## 1-5-1 Subject Numbering System — June 2005

### DEFINITIONS

Chapter: A main divisional unit of this manual, addressing one of the major functions of traffic engineering or supporting functions.

Section: A grouping of related subjects within a chapter.

Subject: A specific guideline, policy or procedure.

### SUBJECT NUMBERING

The manual is divided into topical chapters with each chapter having one or more sections that are divided into specific treatments of material, called subjects.

Chapters, sections and subjects are all numbered.

Chapter numbers are numbered consecutively, generally without gaps. Sections and subjects are numbered consecutively or sometimes with gaps--5, 10, 15, 20--to allow for future insertions of material at the most appropriate locations within the chapter or to follow the MUTCD numbering system.

Chapters 2 through 10 are allotted to subjects related to traffic control devices covered in the corresponding Parts 2 through 10 of the MUTCD.

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## 3-2-1 Longline Marking December 2024

### GENERAL

The purpose of this policy is to provide specific guidance for the uniform application of long line markings on State Highways under DOT jurisdiction. The WISMUTCD Section 3B contains further guidance on longline markings.

### Centerline Markings

Centerline markings **shall** be a 6" wide yellow line. Dashed lines **shall** be 12.5' long with a 37.5' gap.

Centerlines markings **shall** be marked on:

- All highways under DOT jurisdiction
- Through all intersections with local roads on two-lane state highways.
- On undivided multilane highway with a double yellow line

Centerline markings **shall not** be marked through:

- Intersections where the state highway is more than two lanes
- Intersections where Interstate, US, or State Highways intersect
- Signalized intersections
- All way stop
- Intersections with opposing left turn lanes.
- Stop lines or marked crosswalks.

Further information on centerline markings are located in Section 3B.01 of the WISMUTCD.

### Edge line Markings

The WISMUTCD Section 3B.06, describes edge line markings in more detail. Edge line markings **shall** be a 6" white line on the edge of the roadway except the left most edge line on a divided highway **shall** be yellow.

Edge line markings **shall:**

- Continue through all driveways (commercial or private) except major commercial driveways (big box stores, etc.) with a full width turn lane.
- Be used on freeways and expressways
- Be used on rural arterial roads with a traveling width of at least 20 feet and an ADT > 6,000 vehicles per day

Edge line markings **shall not** continue through**:**

- Intersecting roadways with two lanes or more
- Intersections where Interstate, US, or State Highways intersect
- Intersections with opposing left turn lanes
- Signalized intersections
- Stop controlled intersections
- Commercial driveways meeting intersection design standards with full width paved turn lanes.

Edge lines *should* be used in urban areas or semi urban areas that do not have curb and gutter as required in WISMUTCD Section 3B.07. Edge lines *should* be used in urban areas where a single paved width is 16 ft or greater.

Edge Lines Adjacent To Urban Curb & Gutter Sections

| POSTED SPEED | IS THERE CONTINUOUS LIGHTING? | |
|---|---|---|
| | YES | NO |
| ≤ 30 mph | No | Optional |
| 35 mph or 40 mph | Optional | Recommended |
| ≥ 45 mph | Recommended | Required |

### Lane Line Markings

Lane lines **shall** be marked to delineate traffic traveling in the same direction. Lane lines **shall** be a 6" wide white line that is 12.5' long with a 37.5' gap between lines. Lane lines **shall** be marked on all state highways under DOT jurisdiction. Lane lines **shall** be marked through minor intersections and major T-intersections on the state

highways.

**Dotted Lane Lines**

According to the WISMUTCD Section 3B.04, a dotted line (3' line, 9' gap) *maybe* used as a substitute lane line or a continuation of an edgeline. This line **shall** be 6" wide and **shall** be used to separate a through lane that continues beyond an intersection or interchange from an adjacent lane under the following conditions:

- A deceleration or acceleration lane
- A through lane that becomes a mandatory turn or exit lane ( SDD 15C31 sheet b)
- Auxiliary lane
- Tapered Exit and On Ramps (SDD 15C31 sheet a)
- Parallel Exit (Deceleration) Ramps (SDD 15C 31 sheet b)

**Dotted Lines**

Dotted lines "cat tracks" **shall** be added to provide guidance through intersections where the edge of the traveled lane is unclear. A dotted line *may* extend through an uncontrolled movement of a state highway intersection with another highway. If these lines are used through an intersection they **shall** be 2' lines with a 6' gap and the same width as the line that is being extended see in SDD 15C8 sheet c. Dotted lines "cat tracks" **shall** be installed when there are multiple left turn lanes and at side by side ramps..

