

## CHAPTER 13 - NON-MOTORIZED FACILITIES

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## 13-1.00 INTRODUCTION

### 13-1.01 Purpose

The purpose of this chapter is to provide users with guidance regarding pedestrian crosswalk markings, where to install curb ramps, and pedestrian crossing enhancements.

Placing crosswalk markings and facilitating pedestrian crosswalk markings will often be dependent on the context or circumstances specific to a particular area and/or situation. When considering a non-motorized facility, short term solutions should be considered before implementing long term fixes. Many factors are involved in determining the need for and solution to pedestrian crossing enhancements.

### 13-1.02 Scope

This chapter describes locations where pedestrian crossing enhancements should be provided and whether or not they should be marked or enhanced in other ways. Pedestrian crossing facilitation should be considered as early in a project as scoping, and issues should be tracked to be able to correct issues in the future.

## 13-2.00 PEDESTRIAN CROSSING FACILITATION

This section describes locations where facilitated crossing opportunities should be provided for pedestrians at signalized and unsignalized intersections. Regardless of pavement markings, pedestrians are afforded the legal right to cross the street at all intersections unless specifically prohibited ([Minn. Stat. Sec. 169.21, Subd. 1 and Subd. 2](#)).

[Minn. Stat. Sec. 169.011, Subd. 20](#) defines a Crosswalk as:

“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.

Although every intersection affords pedestrians the legal right to cross regardless of the existence of sidewalks (unless specifically prohibited), pedestrian signal heads, or curb ramps; providing convenient access for all users is an important consideration.

### 13-2.01 Curb Ramp Installation

The installation of curb ramps at unsignalized crossings does not necessitate the installation of crosswalk markings. See Section [13-3.00](#) for further guidance.

At a crossing, sidewalks and trails should always have curb ramps. Exceptions to this are:

1. If an alternate route is provided due to measurable safety concerns (such as unresolvable sight distance issues or crash history) with the crossing, or
2. If the phasing at a signalized intersection is not possible, or prohibited. See Section [13-2.03](#) for more information.

#### 13-2.01.01 Goat Paths

Curb ramps should be installed where there is indication of regular pedestrian activities. The term “goat path” is often used with regard to a path that is made by people consistently walking along the same area (See [Figure 13-1](#)). Pedestrians should be accommodated at the location of the goat path. If the location of the goat path cannot physically be made accessible, an attempt should be made to provide an equally convenient alternate crossing. If a goat path is present, installing a sidewalk or shared use path should be investigated as

an option. Installations of curb ramps or sidewalks/shared use paths should be coordinated with any bicycle or pedestrian plans as well as with the MnDOT Americans with Disabilities Act ([ADA Transition Plan](#)).



**Figure 13-1 Goat Path**

#### 13-2.01.02 Sidewalks or Trails

Sidewalks or trails that end at a shoulder or an intersection shall have a curb ramp to allow users to enter and exit the sidewalk or trail system. Where a sidewalk or trail system runs parallel to a roadway but there are no perpendicular sidewalks or trails to destinations, curb ramps should be provided perpendicular to the sidewalk system. When placing curb ramps perpendicular to a sidewalk system, only one side of an intersection needs to have a crossing. These crossings should be chosen based on the side of the street with the least conflicts (i.e., trees, drainage grates, etc.). These ramps should be spaced so that a pedestrian would not have to travel further than 660 feet (1/8 mile) out of their way to access to the sidewalk or trail system (See [Figure 13-5](#) and [Figure 13-6](#)).

T-intersections should always include a perpendicular curb ramp to a sidewalk because pedestrians have no other options to access the sidewalk from that point. T-intersections create an ADA barrier and should have a perpendicular curb ramp for access to the sidewalk system. Where a sidewalk system ends a ramp shall be added at the end of the system terminating either into the shoulder or the street (see [Figure 13-5](#) and [Figure 13-6](#)).

On the side of the street without sidewalk, curb ramps would only be needed when

1. A striped crosswalk or signed crossing exists, or
2. There is no shoulder to receive the crosswalk (see [Figure 13-3](#) and [Figure 13-7](#)).

As a last resort, a grade-compliant driveway may be used to receive a crossing. If it is decided to not place a curb ramp at any of the locations illustrated in [Figure 13-7](#), an engineering study shall be completed documenting a lack of need and shall be kept in the project file. The engineering study shall follow the guidelines set forth in the Minnesota Manual on Uniform Traffic Control Devices ([MN MUTCD](#)).

Curb ramp placement will often depend on context. More curb ramps may be needed depending on the context of the location. Crossings should connect destinations/pedestrian generators. Pedestrian generators are locations that influence pedestrian volume by acting as a source or destination of pedestrians, including, but not limited to:

- housing (paying special attention to vulnerable users such as senior or assisted living facilities)
- restaurants

- shopping
- hotels
- schools
- places of worship
- transit station
- parks
- museums
- gas stations
- civic buildings (libraries, post offices, etc.)
- health care facilities

Pedestrian generators will create pedestrian traffic regardless of the size of the road, the speed of traffic, the ADT, crossing facilitation, or presence/absence of sidewalks. That being said, if the road is difficult to cross or there are not adequate facilities but there are generators, there is likely pent up demand for pedestrian facilities. As long as there is a lack of measurable safety issues (sight distance, crash history) providing pedestrian crossing facilitation where pedestrians are already crossing can make the crossing safer. Regardless of the distance between crossings at unsignalized corners with sidewalks or trails, curb ramps should be provided from the sidewalk or trail system to access a pedestrian generator/destination, whether it is parallel or perpendicular to the sidewalk or trail (See [Figure 13-5](#) and [Figure 13-6](#)).

Small segments of sidewalk should be installed to connect parking lots to sidewalk or trail systems (See [Figure 13-8](#)). Often these connections provide the shortest path for pedestrians and in the absence of installing these sidewalks goat paths will likely be created. These improvements should be coordinated with property owners as redevelopment occurs. The Cost Participation Policy should be consulted for funding these segments of sidewalk. Maintenance agreements will also need to be in place.

Midblock curb ramps should be evaluated on a case-by-case basis; much of the same guidance laid out in this section can be used. Midblock crossings may be necessary at some locations. An analysis of context, location, volume, need, traffic operations will assist in determining whether a midblock crossing is appropriate.

### 13-2.02 Signalized Pedestrian Crossings

Signalized intersections will sometimes merit the installation of curb ramps and Accessible Pedestrian Signals (APS) push buttons even without sidewalk connections. Curb ramps are necessary for ADA purposes in order to use APS push buttons. Crossings should be provided for all of the reasons listed in the “Curb Ramp Installation” section and destinations should be connected regardless of the existence of sidewalk or trail. Shoulders can be classified as a pedestrian facility leading up to a signal. Shoulders are a legal walking area for pedestrians when there is no sidewalk.

