

Pedestrian Crosswalk Policy Development Guidelines

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PEDESTRIAN CROSSWALK POLICY DEVELOPMENT GUIDELINES

FINAL REPORT

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EXECUTIVE SUMMARY

This study was driven by the need to improve consistency in the methods and approach that local agencies use to address crosswalks. This study focuses on the question of how a crosswalk should be enhanced with additional countermeasures, if any, once the decision is made to mark it. During the research portion of this project, it was found that the primary information agencies use that provides guidance for decisions on how to mark crosswalks comes from the Federal Highway Administration. A quick reference guide was developed from FHWA's *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*, July 2018, that will help agencies determine when to use different countermeasures based on roadway type, vehicle volumes, and posted speed limits. In addition, fact sheets for twelve countermeasures identified in the document were developed to explain what the benefit of each one is, when it is best applied, and how to provide high-level planning cost for each one.

CHAPTER 1: INTRODUCTION

The development of the *Pedestrian Crosswalk Policy Development Guidelines* was identified and supported by local agencies in Minnesota because of the need to improve consistency of the methods and approach that local agencies use to address crosswalks. It is believed that improving the consistency of the approach from one community to the next will improve pedestrian safety.

The approach to providing guidelines consisted of three key parts:

- Reviewing the literature documenting the results of previously published research
- Surveying local agencies in Minnesota on their practices and policies for crosswalks
- Development of Quick Reference Fact Sheets on different crosswalk treatments

While working through this project, the Technical Advisory Panel (TAP) determined that the question on when to mark a crosswalk was an agency decision and that providing standard policy language would not be useful. Instead this document provides several existing agency policies in the Appendix that other agencies can use if they choose. An assortment of policies is provided in the Appendix and includes policies from both large and small cities and both rural and urban counties across Minnesota.

During our research, we found that the primary information agencies use that provides guidance for decisions on how to mark crosswalks comes from the Federal Highway Administration (FHWA). Because this information is very useful, the TAP determined that this study should take the guidance from FHWA and apply it in a more meaningful way for local agencies in Minnesota. This document outlines the literature research completed and the local agency survey results.

The documents provided in the Appendix primarily focus on the question of how a crosswalk should be enhanced with additional countermeasures, if any, once the decision is made to mark it. There are several tools available, but it can be somewhat unclear as to when each tool should be used. To provide consistency, the TAP determined that the guidance provided in FHWA's *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*, July 2018, provided the guidance that Minnesota should follow. The scope of this project was then changed to provide a user-friendly way for agencies to use this information without having to read the full report. A quick reference guide was developed from the FHWA report that helps agencies determine when to use different countermeasures based on roadway type, vehicle volumes, and posted speed limits. In addition, fact sheets for twelve different countermeasures identified in the document were developed to explain what the benefit of each one is,

determine when it is best applied, and provide a high-level planning cost for each one. The twelve countermeasures identified are:

- High-visibility crosswalk markings
- Parking restrictions on crosswalk approach
- Adequate nighttime lighting levels
- Crossing warning signs
- Raised crosswalks
- Advanced Stop Here for Pedestrian sign and stop line
- In-street pedestrian crossing sign
- Curb extension
- Pedestrian refuge island
- Rectangular Rapid Flashing Beacon (RRFB)
- Road diet
- Pedestrian Hybrid Beacon (PHB)

Before going any further, it is important that anyone reading this document understands what Minnesota law says about uncontrolled crosswalks and pedestrians. Minnesota 2019 State Statute 169.21 addresses pedestrians and crosswalks. See Section 2.1.1 for details.

CHAPTER 2: LITERATURE SEARCH

Nationally there were 7,140 pedestrian and bicycle fatalities in 2018, which was a 3.6-percent increase from the 6,881 pedestrian and bicycle fatalities in 2017. In 2018, nationally, 19.5 percent of all traffic fatalities were pedestrians or bicyclists. Minnesota pedestrian fatalities in the same year comprised 11.8 percent of all fatalities in the state, slightly better than the national percentage (1). Because of the increase in pedestrian crashes over the years and the demand for pedestrian facilities have increased, crosswalks and treatments have been studied and policies/practices have been implemented by multiple agencies with a focus on determining when an uncontrolled crosswalk should be treated and how.

2.1 LITERATURE REVIEW

The Federal Highway Administration (FHWA) and several agencies across the United States have conducted studies and adopted practices and policies to address uncontrolled crosswalks. Most of these policies are based on Average Annual Daily Traffic (AADT) and/or pedestrian volumes at an intersection.

2.1.1 2019 Minnesota State Statute 169.011 Definitions and 169.21 Pedestrian and

2.1.1.1 169.011 Definitions

Subd. 20. Crosswalk.

"Crosswalk" means (1) that portion of a roadway ordinarily included with the prolongation or connection of the lateral lines of sidewalks at intersections; (2) any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface.

Subd. 53. Pedestrian.

"Pedestrian" means any person afoot or in a wheelchair.

Subd. 68. Roadway.

"Roadway" means that portion of a highway improved, designed, or ordinarily used for vehicular travel, exclusive of the sidewalk or shoulder. During periods when the commissioner allows the use of dynamic shoulder lanes as defined in subdivision 25, roadway includes that shoulder. In the event a highway includes two or more separate roadways, the term "roadway" as used herein shall refer to any such roadway separately but not to all such roadways collectively.

2.1.1.2 169.21 Pedestrian

- Subdivision 1 - Obey traffic-control signals. Pedestrians shall be subject to traffic-control signals at intersections as heretofore declared in this chapter, but at all other places pedestrians shall be accorded the privileges and shall be subject to the restrictions stated in this section and section [169.22](#).

- Subdivision 2 – Rights in absence of a signal.

(a) Where traffic-control signals are not in place or in operation, the driver of a vehicle shall stop to yield the right-of-way to a pedestrian crossing the roadway within a marked crosswalk or at an intersection with no marked crosswalk. The driver must remain stopped until the pedestrian has passed the lane in which the vehicle is stopped. No pedestrian shall suddenly leave a curb or other place of safety and walk or run into the path of a vehicle which is so close that it is impossible for the driver to yield. This provision shall not apply under the conditions as otherwise provided in this subdivision.

(b) When any vehicle is stopped at a marked crosswalk or at an intersection with no marked crosswalk to permit a pedestrian to cross the roadway, the driver of any other vehicle approaching from the rear shall not overtake and pass the stopped vehicle.

(c) It is unlawful for any person to drive a motor vehicle through a column of school children crossing a street or highway or past a member of a school safety patrol or adult crossing guard, while the member of the school safety patrol or adult crossing guard is directing the movement of children across a street or highway and while the school safety patrol member or adult crossing guard is holding an official signal in the stop position. A peace officer may arrest the driver of a motor vehicle if the peace officer has probable cause to believe that the driver has operated the vehicle in violation of this paragraph within the past four hours.

