

# City of Longmont Pedestrian Crossing Treatment Guidelines



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Public Works and Natural Resources  
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**Figure 1 Pedestrian Crossing Evaluation Flowchart**



## **1.0 Crossing Treatment Policies**

Safe and efficient pedestrian travel benefits everyone in our community and has become an increasingly important issue for the City of Longmont. Pedestrian facilities play a major role in promoting walking as a viable mode of travel, reducing our dependency on the automobile, and improving quality of life. Our decision to walk, or to let our children walk, often depends on our ability (and perceived ability) to safely cross streets that act as barriers along the way.

A quality pedestrian environment should have the following characteristics:

- Provide safe and efficient travel along facilities and at crossings
- Meet needs of all pedestrian abilities and age groups
- Reasonable balance of impacts among all modes of travel
- Effective balance between treatment needs and available resources

Until recently there has been little available research and few agencies had developed formal guidelines for pedestrian crossing treatments. National standards continue to provide little guidance for pedestrian crossings, especially at mid-block locations. There has been considerable controversy and disagreement regarding the safety benefits of marking crosswalks. Many believe that marked crosswalks can give pedestrians a “false sense of security” when crossing a roadway and therefore create a hazardous pedestrian environment. Others believe that marked crosswalks help channel pedestrians to a preferred crossing location, alert motorists to the presence of a pedestrian, and therefore create a safer pedestrian environment. With these varying opinions and lack of a national standard, agency staff are often left to use their own judgment (often influenced by public and/or political pressure) in determining where to install crosswalks, resulting in practices that differ considerably from one community to another and even within a community. Inconsistent application in turn can lead to reduced driver and pedestrian compliance, increased public discontent, and reduced safety.

The lack of a national standard and increased emphasis on pedestrian safety has spurred a growing number of guidelines and studies on this topic. In an effort to apply a more systematic approach for Longmont’s pedestrian crossings, these guidelines were developed to include:

- Criteria and procedures for evaluating the need for and recommended level of pedestrian devices,
- Identification of appropriate treatments for pedestrian crossings based on pedestrian characteristics, vehicular characteristics, and roadway geometry,
- Review of pedestrian crossing research and evaluation, both nationally and in our region.

This is Longmont’s initial attempt to formally establish written guidelines on this topic. In the past, Longmont has often relied upon *Guidelines for the Installation of Crosswalk Markings* (American Automobile Association, 1988) to evaluate the need for marked pedestrian crossings. These AAA guidelines are well established and nationally recognized, but are viewed by many as pedestrian-unfriendly with unreasonably difficult requirements for installing a marked crossing.



Longmont's transportation system should be consistent throughout the community, and relatively consistent with our neighbor communities, so that expectations of all pedestrians and drivers are met and "surprises" are minimized. These guidelines are based on research and best practices in surrounding Front Range communities and around the country, and recommended crossing treatments are consistent with treatments used by CDOT and nearby communities. A separate document, *Support Material for Pedestrian Crossing Treatment Guidelines*, summarizes research and best practices related to these City guidelines.

Following are pedestrian crossing and treatment policies that support Longmont's goal of providing a safe pedestrian environment within a balanced transportation system.

### **1.1 Avoid overuse of Crossings and Treatments**

Following are reasons to avoid the overuse of pedestrian crossings and treatments:

- The MUTCD (2003 edition) recommends against indiscriminate use of crosswalks,
- Research by FHWA and other sources suggests that overuse of crosswalks and treatments can lead to reduced compliance, effectiveness and safety,
- Crosswalks and treatments at locations with low pedestrian levels lose their effectiveness and become less safe, as drivers rarely see pedestrians and ignore the treatments,
- Installation and maintenance of unnecessary crossings and treatments is an inefficient use of limited City resources,
- Inappropriate crossings and treatments may increase the risk of liability.

While crossings and treatments may be effective at many individual crossing locations, their overuse can result in their decreased effectiveness if drivers become desensitized (and disrespectful) to them. Therefore, these minimum pedestrian and vehicle volume criteria should be followed for installation and removal of pedestrian crossing treatments.

### **1.2 Minimum Pedestrian Volume for Installation of Crossings and Treatments**

Marked pedestrian (and school) crossings and treatments should only be installed where the following levels of pedestrian (or bicycle) crossing volumes exist:

1. 20 or more pedestrians per hour during any single hour of an average day, or
2. 18 or more pedestrians during each of any two hours of an average day, or
3. 15 or more pedestrians during each of any three hours of an average day.