If crossings are provided on three legs of a signalized intersection, a crossing should be provided on the fourth leg of the intersection unless a severe operational problem (i.e., operations at LOS F for a movement) or a measurable safety issue (i.e., sight distance, crash history) is present on the fourth leg. This is to decrease pedestrian exposure and increase safety so that pedestrians can choose to cross one leg instead of crossing three. It also increases pedestrian level of service (LOS) if pedestrians can choose to cross one leg instead of three to get to one destination. It is important to remember that pedestrians are the most vulnerable user, and sometimes exposed to harsh weather conditions without protection. Minimizing pedestrian wait time is an important safety and LOS concern.

Some quadrants of signalized intersections may not contain a destination or require a pedestrian crossing. Some signalized intersections are in locations without sidewalks or trails and where little to no pedestrian or bicycle activity is expected. At these locations selected pedestrian crossings may be excluded from design. An engineering study should be completed recording existing conditions and lack of pedestrian generators in the area and expected pedestrian paths. The study should be kept with the project file.

### 13-2.03 Prohibiting Pedestrian Crossing

Pedestrian crossings may be prohibited if allowing the pedestrian crossing would severely impact vehicular traffic operations and an equally convenient alternate path for pedestrians is available. Judgment of when operations are severely affected should be decided by the District Traffic Engineer after consultation with local agency(s), MnDOT [ADA Policy](#), and MnDOT 's Office of Traffic Engineering (OTE) [Bicycling](#) and [Pedestrian](#) Section as necessary. One example of an acceptable location to prohibit pedestrian crossings is at the inner legs of ramp interchange intersections due to the fact that the crossing would be a redundant route and affect LOS. If safety issues are present, such as a sight distance problem (for either sidewalk/shared use path users or roadway users) and it is deemed not feasible/possible to correct or eliminate the problem, the pedestrian crossing should be prohibited. Install "No Pedestrian Crossing Signs" (Figure 13-2) in locations where it is deemed necessary to prohibit pedestrian crossings.



Figure 13-2 No Pedestrian Crossing Sign R9-3 R9-3a

The **R9-3 R9-3a** sign use should be judicious and limited in order to retain effectiveness. At locations where only very occasional pedestrian activity is expected, a good rule of thumb is to never strand a pedestrian in a quadrant by prohibiting crossings. If no convenient alternate route is available (a reasonable distance to walk in a suburban or rural setting is approximately 660 feet) then pedestrians should not be legally prohibited (i.e., by installing an **R9-3 R9-3a** sign) from using the signal indications to cross even if a pedestrian signal head is not provided. The following items should be considered when deciding whether to prohibit pedestrian crossings at a signal:

- The presence of medians.
- If crossings are prohibited where would a wheelchair cross?
- Will snow prohibit pedestrian crossings in the winter?
- Crossing distance and number of lanes.
- Speed
- AADT
- Phasing complexity
- Minimum green time (short minimum green times across 4-lane roadways mean that pedestrians will not be able to cross far enough to be seen and a crossing should be provided of at least one leg).
- Whether the side street is on recall.
- Railroad preemption (consideration should be given to eliminating a pedestrian crossing to avoid excessively long preemption lead times).
- T-intersections (pedestrians approaching from the unsignalized leg do not have a green ball to cross with and will not know when to cross).
- The presence of adjacent signals ([Minn. Stat. Sec.169.21, Subd. 3\(c\)](#) prohibits a pedestrian crossing the road between two signalized intersections).
- Context
- Pedestrian generators/destinations

If a grade separated crossing is nearby (within 660 feet), it is unnecessary to prohibit crossings at nearby signalized or unsignalized intersections unless operations are severely impacted or a measurable (sight distance, crash history) safety issue is present. Grade separated crossings should be as convenient (placement should be optimized and grade change minimized for pedestrians) as possible to reap the safety benefits of grade separation. Allowing the at-grade crossing gives opportunities for those who find the grade separated crossing more difficult, whether because of the crossings location, distance to the crossing, or the user's mobility issues, to use the at-grade option.

At semi-rural, 4-lane, high speed (45 mph or greater), roads that intersect with a two-lane lower volume road a crossing on one leg of the main road should be provided while prohibiting pedestrians on the other leg of the main road (if desired). Pedestrians would then be allowed to use the vehicle signal face to cross parallel to the main road (See [Figure 13-4](#)).

### 13-3.00 CROSSWALK MARKINGS AND ENHANCEMENTS

This section describes locations where crosswalk markings or additional crossing enhancement should be considered. Marking crosswalks alone does not improve safety, but does delineate an approved path to alert pedestrians, bicyclists, and motorists of potential pedestrian movements across a roadway. At intersection locations, pedestrians have the legal right to cross. At non-intersection locations crosswalk markings legally establish the crosswalk. Before placing crosswalk markings or other crossing treatments at unsignalized locations, an engineering study should be completed to determine the necessity and feasibility of pedestrian crossing treatments. One option is to use the methodology set forth in the guide: [Pedestrian Crossings: Uncontrolled Locations](#). An engineering study can be as simple as a site review and notes. The study should include input from stakeholders such as ADA, the (OTE) [Bicycling](#) and [Pedestrian](#) Section, local units of government, and any bicycle and pedestrian plans. The study should consider the following information:

- Geometrics
- Sight distance
- Traffic volumes, truck traffic, turning movements, queues from adjacent intersections.
- Pedestrian/bicycle volumes (methodology included in the [FHWA Traffic Monitoring Guide](#)).
- Site observations and driver distractions.
- Posted speed limit.
- Crash history
- Requests for a crosswalk/crossing facilitation.
- Existing pedestrian/bicycle crossing facilities (at intersection and along corridor).
- Nearby transit stops.
- Surrounding land use and pedestrian/bicycle generators.

Some of this information, particularly volumes, may not be available or easily maintained. Context and season should also be kept in mind. If a location near a beach is being reviewed in the winter, critical volumes may not be reached. Volumes taken near a school in the summer may not represent the volumes that occur during a school year. Origins and destinations could be considered as a stand-in for volumes. See bulleted list under [13-2.01](#).

#### 13-3.01 Crosswalk Markings Installation Criteria

Crosswalk markings should be installed at all legs of signalized intersections that have pedestrian facilities. Channelized right turn movements should follow the criteria of an unsignalized crosswalk, discussed below. Crosswalk markings should be installed at all pedestrian crossings at roundabouts.

