



I-35 Connects

Moving Duluth People and Goods

# ARDC MIC I-35 CORRIDOR PLAN Technical Advisory Committee & Policy Board Updates May 2023



# AGENDA

- STUDY PURPOSE
- ALTERNATIVES APPROACH
- MACRO-SCALE ALTERNATIVES
- MESO-SCALE ALTERNATIVES
- MICRO-SCALE ALTERNATIVES
- NEXT STEPS



- Define a vision for I-35 that is innovative and realistic, ensures safety, mobility, resiliency, and access for all modes of travel.
- Develop a long-term plan to systematically address current and future transportation needs from County Road 61 in Midway Township to 26<sup>th</sup> Avenue East in Duluth.



# STUDY APPROACH

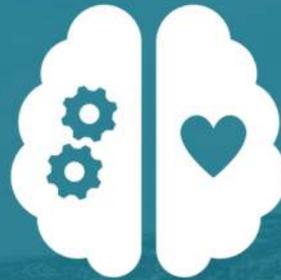


## DISCOVER + LISTEN

Summer/Fall 2022

*Existing Conditions*

*Future Conditions*



## DESIGN + EVALUATE

Winter-Summer 2023

*Visioning*

*Alternatives Analysis*



## REVIEW + APPROVE

Fall 2023

*Implementation*

*Final Report*



# Alternatives Approach





## BUDGETARY LIMITATIONS

**\$2,000,000,000+  
TO CONSTRUCT**



**from Thompson Hill to 26th Ave E**  
(in 2022 dollars)



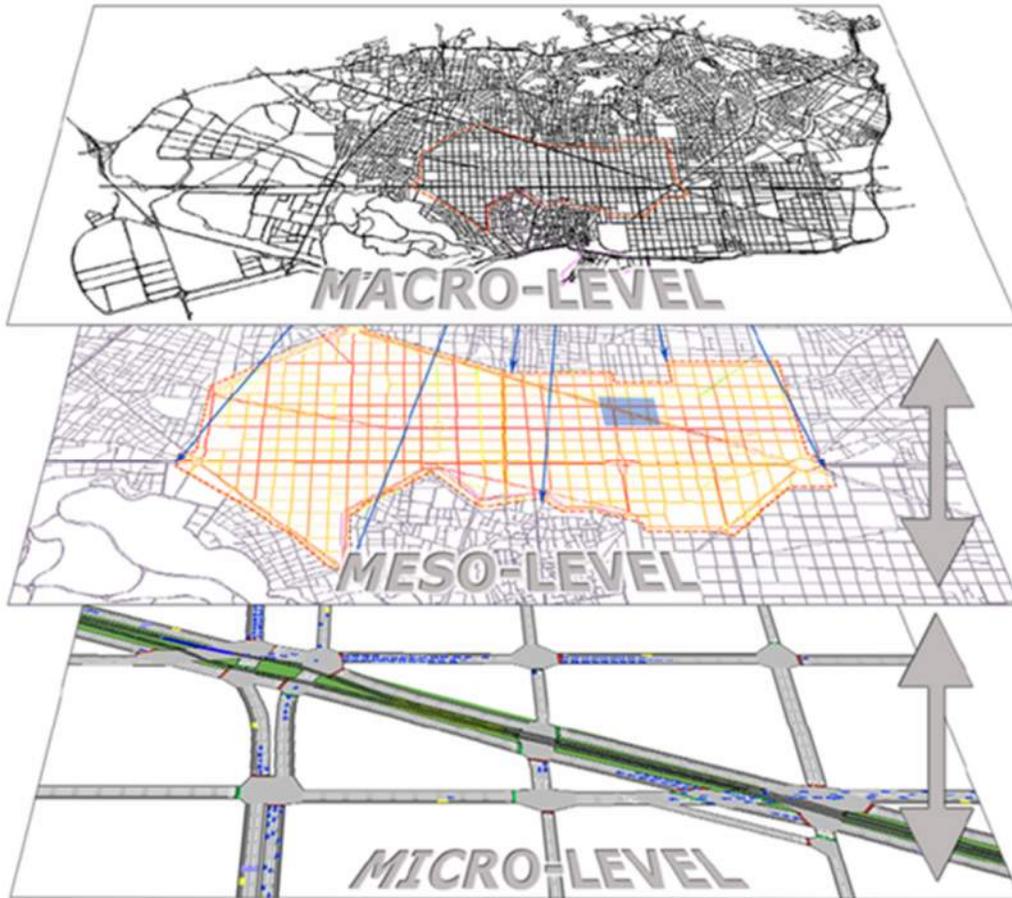
# PROGRAMMED IMPROVEMENTS

- TPI Interchange
- Thompson Hill
- 5th Ave bridge
- Blatnik Bridge



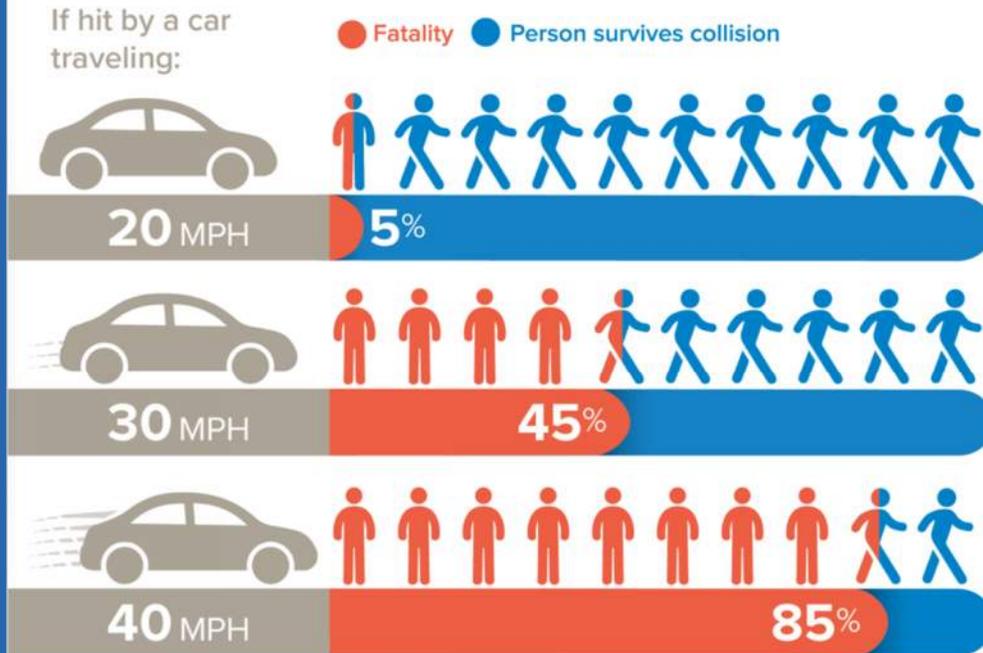


# ALTERNATIVE SCALING



- Pedestrian-Bicycle Crossing Prioritization Plan
  - Intelligent Transportation Systems
- 
- Traffic Control
  - Access Management
  - Lane Configuration
- 
- Downtown Focus Area
  - Spirit Valley Focus Area

## Survivability



National Traffic Safety Board (2017) Reducing Speeding-Related Crashes Involving Passenger Vehicles. Available from: <https://www.nts.gov/safety/safety-studies/Documents/SS1701.pdf>