**Channelizing Lines**

Channelizing lines **shall** be white and 10" in width. Channelizing lines **shall** be used in the following locations:

- In advance of an exit ramps or intersections to distinguish a lane. (3 foot line with a 9 foot gap) SDD 15C8.
- In advance of freeway route splits with dedicated lanes.
- To separate a through lane that continues beyond an intersection from an adjacent auxiliary lane between two intersections SDD 15C8.
- Exit gore markings **shall** extend fifty feet past the unpaved neutral area and 300 feet to begin the gore line, as shown on SDD 15C31.
- Entrance gore marking **shall** follow SDD 15C31.
- To separate turn lane and through movements.
- To separate dual turn lanes.

Channelizing markings **shall not** be marked through:

- Signalized intersections.
- Intersections at a 4 way stop.
- Stop lines or marked crosswalks.

**Dotted Extension Lines**

Dotted extension lines **shall** be used at roundabouts at a 2' line with a 2' gap. Dotted extension lines are 18" in width. Refer to FDM 11-26-35 and SDD 15C22 for more guidance on placement. WisDOT will maintain all dotted extension lines at a state maintained roundabout.

**Bike Lane**

If bike lanes are marked, they are typically at least 5 ft wide, and a minimum of 4 feet from a longitudinal joint. Use a 5 foot width at 45 mph or higher. Refer to SDD 15C29 in the FDM. The words "BIKE LANE" or the bike symbol *maybe* used to delineate the bike lane. Signing *may* also be used to supplement the marking. The DT2500 form **shall** be completed to permit locals to install/maintain bike lanes and the DT2137 form **shall** be completed to permit the locals to install/maintain Shared Lane Markings.

The usage of green pavement marking for bike lanes or bike boxes **shall not** be allowed on state maintained roadways unless locals install and maintain the markings.

## 3-2-2 No-Passing Zone Standards March 2021

**GENERAL**

No-passing zones are marked and signed on state-maintained highways to indicate where a driver cannot safely complete a passing maneuver under normal light and weather conditions. Passing Zones allow the driver to make a decision based on rules of the road and circumstances, such as oncoming traffic, reduced visibility due to fog, low light, rain or smoke, turning traffic, or vehicles entering from side roads or driveways. **No-passing zones *should not* be marked to eliminate all possible conflicts.**

However, certain conditions warrant short zones or no-passing zone extensions. Although sufficient sight distance *may* be present at these locations, the passing operation is not appropriate under state law or for safety reasons as documented in an engineering study.

Wisconsin Statute 346.10 allows passing another vehicle at a rural (non-business regional, non-residential regional) intersection, unless the intersection is designated by signals, stop signs, yield signs, or warning signs. Routinely marking zones through minor intersections and/or driveways would significantly reduce legal passing areas available to the driver, increasing non-compliance and unsafe passing in less favorable locations where adequate sight distance *may not* be available.

**SIGHT DISTANCE**

Each Region has a No-Passing Zone Sight Distance Map or spreadsheet listing the sight distance criteria on on state-maintained highways. Typical sight distances are shown in the following table, but other criteria such as ADT or geometrics *may* change or alter those requirements.

**Table 1**. Sight Distance

| Posted Speed Limit | No-Passing Zone Sight Distance | | Minimum Distance Between Zones | |
|---|---|---|---|---|
| (MPH) | (mile) | (feet) | (mile) | (feet) |
| 25-30 | 0.10 | 528 | 0.10 | 528 |
| 35-40 | 0.13 | 686 | 0.10 | 528 |
| 45-50 | 0.16 | 845 | 0.13 | 686 |
| 55 | 0.21* | 1,110* | 0.15 | 792 |

* When authorized by the designated Regional Signing/Marking Engineer, the 55 MPH No-Passing Zone, sight distance ***may* be increased from 0.21 to 0.26 miles** on certain higher volume highway segments, due to higher frequency of crashes and/or a demonstrated history of excessive speeding above the posted limit.