The following criteria should be considered for marking unsignalized crosswalks:

- Locations for a marked crosswalk should be connected by sidewalks or trails and have ADA compliant curb ramps and landings.
- Parking will be prohibited at least 20 feet prior to and after a marked crosswalk ([Minn. Stat. Sec. 169.34, Subd. 1\(6\)](#)).
- Crosswalk markings and advanced warning signs should not be installed at stop-controlled locations, although additional pedestrian treatments such as curb extensions and medians can be installed if an engineering study indicates a need.

- Crosswalk markings and signs (Figure 13-3) should be installed at all uncontrolled crossings along approved school crossings or crossings included in a [Safe Routes to School](#) plan. An intersection near a school will not necessarily be marked with a crosswalk; it needs to be included as an approved crossing or in a Safe Routes to School plan in order to be marked. Additional crossing enhancements should be considered at school crossing locations by analyzing the crossing with [Figure 13-9](#) and [Table 13-1](#) (see Section [13-2.00](#) for more information on school crossings).
- Crosswalk markings should generally not be installed at channelized right turn movements. Some channelized right turn movements may benefit from treatments such as signing and other enhancements and should always include appropriate geometrics to control speed, such as tight radii and appropriate crosswalk placement, while serving the typical vehicle within the corridor.



Figure 13-3 Crosswalk Marking Sign S1-1

Midblock crossings should be carefully evaluated for markings and additional treatments. Midblock crossings may be unexpected by motorists. Unmarked midblock crossings afford pedestrians no legal right of way ([Minn. Stat. Sec. 169.21, Subd. 3\(a\)](#)), and pedestrians must yield to cars. Therefore, unmarked midblock crosswalks should be limited to low ADT and low speed locations. Additional crossing facilitation should be considered at these locations. If a midblock crossing is between two signalized intersections, it shall be marked ([Minnesota Statute 169.21 Subd. 3\(c\)](#)).

Some unsignalized locations may not qualify for marked crosswalks. Locations where the speed limit is 45 mph or greater, locations where pedestrian traffic occurs below the threshold volumes, or locations where there are no sidewalks, trails, or ramps but regular pedestrian traffic still occurs do not qualify for striping. See [MN MUTCD](#), Part 3 for more information.

### 13-3.02 Additional Treatment Considerations

A marked crosswalk alone may not be enough to facilitate safe and efficient pedestrian movements. Pedestrian crossing enhancements have been shown to significantly improve motorist yielding behavior.

#### Marked Crosswalk Crossing Enhancements

- Advance and crosswalk-located warning signs,
- Prohibiting parking prior to the crossing,
- Medians,
- Curb extensions,
- Reduced corner radii,
- Advance stop lines,
- Raised crosswalks,
- Crosswalk lighting,
- Rectangular rapid flashing beacons (RRFBs),
- In-roadway lights,
- Pedestrian Hybrid Beacon Systems (see [MN MUTCD](#), Part 4),
- Pedestrian signals (see [MN MUTCD](#), Part 4), and
- Grade separation.

Other enhanced crossing treatments should be considered at locations where an engineering study indicates a need. Short term solutions can be implemented while waiting for the long term ultimate solution. Engineering

judgment, research, and national best practices need to be used to find the best treatment for each unique location. Coordination with maintenance staff should occur to ensure efficient snow removal in areas such as median cut-throughs.

See [Figure 13-9](#) and [Table 13-1](#) for determining the need for a crosswalk and other crossing enhancements.

Locations that do not qualify for marked crosswalks should still be given consideration for other crossing enhancements. Treatments such as lighting, eliminating sight distance issues, curb ramps, curb extensions, and median cut-throughs can benefit all types of pedestrian crossings whether they are marked or not. Coordination with maintenance staff should occur to ensure efficient snow removal in areas such as median cut-throughs. The following mitigation measures should be considered for all corridors where pedestrian activity occurs, and all legal crossings regardless of whether they are marked or not.

#### **Non-Marked Crosswalks Crossing Enhancements**

- Calm traffic by narrowing or removing lanes, adding bike lanes, widening sidewalks, providing curb extensions and planting trees. All of these can be used to slow traffic flow and increase the expectation of pedestrian activity by the driver.
- Remove and relocate obstructions, add curb extensions, and add illumination to address visibility. Curb extensions place pedestrians within the drivers' field of vision, and allow for a shorter pedestrian crossing distance at the same time.
- Tighten turn radii.
- Install median islands to simplify crossings into two steps. Porkchop right turn islands can simplify the crossing even further. Access management can be used to eliminate turn lanes and turning conflicts.
- Move bus stops to the downstream side of the crosswalk.
- Prohibit on street parking 20-50 feet upstream and downstream of a crosswalk. Providing greater visibility should be balanced against traffic calming, as some measures to improve visibility may increase speeds.

#### **13-4.00 INSTALLATION AND REMOVAL GUIDELINES**

It is important for pedestrian, bicyclist, and driver expectation and compliance that crossing treatments are applied appropriately and consistently. Overuse of crosswalk markings and electronic enhancements such as flashers, beacons, and pedestrian signals should be avoided to maximize their effectiveness. Crosswalks and signs should be used at locations that meet the minimum pedestrian volume thresholds to avoid deteriorating effectiveness by overuse. Electronic enhancements may lose their effectiveness over time and usually have much higher ongoing maintenance costs. Electronic enhancements should be limited to locations with higher needs and where more standard engineering options (medians, curb extensions, etc.) are not effective or are infeasible.

Electronic crossing enhancements, such as in-roadway lighting, pedestrian flashers, and RRFBs should always be pedestrian-activated (either passively or actively) and meet ADA requirements for activation.

Conditions that contribute to the need for a crossing treatment may change over time. When a roadway is to be resurfaced, a review of existing crosswalks should be performed to determine whether the need for a crosswalk continues to exist. If the crossing no longer meets the guidelines, it should be removed. A review of the surrounding area should be conducted at this time to determine if pedestrian traffic has shifted to another nearby location that may need consideration or if conditions are affecting/compromising the pedestrian crossing volumes.