(d) A person who violates this subdivision is guilty of a misdemeanor. A person who violates this subdivision a second or subsequent time within one year of a previous conviction under this subdivision is guilty of a gross misdemeanor.

- Subdivision 3 – Crossing between intersections.

(a) Every pedestrian crossing a roadway at any point other than within a marked crosswalk or at an intersection with no marked crosswalk shall yield the right-of-way to all vehicles upon the roadway.

(b) Any pedestrian crossing a roadway at a point where a pedestrian tunnel or overhead pedestrian crossing has been provided shall yield the right-of-way to all vehicles upon the roadway.

(c) Between adjacent intersections at which traffic-control signals are in operation pedestrians shall not cross at any place except in a marked crosswalk.

(d) Notwithstanding the other provisions of this section every driver of a vehicle shall

(1) exercise due care to avoid colliding with any bicycle or pedestrian upon any roadway and

(2) give an audible signal when necessary and exercise proper precaution upon observing any child or any obviously confused or incapacitated person upon a roadway.

2.1.2 Matthiesen, Wickert & Lehrer, S.C. (2)

This document published in April 2019 outlines pedestrian and crosswalk laws in all 50 states. The document states that in Minnesota, the law currently requires a vehicle to stop when a pedestrian is in a marked crosswalk or at an intersection with no marked crosswalk—controlled or uncontrolled. Drivers in Minnesota must currently stop for crossing pedestrians at marked crosswalks and at all intersections without crosswalks or stop lights. Although pedestrians must not enter a crosswalk if a vehicle is

approaching and it is impossible for the driver to stop, there is no defined distance that a pedestrian must abide by before entering the crosswalk. In addition, when a vehicle is stopped in Minnesota at an intersection for pedestrians to cross the roadway, it is illegal for another driver approaching from the rear to pass the stopped vehicle.

2.1.3 Crosswalk Policy – City of El Cerrito, CA (3)

In April 2016 the City of El Cerrito published a Crosswalk Policy as part of the city’s Transportation Plan. The policy describes the function of crosswalks and their legal context in the California Vehicle Code. The purpose the policy is to enable the City to respond to crosswalk requests in a manner that improves pedestrian accessibility and maintains public safety.

The policy considers markings to be used to communicate the shortest path and best sight distance for pedestrians to cross, also to assure them of their legal right to cross at a midblock crossing. The policy provides a flow chart that uses pedestrian volumes, sight distance and location as criteria to help determine when a crosswalk should be marked. It then uses a combination of vehicle speeds and pedestrian delay level of service to determine which treatments will be considered.

2.1.4 Minnesota’s Best Practices for Pedestrian/Bicycle Safety (4)

In September 2013, Minnesota Department of Transportation (MnDOT) published this document to provide a resource to assist agencies in their effort to more safely accommodate pedestrians and bicyclists on their roads and highways. The document discusses proven, tried and experimental strategies available and provides a description and definition to each in addition to the safety characteristics.

2.1.5 City of Albert Lea, MN Crosswalk Policy (5)

This policy, published as part of the City’s policy and procedures manual, establishes the guidelines and considerations for the installation of marked crosswalks. The policy requires an engineering study to determine if the criteria is met for a marked crosswalk. The criteria include minimum vehicle volumes, minimum peak hour pedestrian volumes, inadequate gaps, and distance from other crossings.

Once the decision is made to mark a crosswalk, the policy identifies a chart based on AADT, vehicle speeds, and roadway configuration to determine the proper treatment needed.

2.1.6 City of Mankato, MN Crosswalk Marking Policy (6)

Adopted by the City Council in May 2011, this policy outlines a process that can be taken for a citizen to request a marked crosswalk. If a location is to be marked, it requires 20 or more pedestrians within a 2-hour period, in addition to sufficient stopping sight distance. Crosswalks are not allowed on arterial roadways or on street with a speed limit greater than 30 mph unless the intersection is signalized. The policy also provides a list of locations where conditions may warrant a crosswalk (school routes, parks, trails, etc..). The policy states that in all cases, the City Council will make the final decision.

2.1.7 City of Blaine, MN Crosswalk Policy (7)

In November 2014, the Blaine City Council adopted a policy very similar to the City of Mankato's policy from 2011. If a location is to be marked it must have over 5 pedestrian per hour during a 10-hour period. Crosswalks are not allowed on arterial roadways or on street with a speed limit greater than 30 mph unless the intersection is signalized. The policy also provides a list of locations where conditions may warrant a crosswalk (school routes, parks, trails, etc..). The Blaine policy has a process for a citizen to make a request for a crosswalk and states that in all cases, the City Council will make the final decision to mark a crosswalk.

2.1.8 Hennepin County Pedestrian Plan (8)

The Hennepin County Board of Commissioners adopted the Pedestrian Plan in September 2013. The plan was adopted for the purpose of guiding the implementation of improved opportunities for walking within Hennepin County, while remaining consistent with adopted policies and improving health outcomes. The plan does not address crosswalk guidelines but discussed a need to develop guidelines for Leading Pedestrian Intervals (LPI), Rectangular Rapid Flashing Beacons (RRFB), and High-Intensity Activated Crosswalk Beacons (HAWK) across County Roads.

2.1.9 Minnesota Manual of Uniform Traffic Control Devices (MN MUTCD) (9)

Section 3B.18 of the 2018 MN MUTCD states that an engineering study is needed to determine if crosswalks should be marked. The criteria for the study is defined, while the actual study requirements or procedure is not. Some of the criteria listed are number of lanes, the presence of medians, distance to adjacent signals, pedestrian volumes and delays, AADT, posted speed limits, geometry, and lighting. The document states that a new crosswalk shouldn't be installed alone without other measures designed to reduce traffic speeds, shorten crossing distances, and/or provide active warning of pedestrian presence if speeds exceed 40mph and either:

1. 4 or more lanes with no refuge and 12,000 ADT or higher, or
2. 4 or more lanes with raised refuge and greater than 15,000 ADT.

The MN MUTCD does not provide much in the way of guidance for what these other countermeasures should be.

2.1.10 City of Boulder, CO Pedestrian Crossing Treatment Installation Guidelines (10)

In November 2011 the City of Boulder published *The Pedestrian Crossing Treatment Installation Guidelines* which are intended to provide a consistent procedure for considering the installation of crossing treatments where needed on a case-by-case basis.

The guidelines prescribe pedestrian crossing criteria and procedures for evaluating the need for crossing treatments, including a “flowchart” approach and specific pedestrian crossing treatments that may be applicable for a particular set of pedestrian volumes, pedestrian types, vehicular volumes, vehicular speeds, and roadway geometry.

2.1.11 Best Practices for Traffic Control at Regional Trail Crossings (11)

In 2009, several Minnesota metro road and trail managing agencies came together to provide clarification on Minnesota State statutes regarding crossing locations, and to provide a general set of principles and options to consider when evaluating traffic control configurations at trail crossings. A chart was given to provide consistency along regional trails for crossing treatments based on roadway type, vehicle ADT and vehicle speeds.

