



Image credit: European Transport Safety Council

A Safe System Approach: How Complete Streets Create A Safe System

Sonja Piper | Active Transportation Safety Engineer

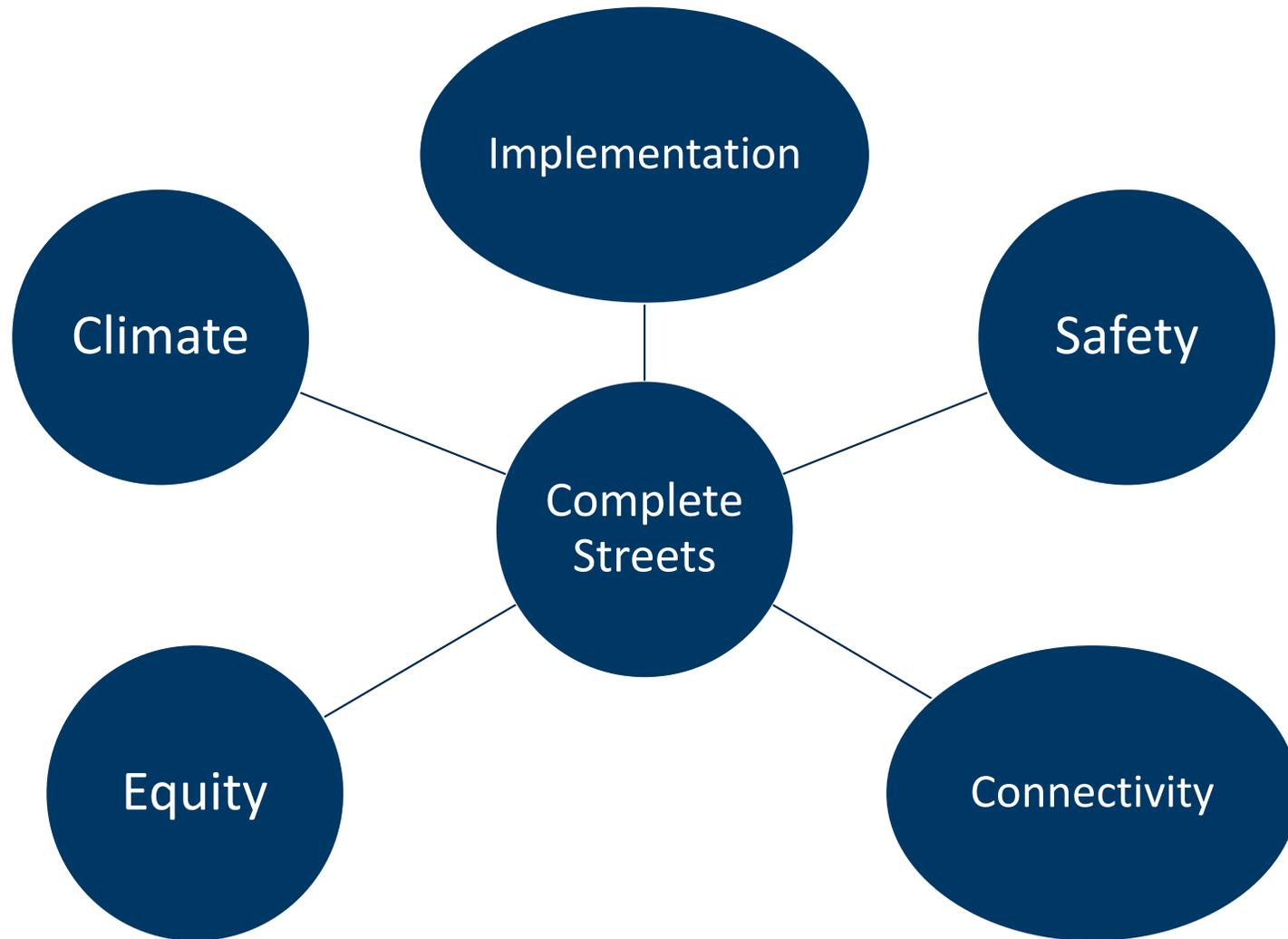
Presentation Overview

- Relation of Complete Streets to the Safe System Approach
- Applying a Complete Street & Safe System IRL
- Design for the Results We Want