## Exposure

- Crossing Distance x Daily Traffic Volume

## Comfort

**Before:**

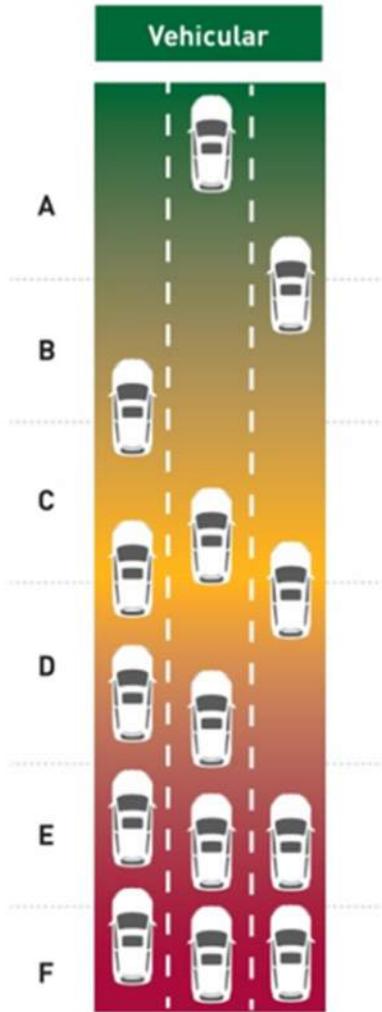
Uncomfortable for all modes

**After:**

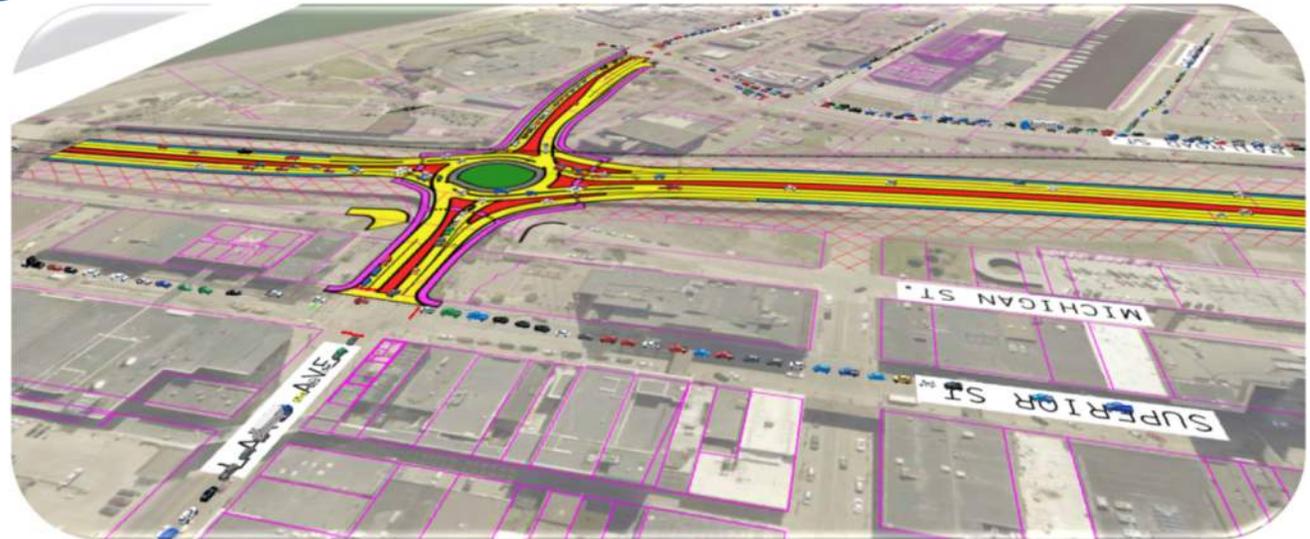
Comfortable for all modes



# Level of Service



# Local Delays (Study Corridor)



# Network Delays (Outside Study Corridor)



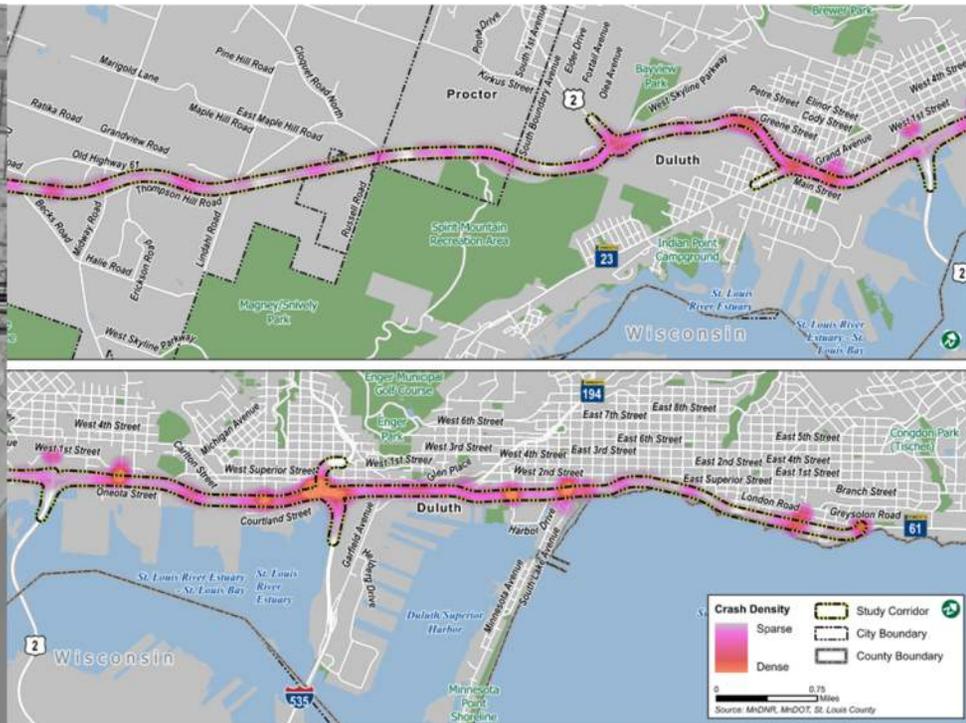


# SAFETY

## Modeled Conflicts



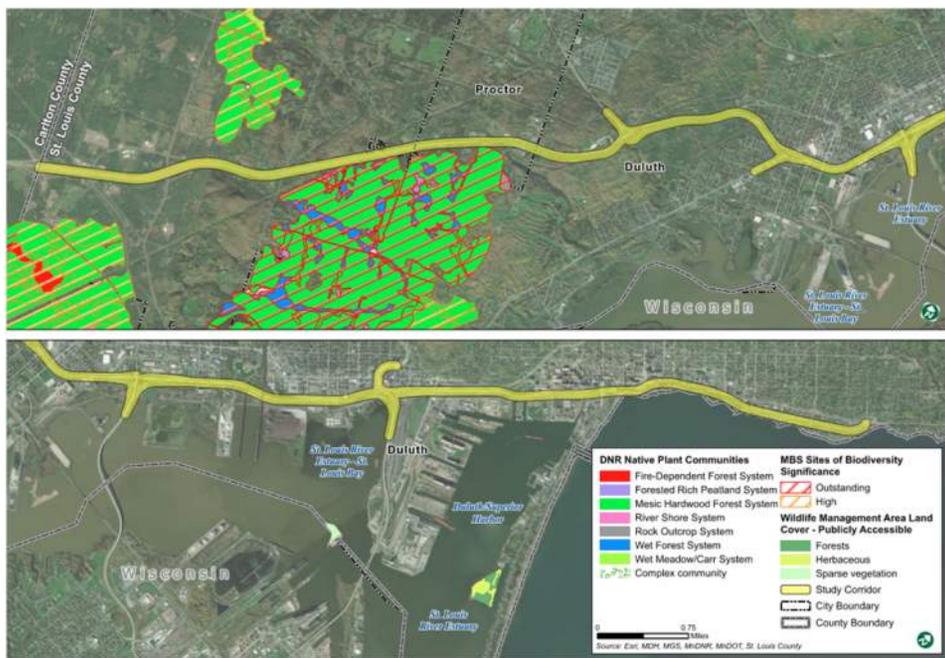
## Crash Modification Factors



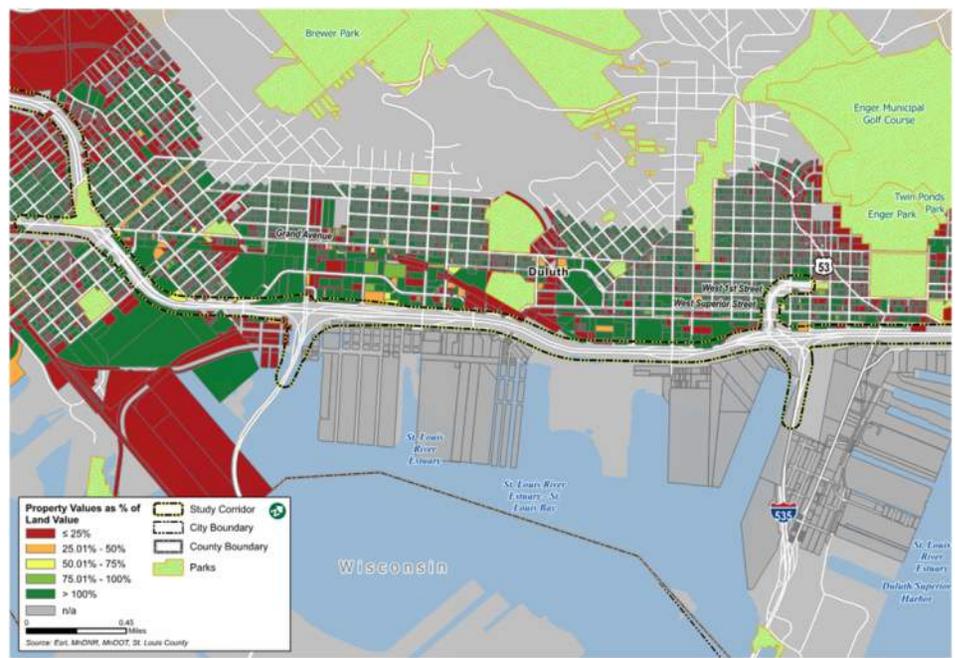


# COSTS & IMPACTS

- Impacts
  - Property
  - Environmental
  - Emissions



- Economic Considerations
  - Costs
  - Redevelopment Potential
  - Adjacent Property Values