#### **13-5.00 APPROVAL OF LOCAL REQUESTS**

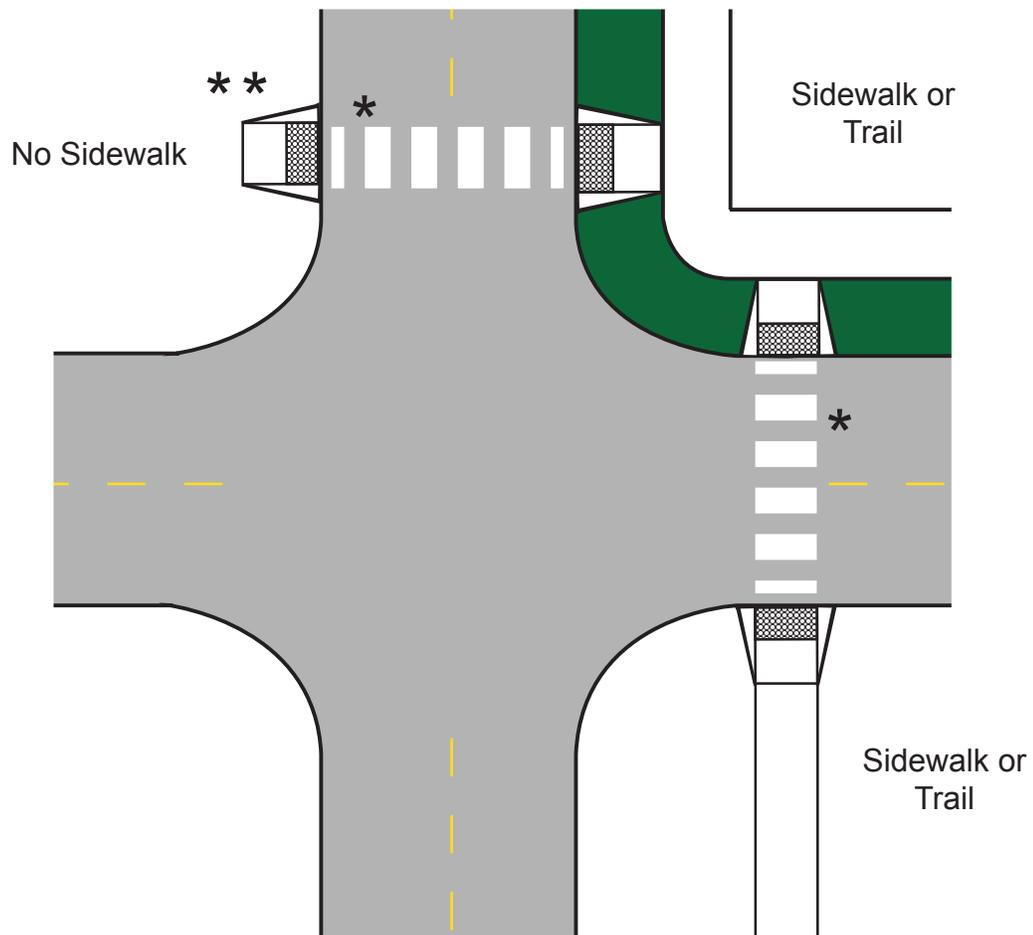
The District Traffic Engineer shall approve the proposed location for the crosswalk and/or pedestrian crossing enhancement. Prior to installation, the proposed location must have met the requirements of an engineering study as described above and have a request from the local agency requesting a marked crosswalk or other crossing enhancement.

If approved, the applicant will need to (unless otherwise agreed upon):

1. Work with MnDOT to determine cost share according to the [Cost Participation Policy](#) of the crosswalk or crossing enhancement.
2. Apply for a MnDOT permit to install the system in the right-of-way. As part of the permit the applicant will agree to:
  - Install crosswalk pavement markings (if not currently present) or refresh existing crosswalk pavement markings at the crossing.
  - Install or refresh existing “no parking” yellow curb, 20 feet in advance of, and 20 feet beyond the crossing.
  - Be responsible for installing, operating, and maintaining the crossing system and associated curb and pavement markings to MnDOT standards; along with all costs associated with said responsibilities.
  - Allow MnDOT to remove the system at their discretion. If removed by MnDOT, static pedestrian or school crossing signs may be installed by MnDOT in place of the system.
  - Provide an operations plan to MnDOT upon installation and provide an updated plan to the District Traffic Engineer if ever revised.

