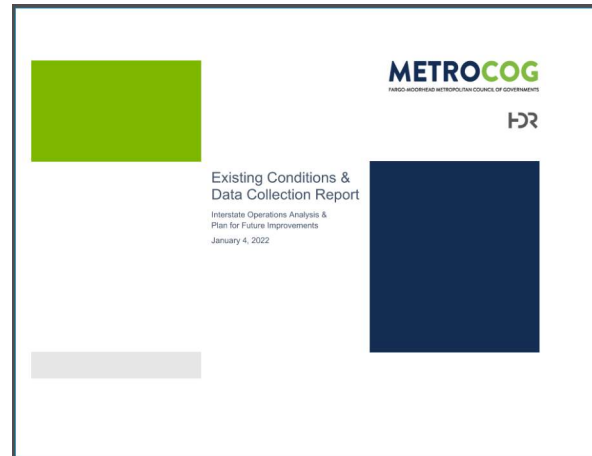
# 02

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## **Project Status Update**

## Existing Conditions & Data Collection Report

-  Speed Profiles
-  Crash Assessment
-  O-D Analysis

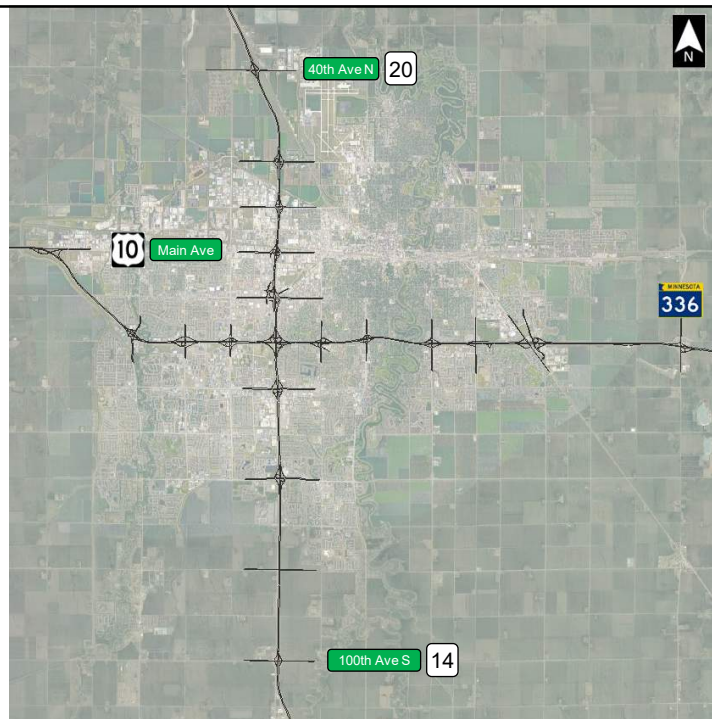


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## Microsimulation Model Development

### Progress To-Date

- Model Coding
  - Roadway Geometry
  - Intersection Geometry
  - Traffic Control
  - Speeds
- Demand Development
  - Existing Origin & Destinations (O-D's from Streetlight)
    - O-D Matrix Estimation with Miovision Counts
  - Future Growth (ATAC Model)
- Initial Model Calibration

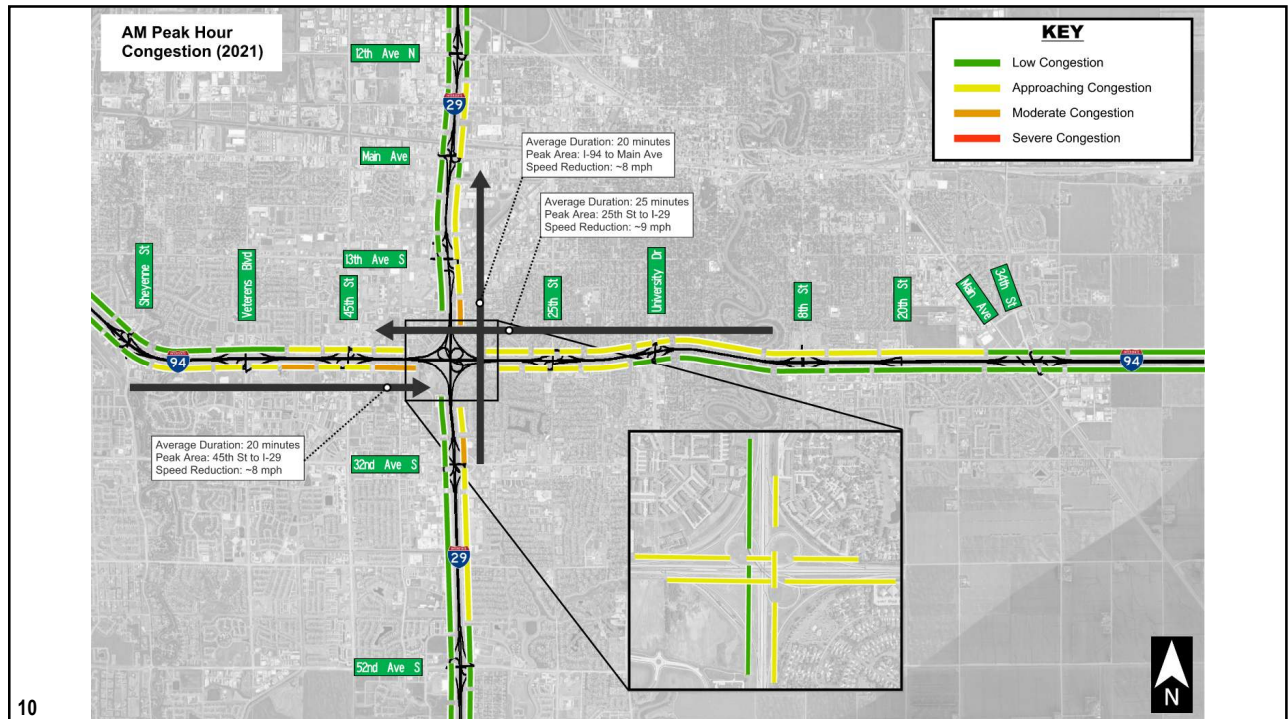


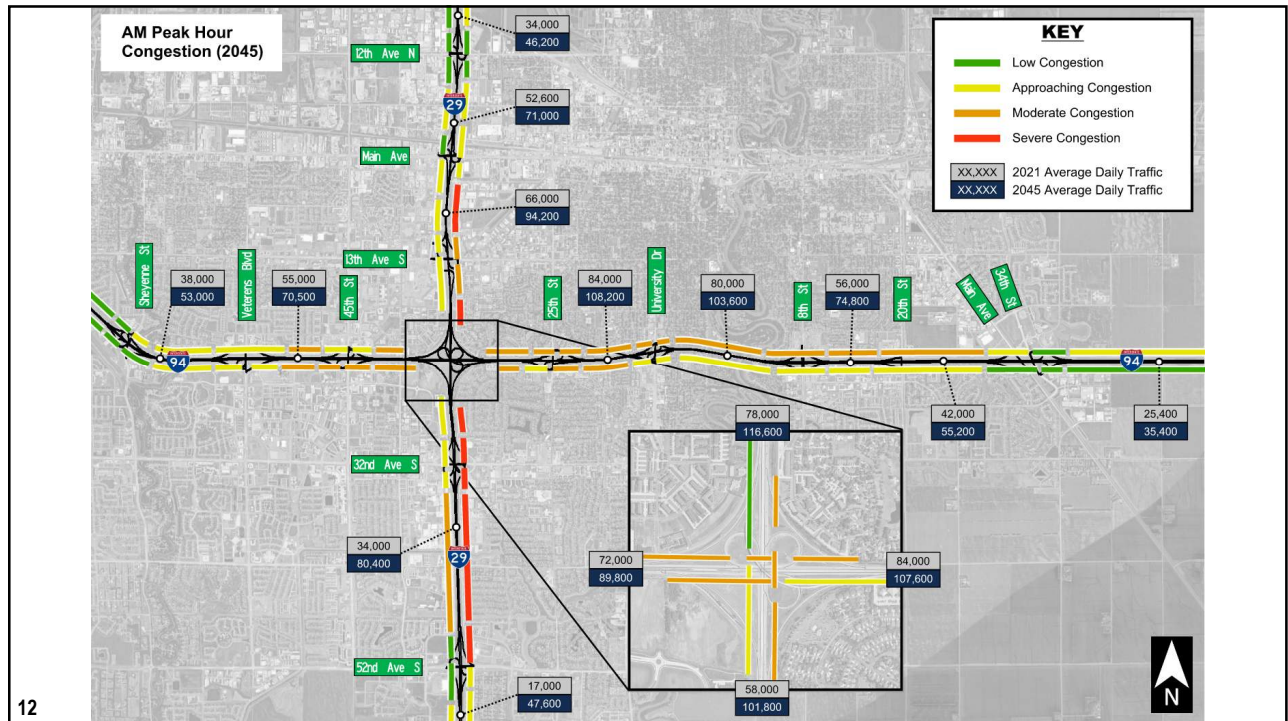
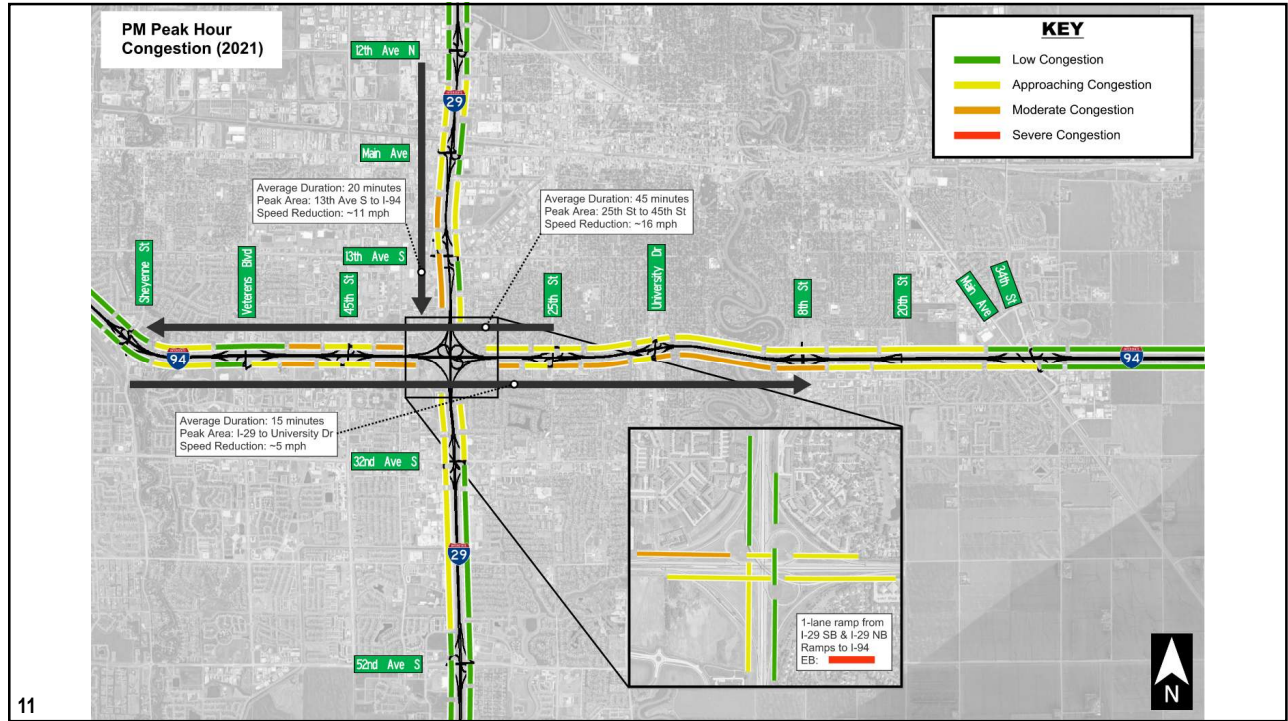
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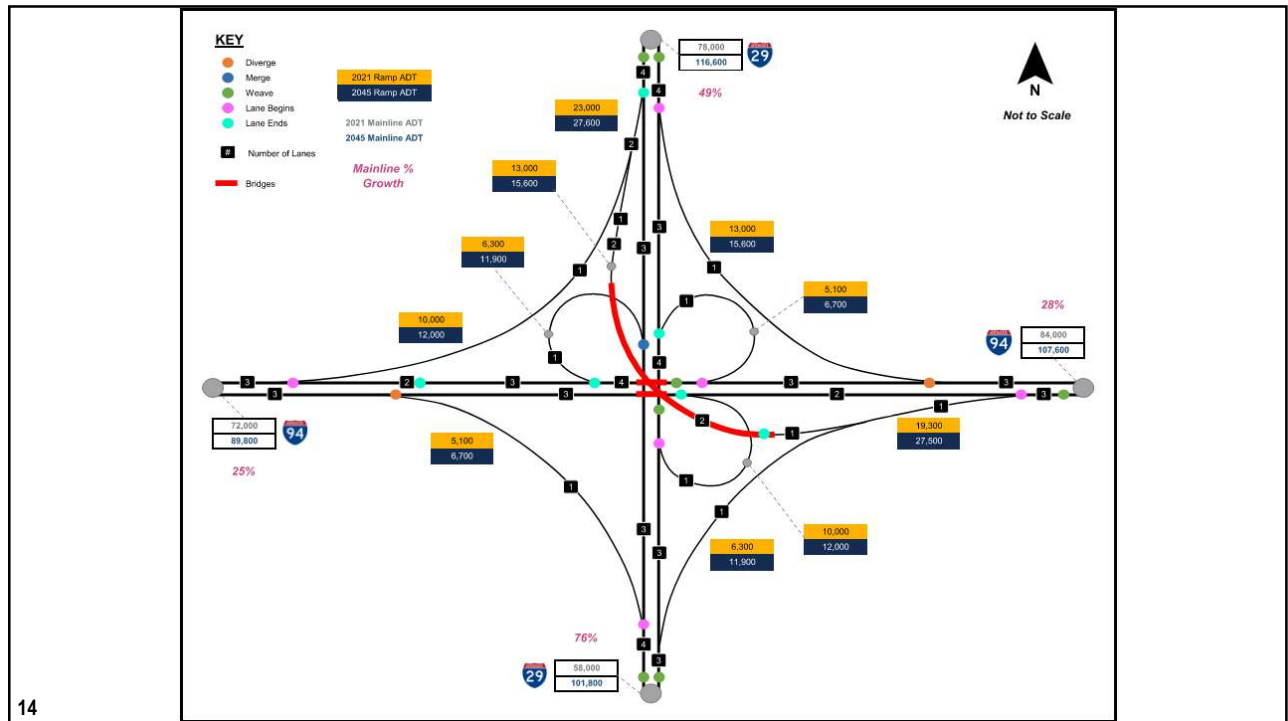
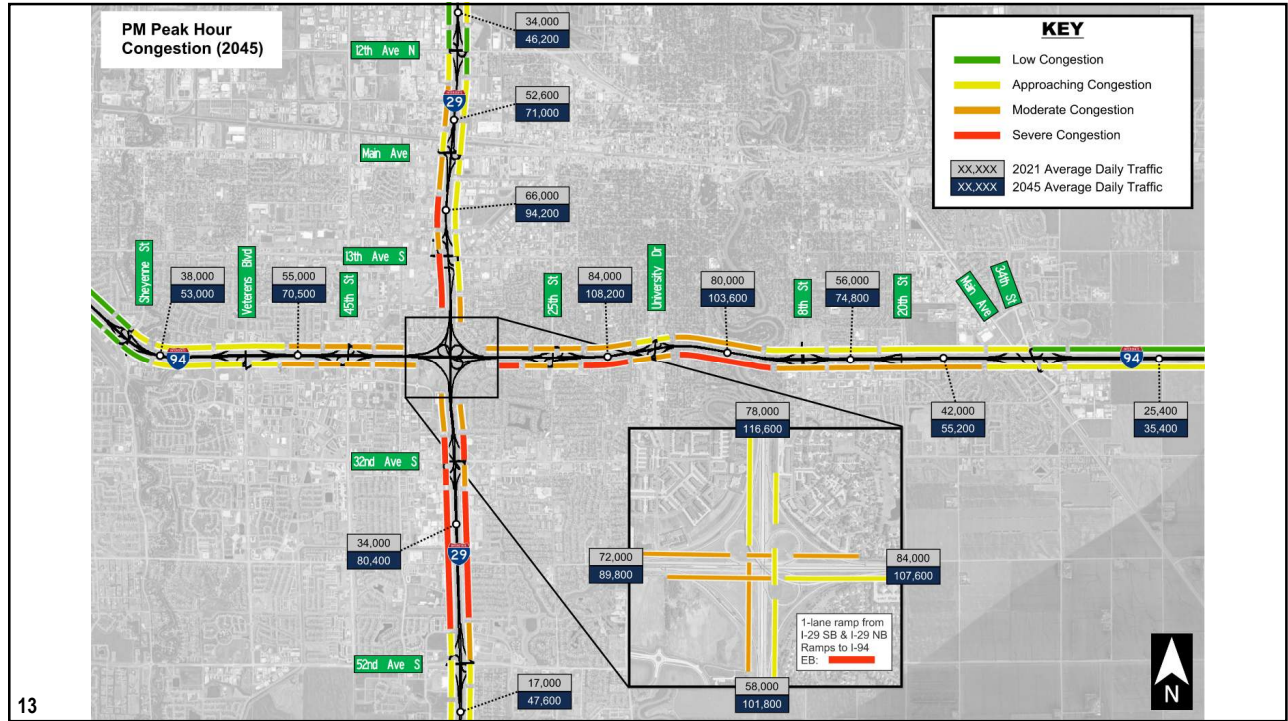


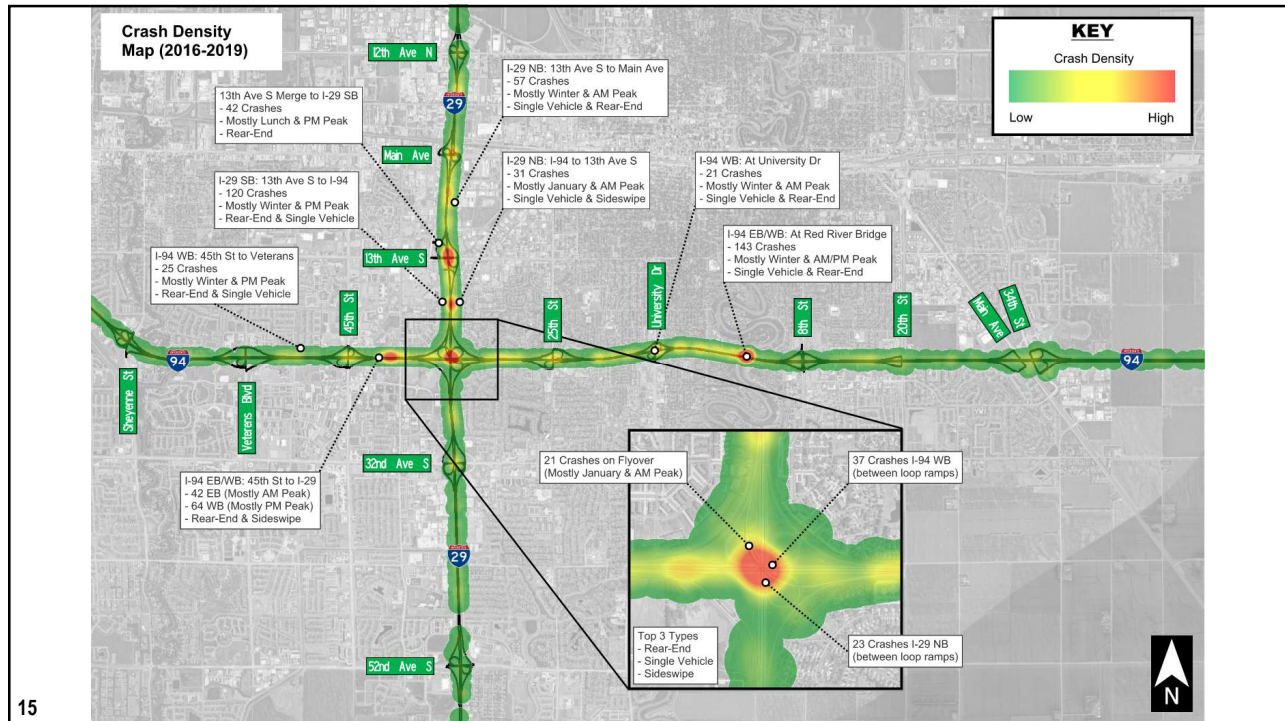
# 03

## Existing & Future Conditions









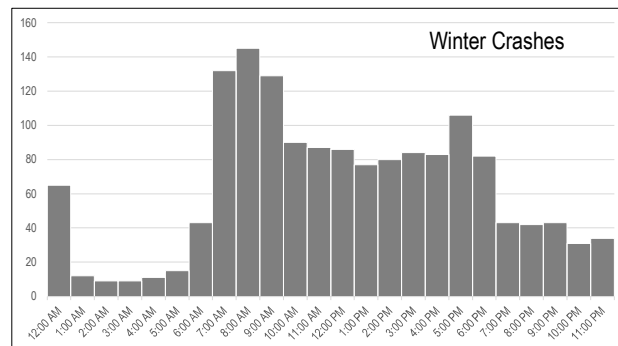
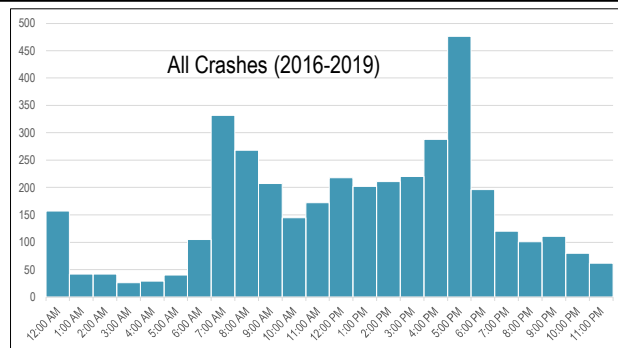
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## Crash Statistics Highlights

Surface Conditions	Total (2016-2019)	
	Mainline	Arterial
Dry	1376	683
Winter Conditions*	1210	295
Wet	189	97
<b>Total</b>	<b>2775</b>	<b>1075</b>

### Impact of Weather

Winter months (December, January, February) account for 43% of total crashes.



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# Meeting Notes

Project: Interstate Operations Analysis and Plan for Future Improvements

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Subject: SRC #4 - Strategies

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Date: Thursday, May 26, 2022

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Location: Webex

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## 1. Introductions

- Attendees
  - i. Metro COG - Cindy Gray, Michael Maddox, Dan Farnsworth, Ayden Schaffler
  - ii. HDR - Brian Ray, Jason Carbee, Jacob Weiss, Brian King
  - iii. NDDOT - Jason Thorenson, Bob Walton, Wayne Zacher, Jack Smith, Michael Johnson
  - iv. MnDOT - Mary Safgren, Jerilyn Swenson, Eli Ramirez
  - v. Cass County - Jason Benson
  - vi. Clay County - Justin Sorum
  - vii. Fargo – No representative
  - viii. West Fargo - Andrew Wrucke, Malachi Petersen
  - ix. Moorhead - Jonathan Atkins
  - x. ATAC - Diomo Motuba, Kshitij Sharma, Sharijad Hasan

## 2. Project Status Update

- HDR discussed the status of the Microsimulation Model Development including model results and calibration.

## 3. Future Year Conditions (Refresher)

- HDR presented 2045 AM / PM Peak hour congestion figures from the previous SRC to set the stage for the strategy discussion.

## 4. Ring Route Discussion

- HDR presented DRAFT future year model results for an updated “True Ring Route” where all 4 quadrants connected at Interstate crossing points.
  - i. HDR compared the model results of the “true ring route” to the alignments from the previous SRC.
  - ii. Although speeds were increased for all quadrants, the interstate trip reduction on I-94 at the Red River was less for the “True Ring Route” vs the previous alignments. This was mostly due to the shift from 76<sup>th</sup> Ave S to 100<sup>th</sup> Avenue S for the SE bypass.
- The SRC provided the following comments about to the ring routes:
  - i. Jason Benson noted that there are limited opportunities to enforce access policies and/or development patterns along these corridors. He noted that

high costs are a concern if the bypass becomes a need 20 years down the road but the ROW wasn't preserved.

- Cindy agreed with Jason's assessment and noted the struggle of preserving ROW.
- ii. Wayne Zacher noted that once the public sees lines on a map, land purchases may start near ROW along proposed routes.
  - Cindy noted that the opposite case exists for the NW bypass – the land has already been purchased for the diversion.
  - Jason Benson noted the land purchased for the diversion is owned by the Cass County Resource District.
- iii. Jason Benson also noted existing access preservation along 100<sup>th</sup> Ave S
- iv. Diomo asked about the number of trucks diverted from the interstate onto the bypass routes – and utilizing a passenger car equivalent to help the justification of a bypass.
  - Jason Carbee noted that we used multiple data sources to estimate the volumes on the bypass routes including the Travel Demand Model, Streetlight, and Existing ADT maps surrounding the metro area.
  - Truck volumes could be estimated for the bypass routes if necessary to show the benefits of the bypass routes and need for corridor preservation.
- v. Jason Benson added that 2,500 ADT would be the largest ADT on any county road on the system.

## 5. Potential Strategies

- HDR presented a list of TSMO / ITS strategies that will be carried further as part of this study.
  - i. Brian Ray noted that we are removing Hard Shoulder Running and Variable Speed Limits from further consideration
    - Sharijad Hasan asked the study team to share the B/C of the VSL
    - HDR noted most of the analysis for HSR and VSL has been qualitative up to this point of the study. The study team has been incorporating lessons learned from other agencies.
  - ii. Brian Ray presented the two strategies for TSMO including a proactive (Strategy A) and reactive (Strategy B) approach
    - Sharijad Hasan asked the study team to review the concept of operations on NDDOTs website relating to Strategy B.
    - Kshitij Sharma noted that traffic signal performance measures at ramp terminal intersections should be incorporated into monitoring for signals.
    - Sharijad Hasan asked about how all jurisdictions are coordinating the sharing of information.
      - a. HDR noted that this was expressed as a concern in the Focus Groups, but this study will not address the steps to

address this. A concept of operations for a TMC would be needed to get the ball rolling for these discussions.

- Bob Walton noted that the NDDOT 511 system does not show all of the cameras that exist in the Fargo Metro Area. Due to cybersecurity concerns, some of the cameras are owned by the District.
  - a. HDR will coordinate with Lyle Landstrom for locations of cameras within the Fargo metro area.
- HDR presented geometric improvement options in the metro area including varying levels of investment.
- HDR presented service interchange considerations at 20<sup>th</sup> Street, 40<sup>th</sup> Ave N, and I-29 south of 52<sup>nd</sup> Ave S.
  - i. Jerilyn and Mary from MnDOT asked to be included on any correspondence with Jon Atkins pertaining to 20<sup>th</sup> Street.
  - ii. NDDOT noted that City of Fargo has been leading the 64<sup>th</sup> Ave S overpass and questions about timeframe for future improvements should be directed towards City of Fargo.
- HDR presented the higher investment interstate alternative concepts including a C-D Road Option and Braided Ramp Option.
  - i. MnDOT had questions regarding the C-D road and asked for some examples / clarification on how they'd operate.
  - ii. Members of the SRC suggested that the study team provide further explanation on C-D Roads
    - HDR prepared and sent some Midwest Examples of C-D Roads with the PowerPoint Slides and Alternative Concepts

## 6. Next Steps

- Testing of Future Year Strategies (Capacity, TSMO, Safety)

## Collector-Distributor Road Examples

Collector-Distributor Roads are used to relieve interstate congestion by shifting access points onto a collector system. A C-D road system is typically barrier separated, highlighted in the figure below.

Omaha, Nebraska has a C-D Road system on a portion of I-80, shown below. This Streetview location is linked [HERE](#).



A couple examples of CD roads in the Midwest are listed below with a link to Google Maps.

- Omaha, Nebraska: [I-80 from I-680 to Q Street](#)
- Council Bluffs, Iowa: [I-80 / I-29 between System Interchanges](#)
  - o Currently Under Construction
- Minneapolis area, Minnesota:
  - o [I-394 & US 169 System Interchange](#)
    - I-394 C-D Roads remove weaving traffic from mainline I-394 lanes
  - o [I-394 & MN 100 System Interchange](#)
    - EB I-394 C-D Road lanes are pulled off the mainline at the upstream service interchange (Xenia Ave / Park Place Blvd)

As part of the C-D road concept at I-94 & I-29, optional slip ramps were included. Examples of slip ramps in Las Vegas, Nevada are listed below:

- [WB Exit Slip Ramp](#) on Oran K Gragson Freeway
- [WB Entrance Slip Ramp](#) on Oran K Gragson Freeway
- [NB Exit Slip Ramp](#) on Las Vegas Freeway
- [NB Entrance Slip Ramp](#) on Las Vegas Freeway





Please add your  
(1) Name & (2) Agency  
in the chat while we  
wait to get started.

## Interstate Operations Analysis & Plan for Future Improvements

SRC Meeting #4  
Strategies & Ring Route Update



1

# AGENDA

Please add your  
(1) Name & (2) Agency  
in the chat.

- 01 Introduction
- 02 Project Status Update
- 03 Traffic Operations (Refresher)
- 04 Ring Route Results
- 05 Strategy Discussion
- 06 Next Steps

2

# 01

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## Introduction

3

### 01 Project Objectives/Outcomes

- Determine the pros/cons of potential ring routes in order to make recommendation
- Present a clear menu of prioritized improvements
- Provide operational and analytical data to assist with later project development phases
- Have the study results that are intuitive and easy to interpret

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# 02

## Project Status Update

### Microsimulation Model Development



**METROCOG**  
FARGO-MOODHEAD METROPOLITAN COUNCIL OF GOVERNMENTS

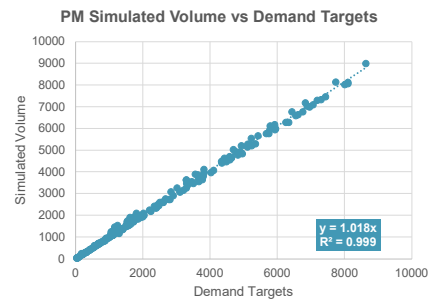
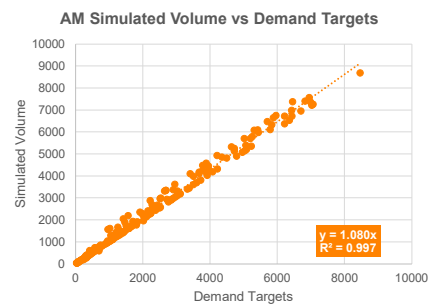
HDR

TransModeler  
Methodology &  
Calibration Memo

Interstate Operations Analysis &  
Plan for Future Improvements

April 15, 2022

**DRAFT**



# Microsimulation Model Development: I-94 Calibration

Figure 6. I-94 AM Probe Data Speeds



Figure 8. I-94 PM Probe Data Speeds

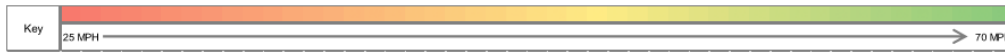


Figure 7. I-94 AM Simulated Speeds



Figure 9. I-94 PM Simulated Speeds



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# Microsimulation Model Development: I-29 Calibration