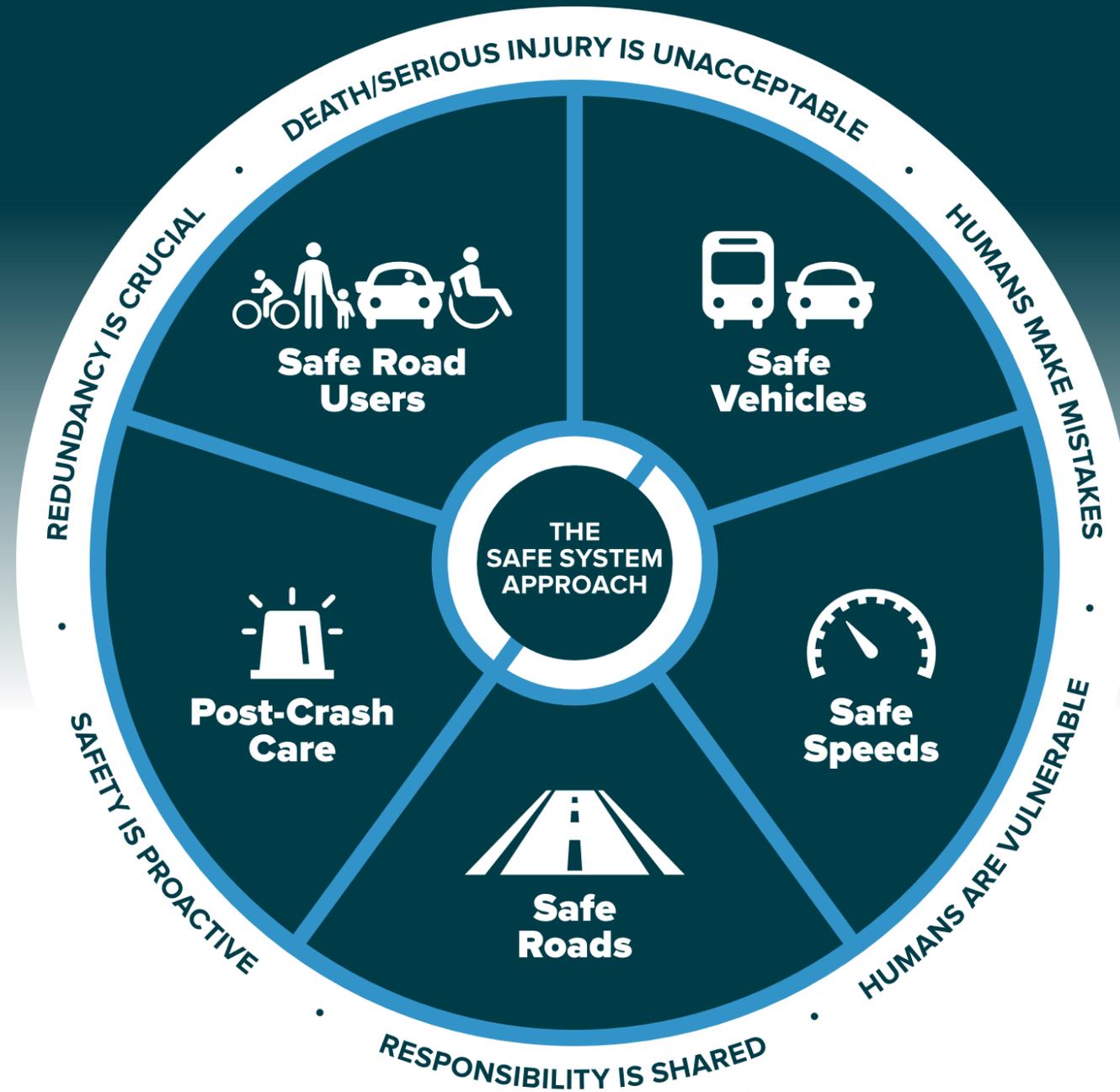


Photo source: Toole Design Group

Complete Street Strategy Summary



THE SAFE SYSTEM APPROACH



The Safe System approach aims to eliminate fatal and serious injuries for all road users by:



Accommodating human mistakes



Keeping impacts on the human body at tolerable levels

Where are You on the Safe System Journey?

Traditional approach

Prevent crashes



Improve human behavior



Control speeding



Individuals are responsible



React based on crash history



Safe System approach

Prevent death and serious injuries

Design for human mistakes/limitations

Reduce system kinetic energy

Share responsibility

Proactively identify and address risks

Complete Streets & Safe System

- Complete Streets is an implementation strategy of the Safe System Approach
- Complete Streets addresses 2 of the 5 elements of a Safe System
 - Safe Speeds
 - Safe Roads