# EXAMPLE SCORECARD

## LIVABILITY

### SURVIVABILITY

Before



After



### EXPOSURE



### PED BIKE FACILITY COMFORT LEVEL

Before: Uncomfortable for all modes

After: Comfortable for all modes



## SAFETY

### CRASH POTENTIAL - LOW SEVERITY

Before



After



159%↑ Increase in the peak hours

### CRASH POTENTIAL - HIGH SEVERITY

Before



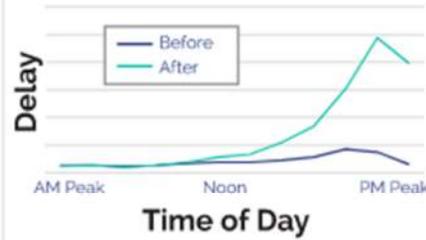
After



447%↑ Increase in the peak hours

## MOBILITY

### LOCAL DELAYS

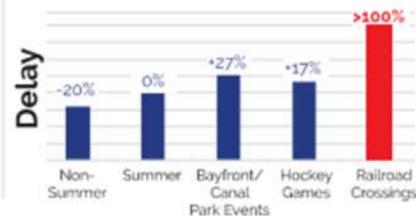


### TRIP REDISTRIBUTION

30% of I-35 traffic redistributes to local network



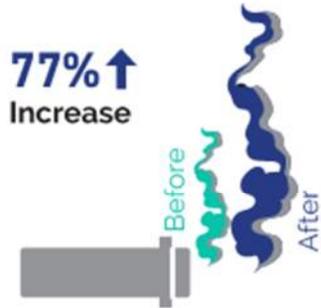
### EVENT TRAFFIC



## IMPACT

### EMISSIONS

77%↑ Increase



### IMPACTS



2+ Buildings Impacted

### ECONOMICS

Cost \$100M-\$150M\* Reinvestment Potential \$7-10M



\*High degree of uncertainty and risk



I-35 Connects



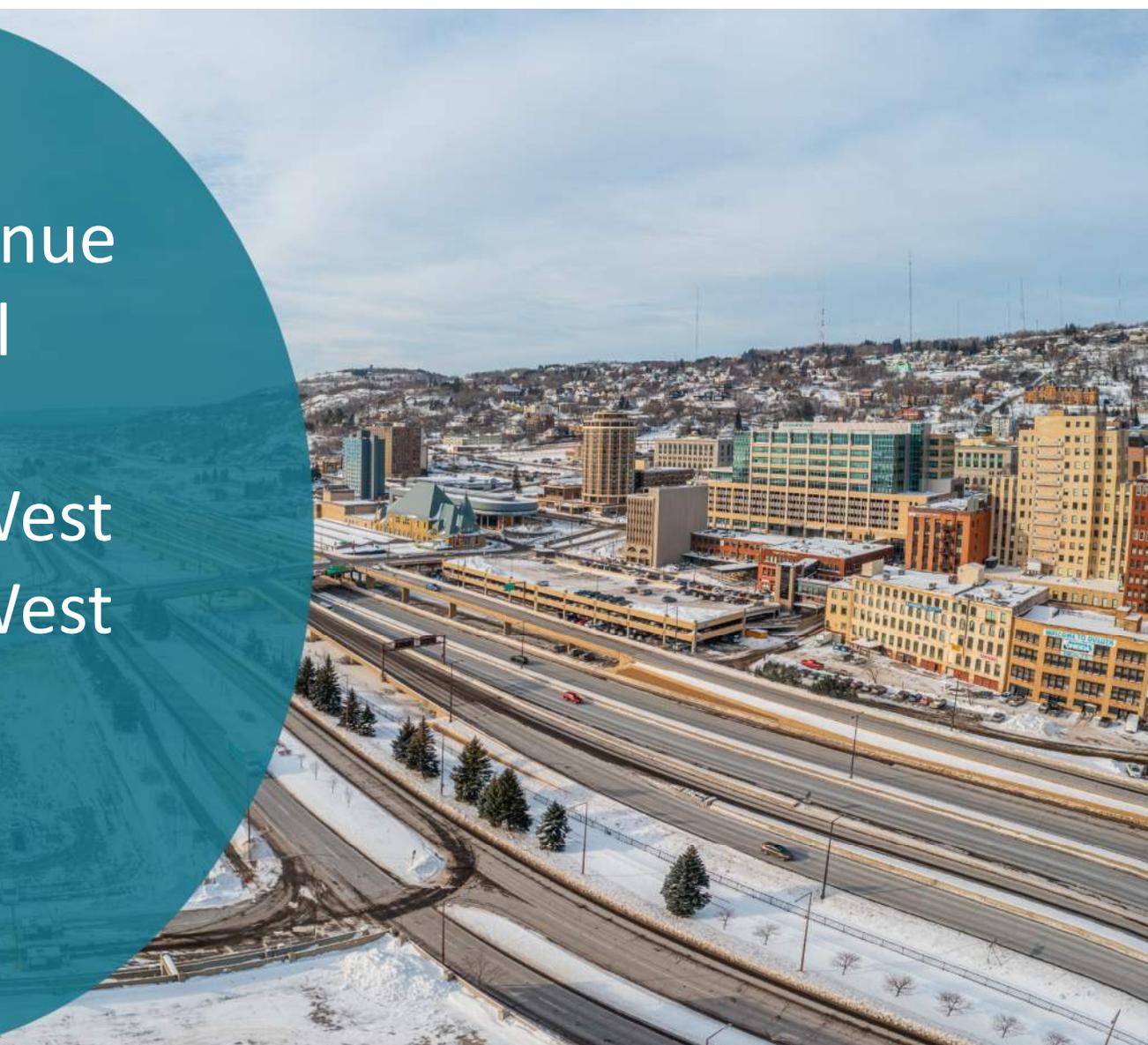
We will not review these today, but they will be available at the Public Open House and online.

- Multimodal Priority Crossings
- Intelligent Transportation Systems



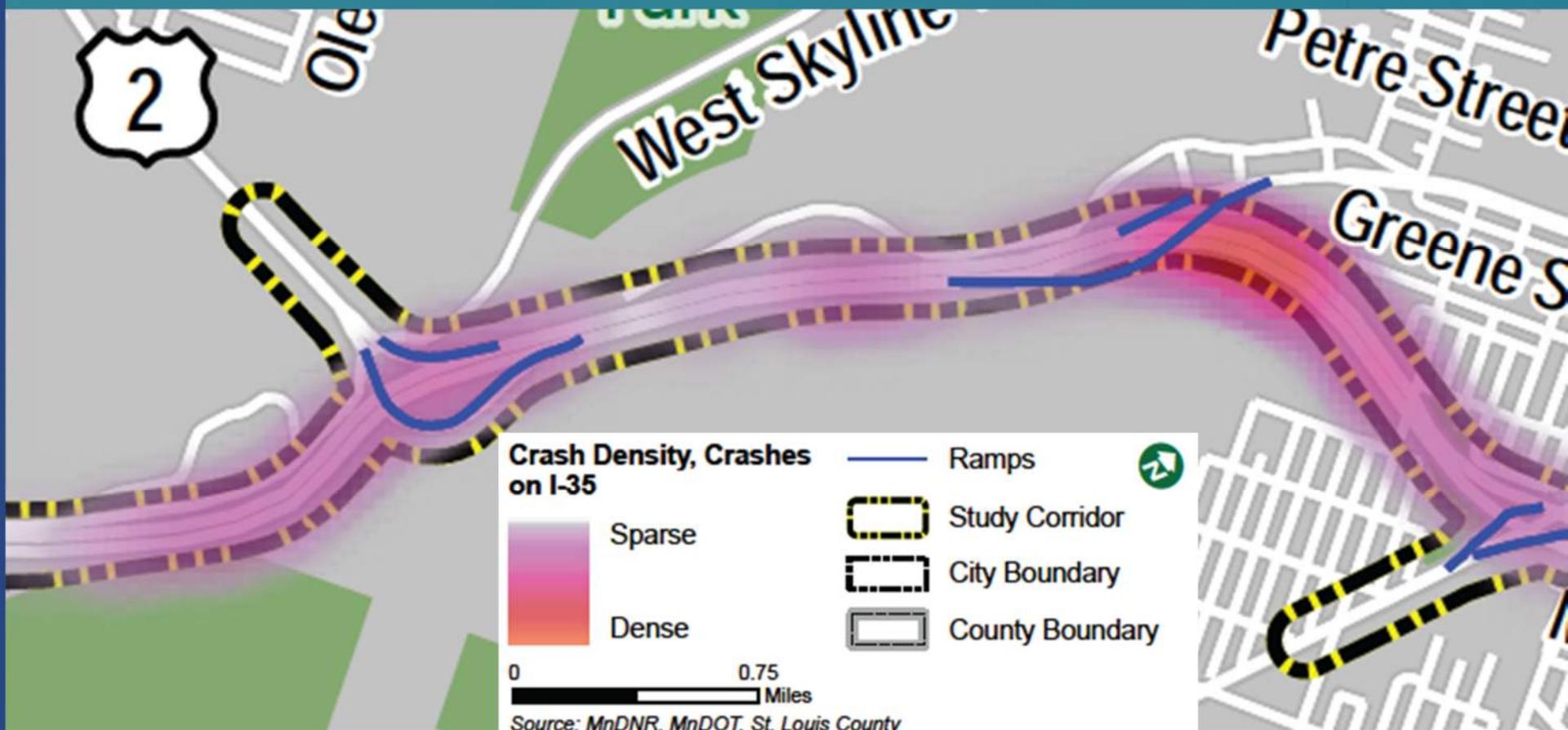
# Meso Alternatives

- Boundary Avenue
- Thompson Hill
- Ugstad Road
- 40<sup>th</sup> Avenue West
- 27<sup>th</sup> Avenue West
- Others