CHAPTER 3: LOCAL AGENCY SURVEY

A survey of Minnesota cities and counties was completed through the use of Survey Monkey, an online survey development software. The survey was used to inform local agencies about the project and to solicit information regarding their agencies practices and policies for crosswalks. In addition, the survey examined local agencies practices and policies for removing existing marked crosswalks.

The survey was distributed to members of two organizations: The Minnesota County Engineers Association (MCEA) and the City Engineers Association of Minnesota (CEAM). The survey questions are provided in Appendix A; a summary of each questions is provided in Appendix B.

One-hundred and one (101) agencies completed the survey, all but two currently have marked crosswalks on its system. Of the 101 respondents there was a good mix of agency types with 45 being County agencies and 56 being City agencies. Key findings from all the local agencies responding to the survey are summarized below in two categories:

- Administration Policy and Practice
- Field Policy and Practice

3.1 ADMINISTRATION POLICY AND PRACTICE SURVEY RESULTS

Below is the summary when asked if an agency had a policy that addresses how, when and where pedestrian crosswalks are marked:

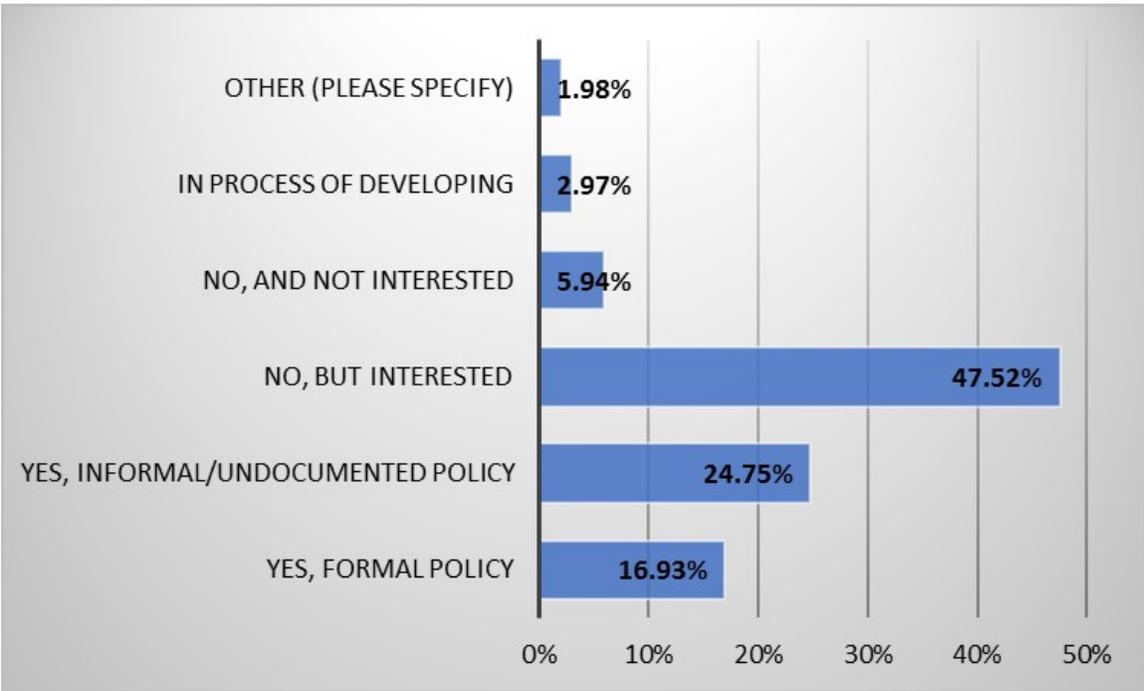


Figure 3-1 Type of Crosswalk Policy Respondents Currently Have

Overall, just under half of the respondents have either a formal or informal policy and 47% were interested in developing one. Of the agencies that have a policy, 4 of them have been updated in the past year while 13 of them are older than 5 years. Of the existing policies, 23 of them have buy-in from policy makers within the agency.

When asked if an agency currently has a policy that addresses how, when and where crosswalk treatments are discontinued, only 9 agencies stated they did address that with a policy, while 48 agencies at some point had made a decision to discontinue the use of a crosswalk treatment.

When asked what the biggest challenges an agency has with pedestrian crossings the top answer was overwhelmingly handling requests from the public. Cost and maintenance were the second and third most common challenge.

When asked what would be most helpful in developing and implementing a pedestrian crosswalk policy the biggest answer was sample policies and guidelines for best practices.

3.2 FIELD POLICY AND PRACTICES

The summary for what style crosswalk markings an agency uses is below:

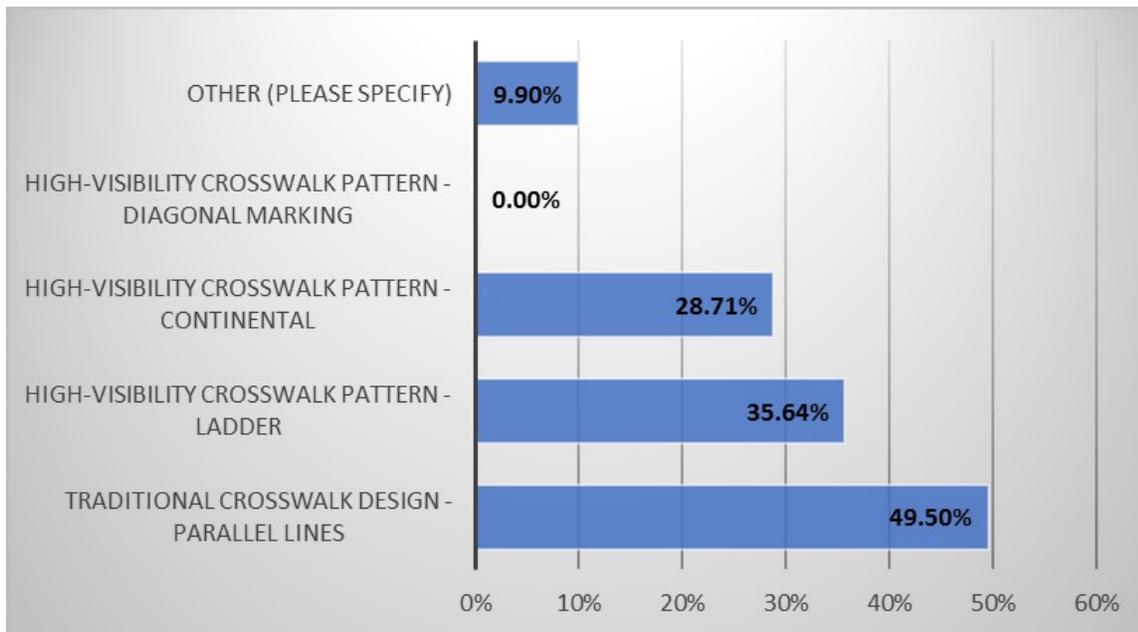


Figure 3-2 Style of Crosswalks Used by Agencies

About half of the responding agencies are using traditional crosswalk design and the other half are using a high-visibility pattern (either ladder, continental or Seattle-style).

