

# Mn 220 N Corridor Study

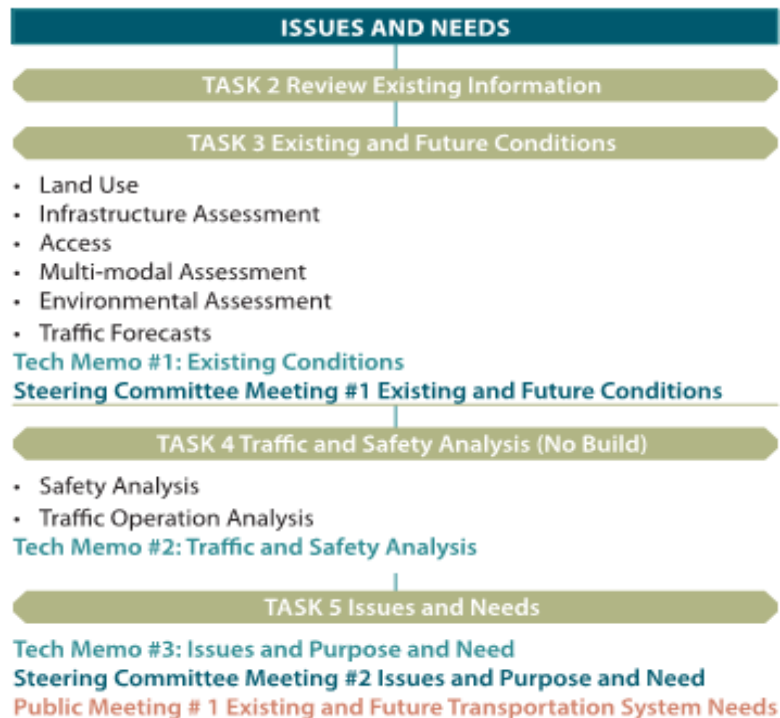
East Grand Forks City Council Work Session – Implementation Plan and Study Conclusions | June 25, 2019



# AGENDA

- Study Overview
- Opinion Survey Results
- Recommendations
- Implementation Plan
- Project Development Process Overview
- Roundabout Design Discussion
- Questions / Discussion

# Study Overview

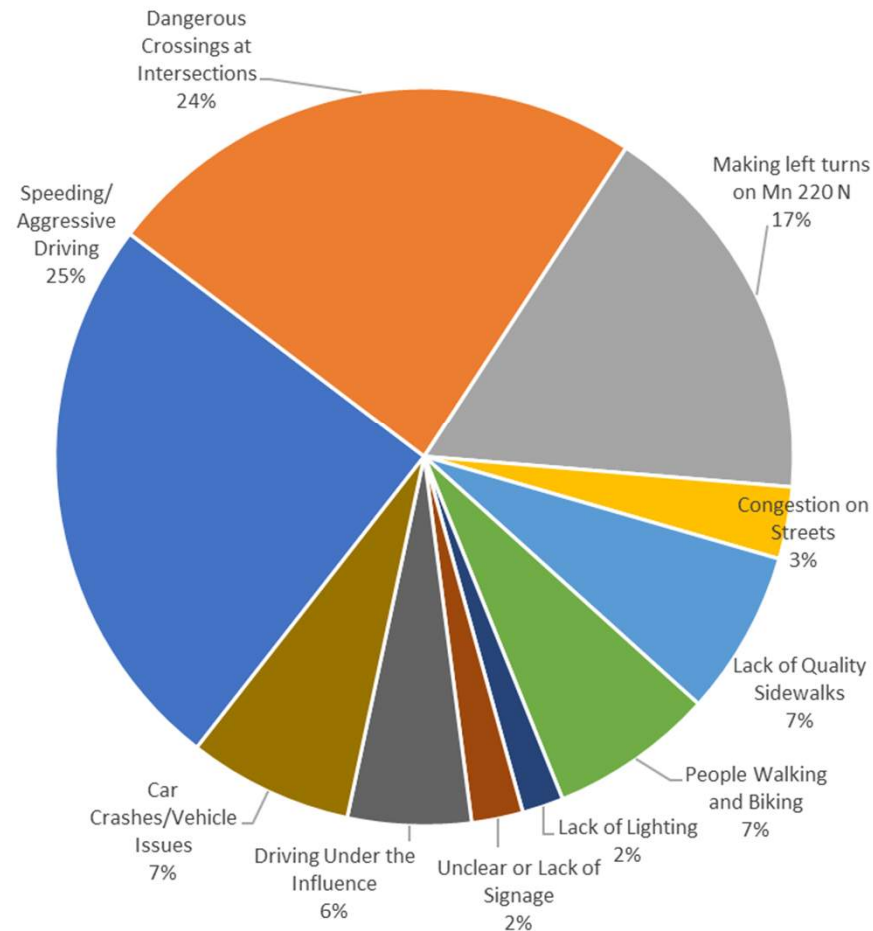


# Opinion Survey Results

## Overview

- 52 Respondents
- 35% Residents along Corridor
- Most Respondents were Motorists / Daily Users / Middle Aged
- **Top 3 Most Concerning Intersections:** US 2, 17<sup>th</sup>, 23<sup>rd</sup>, Followed by No Concerns (4<sup>th</sup> ranked)
- **Top 3 Safety Concerns:** Speed/Aggressive Driving, Perception of Dangerous Crossing at Intersection, Making Left Turns
- **Top 4 Improvement Elements:** Improve crosswalks, traffic signal, roundabout, pedestrian/bicycles facilities
- Consistent Noted Concern – Trucks and Ag Vehicles

