

Pedestrians and Bicyclists

Engineering Considerations

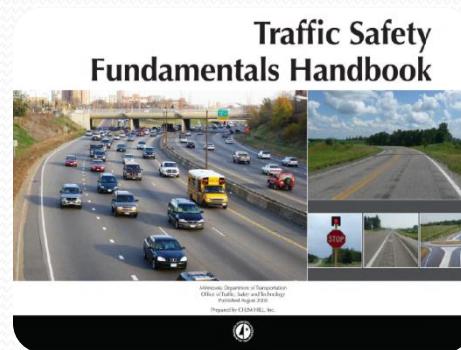
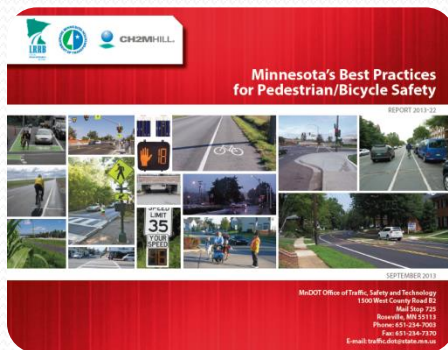
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Northeast Minnesota TZD Workshop
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Overview

- Pedestrian and bicyclist data overview
- Discussion of safety strategies
 - Curb bump out
 - Bike boxes
 - Green bicycle lanes
 - Accessible pedestrian signals (APS)
 - Countdown pedestrian indications
 - Leading pedestrian interval
- Speed Limits and Traffic Calming Strategies