Young, elderly and disabled pedestrians count two times (2x) toward these volume thresholds; so that a crossing with 10 students (elementary or middle school) meets the 20 pedestrian volume threshold.

### **1.3 Minimum Vehicular Volume for Installation of Crossings and Treatments**

Pedestrians (and students) can normally cross a street with low traffic volumes safely and quickly





without marked crosswalks and treatments. Therefore, marked pedestrian (and school) crossings and treatments should only be installed at locations where the average daily traffic (ADT) is at least 1,500 vehicles per day (vpd). School crossings and treatments can also be installed if hourly vehicle traffic exceeds 10% of required ADT during a peak hour of student activity when pedestrian volumes also exceed their minimum threshold. School crossing treatments are normally installed where student pedestrian volumes and vehicular volumes exceed these thresholds during peak school times and the crossing is along a school route.

These installation thresholds apply to crossings that are either uncontrolled or controlled by a stop or yield sign. Crossings controlled by a traffic signal are discussed in Section 1.8.

#### **1.4 Removal of Marked Crosswalks and Treatments**

Conditions can change over time so that a crossing and/or specific treatment(s) may no longer be needed. If traffic volumes or pedestrian (or student) volumes drop below 50% of their minimum thresholds for installation, then removal of the marked crosswalk should be considered. If conditions change and some treatments are no longer appropriate or justified, then these treatments may be changed or removed. Existing crossings or treatments may be evaluated when there is a planned roadway rehabilitation or overlay project, change in land use, need for replacement or maintenance of crossing markings and/or treatments, safety or operational issues, installation of alternate pedestrian facility or crossing, or other conditions that bring to question the need for a marked crosswalk or the appropriateness of its treatments.

#### **1.5 Multi-Use Path Crossings**

Our goal is to promote the use of multi-use paths around Longmont, and roadway crossings often create barriers for pedestrians and bicyclists. Therefore, crossing locations connecting a multi-use path on each side of a roadway are not subject to minimum pedestrian volume criteria for installation or removal of markings and treatments. Locations where a multi-use path ends on one side of a roadway crossing and a sidewalk or similar facility exists on the other side of the crossing must meet 50% of the pedestrian volume threshold for installation, and are subject to removal if pedestrian volumes fall below half of this reduced threshold. Minimum vehicular volume criteria still apply for installation (Section 1.3) and possible removal (Section 1.4) of marked crosswalks and treatments at these multi-use paths.

#### **1.6 Crosswalk Markings**

Longmont's goal is to provide safe crosswalks for pedestrians in a cost-efficient manner. High visibility markings such as Continental crosswalks are more expensive to install as they typically require 30-75% more pavement marking material than standard (or transverse) crosswalks. Standard crosswalk markings are typically used at crossings controlled by traffic signals, stop signs, or yield signs. Continental markings should be used where their higher visibility can provide additional benefit, such as uncontrolled crossings and school crossings. The following table describes the style of crosswalk markings that will generally be installed under different crossing situations:





<b>Vehicle Control at Crossing</b>	<b>Pedestrian Crossing</b>	<b>School Crossing</b>
Traffic Signal	Standard	Standard or Continental
Stop or Yield	Standard	Continental
Uncontrolled at Intersection	Continental	Continental
Uncontrolled Mid-block	Continental	Continental

Longmont may install continental markings rather than standard markings at locations where they could potentially last longer and be more cost-effective, such as intersection approaches with low turning volumes where markings can be located to avoid wheel paths.

### **1.7 Geometric Elements**

Longmont follows the FHWA recommendation that geometric elements, such as median refuge islands, curb extensions, and raised crosswalks, should be considered and installed based on engineering judgment rather than a warrant. These geometric elements are very effective at minimizing pedestrian exposure as they can improve pedestrian visibility, reduce crossing distance, improve accessibility, allow pedestrians to cross a roadway in two stages, provide increased pedestrian (and bicycle) storage, and moderate vehicle speeds to help make gap selection more predictable and safe. While these geometric elements are typically installed at marked crosswalks, they have also proven effective as traffic calming measures at unmarked crossings where pedestrian volumes did not justify a marked crosswalk. Longmont will continue to evaluate and implement these types of geometric elements on a case by case basis at marked and unmarked pedestrian crossing locations. Longmont will also continue to be guided by AASHTO’s Green Book and Pedestrian Guide in the design of these elements.