### Top Safety Concerns on Mn 220 Corridor



# Recommendations / Study Goals

## Study Goals

- Opinion Survey Consistent with Goals of this Study
- Alternatives Analysis Focus
  - Access Control
  - Mobility
  - Safety
  - Pedestrian Crossings

## Study Recommendations / Implementation Plan

- Specifically Address Issues Raised, Safety, Mobility and Multimodal Deficiencies
- Evaluation Metrics - Balance Objectives for All Users
- Carry Forward Highest Ranked and Feasible Alternatives
- Implementation Plan for Project Programming

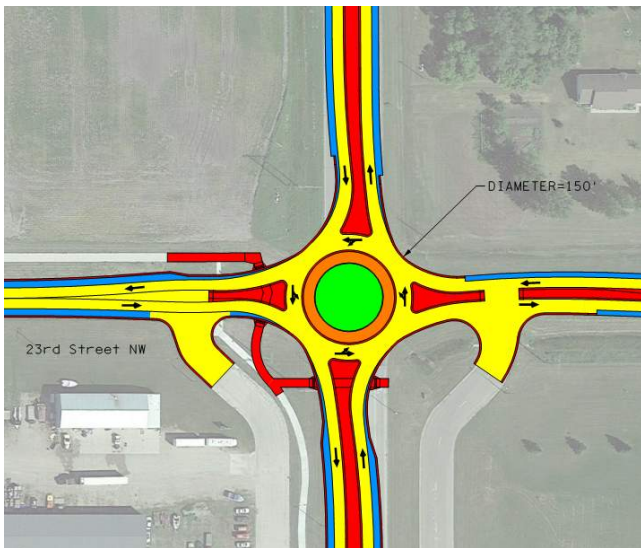


# Recommendations

## Intersection Control, Mobility, Safety and Pedestrian Crossings

### 23<sup>rd</sup> Street NW

- Highest Ranked: Roundabout



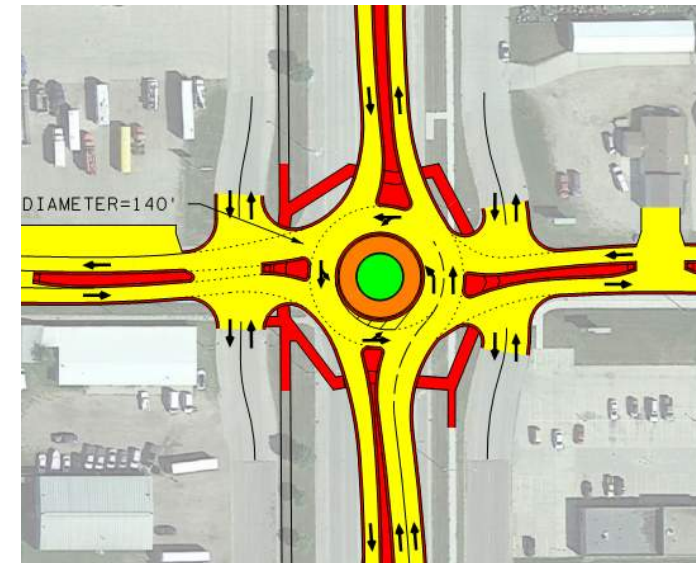
### 20<sup>th</sup> Street NW

- Highest Ranked: Maintain Existing Intersection Access/Control
- Feasible Alternative:  $\frac{3}{4}$  Configuration (If Traffic Signal at 17<sup>th</sup> Street)



### 17<sup>th</sup> Street NW

- Highest Ranked: Roundabout
- Feasible Alternative: Traffic Signal



# Recommendations

## Intersection Control, Mobility, Safety and Pedestrian Crossings

### 15<sup>th</sup> Street NW

- **Highest Ranked: Maintain Existing Access and Control**



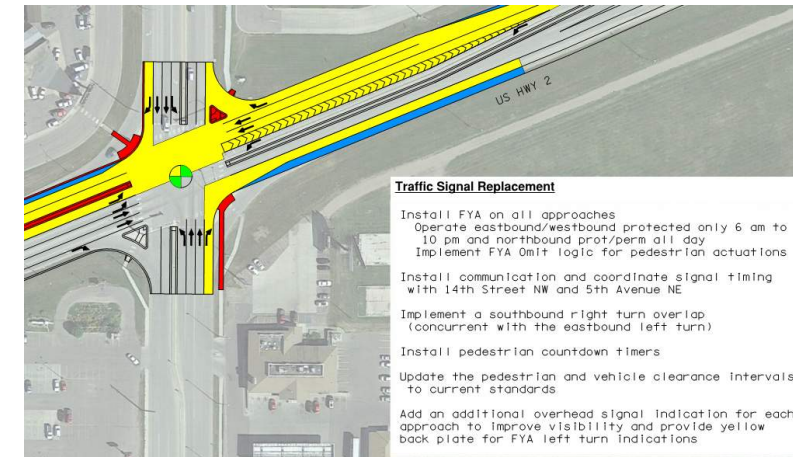
### 14<sup>th</sup> Street NW

- **Highest Ranked: Replace Traffic Signal – Operation Improvements**



### US 2

- **Highest Ranked: Replace Traffic Signal System, Operation and Geometric Improvements**
- **Feasible Alternatives: Roundabout and Eastbound Displaced Left Turn**