- Highest Crash Rates due to Weather, Horizontal, and Vertical Curvature
- Substandard shoulder widths present
- Substandard Partial Access to Cody Street





- \$24M-32M programmed in CHIP for 2028
- End of Useful Life of Pavement
- Replace Retaining Wall, Made of Stone from 1938
- Steep Grades Make for Costly Improvements
- Rest Area Limits Ability to Minimize Horizontal Curvature



# THOMPSON HILL



**Criteria**  
● Worse ● Neutral ● Better

CRITERIA	BEFORE	AFTER	DESCRIPTION
LIVABILITY			• Increase in pedestrian comfort and protection provided by DWP trail pedestrian tunnel
SAFETY			• Substandard shoulders and curvature corrected • Remove deficient partial interchange that doesn't meet spacing standards
MOBILITY			• Truck climbing lane improved freight reliability and mainline operations • Turn lanes at US 2 & Skyline Pkwy improve local mobility
IMPACT			• Environmentally sensitive areas with potential for impacted • Potential for 4 bridge replacements at US 2 interchange
COST			• Estimated Construction Cost - \$35M - \$45M (2023 dollars)

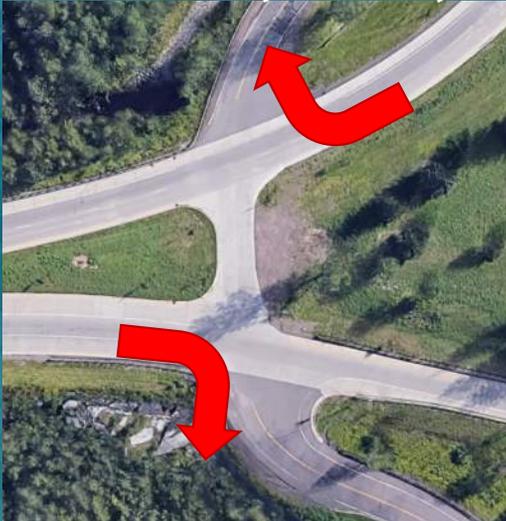


## Boundary Ave/Skyline Pkwy at I-35 NB



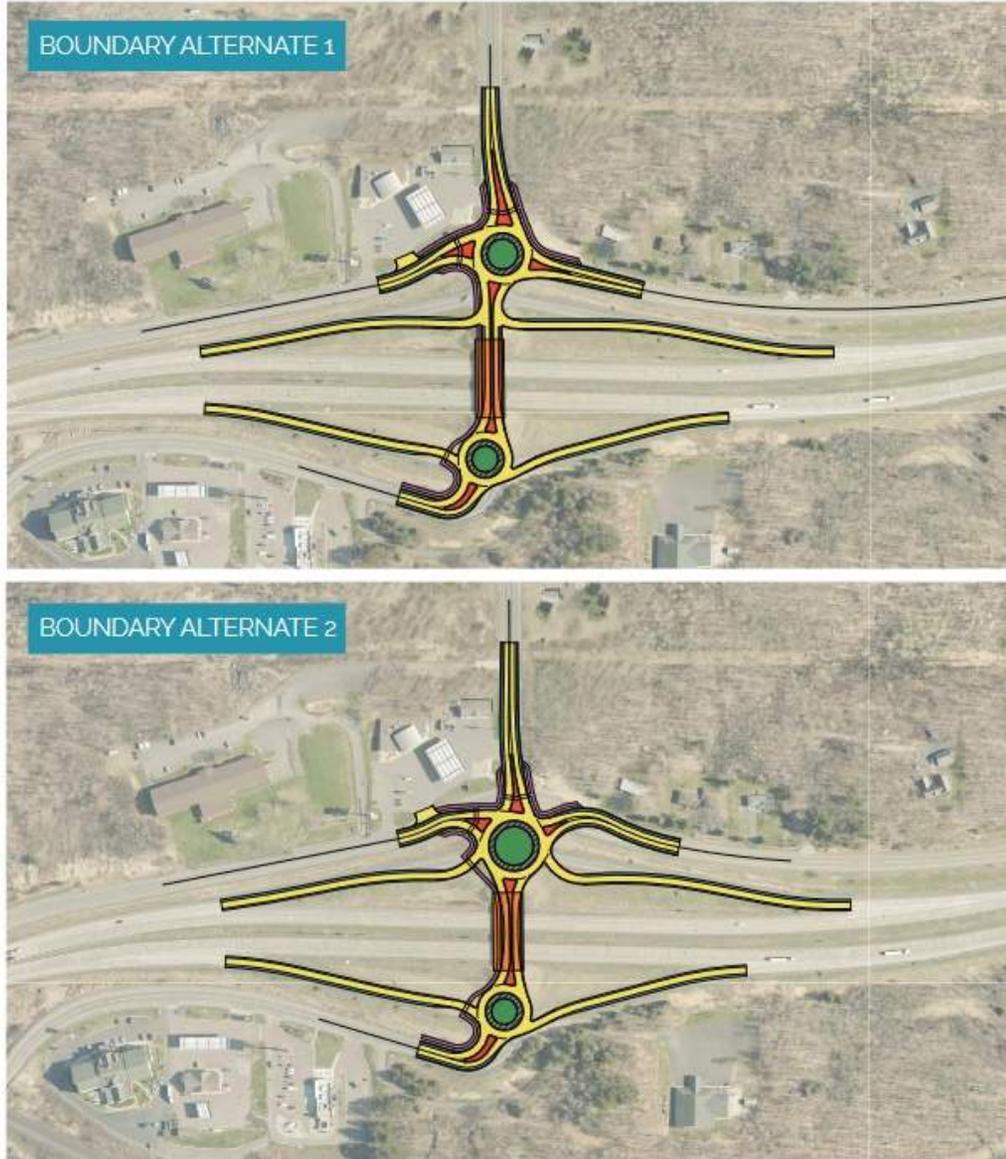
- 60% right angle/left turn crash type
- Critical index = 1.02
- Skew/curvature of south leg limiting sight distance
- Uncontrolled southbound approach may cause confusion

## US 2 at Skyline Pkwy



- Skyline Parkway Hidden from View and Turns Onto/Off Can Be Surprising
- 50% occur December-January
- 1/3 sideswipe same direction crash type
- Critical index = 1.47

# BOUNDARY AVENUE



### Criteria

● Worse    
 ● Neutral    
 ● Better

CRITERIA	BEFORE	AFTER	DESCRIPTION
LIVABILITY			<ul style="list-style-type: none"> <li>Added trail crossing of I-35 in rural subarea</li> <li>Aligns with Proctor's Boundary Ave Multimodal Improvements plan</li> </ul>
SAFETY			<ul style="list-style-type: none"> <li>Rectifies sightline issues at southern ramp terminal and associated crash issues</li> </ul>
MOBILITY			<ul style="list-style-type: none"> <li>Increased ramp terminal capacity</li> </ul>
IMPACT			<ul style="list-style-type: none"> <li>Minimal ROW needs</li> <li>Potential for business access impacts</li> <li>Negligible change in GHG emissions</li> </ul>
COST			<ul style="list-style-type: none"> <li>Estimated Construction Cost - \$10M - \$15M (2023 dollars)</li> </ul>

## UGSTAD ROAD



### Criteria

- Worse
- Neutral
- Better

CRITERIA	LIVABILITY	SAFETY	MOBILITY	IMPACT	COST
<b>BEFORE</b>					
<b>AFTER</b>					
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>Issues with land use conflicts on Ugstad Road (i.e. school)"</li> </ul>	<ul style="list-style-type: none"> <li>1 mile spacing to Boundary Ave interchange</li> <li>High amount of accesses on/near Ugstad Road difficult to resolve</li> </ul>	<ul style="list-style-type: none"> <li>Ugstad Road not built for significant traffic volumes, does not provide key connections</li> </ul>	<ul style="list-style-type: none"> <li>Significant ROW needs, 5+ properties impacts</li> <li>Potential for biological impacts to south</li> <li>Negligible change in GHG emissions</li> </ul>	<ul style="list-style-type: none"> <li>Estimated Construction Cost - \$10M - \$15M (2023 dollars)</li> </ul>