Agencies were asked if they currently marked a crosswalk at a channelized right-turn location, 40% of the respondents said they did.

When an agency discontinues a crosswalk, they were asked how the marking is removed. The next graphic provides a summary of the results of agencies who have removed responded as well as agencies who haven't but have a method they would likely use.

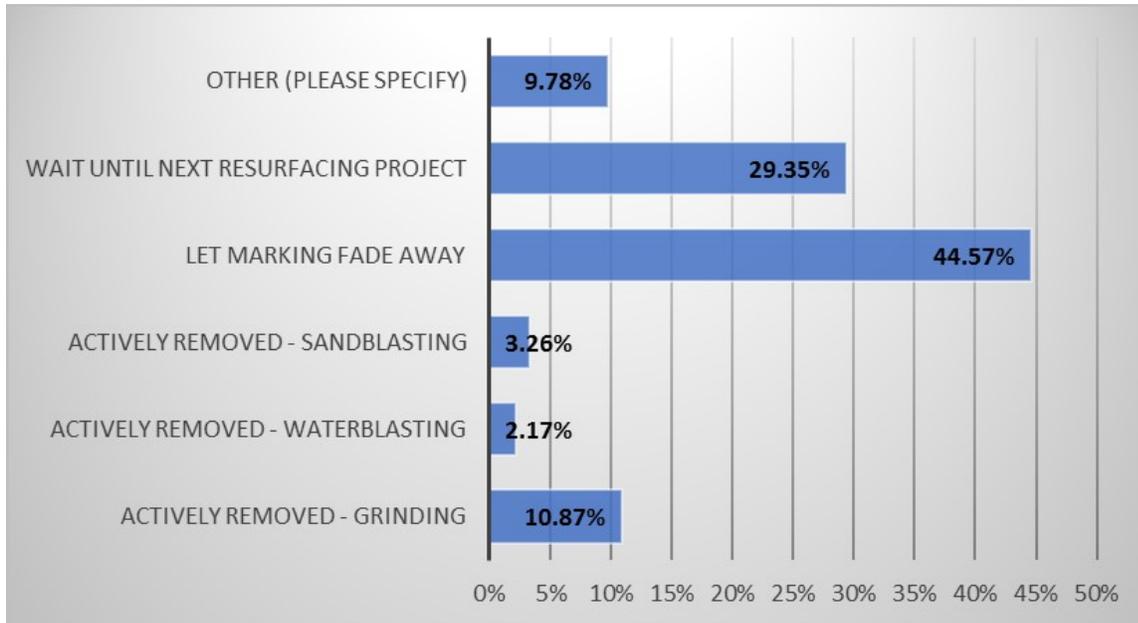


Figure 3-3 Methods Used by Agencies When Discontinuing a Crosswalk

Most of the agencies would make the change through attrition methods (fading or resurfacing project) rather than actively removing it with a physical method.

When the local agencies were asked about crosswalk treatments they have used, results show that most of the treatments identified have been used across the state.

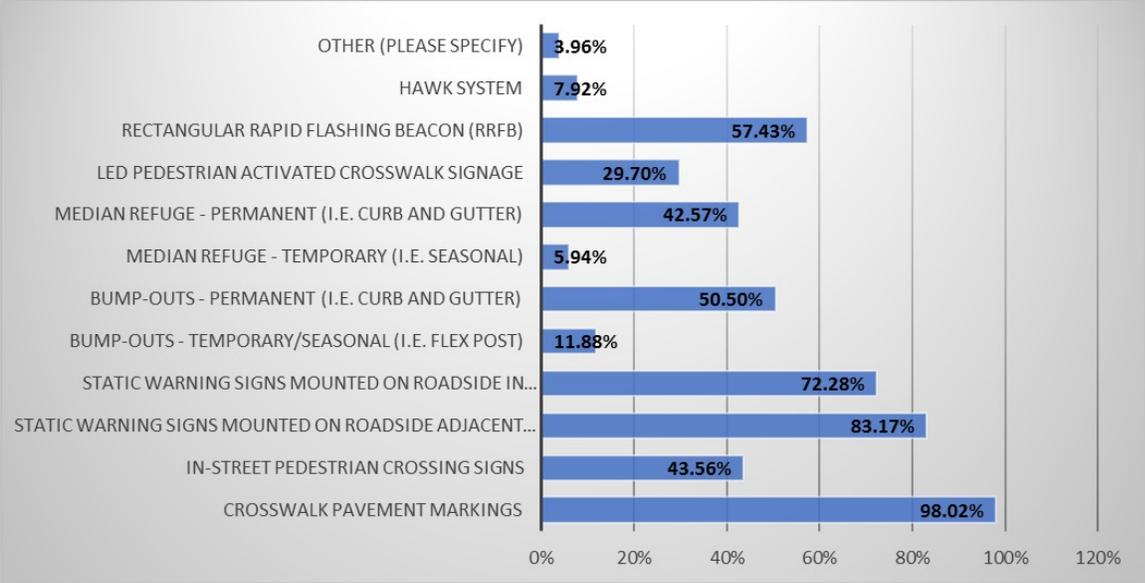


Figure 3-4 Treatments Respondents Have Used on Their Roadways

The information gathered in this survey is expected to inform local agencies of practices other agencies in the state of Minnesota are using. These survey responses were used to help develop the remainder of this project:

- Sample crosswalk policies for the decision to mark a crosswalk.
- Guidelines to follow on what treatment should be used once it is determined to mark a crosswalk.

CHAPTER 4: QUICK-REFERENCE GUIDE

Once the decision has been made to mark a crosswalk, most agencies who answered the survey are using the guidance provided by FHWA in *“Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations”* to determine how a crosswalk should be marked. A quick-reference guide was created in order to provide a quicker way for agencies to use this information without reading the full report. The quick-reference guide can be found in the Appendices and includes two parts:

- Countermeasures determined by roadway features
- Countermeasure Fact Sheets

4.1 COUNTERMEASURES BY ROADWAY FEATURE

The first part of the quick-reference guide includes charts that help determine which of the twelve countermeasures mentioned in Chapter 1 is appropriate for a roadway. The criteria that is used for this determination is:

- Number of lanes in each direction
 - 2 lanes
 - 3 lanes with raised median
 - 3 lanes without raised median
 - 4+ lanes with raised median
 - 4+ lanes without raised median
- Average Annual Daily Traffic (AADT)
 - Less than 9,000
 - 9,000-15,000
 - Greater than 15,000
- Speed
 - Less than or equal to 30 mph
 - 35 mph
 - Greater than or equal to 40 mph

Each page is broken down into charts for number of lanes and AADT, with all speeds included in each chart. These charts guide a user to which countermeasure should always be considered, also considered, and used only in conjunction with other countermeasures. If a treatment falls under the “always consider” category, this indicates that a marked crosswalk at a location with the associated roadway features should always be considered a candidate for use but is not mandated or required. If a treatment falls under the “also consider” category, this indicates that a marked crosswalk at a location with the associated roadway features should always be considered, but it is not mandated or required, based upon engineering judgment. If a treatment falls under the “use only in conjunction with other countermeasures” category, this indicates that a marked crosswalk with the associated roadway features should only use these countermeasures with other identified countermeasures.