# Recommendations

## Intersection Control, Mobility, Safety and Pedestrian Crossings

### 10<sup>th</sup> Street NW

- Highest Ranked: Maintain Existing Access and Control
- Relocate Utilities on Southwest Corner



### 9<sup>th</sup> Street NW

- Highest Ranked: Maintain Existing Access and Control – Provide Lane Configuration Improvement





# Recommendations

## Intersection Control, Mobility, Safety and Pedestrian Crossings

### 9<sup>th</sup> Street to 17<sup>th</sup> Street

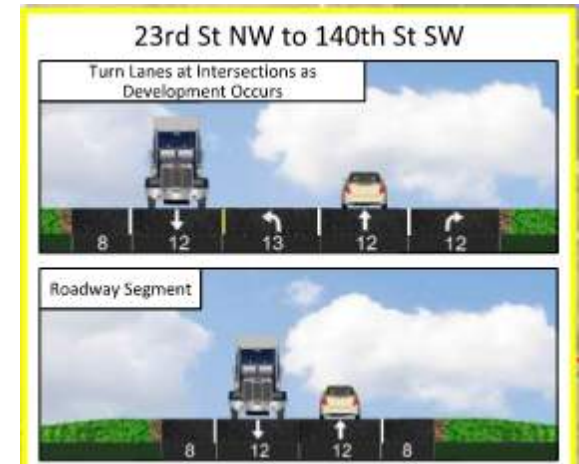
- Maintain Existing Cross-section – Same Traffic Lanes

### 17<sup>th</sup> Street to 23<sup>rd</sup> Street – Depends on Final Intersection Control

- Highest Ranked: 2-Lane Divided (W/Roundabouts at 17<sup>th</sup> and 23<sup>rd</sup>, Existing Lanes at 20<sup>th</sup> Street)
- Alternative: Extend 4-lane Segment to 20<sup>th</sup> Street NE (w/ signal at 17<sup>th</sup> Street), Maintain Existing Lanes Between 20<sup>th</sup> Street and 23<sup>rd</sup> Street

### 23<sup>rd</sup> Street to 140<sup>th</sup> Street SW

- Highest Ranked: Maintain 2-Lane Rural Road, Construct Left and Right Turn Lanes as Access and Development Occurs



# Implementation Plan Summary

## Phasing

- **Short Term – 0 to 5 years (2019-2024)**
- **Mid Term – 5 to 15 years (2025-2035)**
- **Long Term – More than 15 years (2036-2045)**

### Short Term (2019-2024)

- **Improve Pedestrian Crosswalk at 17<sup>th</sup> Street NW**
- 9<sup>th</sup> Street Lane Configuration Improvement
- US 2/Mn220 NE Corner – Establish Sidewalk Connection and Accessibility to Frontage Road
- Bus Stop Signing Improvements – 4 Locations (City)
- Relocate Utility Boxes – 10<sup>th</sup> Street NW
- **Total Cost: \$108,000**

### Near Term Improvements (2019-2024)

**Location 1: Mn 220 at 17th Street NW**

Improve pedestrian crosswalk with curb bump-outs, median island, crosswalk pavement markings, and signage.  
Total Cost: \$71,600

**Location 2: 10th St NE to 9th St NE**

Improve southbound lane configuration. Relocate southbound lane drop south of 9th St NE beyond curve, and provide separated southbound left turn lane at 9th St NE.  
Total Cost: \$25,300

**Location 3: Mn 220 at US 2**

Install sidewalk from northeast corner to Frontage road and ADA accessible connection.  
Total Cost: \$8,200

**Location 4: Mn 220 at 17th Street NE**

Provide bus stop signage for bus stop on northeast corner.  
Total Cost: \$700

**Location 5: Mn 220 at 14th Street NE**

Provide bus stop signage for bus stop on northeast corner.  
Total Cost: \$700

**Location 6: Mn 220 at 10th Street NE**

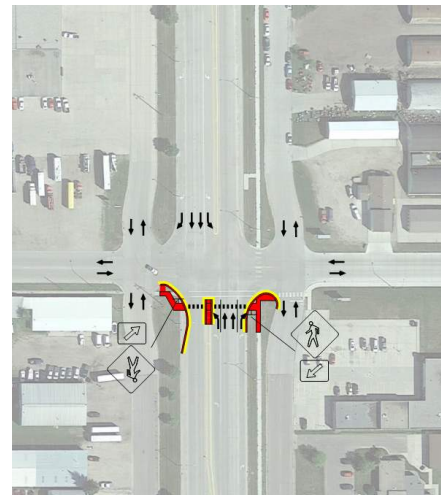
Provide bus stop signage for bus stop on southeast corner.  
Total Cost: \$700

**Location 7: Mn 220 at 10th Street NW**

Provide bus stop signage for bus stop on northwest corner.  
Total Cost: \$700

**Location 8: Mn 220 at US 2**

Relocate utilities to improve corner visibility.  
Total Cost: unknown, coordinate with utility owner.