## 27<sup>th</sup> Ave Ramps



- Interchange Spacing and Merging Conditions
- Sight distance challenging
  - Vegetation and curvature of multiple bridges
- SB Ramp Critical index = 2.15

## 40<sup>th</sup> Ave Ramps



- 75% right angle crash type
- Sight distance challenging
  - Vegetation and curvature of bridge
- Spacing, Merging, and Directional Interchange Issues
- SB Ramp Critical index = 4.15



# 27<sup>TH</sup> AVENUE WEST



**Criteria**  
● Worse    ● Neutral    ● Better

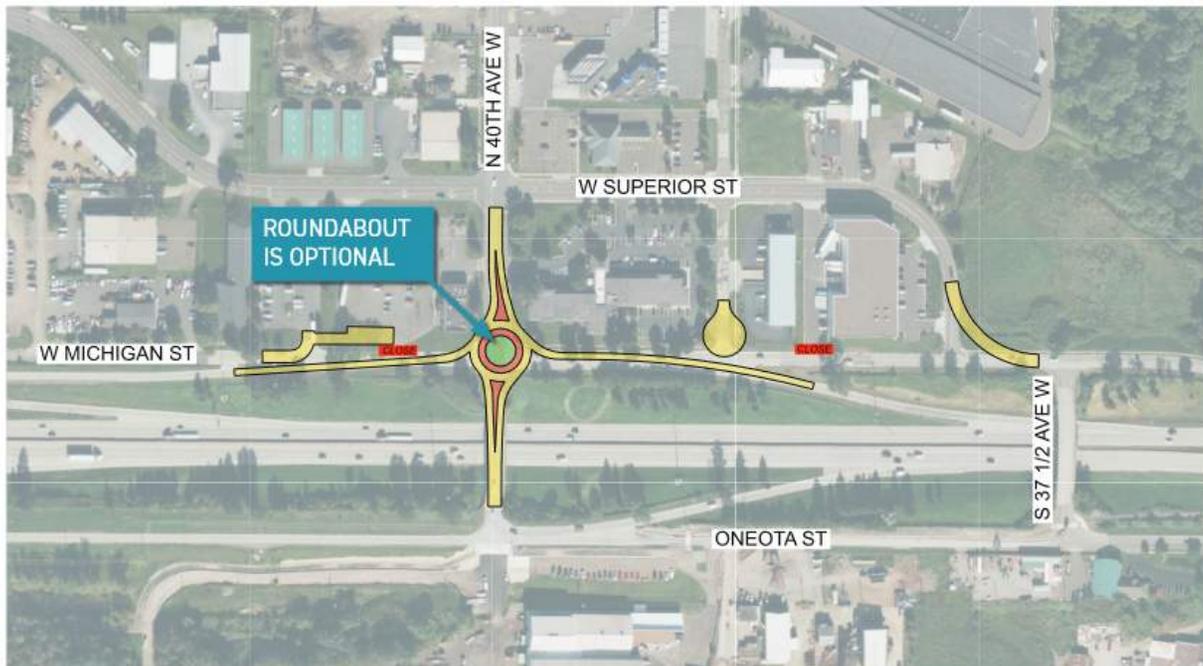
CRITERIA	BEFORE	AFTER	DESCRIPTION
LIVABILITY			• Recently reconstructed bridge features sidewalk on both sides but no ped/bike facilities are provide over railroad tracks due to low lakeside demand
SAFETY			• Eliminates complex merge and diverge conflicts between ramps and Michigan St • Both ramp terminal intersections are operating with above average crash rates due to complex interactions, heavy truck traffic and poor sightlines
MOBILITY			• Local access diverted away from I35 influence area • Allows proper functionality of interchange
IMPACT			• Low impacts • Reduced pavement areas • Access management mitigated by alternative routes
COST			Estimated Construction Cost - \$100,000 - \$250,000 (2023 dollars)

# 40TH AVENUE WEST

## 40TH AVE

### Criteria

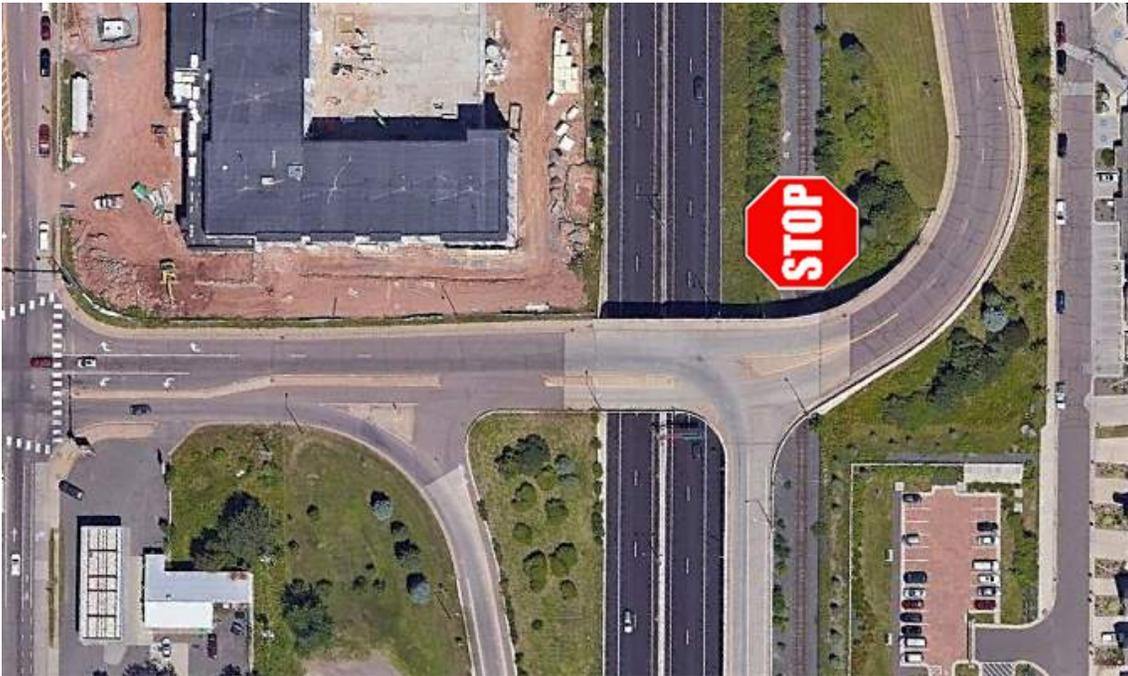
- Worse
- Neutral
- Better



CRITERIA	LIVABILITY	SAFETY	MOBILITY	IMPACT	COST
<b>BEFORE</b>					
<b>AFTER</b>					
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Pedestrian facilities may be included with roundabout but will not fit on existing bridge section</li> <li>• Add ped/bike facilities when bridge is replaced</li> </ul>	<ul style="list-style-type: none"> <li>• Eliminates complex merge and diverge conflicts between ramps and Michigan St</li> <li>• Both ramp terminal intersections are operating with significant crash rates due to complex interactions, heavy truck traffic and poor sightlines</li> </ul>	<ul style="list-style-type: none"> <li>• Increased capacity at north ramp terminal</li> <li>• Local access diverted away from I35 influence area</li> </ul>	<ul style="list-style-type: none"> <li>• Low impacts</li> <li>• Reduced pavement areas</li> <li>• Access management mitigated by alternative routes</li> </ul>	Estimated Construction Cost - \$2.5 M - \$5 M (2023 dollars)

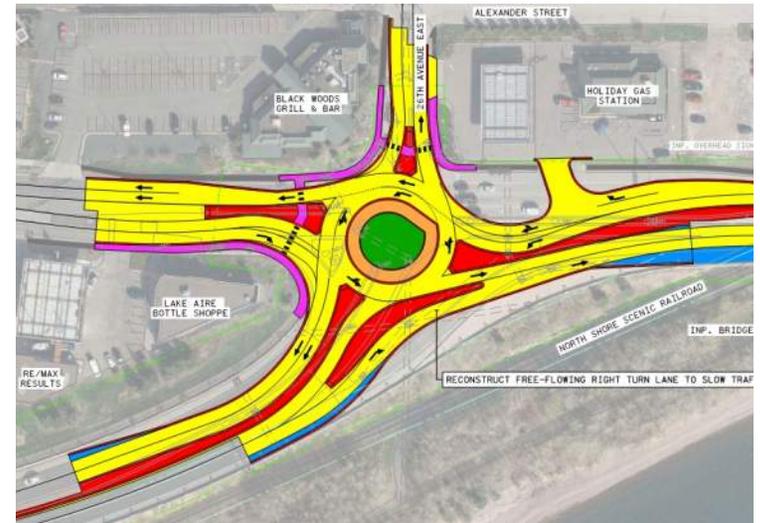
# OTHER IMPROVEMENTS

## 21<sup>st</sup> Avenue East Traffic Control



- Deficient northbound ramp operations and queueing during peak hours
- Future Roundabout and Ped/Bike Improvements when Reconstruction is Needed