**REQUIRED EQUIPMENT**

1. Use two vehicles that provide a target on the lead vehicle 42 inches above the roadway. The observer's eye in the trailing vehicle **shall** be 42 inches above the roadway. Whatever type of target is used, it **shall** have a sharp cutoff when it disappears and appears.
2. A Distance Measuring Instrument (DMI) **shall** be used and **shall** have an accuracy of at least 10 feet per mile. The DMI **shall** decrease the measured distance when the vehicle backs up.
3. Two-Way communication equipment is required for the two vehicles.
4. At a minimum, a full-width flashing yellow light bar with 360-degree visibility **shall** be used. Additional signs and flashing lights on the vehicles are recommended.

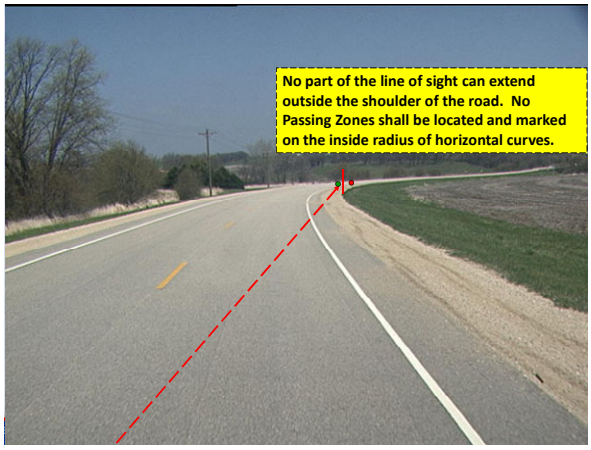
**CRITERIA FOR LOCATING AND MARKING NO PASSING ZONES**

- Prior to beginning work on locating no passing zones, the project engineer or Region Signing/Marking Engineer **shall** be contacted to determine if there are any special no-passing zones to mark under the contract.
- Follow the no passing zone sight distance shown in Table 1.
- The termini of no-passing zones **shall** be established to an accuracy of +/- 50 feet (0.01 mile).
- When the distance between two successive no-passing zones is less than the minimum distance shown in Table 1, connect the two zones.
- For roadways with speed limit changes, the proper no-passing zone sight distance in Table 1 **shall** be maintained.
    - Posted speed limit is increasing:

      When the lead vehicle reaches the increased speed sign, the trail vehicle would back up until the appropriate no-passing zone sight distance is achieved.
    - Posted speed limit is decreasing:

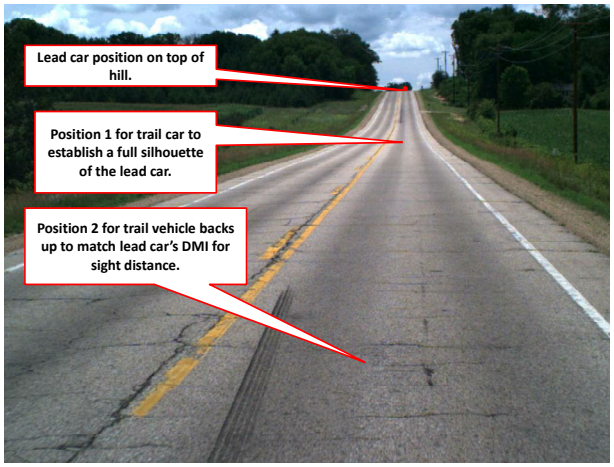
      When the trail vehicle reaches the decreased regulatory speed sign, the lead vehicle would back up until the appropriate no-passing zone sight distance is achieved.
- On horizontal curves, no part of the line of sight **shall** extend outside the shoulder (see Figure 1). No passing zones **shall** be located and marked on the inside radius of horizontal curves. If the horizontal curve requires a No Passing Zone, the starts and ends of the zones **shall** be recorded in the cardinal direction.