# Implementation Plan Summary

## Mid-Term (2025-2035)

- Mn 220 at 14<sup>th</sup> Street NW – Traffic Signal Replacement and Improvements
- Mn 220 at US 2 – Traffic Signal Replacement and Geometric Improvements
- 20<sup>th</sup> Street – Establish Sidewalk Connections
- 15<sup>th</sup> Street NE – Establish Sidewalk Connection
- **Total Cost: \$6.7 Million**

## Other Improvements

- Non-Compliant Ramps (EGF ADA Transition Plan)
- 23<sup>rd</sup> Street to 140<sup>th</sup> Street Turn Lanes (As Development and Access Improvements Occur)



**Mid Term Improvements (2025-2034)**

**Location 12: Mn 220 at 14th Street NW**  
Replace traffic signal system (install Flashing Yellow Arrows, improve phasing, coordination, etc.) and delineate eastbound/westbound lane configuration.  
Total Cost: \$519,100

**Location 11: Mn 220 at US 2**  
Intersection control and geometric improvements.  
Total Cost: \$6,021,500

**Location 10: 23rd Street NW to 140th Street SW**  
Construct left and right turn lanes as applicable at public street access as land develops.  
Total Cost: TBD, construction scope and cost to be determined as part of development plan at future time.

**Location 9: Upgrade Non-Compliant Pedestrian Ramps**  
Upgrade non-compliant pedestrian ramps (33 ramps on Mn 220 N Corridor).  
Total Cost: ADA ramps are incorporated in full intersection improvements as applicable. Refer to the City of East Grand Forks ADA Transition plan for standalone pedestrian ramp upgrades.

**Location 8: 20th Street NW (both sides) from 5th Avenue NW to Mn 220**  
Install sidewalks.  
Total Cost: \$207,700

**Location 7: 15th Street NE (north side) from Mn 220 to East of Frontage Road**  
Install sidewalk.  
Total Cost: \$22,500

**Long Term Improvements (2035-2045+)**

**Location 15: Mn 220 at 23rd Street NW**  
Intersection control improvements.  
Total Cost: \$6,819,600

**Location 14: Mn 220 at 17th Street NW**  
Intersection control improvements.  
Total Cost: \$6,340,700

**Location 13: 17th Street NW to 23rd Street NW**  
Rehabilitate pavement, convert to two-lane divided highway.  
Total Cost: MnDOT maintenance and preservation.

**Location 12: US 2 to 17th Street NW**  
Rehabilitate pavement, maintain four-lane divided highway.  
Total Cost: MnDOT maintenance and preservation.

**Location 11: Mn 220 (east side) from 20th Street NE to 23rd Street NE**  
Install sidewalks.  
Total Cost: \$145,400

**Location 10: 10th Street NW (both sides) from Terrace Drive to Mn 220**  
Install sidewalks.  
Total Cost: \$84,300

**Location 9: 10th Street NW (both sides) from Mn 220 to 2nd Avenue NE**  
Install sidewalks.  
Total Cost: \$78,500

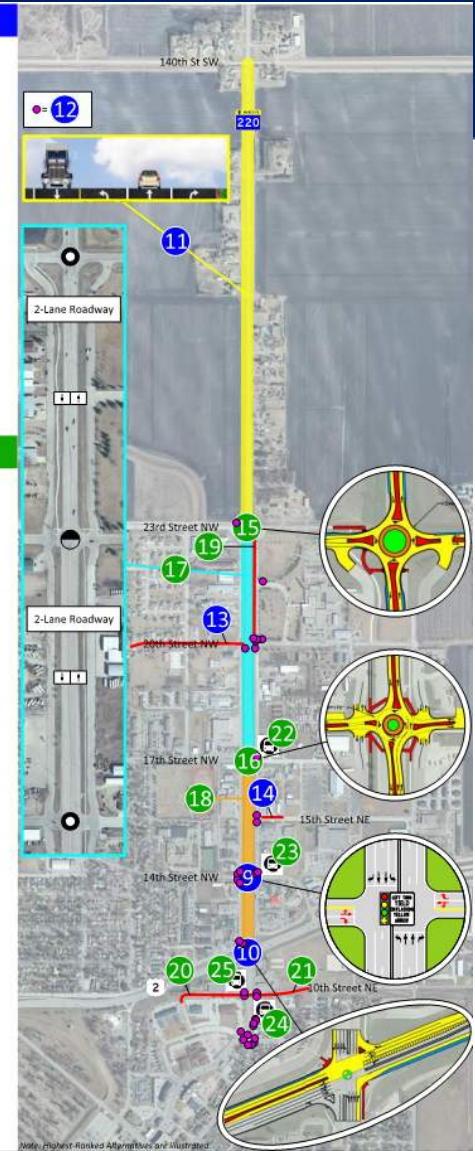
**Location 8: Mn 220 at 17th Street NE**  
Provide bus bench at bus stop on northeast corner.  
Total Cost: \$7,000

**Location 7: Mn 220 at 14th Street NE**  
Provide bus bench at bus stop on northeast corner.  
Total Cost: \$7,000

**Location 6: Mn 220 at 10th Street NE**  
Provide concrete pad, sidewalk access, and bus bench at bus stop on southeast corner.  
Total Cost: \$8,700

**Location 5: Mn 220 at 10th Street NW**  
Provide concrete pad, sidewalk access, and bus bench at bus stop on northwest corner.  
Total Cost: \$8,700

Note:  
Construction costs reflect the highest feasible alternative and are estimated year of expenditure (YOE) with an assumed 3% inflation rate. YOE is assumed to be mid-point of improvement range. Engineering, Administration, Utilities and Inspection are assumed to be 25% of the construction cost.