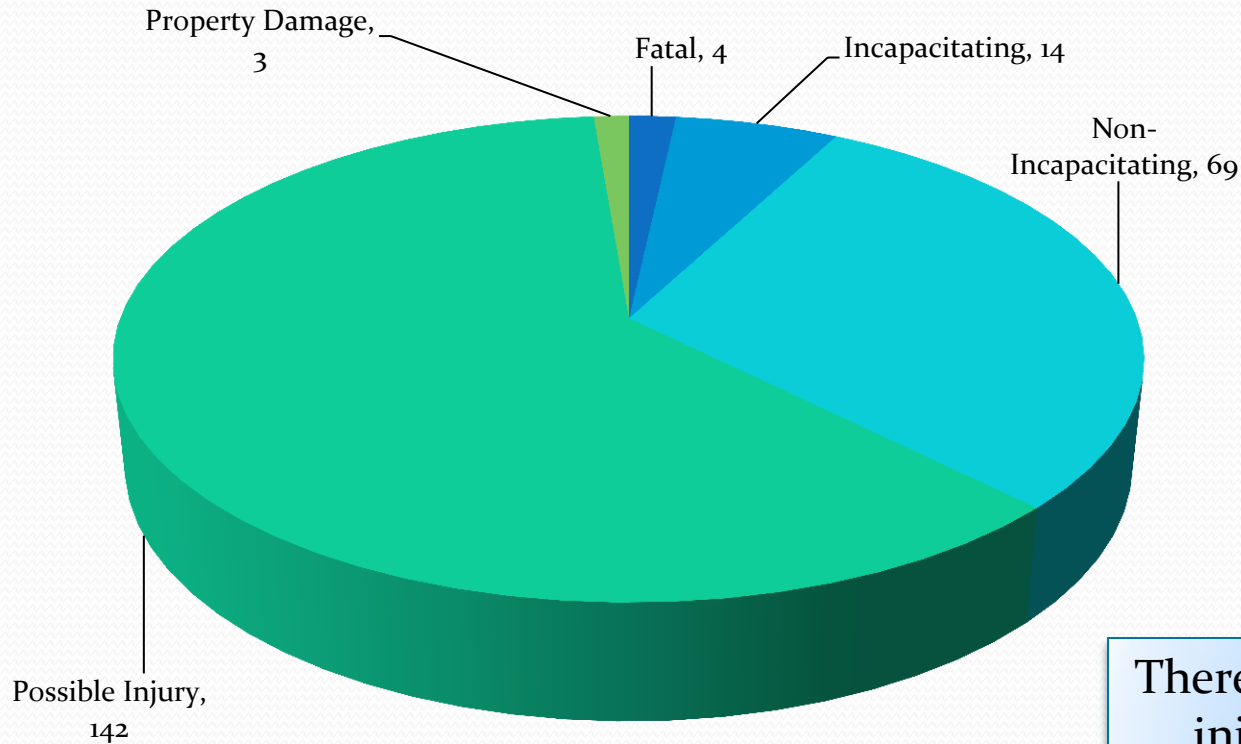
Traffic Engineering Resources

- MnDOT State Aid
- www.dot.state.mn.us/stateaid/trafficsafety.html
 - “Best Practices for Pedestrian/Bicycle Safety”
 - “Traffic Safety Fundamental Handbook”
 - “Minnesota’s Best Practices for Traffic Sign Maintenance/Management Handbook”
- FHWA Safety
 - <http://safety.fhwa.dot.gov>



All Pedestrian/Bicyclist Crashes by Severity

Five Year Period of 2009-2013, All Roads
Duluth, Hermantown and Proctor



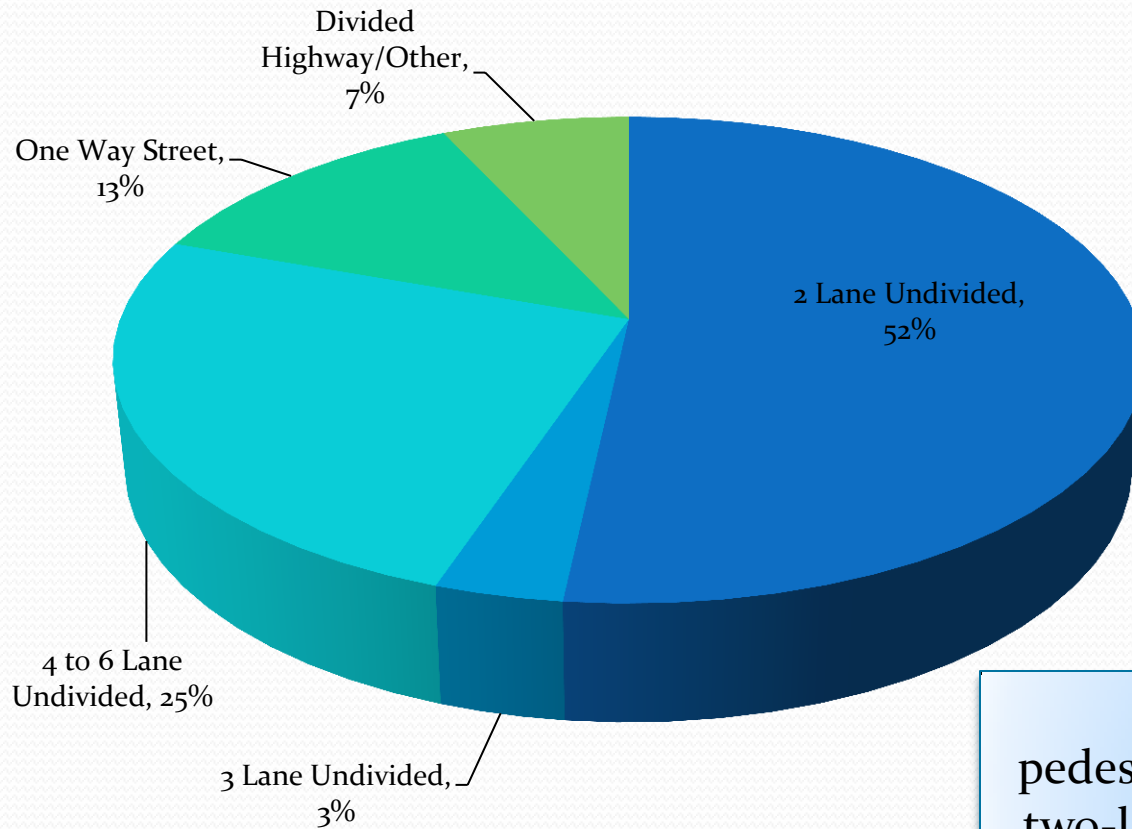
There were 18 fatal and major injury crashes involving pedestrians/bicyclists.