Figure 2. I-29 AM Probe Data Speeds

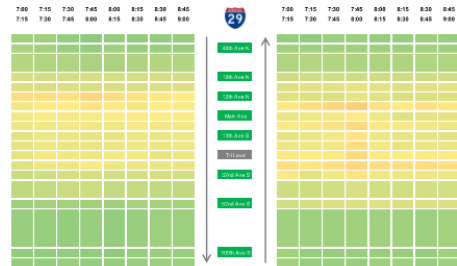


Figure 4. I-29 PM Probe Data Speeds

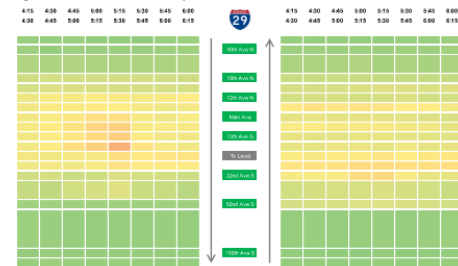


Figure 3. I-29 AM Simulated Speeds

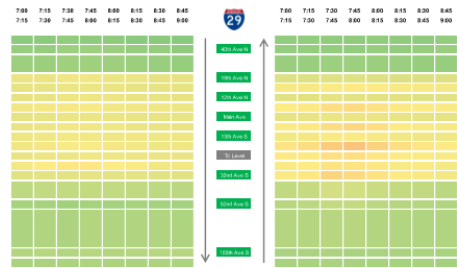


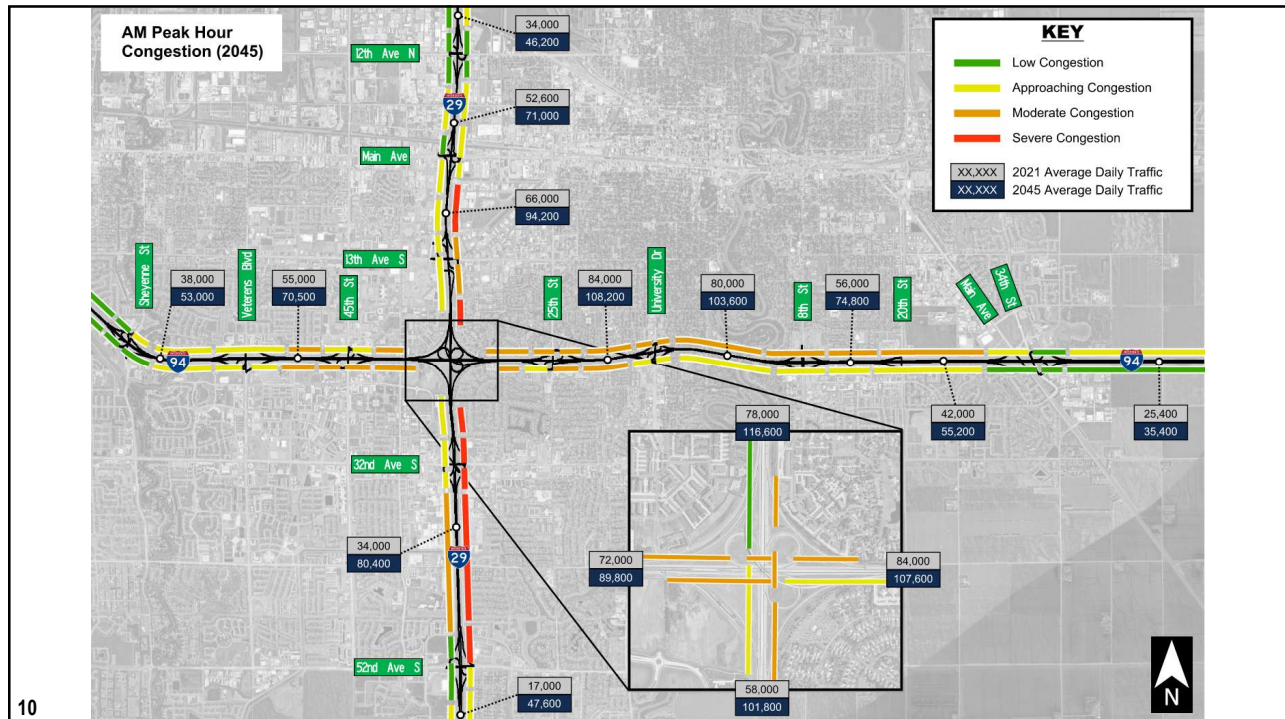
Figure 5. I-29 PM Simulated Speeds

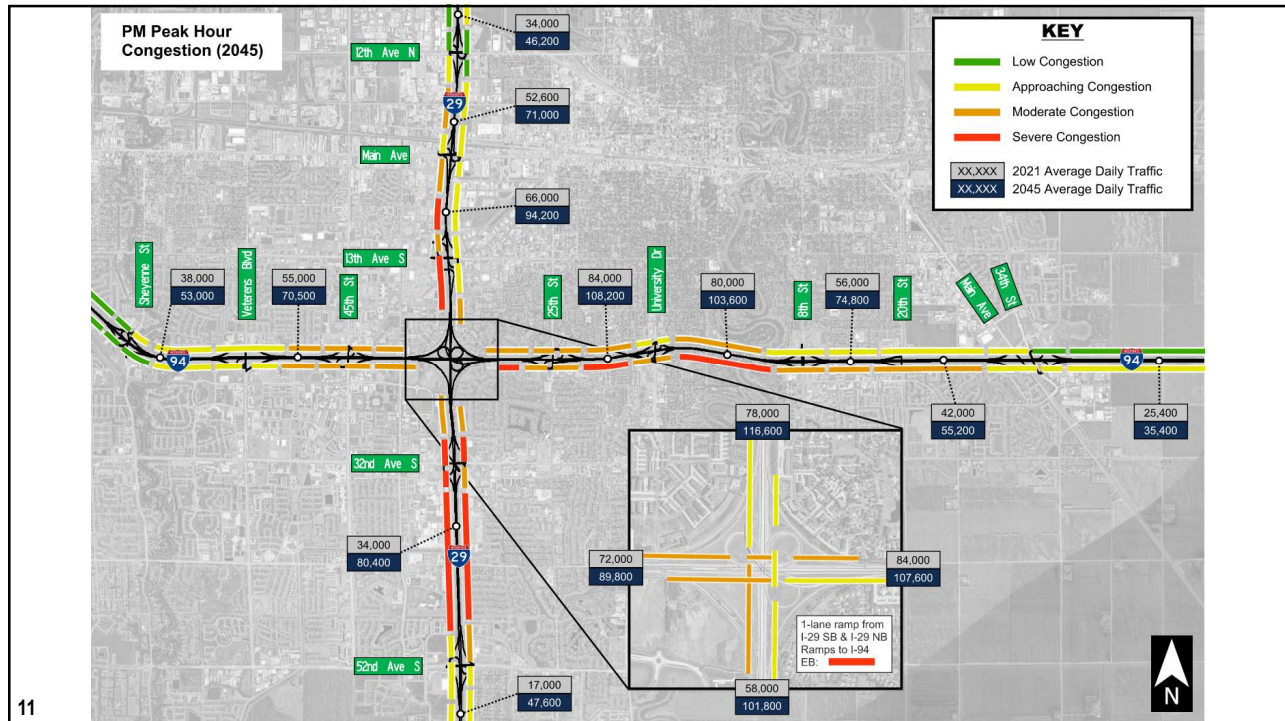


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# 03

## Future Year Operations (Refresher)





# 04 Ring Route Discussion

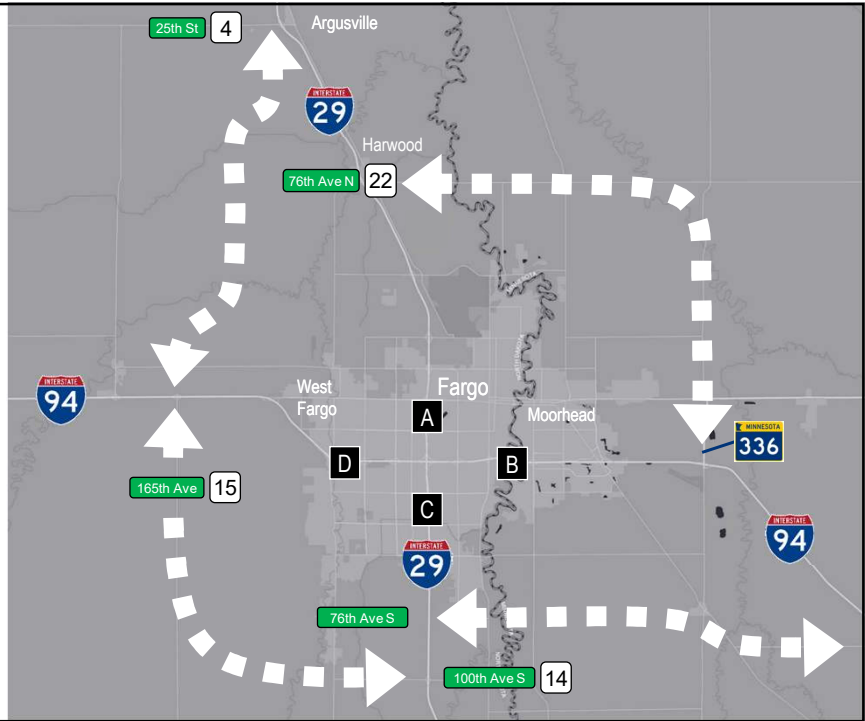
# Ring Route Analysis

All Ring Routes (Combined)

## Interstate Trip Reduction

- A. I-29: ~1,500 - 2,500
- B. I-94: ~3,000 - 6,000
- C. I-29: ~2,000 - 4,000
- D. I-94: ~1,500 - 2,500

From Previous SRC Meeting



# Ring Route Analysis

## Interstate Trip Reduction

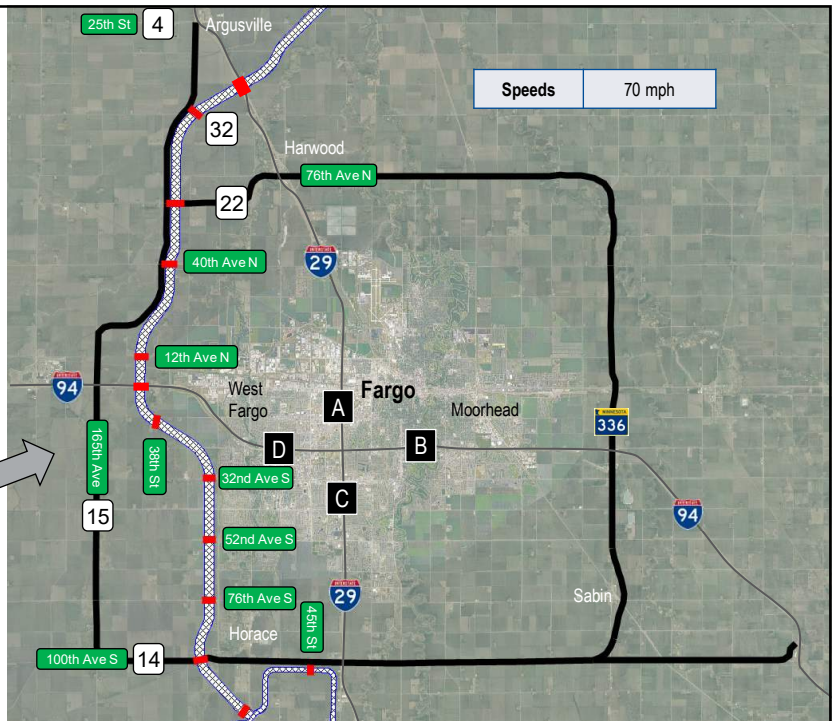
- |                         |                |
|-------------------------|----------------|
| A. I-29: ~1,500 - 2,500 | ~2,500 - 3,500 |
| B. I-94: ~3,000 - 6,000 | ~2,000 - 5,000 |
| C. I-29: ~2,000 - 4,000 | ~1,500 - 3,000 |
| D. I-94: ~1,500 - 2,500 | ~1,500 - 2,500 |

From Previous SRC

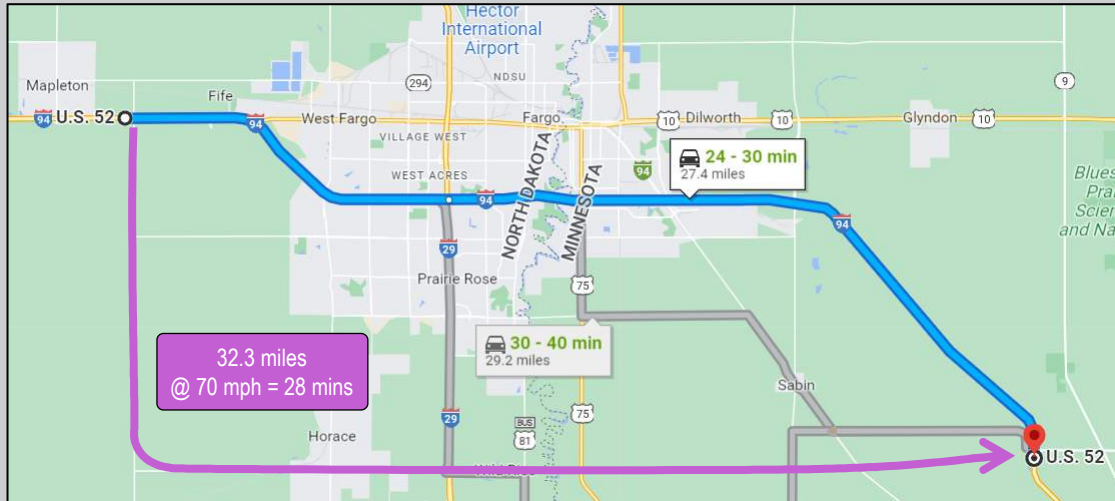
True Ring Route



Speeds 70 mph



## Travel Time Comparison



## Ring Route Summary

- **NW Route**
  - Minimal Through Trips (Existing & Forecasted)
  - Utilized by internal to external & internal fringe trips
- **SW Route**
  - Potential for “True” bypass when combined with SE Route
  - Bypass volume increases when located close to 76<sup>th</sup> Ave S
- **SE Route**
  - Highest volume quadrant / Highest number of Interstate trips diverted
  - Potential for “True” bypass when combined with SE Route
  - Bypass volume increases when located close to 76<sup>th</sup> Ave S
- **NE Route**
  - Currently used today
  - Limited opportunities for spot improvements

Short Term: Reserve ROW

Long Term: Build for local circulation needs (by quadrant basis)














Full Buildout: TBD



# 05

## Strategy Discussion

### Potential Improvement Strategies

TSMO/ITS IMPROVEMENTS	
	Ramp Metering
	Hard Shoulder Running
	Variable Speed Limits
	Bottleneck Removal
	CAV Infrastructure
	Traffic Management Center
	Queue Detection System
	Anti-Icing Systems
	Traveler Information
	Network Surveillance
	Work Zone Management
	Roadway Service Patrol
	Traffic Incident Management

Removed HSR and VSL from further consideration

## TSMO Strategy A (Proactive)

Assumes Local Traffic Management Center

### TMC Required

- Ramp Metering
- Queue Warning System

### TMC Recommended

- Traveler Information / DMS
  - Upgrade Overhead Color DMS
- Network Surveillance (CCTV)
- Roadway Service Patrol (Year-Round)
- Work Zone Management
- Traffic Incident Management

### TMC Not Needed

- Anti-Icing Systems
- Bottleneck Removal
  - *Discussed in Geometric Improvement Slides*

---

CAV Infrastructure would enhance real-time data aggregation for future TMC enhancements

### Near Term Options for Strategy A:

- Cameras for full coverage
- Increase DMS coverage & messaging capabilities
- Concept of Operations for a TMC

19

## TSMO Strategy B (Reactive)

Assumes Local or Statewide Operations Center

- Traveler Information / DMS
- Network Surveillance (CCTV)
- Roadway Service Patrol (Seasonal)
- Work Zone Management
- Traffic Incident Management
- Anti-Icing Systems
- Bottleneck Removal
  - *Discussed in Geometric Improvement Slides*

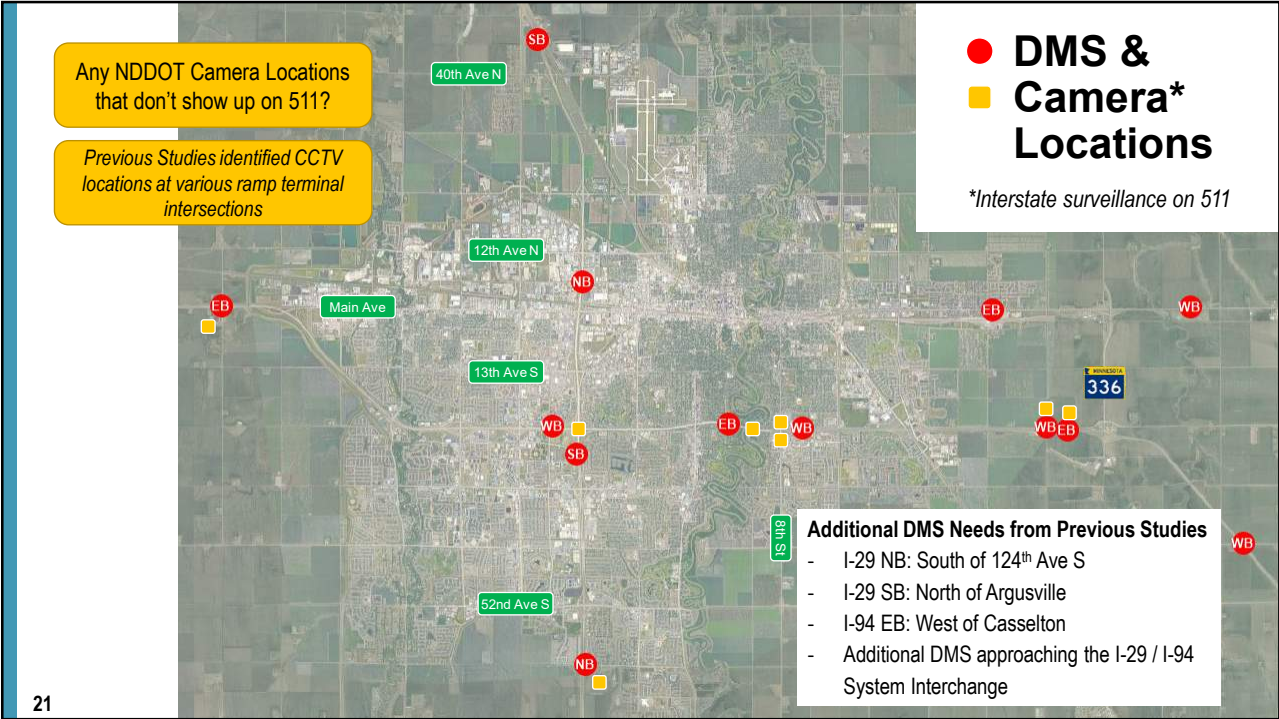
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CAV Infrastructure would enhance real-time data aggregation for future Operations Center enhancements

### Near Term Options for Strategy B:

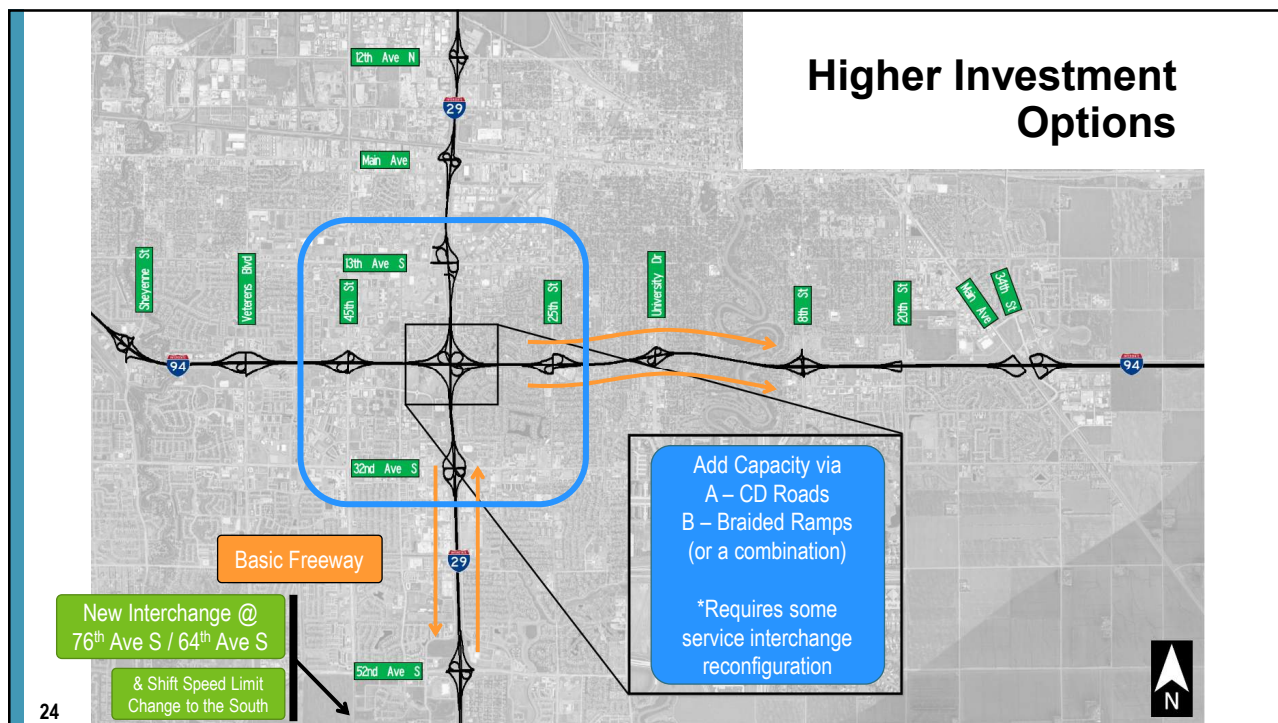
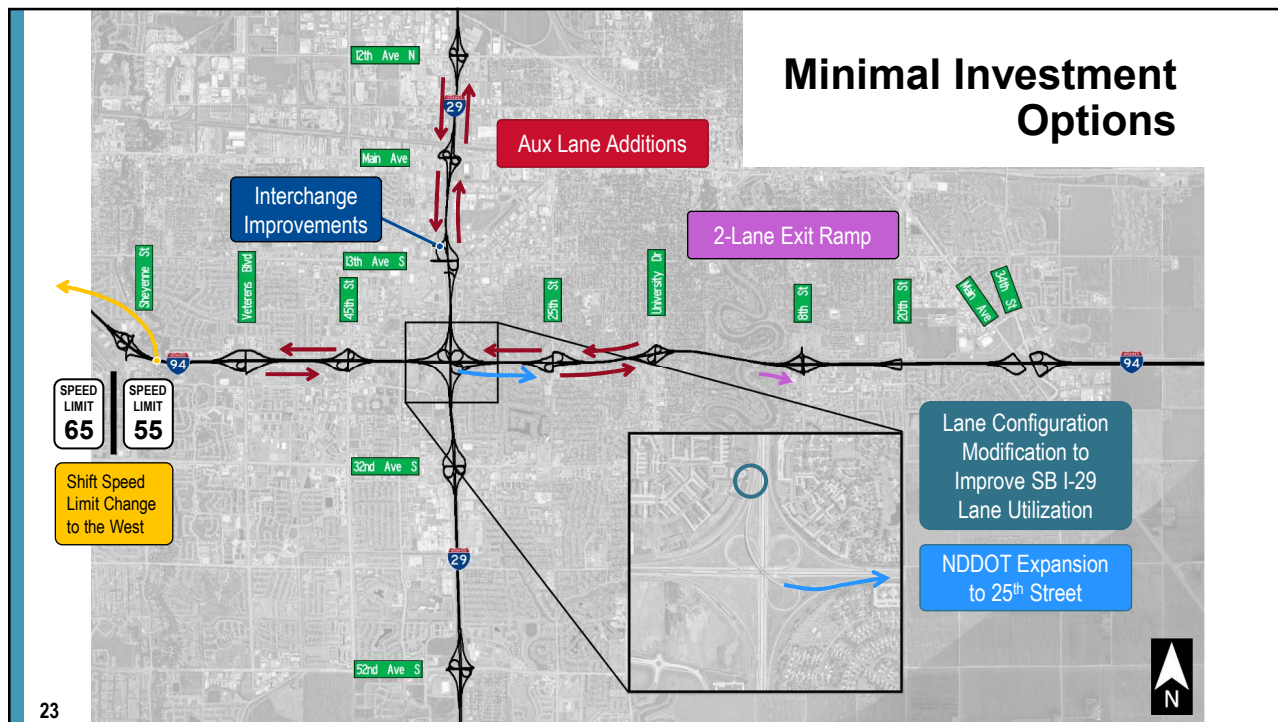
- Cameras for full coverage
- Increase DMS coverage & messaging capabilities

20



## Potential Improvement Strategies

GEOMETRIC IMPROVEMENTS	
	Future Interchanges
	Collector/Distributor Alternatives
	Lane Configuration
	Acceleration/Deceleration Lanes
	Exit/Entry Configurations
	Auxillary Lanes
	Ring Route Reliever



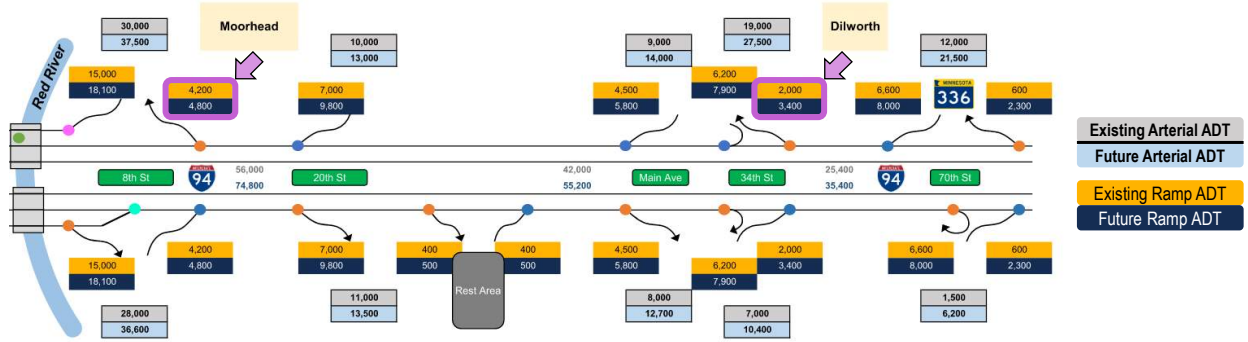
# Service Interchange Discussion

## 20th Street

- Existing ADT (sum):
- Future ADT (sum):

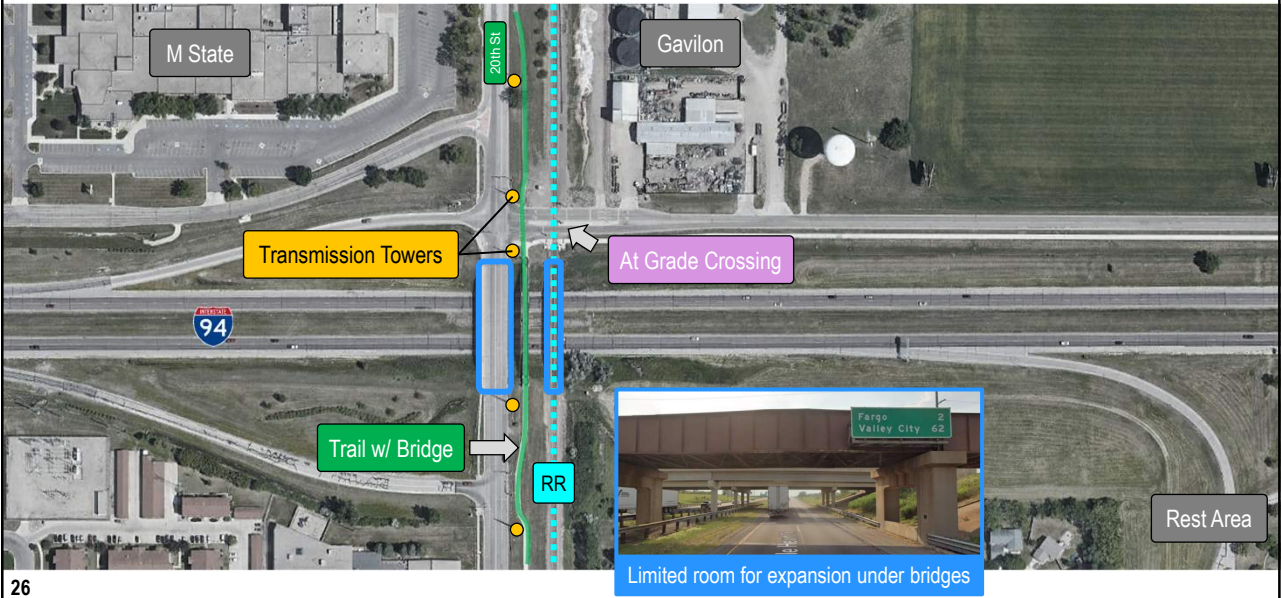
6,200  
8,200

Future Demand at 20th Street Ramps ~ 2,500-3,000 ADT



# Service Interchange Discussion

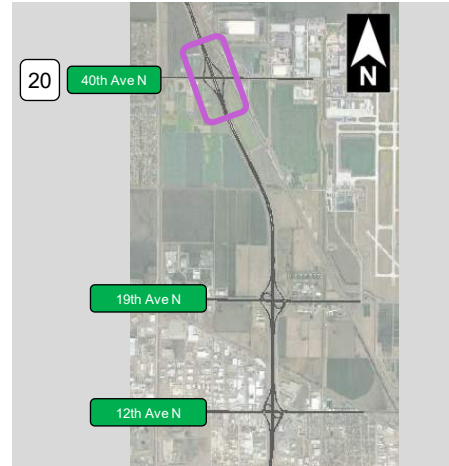
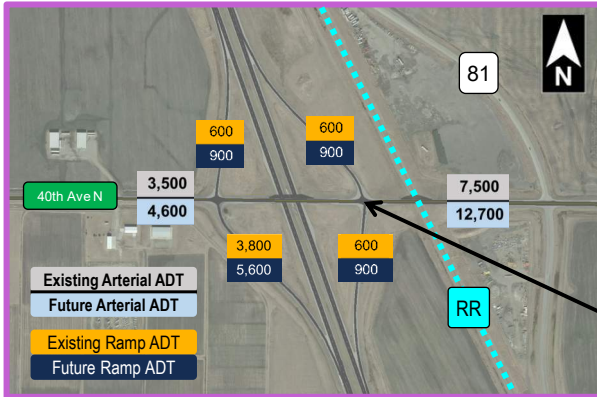
## 20th Street Constraints



# Service Interchange Discussion

## 40th Avenue N

- Update to Urban Interchange Design
- Reduce the potential for wrong-way drivers
- Improve freight operations



Total Entering Trucks: 12% During Peak Periods  
6% Heavy / 6% Single-Unit (Existing)

# Service Interchange Discussion

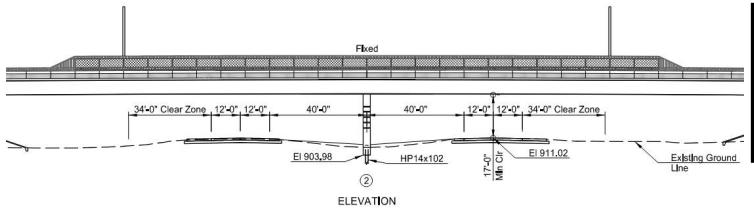
## 40th Avenue N – Potential Solution



## Service Interchange Discussion

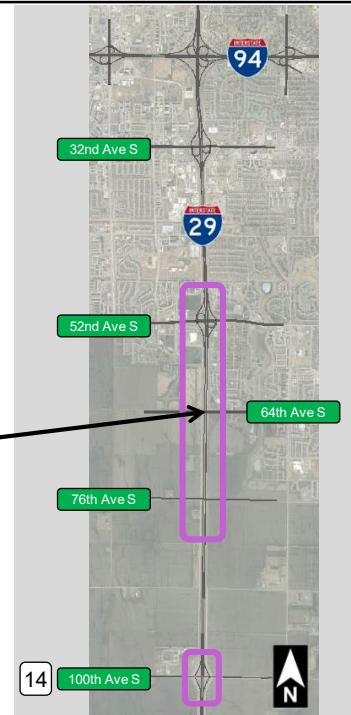
### 52<sup>nd</sup> Ave S, 64<sup>th</sup> Ave S, 76<sup>th</sup> Ave S

- Provide access to 64<sup>th</sup> Ave S and 76<sup>th</sup> Ave S
- Update from SRC
  - Bridge length / lateral clearance under 64<sup>th</sup> Ave S
  - Timeframe & Next Steps



### 100<sup>th</sup> Ave S

- Update to Urban Interchange Design (as urban area extends to 100<sup>th</sup> Ave S)



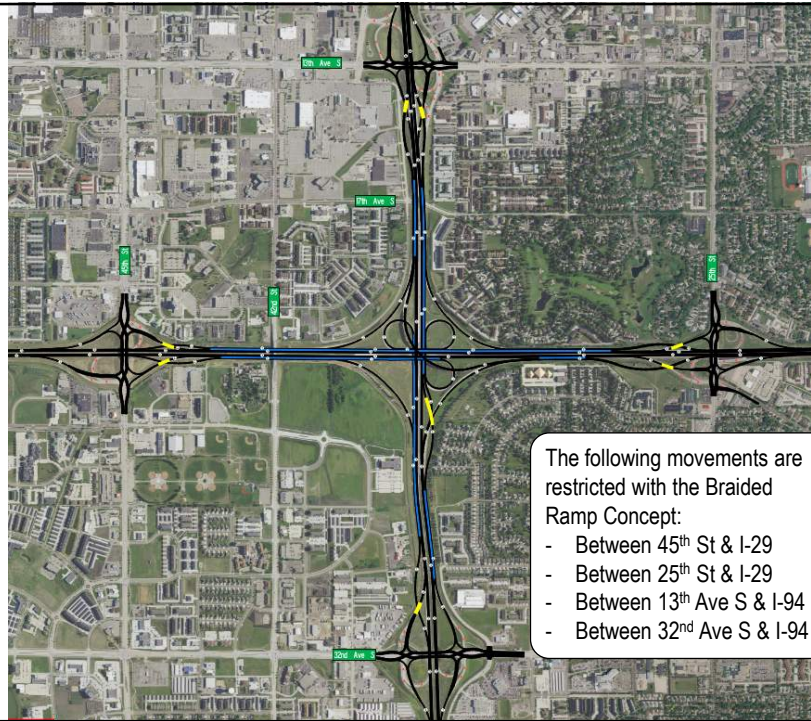
## CD-Road Concept

- CD-Road Starts / Ends at service interchanges adjacent to I-29 / I-94 System Interchange
- Reconfiguration at service interchanges shown to
  - Fit +1 interstate lane and preserve bridge
  - Improve AASHTO access spacing requirements



## Braided Ramp Concept

- All service interchange ramps towards the system interchange are braided.
- Reconfiguration at service interchanges shown to
  - Fit +1 interstate lane and preserve bridge
  - Improve AASHTO access spacing requirements



31

## Braided Ramp Concept

Restricted Turn Example between I-29 & 45<sup>th</sup> Street



32



# 06

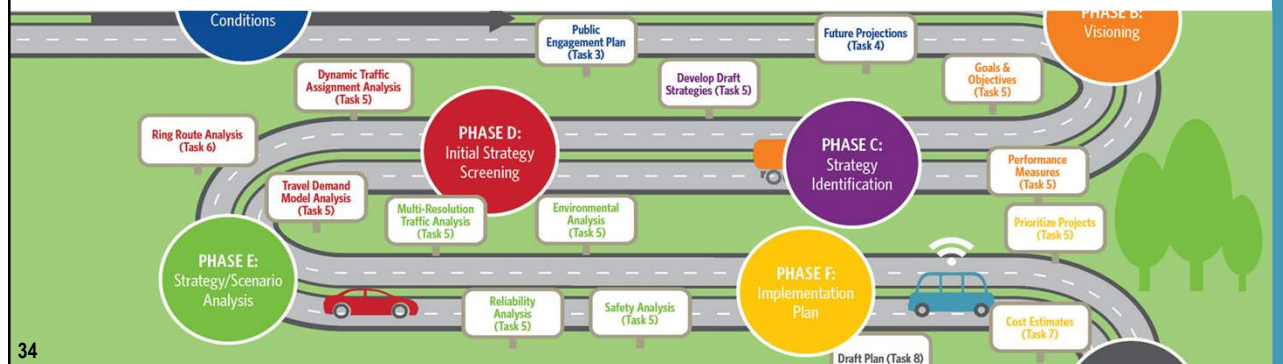
## Next Steps

### Next Steps

- Analyze Future Year Strategies
  - Capacity
  - TSMO
  - Safety
- Develop Future Draft Scenarios

Meeting information will be emailed next week

Deadline for Comments: June 10



# Meeting Notes

Project: Interstate Operations Analysis and Plan for Future Improvements

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Subject: SRC #5 – Strategies Analysis

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Date: Tuesday, September 13, 2022

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Location: Hybrid: Webex & Metro COG

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## 1. Introductions

- Attendees
  - i. Metro COG - Cindy Gray, Michael Maddox, Dan Farnsworth
  - ii. HDR - Brian Ray, Jacob Weiss, Brian King, Jason Carbee, Jon Markt
  - iii. NDDOT - Jason Thorenson, Wayne Zacher, Jack Smith, Michael Johnson, Brandon Beise, Justin Schlosser, Jon Ketterling
  - iv. MnDOT - Jerilyn Swenson, Mary Safgren
  - v. FHWA - Kristen Sperry
  - vi. Cass County - No representative
  - vii. Clay County - No representative
  - viii. Fargo – No representative
  - ix. West Fargo – Andrew Wrucke
  - x. Moorhead – Jon Atkins
  - xi. ATAC - Diomo Motuba, Sharijad Hasan

## 2. Project Status Update

- HDR discussed the status of the development and analysis of TSMO & Geometric Improvement strategies.

## 3. Future Year Conditions (Refresher)

- HDR presented 2045 AM / PM Peak hour congestion figures from the previous SRC to set the stage for the strategy analysis discussion.

## 4. Near- & Mid-Term Strategies

- Michael Johnson asked if the widening south of 32<sup>nd</sup> Ave S was to the inside or to the outside – noted that the corridor was originally designed to be widened to the inside.
  - i. HDR noted that we simply used the same per-mile cost for inside and outside widening and didn't get into design issues
- Jason Thorenson asked which bridges would be replaced as part of the widening south of 32<sup>nd</sup> Ave S
  - i. HDR noted that bridges that were 50+ years old were assumed to be replaced, and those details will be included in the implementation plan (next step in this study)

- Kristen Sperry asked if these projects have been shared with NDDOT and those working on the freight plan
  - i. HDR noted they have been shared with NDDOT but are preliminary potential solutions – need to get to the implementation phase to determine projects that move forward.