# Implementation Plan Summary

## Long Term (2036-2045+)

- Mn 220 at 23rd Street NW – Intersection Control Improvements
- Mn 220 at 17th Street NW – Intersection Control Improvements
- US 2 to 23rd Street NW Pavement Rehabilitation (MnDOT)
- 20th Street to 23rd Street – Establish Sidewalk (East Side)
- 10th Street NW/NE – Establish Sidewalks
- Bus Stops (4 Locations) – Provide Bus Bench, Establish Concrete Pad at 10th Street (Both Directions)
- **Total Cost: \$13.5 Million**

## Mid Term Improvements (2025-2034)

### Location 12: Mn 220 at 14th Street NW

Replace traffic signal system (install Flashing Yellow Arrows, improve phasing, coordination, etc.) and delineate eastbound/westbound lane configuration.  
Total Cost: \$519,100

### Location 16: Mn 220 at US 2

Intersection control and geometric improvements.  
Total Cost: \$6,021,500

### Location 11: 23rd Street NW to 140th Street SW

Construct left and right turn lanes as applicable at public street access as land develops.  
Total Cost: TBD, construction scope and cost to be determined as part of development plan at future time.

### Location 15: Upgrade Non-Compliant Pedestrian Ramps

Upgrade non-compliant pedestrian ramps (33 ramps on Mn 220 N Corridor).  
Total Cost: ADA ramps are incorporated in full intersection improvements as applicable. Refer to the City of East Grand Forks ADA Transition plan for standalone pedestrian ramp upgrades.

### Location 18: 20th Street NW (both sides) from 5th Avenue NW to Mn 220

Install sidewalks.  
Total Cost: \$207,700

### Location 13: 15th Street NE (north side) from Mn 220 to East of Frontage Road

Install sidewalk.  
Total Cost: \$22,500

## Long Term Improvements (2035-2045+)

### Location 14: Mn 220 at 23rd Street NW

Intersection control improvements.  
Total Cost: \$6,819,600

### Location 17: Mn 220 at 17th Street NW

Intersection control improvements.  
Total Cost: \$6,340,700

### Location 19: 17th Street NW to 23rd Street NW

Rehabilitate pavement, convert to two-lane divided highway.  
Total Cost: MnDOT maintenance and preservation.

### Location 2: US 2 to 17th Street NW

Rehabilitate pavement, maintain four-lane divided highway.  
Total Cost: MnDOT maintenance and preservation.

### Location 15: Mn 220 (east side) from 20th Street NE to 23rd Street NE

Install sidewalks.  
Total Cost: \$145,400

### Location 18: 10th Street NW (both sides) from Terrace Drive to Mn 220

Install sidewalks.  
Total Cost: \$84,300

### Location 10: 10th Street NW (both sides) from Mn 220 to 2nd Avenue NE

Install sidewalks.  
Total Cost: \$78,500

### Location 25: Mn 220 at 17th Street NE

Provide bus bench at bus stop on northeast corner.  
Total Cost: \$7,000

### Location 24: Mn 220 at 14th Street NE

Provide bus bench at bus stop on northeast corner.  
Total Cost: \$7,000

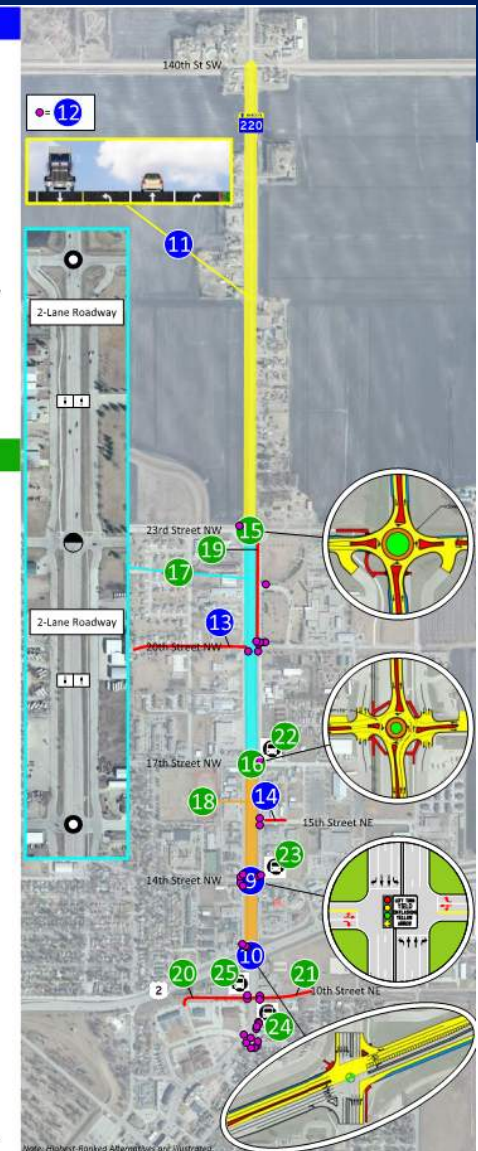
### Location 23: Mn 220 at 10th Street NE

Provide concrete pad, sidewalk access, and bus bench at bus stop on southeast corner.  
Total Cost: \$8,700

### Location 21: Mn 220 at 10th Street NW

Provide concrete pad, sidewalk access, and bus bench at bus stop on northwest corner.  
Total Cost: \$8,700

Note: Construction costs reflect the highest feasible alternative and are estimated year of expenditure (YOE) with an assumed 3% inflation rate. YOE is assumed to be mid-point of improvement range. Engineering, Administration, Utilities and Inspection are assumed to be 25% of the construction cost.