All Serious Pedestrian/Bicyclist Crashes by Road Type*

Five Year Period of 2009-2013, All Roads

Duluth, Hermantown and Proctor

*Serious defined as Fatal, Major Injury or Minor Injury



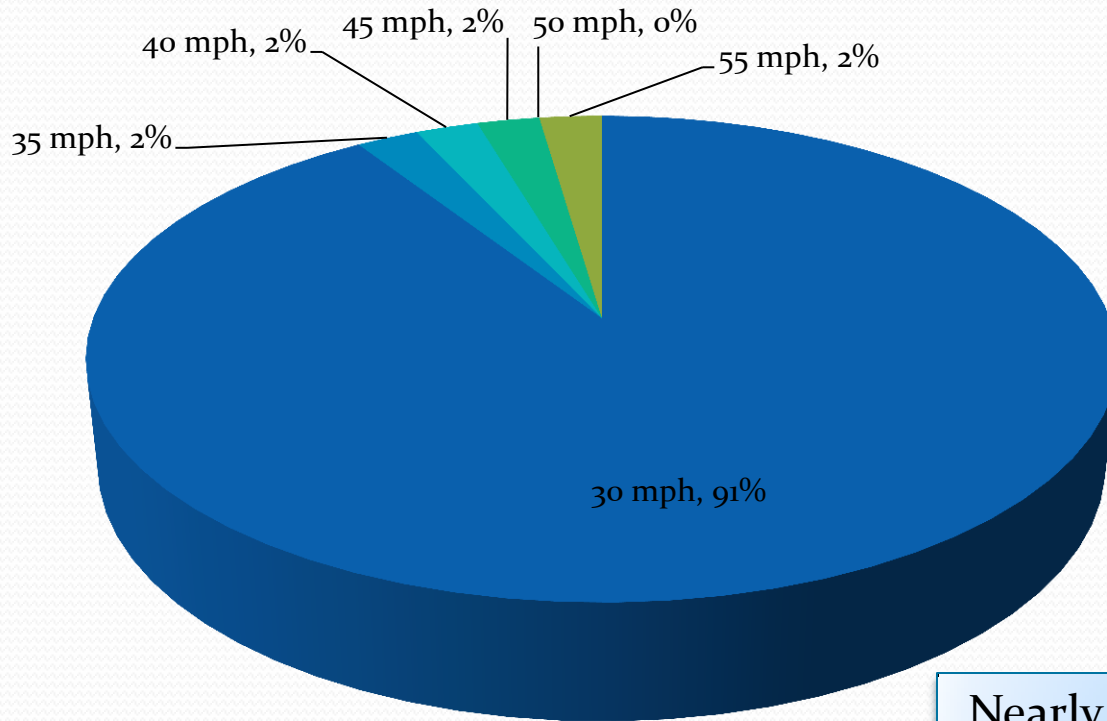
Just over half of serious pedestrian/bicyclist crashes occur on two-lane, two-way, undivided roads.