#### 5. Long-Term Strategies

- HDR presented the CD Road and Braided Ramp Strategy results
  - i. There was limited internal discussion on the long-term strategies

#### 6. TSMO Strategies

- Jon Atkins noted that DMS boards that have general safety messages are currently ignored. If queue detection is implemented, it needs to be dedicated to queue detection only and not have any other messages.
- Sharijad Hasan asked the following TSMO questions
  - i. He asked if we simulated any TSMO strategies – HDR noted we did in Des Moines for a similar project, and could do it if it provides benefit to the project
  - ii. Asked about CAV and infrastructure related to CAV
    - Brian Ray noted the projections for market penetration is all over the board. Jon Markt noted that we need 50+% adoption before we'd see any operational benefits – for now we focus on power and communications for V2I
  - iii. He advocated for TMC and TIM / Work Zone Management & improved anti-icing systems.
    - HDR noted the only current deployment is on the Red River Bridges
    - NDDOT noted that the system only works to certain temperatures – at extremely low temps, the system is shut off since the mixture can cause additional ice buildup on the bridges
- Michael Maddox asked about the potential for TSMO strategies to delay the need to make capacity improvements
  - i. HDR noted that it would depend on the metro area's appetite on how much to meter service interchange ramps in the metro area.
  - ii. Cindy asked if we could do TSMO first and widen second
  - iii. HDR noted that that would be a cost-effective implementation strategy
  - iv. Jon Atkins noted that ramp metering seems like a cost-effective safety improvement and that the ultimate solution needs to be a combination of TSMO and Geometric improvements
- Brandon Beise (PM for the I-29 Smart Corridor) gave an update on the study. Bolton & Menk is working with NDDOT working on a planning document for the I-29 smart corridor from South Dakota to Canada. No solutions at this point but expect study completion by 2024.

- i. He also noted TMC location has not been determined.

## 7. Next Steps / Open Discussion

- Recent Safety issues in Moorhead on I-94 were discussed by the group
  - i. Jon Atkins asked if more lanes through Moorhead make sense
  - ii. Poor lane utilization was noted through Moorhead – noting that a majority of traffic is in the outside lane.
  - iii. Jerilyn Swenson noted that MnDOT understands that I-94 cannot be reduced to one lane during certain times of the day. She asked if microsimulation can help make the case to investigate the lane utilization issues.
    - HDR noted that we can have a separate conversation off-line with MnDOT and MetroCOG on the use of simulation to look at lane closures, etc.
  - iv. HDR noted that there are some significant constraints to widening I-94 to 6 lanes including bridges (vehicular and RR) near 20<sup>th</sup> Street. An interim solution may be widening shoulders to MN 336 to allow some lane shifts while maintaining 2 lanes in each direction.
  - v. The group discussed the lack of parallel routes to I-94 on the Moorhead side which might contribute to heavy congestion & queues during construction of crash events – noting that some reliever routes during construction (52<sup>nd</sup> Ave S) were very busy.

# Meeting Notes

Project: Interstate Operations Analysis and Plan for Future Improvements

Subject: Focus Group(s) #3 – Strategy Analysis

Date: Tuesday & Wednesday, September 13 & 14, 2022

Location: Hybrid: Webex & Metro COG

## 1. Introductions

- Attendees – Focus Group A
  - i. Brian Ray, Brian King, Jacob Weiss, Cindy Gray, Michael Maddox, Cale Dunwoody, Aaron Nelson, Maegin Elshaug Grace Puppe
- Attendees – Focus Group B
  - i. Brian Ray, Matt Huettl, Jacob Weiss, Brian King, Cindy Gray, Michael Maddox, Brian Cheney, Tom Clark, Craig Nelson, Jeff Walin, Chad Mickelson, Kohl Skalin, Mark Empting, Jason Dura, Steve Iverson
- Attendees – Focus Group C
  - i. Brian Ray, Matt Huettl, Jacob Weiss, Brian King, Cindy Gray, Michael Maddox, Dan Farnsworth, Bryan Wold, Erin Albrecht

## 2. Focus Group A Highlights

- HDR presented the strategy analysis to Focus Group A
- The group agreed with the initial set of Near- & Mid-Term Projects
- West Fargo growth west of I-94 was discussed – Aaron noted the potential growth due to the diversion and mentioned that a 13<sup>th</sup> Ave S interchange with I-94 may be discussed in the future
  - i. The study team noted that interchange spacing may be an issue and that the Main Avenue and Sheyenne interchanges have reserve capacity
  - ii. An overpass option could be an option to provide access to potential future development west of I-94

## 3. Focus Group B Highlights

- A majority of the meeting focused on recent and ongoing safety concerns on I-94 between the Red River and MN 336.
  - i. The group discussed the fatalities that occurred earlier this year
  - ii. Two options were discussed
    - Widening I-94 to 6 lanes to MN 336.
      - a. The study team noted the challenges of some overhead bridges near 20<sup>th</sup> Street
    - Widening the inside & outside shoulders with a median barrier.
      - a. To provide safer options for stalled vehicles or vehicles that are pulled over

- b. To allow lane shifts in construction scenarios without shutting down a lane of traffic
      - c. To improve winter operations due to reduced shoulder width due to snow.
    - iii. The group also discussed safety concerns around the EB I-94 weigh station and the potential need to provide some auxiliary lanes between the entrance ramp and MN 336
    - iv. The group noted that the recommendation and discussion about improvements on I-94 should include the county commissioner.
  - The group re-iterated many of their ideas / concerns from the previous Focus Group Meeting in March 2022 including:
    - i. The need for a local TMC to implement TSMO strategies
    - ii. More DMS, including overhead DMS and easier messaging capabilities
    - iii. Truck weigh stations and future needs to make sure vehicles are routing around them – including the potential to add a site between Dilworth and MN 336
  - The group noted that there are plans for a deck replacement of the Red River Bridge
    - i. They noted that they'd prefer a full replacement sooner due to bridge condition.
    - ii. They also noted the potential traffic impacts during deck replacement will be horrendous.
  - There were discussions about appropriate DMS messaging including the need to reduce / remove message Mondays since they become “white noise” and sometimes travelers don't pay attention when it is important to read a DMS message.
  - Permanent snow fences on the fringes of the metro area were discussed – noting the benefits of recent installations on I-94 near Moorhead.
  - The group discussed the need for including de-icing systems on braided ramp applications if the alternative moves forward.
4. Focus Group C Highlights
- The group re-iterated many of their ideas / concerns from the previous Focus Group Meeting in March 2022 including:
    - i. The group was in favor of auxiliary lanes between interchanges to allow trucks a longer distance to get up to speed.
    - ii. Trucks utilizing the inside lane for some trips to avoid congestion in the outside lanes.
  - The group talked about the difficult weave on WB I-94 between I-29 and 45<sup>th</sup> Street – one potential solution would be to carry 6 lanes (3 in each direction) to Veterans.
  - The group agreed with a majority of the geometric and TSMO solutions, specifically
    - i. Auxiliary Lane Additions
    - ii. Adding Northbound lanes north of 32<sup>nd</sup> Ave S

- iii. General interstate widening
  - iv. Ramp Metering – provided that it can accommodate trucks
- The group re-iterated the safety concerns on eastbound I-94 around the weigh station with weaving concerns and speed differentials between trucks and vehicles.
- The group discussed safety concerns at 21<sup>st</sup> Street NW & Main Ave
  - i. Vehicles can experience long queues due to uncontrolled intersection and a steady stream of vehicles from I-94 to Main Ave not providing acceptable gaps
  - ii. One solution would be to turn the existing full access to a right-in-right-out or  $\frac{3}{4}$  access intersection and route all vehicles to the signalized intersection to the east.
  - iii. Cindy also noted the potential interchange improvement options that reconfigures the Main Avenue & I-94 interchange and provides a more direct connection to the north



**\*\* If Virtual \*\***  
Please add your  
(1) Name & (2) Agency  
in the chat.

## Interstate Operations Analysis & Plan for Future Improvements

SRC & Focus Group Meetings  
Strategy Analysis



1

# AGENDA

**\*\* If Virtual \*\***  
Please add your  
(1) Name & (2) Agency  
in the chat.

- 01 Introduction
- 02 Project Status Update
- 03 Traffic Operations (Refresher)
- 04 Near- & Mid-Term Strategies
- 05 Long-Term Strategies
- 06 TSMO Strategies
- 07 Next Steps

2



# 01

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## Introduction

3

### 01 | Project Objectives/Outcomes

- Determine the pros/cons of potential ring routes in order to make recommendation
- Present a clear menu of prioritized improvements
- Provide operational and analytical data to assist with later project development phases
- Have the study results that are intuitive and easy to interpret

4

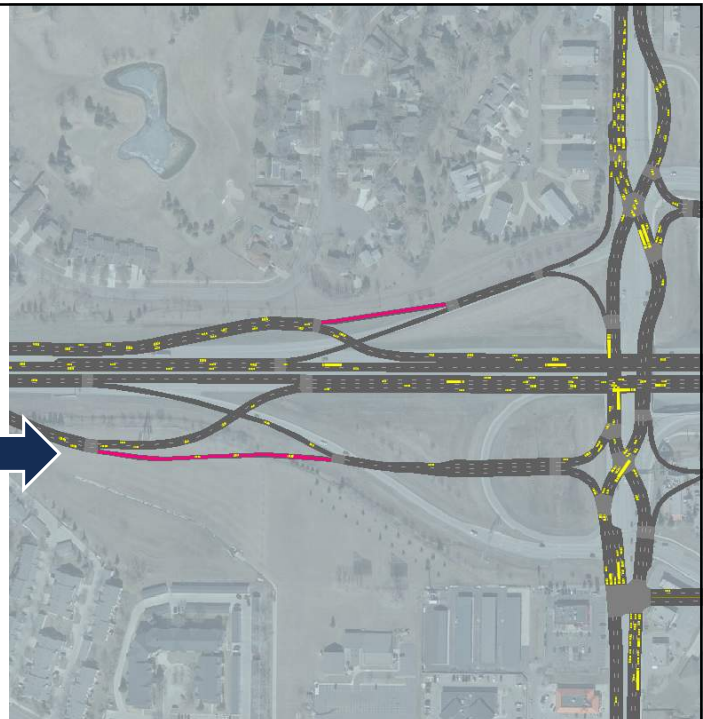
# 02

## Project Status Update

5

### 02 | Project Status Update

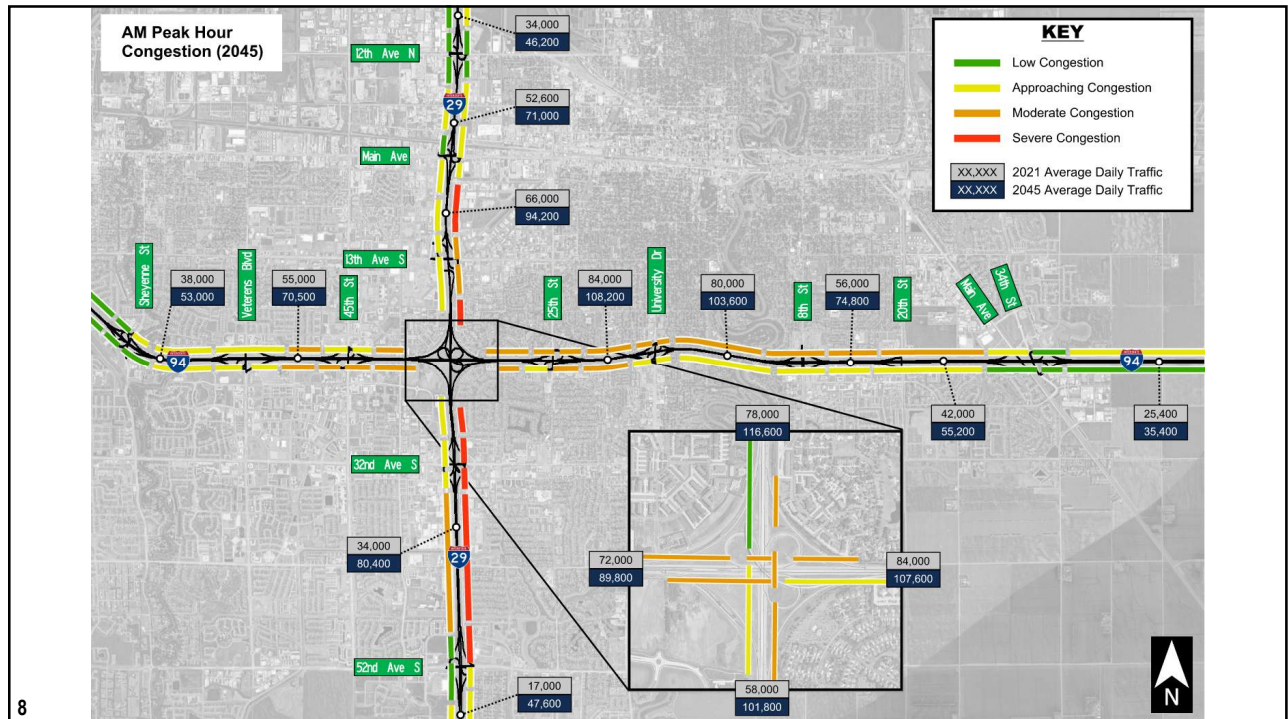
- Continued Development of TSMO & Geometric Improvement Strategies
- Peer City Review Memo of Ring Routes / Bypass Routes
- Developed Microsimulation Model Network for Geometric Improvement Strategies
- Developed Safety Models for TSMO & Geometric Improvement Strategies

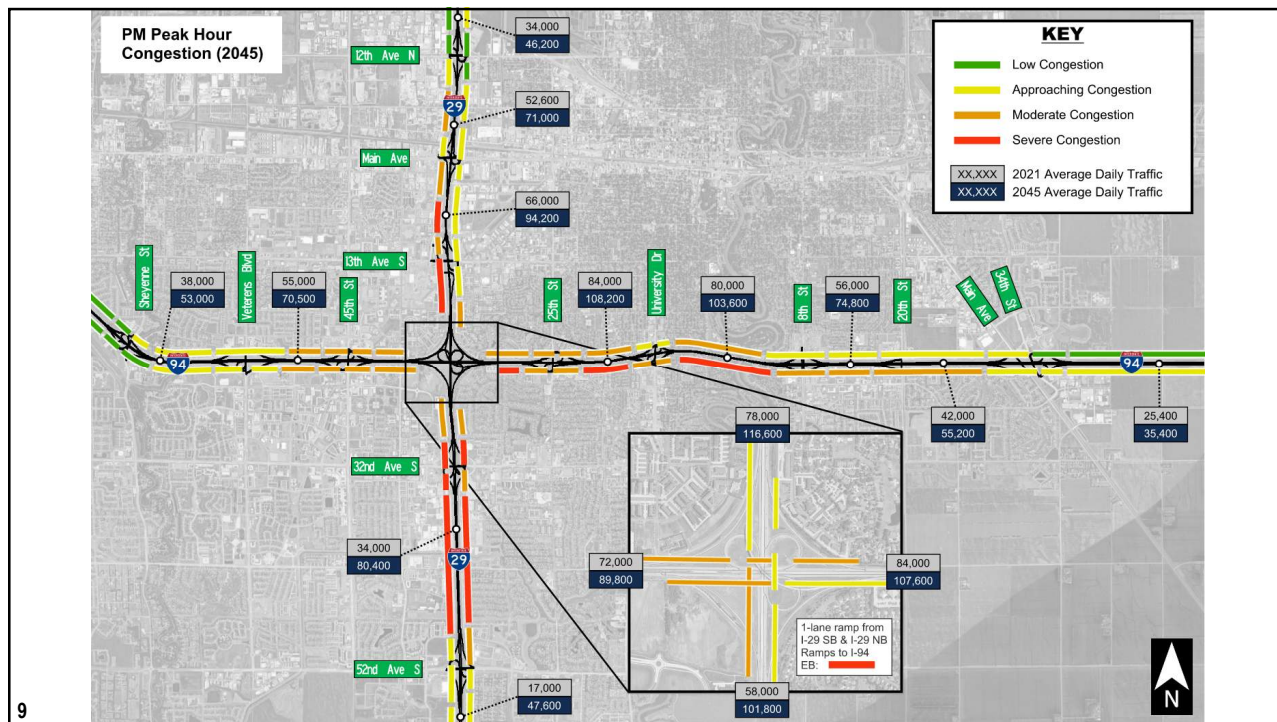


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# 03

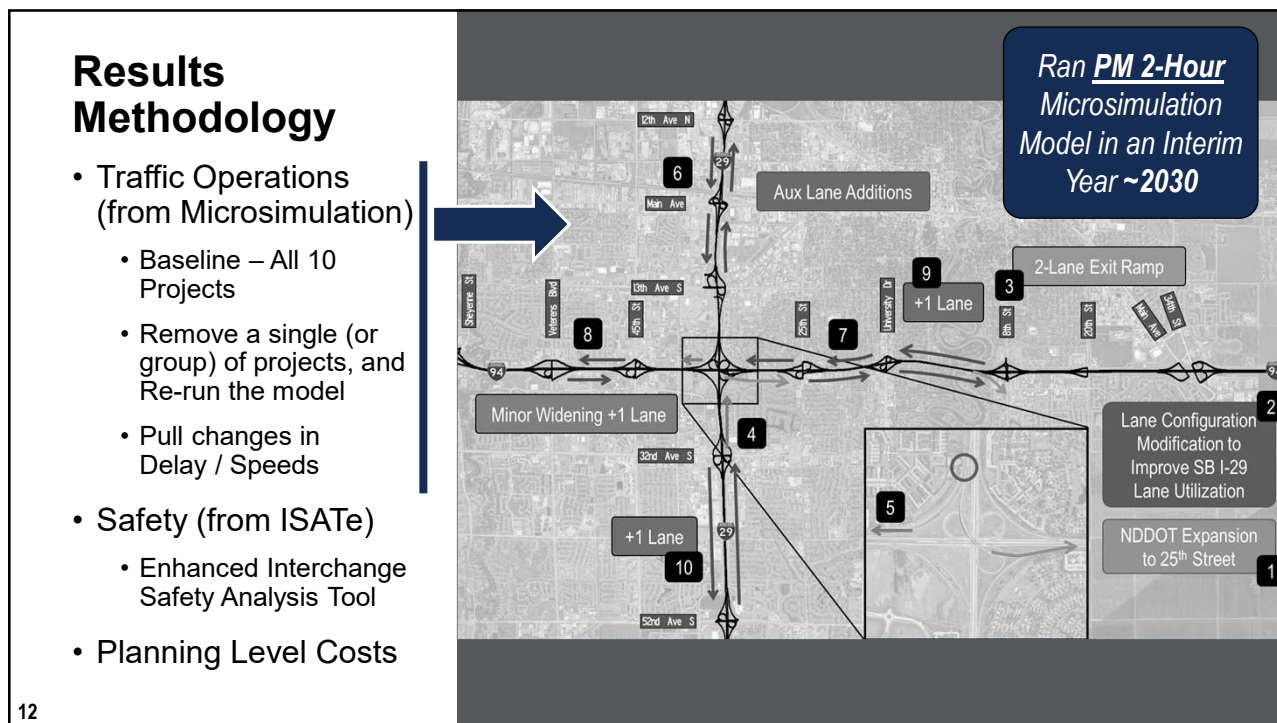
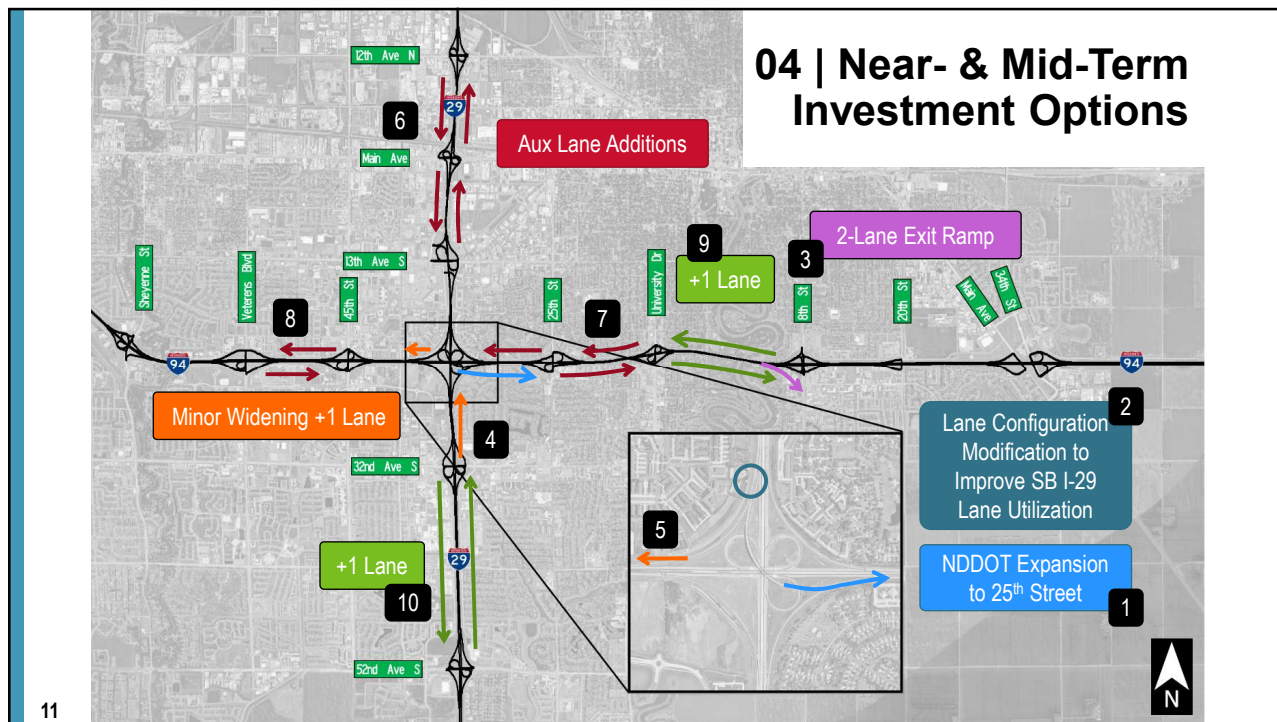
## Future Year Operations (Refresher)





# 04

## Near- & Mid-Term Strategies

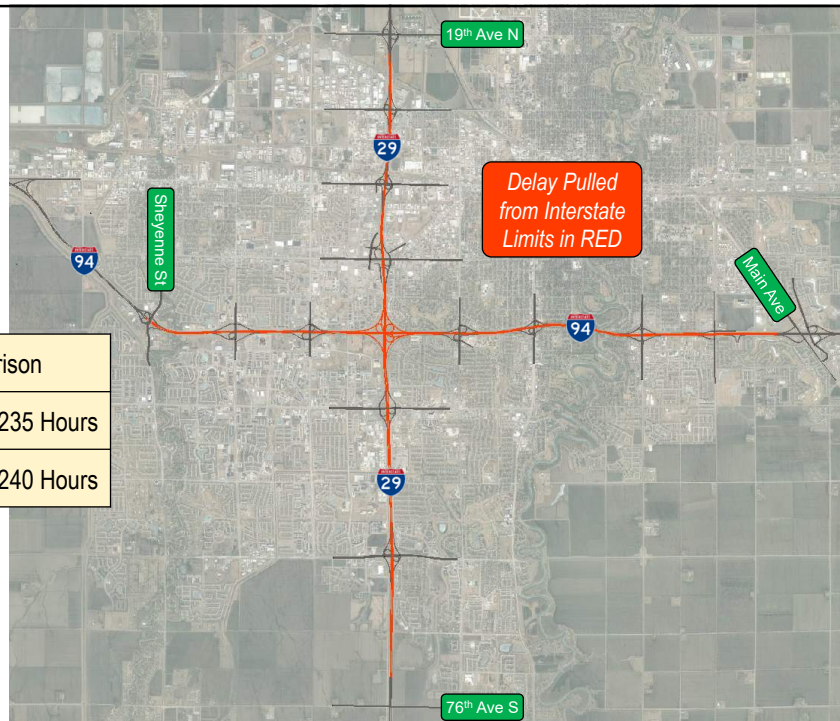


## Microsimulation Results Methodology

- Interstate Delays during a 2-Hour PM Peak Period

PM Peak Period Delay Comparison	
2021 Existing Calibrated Model	235 Hours
2030 All Near- & Mid-Term Projects	240 Hours

- Speeds: Average speeds during the Peak Hour on Interstate Segments



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## Safety Results Methodology

- Crash prediction only (evaluations of existing safety not applied)
- Application of Highway Safety Manual Tools
  - ISATe (Enhanced Interchange Safety Analysis Tool)
  - Planning-Level, not all design inputs considered
  - Simplified to a limited number of crash rates and safety effectiveness per treatment
  - Preparation step for future Interchange Modification Justification requirements
- Use of the CMF Clearinghouse / Research
  - TSMO strategies in particular
  - CMFs supplemented with safety effectiveness research outside the CMF Clearinghouse

14

# Near- & Mid-Term Summary

— : Limited Change

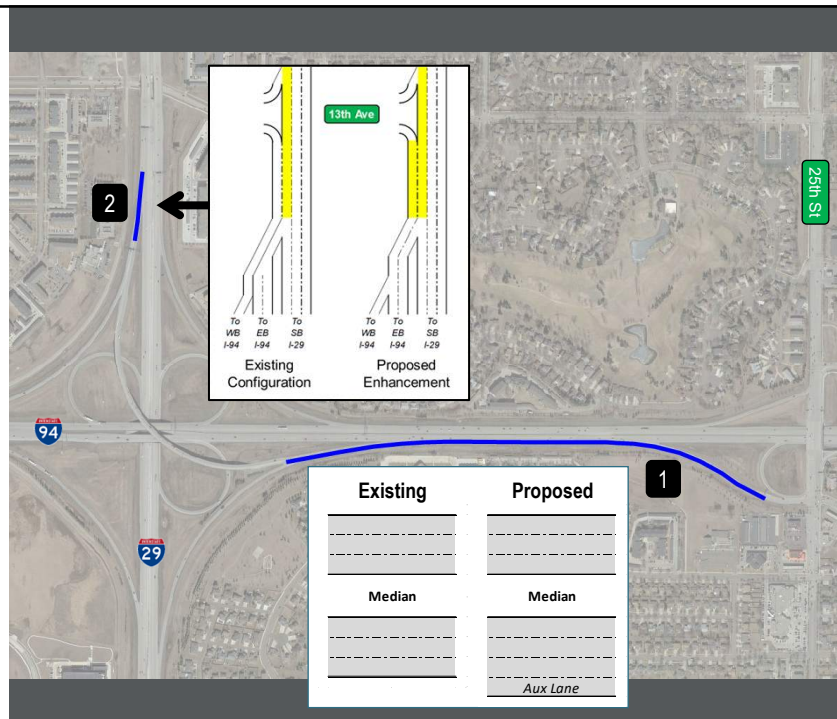
ID	Description	Operations				Total Crashes	Cost (\$ M)
		Delay (hrs)		Speed (mph)			
1	Flyover to 25th	560	↓	17	↑	-	2.4 - 2.9
2	I-29 → I-94 Exit						0.4 - 0.5
3	2-Lane Exit to 8th	35	↓	13	↑	-	0.7 - 0.8
4	I-29 NB Aux @ 32nd S	5	↓	-		-	1.4 - 1.7
5	I-94 WB Add	10	↓	6	↑	-	0.9 - 1.1
6	I-29 4 Aux (N of I-94)	-		2	↑	-	15.8 - 19.4
7	I-94 3 Aux (E of I-29)	-		3	↑	-	6.6 - 8.1
8	I-94 2 Aux (W of I-94)	-		2	↑	-	4.7 - 5.8
9	I-94 Widen over Red River	40	↓	13	↑	5% ↓	65.5 - 80.1
10	I-29 Widen S of 32nd S	250	↓	28	↑	5% ↓	15.9 - 19.4

Delay & Speed Reduction Compared to Baseline

## Projects 1 & 2

- 1: NDDOT Expansion project to relieve SB I-29 to EB I-94 Congestion
- 2: SB I-29 to I-94 Lane Reconfiguration

*Combined #1 & #2 since benefits of #1 wouldn't be realized without #2*



## Projects 1 & 2

DELAY



*Hours Reduced*  
560

SAFETY

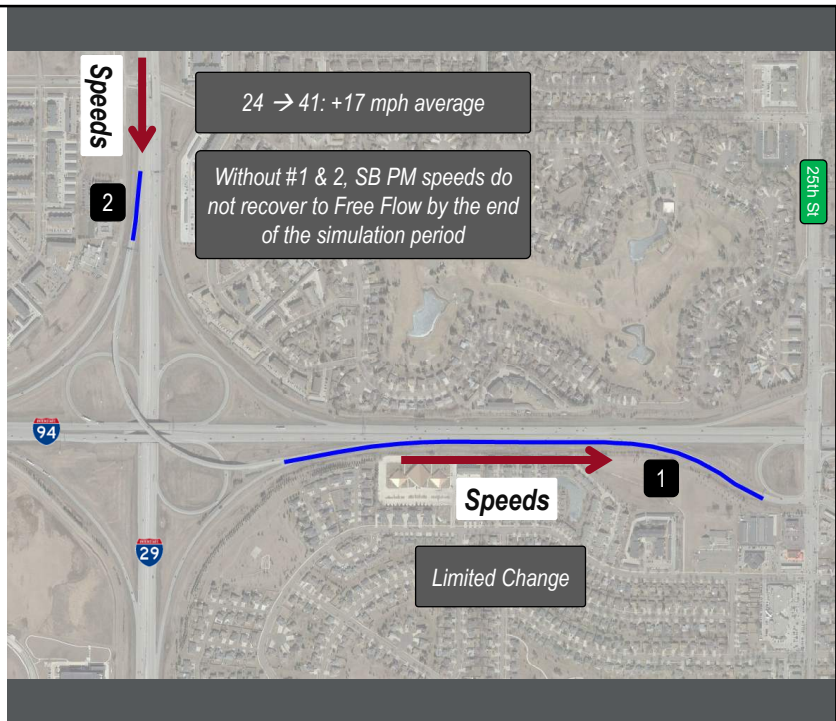


*Limited Change*

COST



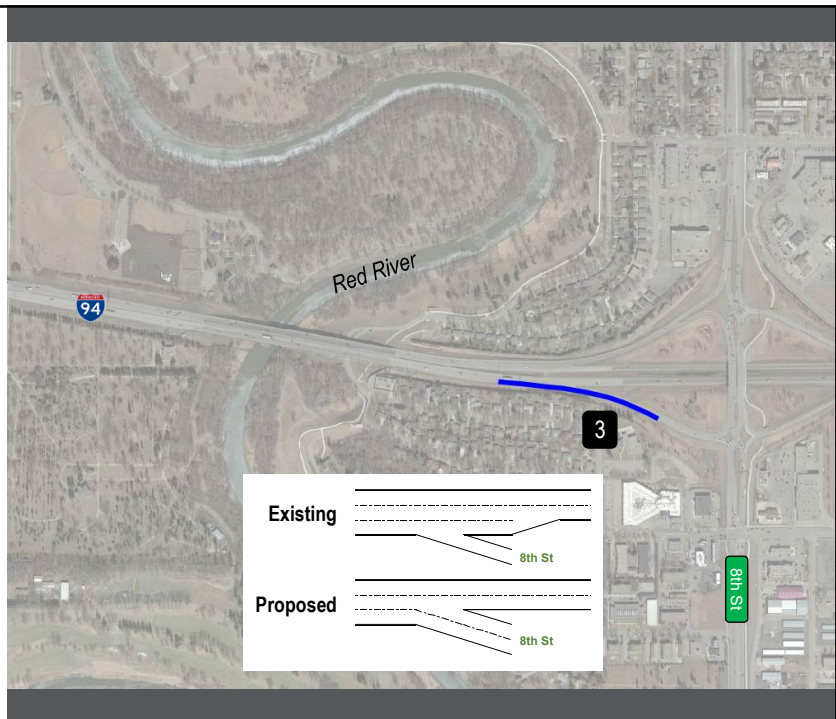
1: \$2.4 - \$2.9 M  
2: \$0.4 - \$0.5 M



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## Project 3




- 3: Modify single lane exit ramp to 2-lane exit ramp to 8<sup>th</sup> Street

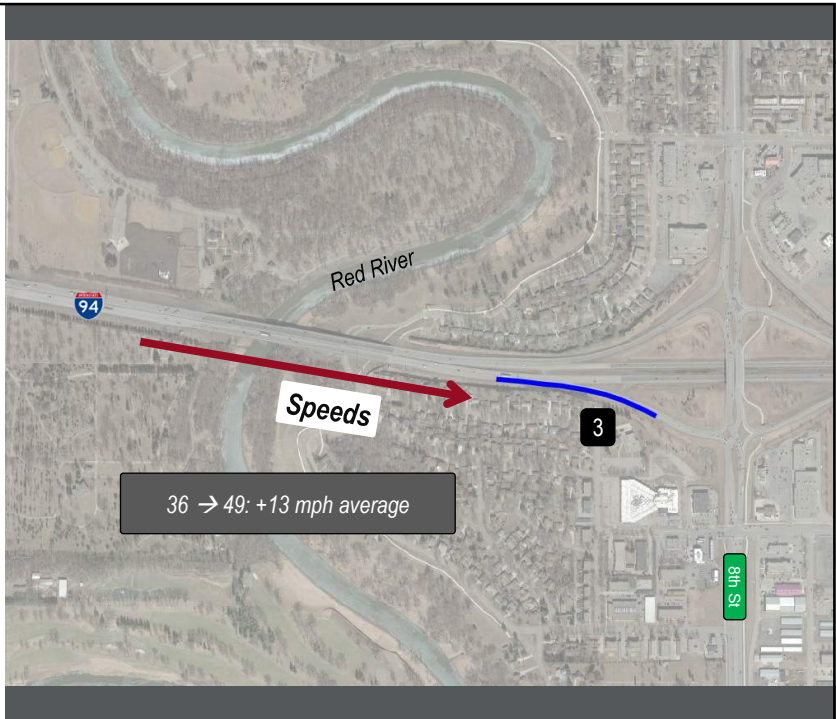


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## Project 3

DELAY		<b>Hours Reduced</b> 35
SAFETY		<b>Limited Change</b>
COST		<b>\$0.7 - \$0.8 M</b>