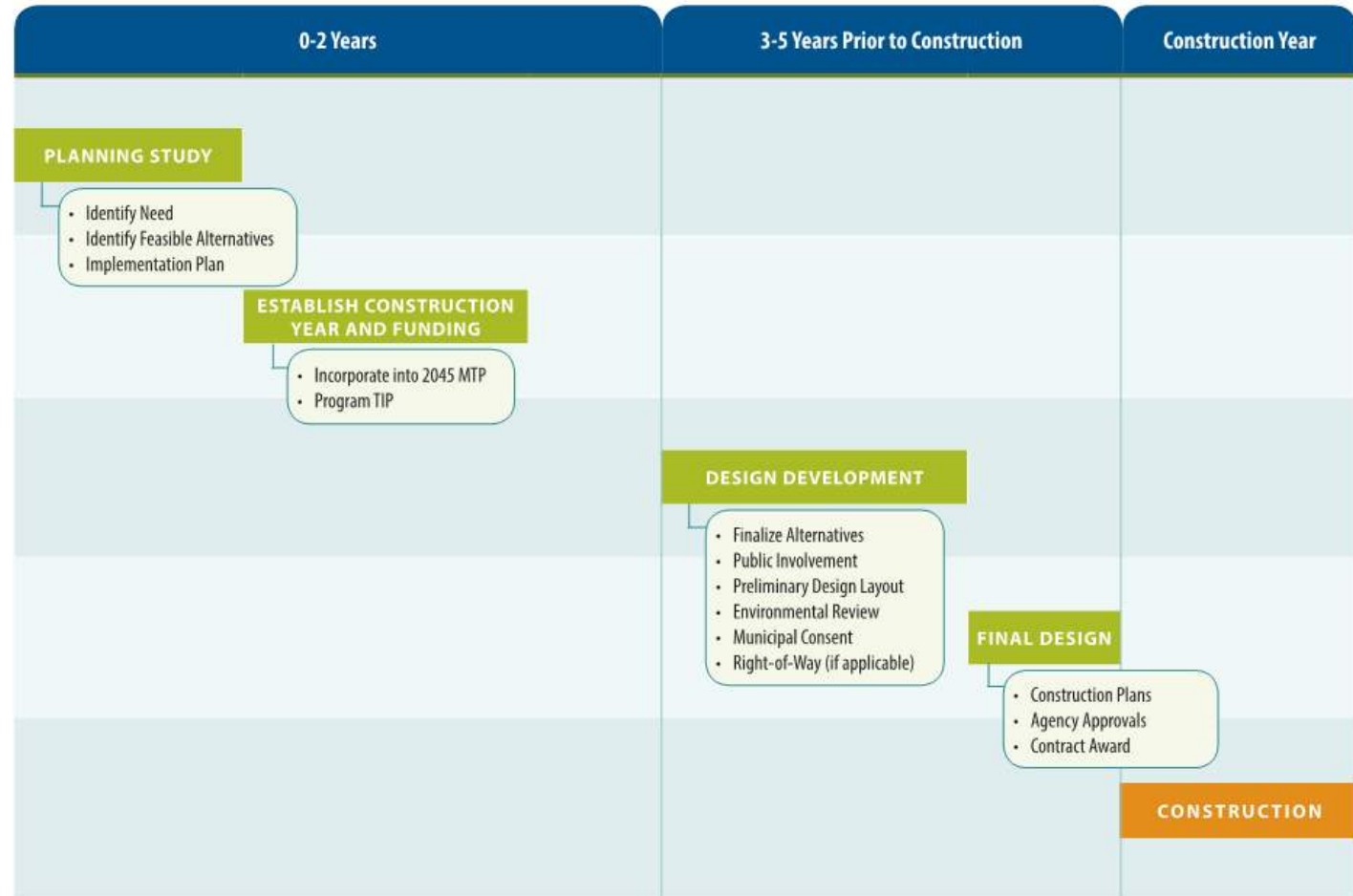
# Project Development Process

## 3 Primary Future Projects

- US 2 at Mn 220 – Traffic Signal Replacement/Geometric Improvements
- Mn 220 at 17<sup>th</sup> Street – Intersection Control Improvement
- Mn 220 at 23<sup>rd</sup> Street – Intersection Control Improvement

## Project Development Process (High Level)

- Planning Study
- Establish Construction Year and Funding
- Design Development
- Final Design
- Construction