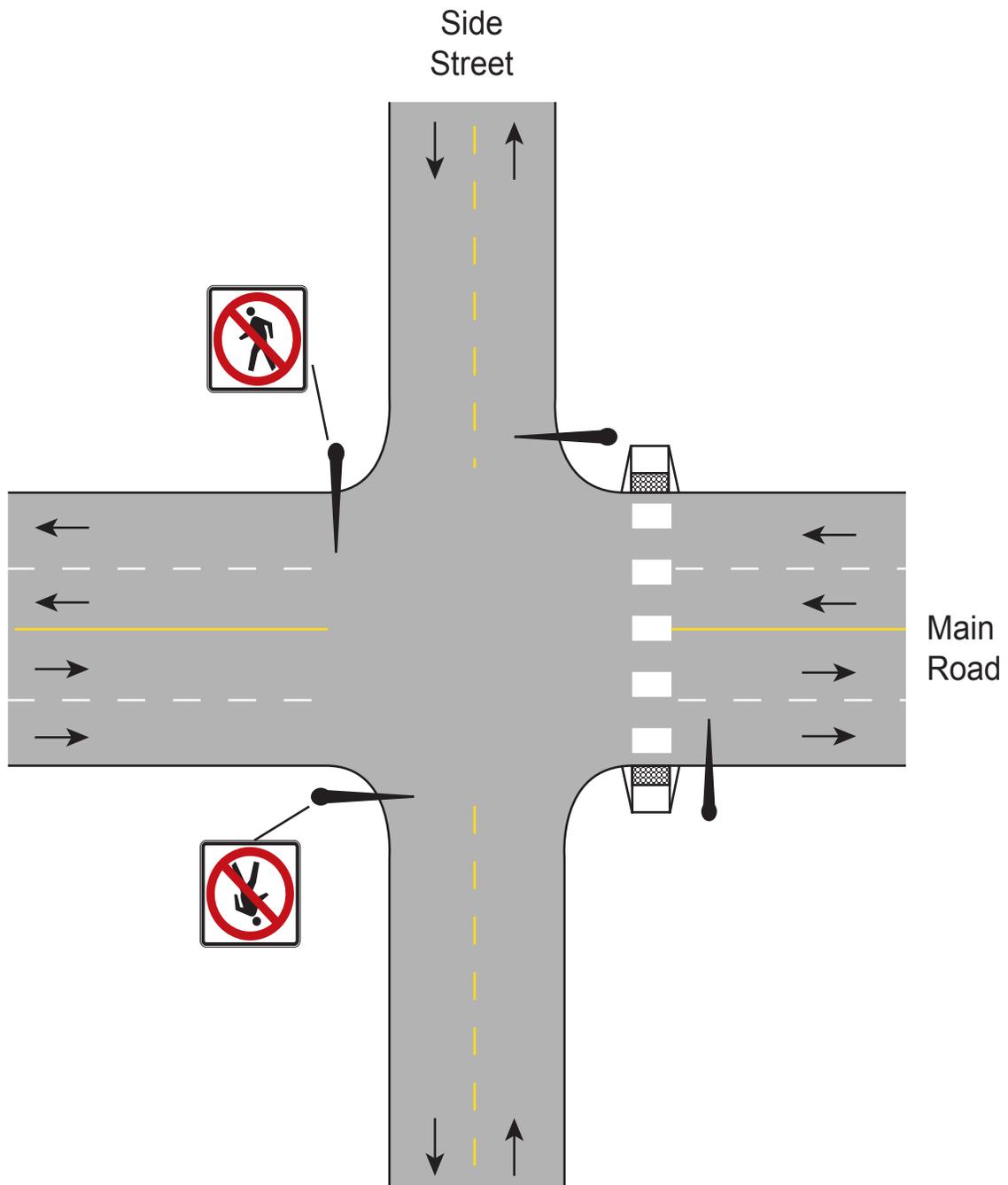
#### 13-6.00 REFERENCES

1. Mead, Jill; Zegeer, Charlie; and Bushell, Max. [Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research](#). FHWA DTFH61-11-H-00024, FHWA, April 2013.
2. Traffic Engineering Division, [Virginia Department of Transportation. Guidelines for the Installation of Marked Crosswalks](#).
3. Fitzpatrick, Kay; Turner, Shawn; Brewer, Marcus; Carlson, Paul; Ullman, Brooke; Trout, Nada; Park Eun Sug; Whitacre, Jeff; Lalani, Nazir; and Lord, Dominique. [Improving Pedestrian Safety at Unsignalized Crossings. NCHRP Report 562](#), TCRP Report 112, 2006.
4. Zegeer, Charles V.; Stewart, Richard; Huang, Herman H.; Lagerwey, Peter A.; Feaganes, John; and Campbell, B.J.. [Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Intersections: Final Report and Recommended Guidelines](#). USDOT, FHWA HRT-04-100, September 2005.
5. City of Boulder Transportation Division and Fox Tuttle. [Pedestrian Crossing Treatment Installation Guidelines](#). City of Boulder, November 2011.
6. Fitzpatrick, Kay; Chrysler, Susan T.; Van Houten, Ron; Hunter, William W.; and Turner, Shawn. [Evaluation of Pedestrian and Bicycle Engineering Countermeasures: Rectangular Rapid-Flashing Beacons, HAWKs, Sharrows, Crosswalk Markings, and the Development of an Evaluation Methods Report](#). FHWA HRT-11-039, FHWA, April 2011.
7. NCITE. Best Practices for Traffic Control at Regional Trail Crossings. NCITE, July 2011.
8. NCITE. Guidance for the Installation of Pedestrian Crossing Facilities. NCITE, January 2009.
9. Lambert, William R, New Hampshire DOT. Marked Crosswalks. NHDOT #PM-09, NHDOT October 2007.
10. [Oregon Department of Transportation Roadway Section. Traffic Manual Section 6.6 Crosswalks](#). ODOT, December 2012.
11. Director, Bureau of Traffic Operations, Wisconsin DOT. Traffic Guidelines Manual. WisDOT 3-2-18, WisDOT, March 2011.

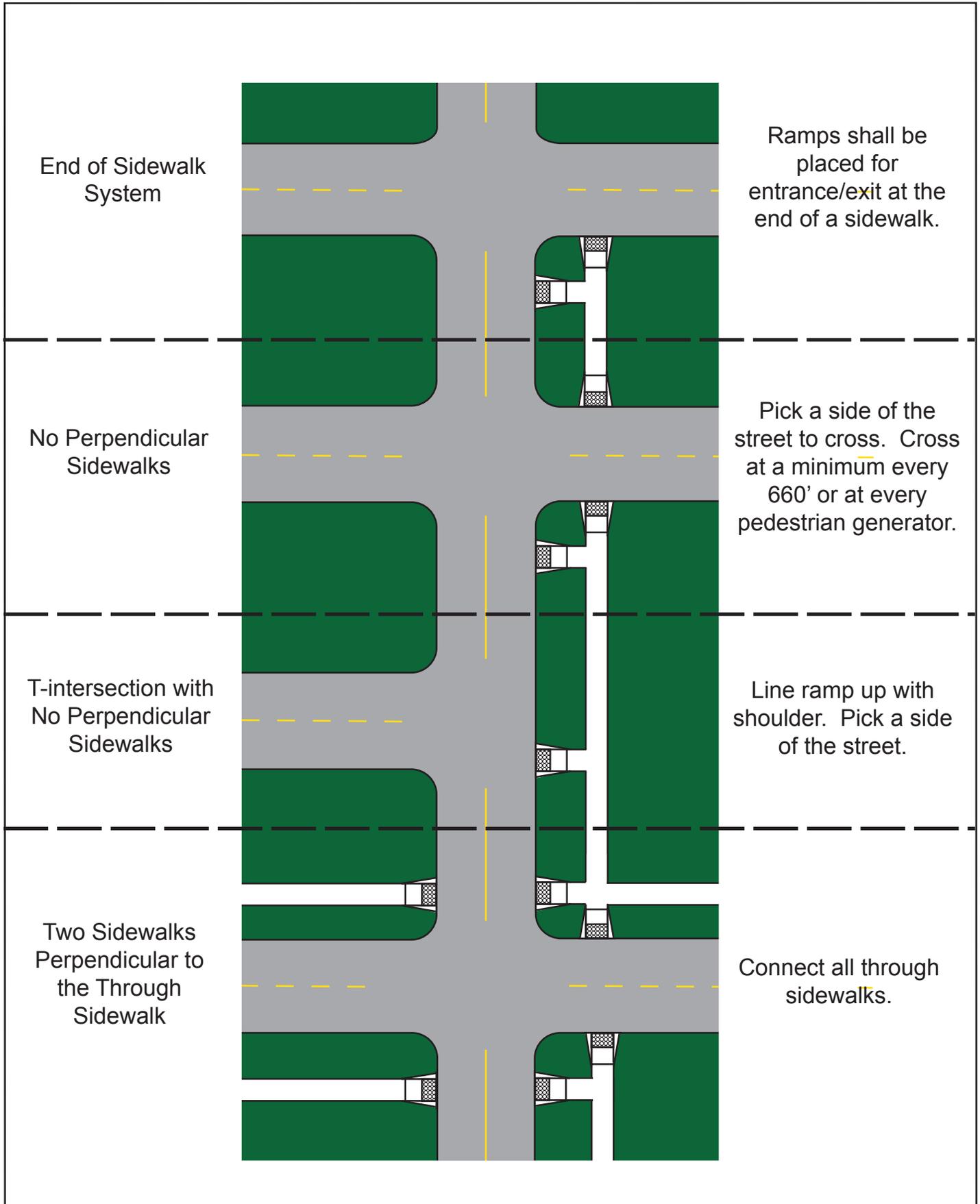


- \* Optional crosswalk marking at unsignalized locations.
- \*\* A curb ramp without a sidewalk should be installed:
  - 1) At an unsignalized location with a marked or signed crosswalk,
  - 2) Where there is no shoulder to receive a pedestrian (see Figure 7).