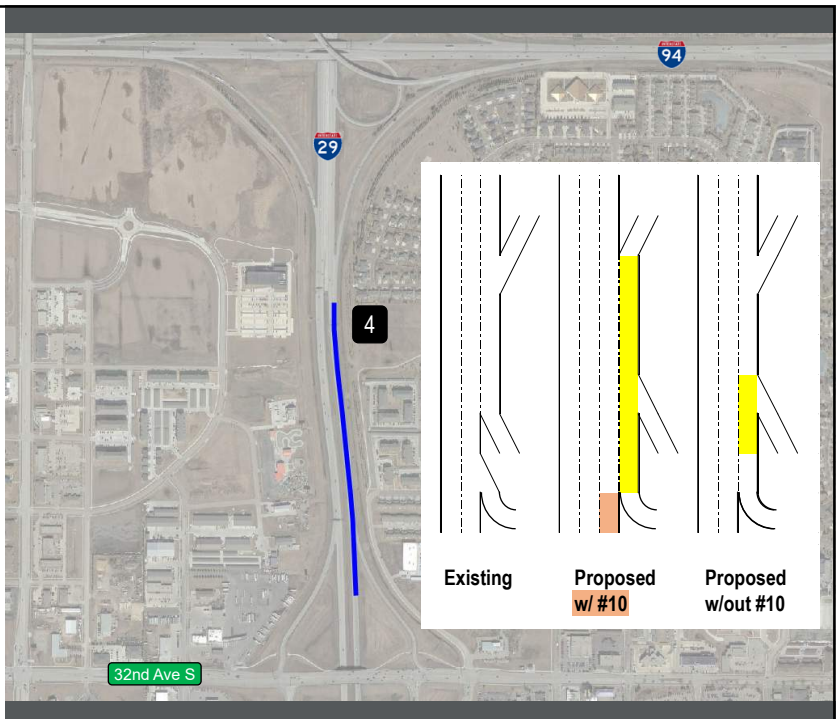


19

## Project 4




- 4: Modify entrance ramp add lane to loop ramp – taper in WB to NB ramp

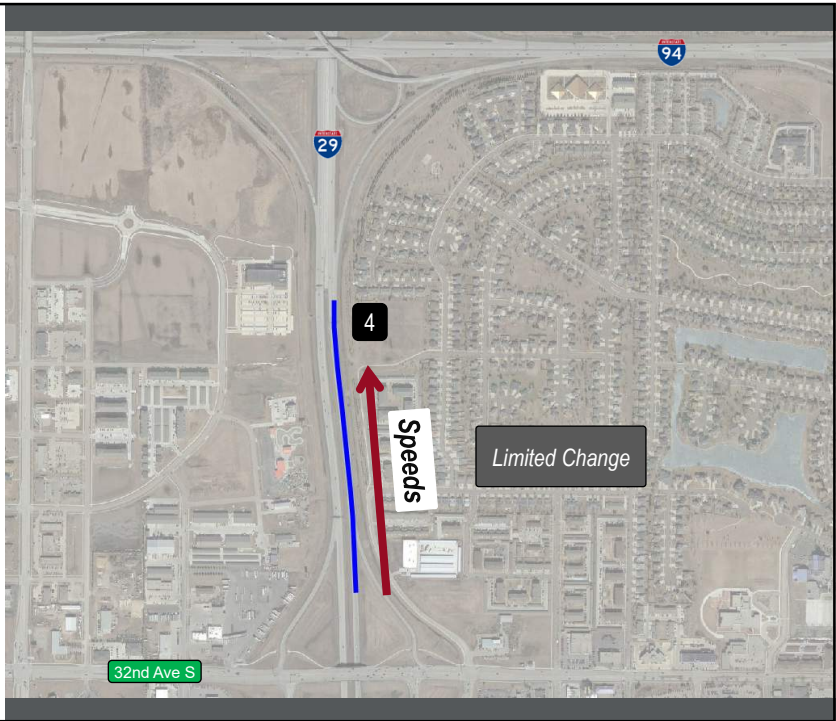
#4 Length could be reduced if Project #10 (widening between 32<sup>nd</sup> Ave S & 52<sup>nd</sup> Ave S) does not occur



20

## Project 4

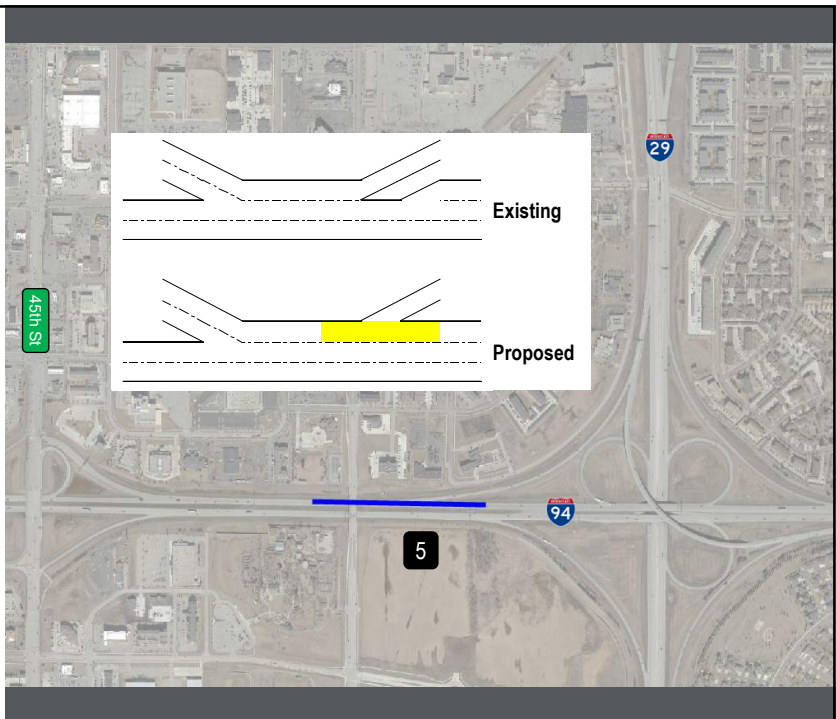
DELAY		Hours Reduced 5
SAFETY		Limited Change
COST		\$1.4 - \$1.7 M



21

## Project 5

- 5: Remove WB I-94 lane drop & taper in SB I-29 to WB I-94 system ramp



22

## Project 5

DELAY



Hours Reduced  
10

SAFETY

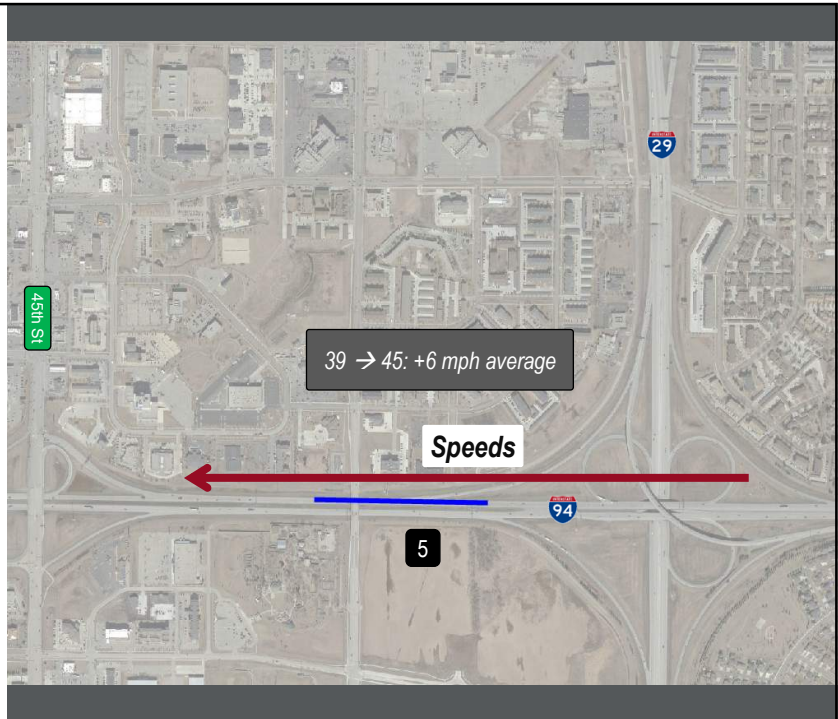


Limited  
Change

COST



\$0.9 - \$1.1 M



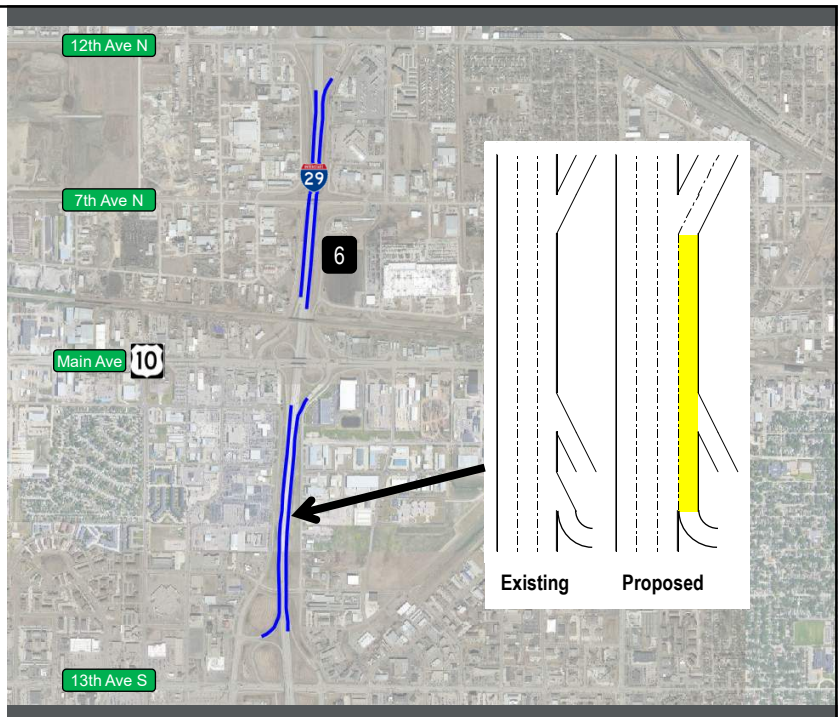
23

## Project 6

- 6: I-29 Aux Lanes north of I-94

1 or 2 lane off Ramps can be provided

Loop Ramp adds aux lane



24

## Project 6

DELAY



Hours Reduced  
Limited Change

SAFETY

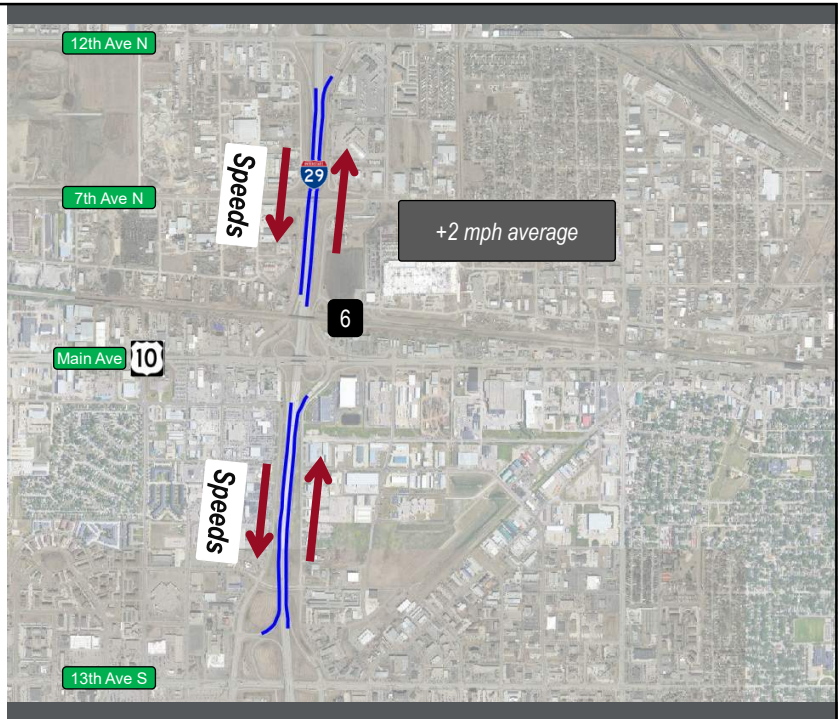


Limited  
Change

COST



\$15.8 - \$19.4 M



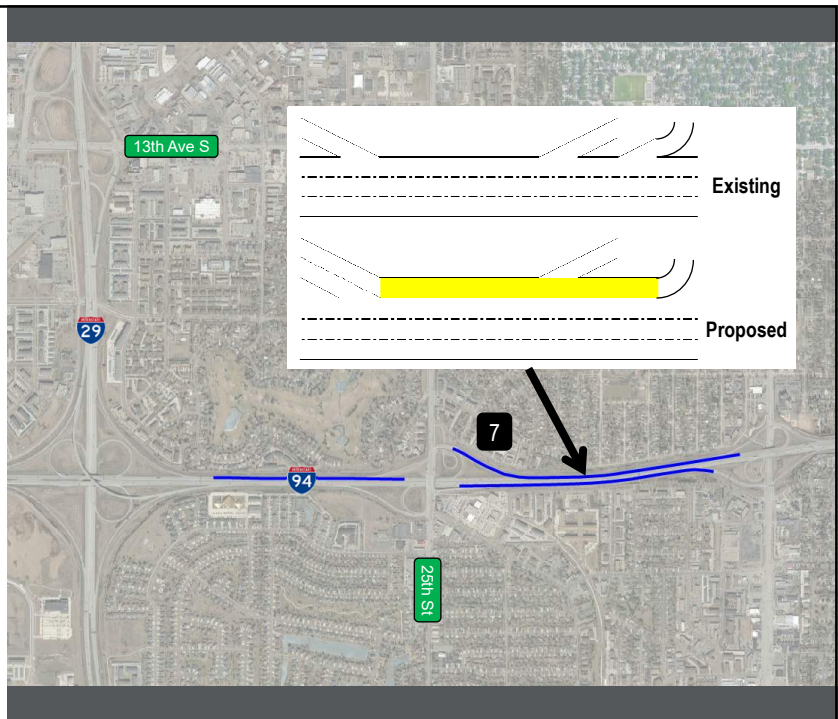
25

## Project 7

- 7: I-94 Aux Lanes east of I-29

1 or 2 lane off Ramps can be provided

Loop Ramp adds aux lane



26

## Project 7

DELAY



Hours Reduced  
Limited Change

SAFETY

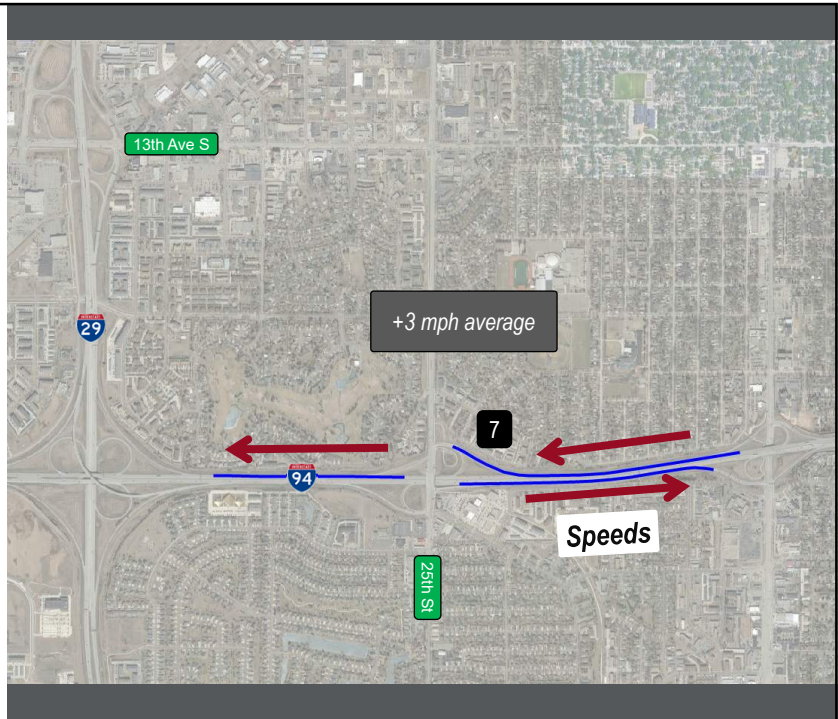


Limited  
Change

COST



\$6.6 - \$8.1 M



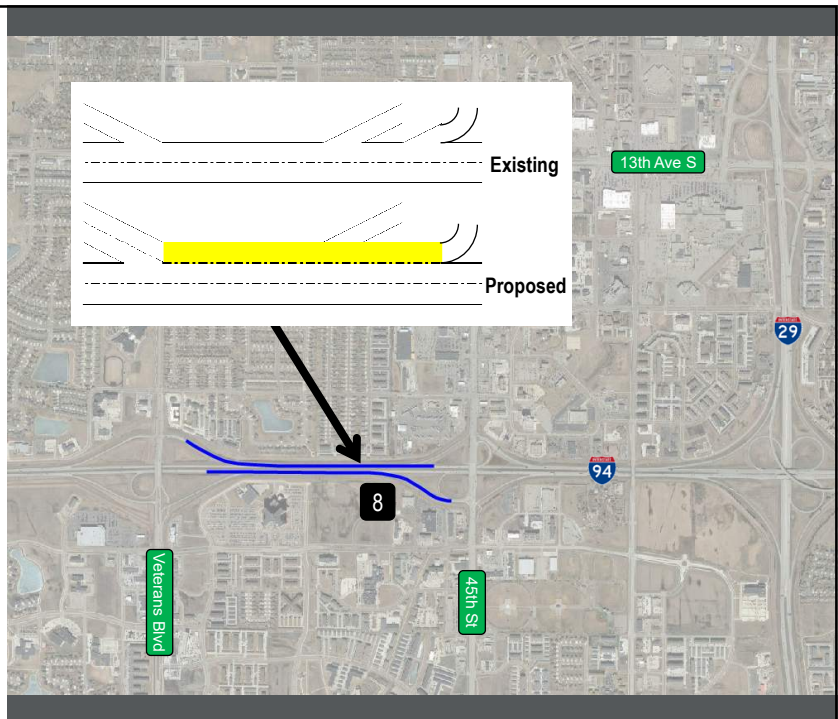
27

## Project 8

- 8: I-94 Aux Lanes west of I-29

1 or 2 lane off Ramps can be provided

Loop Ramp adds aux lane



28

## Project 8

DELAY



Hours Reduced  
Limited Change

SAFETY

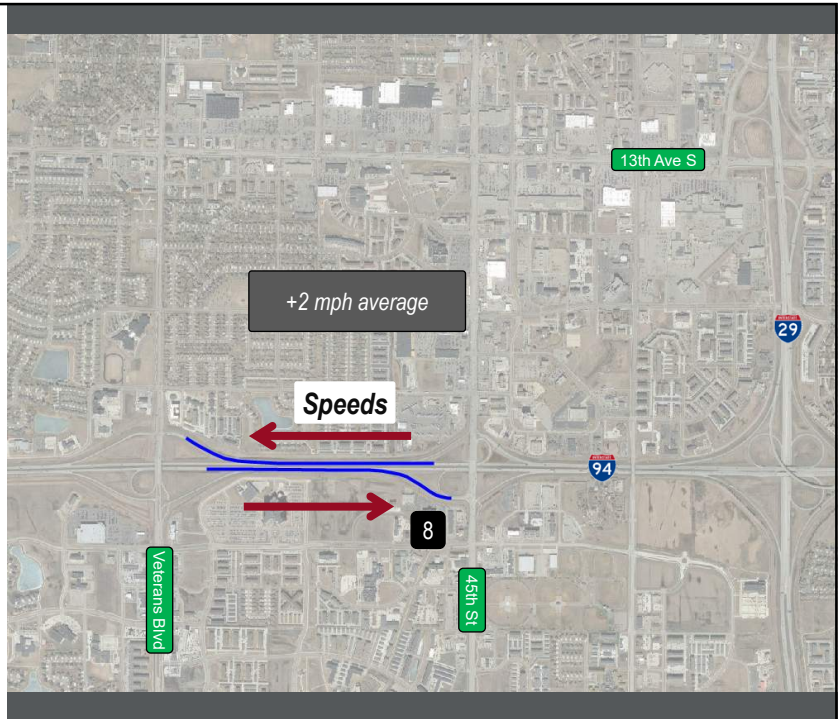


Limited  
Change

COST



\$4.7 - \$5.8 M

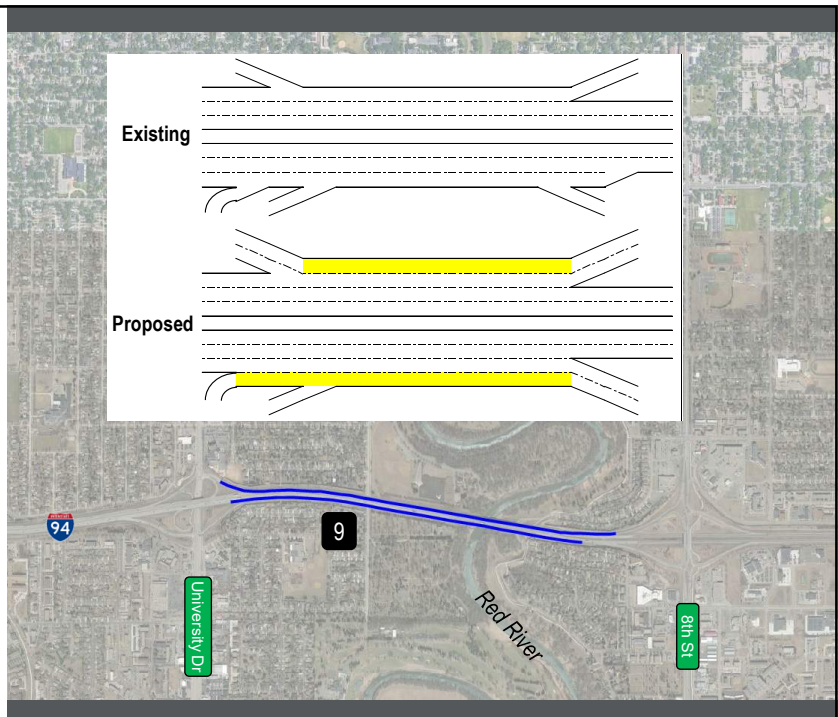


29

## Project 9

- 9: I-94 Widening over Red River

Includes Replacement of Red River Bridges



30

## Project 9

DELAY



Hours Reduced  
40

SAFETY

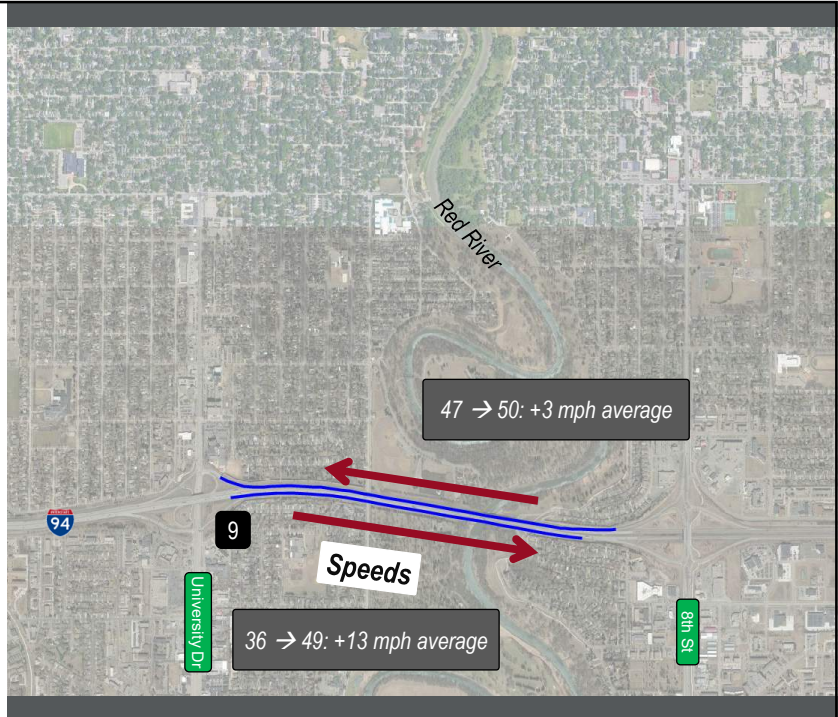


5% Crash  
Reduction

COST



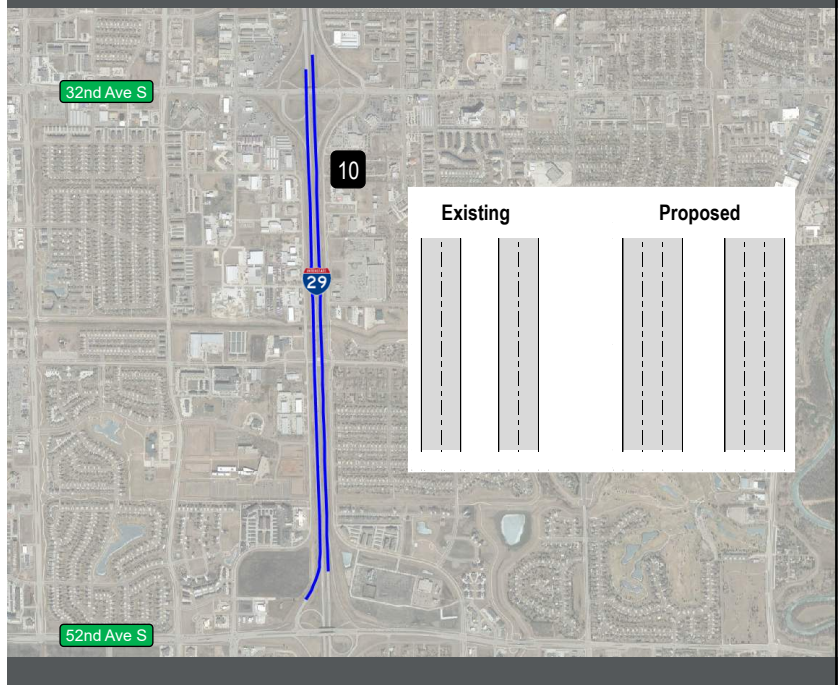
\$65.5 - \$80.1 M



31




## Project 10

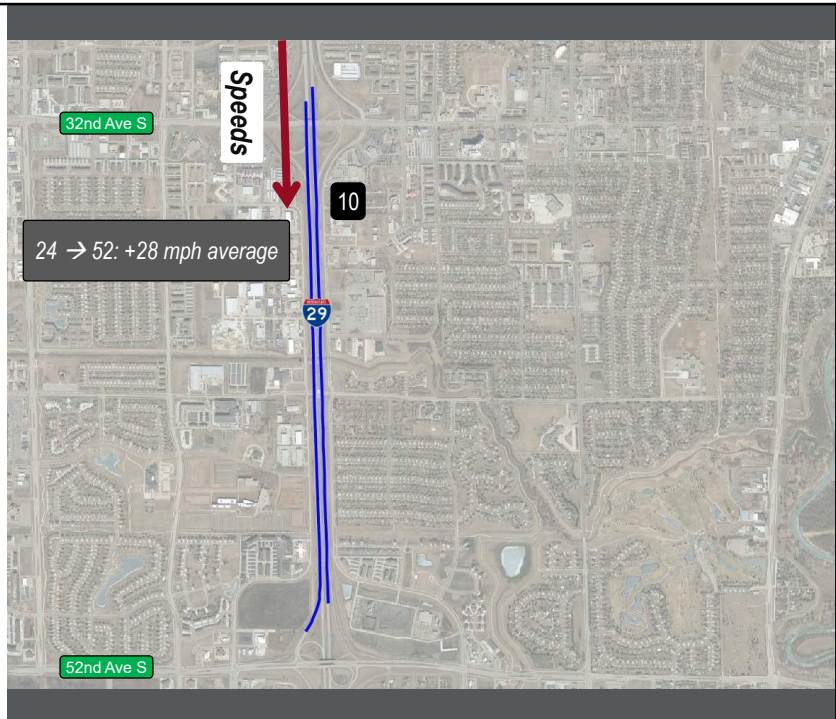
- 10: I-29 Widening between 32<sup>nd</sup> Ave S & 52<sup>nd</sup> Ave S



32

## Project 10

DELAY		<b>Hours Reduced</b> 250
SAFETY		<b>5% Crash Reduction</b>
COST		<b>\$15.9 - \$19.4 M</b>



33

## Near- & Mid-Term Summary

— : Limited Change

ID	Description	Operations		Total Crashes	Cost (\$ M)
		Delay (hrs)	Speed (mph)		
1	Flyover to 25th	560 ↓	17 ↑	-	2.4 - 2.9
2	I-29 → I-94 Exit				0.4 - 0.5
3	2-Lane Exit to 8th	35 ↓	13 ↑	-	0.7 - 0.8
4	I-29 NB Aux @ 32 <sup>nd</sup> S	5 ↓	-	-	1.4 - 1.7
5	I-94 WB Add	10 ↓	6 ↑	-	0.9 - 1.1
6	I-29 4 Aux (N of I-94)	-	2 ↑	-	15.8 - 19.4
7	I-94 3 Aux (E of I-29)	-	3 ↑	-	6.6 - 8.1
8	I-94 2 Aux (W of I-94)	-	2 ↑	-	4.7 - 5.8
9	I-94 Widen over Red River	40 ↓	13 ↑	5% ↓	65.5 - 80.1
10	I-29 Widen S of 32 <sup>nd</sup> S	250 ↓	28 ↑	5% ↓	15.9 - 19.4

34

Delay & Speed Reduction Compared to Baseline



# 05

## Long-Term Strategies

35

### 05 | Long-Term Strategies

#### 4 Models Developed

1. Near- & Mid-Term Projects
  - *Used as a Baseline*
2. C-D Road Concept
3. Braided Ramp Concept (Full)
4. Braided Ramp Concept (Partial)

Ran **PM 2-Hour** Microsimulation Model with a **2040** Demand Set

#### Other Notes

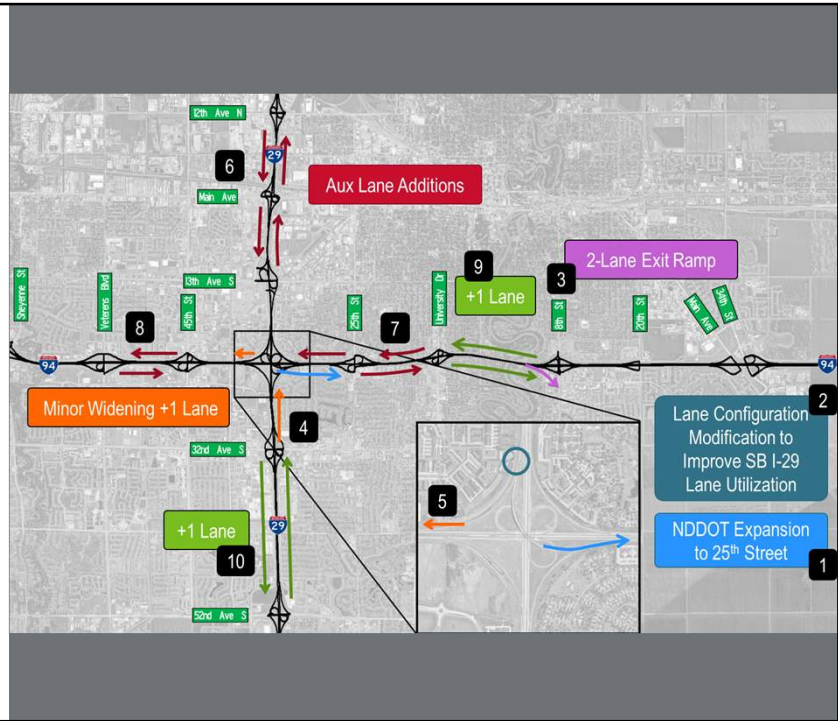
- Assumed 1 new interchange South of 52<sup>nd</sup> Ave S
- No Ramp Metering and / or demand reduction assumed at service interchange ramps (i.e. no traffic diversion from the Interstate)
- Minor Improvements to get full demand to core of the system
  - Signalizing Rural Interchanges
  - Adding Minor Service Interchange Capacity / Signal Timing Changes

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# 1. Near- & Mid-Term Projects

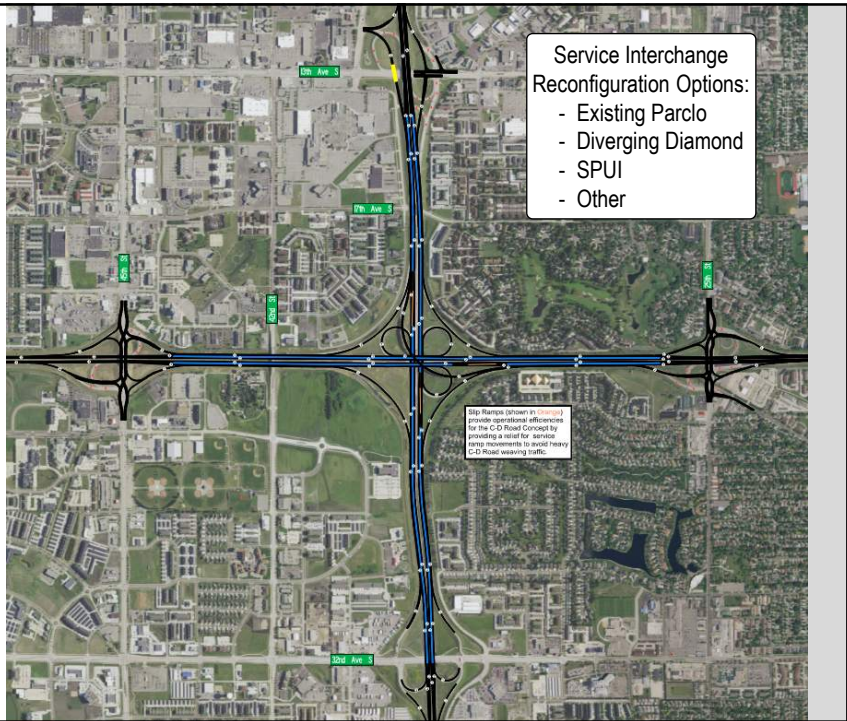
- Geometric Improvements from Near- & Mid-Term Improvement List
- Would likely need significant investment TSMO strategies in order to be effective

*For this analysis, no traffic demand diversion from the Interstate was assumed*



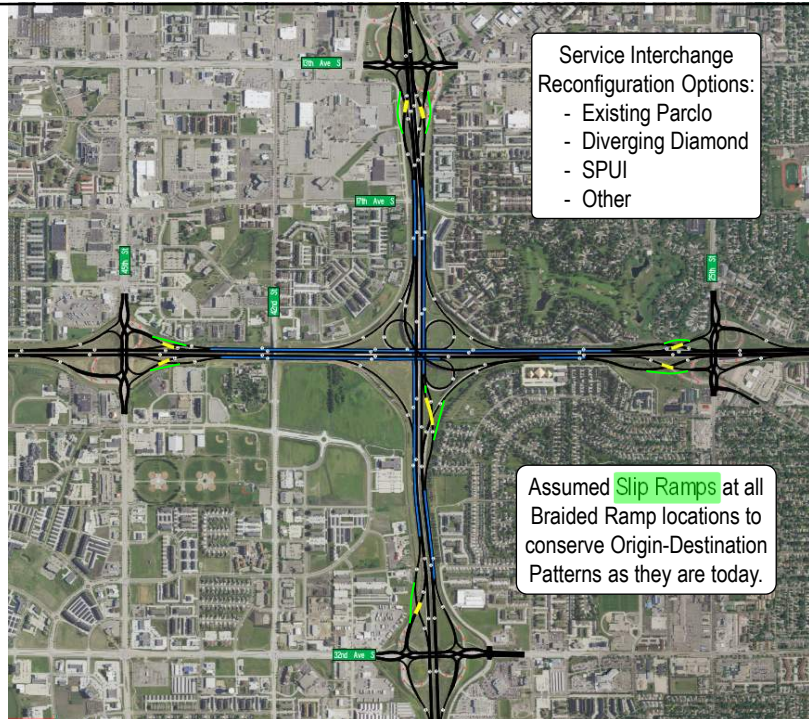
# 2. CD-Road Concept (Full)

- CD-Road Starts / Ends at service interchanges adjacent to I-29 / I-94 System Interchange
- Reconfiguration at service interchanges shown to
  - Fit +1 interstate lane and preserve bridge
  - Improve AASHTO access spacing requirements