All Serious Pedestrian/Bicyclist Crashes by Speed Limit*

Five Year Period of 2009-2013, All Roads

Duluth, Hermantown and Proctor

*Serious defined as Fatal, Major Injury or Minor Injury

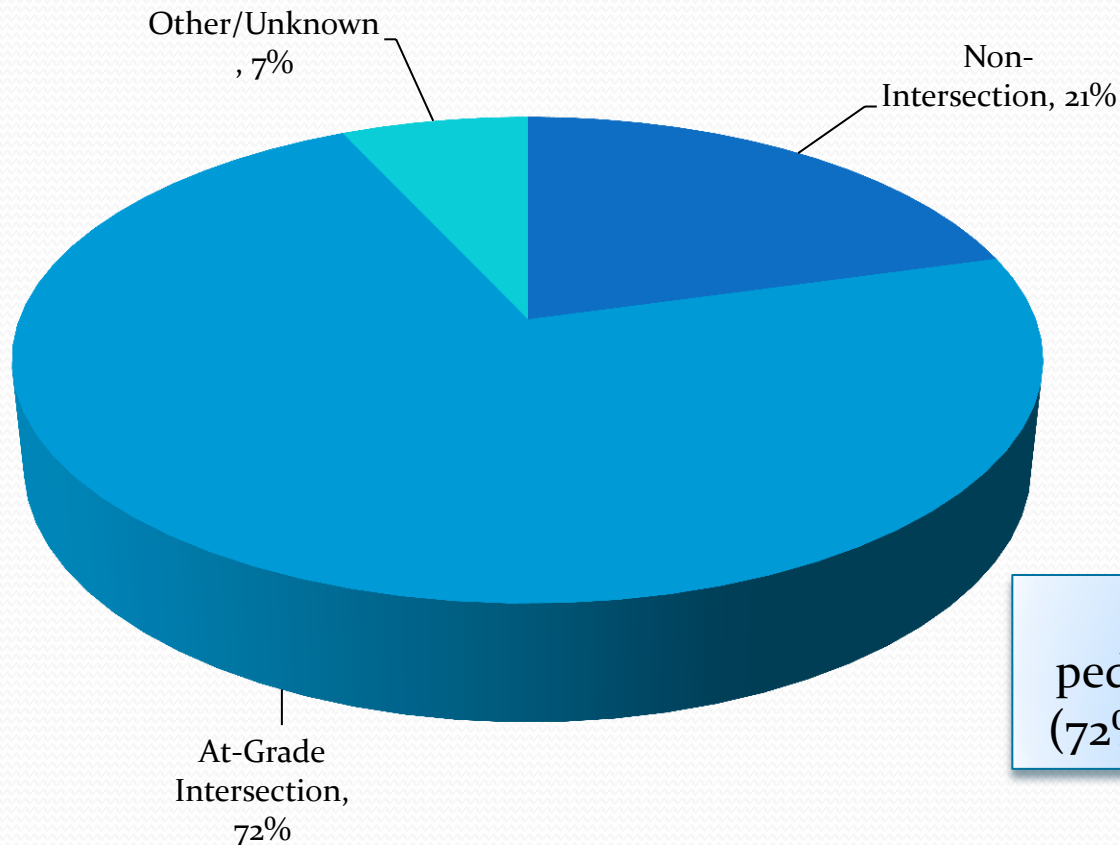


Nearly all serious pedestrian/bicyclist crashes (91%) occur on roads with a speed limit of 30 mph.

All Serious Pedestrian/Bicyclist Crashes by Relation to an Intersection*

Five Year Period of 2009-2013, All Roads
Duluth, Hermantown and Proctor

*Serious defined as Fatal, Major Injury or Minor Injury



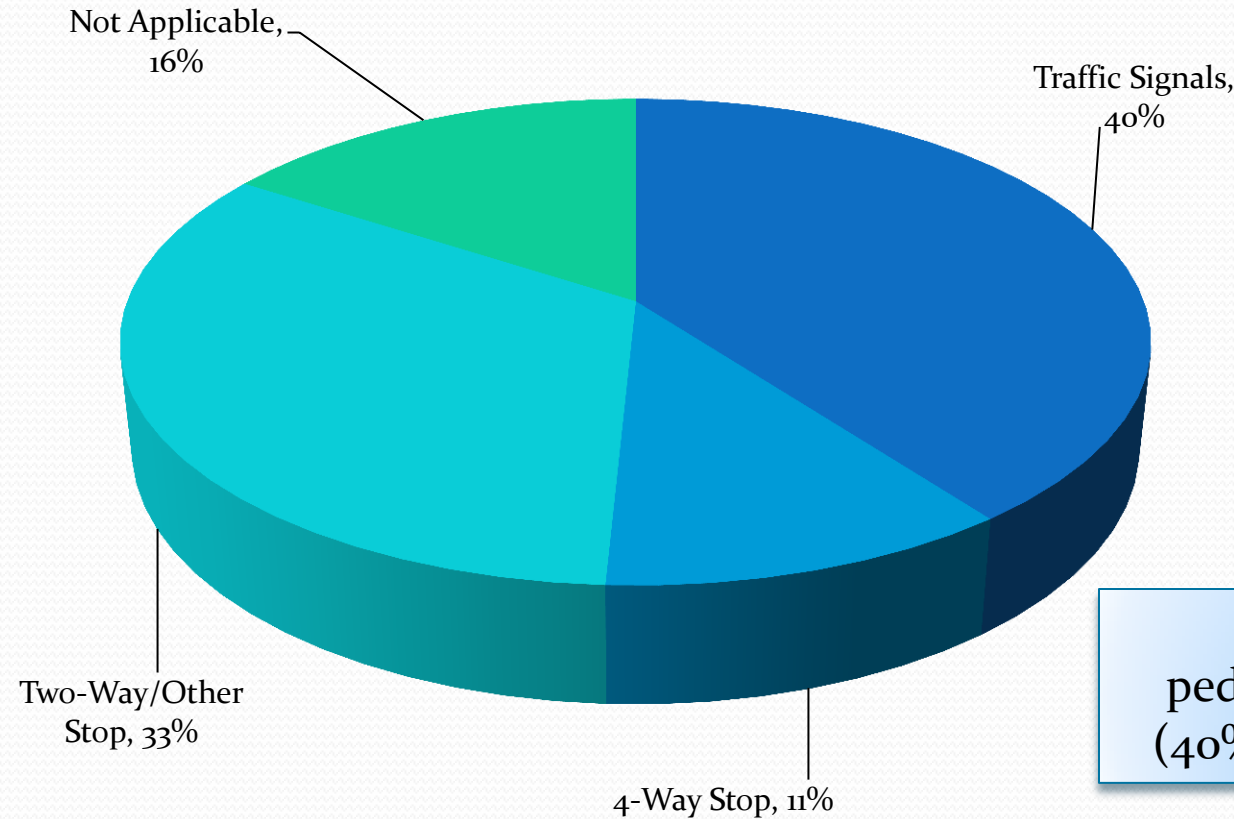
Most serious pedestrian/bicyclist crashes (72%) occur at intersections.