In order for center median refuge islands to be a viable refuge treatment, it should be able to store a group of pedestrians, provide at least two feet on each side for splash protection, and accommodate a bicycle without overhanging into traffic lanes. At higher speeds, wider medians should be used to increase protection of pedestrians. Therefore, center median islands at pedestrian crossings of roadways with 35 mph speed limits or less must be at least 6 feet wide, and are recommended to be 8 feet wide or more if feasible. Along multi-lane roadways or where speeds are 40 mph or higher, center median islands must be at least 8 feet wide. 10 foot wide center median islands are desirable at multi-use path crossings to better accommodate bicycles with child trailers, tandem bicycles, or groups of bicycles.

Curb extensions improve visibility of pedestrians, shorten the crossing distance, and moderate speeds of vehicular traffic. Longmont has effectively used these in many locations, including

signalized intersections, STOP controlled intersections, and uncontrolled crossings (marked or unmarked).

Raised pedestrian crosswalks improve visibility of pedestrians, improve accessibility, and moderate the speed of vehicular traffic. Raised pedestrian crossings can be particularly effective at right turn bypass islands and school crossings. Installation may not be possible along roadways that serve as a primary access route for emergency vehicles.



### **1.8 Traffic Signal Enhancements**

It is Longmont's goal to provide the following enhancements at signalized intersections:

- Pedestrian signals, pushbuttons and stop bars at all intersection approaches,
- Marked crosswalks on all intersection approaches with pedestrian facilities on both sides,
- Countdown pedestrian heads to better educate everyone on pedestrian signal operation, and inform pedestrians about remaining available crossing time,
- place pedestrian signals on recall so that the "Walk" phase comes up every signal cycle for crosswalks parallel to major roadways with pedestrian activity and sidewalks present, in order to reduce pedestrian delay; this can be provided as long as traffic operations are not significantly impacted.



These improvements will be phased in as resources become available, and will be prioritized for locations with high pedestrian activity, such as near schools and in business and commercial districts.

### **1.9 Prioritization**

When limited resources restrict our ability to evaluate or install pedestrian crossing treatments, Longmont may need to prioritize our crossing evaluations and installations.

Projects - Crossing treatment evaluations within the limits of Street Rehabilitation, Neighborhood Mitigation, or other Projects in the City will occur during the planning phases of the project in order to allow the treatments to be installed with the Project.

Non-Project – Citizen requests will be evaluated by staff in the order that the requests are received. City initiated evaluations will be performed based on the crash rating or # crashes / severity. Locations that meet these Guidelines for installation will be prioritized based on crossing activity, conflicting vehicle activity, and construction cost. Construction will occur as resources are available.

### **1.10 Pedestrian Abilities**

Recognizing that people have very different abilities as pedestrians, Longmont will consider the unique needs of pedestrians at crossing locations. Research has shown that young, elderly and disabled pedestrians are often more challenged when crossing streets, due to factors such as inattention, ability to judge gaps in traffic, and slower walking speeds.

When counting pedestrians for crossing evaluation Longmont will classify young (middle school age children or younger), elderly, and disabled pedestrians separately and multiply them by two (2) when calculating the total number of pedestrians at crossings. For example, where 20 pedestrians in an hour might be required for a crosswalk, only 10 young or elderly pedestrians would be needed. Longmont will consider special treatments for unique needs where there are high concentrations of these users.

Longmont's School Safety Program supplements these guidelines on topics specific to schools.

### **1.11 Crosswalk Lighting**

FHWA recommends that adequate lighting be provided at marked crosswalks to enhance the safety of pedestrians crossing at night. Where there is an expectation of frequent night time pedestrian use, adequate lighting shall be provided at all marked crosswalks. Where infrequent pedestrian use is anticipated, it should be Longmont's goal to provide adequate nighttime lighting at unprotected marked crosswalks, and where feasible and practical at protected marked crosswalks.

### **1.12 Textured and Colored Pavement Treatments**

Applications of textured, brick, or otherwise colored pavement treatments alone do not establish a marked crosswalk. Pavement markings as described in the MUTCD are required to mark crosswalks at intersections, or legally establish crosswalks at mid-block locations. Contrasting pavement treatments can supplement these crosswalk lines as long as they do not reduce the visibility of the crosswalk lines.