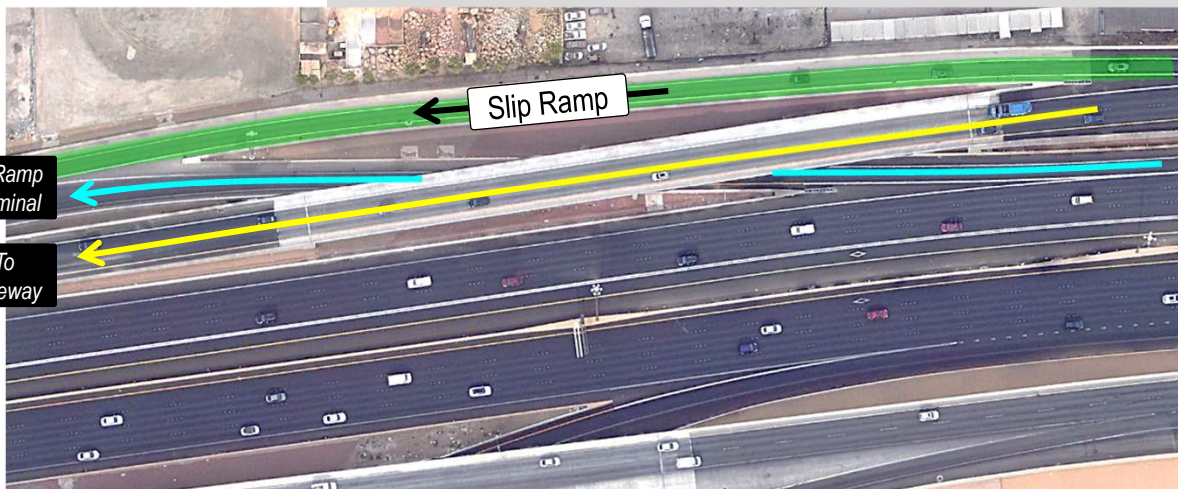


### 3. Braided Ramp Concept (Full)

- All service interchange ramps towards the system interchange are braided.
- Reconfiguration at service interchanges shown to
  - Fit +1 interstate lane and preserve bridge
  - Improve AASHTO access spacing requirements

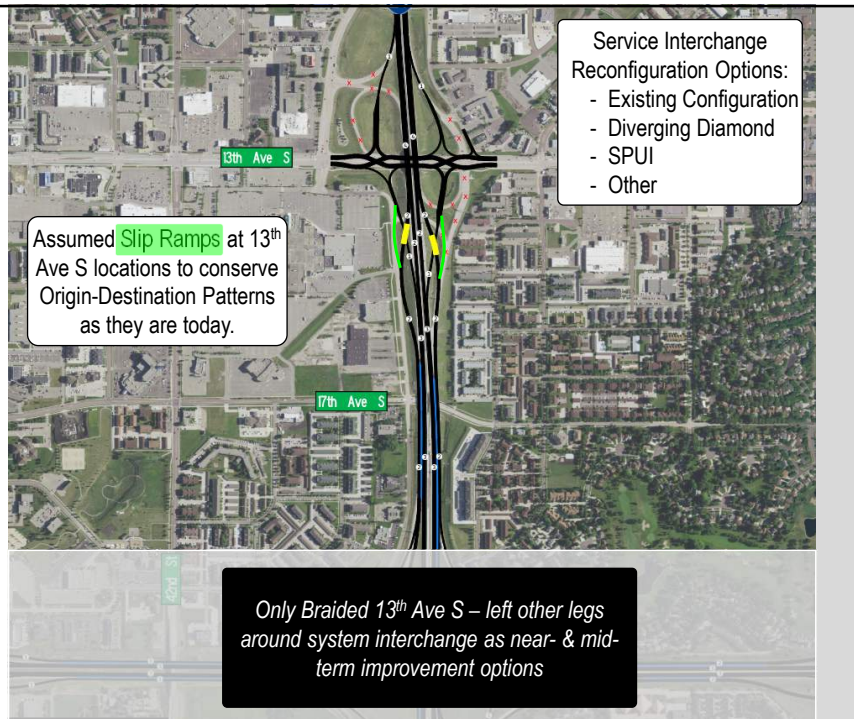


### Braided Ramp Example



## 4. Braided Ramp Concept (Partial)

- Braided the **most critical weaving issue**
  - 13<sup>th</sup> Ave S to I-94



41

## Long-Term Summary

ID	Description	2040 PM Delay (hours)		Total Crashes	Cost (\$ M)
		Total	Change (compared to ID 1)		
1 (Base)	Near- & Mid-Term	549			
2	C-D Road (Full)	378	171 ↓	7% ↓	234 - 286
3	Braided Ramp (Full)	368	184 ↓	9% ↓	296 - 362
4	Braided Ramp (Partial)	387	162 ↓	3% ↓	104 - 128

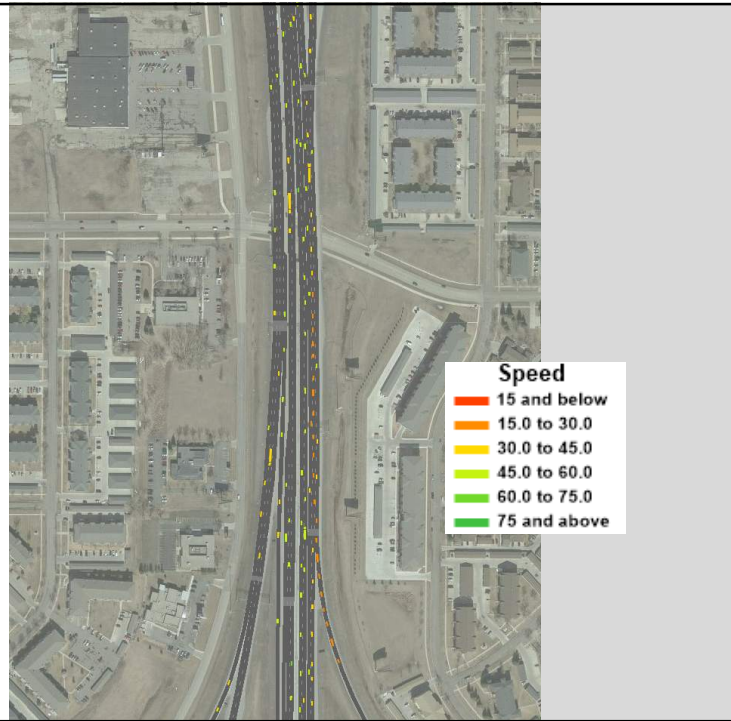
PM Peak Period Delay Comparison	
2021 Existing Calibrated Model	235 Hours
2030 All Near-Mid Term Projects	240 Hours

No cost shown for ID 1 since all long-term projects include near- & mid-term

42

## CD-Road Concept (Full)

- Weaving Operations



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# 06














## TSMO Strategies

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## 06 | TSMO Strategies

### Safety Results (Total Crashes)














- Ramp Metering: 40% Reduction
  - In speed-change areas
- Queue Warning: 16% Reduction
  - Design Consideration: Signs will be ignored if the information is not designed to be timely, accurate, and relevant
- Other TSMO: 20% Reduction
  - Includes TIM, Service Patrol, Work Zone Management

TSMO/ITS IMPROVEMENTS	
	Ramp Metering
	Hard Shoulder Running
	Variable Speed Limits
	Bottleneck Removal
	CAV Infrastructure
	Traffic Management Center
	Queue Detection System
	Anti-Icing Systems
	Traveler Information
	Network Surveillance
	Work Zone Management
	Roadway Service Patrol
	Traffic Incident Management

45

## 06 | TSMO Strategies

ID	Description	Travel Time / Reliability	Total Crashes	Unit Cost
1	Ramp Metering	~20% Reduction in Travel Time / Improved Reliability	40% ↓	\$400k to \$600k
2	Queue Detection	Limited Change in Travel Time / Improved Reliability	16% ↓	\$500k to \$600k
3	TIM / Work Zone / Quick Clearance	Limited Change in Travel Time / Improved Reliability	20% ↓	Varies

TSMO/ITS IMPROVEMENTS	
<b>1</b>	 Ramp Metering
	 Hard Shoulder Running
	 Variable Speed Limits
	 Bottleneck Removal
	 CAV Infrastructure
	 Traffic Management Center
<b>2</b>	 Queue Detection System
	 Anti-Icing Systems
	 Traveler Information
	 Network Surveillance
	 Work Zone Management
<b>3</b>	 Roadway Service Patrol
	 Traffic Incident Management

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# 07

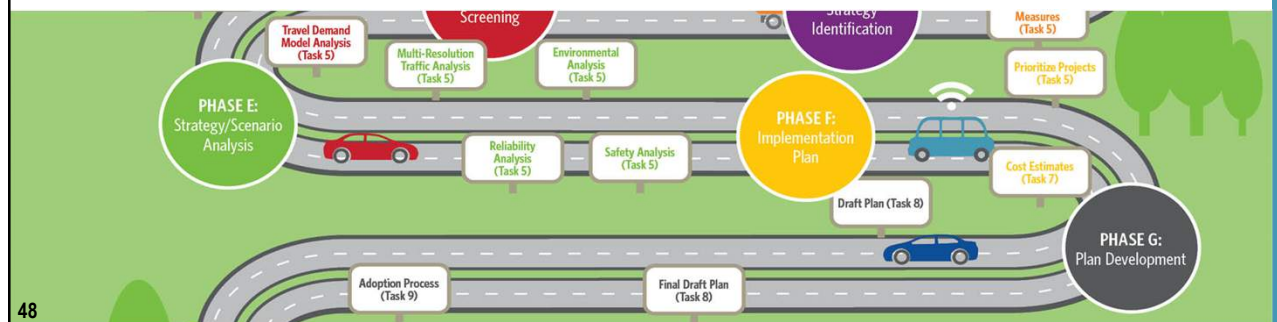
## Next Steps

### 07 | Next Steps

- Full Build-Out Ring Route Analysis
- Refine Costs & Analysis Results
- Implementation Plan Development

Meeting information will be  
emailed later this week

Deadline for Comments:  
September 23



# Meeting Notes

Project: Interstate Operations Analysis and Plan for Future Improvements

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Subject: SRC #6 – Implementation

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Date: Thursday, February 23, 2023

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Location: Virtual - Webex

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## 1. Introductions

- Attendees
  - i. Metro COG - Cindy Gray, Michael Maddox, Dan Farnsworth
  - ii. HDR - Brian Ray, Jacob Weiss, Brian King, Jason Carbee
  - iii. NDDOT - Jason Thorenson, Wayne Zacher, Lindsay Bossert, Eli Ramirez, Jack Smith, Jon Ketterling, Aaron Murra, Bob Walton
  - iv. MnDOT - Jerilyn Swenson, Mary Safgren, Dan Kuhn
  - v. FHWA – no representative
  - vi. Cass County – Jason Benson
  - vii. Clay County - Justin Sorum
  - viii. Fargo – Brenda Derrig, Jeremy Gordon
  - ix. West Fargo – Andrew Wrucke
  - x. Moorhead – Jon Atkins
  - xi. ATAC - Diomo Motuba, Sharijad Hasan

## 2. Project Status Update

- HDR discussed continued conversations with DOTs on major system preservation projects
- HDR discussed the Full Build Out analysis that will be modeled over the next couple months

## 3. Future Year Conditions (Refresher)

- HDR presented 2045 AM / PM Peak hour congestion figures from the previous SRC to set the stage for the strategy analysis discussion.

## 4. Implementation Plan

- System Preservation
  - i. HDR presented the full reconstruction / replacement projects on the Interstate system
  - ii. Jason Thorenson (NDDOT) noted that there will be Bridge Deck overlays on the Red River Bridges in 2025
    - HDR noted that minor rehab / concrete pavement repair projects will be discussed in the final report
- Near-Term Strategies



- i. HDR presented Near-Term Strategies
  - ii. Wayne Zacher (NDDOT) noted that TMC con ops is close to a reviewable draft. Brandon Beise from NDDOT would be happy to talk to the IOS project team if they set up a call.
  - iii. City of Fargo asked HDR to soften the “C-D Road” language tied with the 64<sup>th</sup> Avenue S Improvements
    - HDR noted the closely spaced ramps will likely need some access road / C-D road in the future but Opening Day may not. HDR will soften this language in the final report
    - HDR also noted that the preliminary concepts showing 6 mainline lanes on I-29 with C-D roads is not necessary in the design year. The team working on the 64<sup>th</sup> Ave S project should strongly consider 4 mainline lanes (2 in each direction)
  - iv. Jon Atkins asked about the WB I-94 Lane Drop (3 → 2) within the Tri-Level Interchange.
    - HDR noted that the project to remove the lane drop was shifted to the mid-term strategies to align with full reconstruction of I-94.
- Mid-Term Strategies
  - i. HDR presented Mid-Term Strategies – noting that a majority of the projects align with full reconstruction of the system
  - ii. Sharijad Hasan (ATAC) asked about the opportunity to use Ramp Metering during construction activities in association with smart work zones.
    - HDR noted that it could be implemented before or after reconstruction of I-94, but we see advantages of metering demand during construction.
  - iii. Jeremy Gordon noted perceived complexity of braided ramps at the 13<sup>th</sup> Ave S location
    - HDR noted that from an aerial view, the concept may look complex and that it’ll be important to develop driver-perspective visualizations if this concept moves forward
    - Cindy noted that she’s driven through braided ramps in Minneapolis and they are very easy to navigate
- Long-Term Strategies
  - i. HDR presented Long-Term Strategies – noting that specific years for the projects will not be identified
  - ii. Andrew Wrucke asked if the I-94 / Main Ave improvements could be shifted to the mid-term
    - He also noted that they are working with another consultant on concepts / ROW preservation
    - Cindy noted a project in the 2024 UPWP for this interchange plus another look at the 13<sup>th</sup> Ave S overpass
  - iii. Cindy asked Jason Benson about 100<sup>th</sup> Ave S

- Jason noted that it is possible that the improvement would need to be moved up.
- Cindy noted that lighting could be an interim solution.
- iv. Aaron and Bob (NDDOT) were supportive of the braided loop ramp as a lower-cost solution to the NB to WB flyover
  - HDR also noted potential operational deficiencies the flyover could induce due to the shortening of the WB I-94 weave between I-29 and 45<sup>th</sup> Street.

#### 5. Next Steps / Open Discussion

- The project team will continue working on Final Report Documentation
- An upcoming presentation to NDDOT Management will be held on March 15 (Virtually)



Please add your  
(1) Name & (2) Agency  
in the chat.

# Interstate Operations Analysis & Plan for Future Improvements

SRC – Feb 23, 2023  
Implementation



Please add your  
(1) Name & (2) Agency  
in the chat.

- 01 Introduction
- 02 Project Status Update
- 03 Traffic Operations (Refresher)
- 04 Implementation Plan
- 05 Next Steps

# 01

---

## Introduction

3

### 01 | Project Objectives/Outcomes

- Determine the pros/cons of potential ring routes in order to make recommendation
- Present a clear menu of prioritized improvements
- Provide operational and analytical data to assist with later project development phases
- Have the study results that are intuitive and easy to interpret

4

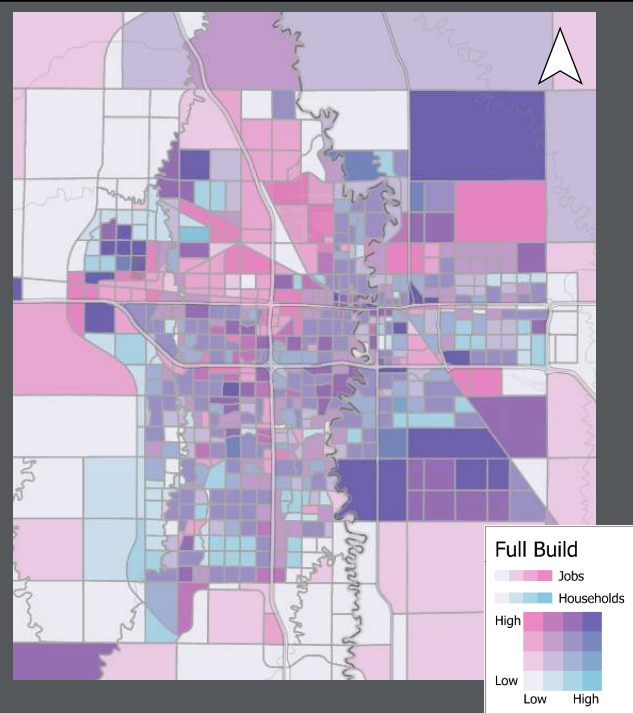
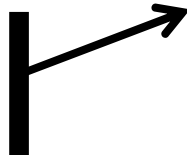
# 02

## Project Status Update

5

### 02 | Project Status Update

- Continued Coordination with DOTs on System Preservation
- Development of Draft Implementation Plan
- Started Full Built Out Ring-Route Modeling / Analysis

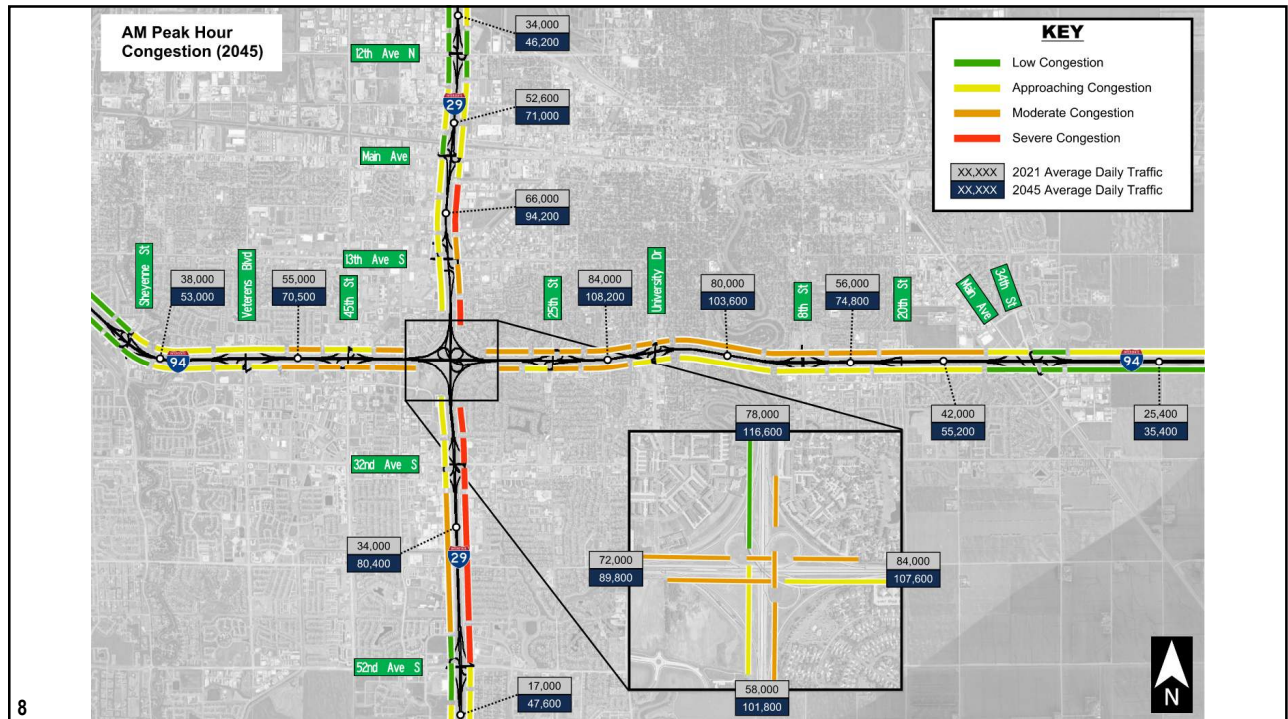


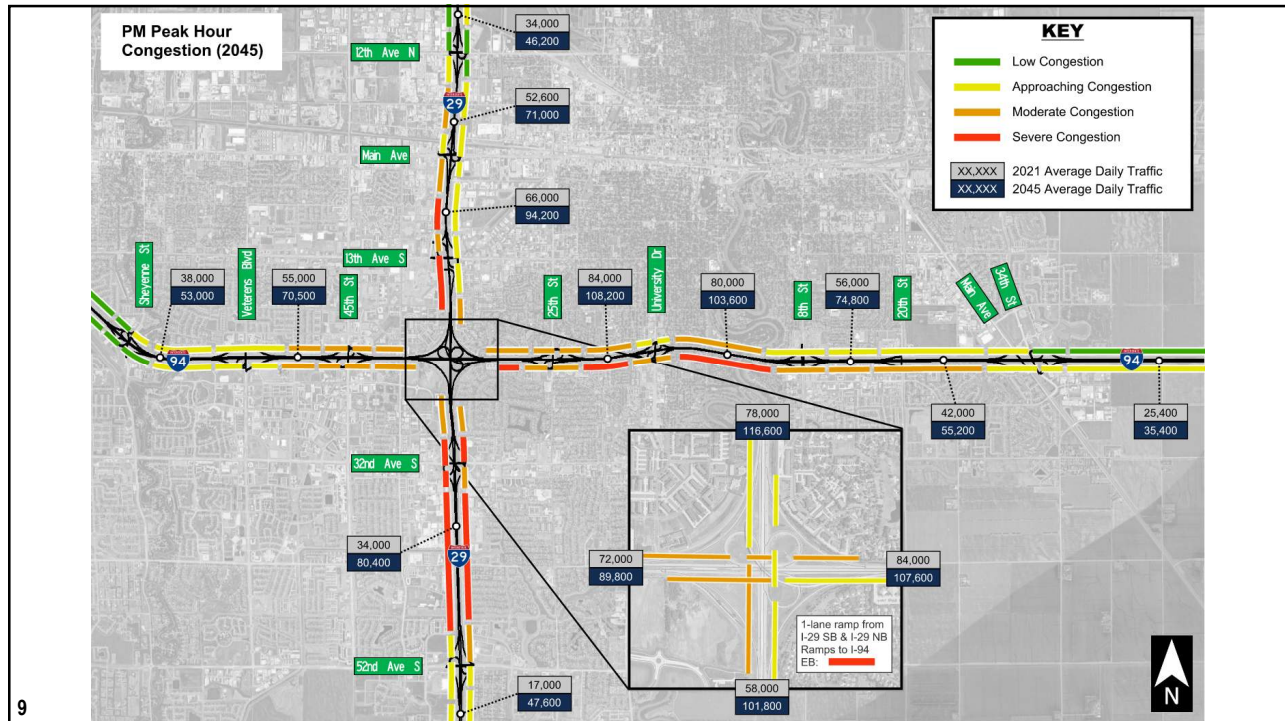
6

# 03

## Future Year Operations (Refresher)

7





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# 04 Implementation Plan

10

# Implementation Plan

Type	Project	Near Term									Mid Term									Long Term									
		23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Interstate	I-94 EB Exit to 8th Street																												
Interstate	Flyover Expansion to 25th Street																												
Interstate / Interchange	New Interchange at 64th Ave S (includes C-D Roads)																												
Interstate	I-29 Expansion (Between I-94 & 52nd Ave S)																												
Interstate	I-94 Aux Lane (Between Weigh Station & Mn 336)																												
Interchange	40th Ave N Interchange Reconfiguration																												
Off-System	52nd Ave S / 60th Ave S Widening (Between University & US 75)																												
TSMO	Re-Start TIM Group																												No Years Identified
TSMO	Development of TMC																												No Years Identified
TSMO	DMS / CCTV Expansion																												No Years Identified
TSMO	I-94 Shoulder Widening through Moorhead																												No Years Identified

## KEY

Interstate Mainline Expansion / Improvements
Interchange Reconfiguration
Off-System Improvements
TSMO Improvements
System Preservation

Type	Project	Near Term									Mid Term									Long Term									
		23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Interstate	I-94 EB Exit to 8th Street																												
Interstate	Flyover Expansion to 25th Street																												
Interstate / Interchange	New Interchange at 64th Ave S (includes C-D Roads)																												
Interstate	I-29 Expansion (Between I-94 & 52nd Ave S)																												
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TSMO	Re-Start TIM Group																												No Years Identified
TSMO	Development of TMC																												No Years Identified
TSMO	DMS / CCTV Expansion																												No Years Identified
TSMO	I-94 Shoulder Widening through Moorhead																												No Years Identified
Interstate	I-94 Expansion to 6 Basic Lanes (Between Sheyenne & I-29)																												No Years Identified
Interstate	I-94 Expansion to 8 Basic Lanes (Between I-29 & 8th Street)																												No Years Identified
Interstate	I-94 Expansion to 6 Basic Lanes (Between 8th Street & Mn 336)																												No Years Identified
Interchange	20th Street Reconfiguration																												No Years Identified
Interstate / Interchange	I-29 Braided Ramps between 13th Ave S & I-94																												No Years Identified
Off-System	NW Connector Road																												No Years Identified
TSMO	Ramp Metering (Ring 1)																												No Years Identified
TSMO	Service Patrol																												No Years Identified
TSMO	Smart Work Zones																												No Years Identified
Interstate	I-29 Aux Lanes (Between 12th Ave N & 13th Ave S)																												No Years Identified
Interstate	Braided NB Loop Ramp (At I-29 / I-94 System Interchange)																												No Years Identified
Interchange	New Interchange at 76th Ave S (includes C-D Roads)																												No Years Identified
Interchange	100th Ave S Improvements																												No Years Identified
Interchange	I-94 & Main Ave Improvements (Including 13th Ave S I-94 Overpass)																												No Years Identified
Off-System	Connector Road(s)																												No Years Identified
TSMO	Ramp Metering (Ring 2)																												No Years Identified
System Preservation	I-94 & Main Avenue Interchange Reconstruction																												No Years Identified
System Preservation	I-94 Reconstruction (Between Sheyenne & I-29)																												No Years Identified
System Preservation	I-94 Reconstruction (Between I-29 & 8th Street)																												No Years Identified
System Preservation	I-94 Reconstruction (Between 8th Street & Mn 336)																												No Years Identified
System Preservation	I-29 Reconstruction (Between 40th Ave S & 126th Ave S)																												No Years Identified



# System Preservation

## Near Term

1. Full Reconstruction: 2023

## Mid Term

2. Full Reconstruction: 2031-2034
3. Bridge Replacement: 2031-2034
4. Full Reconstruction: 2031-2034
5. Full Reconstruction: 2034-2037

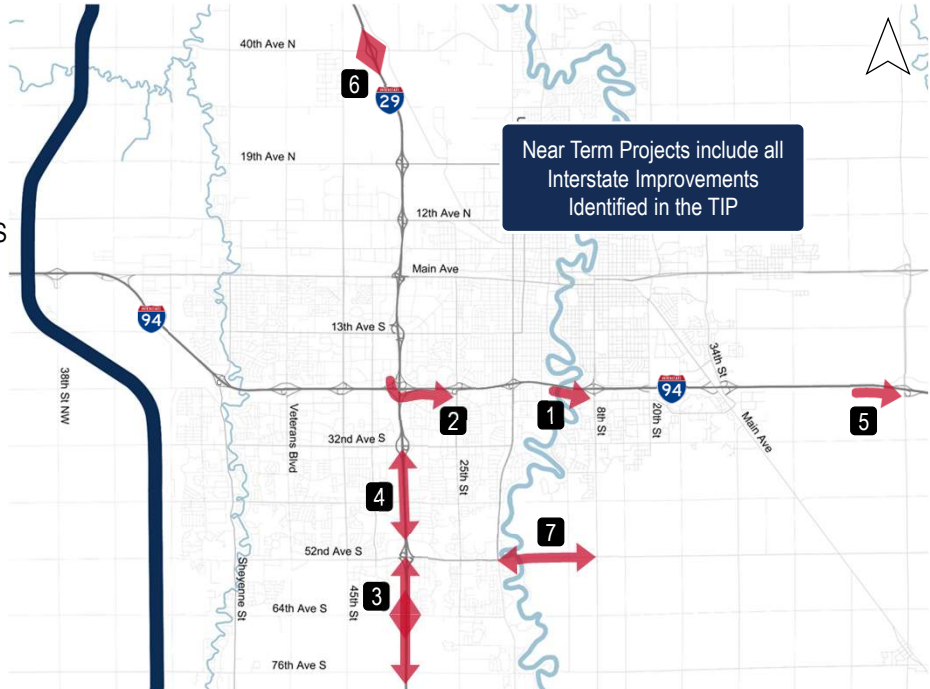


# Near Term 2023-2030

1. I-94 EB Exit to 8th Street
2. Flyover Expansion to 25th Street
3. New Interchange at 64th Ave S (includes C-D Roads)
4. I-29 Expansion
5. I-94 Aux Lane (East of Weigh Station)
6. 40th Ave N Interchange Reconfiguration
7. 52nd Ave S / 60th Ave S Widening

## TSMO Improvements

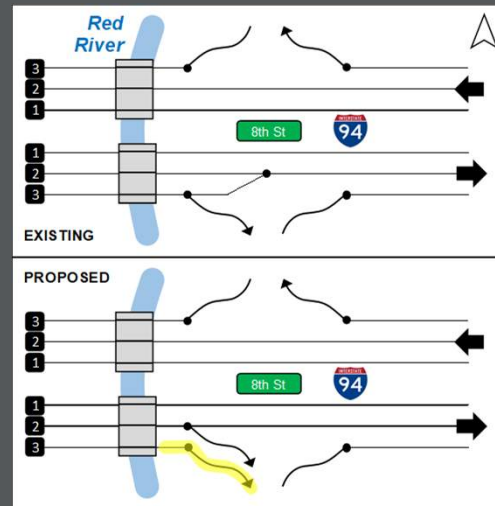
- TIM Group
- TMC
- DMS / CCTV
- I-94 Shoulder Widening through Moorhead



## Near Term 2023-2030

### Project 1

- Modify single lane exit ramp to 2-lane exit ramp to 8<sup>th</sup> Street



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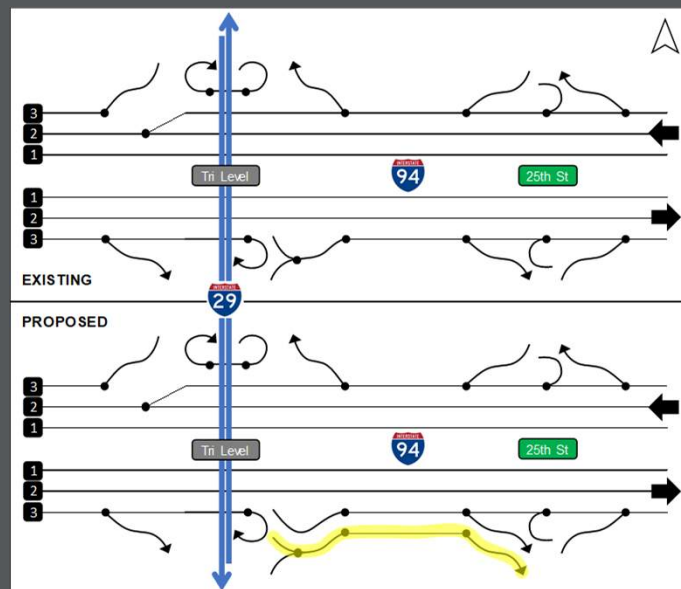
## Near Term 2023-2030

### Project 2

- NDDOT Expansion project to relieve SB I-29 to EB I-94 Congestion

#### Potential Addition

SB I-29 to I-94 Lane Reconfiguration



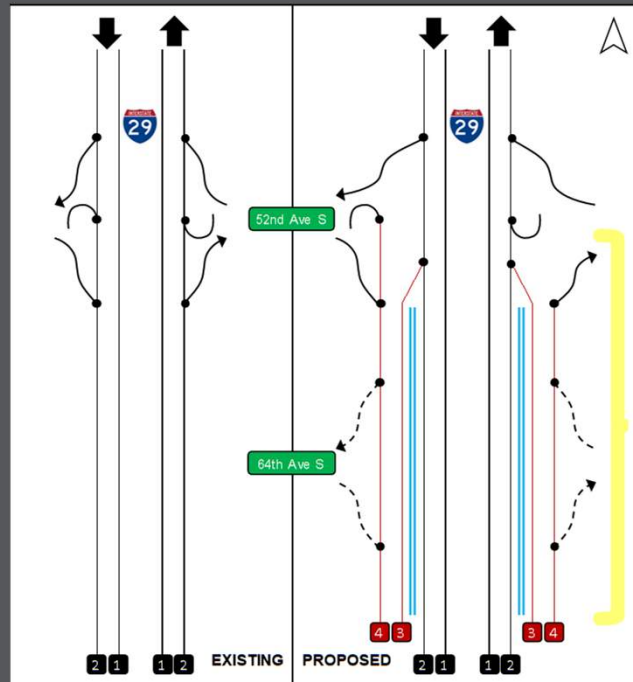
16

## Near Term 2023-2030

### Project 3

- New Interchange at 64<sup>th</sup> Ave S  
(Includes C-D Roads)

Project 3 is being studied independently by others

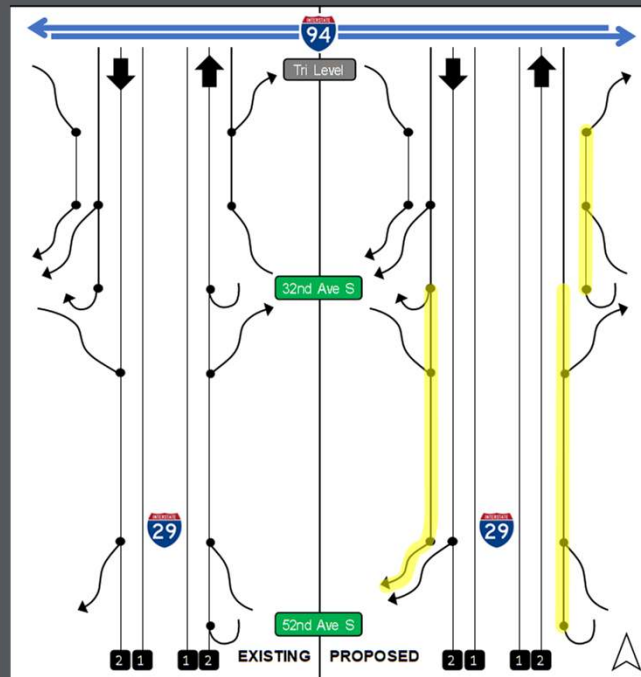


17

## Near Term 2023-2030

### Project 4

- I-29 Widening  
between I-94 & 52<sup>nd</sup> Ave S



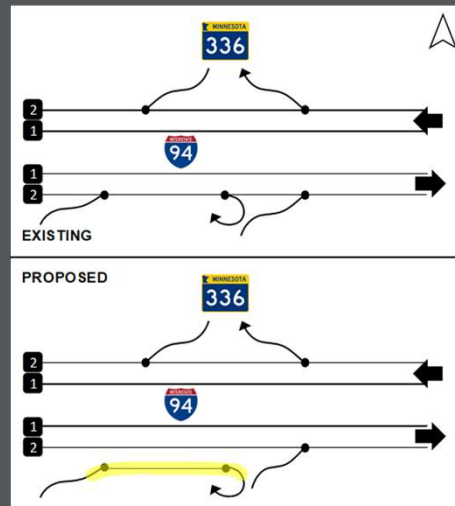
18

## Near Term 2023-2030

### Project 5

- I-94 EB Aux Lane

Large speed differential between entering traffic from weigh station and exit ramp to MN 336