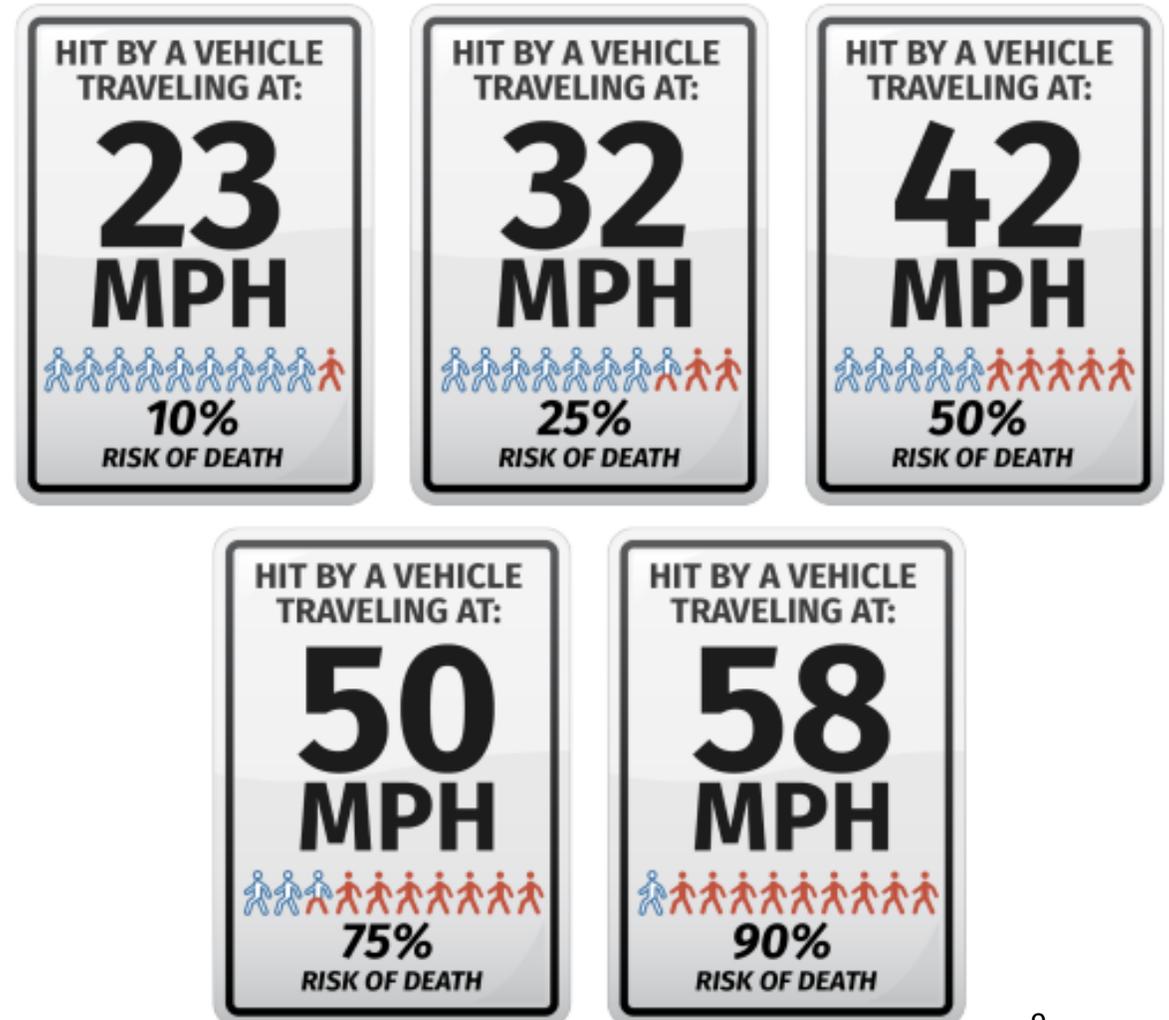


- Separate people in space and time
- If not possible to separate, then try to manage kinetic energy
- Increase visibility and awareness
- Creating predictable behaviors



Safe Speeds

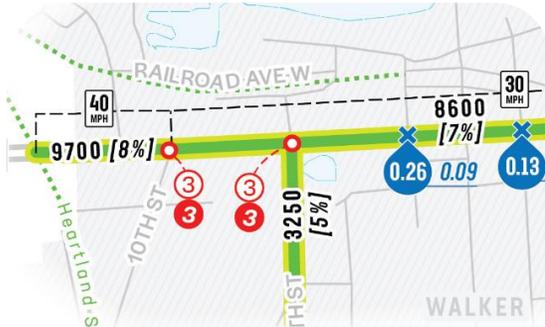
- Keep impacts on the human body at tolerable levels
- Design streets for desired speed
- Prioritize lower speeds when people walking/biking are mixing with drivers





Applying Complete Streets & Safe System IRL

Active Transportation Project Scoping



Collect Background Information

- Discuss with District Staff
- Traffic and Safety Data
- Past Plans and Studies
- Equity Data



Listen

- Field Walk
- Drone Walk
- Other Stakeholders



Develop Recommendations

- Comprehensive View
- Mode of Travel Similar to Vehicles
- Provide Report to Project Manager

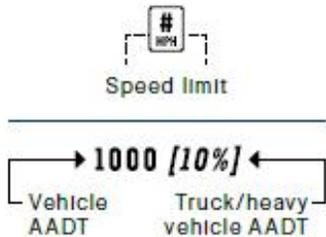
Example Project

- TH 65 through Mora
- Planned as FY 2030 Urban Reconstruction

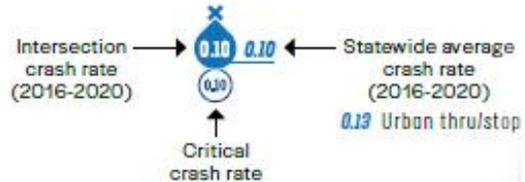
*** Disclaimer: The project and recommendations we discuss may not be part of the final project and is for discussion purposes only ***

EXISTING DATA

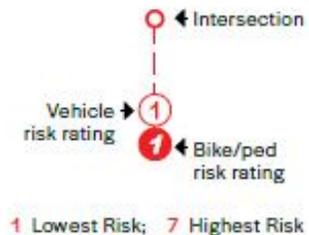
SPEED and AADT INFORMATION



INTERSECTION CRASH RATE AT OR ABOVE STATEWIDE AVERAGE



INTERSECTION CRASH RISK RATING



10/17/2022



mndot.gov

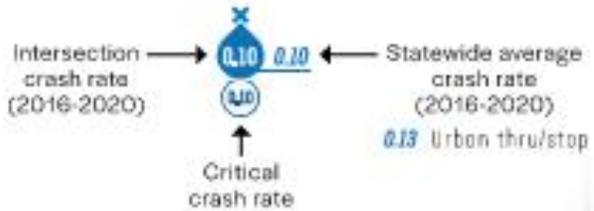
- High Crash Rate (blue) shows existing issue
- High Risk Rating (red) shows potential issue
- Traffic volumes
- Speed limits