Not all of the countermeasures listed in the charts should necessarily be installed at a crossing. Agencies should also review safety issues, surrounding land development context, pedestrian travel patterns, countermeasure effectiveness, and costs when considering what countermeasure(s) are best suited for the crossing.

The second part of the quick reference guide will help make the determination on the most appropriate countermeasure to use.

4.2 COUNTERMEASURE FACT SHEETS

The countermeasure fact sheets include a sheet for each of the twelve countermeasures identified in the study. The fact sheets describe considerations for implementation of each countermeasure including:

- Benefits
- Best locations for use
- Design considerations
- Planning level costs

The fact sheets are meant to be used as a quick reference guide. Agencies should further review the MN MUTCD, AASHTO Pedestrian Guide, and/or agency policies and practices to identify and select countermeasures for implementation.

CHAPTER 5: CONCLUSIONS

Pedestrian crosswalks are a topic of interest across the spectrum of city and county agencies in Minnesota because appropriate use of marked crosswalks is a key part of implementing the statewide initiative of Toward Zero Deaths.

During the research portion of this project, it was determined that the scope would change slightly because the TAP members did not feel that policy language should be developed. They felt the policy decision to mark a crosswalk was an agency decision and this project should only provide existing sample policies for local agencies. Thus, this project's focus would be on answering the question of how to mark a crosswalk once the decision was made to mark it.

A review of eleven published guideline documents and sample policies indicates that the majority of communities with existing policies and practices, both documented and undocumented, have been using the guidance provided by the FHWA in its *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*. This document was then redeveloped into a user-friendly, quick-reference guide for local agencies in Minnesota in addition to the development of countermeasure sheets to describe the twelve different countermeasures.

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APPENDIX A
UNCONTROLLED PEDESTRIAN CROSSWALK QUICK REFERENCE
GUIDE

Uncontrolled Pedestrian Crosswalk

Quick Reference Guide



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Introduction

A consistent approach and methods for treating uncontrolled crosswalks in Minnesota will improve pedestrian safety throughout the state. This quick reference guide helps local agencies select appropriate crosswalk treatments based on roadway type, vehicle volumes and posted speed limits.

The following twelve countermeasures are identified, along with their benefits and design, cost, and location considerations:

- Advance Stop Here for Pedestrians sign and stop line
- Crosswalk lighting
- Crosswalk pavement marking
- Crosswalk warning signs
- Curb extension
- In-street pedestrian crossing sign
- Parking restrictions on crosswalk approach
- Pedestrian hybrid beacon
- Pedestrian refuge island
- Raised crosswalks
- Rectangular Rapid-Flashing Beacon
- 4- to 3- lane conversion

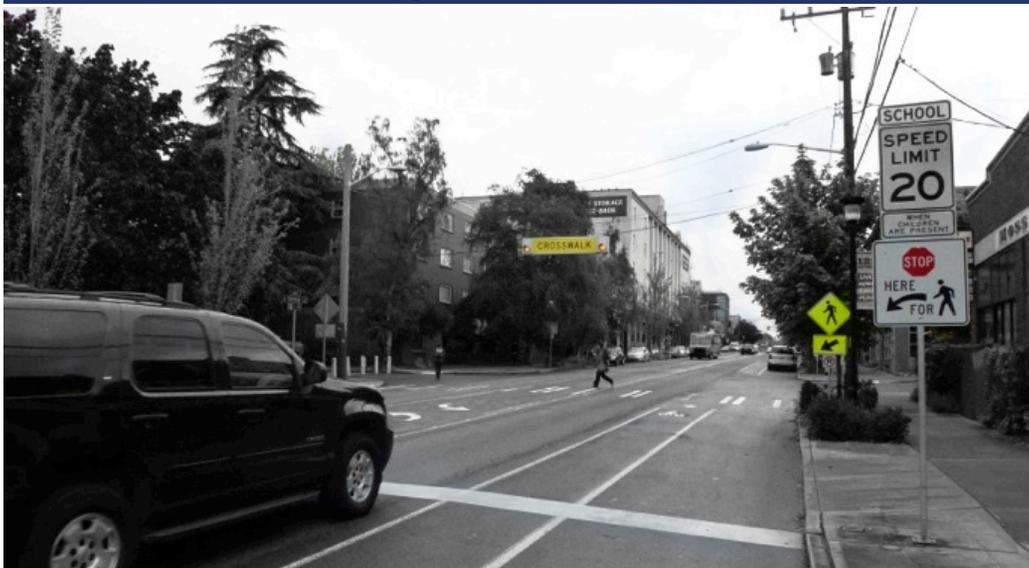
Examples are provided for various roadway segments based on the following criteria:

- Number of lanes in each direction
 - Two lanes
 - Three lanes with raised median
 - Three lanes without raised median
 - Four or more lanes with raised median
 - Four or more lanes without raised median
- Average annual daily traffic (AADT)
 - Less than 9,000
 - 9,000 to 15,000
 - Greater than 15,000
- Speed
 - Less than or equal to 30 mph
 - 35 mph
 - Greater than or equal to 40 mph

Each example lists the countermeasures that should always be considered, those that should also be considered and those that should be used only in conjunction with other countermeasures. *Note:* Treatments in the “always consider” and “also consider” categories are not mandated or required. Agencies should also review safety issues, surrounding land development, pedestrian travel patterns, countermeasure effectiveness and costs when considering appropriate countermeasures for the crossing.