### **1.13 Accessible Crosswalks**

It is a Longmont's goal that all crosswalks comply with the Americans with Disabilities Act (ADA) in order to provide and enhance mobility for all users.





## **1.14 The Other ‘E’'s**

These guidelines primarily address Engineering aspects of pedestrian crossings, but other ‘E’'s also help provide a safe pedestrian environment.

Education – Research has found that drivers and pedestrians lack an accurate knowledge of right of way laws in crosswalks at unsignalized intersections. Longmont provides route maps with safety tips for elementary and middle school students who walk and bicycle to school. Longmont will expand the use of crosswalk treatments that help educate drivers and pedestrians, such as:

- “State Law” signs for drivers approaching marked crosswalks,
- Informational signs to instruct pedestrians on how to safely cross, especially at more challenging crossings with high vehicular volumes, multiple lanes, and pedestrian activated treatments.

Enforcement – Pedestrian and driver behavior improves when enforcement is provided. The presence of Longmont police at many schools during peak times reminds everyone to drive slowly in school speed zones. Longmont staff regularly provides an annual crash safety report to the police, and coordinates with police on safety issues related to pedestrians.

Encouragement – Emphasizing a safe pedestrian environment and developing (and maintaining) an extensive sidewalk / path network, are key elements that encourage people to walk. The City of Longmont and the St. Vrain Valley School District have been very active in the statewide Safe Routes to School program and have been awarded grants in recent years. The number of students walking to schools has noticeably increased at schools that actively participate in this program.

## **2.0 Recommended Treatments for Longmont**

Many treatments are being used in nearby communities with varying degrees of success. The selection of treatments in Longmont will be based on recommendations in recent FHWA and NCHRP reports that include the most thorough research in the United States. Longmont will also try to be reasonably consistent with treatments used in nearby communities. Pedestrian crossing treatments that are traffic control devices will adhere to the current Manual on Uniform Traffic Control Devices (MUTCD).

Following are recommended **device categories** and typical treatment options for Longmont:

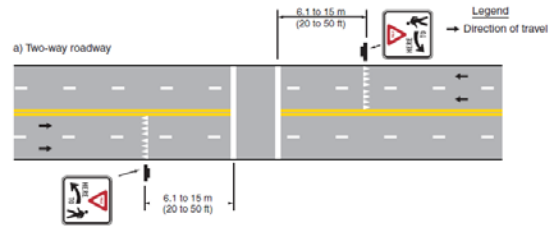
1. **Unmarked or No Crosswalk** – If criteria are not met to justify a marked crosswalk, then the location will remain an unmarked crossing or will not be established as a mid-block crossing.
2. **Crosswalk** - Standard or continental crosswalk markings. At uncontrolled crossings install pedestrian crossing sign (W11-2) and diagonal downward pointing arrow plaque (W16-7p)



at the crossing. An additional pedestrian crossing sign (W11-2) in advance is an option at all unsignalized marked crossings. Use school crosswalk warning sign (S1-1) sign for school crossing locations.



3. **Enhanced** – Supplemental treatments to enhance visibility and increase compliance at crossings without signal or stop sign control:
  - a. **Roadside Signs** - Install “State Law – Yield to Pedestrian” signs at crossing.
  - b. **In-Street signs** – Install “State Law – Yield to Pedestrian within Crosswalk” (R1-6) at the marked crosswalk in the center median island or center of the roadway. Add school plaque (S4-3) for school crossings locations.
  - c. **Advance Signs and Markings** - Install “Yield Here to Pedestrian” (R1-5 or R1-5a) signs in conjunction with yield lines in advance of mid-block marked crosswalks.



4. **Active** – Treatments to display warnings when activated by pedestrians at crossings without signal or stop sign control:
  - a. **Pedestrian Activated Flashing Signs** – Install LED lights on pedestrian crossing sign (W11-2) with nearby pedestrian pushbuttons, which can be activated by a pedestrian with nearby pushbuttons. This treatment is primarily intended for multi-lane crossings, and is not available for use at school crossings.
  - b. **Overhead Flashing Amber Beacons** – Install LED lights on pedestrian crossing sign (W11-2), or beacons next to pedestrian crossing sign (W11-2), on mast arms that extend over the roadway at or in advance of the crossing. These beacons can be activated by pedestrians with nearby pushbuttons, and are normally intended for mid-block crosswalks