EXISTING DATA

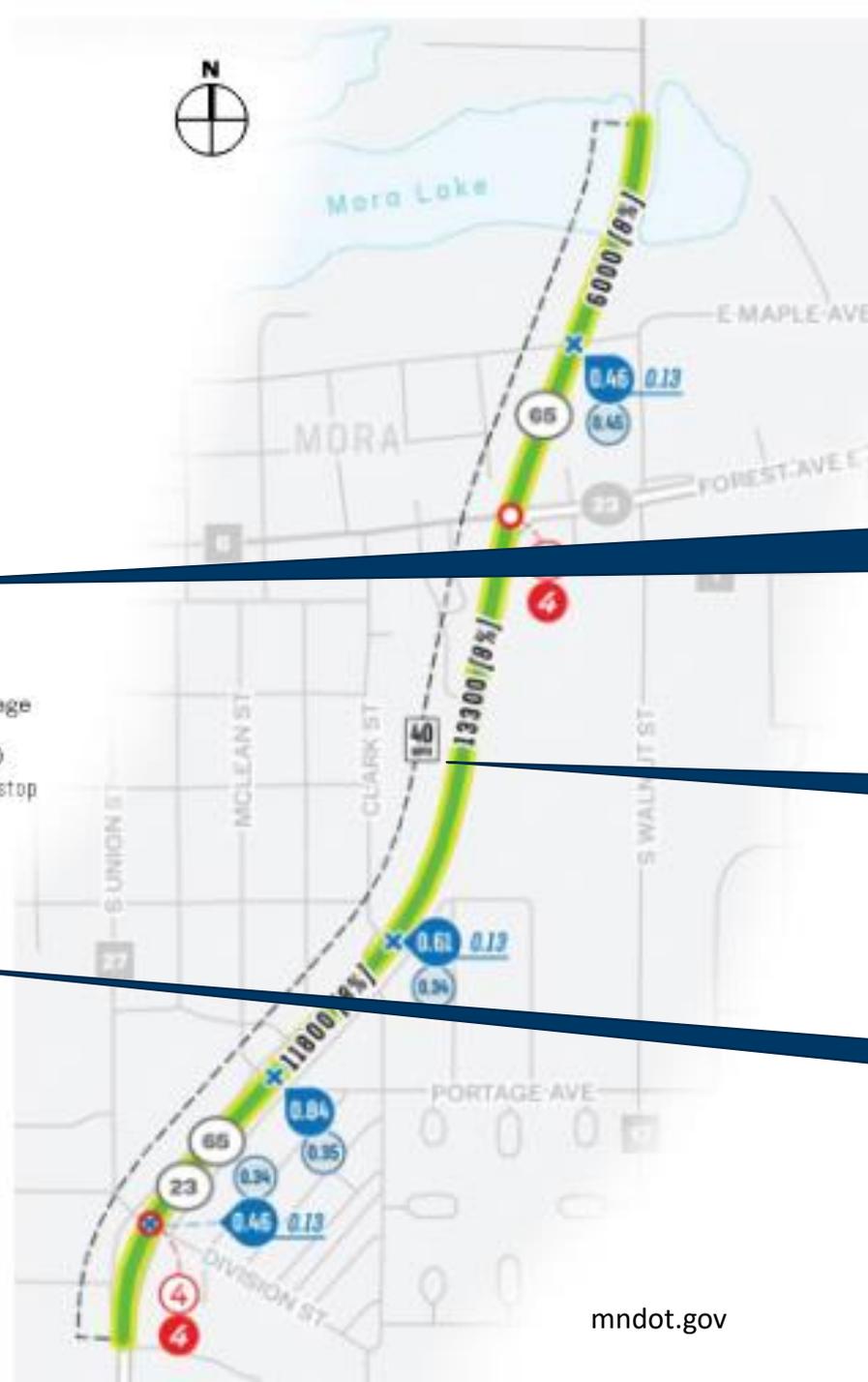
SPEED and AADT INFORMATION



INTERSECTION CRASH RATE AT OR ABOVE STATEWIDE AVERAGE



INTERSECTION CRASH RISK RATING



Background Information in SSA Concepts

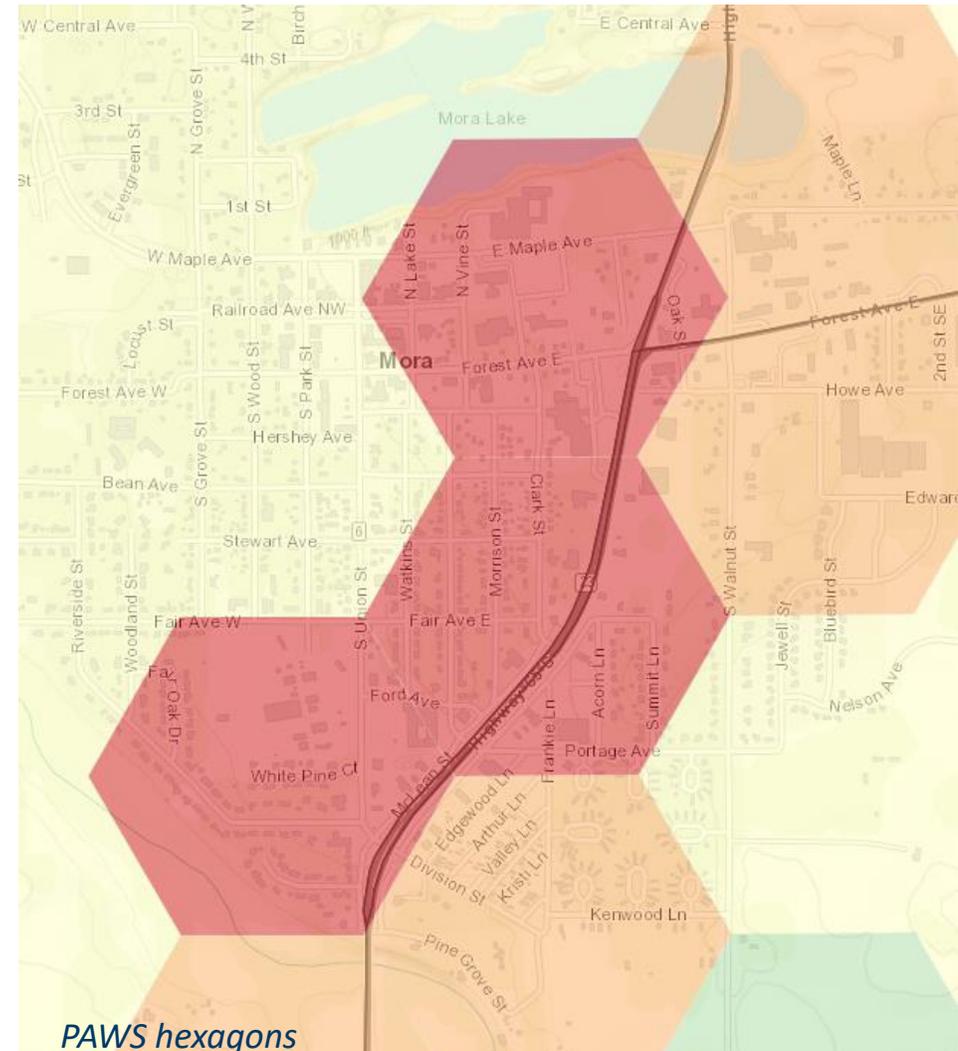
- Prevent death and serious injury
- Design for human mistakes/ limitations