## London Road Roundabout



- Existing signal is overcapacity
- Majority of crashes during peak hours
- Aligns with planned London Road reconstruction (2 roundabouts)

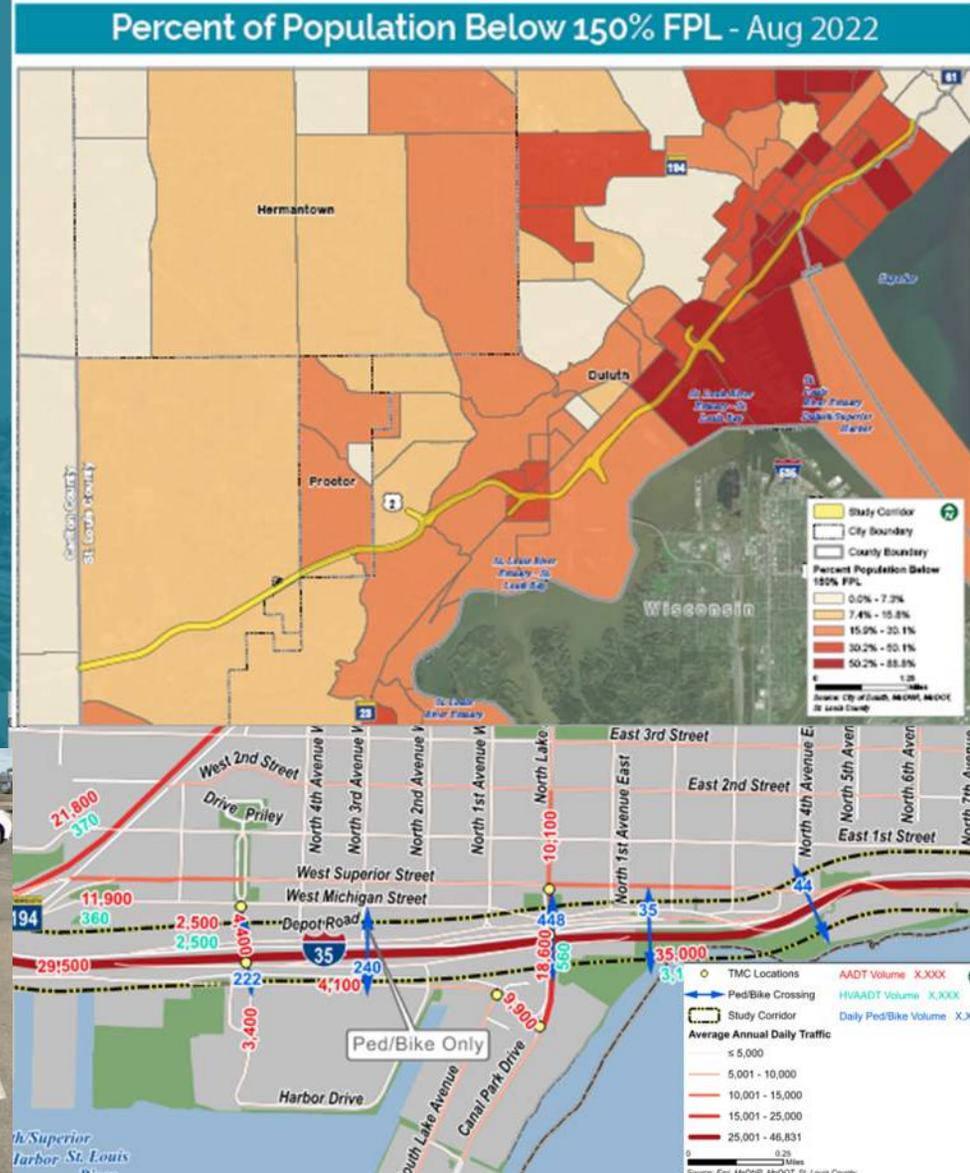


- Downtown Focus Area
- Spirit Valley Focus Area



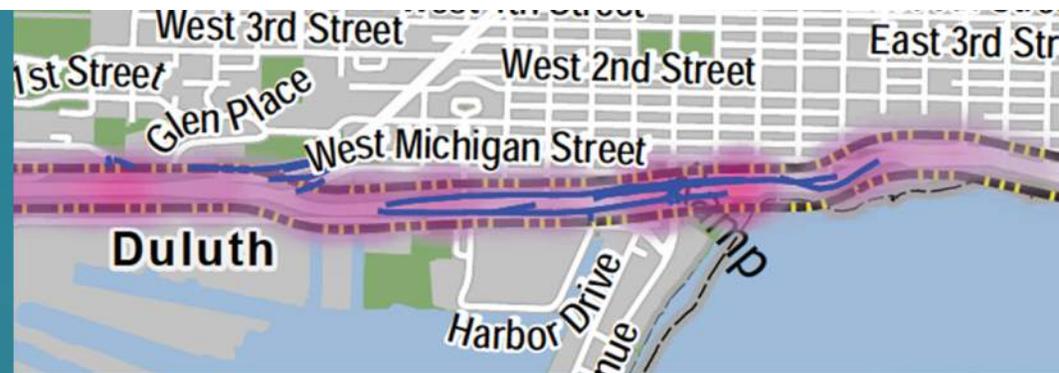
## Evaluate Improved Multimodal Conditions

- Narrow and Uncomfortable Ped/Bike Facilities
- Ped/Bike crashes recorded at 5th Ave, Lake Ave, Canal Park Dr
- Most Active Ped/Bike Area on Corridor
  - 225-480 Crossings/Day
- Disproportionate Environmental Justice Areas

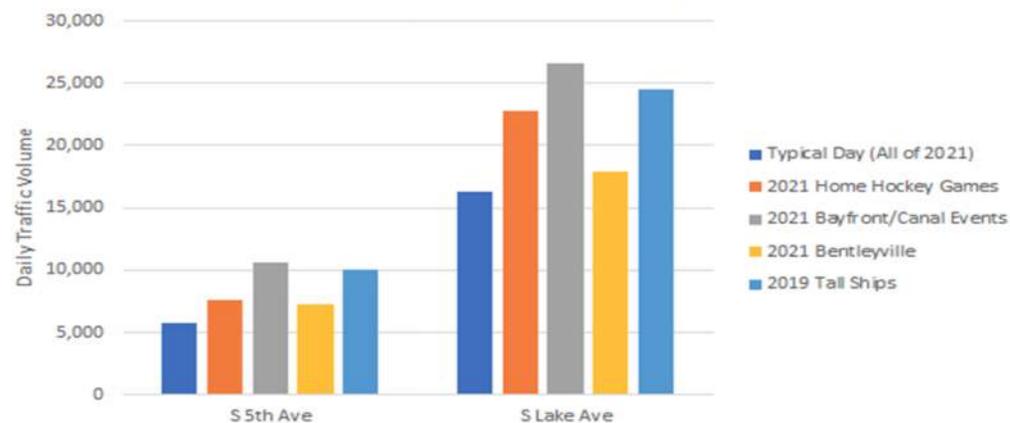


## Consider Reconfiguration Opportunities

- Excess Capacity throughout Normal Day
- 15-50% Increase in Traffic During Events
- Critical Crash Rate Based on Configuration



Canal Park Exits - Event Analysis





## Evaluate Reinvestment Opportunities

- 6.7M Annual Tourists Concentrated in Canal Park Area
- Highest Taxable Land in Study Area

## UMD Economic Effects Study

- Case Studies Show Significant Economic Benefits
- Engagement Shows Interest in Redevelopment Potential

## Key Factors to Consider

- Growth and Economic Activity
- Travel Characteristics to/from Canal Park Area
- Alternative Routes Availability for Freight