5. **Red** – These devices display a circular red signal indication to motorists at the crossing location after pedestrian activation. These signal devices do not service side street motor vehicle traffic.
- a. Pedestrian Crosswalk Signal – Install three section traffic signal head (red, yellow, green) with pushbuttons at mid-block crossing that is activated by a pedestrian. This signal is subject to MUTCD requirements.
  - b. Half Signal, HAWK Beacon Signal, or Pedestrian Beacon Signal – These devices are experimental or proposed in 2003 MUTCD, and may be included in future MUTCD revisions. The Half Signal is standard three section head, while the others use “Mickey Mouse Ears” signal heads with two red lenses above a yellow lens.



6. **Signal** – These are standard traffic control signals that serve side street vehicular traffic as well as pedestrians attempting to cross.

These criteria will first determine the appropriate device category, after which the crossing location will be evaluated to select the appropriate treatment within that device category. Specific treatment options and traffic control devices will be selected based on current MUTCD standards, national guidelines and best practices.

Following are some recommendations and restrictions:

- Geometric elements such as center median islands and curb extensions may be considered to enhance pedestrian safety at Marked or Unmarked crossing.
- Some geometric elements are more appropriate when used with other specific treatments; for example, a raised crosswalk are intended for marked crosswalks.
- Significant treatments and possibly geometric elements are needed at uncontrolled marked crosswalks when vehicle speeds are 40 mph or 45 mph, or when crossing 4 lanes or more.
- Traffic control signal or grade separated crossing is needed when crossing 6 lanes or more, or when major roadway speeds are 50 mph or higher.
- Active devices are intended for multi-lane crossings.
- Active devices are not intended for school crossings or crossing locations where vehicular speeds are 45 mph or higher.

### 3.0 Crossing Evaluation Procedures

This section describes the procedures that should be followed when evaluating a potential new crossing, changes to an existing crossing, or possible removal of an existing marked crosswalk.

### **3.1 Identify and Describe Crossing Location and Issues**

- Identify street, crossing location, and whether it connects to a multi-use path on one or both sides (intersection leg, street address, sidewalks, intersecting path or trail, etc.).
- Document specific issues (citizen request, roadway project, safety history, etc.).
- Identify nearby pedestrian generators (schools, parks, community centers, retirement centers, commercial uses, etc.).

### **3.2 Physical Data Collection**

- Existing roadway configuration and geometric elements (crossing distance, lane configuration, center medians, curb extensions, curb ramps, bike lanes, etc.).
- Posted speed limit along major street at crossing location.
- Existing traffic control and other crossing treatments (lighting, signs, markings, etc.).
- Stopping sight distance (SSD) on all vehicular approaches to the crossing; if SSD does not meet AASHTO Green Book criteria, determine if mitigation is feasible to achieve adequate SSD.