This guide was developed based on guidance from the Federal Highway Administration (FHWA) and the *Pedestrian Crosswalk Policy Development Guidelines* (Report 2020RIC01), a Local Road Research Board study that aims to improve pedestrian safety at uncontrolled crosswalks. The report is available along with this quick reference guide at lrrrb.org

Advance Stop Here for Pedestrians Sign and Stop Line



Benefits:

25%

reduction in pedestrian crashes

- Reduces risk of multiple threat crash
- Reduces vehicle encroachment into crosswalk

Source: www.pedbikesafe.com / Toole Design Group

Best Locations:

- 3 or more lanes
- Speeds greater than 35 mph
- Inadequate visibility of pedestrians

Planning Level Cost (2019):

- \$1,500 per location

Source: FHWA

Design Considerations:

- See also MnMUTCD Section 2B.11 and 3B.16
- Accessibility: ADA-compliant ramps

Parking Restrictions on Crosswalk Approach



Benefit:

- Improves sightlines of pedestrians and motorists

Source: www.pedbikesafe.com / Peter Lagerwey

Best Location:

- Inadequate visibility of pedestrians

Planning Level Cost (2019):

- Less than \$1,000 per location

Source: FHWA

Design Considerations:

- Parking resolution may be needed from local agency
- State law prohibits parking within 20 feet of a crosswalk
- Agencies are encouraged to develop a policy on curb color use if coloring is desired

Crosswalk Lighting



Benefit:

59%

reduction in
pedestrian injury
crashes

Source: www.pedbikeimages.com/ / Brandon Whyte

Best Location:

- Nighttime visibility of pedestrians is a concern

Planning Level Cost (2019):

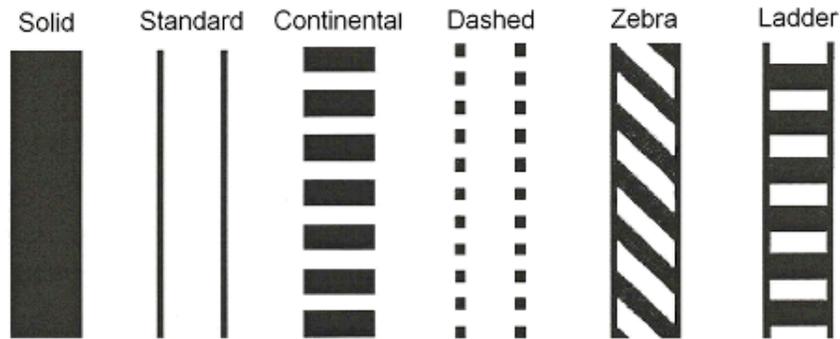
- \$10,000 to 42,000 per crosswalk

Source: FHWA

Design Considerations:

- Place lights before the crossing to avoid creating a silhouette
- Use uniform lighting levels within crosswalk area

Crosswalk Pavement Marking



Benefit:

- Indicates preferred pedestrian crossing location

Best Locations:

- Convenient for pedestrian access
- Low-volume roadways
- Low-speed roadways

Planning Level Cost (2019):

- \$600 to \$5,700, Average \$2,500

Source: FHWA

Design Considerations:

- High-visibility crosswalks preferred over parallel line crosswalks
- Accessibility: ADA-compliant ramps
- Pavement marking materials

Crosswalk Warning Signs



Source: www.pedbikeimages.com / Dan Burden

Benefit:

- Provides helpful information to motorists and pedestrians who are unfamiliar with the area

Best Location:

- Pedestrian crossing not expected by motorists

Planning Level Cost (2019):

- Less than \$1,000 per crossing

Source: FHWA

Design Considerations:

- Design must comply with MnMUTCD
- Signs must provide adequate retroreflectivity
- Crosswalk warning signs must fit with the location of other signs

Curb Extension



Source: www.pedbikeimages.com/ Andy Hamilton

Best Locations:

- Inadequate visibility of pedestrians
- Vehicle speeds causing problems
- On-street parking or shoulders exist

Planning Level Cost (2019):

- Range \$2,000 - \$20,000, Average \$13,000

Source: FHWA

Benefits:

- Reduces pedestrian crossing distance
- Increases visibility of pedestrians to motorists
- Slows vehicle speeds at turns, increasing safety for all modes
- Can be used with unmarked crosswalk

Design Considerations:

- Must not block bicycle lanes
- Must facilitate drainage
- Must not extend into travel lanes
- Must meet turning movement needs of larger vehicles
- Accessibility: ADA-compliant ramps

In-Street Pedestrian Crossing Sign



Source: www.pedbikeimages.com/ Peter Speer

Benefits:

- Reminds road users of right of way laws
- May reduce vehicle speeds, especially if used in a gating fashion

Best Locations:

- 3 lanes or fewer
- Speeds less than 30 mph
- Drivers not yielding to pedestrians in the crosswalk
- Vehicle speeds causing problems

Planning Level Cost (2019):

- Less than \$1,000 per location

Source: FHWA

Design Considerations:

- Must maintain and promptly replace damaged signs
- Become less effective over time as drivers become used to signs
- See also MnMUTCD Section 2B.12
- Must comply with AASHTO breakaway requirements if placed within roadway
- Accessibility: Signs must not be placed in middle of crosswalk

Pedestrian Hybrid Beacon (PHB)



Source: www.pedbikeimages.com / Mike Cynecki

Best Locations:

- AADT greater than 9,000
- 3 or more lanes
- Speeds greater than 40 mph
- Traffic signal warrants not being met
- Midblock crossings (most common); also successful at intersections
- Drivers not yielding to pedestrians in the crosswalk
- Inadequate visibility of pedestrians
- Traffic volumes not providing adequate safe gaps for pedestrians to enter the crosswalk

Benefits:

55% reduction in pedestrian crashes

- Improves motorist yielding for pedestrians by 90%

Design Considerations:

- Proximity of closest signalized intersection
- Cost compared to a signal
- Power source or solar power required
- Impact on traffic during operation
- Accessibility: ADA compliant ramps, push buttons and audible component

Planning Level Cost (2019):

- Range \$21,000 - \$128,000, Average \$57,700

Source: FHWA

Pedestrian Refuge Island



Benefits:

32%

reduction in
pedestrian crashes

- Reduces pedestrian delay
- Reduces/eliminates multiple threat risk
- Reduces crossing distance
- May influence driver behavior by visually narrowing roadway
- Can be used with unmarked crosswalk

Source: www.pedbikeimages.com / TooleDesign

Best Locations:

- Multiple-lane roadways
- High-volume roadways
- High-speed roadways
- Inadequate visibility of pedestrians
- Vehicle speeds causing problems

Planning Level Cost (2019):

- \$2,140 - \$41,170, Average \$13,520

Source: FHWA

Design Considerations:

- Island width: minimum of 4 feet
- Preferred island width: 8 feet
- Must facilitate drainage
- Accessibility: ADA-compliant ramps

Raised Crosswalk



Benefit:

45%

reduction in
pedestrian crashes

Source: www.pedbikeimages.com / Penn. Dept. of Transportation

Best Locations:

- Local and collector streets
- 2- or 3- lane roadways
- Speeds of 30 mph or less
- AADT less than 9,000
- Regional trail crossing
- Drivers not yielding to pedestrians in the crosswalk
- Vehicle speeds causing problems
- Inadequate visibility of pedestrians

Planning Level Cost (2019):

- \$7,110 - \$30,880 (Average \$8,170)

Source: FHWA

Design Considerations:

- Avoid truck routes, bus transit routes, emergency routes and arterial streets
- Ensure appropriate width (typically 10 feet to allow front and rear wheels of a passenger vehicle to be on the table at the same time)
- Consider snowplowing needs
- Must facilitate drainage
- Accessibility: ADA-compliant ramps

Rectangular Rapid-Flashing Beacon (RRFB)



Benefit:

47% reduction in pedestrian crashes

- Motorist yielding rates as high as 98%

Source: www.pedbikeimages.com / TooleDesign

Best Locations:

- Multilane roadways
- Two-lane, one-way streets
- Posted speeds less than 40 mph
- Drivers not yielding to pedestrians in the crosswalk
- Inadequate visibility of pedestrians

Planning Level Cost (2019):

- \$4,500 to \$52,000, Average \$22,250

Source: FHWA

Design Considerations:

- Power source or solar power required
- FHWA interim approval for use; Minnesota has submitted a request for statewide approval
- Accessibility: ADA-compliant ramps, push buttons and audible components

4-to-3 Lane Conversion



Benefits:

47%*

reduction in all crash types

*FHWA sites a range of 19 to 47%

- Provides opportunity for shoulder and/or bike lane
- Reduces crossing distance
- Reduces risk of multiple threat crash

Best Locations:

- Roads that have 4 or more lanes without a raised median
- AADT less than 20,000 (most successful; but can also be successful where AADT is greater than 20,000)
- Inadequate visibility of pedestrians

Planning Level Cost (2019):

- \$25,000 - \$40,000/mile

Source: FHWA

Design Considerations:

- Current and future vehicle operations
- Roadside stops (mail, trash, transit, etc.)
- Corridorwide considerations

2 Lanes

AADT: < 9,000

(1 lane in each direction)



	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Raised crosswalk • Pedestrian refuge island • In-street pedestrian crossing sign • Curb extension 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island
<i>Use Only in Conjunction With Other Countermeasures</i>			<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

2 Lanes

AADT: 9,000-15,000
(1 lane in each direction)



	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • In-street pedestrian crossing sign • Curb extension • Pedestrian refuge island 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island
<i>Use Only in Conjunction With Other Countermeasures</i>			<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

2 Lanes

AADT: > 15,000

(1 lane in each direction)

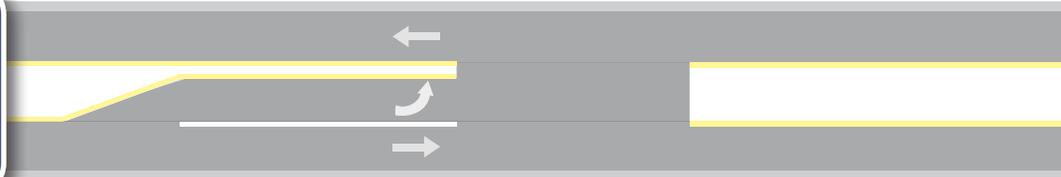


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • In-street pedestrian crossing sign • Curb extension • Pedestrian refuge island • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island
<i>Use Only in Conjunction With Other Countermeasures</i>		<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

3 Lanes With Raised Median

AADT: < 9,000

(1 lane in each direction)



	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs • Advance Stop Here for Pedestrians sign and stop line 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Raised crosswalk • Advance Stop Here for Pedestrians sign and stop line • In-street pedestrian crossing sign • Curb extension 	<ul style="list-style-type: none"> • Curb extension • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension
<i>Use Only in Conjunction With Other Countermeasures</i>			<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

3 Lanes With Raised Median

AADT: 9,000-15,000

(1 lane in each direction)



	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Advance Stop Here for Pedestrians sign and stop line • In-street pedestrian crossing sign • Curb extension • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension 	<ul style="list-style-type: none"> • Curb extension
<i>Use Only in Conjunction With Other Countermeasures</i>	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

3 Lanes With Raised Median

AADT: >15,000

(1 lane in each direction)

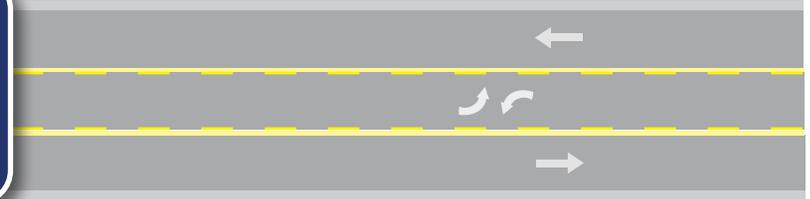


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Advance Stop Here for Pedestrians sign and stop line 	<ul style="list-style-type: none"> • Curb extension 	<ul style="list-style-type: none"> • Curb extension
<i>Use Only in Conjunction With Other Countermeasures</i>	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

3 Lanes Without Raised Median

AADT: < 9,000

(1 lane in each direction with a two-way left-turn lane)

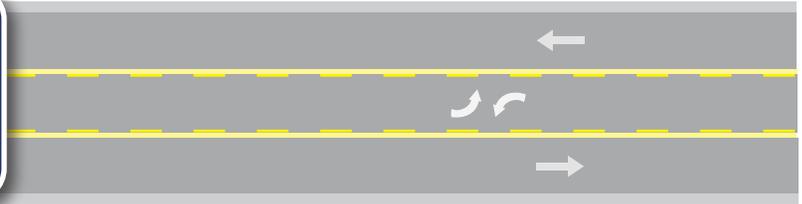


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs • Advance Stop Here for Pedestrians sign and stop line 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Raised crosswalk • Advance Stop Here for Pedestrians sign and stop line • In-street pedestrian crossing sign • Curb extension • Pedestrian refuge island • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island
<i>Use Only in Conjunction With Other Countermeasures</i>			<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

3 Lanes Without Raised Median

AADT: 9,000-15,000

(1 lane in each direction with a two-way left-turn lane)

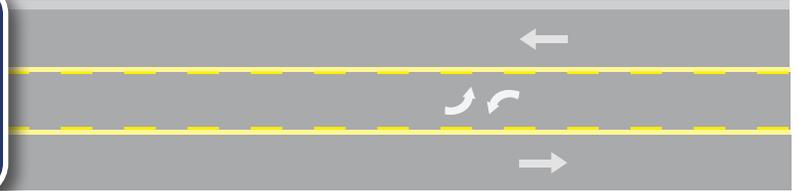


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian hybrid beacon
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<i>Use Only in Conjunction With Other Countermeasures</i>	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

3 Lanes Without Raised Median

AADT: >15,000

(1 lane in each direction with a two-way left-turn lane)