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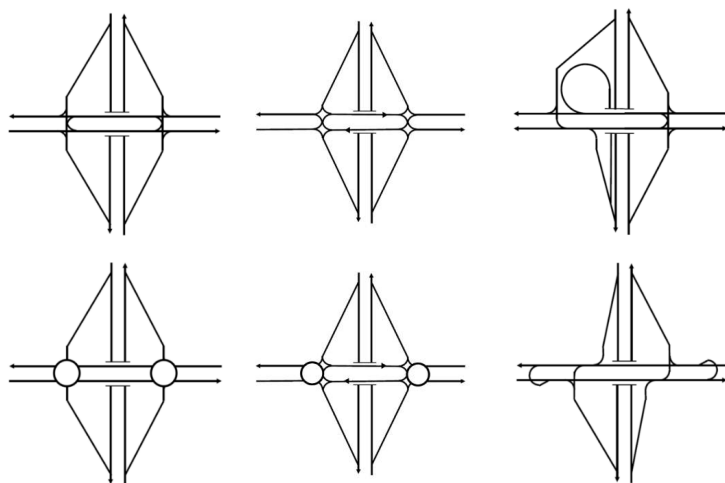
## Near Term 2023-2030

### Interchanges

- 4: 64<sup>th</sup> Ave S
- 6: 40<sup>th</sup> Ave N

Project 4 & 6 is being studied independently by others

Initial Options Identified at 40<sup>th</sup> Avenue N (by others)



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# Mid Term 2031-2040

1. I-94 Expansion to 6 Lanes
2. I-94 Expansion to 8 Lanes
3. I-94 Expansion to 6 Lanes
4. 20th Street Reconfiguration
5. I-29 Braided Ramps between 13th Ave S & I-94
  - 13th Ave S Reconfiguration
6. NW Connector Road

### TSMO Improvements

- Ramp Metering (Ring 1)
- Service Patrol
- Smart Work Zones



# System Preservation

### Near Term

1. Full Reconstruction: 2023

### Mid Term

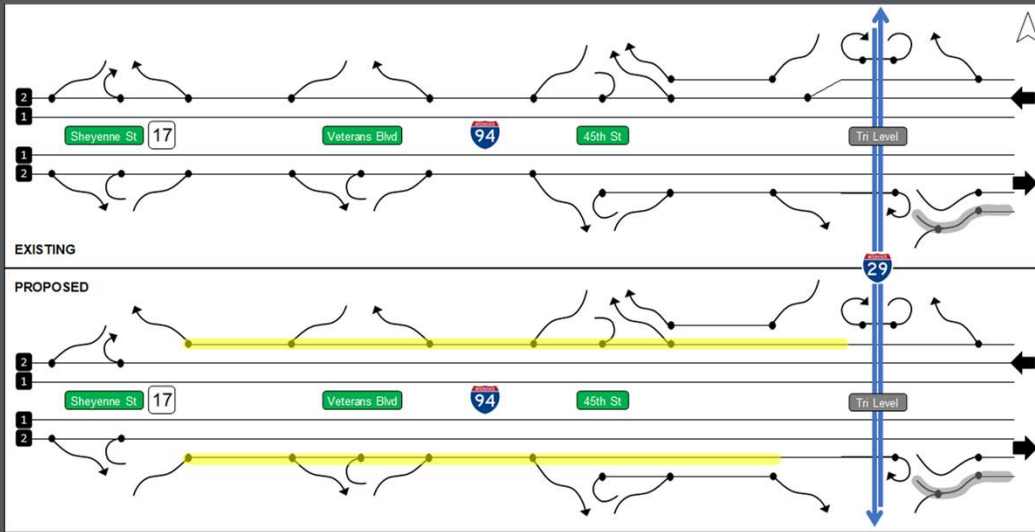
2. Full Reconstruction: 2031-2034
3. Bridge Replacement: 2031-2034
4. Full Reconstruction: 2031-2034
5. Full Reconstruction: 2034-2037



# Mid Term 2031-2040

## Project 1

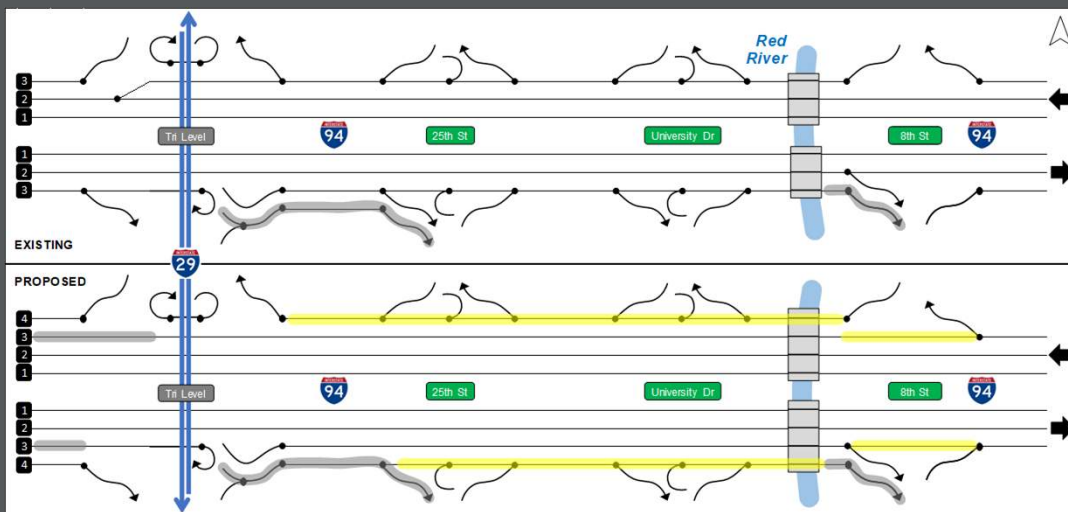
I-94 Reconstruction /  
Expansion to 6 Basic  
Lanes



# Mid Term 2031-2040

## Project 2

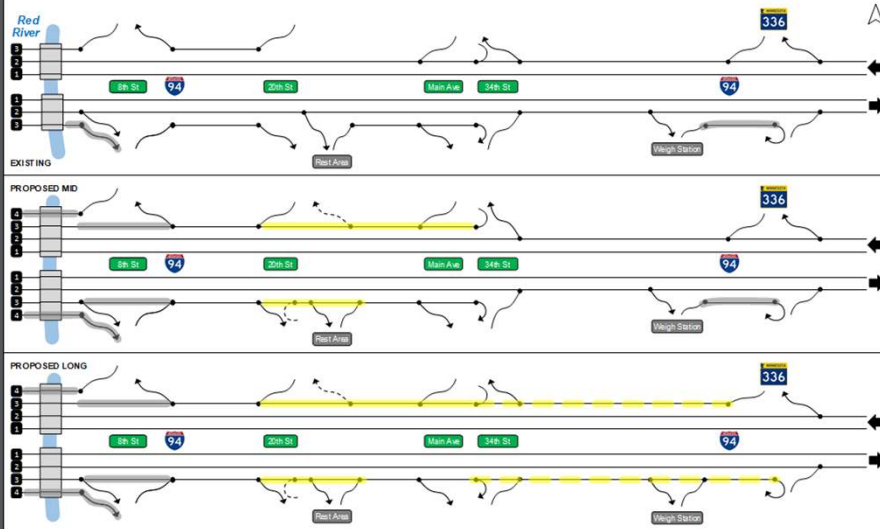
I-94 Reconstruction /  
Expansion to 8 Basic  
Lanes w/ Bridge  
Replacement & Widening



# Mid Term 2031-2040

## Project 3 & 4

I-94 Reconstruction /  
Expansion to 6 Basic Lanes  
w/ 20<sup>th</sup> Street Interchange  
Reconfiguration



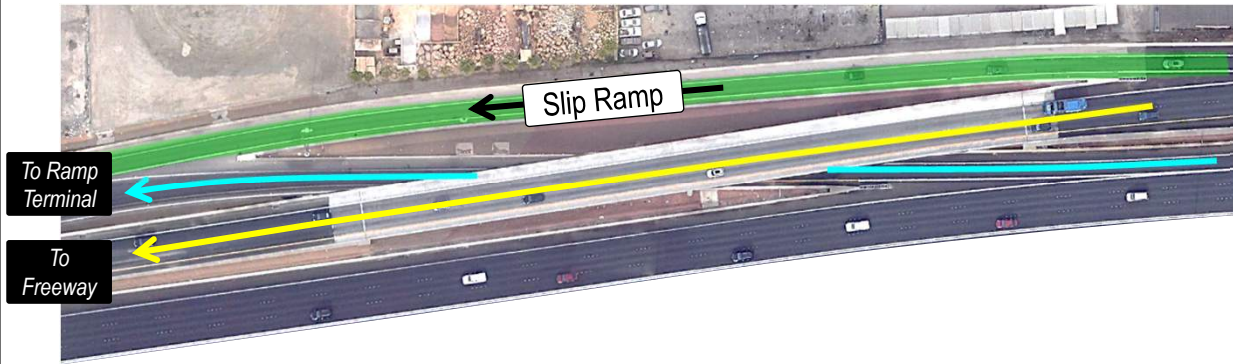
# Mid Term 2031-2040

## Project 5

- I-29 Braided Ramps between 13th Ave S & I-94
- 13th Ave S Reconfiguration



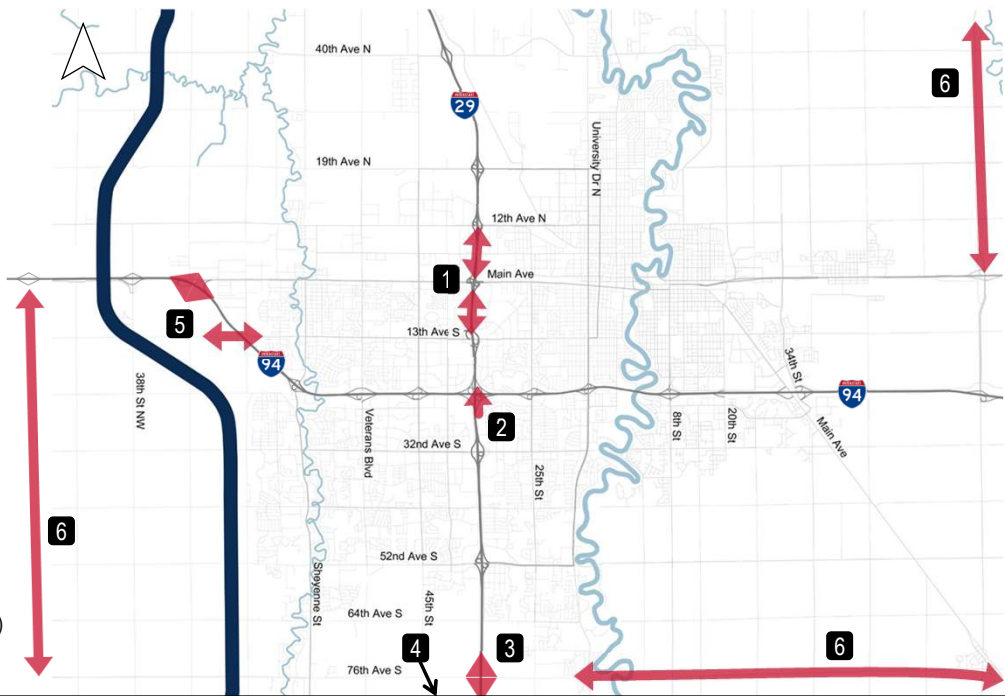
# Braided Ramp Example



## Long Term 2041-2050+

1. I-29 Aux Lanes
2. Braided NB Loop
3. New Interchange at 76th Ave S (includes C-D Roads)
4. 100th Ave S Improvements
5. I-94 & Main Ave Improvements
  - Including 13th Ave S I-94 Overpass
6. Connector Road(s)

- TSMO Improvements**
- Ramp Metering (Ring 2)



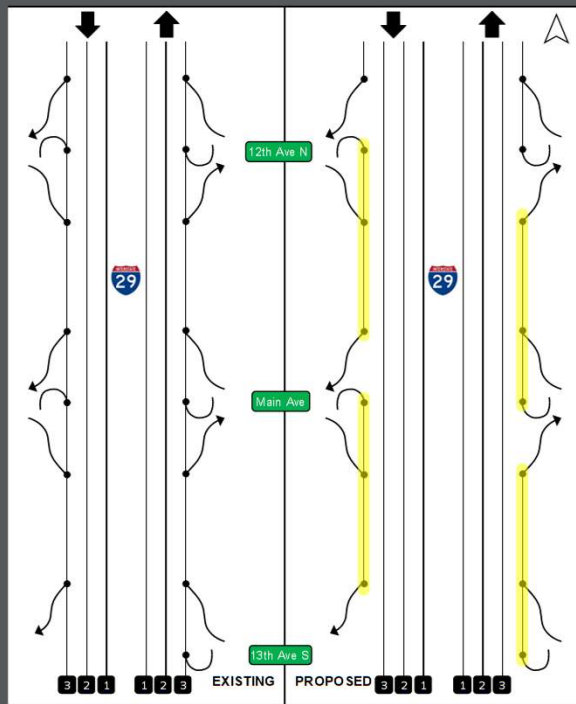


# Long Term 2041-2050+

## Project 1

- I-29 Aux Lanes

29

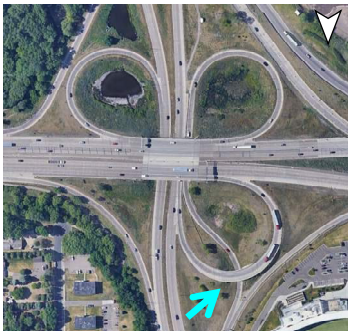


# Long Term 2041-2050+

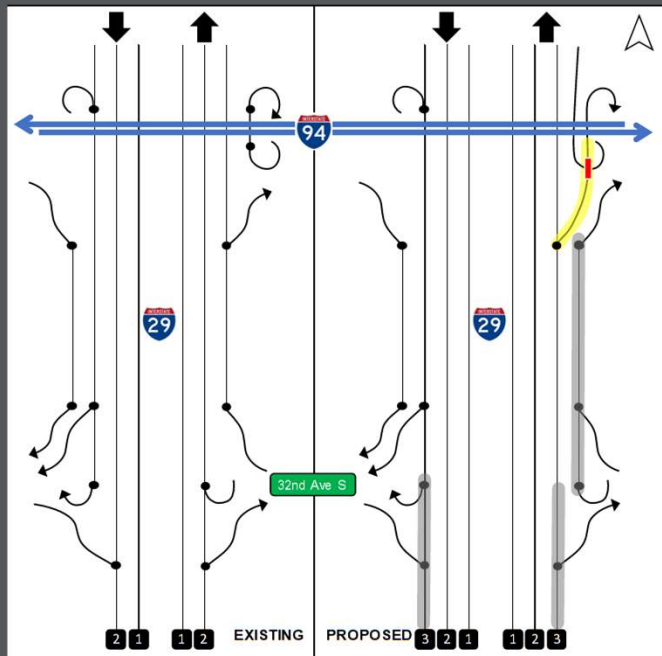
## Project 2

- Braided NB Loop Ramps at Tri Level

Example: I-94 / I-694 In Minneapolis



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## Long Term 2041-2050+

### Interchanges

- 3: 76<sup>th</sup> Ave S
- 4: 100<sup>th</sup> Ave S
- 5: I-94 & Main Ave

Project 3 is being  
studied independently  
by others

I-94 / Main Ave Concept from NW Metro Transportation Plan



# 05

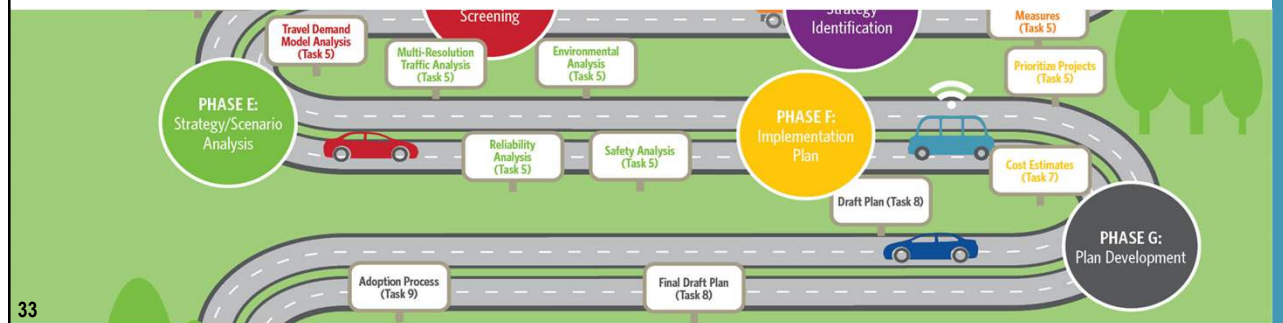
## Next Steps

## 05 | Next Steps

- Full Build-Out Ring Route Analysis
- Develop Costs & Implementation Plan
- Adoption Process & Final Report

Meeting information will be  
emailed later this week

Deadline for Comments:  
March 2





Please add your  
(1) Name & (2) Agency  
in the chat.

# Interstate Operations Analysis & Plan for Future Improvements

NDDOT Management Meeting  
March 15, 2023



Please add your  
(1) Name & (2) Agency  
in the chat.

- 01 Introduction
- 02 Existing & Future Conditions
- 03 Strategy Development
- 04 Implementation Plan
- 05 Next Steps

# 01

---

## Introduction

3

### 01 | Project Objectives/Outcomes

- Determine the pros/cons of potential ring routes in order to make recommendation
- Present a clear menu of prioritized improvements
- Provide operational and analytical data to assist with later project development phases
- Have the study results that are intuitive and easy to interpret

4

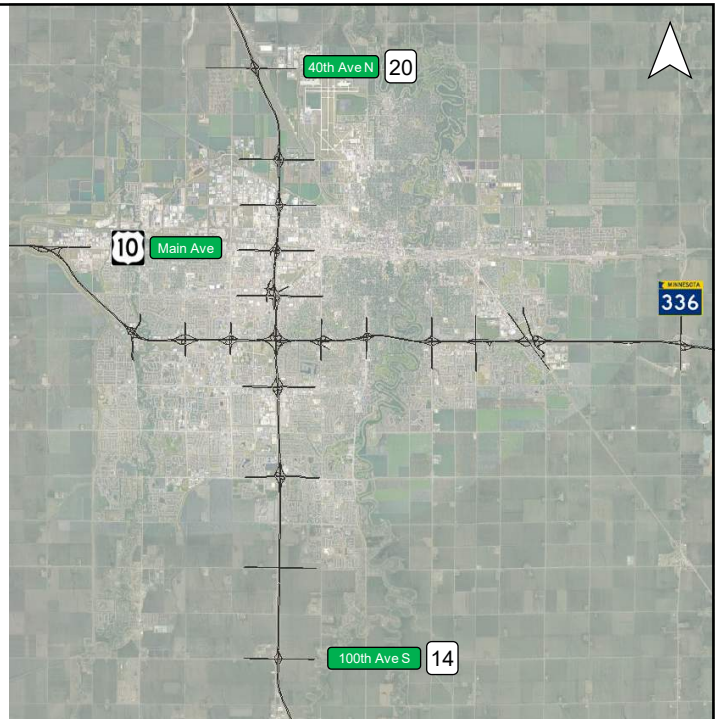
# 02

## Existing & Future Conditions

5

### 02 | Existing Conditions

- Microsimulation Model Development
- Existing Speed Profiles
- Crash Data Summaries
- Streetlight O-D Analysis

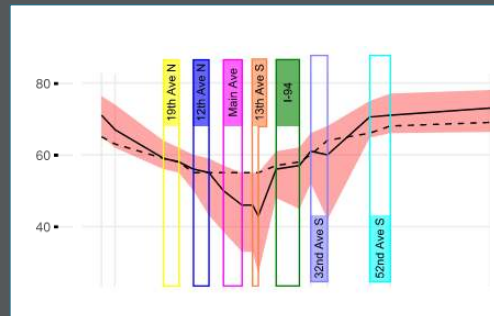


6

## 02 | Existing Conditions

- Microsimulation Model Development
- Existing Speed Profiles
- Crash Data Summaries
- Streetlight O-D Analysis

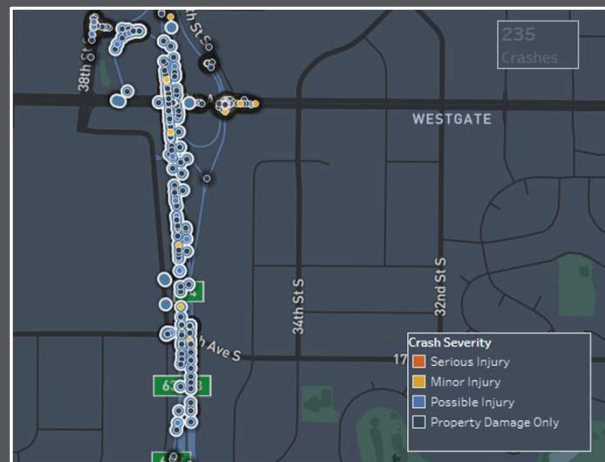
I-29 Southbound  
5:15 PM



7

## 02 | Existing Conditions

- Microsimulation Model Development
- Existing Speed Profiles
- Crash Data Summaries
- Streetlight O-D Analysis



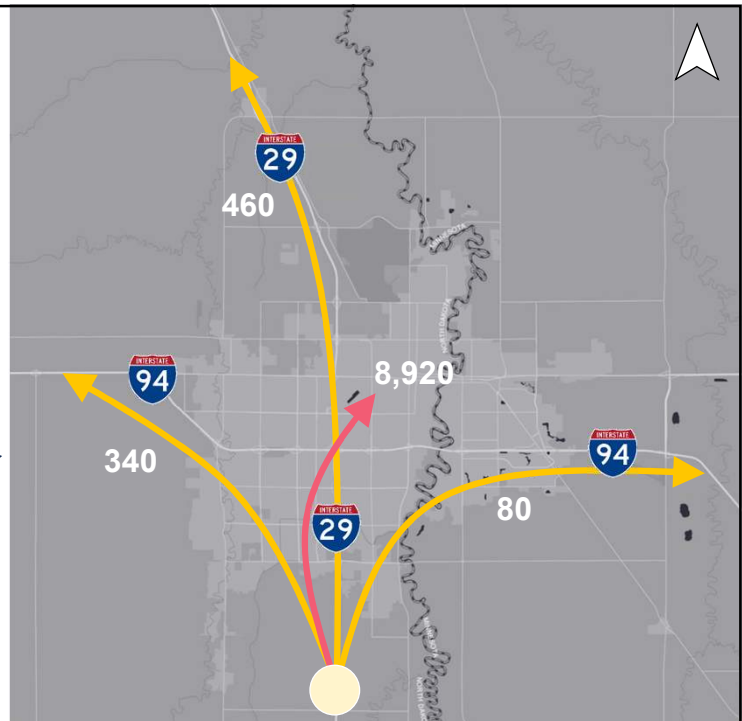
### Types of Crashes

- 113 rear-end
- 69 non-collision w/ vehicle
- 32 side-swipe
- 11 property damage only

8

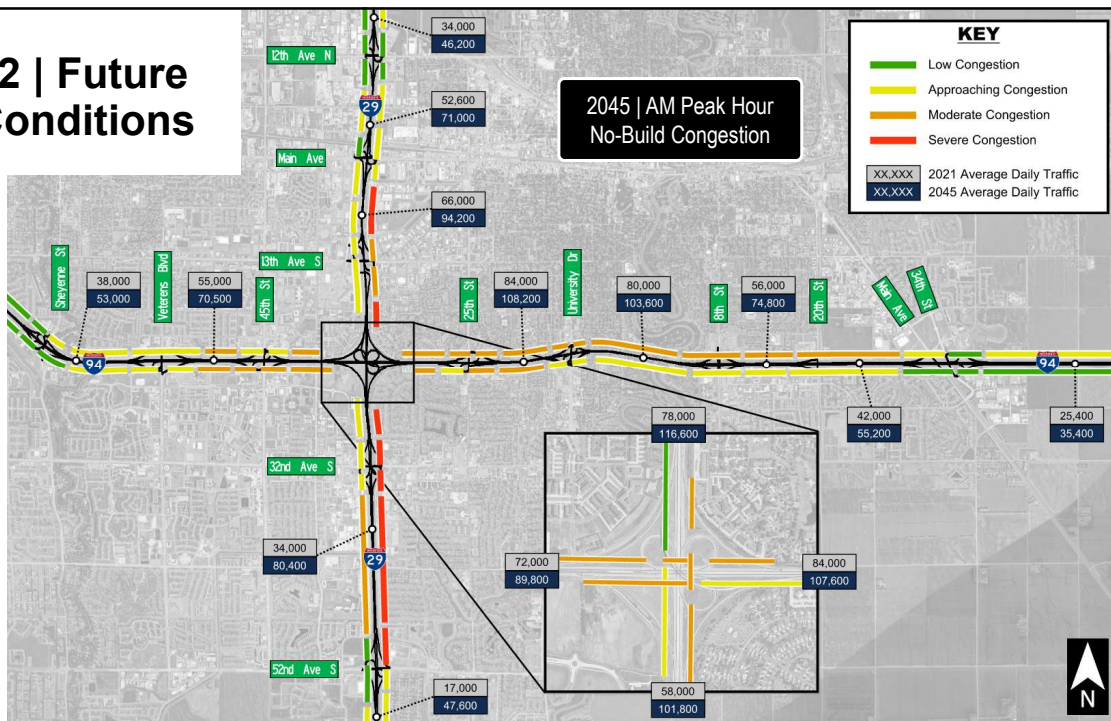
## 02 | Existing Conditions

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9

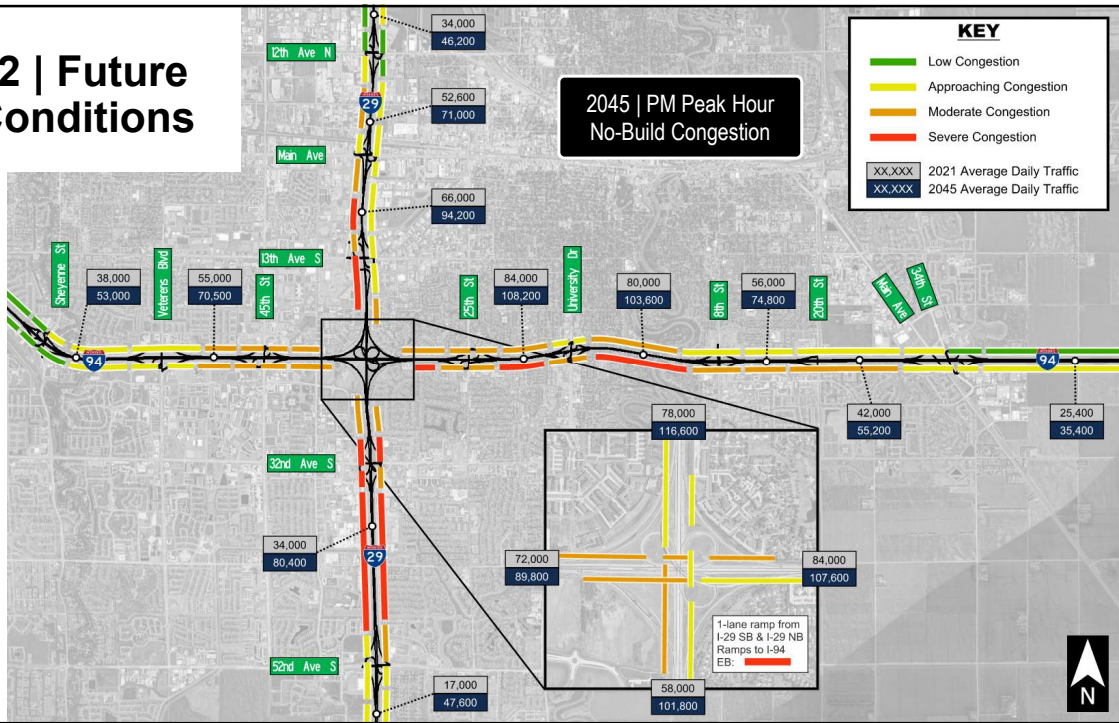
## 02 | Future Conditions



10



## 02 | Future Conditions



# 03

## Strategy Development

## Potential Improvement Strategies








**Geometric Improvements**

**TSMO Strategies**

**Off-System Improvements**

13

## Potential Improvement Strategies

GEOMETRIC IMPROVEMENTS	
	Future Interchanges
	Collector/Distributor Alternatives
	Lane Configuration
	Acceleration/Deceleration Lanes
	Exit/Entry Configurations
	Auxillary Lanes
	Ring Route Reliever

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# TSMO Strategies

ID	Description	Travel Time / Reliability	Total Crashes	Unit Cost
1	Ramp Metering	~20% Reduction in Travel Time / Improved Reliability	40% ↓	\$400k to \$600k
2	Queue Detection	Limited Change in Travel Time / Improved Reliability	16% ↓	\$500k to \$600k
3	TIM / Work Zone / Quick Clearance	Limited Change in Travel Time / Improved Reliability	20% ↓	Varies

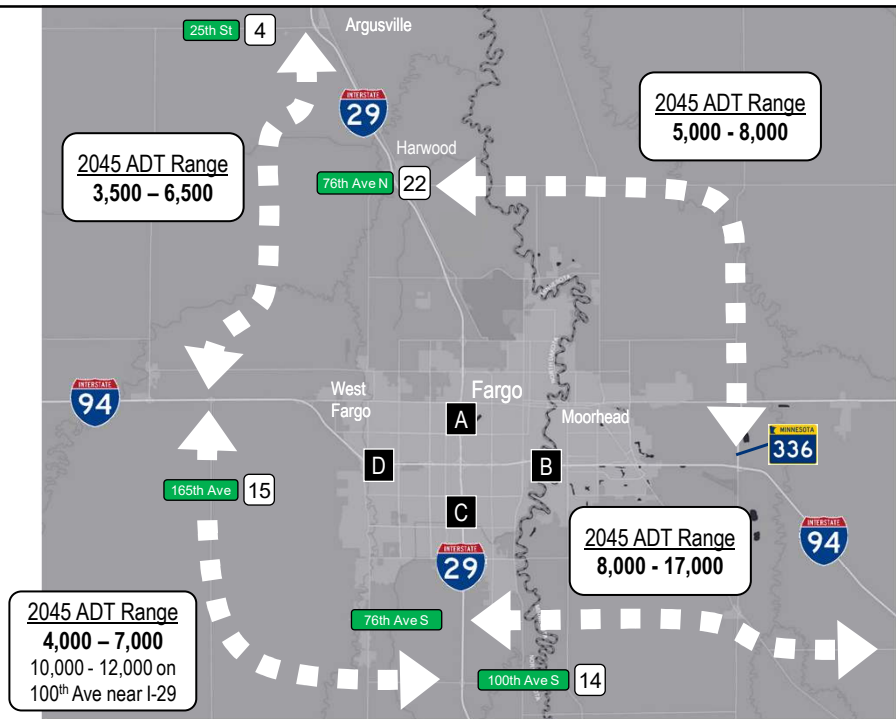
Queue Detection Design Consideration: Signs will be ignored if the information is not designed to be timely, accurate, and relevant

TSMO/ITS IMPROVEMENTS	
1	Ramp Metering
	Hard Shoulder Running
	Variable Speed Limits
	Bottleneck Removal
	CAV Infrastructure
2	Traffic Management Center
	Queue Detection System
	Anti-icing Systems
	Traveler Information
	Network Surveillance
3	Work Zone Management
	Roadway Service Patrol
	Traffic Incident Management

# Off-System Improvements

## Perimeter Highways

Interstate Trips Diverted	
A.	I-29: ~1,500 - 2,500
B.	I-94: ~3,000 - 6,000
C.	I-29: ~2,000 - 4,000
D.	I-94: ~1,500 - 2,500



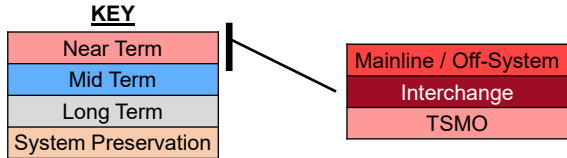
# 04

## Implementation Plan

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# System Preservation

## Near Term

1. Full Reconstruction: 2023

## Mid Term

2. Full Reconstruction: 2031-2034
3. Full Reconstruction: 2031-2034
4. Bridge Replacement: 2031-2034
5. Full Reconstruction: 2031-2034
6. Full Reconstruction: 2034-2037

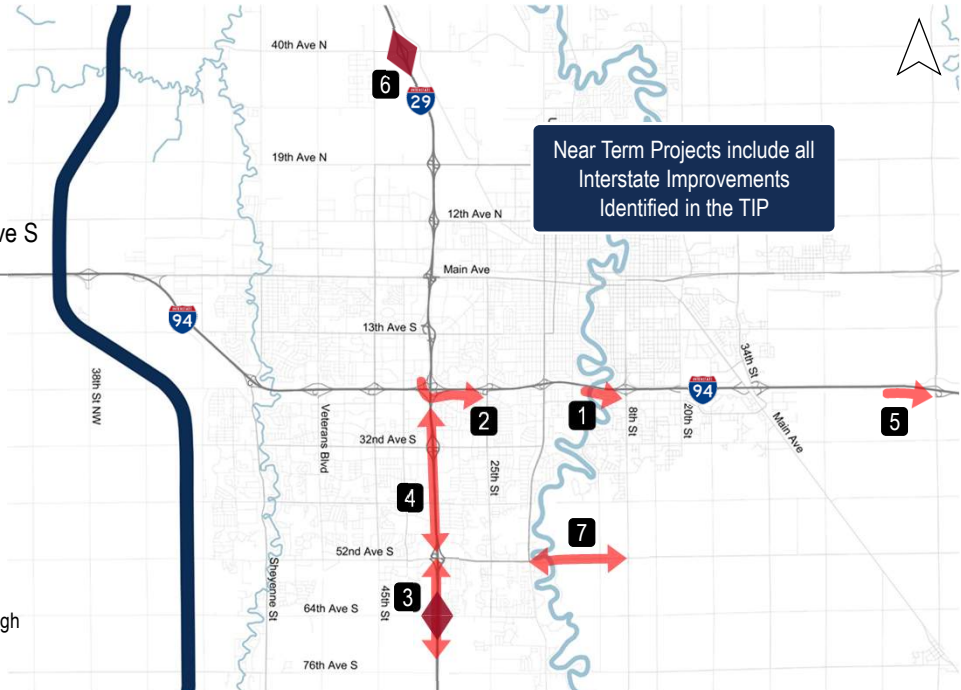


## Near Term 2023-2030

1. I-94 EB Exit to 8th Street
2. Flyover Expansion to 25th Street
3. New Interchange at 64th Ave S (may include C-D Roads)
4. I-29 Expansion
5. I-94 Aux Lane (East of Weigh Station)
6. 40th Ave N Interchange Reconfiguration
7. 52nd Ave S / 60th Ave S Widening

### TSMO Improvements

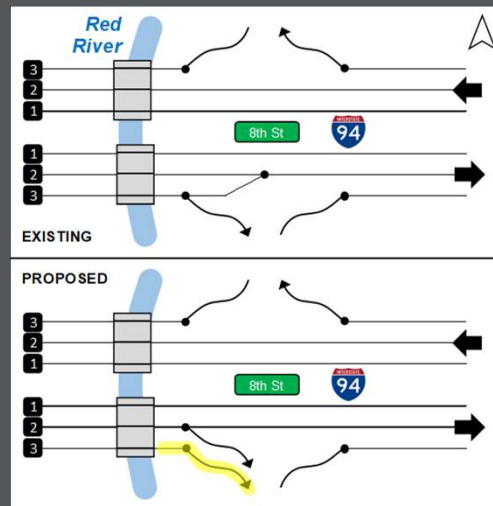
- TIM Group
- TMC
- DMS / CCTV
- I-94 Shoulder Widening through Moorhead