# Roundabout Design Discussion

## **Roundabouts on Mn 220**

- Balances Needs of All Users
- Highest Ranked Alternatives at 17<sup>th</sup> Street and 23<sup>rd</sup> Street – Why?
  - Specifically Reduces Right Angle and Crash Severity (47% at 23<sup>rd</sup> and 55% at 17<sup>th</sup> Street) – Addresses Key Concern
  - Improves Left Turn Access (Lower Delay and Safer) – Addresses Key Concern
  - Provides Vehicle Speed Control without Compromising Mobility Capacity – Addresses Key Concern
  - Especially Efficient During Off Peak Hours (22 Other Hours of Day)
  - Allows for Reduced Pavement Area (Increased Frontage Road Space and Boulevard)
  - Pedestrian Crossing Improvement (Reduced Exposure, Shorter Distance, One Direction at a Time) – Addresses Key Concern

## **Key Issue and Concern**

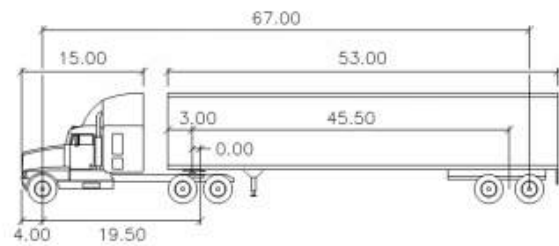
- Trucks
- Agricultural Vehicles
- Access/Circulation
- Truck Travel Time



# Roundabout Design Discussion

## Trucks

- 8-10% of the Traffic (All Trucks During Peak Harvest Season)
- Beet Trucks – Size Does Not Control Geometric Design
- Design Vehicle – WB67 (Standard Trunk Highway Design) – All Movements



WB-67

feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 75.0
Trailer Track	: 8.50		

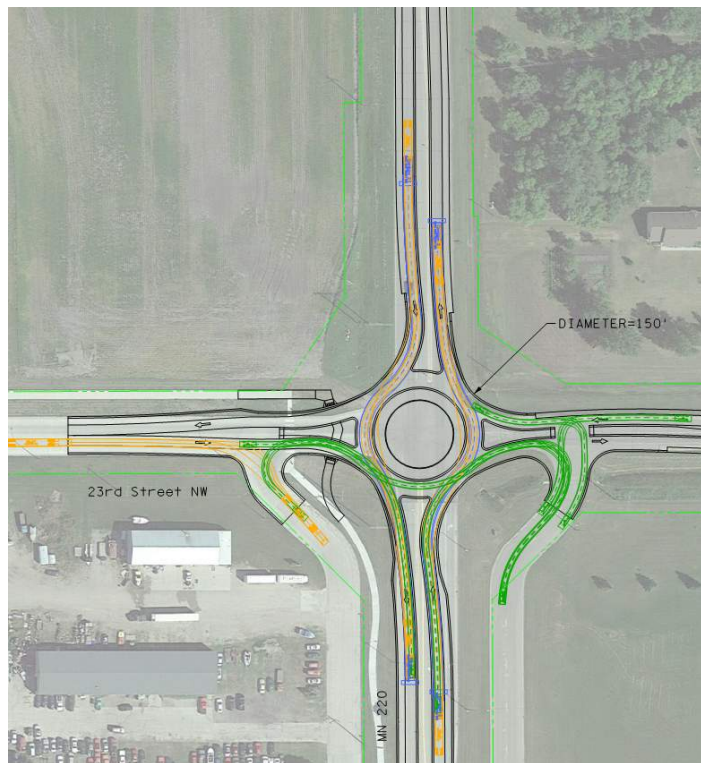
Source: AASHTO

- Video File

# Roundabout Design Discussion

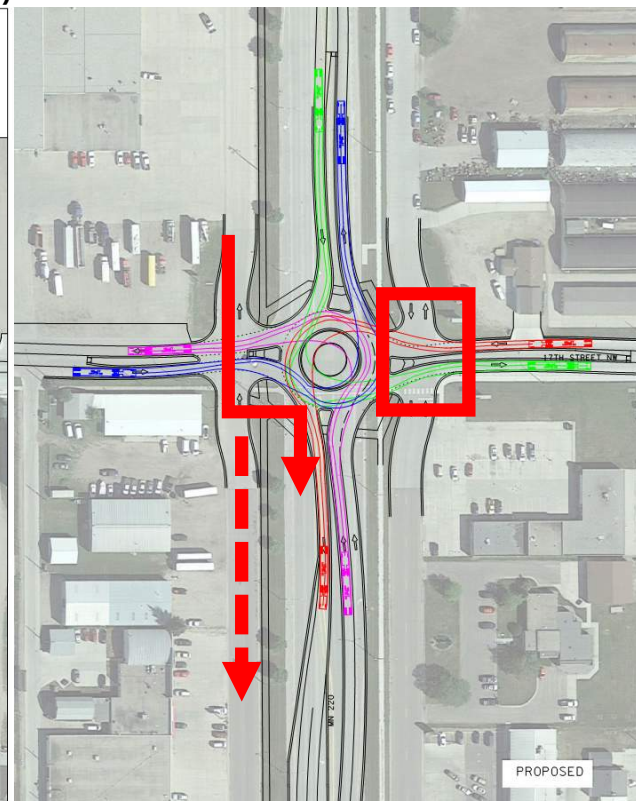
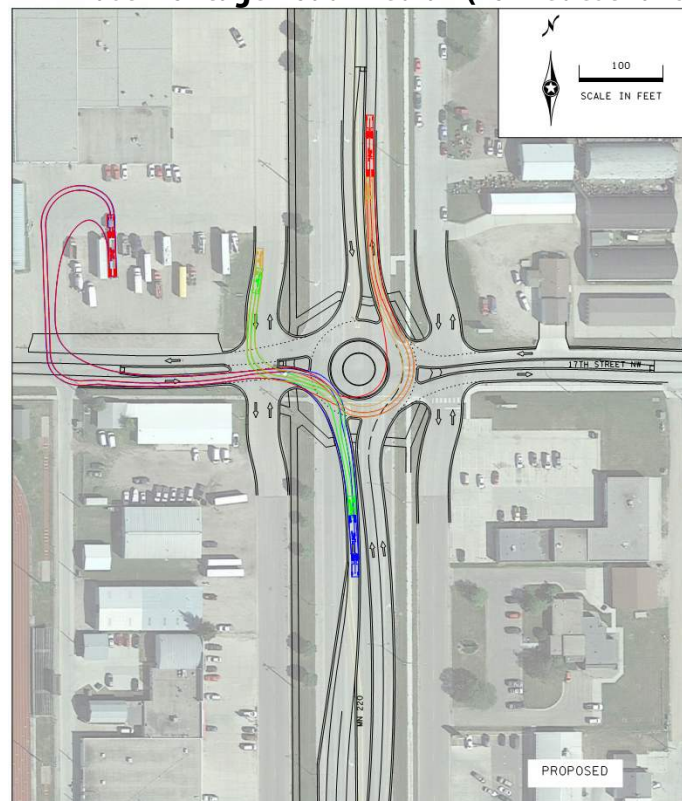
## 23rd Street NW