All Serious Pedestrian/Bicyclist Crashes at At-Grade Intersections by Traffic Control Device*

Five Year Period of 2009-2013, State/County/City Roads

Duluth, Hermantown and Proctor

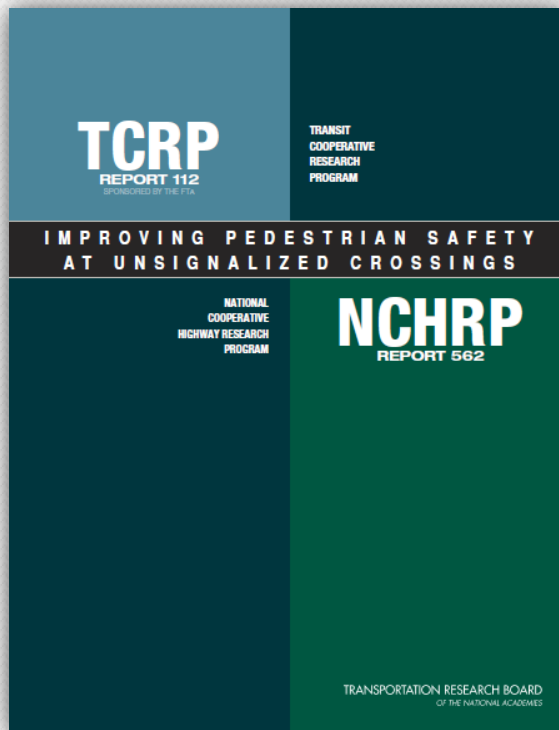
*Serious defined as Fatal, Major Injury or Minor Injury



Most serious pedestrian/bicyclist crashes (40%) occur at traffic signals.

Effectiveness

- Decisions to implement a strategy should always consider effectiveness
- National Cooperative Highway Research Program (NCHRP) produces reports documenting effectiveness of various traffic safety strategies



Proven

- Supported by rigorous academic studies



High confidence in effecting a change

Tried

- Some evaluations
- Conflicting experience and results



May effect a change

Experimental

- New idea
- Limited to no formal evaluation completed
- Limited deployments



Unknown if it will effect a change

Bike Boxes

- Description: A painted area, typically installed at signalized intersections, that allows bicyclists to pull in front of waiting vehicles and give the bicyclist a head start at the beginning of the green phase
- This pavement marking is currently *not approved* by the Minnesota Manual on Uniform Traffic Control Devices. Would require approval by MnDOT to be used on an experimental basis
- Pavement markings require significant investment in resources to maintain
- Considered an *EXPERIMENTAL* strategy



Green Bicycle Lanes

- Description: A green pavement marking placed within a bicycle lane to create a more conspicuous bike lane
- This pavement marking is currently *not approved* by the Minnesota Manual on Uniform Traffic Control Devices. Would require approval by MnDOT to be used on an experimental basis
- Pavement markings require significant investment in resources to maintain
- Considered an *EXPERIMENTAL* strategy
- Cost prohibitive; estimated cost is \$3 to \$15 per square yard with the estimated project cost of \$60,000 to \$170,000