**Figure 1.** Horizontal Curve



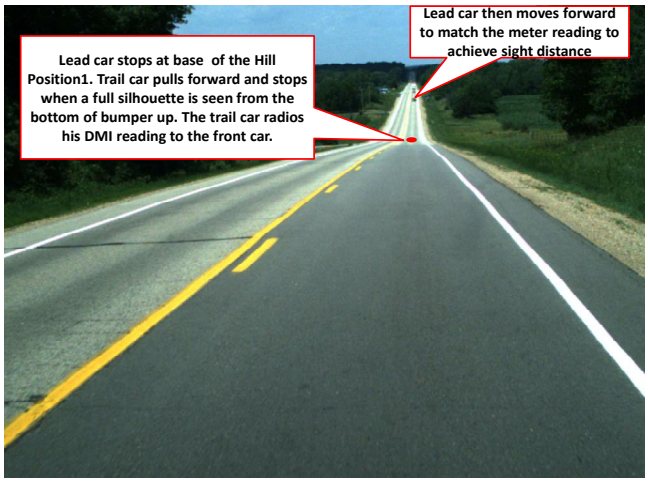

- On vertical curves, whenever the target light disappears from sight, the crew **shall** check for blind spots. For a crest vertical curve, if the target light on the lead vehicle goes out of sight, the trail vehicle parks at the base of the hill. The lead vehicle **shall** back up to reveal a full silhouette of the rear of the car (from the bottom of the bumper up). Once the trail vehicle sees the full silhouette of the lead vehicle, the trail vehicle **shall** back up to establish the sight distance between the 2 vehicles before marking the roadway (see Figure 2).

**Figure 2.** Crest Vertical Curve




- For sag vertical curves, if the target on the lead vehicle goes out, the lead vehicle **shall** stop at the base of the hill or in the sag. The trail vehicle **shall** pull forward until they see a full silhouette of the lead vehicle. Once the trail vehicle sees the full silhouette of the lead vehicle, the lead vehicle **shall** pull forward to establish the sight distance between the 2 vehicles before marking the roadway (see Figure 3).

**Figure 3.** Sag Vertical Curve



- If the no passing zone is less than 500 feet in length, the zone **shall** be extended to 500 feet by lengthening the zone at its beginning in each traffic direction.
- The correctness of no-passing zones leading into and out of the project limits **shall** be checked. Ensure that the minimum distance between zones and the sight distance are checked.

**MARKING MATERIAL**

The beginning and end of all no-passing zones **shall** be marked on the roadway with T's and dots. T's and X's **shall** be 12" X 12" and 2" stroke. Dots **shall** be 3" - 4" in diameter. Use white spray paint (for asphalt) and black spray paint (for concrete) that will be readily visible after one year of application.

**RECORDING OF NO PASSING ZONES**

Use DT2124 to record the No Passing Zones. Include the following data on the No Passing Zone Log Sheets:

- Log all starts and ends in miles to the nearest 1/100$^{th}$ of a mile.
- The beginning and ending of both no-passing zone line in the cardinal direction.
- The sight distance and speed criteria for each zone.
- The location of landmarks (intersecting U.S., State and County trunk highways, bypass lanes, truck climbing lanes, passing lanes, county boundary lines, railroad crossings, and starts and ends of bridges).

**NO-PASSING BARRIER LINE CRITERIA**

1. No-passing barrier lines, 500 feet in length, **shall** be marked on an undivided STH approach in the following intersection situations:
   - The STH traffic is controlled by a stop sign.
   - The intersection with the STH is controlled by a signal.
   - The intersection with the STH is controlled by a roundabout.
   - At a T-intersection with a standard bypass lane that allows vehicles proceeding straight to pass to the right of a left turning vehicle without leaving the paved portion of the highway as per SDD 15C8-b, a 500-foot barrier line **shall** be installed prior to the start of the bypass taper.
2. A no-passing barrier line **shall** be marked in the following non-intersection situations:
   - In advance of a divided highway illustrated on SDD 15C21.
   - In advance of a painted median island illustrated SDD 15C18.
   - Bridges having a width less than 24 feet shown on SDD 15C6.
   - Railroad grade crossings shown on SDD 15C9.
   - Passing/Truck Climbing Lanes illustrated on the SDD 15C8-c and SDD 15C8-d, A bypass lane for an intersection is **not** considered a passing lane under this guideline.
   - Any stretch of undivided 4 lane roadways **shall** have the opposing lanes designated by a double yellow barrier line for its entire length and start the barrier lines of 500 feet before the approaches to this section.