- Reduce system kinetic energy

- Proactively identify and address risks

Who's Using the Roadway?

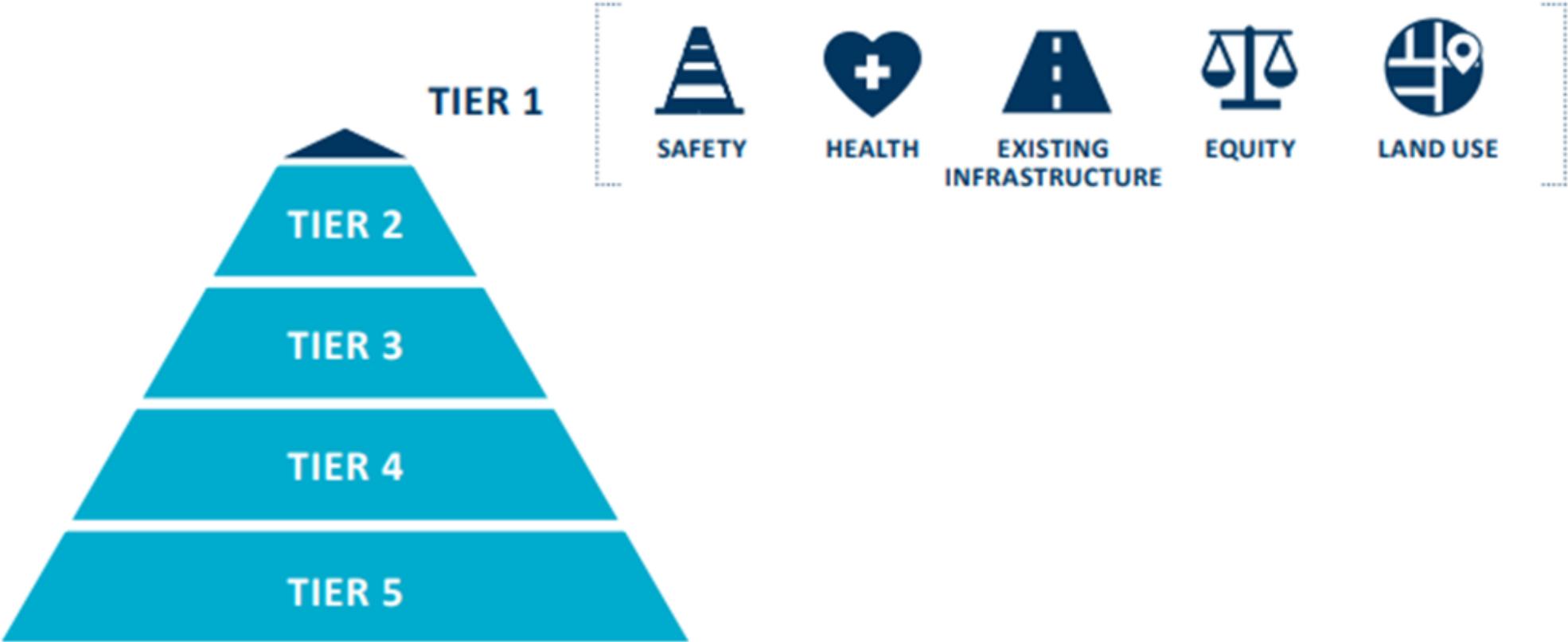
- SPACE score 65
- PAWS Tiers 1 & 2
- Bike Plan Tiers 1 & 2, identified as State Highway Bicycle Investment Route



SPACE & PAWS

Priority Populations	Percent of population AGE 5-17 > average	Percent of workers COMMUTING 15 MIN or less > average	Latent Demand
	Percent of population AGE 65+ > average	Percent of workers COMMUTING BY TRANSIT > 0%	
	Percent of population FOREIGN BORN > average	Percent of workers COMMUTING BY WALKING > 0%	
	Percent of population NATIVE AMERICAN > average	Percent of workers COMMUTING BY BICYCLE > 0%	
	Percent of population with DISABILITY > average	Percent of workers with NO ACCESS TO A VEHICLE > 0%	
E.J.	"Area of concern" by MPCA ENVIRONMENTAL JUSTICE	≥ 25% population within half-mile of SUPERMARKET	Trip Generators
	UNEMPLOYMENT rate ≥ average	Within 1-mile of K-12 SCHOOL	
	Percent of population in POVERTY IN URBAN area ≥ 25%	Within 500 feet of BUS STOP	
Risk	HIGH RISK trunk highway intersection for non-motorists	Within an URBAN area	
	<i>19 factors</i>		
		Contains a state BICYCLE TRAIL	