Curb Bump Outs

- Description: An extension of the sidewalk into the roadway
- Benefits include (1) better visibility of the pedestrian, (2) reduces crossing distances and time pedestrian is in the travel lanes and (3) may have a traffic calming effect
- Disadvantages include (1) reduction in available turning radius for larger trucks and buses, which may encroach onto the pedestrian ramp (2) snow plowing is more difficult and (3) loss of parking
- Considered a *TRIED* strategy



Leading Pedestrian Interval

- Description: Modification of the traffic signal controller timing where the pedestrian phase is turned on before the vehicle indications turn green
- Can increase delay for vehicles because green time is reduced
- Considered a TRIED strategy



Accessible Pedestrian Signals (APS)

- Description: A special type of push button that aids blind pedestrians with finding the right crossing and following the crosswalk
- Provides audible information for a pedestrian in the form of speech and confirmation beeps
- APS is a strategy used to achieve compliance with the Americans with Disability Act (ADA)
- Considered a *TRIED* strategy



Countdown Pedestrian Indications

- Description: A pedestrian indication that digitally displays the available time left on the pedestrian walk phase
- Countdown Pedestrian Indications are now required by the Minnesota Manual on Uniform Traffic Control Devices when new pedestrian indications are installed.
- Considered a TRIED strategy

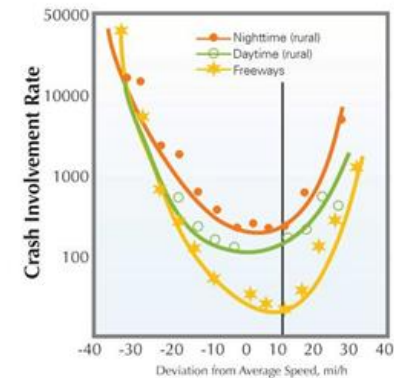


Speed Limits

- One of the most frequent requests made of transportation agencies is to reduce the speed limit of a road or street
- Requests typically are made under the following premises
 - Most vehicles are traveling above the speed limit
 - The current speed limit is too fast
 - Vehicles are traveling too fast for pedestrians
- These requests all share a common assumption...posting a lower speed limit will result in lower speeds which will result in improved safety
- Some considerations...
 - Speed limit law
 - Effectiveness of changing speed limit signs
 - Effective strategies to consider

Speed Limit Law



















- Minnesota Statute 169.14 authorizes speed limits for various types of roads
 - 30 mph for city streets
 - 70 mph for rural interstate highways
 - 55 mph for “other locations”
- For speed limits on roads or streets not covered by this statute, a speed zone must be authorized by MnDOT (local agencies do not have the authority to establish speed limits on their roads or streets)
- A speed zone is authorized after the completion of a traffic engineering investigation on the segment in question considering the following items
 - Measure the average speed, 85th percentile speed and pace (10 mph bracket that contains most vehicles)
 - Crash history
 - Access density
 - Function of the road or street
 - Sight distance



Source: Solomon, 1964, and Cirillo, 1968

Effect of Changing Speed Limit Signs

- Simply changing speed limit signs appears to not affect drivers' choice of speed
- Changing drivers' choice of speed appears to be related to level of enforcement and context of the roadway
- One other consideration...9 out of 10 serious pedestrian crashes in Duluth/Hermantown/Proctor occur on roads or streets with a posted speed limit of 30 mph
- It appears the theory that lower speed limits result in an improvement in safety is not supported by evidence

Study Location	Before	After	Sign Change +/- mph	85% Before After	Change mph
T.H. 65			-10	34 34	0
T.H. 65			-10	44 45	+1
Anoka CSAH 1			-5	48 50	+2
Anoka CSAH 24			+15	49 50	+1
Anoka CR 51			+5	45 46	+1
Henn. CSAH 4			-10	52 51	-1
Nobles Ave.			+5	37 40	+3
62 nd Ave. N			-5	37 37	0
Mississippi St.			+5	39 40	+1

Source: Unpublished MnDOT Data

Traffic Calming Strategies

- Enforcement
- Dynamic Speed Display
- Curb Extensions
- Speed Humps
- On Street Parking



Picture Source: City of St. Paul



Picture Source: Minnesota TZD



Picture Source: City of Duluth



Picture Source: trafficlogix.com

Questions?

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