**SPECIAL NO PASSING BARRIER LINES**

The specific characteristics and factors leading to the increase or decrease of the No-Passing Zone sight distance from the DOT 55 MPH standard of 0.21 mile, *should* be documented in the Region. If there is a justified special zone, the traffic engineer **shall** give the crew locating no passing zones specific directions as to where barrier lines are to be placed. Special zones *may* include:.

- Any intersection justified by an engineering study, appropriate reasons include a crash history related to passing maneuvers or demonstrated operational problems. illustrated on the SDD 15C8-13b
- In low speed urban areas, double yellow barrier lines *may* be placed when justified by an engineering study. Criteria for the engineering study include curb and gutter, reduced speed, parking allowed, poor stopping sight distance, closely spaced driveways or intersections, and high pedestrian volumes. The double yellow lines *should* be installed from the start of the curb and gutter to the end of curb and gutter through the urban area. When urban double yellow lines are used, 500-foot barrier lines **shall** be placed on the approaches to this special layout, unless a longer no-passing zone takes precedence.
- At a T-intersection that allows vehicles proceeding ahead to legally pass to the right of a left turning vehicle without leaving the paved portion of the roadway, a 500-foot barrier line prior to the start of the bypass taper will be optional based on engineering judgment.

**SIGNING**

A No-Passing Zone pennant sign (W14-3) **shall** be installed as required in TEOpS 2-3-38, supplementing zones established under this guideline. This sign **shall** be placed no more than 50 feet from the start of the no-passing barrier line unless it's impossible due to location on a bridge deck or other exception.

## 3-2-3 Special Marking ~~April 2023~~March 2026

**GENERAL**

Special pavement markings consist of arrows, symbols, words, stop lines, crosswalks, diagonals, and aerial/vascar enforcement markings. These markings *may* be used to supplement signing. When used, they **shall** conform to the requirements in Section 3B of the WISMUTCD and the following guidelines.

**POLICY**

Most special markings **shall** be white and reflective.

**Arrows**

In general, arrows are used to supplement signing. There are 3 main types of arrows that WisDOT uses:

1. *Lane Control Arrows*
    - To supplement signing for complicated lane assignments and turn lanes. For mandatory turn lanes, the installation of arrows are required, per SDD 15C8 sheet b
2. *Wrong Way Arrows (Type 4)*
    - On any freeway off-ramp with high crash rates or unusual or poor geometrics.
    - Intersections or ramps with demonstrated problems of wrong way driving.
3. Lane Drop Arrows (Type 5)
    - On any lane drop with high crash rates.

Use SDD 15C7 sheet c and d for the size and shapes of these markings.

**Words**

Words currently allowed by WisDOT can be found on SDD 15C7 sheets a and b All words *should* be used at a site with a documented safety problem and discussed with the regional traffic engineer.

- The word, "ONLY", *may* only be used with singular Type 1 or Type 2 lane use arrows. The word, "ONLY", **shall not** be used in a two-way left turn lane.
- The word, "SCHOOL", either single or dual lane marking, **shall** only be used when one of the following criteria applies:
    - In advance of a marked crosswalk, which is typically monitored by a school crossing guard.
    - At a mid-block or uncontrolled intersection. The requestor **shall** be responsible for maintenance of the "SCHOOL" marking in combination with the crosswalk marking. This **shall** be documented on the application/permit form, DT2136 and the crosswalks policy under the "Type of Crosswalk Marking, Other". The required detail **shall** comply with SDD 15C7.
    - *Should not* be installed in a parking lane.
- "BIKE LANE" **shall** only be used with a signed bike lane.
- "YIELD" *may* only be used at roundabouts where there is a documented safety issue.
- The word, "OK", **shall not** be used on any state maintained highways.