- Facilitates All Truck Movements



## 17th Street NW

- Facilitates All Truck Movements but 1
- East Frontage Road Median (For Pedestrians)





# Roundabout Design Discussion

## **Agricultural Equipment**

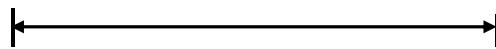
- Variable Equipment Expected – Final Design Consideration
  - Not Uncommon Design Issue
    - 200 Roundabouts on Trunk Highway System
    - Approximately 5-10% are Rural
    - Rural/Urbanizing Examples – Thief River Falls, Hutchinson, Farmington
  - Combine
  - 120' Planter Implement – Largest Available (Folds to 15-18' Wide and 62' Long in Transport) – Likely Controls Design
- 
- Video File



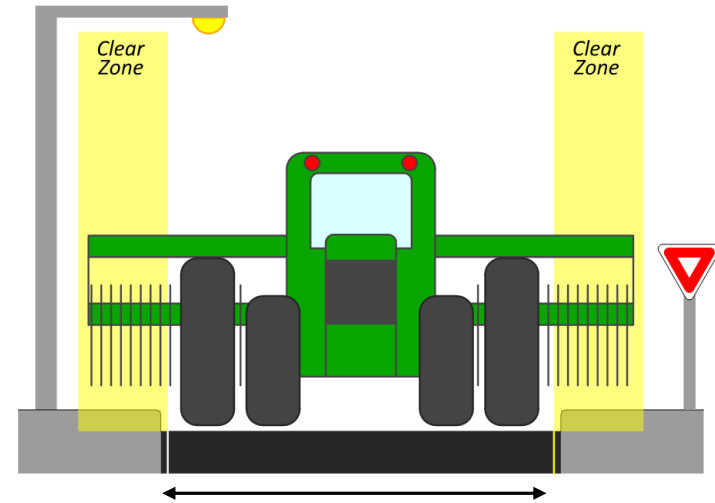
# Roundabout Design Discussion

## Truck and Ag Vehicle Final Design Refinements – During Design Development

- Curb to Curb Widths
- Vertical Clear Zones



Current Mn 220:  
8' SHLD + 12'  
Lane= 20' Travel

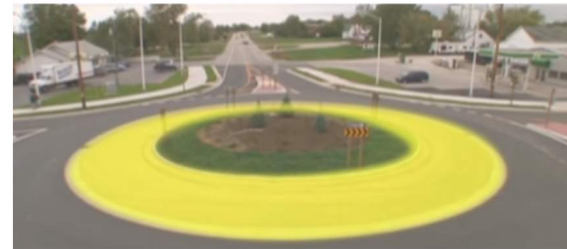


**Variable Width Lane**

# Roundabout Design Discussion

## Truck and Ag Vehicle Final Design Refinements – During Design Development

- Raised Central Island Diameter
- Truck Apron Diameter
- Entry Angles
- Curb Radii
- Final Footprint – Diameter/Location
- Surmountable Aprons on Corners (if necessary)
- Alternative Access / Circulation (17<sup>th</sup> Street NW)



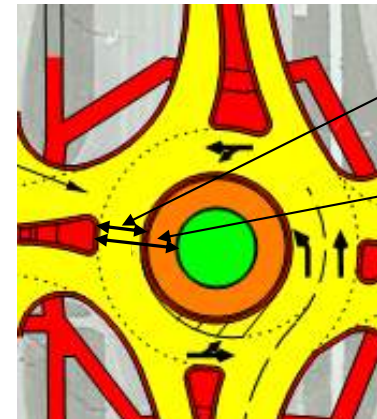
Modern Roundabouts | A Safer Choice



### Variable Width Apron



Current Mn 220:  
10' SHLD + 12'  
Lane + 14' Lane  
= 36' Total Travel



25' Circulating Lane  
40' Lane +  
Truck Apron

Questions / Discussion

# Questions / Discussion