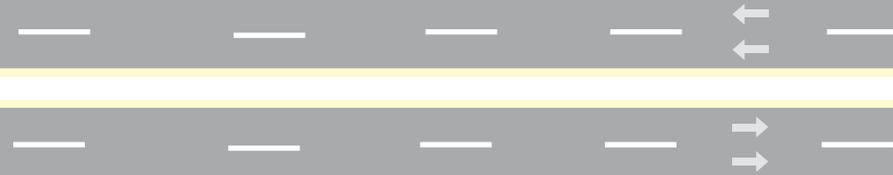


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • In-street pedestrian crossing sign • Curb extension • Pedestrian refuge island • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island 	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island
<i>Use Only in Conjunction With Other Countermeasures</i>	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

4+ Lanes With Raised Median

AADT: <9,000

(2 or more lanes in each direction)

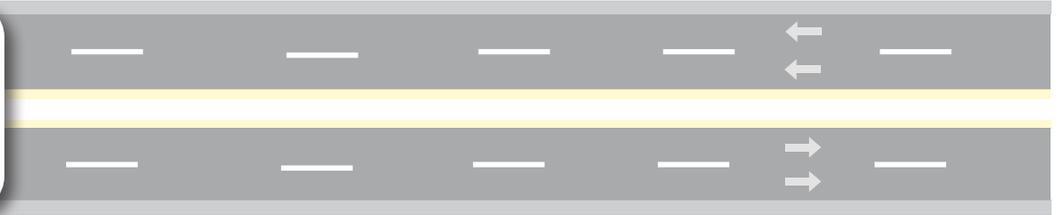


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs • Advance Stop Here for Pedestrians sign and stop line 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs • Advance Stop Here for Pedestrians sign and stop line 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Curb extension • Rectangular Rapid-Flashing Beacon • 4-to-3 Lane Conversion • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • Rectangular Rapid-Flashing Beacon • 4-to-3 Lane Conversion • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion
<i>Use Only in Conjunction With Other Countermeasures</i>			<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

4+ Lanes With Raised Median

AADT: 9,000-15,000

(2 or more lanes in each direction)

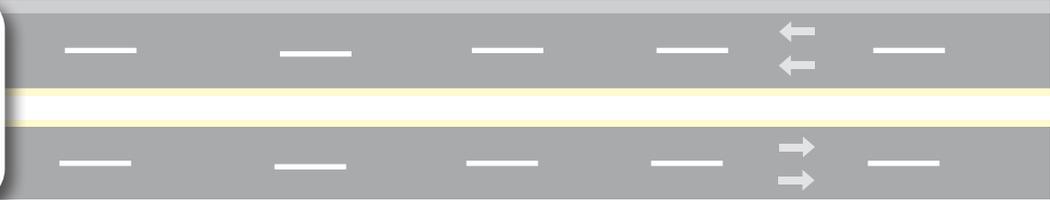


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Curb extension • Rectangular Rapid-Flashing Beacon • 4-to-3 Lane Conversion • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion
<i>Use Only in Conjunction With Other Countermeasures</i>	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

4+ Lanes With Raised Median

AADT: >15,000

(2 or more lanes in each direction)

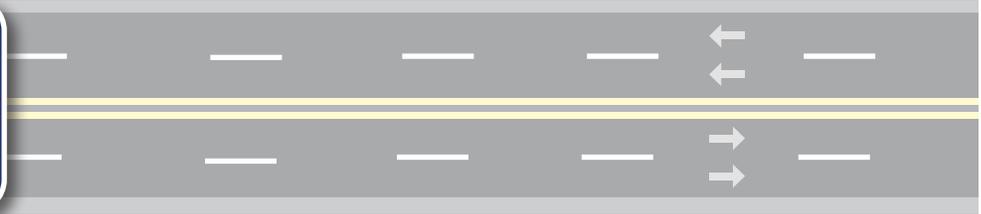


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion
<i>Use Only in Conjunction With Other Countermeasures</i>	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

4+ Lanes Without Raised Median

AADT: <9,000

(2 or more lanes in each direction)

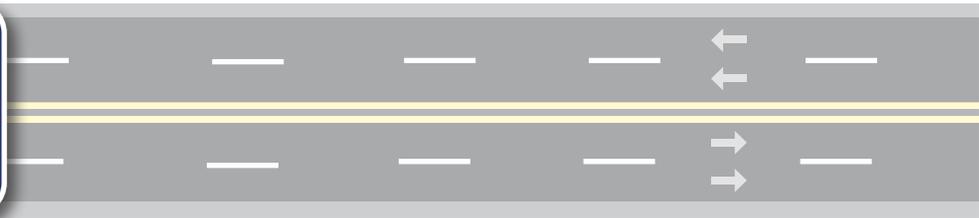


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Crosswalk pavement marking • Crosswalk warning signs • Advance Stop Here for Pedestrians sign and stop line 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian refuge island 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian refuge island • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Curb extension • Pedestrian refuge island • Rectangular Rapid-Flashing Beacon • 4-to-3 Lane Conversion • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • Rectangular Rapid-Flashing Beacon • 4-to-3 Lane Conversion • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion
<i>Use Only in Conjunction With Other Countermeasures</i>		<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

4+ Lanes Without Raised Median

AADT: 9,000-15,000

(2 or more lanes in each direction)

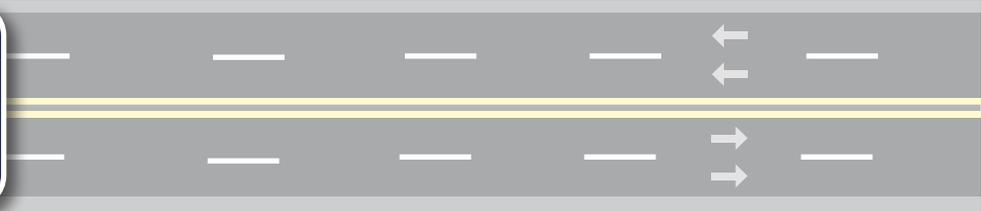


	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian refuge island 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Rectangular Rapid-Flashing Beacon • Pedestrian refuge island • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian refuge island • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Curb extension • Rectangular Rapid-Flashing Beacon • 4-to-3 Lane Conversion • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion
<i>Use Only in Conjunction With Other Countermeasures</i>	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs

4+ Lanes Without Raised Median

AADT: >15,000

(2 or more lanes in each direction)



	≤30 mph	35 mph	≥40 mph
Always Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian refuge island • Rectangular Rapid-Flashing Beacon • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian refuge island • Pedestrian hybrid beacon 	<ul style="list-style-type: none"> • Parking restrictions on crosswalk approach • Crosswalk lighting • Advance Stop Here for Pedestrians sign and stop line • Pedestrian refuge island • Pedestrian hybrid beacon
Also Consider (Candidate Treatment)	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion 	<ul style="list-style-type: none"> • Curb extension • 4-to-3 Lane Conversion
<i>Use Only in Conjunction With Other Countermeasures</i>	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs 	<ul style="list-style-type: none"> • Crosswalk pavement marking • Crosswalk warning signs



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