**Symbols**

Symbols **shall** conform to the SDD15C7 sheet a and **shall** only be used when the following criteria applies:

- At a site with a documented safety problem.
- Supplement to regulatory signage.
- At the discretion of the regional traffic engineer.

## Chevron/Diagonal Markings

Chevron/Diagonal markings provide added emphasis to the neutral area where driving is discouraged. Chevron markings *may* be applied at gores., refer to the FDM SDD 15C 31 sheet a and b. Yellow diagonal markings *may* be used in medians, refer to SDD 15C18 and SDD 15C21.

## Stop Lines .

Stop lines indicate where vehicles are required to stop at intersections. Stop lines ~~are not required at all intersections, but *may* be desired if~~*should* be considered at:

- An approach to a signalized intersection where detection is installed and stopping at a certain point *may* enhance the operation.
- Intersection approaches with unusual geometrics such as large skew angles or non-symmetric approaches.
- A state highway approach to an intersection with a stop condition.
- Complex multilane approaches.
- An approach to an intersection with the STOP sign installed well in advance of the desired stopping point because of curb radii.
- In advance of a marked or unmarked crosswalk with significant pedestrian volumes.

For placement of stop lines refer to SDD 15C33. If the stop lines are required by the department, the Department will maintain the markings. All other stop lines and crosswalks *may* be marked by contract at the request of the municipality with the understanding that the local agency assumes responsibility for the maintenance.

## Crosswalks

Crosswalks mark the path at which pedestrians *should* cross the roadway by delineating paths on approaches to and within signalized intersections, and on approaches to other intersections where traffic stops. As a secondary purpose, crosswalk markings *may* also serve to alert drivers of a pedestrian crossing point without signal or stop control. At non-intersection locations, crosswalk markings legally establish the crosswalk.

The Department policy for installation of crosswalks is as follows:

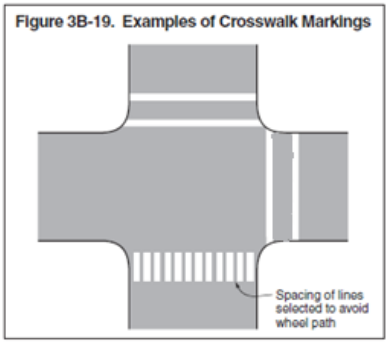
- Crosswalk markings *should* be installed at signalized intersections where pedestrian signal indications are present and at locations where there is a signed school crossing.
- Crosswalk markings *should not* be installed at non-intersection, mid-block locations or urban locations where posted speed limits are 45 MPH or more, unless traffic controls (all-way stop, signal, roundabout) or crossing enhancements (curb bump outs, median divider island, etc.) are present.
- Non-intersection crosswalk markings **shall not** be permitted at rural locations with a posted speed limit of 45 MPH or more. Exceptions *may* include trail crossings where advance warning signs are present.
- A permit for crosswalk markings *should not* be approved if a sidewalk or trail approach and/or ADA-compliant curb ramps (where there is curb) do not currently exist or are planned outside the roadway limits on both sides of the crosswalk approach. Per approval of the Region Traffic Engineer, the local government *may* be permitted to maintain existing crosswalk markings without sidewalk and/or ADA-compliant curb ramps as long as the local unit of government agrees to become compliant with the next highway project (regardless of sidewalk or curb work) or local sidewalk project.
- A permit for crosswalk markings **shall not** be approved unless parking is prohibited within 15 feet of the near limits of the crosswalk, as referenced in Wisconsin State Statute 346.53(5).