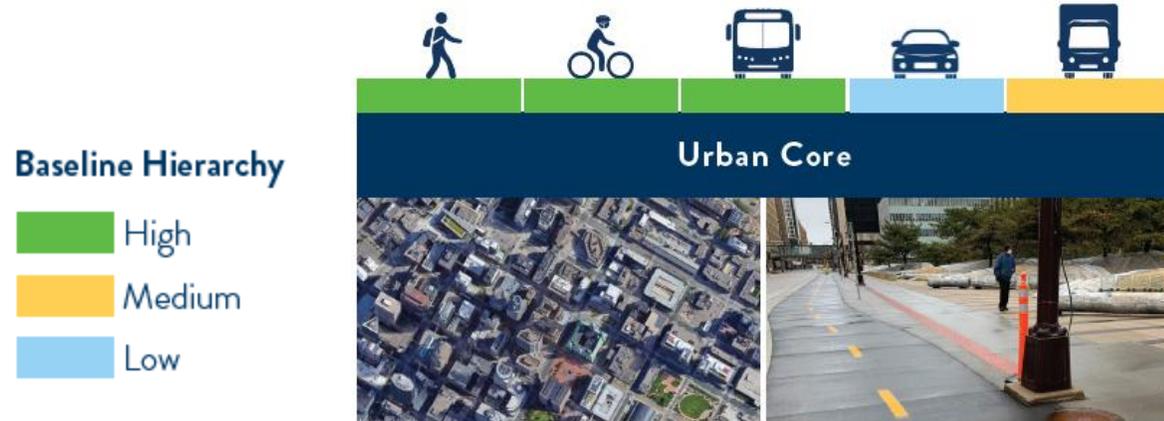
Suitability for Pedestrian and Cyclist Environment



Priority Areas for Walking

Roadway Context & Hierarchy

- Identify land-use characteristic
 - 9 context categories
- Leverage Hierarchy Tool
 - Assigns high, medium, low scale for all transportation user group per context



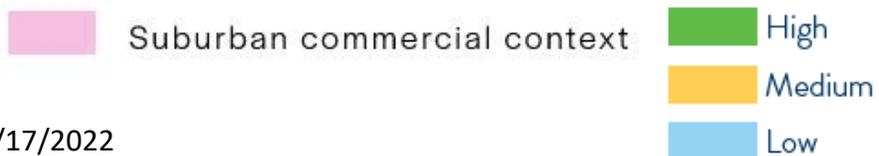
10/17/2022



Project Specific Modal Hierarchy

- Complete Streets Process establishes a hierarchy of users:

BASELINE and SUGGESTED HIERARCHY
for THIS CORRIDOR

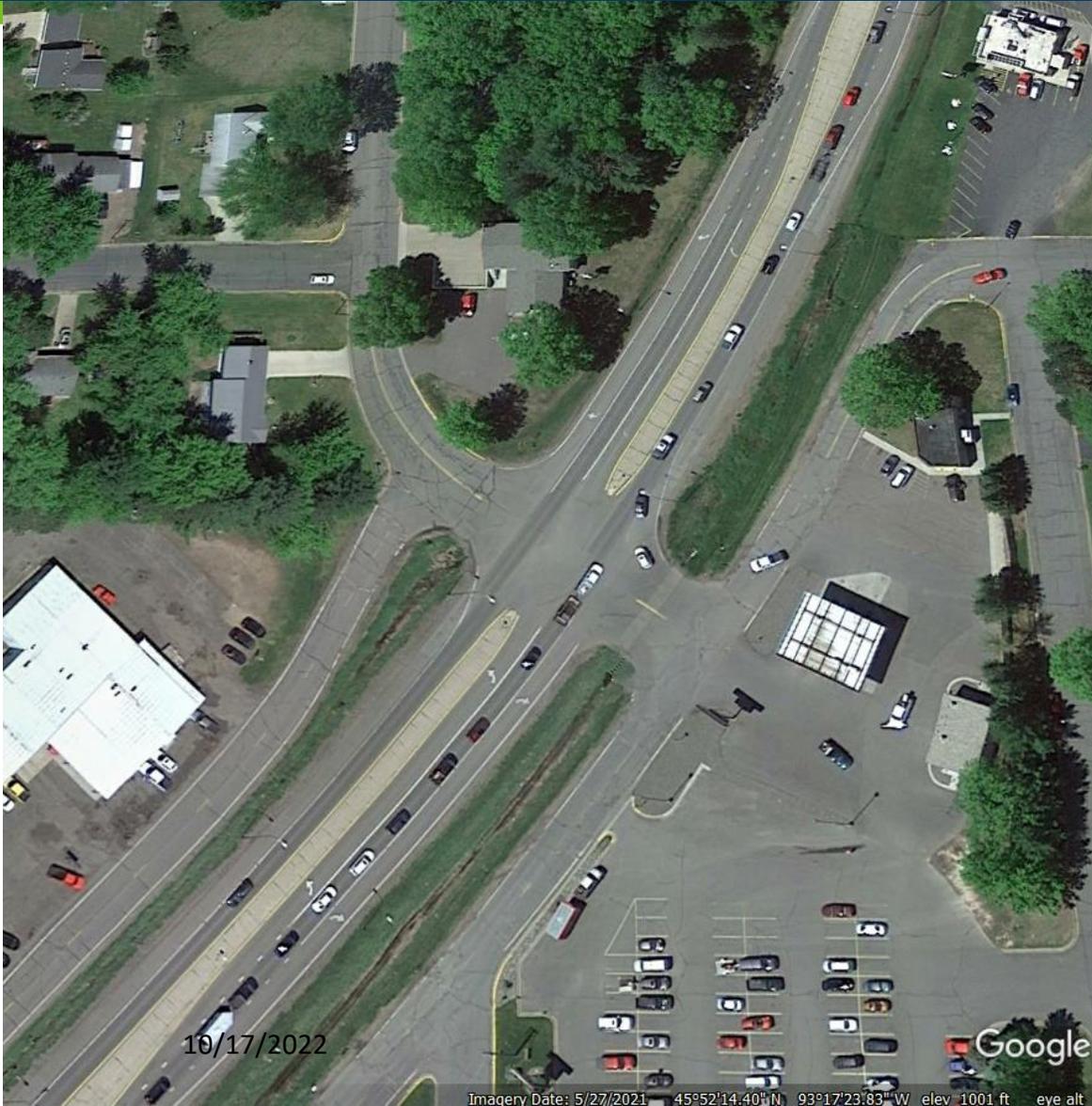


Mora: Site Observation and Virtual Discussion

- The highway is a barrier
- Speeding is a concern
- Difficulty crossing the highway
- There are people walking and biking in shoulder
 - Footprints observed in gravel shoulder
- Marked crossing is not very visible and does not feel safe



What's Missing on the Corridor



- Many AT origins/destinations
- 40 mph posted speed
- No walking/biking facilities
- Wide, high-speed turning radii



Design for the Results We Want

**** Disclaimer: The project and recommendations we discuss may not be part of the final project and are for discussion purposes only ****

User Priorities

- Based on the hierarchy, apply SSA concepts
- What can we do to...



Prevent death and serious injuries?

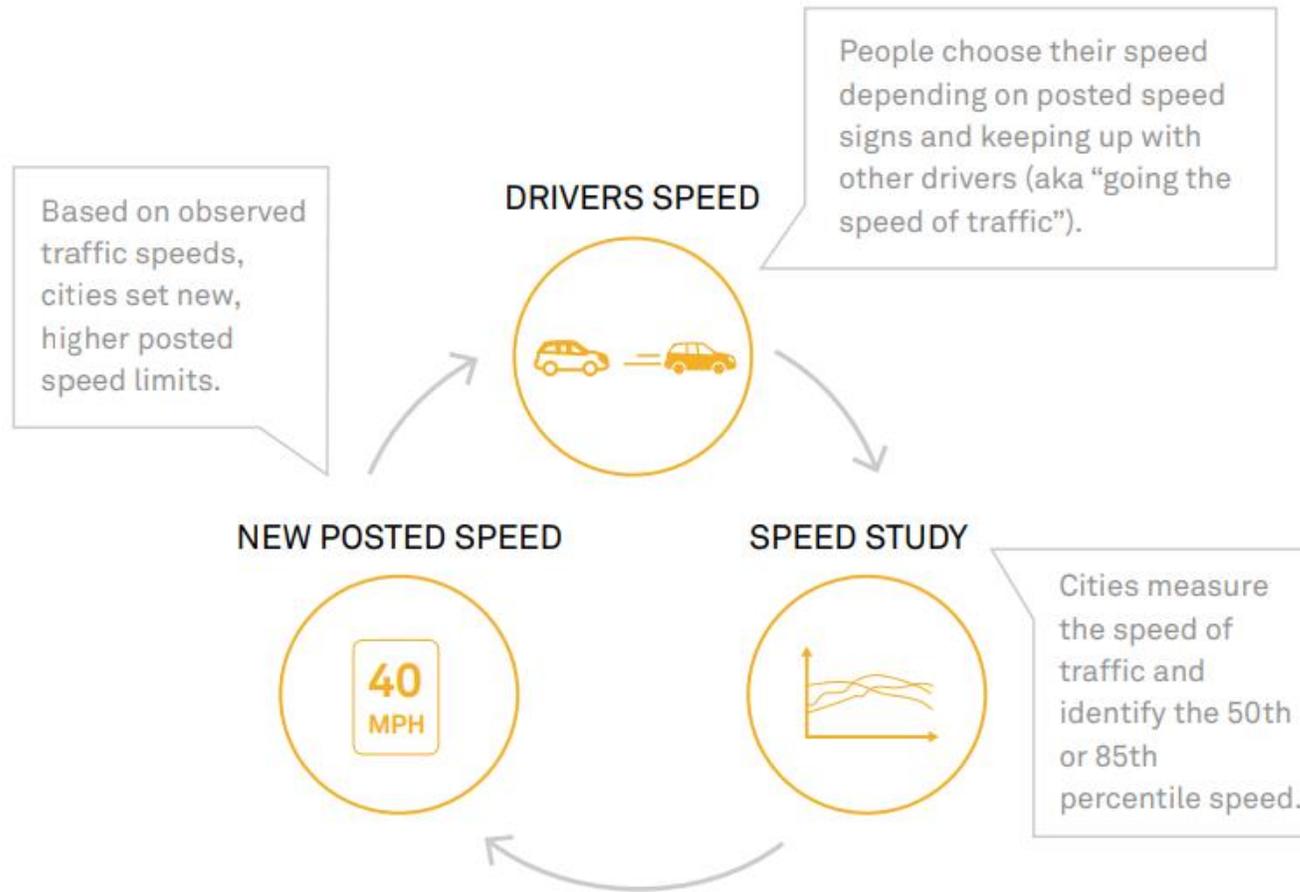
Design for human mistakes/limitations?

Reduce system kinetic energy?

Share responsibility?

Proactively identify and address risks?