See Section [13-2.01.02 Sidewalks or Trails](#) for further discussion.



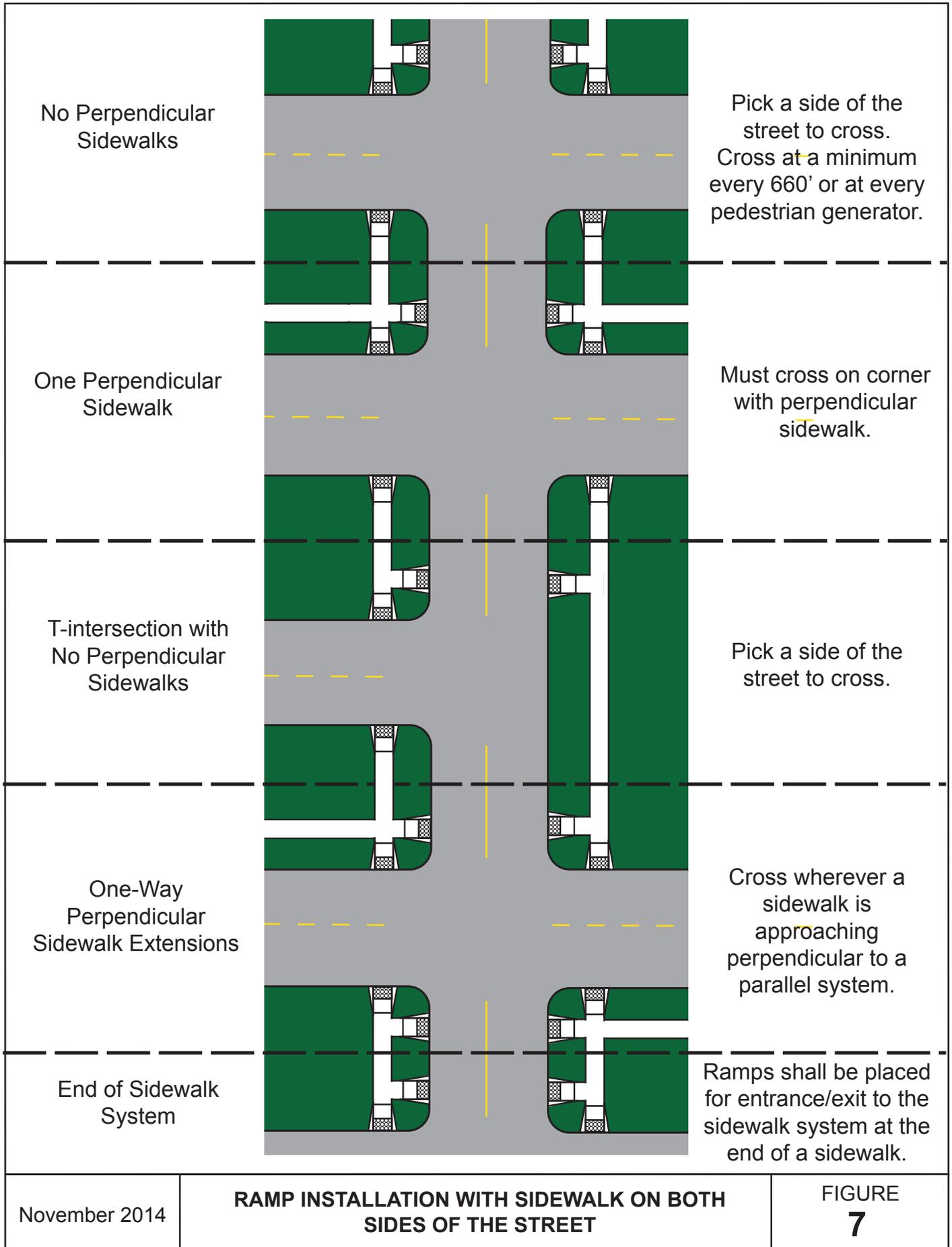
November 2014	<b>PEDESTRIAN CROSSING SCHEME AT SIGNALIZED INTERSECTION</b>	<b>FIGURE 5</b>
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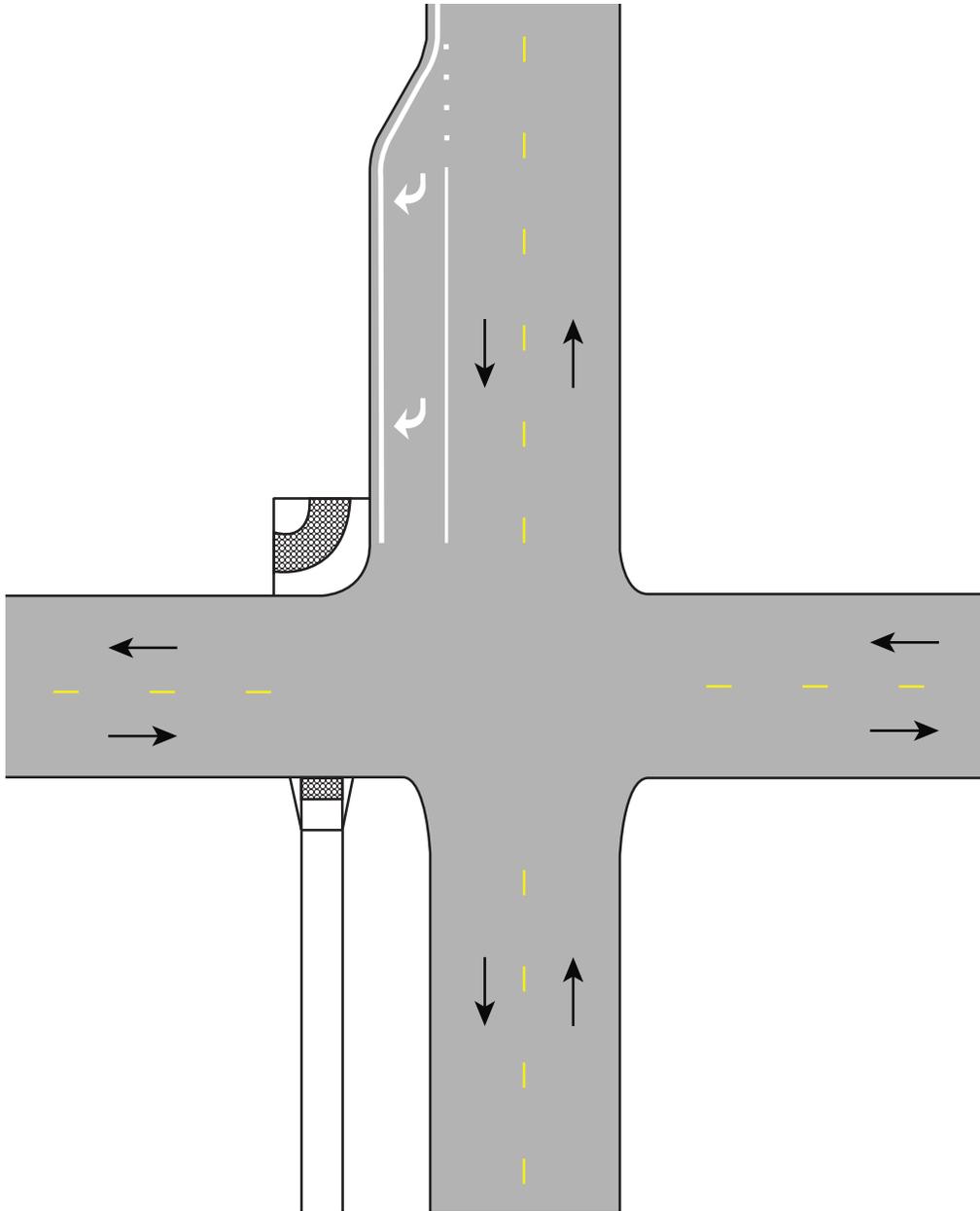