### **3.3 Vehicular and Pedestrian Data Collection**

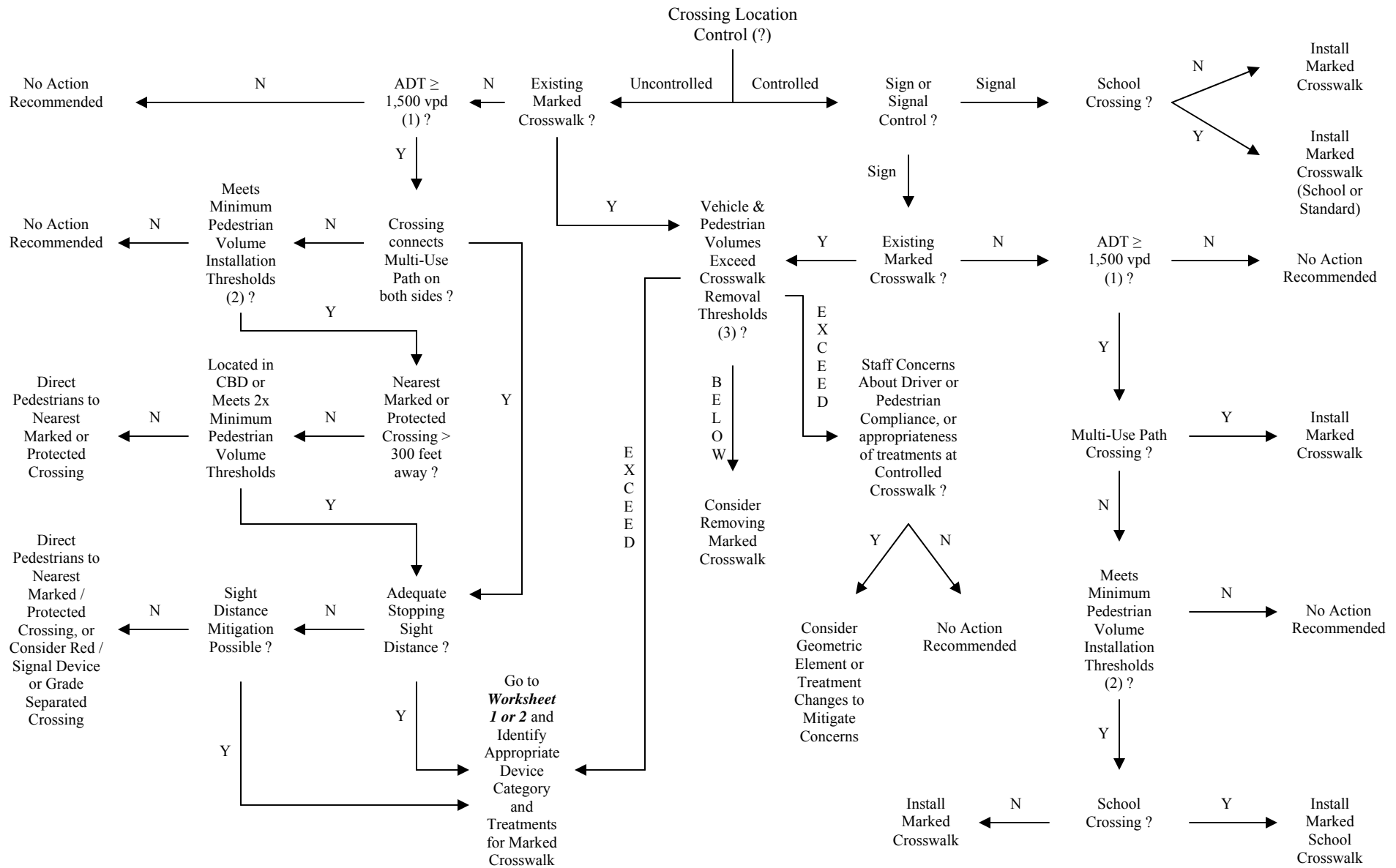
- Perform pedestrian and bicycle crossing counts during peak hours of pedestrian activity, normally during AM, mid-day and PM peak hours. Young, elderly and disabled pedestrians should be noted. Near elementary and middle schools, students on their way to/from school should be noted, and data collection times should include the 30 minute periods before school opens and after school closes.
- Compile or collect average daily traffic volumes for vehicular traffic along the major roadway at the crossing location, and peak hour volumes at proposed school crossings.
- Compile available crash data (normally during the most recent 3-5 years) near the crossing location, noting crashes involving pedestrians and bicycles attempting to cross the road.

### **3.4 Evaluation to Determine Appropriate Treatments**

Based on data described above, perform the following evaluation:

1. Use *Figure 1–Pedestrian Crossing Treatment Flowchart* to evaluate whether a marked crosswalk is needed, and at controlled crosswalks help identify the appropriate treatment.
2. At uncontrolled crossing locations where a crosswalk is needed, use the correct Pedestrian Crossing Evaluation Worksheet (see *Support Material for Pedestrian Crossing Treatment Guidelines*) to determine the appropriate device category (crosswalk, enhanced, active, red, or signal).
3. Evaluate conditions, and select specific treatments and geometric elements.
4. Document the evaluation and treatment selection process.





Notes:

- (1) Or ≥ 150 vph at School Crossing during peak school period
- (2) **Minimum Pedestrian Volume Installation Thresholds:**
  - 20+ pedestrians per hour during any single hour, or
  - 18+ pedestrians per hour during each of any two hours, or
  - 15+ pedestrians per hour during each of any three hours

[Apply 50% of above thresholds if crossing connects end of Multi-Use Path and sidewalk, Young, elderly and disabled pedestrians count 2x toward volume thresholds]
- (3) **Crosswalk Removal Thresholds:**
  - pedestrian or vehicular volumes fall below 50% of Installation Thresholds

**Figure 1**  
**Pedestrian Crossing Evaluation Flowchart**