Speeds: Current Practice



- Design speed is higher than posted speed,
- Drivers drive faster, and
- Speed limit increases

Recommended Practice: Conduct a Safe Speed Study

- Collect Before Data
- Analyze Existing Conditions
 - Conflict Density
 - Activity Level
- Determine Best Option for speed Management
- Conduct an Evaluation



Self-Enforcing Roadway

- Self-enforcing roadways focus on managing driving speeds through design.
- Drivers use clues from roadway design and environment to choose their driving speed.
 - “Friction” from narrow lanes or curb extensions
 - Horizontal deflection
 - Vertical deflection
 - Reduced turning radii
- Use the design to achieve “Safe Speeds”

Colorado Self-Enforcing Roadway

Golden, CO

Big box retail corridor

- Add green for aesthetics, to attract customers and investment
- Eliminate median gaps
 - Eliminates left-turns
 - Eliminates left-turn conflicts



Project Takeaways

- Reduced speeding
- Improved safety for vehicles, pedestrians, bicyclists
- Improved public spaces and positive impact on businesses

Image credit: Slide from NHI Modern Roundabout: Intersections Designed for Safety, 9/16/2021. Sam Swartz Engineering

Mora Recommendations

- Determine a safe speed and design for it
- Change the roadway cross section
- Add bicycle and pedestrian facilities
- Add roundabout intersection control
- Provide connections to businesses and across the river
- Enhance crossing locations

Mora Recommendations



LEGEND - Segments

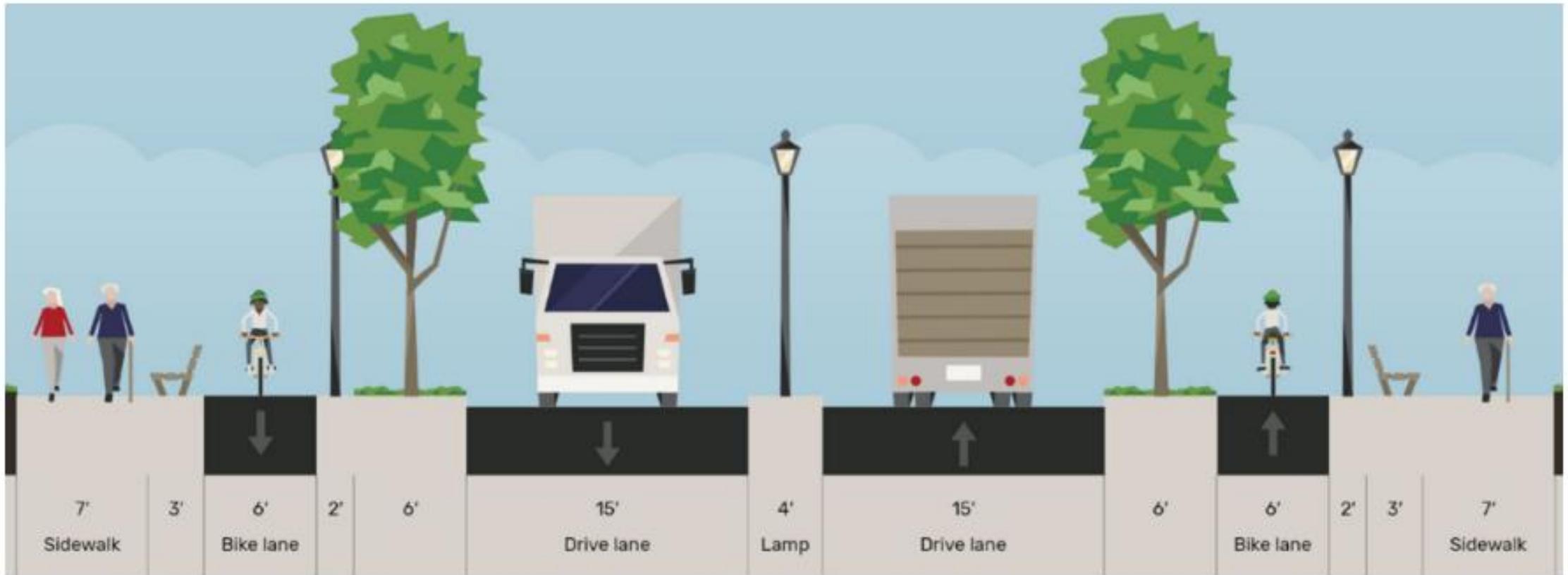
- A**  Roadway reconfiguration along a segment
- A**  Separated active transportation facilities
-  Existing shared-use path

LEGEND - Intersections and Crossings

- B**  Mini or urban compact roundabout
- C**  Enhanced crossing

Mora Recommendations

Concept A-1: S Union Street/Divions Street to E Maple Avenue



Going beyond the roadway



Trees provide shade for VRUs, among other benefits.

Bioswales provide storm water management.

A chicane provides traffic calming on this bicycle boulevard in addition to the traffic calming affects of the landscaping.



Summary

“...it has always been our job to make streets “complete”...Each time we use the excuse “we don’t have enough budget or staff” (rather than strategically making decisions about our community needs), we are contributing to incomplete streets. We will never have enough funding. Obtaining public support for the investment and the accountability needed a name, which is why we have Complete Streets. Achieving these types of roads in our communities can’t fall victim to scarcity-based decision making.”

Ransford S. McCourt, Past ITE International President, November 2020 issue of ITE Journal

“You cannot have a safe system if you do not provide safe mobility for pedestrians, bicyclists, and motorcyclists.”

Wes Kumfer, Collaborative Sciences Center for Road Safety, Nov 4, 2020

Thank You!

Sonja Piper

sonja.piper@state.mn.us

651-234-7376