November 2014

**RAMP INSTALLATION WITH SIDEWALK ON ONE SIDE OF STREET**

**FIGURE 6**

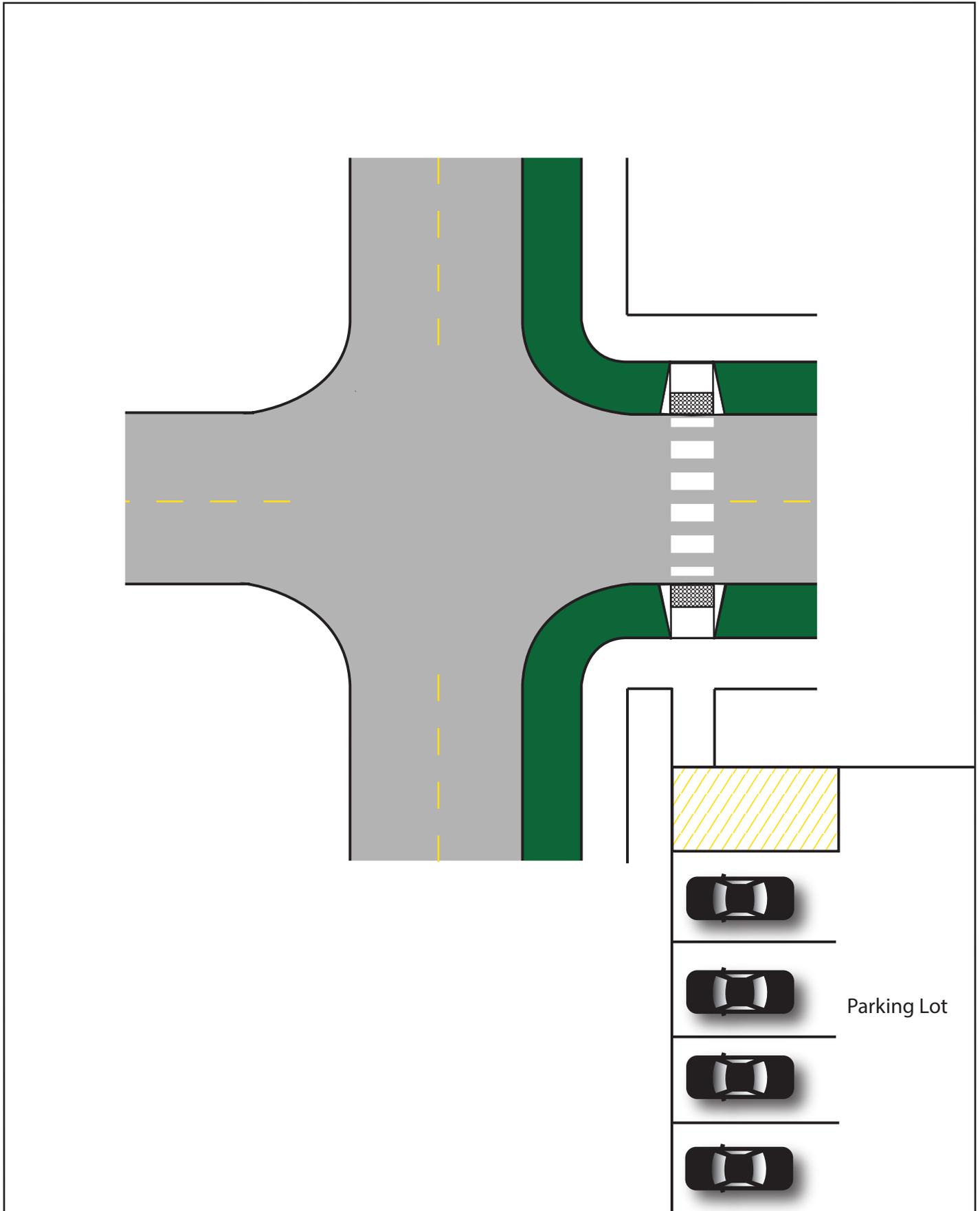




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**REFUGE AREA WITHOUT SIDEWALK**