## Near Term 2023-2030

### Project N-1

- Modify single lane exit ramp to 2-lane exit ramp to 8th Street



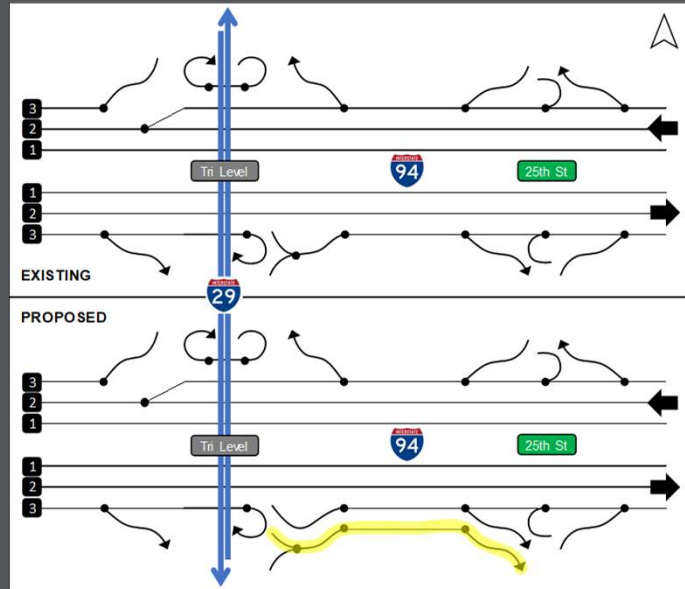
## Near Term 2023-2030

### Project N-2

- NDDOT Expansion project to relieve SB I-29 to EB I-94 Congestion

#### Potential Addition

SB I-29 to I-94 Lane Reconfiguration



23

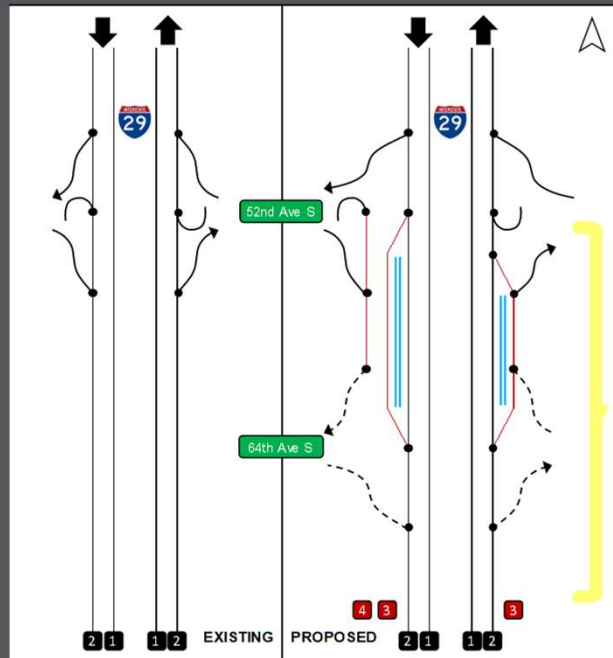
## Near Term 2023-2030

### Project N-3

- New Interchange at 64<sup>th</sup> Ave S

*Project may include C-D Roads: To be determined through independent study*

Project 3 is being studied independently by others

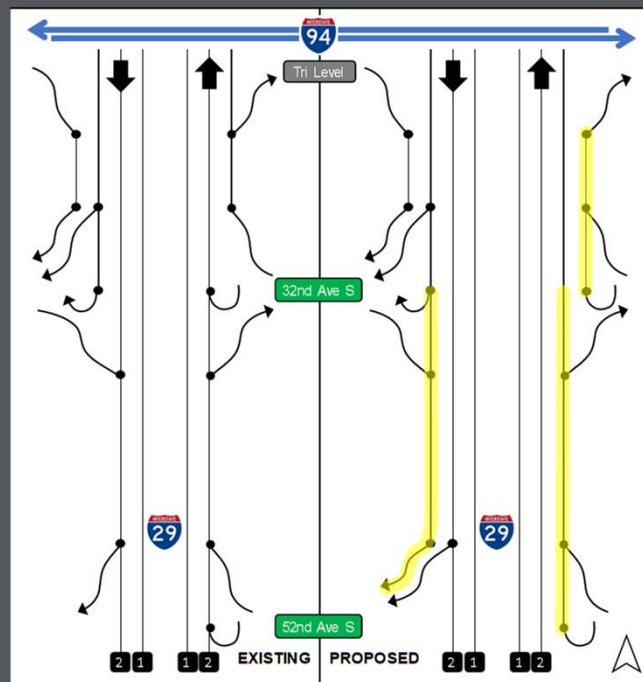


24

## Near Term 2023-2030

### Project N-4

- I-29 Widening  
between I-94  
& 52<sup>nd</sup> Ave S



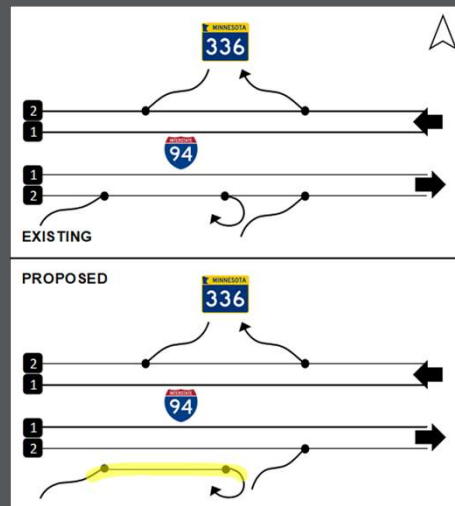
25

## Near Term 2023-2030

### Project N-5

- I-94 EB Aux Lane

Large speed differential  
between entering traffic  
from weigh station and  
exit ramp to MN 336



26



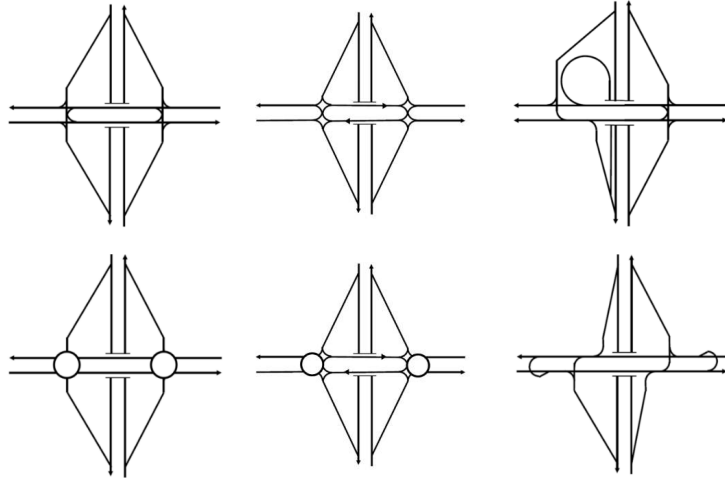
# Near Term 2023-2030

## Interchanges

- N-4: 64<sup>th</sup> Ave S
- N-6: 40<sup>th</sup> Ave N

Project N-4 & N-6 are being studied independently by others

Initial Options Identified at 40<sup>th</sup> Avenue N (by others)



# System Preservation

## Near Term

1. Full Reconstruction: 2023

## Mid Term

2. Full Reconstruction: 2031-2034
3. Full Reconstruction: 2031-2034
4. Bridge Replacement: 2031-2034
5. Full Reconstruction: 2031-2034
6. Full Reconstruction: 2034-2037



# Mid Term 2031-2040

1. I-94 Expansion to 6 Lanes
2. I-94 Expansion to 8 Lanes
3. I-94 Expansion to 6 Lanes
4. 20th Street Reconfiguration
5. I-29 Braided Ramps between 13th Ave S & I-94
  - 13th Ave S Reconfiguration
6. I-94 & Main Ave Improvements
  - Including 13th Ave S I-94 Overpass
7. NW Connector Road

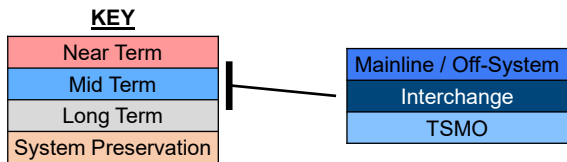
### TSMO Improvements

- Ramp Metering (Ring 1)
- Service Patrol
- Smart Work Zones



# Implementation Plan

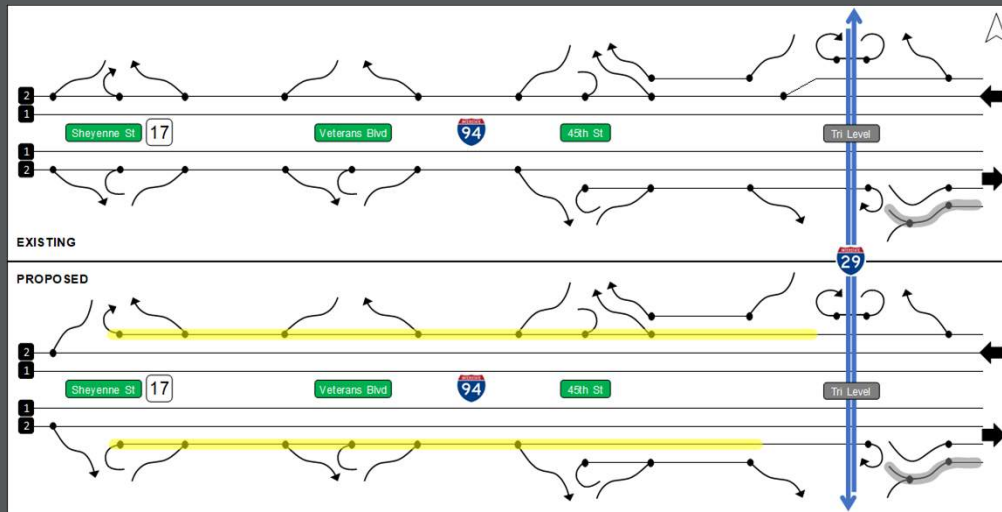
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Off-System	M-7	NW Connector Road																										
TSMO	M-8	Ramp Metering (Ring 1)																										
TSMO	M-9	Service Patrol																										
TSMO	M-10	Smart Work Zones																										



# Mid Term 2031-2040

## Project M-1

I-94 Reconstruction /  
Expansion to 6 Basic  
Lanes

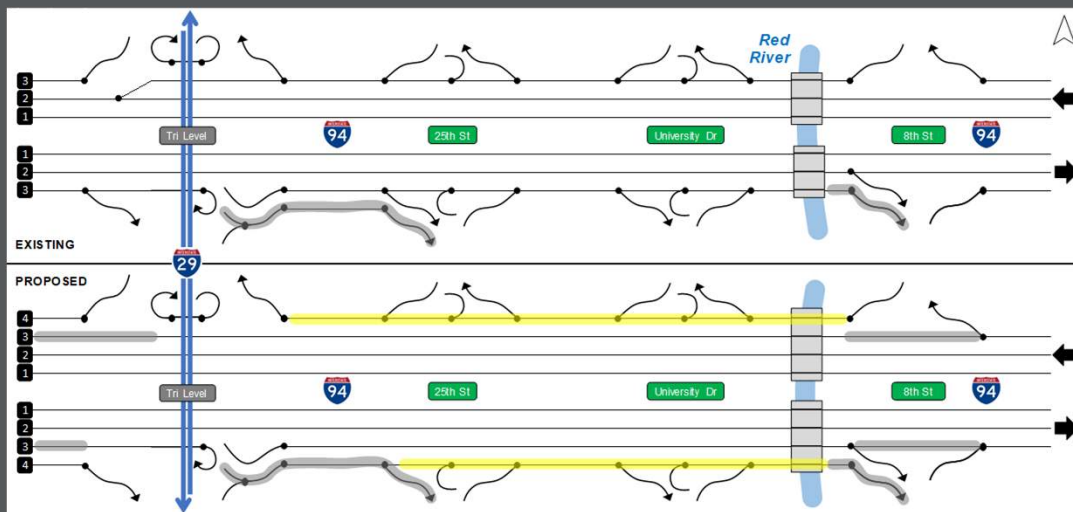


31

# Mid Term 2031-2040

## Project M-2

I-94 Reconstruction /  
Expansion to 8 Basic  
Lanes w/ Bridge  
Replacement & Widening

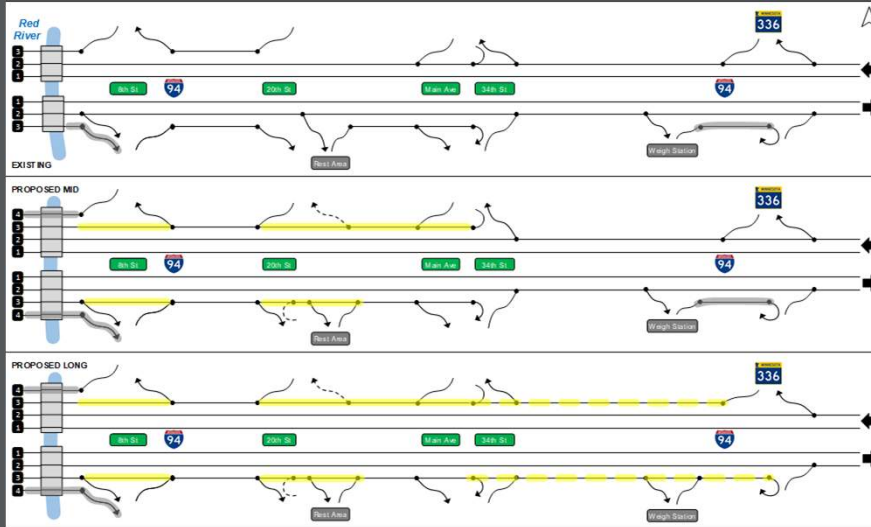


32

# Mid Term 2031-2040

## Project M-3 & M-4

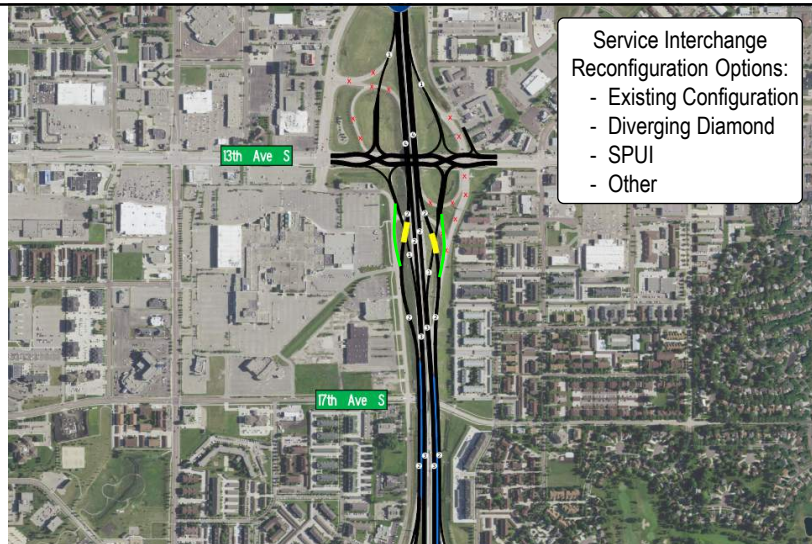
I-94 Reconstruction /  
Expansion to 6 Basic Lanes  
w/ 20<sup>th</sup> Street Interchange  
Reconfiguration



# Mid Term 2031-2040

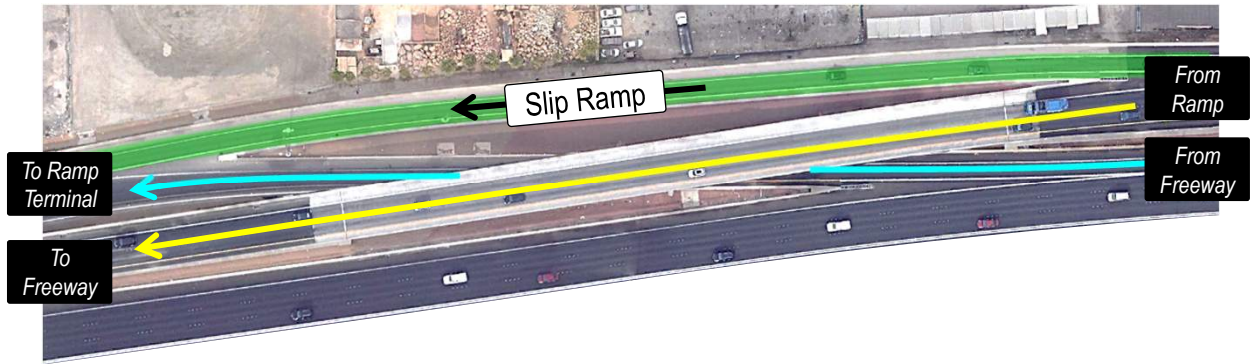
## Project M-5

- I-29 Braided Ramps between 13th Ave S & I-94
- 13th Ave S Reconfiguration



Improvements on I-94 are shown in Projects M-1 & M-2

## Braided Ramp Example



35

## Mid Term 2031-2040

### Interchanges

- M-6: I-94 / Main Ave

Project M-6 is being  
studied independently  
by others

I-94 / Main Ave Concept from NW Metro Transportation Plan



36

# Mid Term 2031-2040

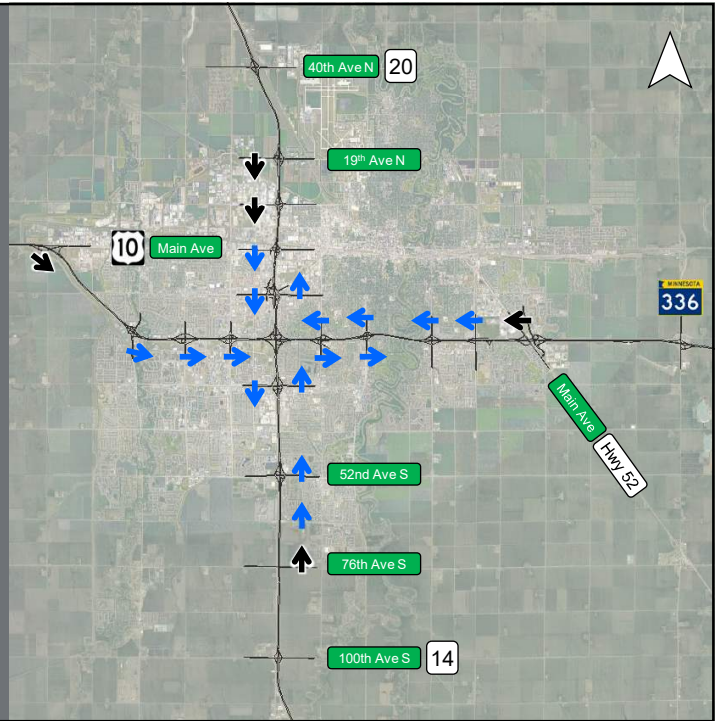
## M-8: Ramp Meter Locations

Mid-Term

Ring 1 24 Meters

Long-Term

Ring 2 11 Meters



# Long Term 2041-2050+

1. I-29 Aux Lanes
2. Braided NB Loop
3. New Interchange at 76th Ave S (includes C-D Roads)
4. 100th Ave S Improvements
5. Connector Road(s)

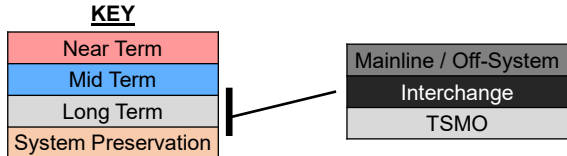
### TSMO Improvements

- Ramp Metering (Ring 2)



# Implementation Plan

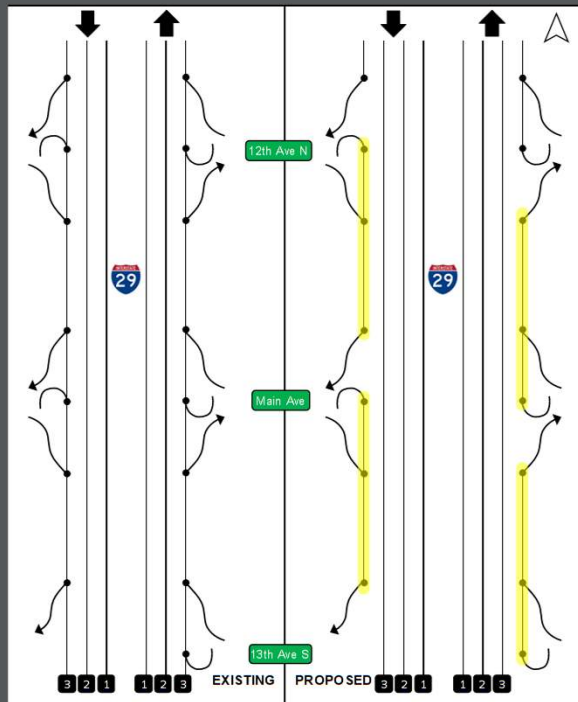
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TSMO	L-6	Ramp Metering (Ring 2)																											No Years Identified



## Long Term 2041-2050+

### Project L-1

- I-29 Aux Lanes



# Long Term 2041-2050+

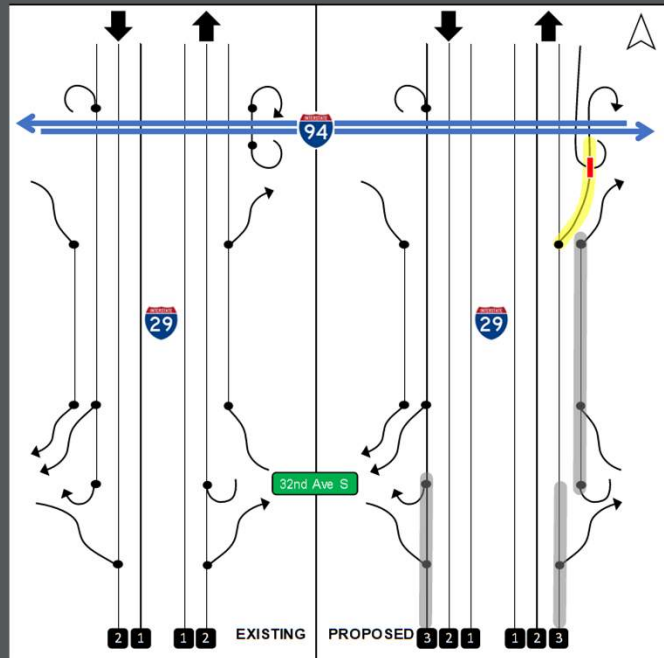
## Project L-2

- Braided NB Loop Ramps at Tri Level

Example: I-94 / I-694 In Minneapolis



41

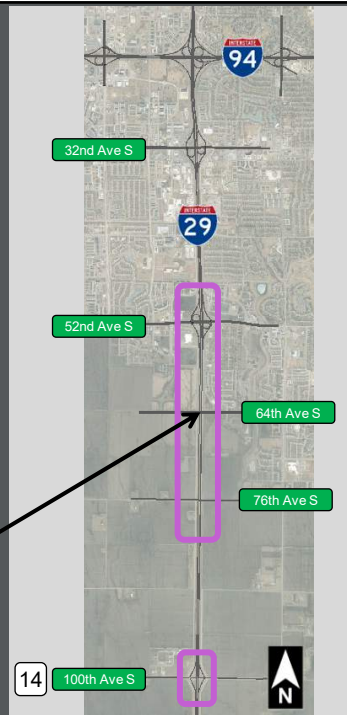
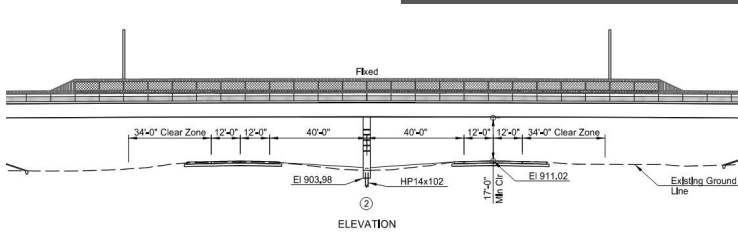


# Long Term 2041-2050+

## Interchanges

- L-3: 76<sup>th</sup> Ave S
- L-4: 100<sup>th</sup> Ave S

Project L-3 is being studied independently by others



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Type	ID	Project	Near Term								Mid Term								Long Term									
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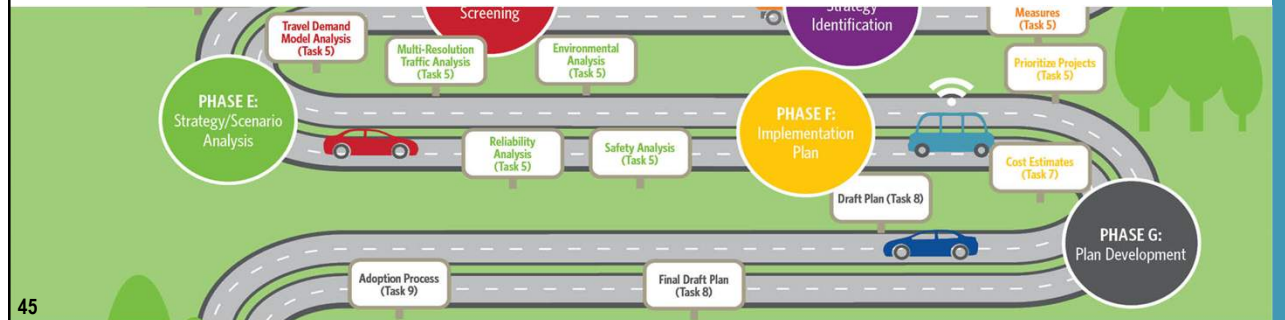
# 05 Next Steps

## 05 | Next Steps

- Full Build-Out Ring Route Analysis
- Adoption Process & Final Report

Meeting information will be  
emailed later this week

Deadline for Comments:  
March 29





Please add your  
(1) Name & (2) Agency  
in the chat.

# Interstate Operations Analysis & Plan for Future Improvements

MnDOT Management Meeting  
April 14, 2023



Please add your  
(1) Name & (2) Agency  
in the chat.

- 01 Intro & Project Objectives
- 02 Existing & Future Conditions
- 03 Strategy Development
- 04 Implementation Plan
- 05 Next Steps

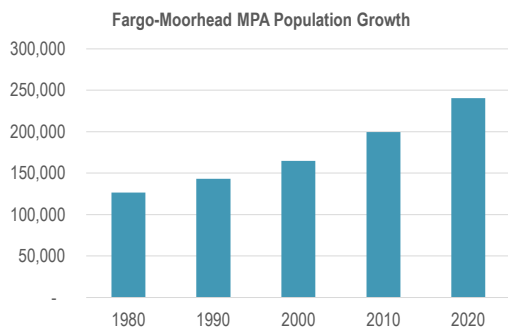
# 01

## Introduction & Project Objectives

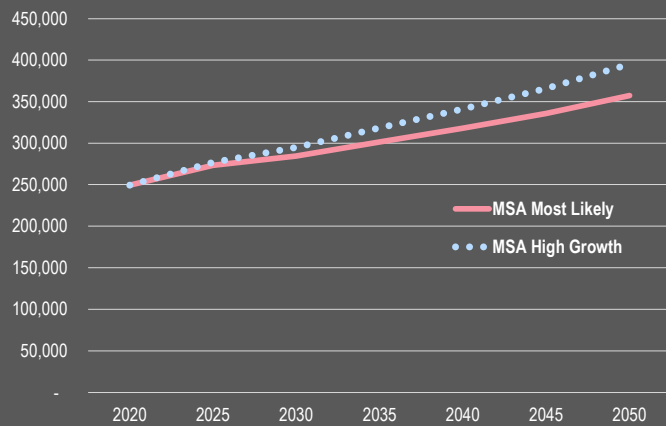
3

### 01 | Introduction

#### Metro Area Growth



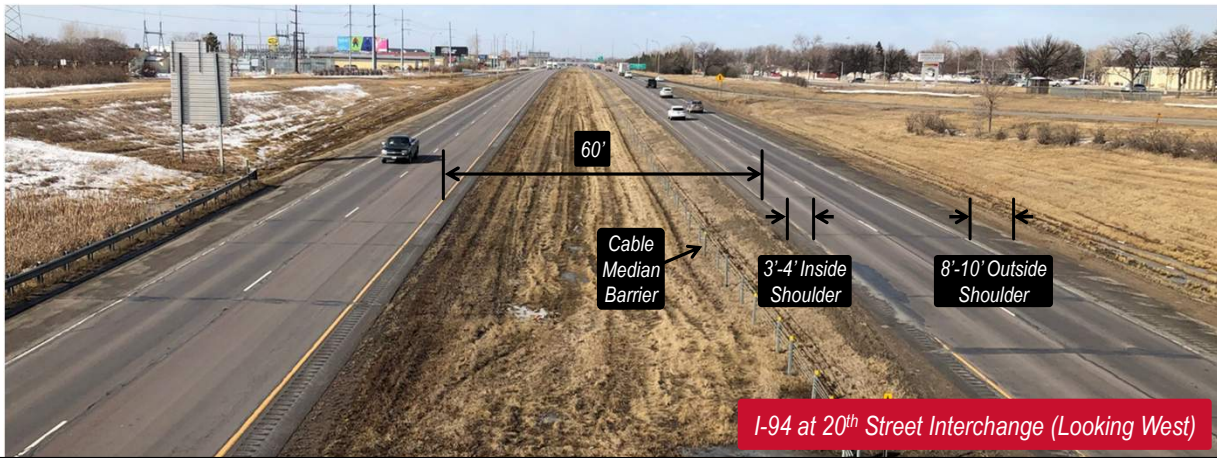
Fargo-Moorhead Projected Population Scenarios



4

# 01 | Introduction

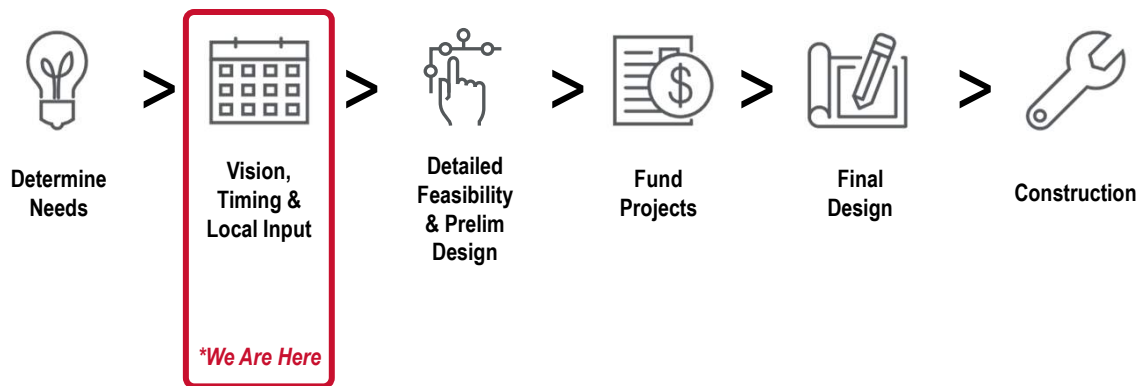
## I-94 Context



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# 01 | Introduction

## Planning to Construction



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## 01 | Project Objectives/Outcomes

- Present a clear menu of recommended improvements aimed at addressing identified deficiencies in operations, safety, reliability, etc.
- Recommend project priorities and staging based on expected increases in traffic volumes combined with planned system preservation projects
- Provide operational and analytical data to assist with later project development phases
- Determine the potential use of a perimeter route around the metro area and identify how such a route affects volumes on the interstate system.