Rochester, NY I-490 Inner Loop before/after | Source: CNU.org

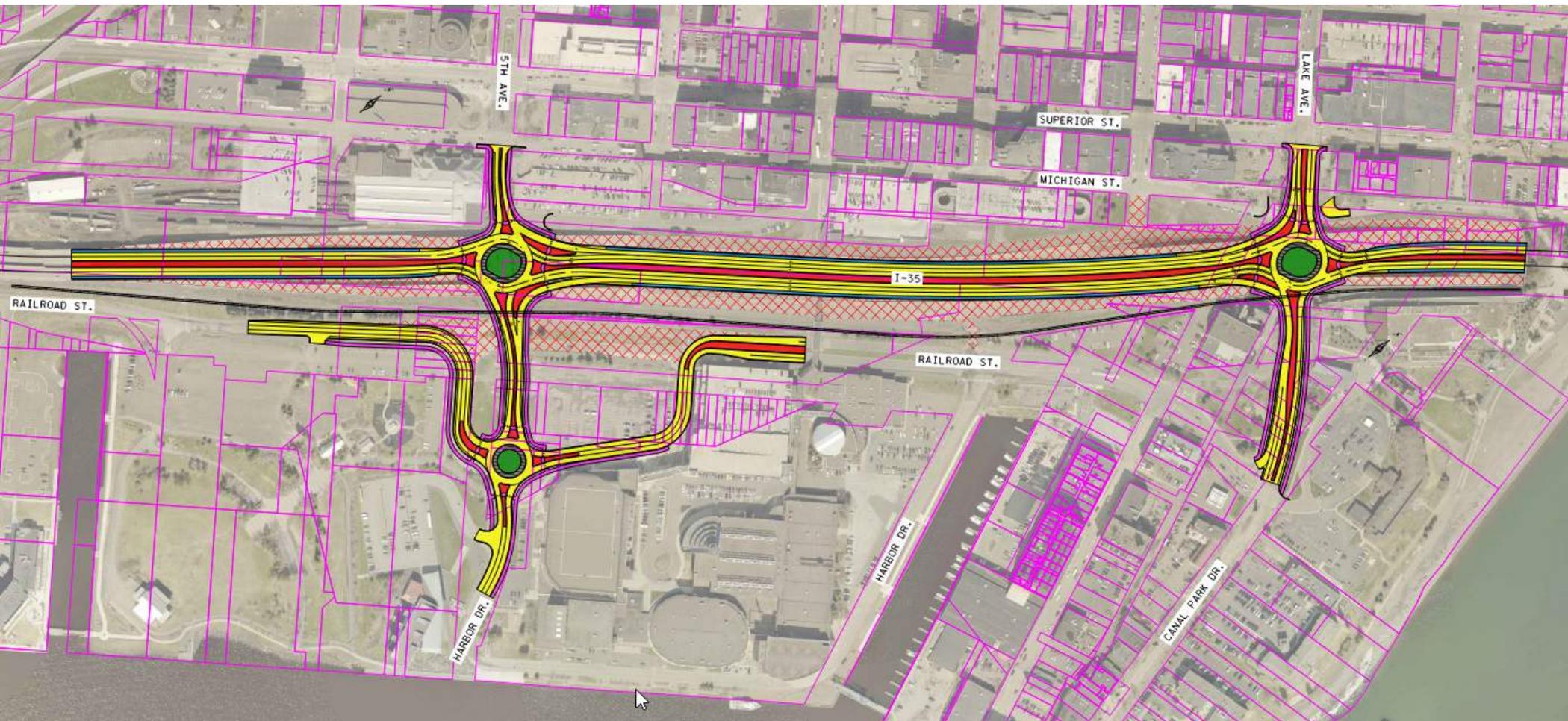
# Downtown Reconfiguration

- Roadway profile grades
  - 5th Avenue roadway profile would exceed recommended maximum to tie into roundabout, particularly dangerous during winter months
- Railroad grade separation and operation
  - The Lake Superior Railroad Museum and North Shore Scenic Railroad lines extend under existing 5th Avenue
  - Creating Multiple at-grade Rail Crossings will be very challenging
- Railroad Alignment
  - Alignment through the center of the corridor will create complete gridlock during rail events
  - Challenging to impossible to get back on alignment under the tunnel
- Roundabouts
  - Triple roundabouts are unlikely to meet MnDOT design standards
  - Multilane roundabouts in Minnesota have been found to increase total crashes by ~150%





# ROUNDAABOUT PARKWAY



# ROUNDABOUT PARKWAY

## LIVABILITY

### SURVIVABILITY



### EXPOSURE



### PED BIKE FACILITY COMFORT LEVEL

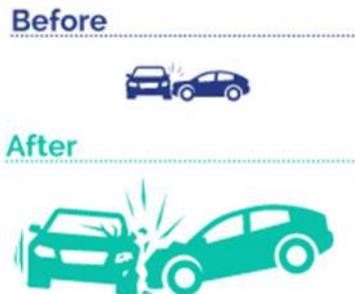
**Before:**  
Uncomfortable for all modes

**After:**  
Comfortable for all modes



## SAFETY

### CRASH POTENTIAL - LOW SEVERITY



**159%↑** Increase in the peak hours

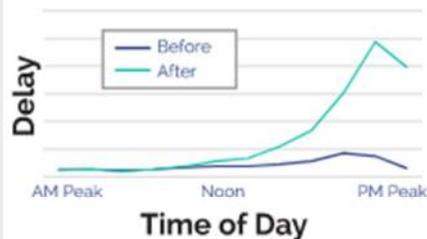
### CRASH POTENTIAL - HIGH SEVERITY



**447%↑** Increase in the peak hours

## MOBILITY

### LOCAL DELAYS

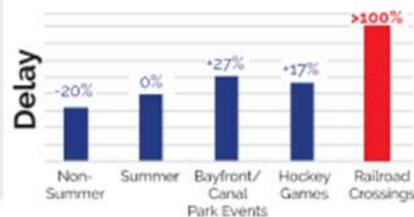


### TRIP REDISTRIBUTION

30% of I-35 traffic redistributes to local network

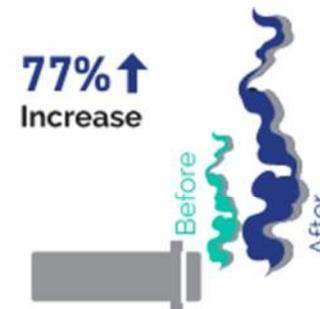


### EVENT TRAFFIC



## IMPACT

### EMISSIONS



### IMPACTS

**2+** Buildings Impacted

### ECONOMICS

**Cost**  
\$100M-\$150M\*

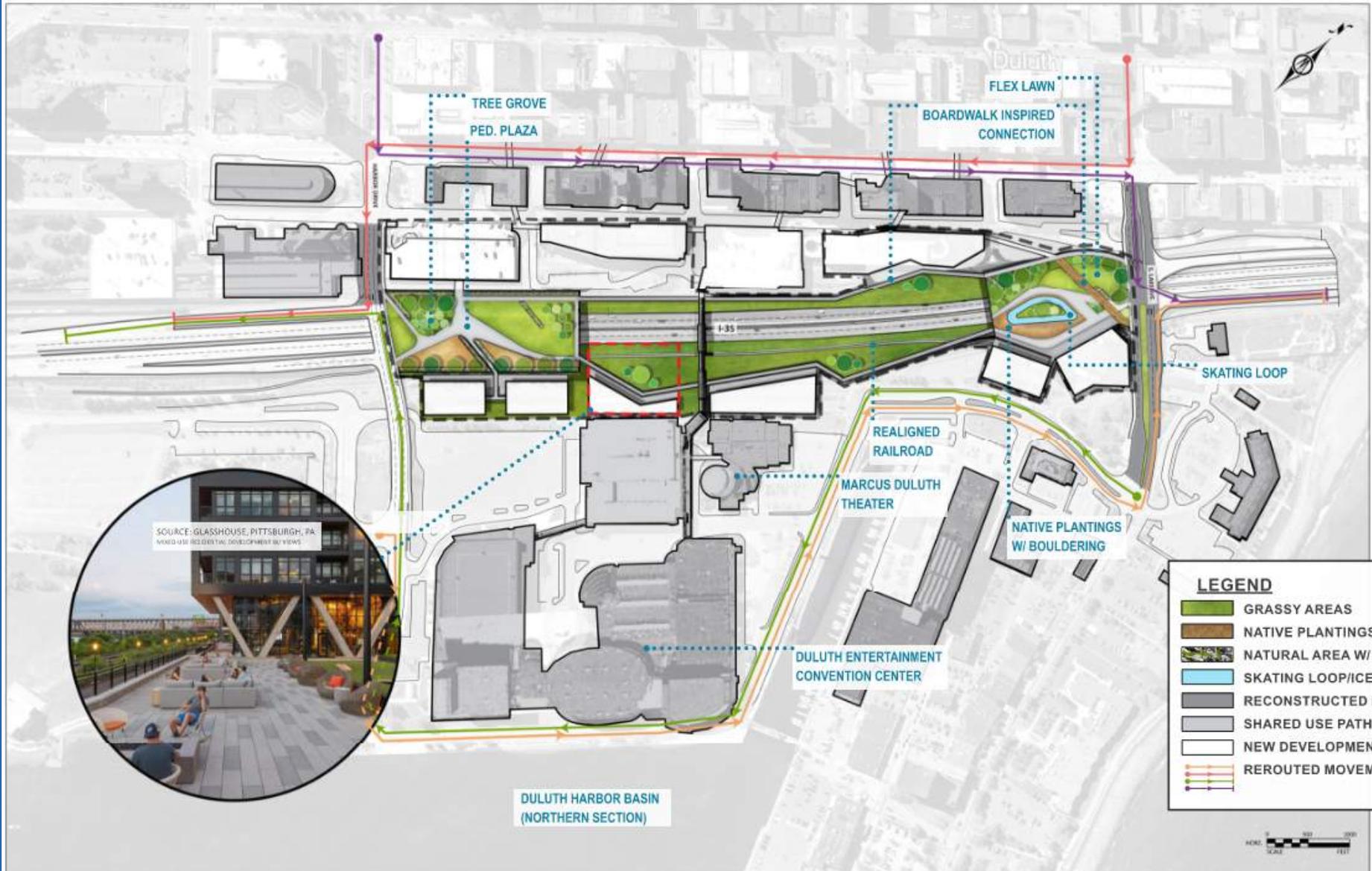
**Reinvestment Potential**  
\$7-10M

\*High degree of uncertainty and risk



I-35 Connects

# LID CONCEPT



# INTERCHANGE IMPROVEMENTS

5TH AVE.