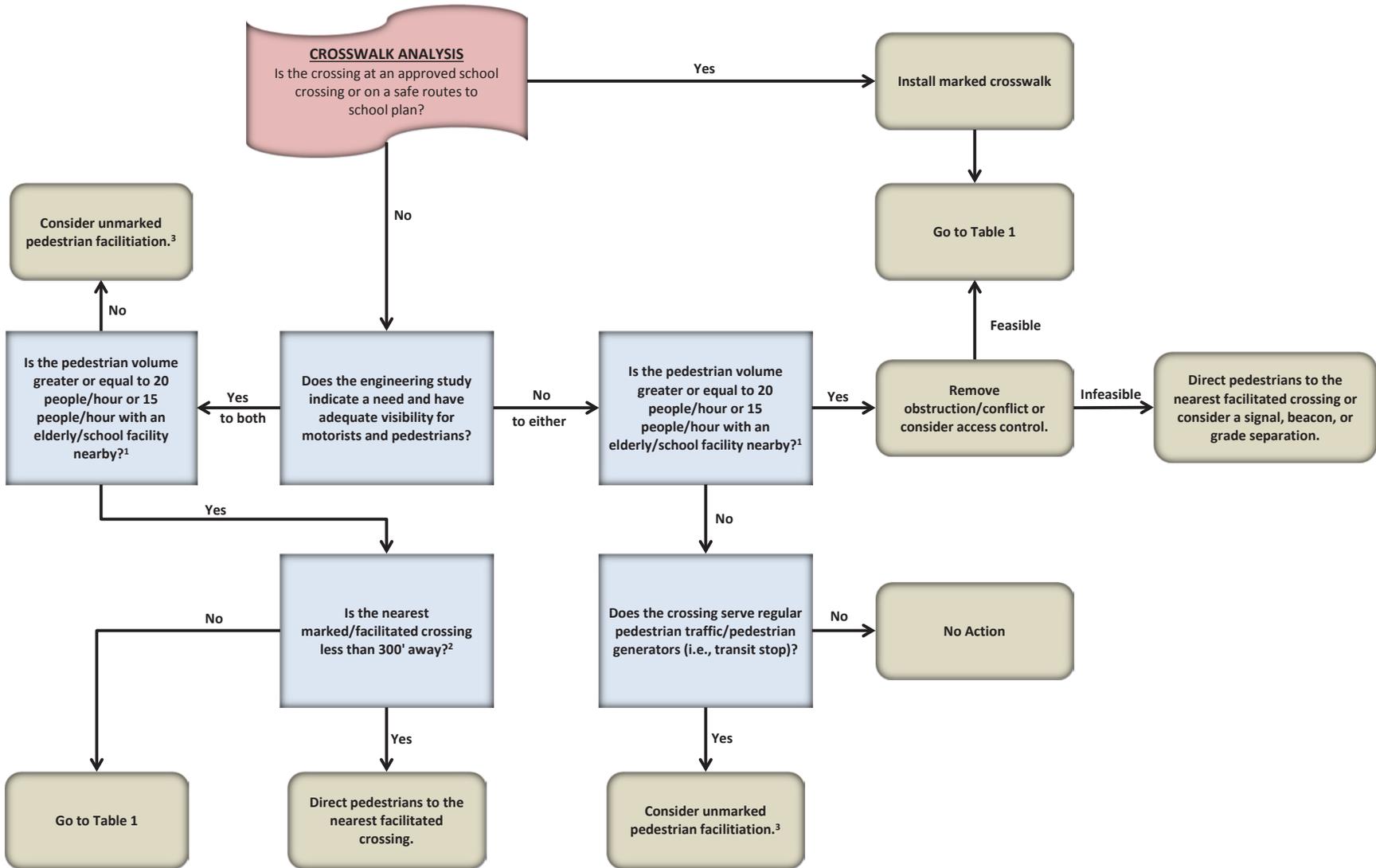
FIGURE  
**8**



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**SHORTEST PATH SIDEWALK**

**FIGURE 9**



**Notes**

1. Urban, suburban, and rural locations may vary in this classification. Urban may want to use locations that have higher volumes than the surrounding crossings. Rural locations may want to mark locations that have regular pedestrian crossings but may never meet the 20 pedestrians/hour minimum.
2. A reasonable walking distance is 660' in some suburban/rural applications, urban marked crossings should never be closer than 150'.
3. See the "Additional Treatment Considerations" section for more information.

**Table 13-1 Pedestrian Facility Treatments**

Roadway Configuration <sup>1,5</sup>	Vehicle ADT ≤ 9000				Vehicle ADT > 9000 - 12,000				Vehicle ADT > 12,000 - 15,000				Vehicle ADT > 15,000			
	≤ 30 mph	35 mph	40 mph	≥ 45 mph	≤ 30 mph	35 mph	40 mph	≥ 45 mph	≤ 30 mph	35 mph	40 mph	≥ 45 mph	≤ 30 mph	35 mph	40 mph	≥ 45 mph
2 lanes (with or without a raised median)	A	A	B	D	A	A	B	D	A	A	C	D	A	B	C	D
3 lanes with raised median	A	A	C	D	A	B	C	D	A	C	C	D	B	C	C	D
3 lanes without raised median	A	B	C	D	A	B	C	D	B	B	C	D	B	C	C	D
Multilane (4 or more lanes) with raised median <sup>2</sup>	A	A	C	D	A	B	C	D	A	B	C	D	C	C	C	D
Multilane (4 or more lanes) without raised median <sup>2</sup>	A	C	C	D	B	C	C	D	C	C	C	D	C	C	C	D

**Treatment Descriptions:**

**A. Consider marked crosswalk and signs**

**Guidance:** Consider installing marked crosswalk with advance warning signs (W11-2); use S1-1 signs for school crossings. Consider in-roadway (R1-6) or overhead (R1-9a) (R1-9b) signs.

**B. Consider marked crosswalk with enhanced signs (R1-6a or R1-9a R1-9b) and/or geometric improvements**

**Guidance:** Consider installing treatment options from Type A treatments. Add curb extensions or median refuge islands.

**C. Consider marked crosswalk with signs, geometric improvements, and pedestrian activated warning devices<sup>4</sup>**

**Guidance:** Consider installing a raised median refuge island if one is not present. Consider installing marked crosswalk and appropriate crossing signs along with a pedestrian activated

**D. Do not install marked crosswalk.<sup>3</sup>**

**Guidance:** Consider pedestrian hybrid beacon, pedestrian traffic signal, or grade separated crossing.

**Specific Notes:**

- Advanced stop lines and signing (R1-5b or c) should be used whenever possible if a multiple threat crash issue is present. Overhead signing, RRFBs or other overhead treatments should be used to mitigate multiple threat crash risks.
- Do not install a marked crosswalk where there are 3 or more through lanes per direction. Consider a pedestrian hybrid beacon, pedestrian traffic signal, or grade separated crossing.
- Traffic calming measures should be considered to reduce speed.
- If a median cannot be or is not currently installed go to Treatment Type D.
- Minimum acceptable median width to provide a refuge is 6 feet.

**General Notes:**

- Adding crosswalks alone will not make crossings safer, result in more vehicles stopping for pedestrians, nor will they necessarily create a false sense of security.
- Crosswalks have not been proven to create a false sense of security - research shows that pedestrians scan the road more at marked crosswalks.
- Whether a crosswalk is marked or not, additional crossing enhancements should be considered. See the "Additional Treatment Considerations" section.
- See MUTCD Section 3B.18 for additional guidance on using this table.
- Lanes are total cross section.