7

Refresh of the IOS completed in 2011



INTERSTATE OPERATIONS ANALYSIS & PLAN FOR FUTURE IMPROVEMENTS

METROCOG



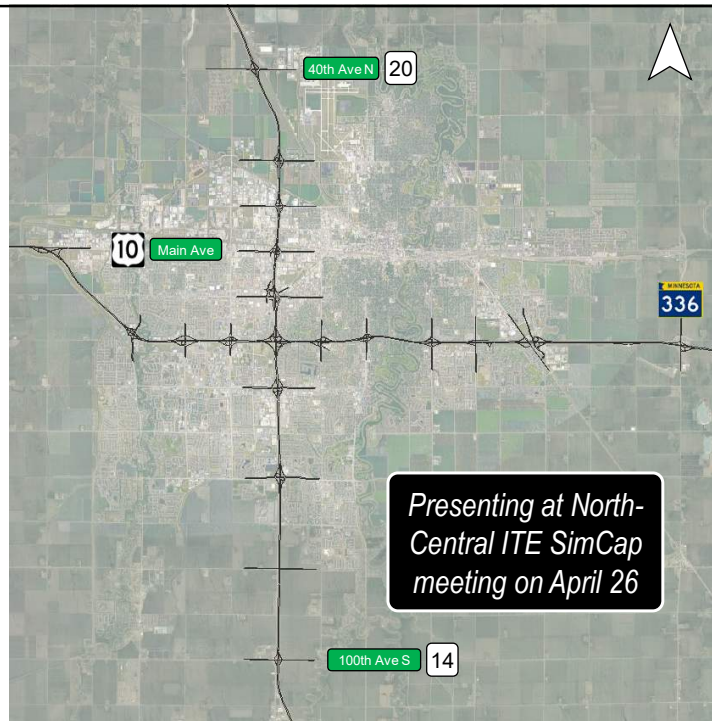
# 02

## Existing & Future Conditions

8

## 02 | Existing Conditions

- Microsimulation Model Development
- Existing Speed Profiles
- Crash Data Summaries
- Streetlight O-D Analysis



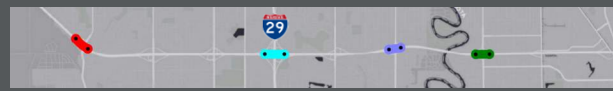
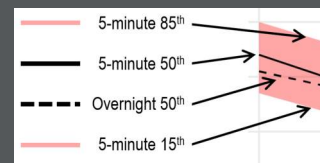
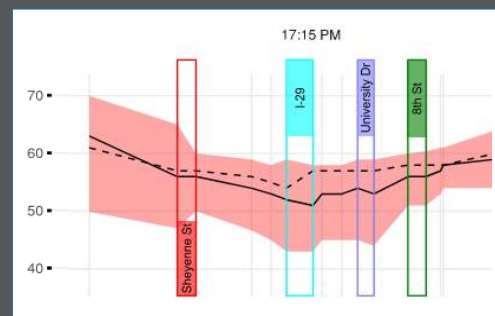
9

## 02 | Existing Conditions

- Microsimulation Model Development
- Existing Speed Profiles
- Crash Data Summaries
- Streetlight O-D Analysis


*NMPRDS (raw data downloader) was used to determine percentile speeds*

### I-94 Eastbound 5:15 PM



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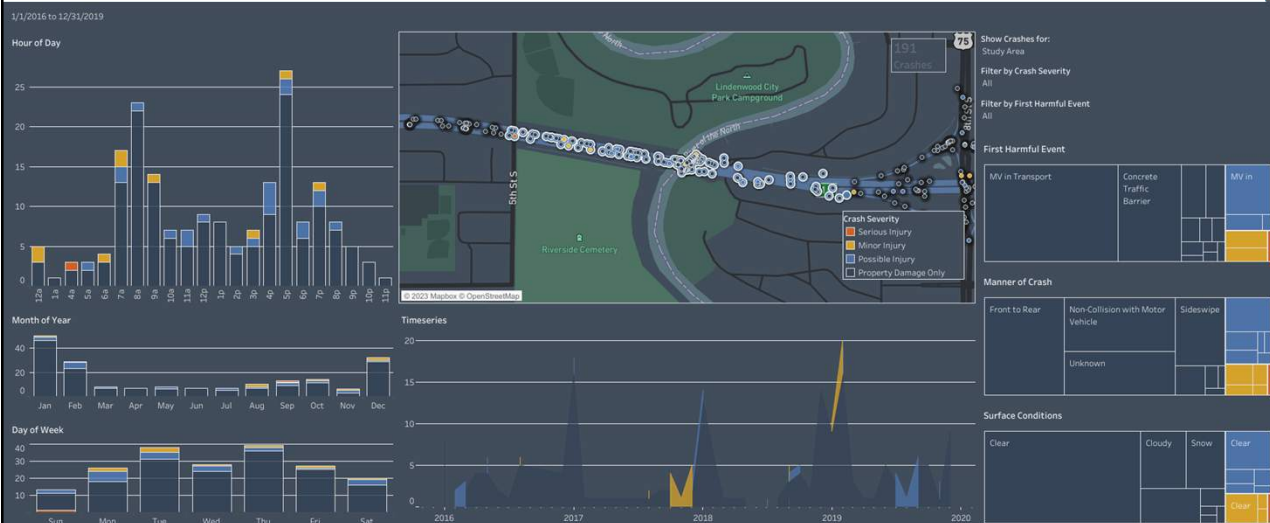
## 02 | Existing Conditions

- Microsimulation Model Development
- Existing Speed Profiles
- **Crash Data Summaries** 
- Streetlight O-D Analysis

Crash data was collected from NDDOT & MnDOT – summaries provided via shapefiles



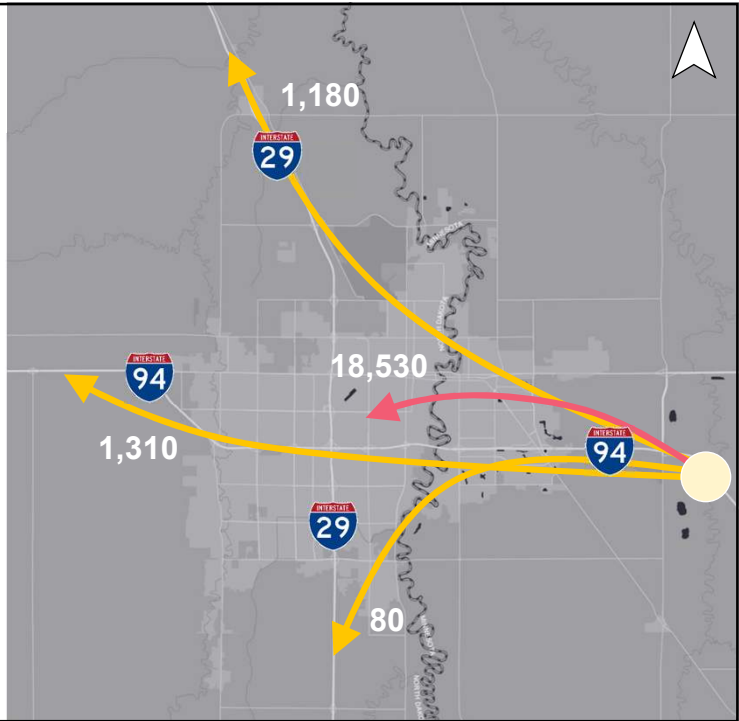
## 02 | Crash Summary Continued



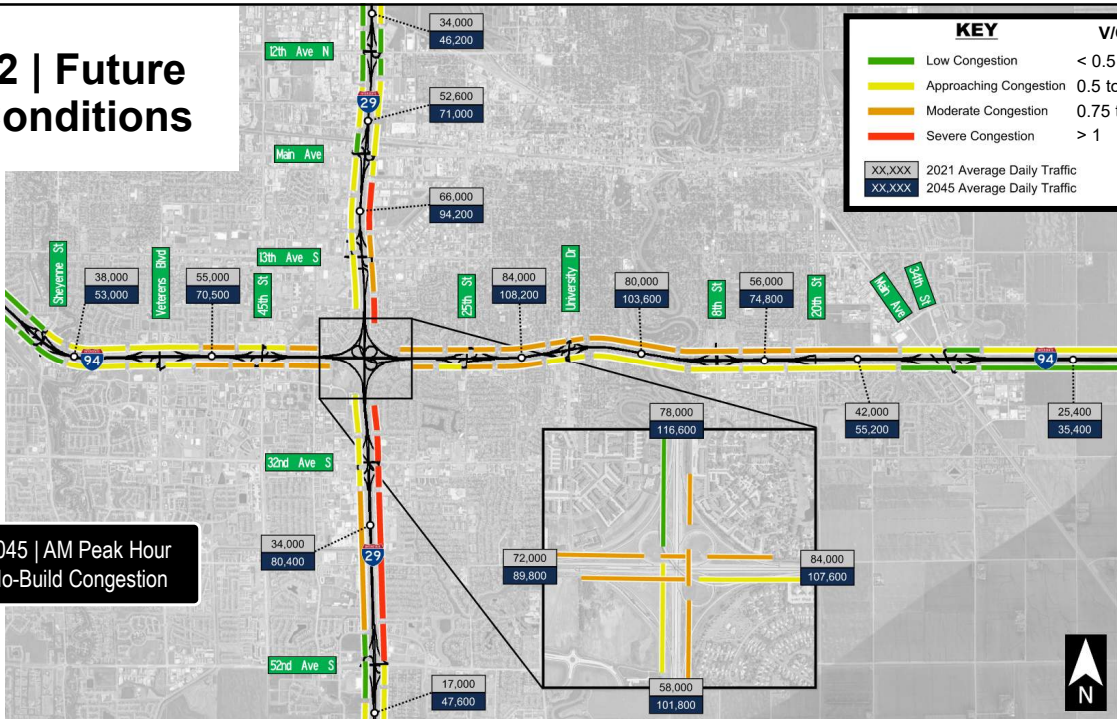


## 02 | Existing Conditions

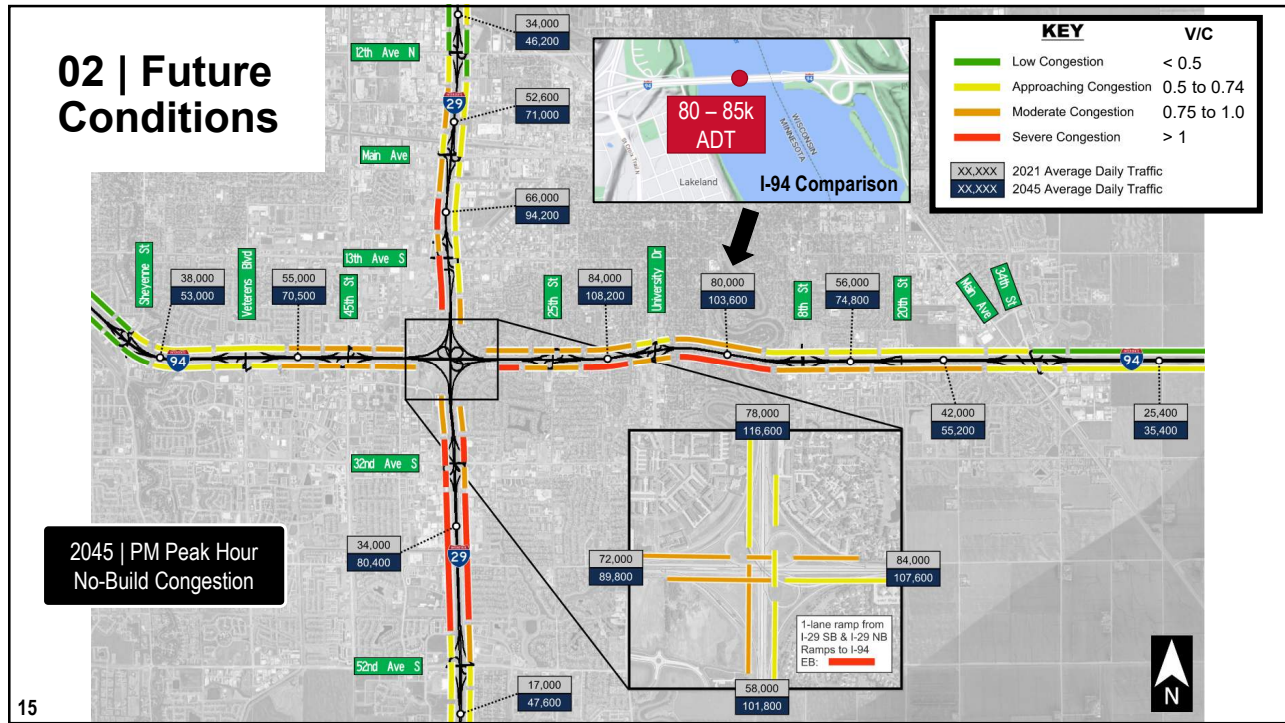
- Microsimulation Model Development
- Existing Speed Profiles
- Crash Data Summaries
- **Streetlight O-D Analysis**



## 02 | Future Conditions



## 02 | Future Conditions



# 03

## Strategy Development

## Potential Improvement Strategies

Geometric Improvements

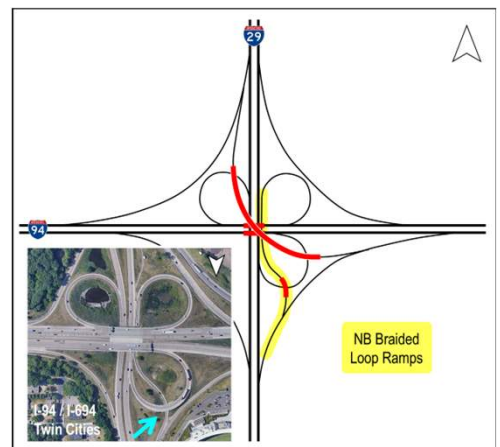
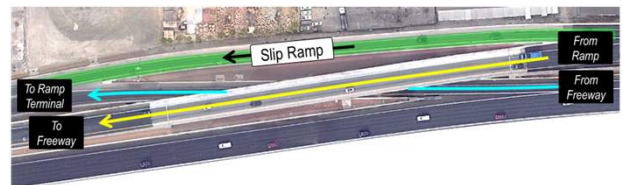
TSMO Strategies

Off-System Improvements

17

## Potential Geometric Improvement Strategies

- Future Interchanges
- Collector – Distributor Alternatives
- Lane Configuration
- Acceleration / Deceleration Lanes
- Braided Ramps
- Auxiliary Lanes
- Perimeter Roadways



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# TSMO Strategies

ID	Description	Travel Time / Reliability	Total Crashes	Unit Cost
1	Ramp Metering	~20% Reduction in Travel Time / Improved Reliability	40% ↓	\$400k to \$600k
2	Queue Detection	Limited Change in Travel Time / Improved Reliability	16% ↓	\$500k to \$600k
3	TIM / Work Zone / Quick Clearance	Limited Change in Travel Time / Improved Reliability	20% ↓	Varies

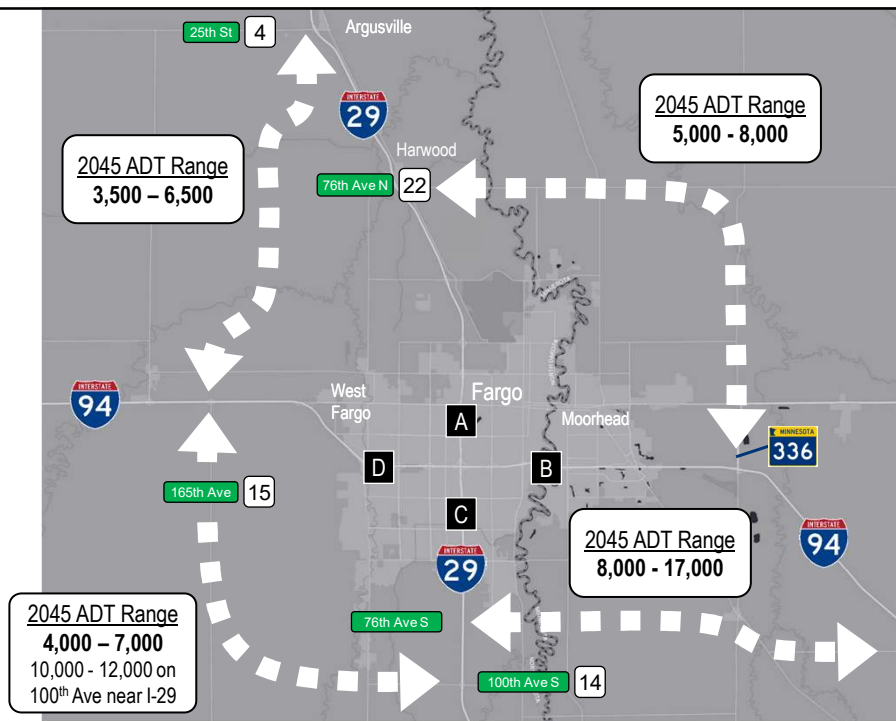
Queue Detection Design Consideration: Signs will be ignored if the information is not designed to be timely, accurate, and relevant

TSMO/ITS IMPROVEMENTS	
1	Ramp Metering
	Hard Shoulder Running
	Variable Speed Limits
	Bottleneck Removal
	CAV Infrastructure
2	Traffic Management Center
	Queue Detection System
	Anti-icing Systems
	Traveler Information
	Network Surveillance
3	Work Zone Management
	Roadway Service Patrol
	Traffic Incident Management

# Off-System Improvements

## Perimeter Roadways

- Interstate Trips Diverted**
- A. I-29: ~1,500 - 2,500
  - B. I-94: ~3,000 - 6,000
  - C. I-29: ~2,000 - 4,000
  - D. I-94: ~1,500 - 2,500



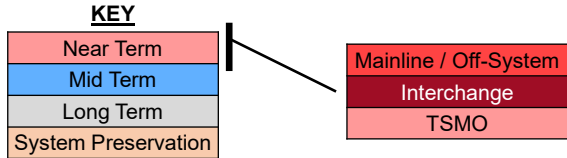
# 04

## Implementation Plan

Type	ID	Project	Near Term					Mid Term					Long Term																
			23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Interstate	N-1	I-94 EB Exit to 8th Street																											
Interstate	N-2	Flyover Expansion to 25th Street																											
Interstate / Interchange	N-3	New Interchange at 64th Ave S (May Include C-D Roads)																											
Interstate	N-4	I-29 Expansion (Between I-94 & 52nd Ave S)																											
Interstate	N-5	I-94 Aux Lane (Between Weigh Station & Mn 336)																											
Interchange	N-6	40th Ave N Interchange Reconfiguration																											
Off-System	N-7	52nd Ave S / 60th Ave S Widening (Between University & US 75)																											
TSMO	N-8	Re-Start TIM Group																											
TSMO	N-9	Development of TMC																											
TSMO	N-10	DMS / CCTV Expansion																											
TSMO	N-11	I-94 Shoulder Widening through Moorhead																											
Interstate	M-1	I-94 Expansion to 6 Basic Lanes (Between Sheyenne & I-29)																											
Interstate	M-2	I-94 Expansion to 8 Basic Lanes (Between I-29 & 8th Street)																											
Interstate	M-3	I-94 Expansion to 6 Basic Lanes (Between 8th Street & Mn 336)																											
Interchange	M-4	20th Street Reconfiguration																											
Interstate / Interchange	M-5	I-29 Braided Ramps between 13th Ave S & I-94																											
Interchange	M-6	I-94 & Main Ave Improvements (Including 13th Ave S I-94 Overpass)																											
Off-System	M-7	NW Connector Road																											
TSMO	M-8	Ramp Metering (Ring 1)																											
TSMO	M-9	Service Patrol																											
TSMO	M-10	Smart Work Zones																											
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Interstate	L-2	Braided NB Loop Ramp (At I-29 / I-94 System Interchange)																											
Interchange	L-3	New Interchange at 76th Ave S (May Include C-D Roads)																											
Interchange	L-4	100th Ave S Improvements																											
Off-System	L-5	Connector Road(s)																											
TSMO	L-6	Ramp Metering (Ring 2)																											
System Preservation	S-1	I-94 & Main Avenue Interchange Reconstruction																											
System Preservation	S-2	I-94 Reconstruction (Between Sheyenne & I-29)																											
System Preservation	S-3	I-94 Reconstruction (Between I-29 & Red River)																											
System Preservation	S-4	I-94 Red River Bridge Replacement																											
System Preservation	S-5	I-94 Reconstruction (Between Red River & Mn 336)																											
System Preservation	S-6	I-29 Reconstruction (Between 40th Ave S & 126th Ave S)																											

# Implementation Plan

Type	ID	Project	Near Term								Mid Term								Long Term									
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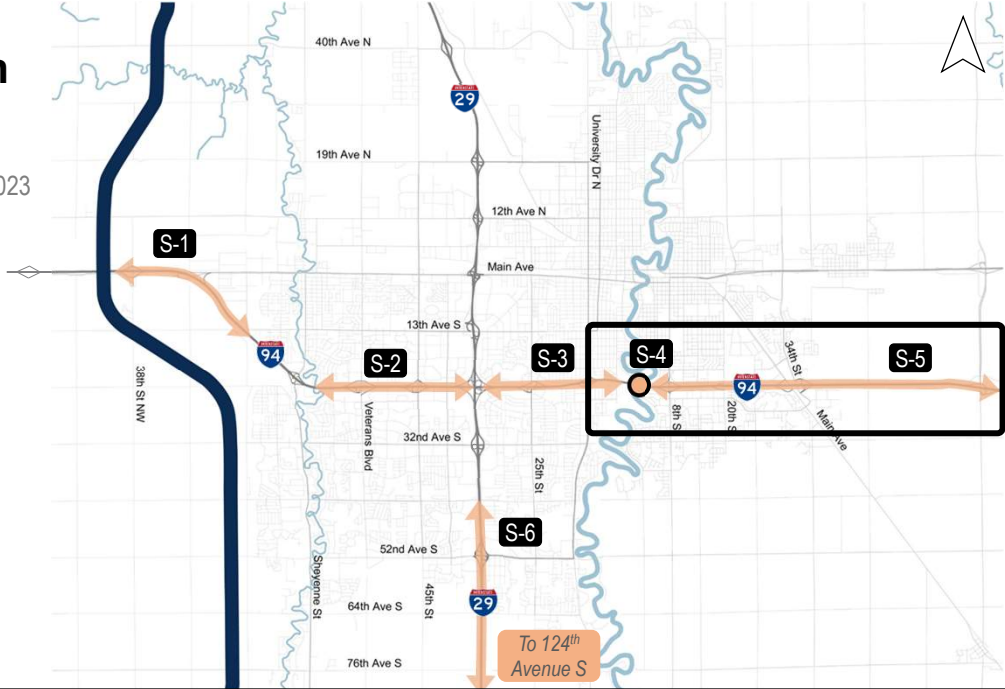
# System Preservation

**Near Term**

- 1. Full Reconstruction: 2023

**Mid Term**

- 2. Full Reconstruction: 2031-2034
- 3. Full Reconstruction: 2031-2034
- 4. Bridge Replacement: 2031-2034
- 5. Full Reconstruction: 2031-2034
- 6. Full Reconstruction: 2034-2037

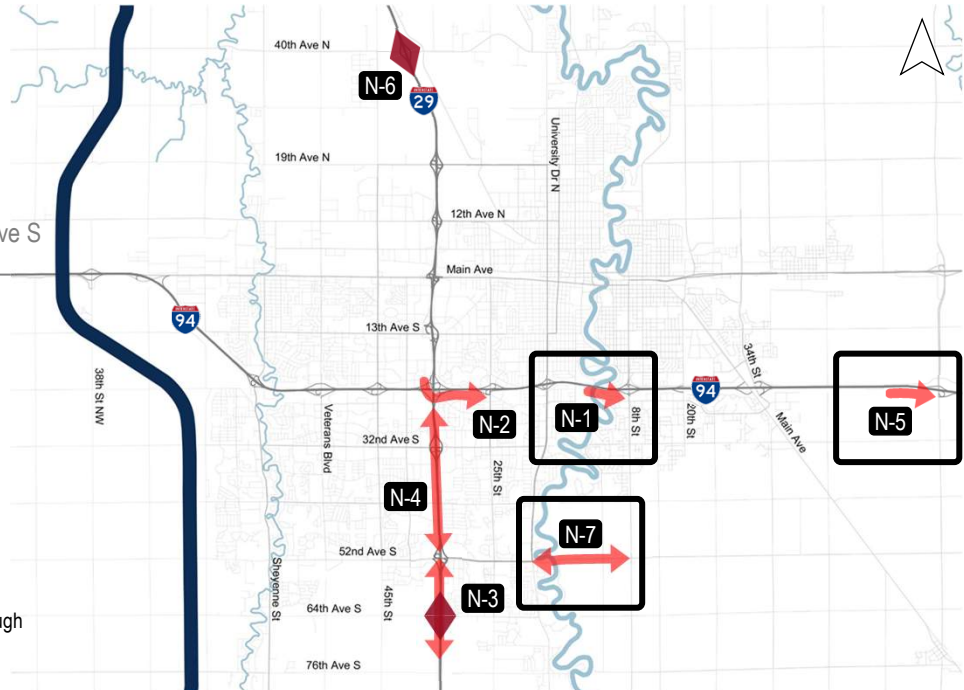


## Near Term 2023-2030

1. I-94 EB Exit to 8th Street
2. Flyover Expansion to 25th Street
3. New Interchange at 64th Ave S (may include C-D Roads)
4. I-29 Expansion
5. I-94 Aux Lane (East of Weigh Station)
6. 40th Ave N Interchange Reconfiguration
7. 52nd Ave S / 60th Ave S Widening

### TSMO Improvements

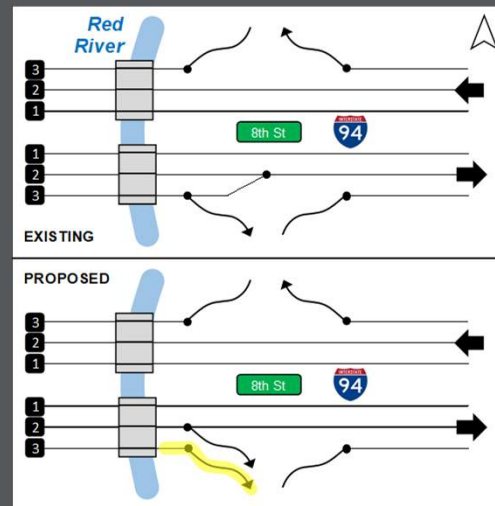
- TIM Group
- TMC
- DMS / CCTV
- I-94 Shoulder Widening through Moorhead



## Near Term 2023-2030

### Project N-1

- Modify single lane exit ramp to 2-lane exit ramp to 8th Street

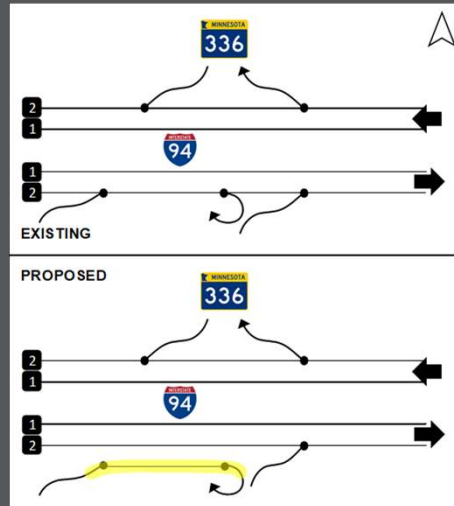


# Near Term 2023-2030

## Project N-5

- I-94 EB Aux Lane

Large speed differential between entering traffic from weigh station and exit ramp to MN 336



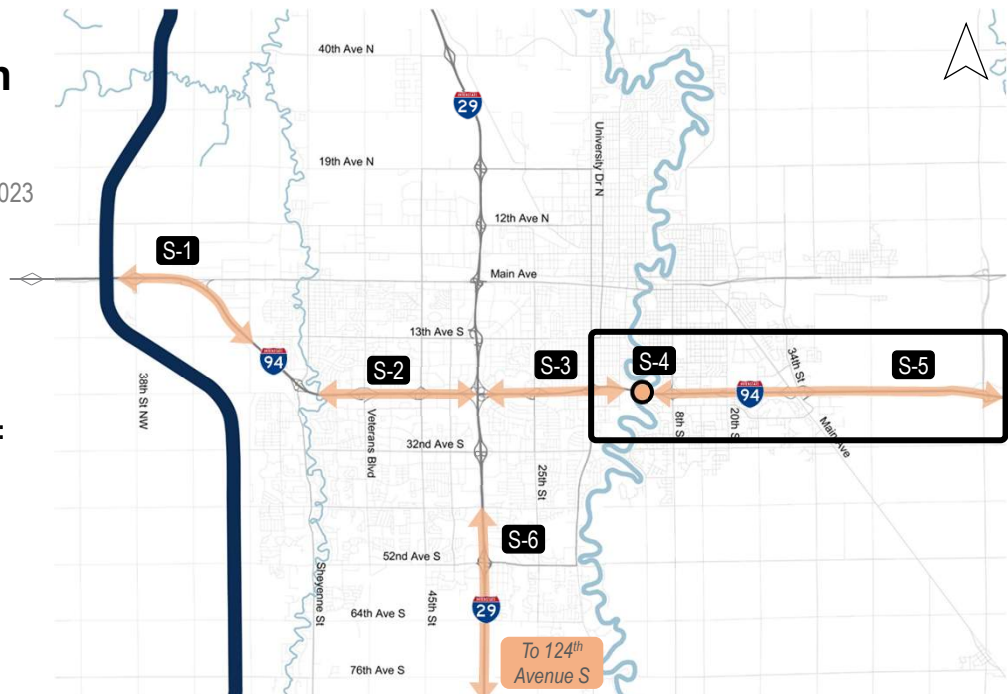
# System Preservation

## Near Term

1. Full Reconstruction: 2023

## Mid Term

2. Full Reconstruction: 2031-2034
3. Full Reconstruction: 2031-2034
4. Bridge Replacement: 2031-2034
5. Full Reconstruction: 2031-2034
6. Full Reconstruction: 2034-2037



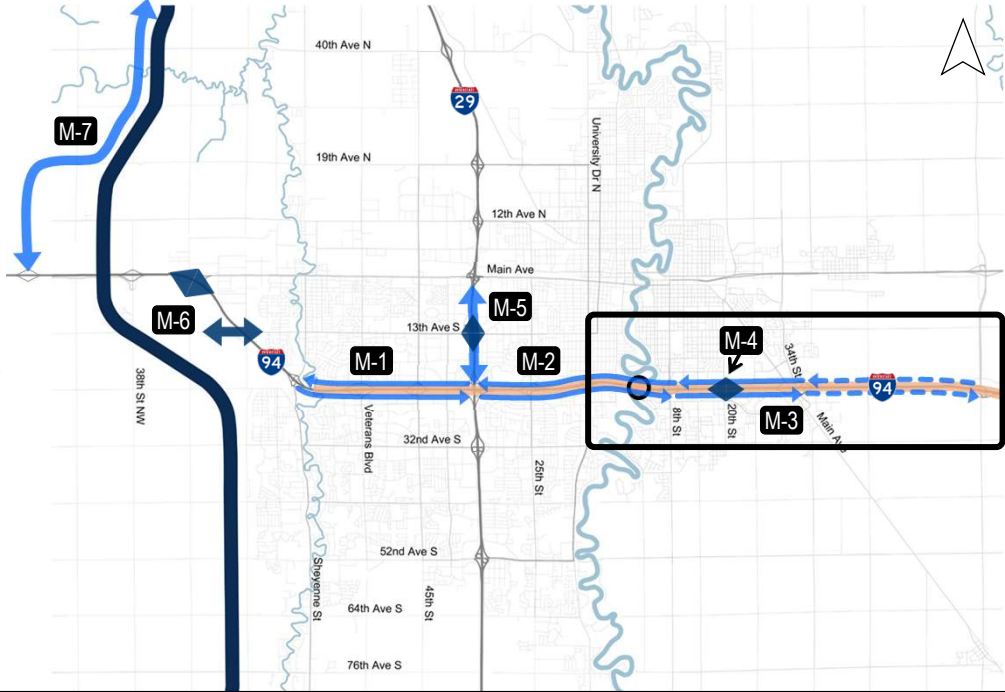


# Mid Term 2031-2040

1. I-94 Expansion to 6 Lanes
2. I-94 Expansion to 8 Lanes
3. I-94 Expansion to 6 Lanes
4. 20th Street Reconfiguration
5. I-29 Braided Ramps between 13th Ave S & I-94
  - 13th Ave S Reconfiguration
6. I-94 & Main Ave Improvements
  - Including 13th Ave S I-94 Overpass
7. NW Connector Road

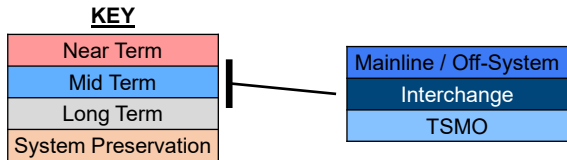
### TSMO Improvements

- Ramp Metering (Ring 1)
- Service Patrol
- Smart Work Zones



# Implementation Plan

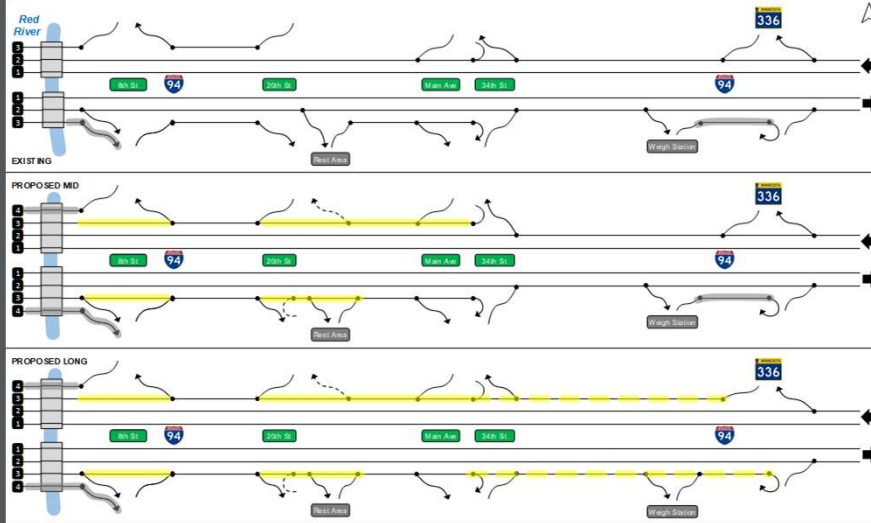
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# Mid Term 2031-2040

## Project M-3 & M-4

I-94 Reconstruction /  
Expansion to 6 Basic Lanes  
w/ 20<sup>th</sup> Street Interchange  
Reconfiguration



# Mid Term 2031-2040

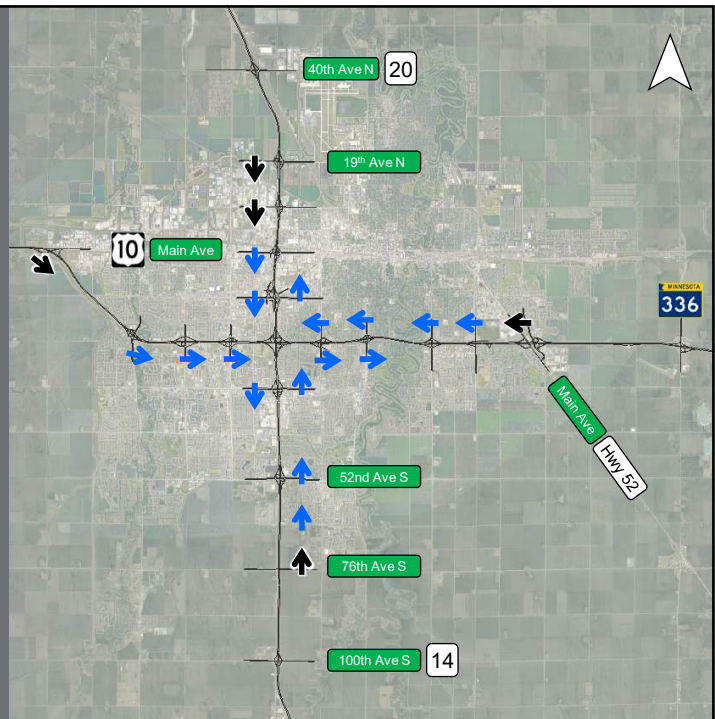
## M-8: Ramp Meter Locations

Mid-Term

Ring 1 24 Meters

Long-Term

Ring 2 11 Meters

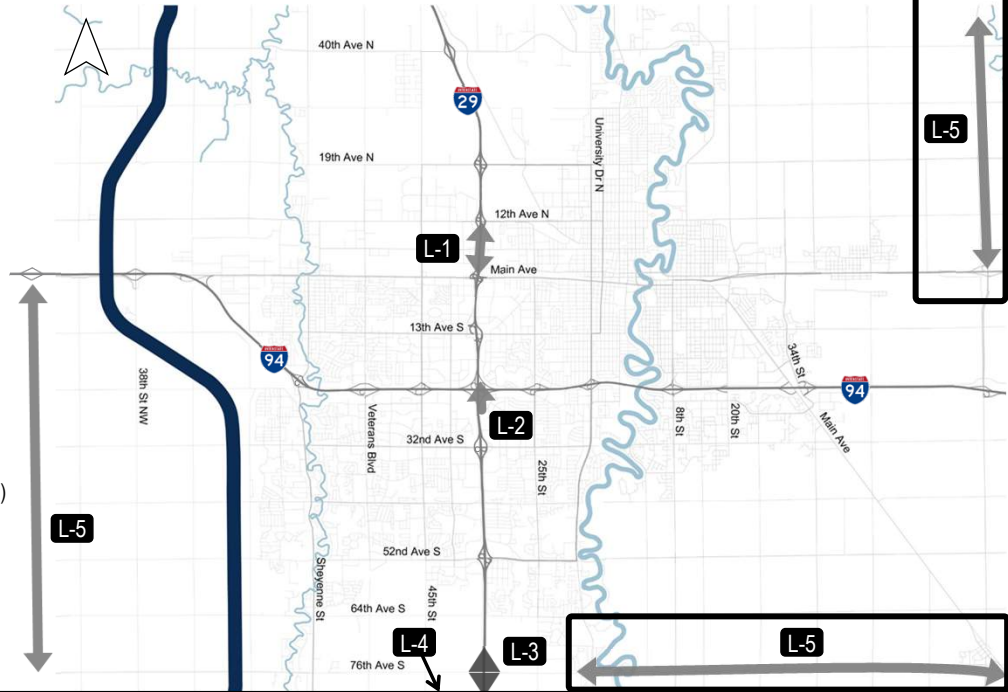


# Long Term 2041-2050+

1. I-29 Aux Lanes
2. Braided NB Loop
3. New Interchange at 76th Ave S (includes C-D Roads)
4. 100th Ave S Improvements
5. Connector Road(s)

## TSMO Improvements

- Ramp Metering (Ring 2)



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# 05

## Next Steps

### 05 | Next Steps

- Full Build-Out Ring Route Analysis
- Adoption Process & Final Report

Meeting information will be  
emailed later this week

Deadline for Comments:  
April 26