HARBOR DR.

SUPERIOR ST.

MICHIGAN ST.

I-35

RAILROAD ST.

LAKE AVE.

L. PARK DR.

**LEADING PEDESTRIAN INTERVAL**  
Reduces vehicle-ped crash potential up to 60%

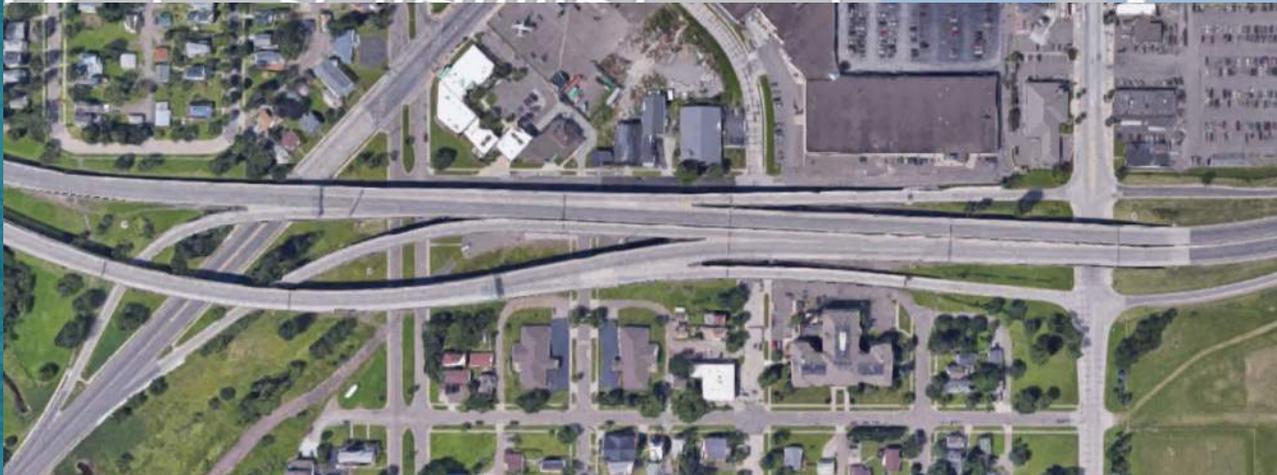
**RESTRICTED RIGHT TURN**  
60%+ Reduction in vehicle-ped crashes



## Programmed Replacement of Bridges

Safety = 70% Higher than Critical

- Spike in crash rate due to closely spaced ramps
- Left exits - FHWA no longer permits
- Partial Interchange - FHWA no longer Permits
- Significant Curvature
- Skewed Intersections





## Environmental Justice

- Elevated % of those without access to a vehicle and living in poverty
- Air and environmental quality issues

## Multimodal Crossings

- Uncomfortable Facilities
- Unprotected Crossings

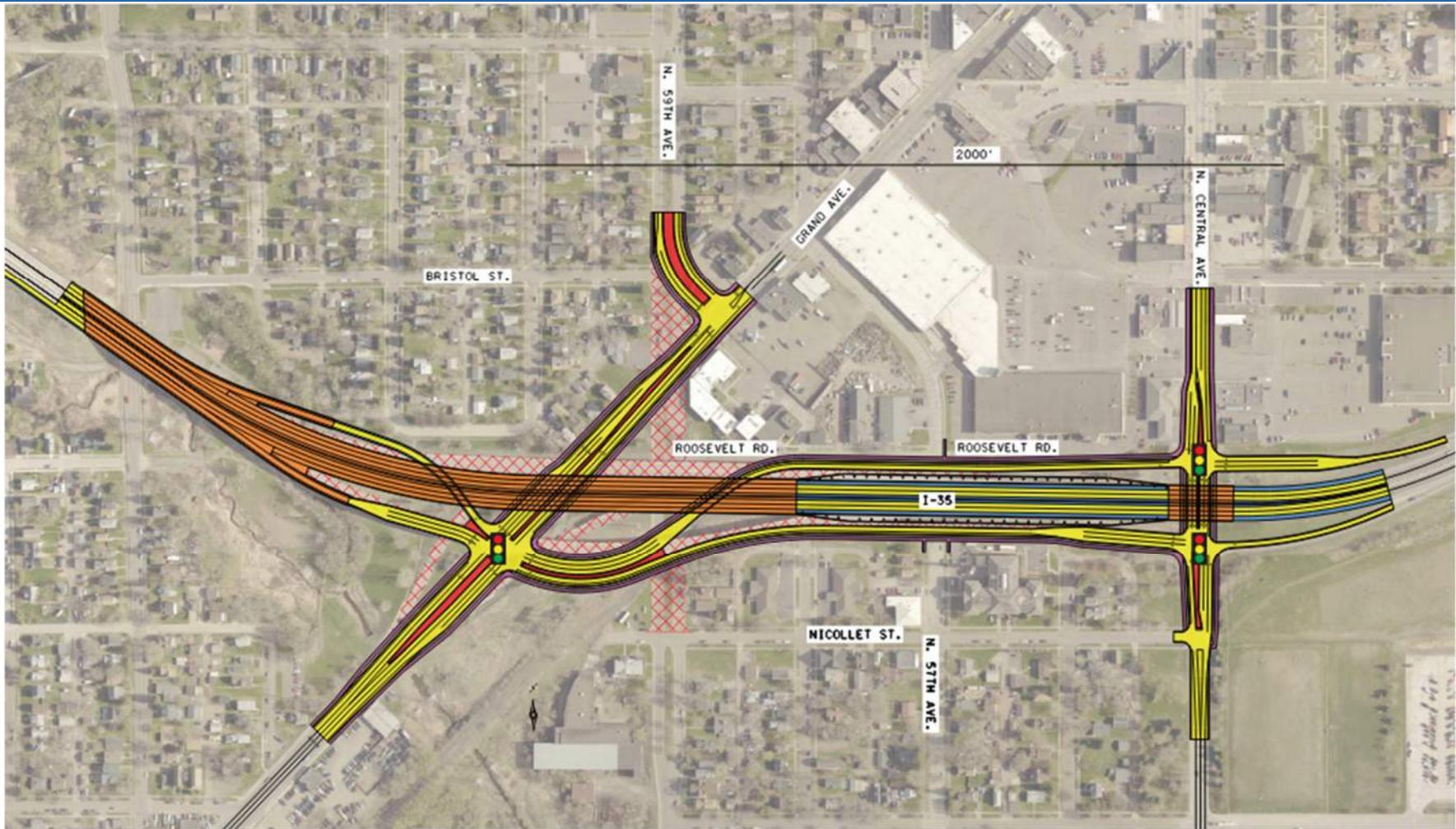
## West Duluth/Spirit Valley Community Node

- >27 acres in the Grand/Center/I-35 "Triangle"
- Possible TOD opportunity with 6+ DTA routes





# CONSOLIDATED INTERCHANGE





# MEDIAN U-TURN INTERCHANGE





# MEDIAN U-TURN INTERCHANGE



# NEXT STEPS



I-35 Connects

Phase	2022												2023											
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
	Discover and Listen												Design and Evaluate						Review and Approve					
A. Project Management																								
Project Management Plan																								
B. Project Management Team Meetings																								
Bi-Weekly Meetings																								
C. Steering Committee Meetings																								
Kickoff and Engagement Workshop																								
Issues and Visioning																								
Future Scenario Workshops																								
Visioning Workshop																								
Alternatives Refinement Workshop																								
Implementation Workshop																								
D. Communication and Engagement Plan																								
Communication and Engagement Plan*																								
Phase I - Discover and Listen																								
Phase II - Design and Evaluate																								
Phase III - Implementation Plan																								
Engagement Appendix																								
E. Current Conditions and System Performance Analysis																								
Technical Memorandum with Appendices																								
F. Future Conditions and System Performance Analysis																								
Technical Memorandum with Appendices																								
G. Vision, Concepts, and Implementation Plan																								
Alternatives Analysis and Development Technical Memorandum																								
Concept Layouts																								
Implementation Plan																								
Draft Report																								
Final Report																								

Schedule Flexibility

- Phase II Public Engagement
  - Focus Group Meetings
  - Public Meeting June 6
  - Online Engagement
- Phase III: Implementation Plan
  - Prioritization of Needs
  - Recommend Additional Studies