### Crosswalk Type Selection

There are 2 types of crosswalks that WisDOT allows as shown in Figure 3B-19 of the WISMUTCD

- Two 6” Transverse Lines at all intersections
  - Preferred method due to:

        - Reduced maintenance cost
        - Less marking area to become slippery and cause problems
        - Reserve ladder bar for the areas with safety issues
    - 24” Ladder Pattern
        - Midblock crossings
        - Multi-lane roundabouts where there is a high presence of pedestrians during peak hours or a demonstrated operational or safety issue. Consult the Region Traffic Engineer and Bike/Ped Coordinator for concurrence.
        - High pedestrian volumes
        - Locations with identified safety issues or risks




Crosswalk markings *should* be placed as nearly perpendicular as possible to the direction of travel on the roadway. The following form needs to be completed to permit a municipality to install and maintain a crosswalk DT2136. A signed copy of the permit **shall** be sent to the local unit of government and a copy **shall** be filed in the Region office. Block pattern crosswalks are paid for by linear feet of each block.

**Special Marking Treatments for Crosswalks**

FHWA has published an official WISMUTCD Ruling, dated August 15, 2013 that allows subdued-colored aesthetic pavement treatments between legally marked transverse crosswalk lines. However, the following criteria **shall** apply:

- The colored pavement treatment **shall not** be made of retroreflective material.
- Transverse crosswalk lines **shall** delineate the edges of the crosswalk and **shal**l be 2-6” white transverse lines.
- Examples of acceptable aesthetic pavement treatments include brick lattice patterns, paving bricks, paving stones, cobbles or other types of paving. All treatments cannot impede wheelchair pedestrians.
- Examples of acceptable colors for aesthetic pavement treatments are red, rust, brown, burgundy, clay, tan or similar earth tone equivalents.

**Funding**

Funding for new crosswalk markings, replacement of existing crosswalk markings or new and replacement colored pavement treatments, is entirely the responsibility of the local government permittee except as follows:

- As part of a highway improvement (new or altered pavement surface) project:
    - Funding of the initial installation and/or colored pavement treatments *may* be included in the project cost without local participation or as outlined in FDM Section 11-3.
    - Routine maintenance of the crosswalk markings between successive improvement projects **shall** be entirely the responsibility of the permittee.
- At signalized intersections with pedestrian signals and at roundabouts:
    - Regions have discretion to maintain the crosswalk marking where sidewalks and ADA compliant ramps are present.

If the local unit of government desires any marking beyond the standard transverse 6” wide lines, the extra cost and maintenance of the marking or colored pavement is borne by the local unit of government.

**Aerial Enforcement and Vascar Enforcement Bars**

Aerial and Vascar Enforcement Bars are transverse markings placed on the roadway to assist law enforcement agencies in the enforcement of speed regulations. These markings are a series of two to five bars with a center-to-center spacing of 660 ft. and **shall** conform to the SDD15C14.

- Aerial –These lines are utilized by airplane to determine vehicle speeds from the air.
- VASCAR (Visual Average Speed Computer and Recorder) – These lines are utilized at ground locations for speed monitoring and verification of distance traveled.

Wisconsin State Patrol is the authority on these markings in cooperation with the Division of Transportation System Development to determine the quantity and locations of these markings for the use on state trunk system. Wisconsin State Patrol will notify the Regional traffic office for new locations that are needed or those that need to be remarked. Actual marking of the lines will be done by the Special Marking Contractor as the work schedule permits. A representative of State Patrol **shall** mark the locations of the lines with a small paint stripe prior to placing markings. A car can be provided by State Patrol for Traffic Control during the marking process, if the project engineer deems it necessary.

**Parking on State Highways**

Parking on State Highways is not encouraged due to the impacts on traffic flow, safety, highway operations, and maintenance. Parking on State Highways is only allowed when a municipality agrees to establish **and** maintain the parking lanes.

This policy is consistent with provisions of Section 86.32(4) of the Wisconsin State Statutes for connecting highways, section 3B.19 of the Wisconsin MUTCD, MUTCD Part 8, and FDM Chapter 17.The Region, after Regional Traffic Engineer review, *may* issue a permit or sign an agreement with local municipalities to allow the marking of parking spaces on the state highway. Installation and marking of parking spaces *may* appear in contracts for state highway work after a project agreement with local cost participation is finalized. Parking space **shall** follow SDD 15C36.

**Parking Restrictions**

Yellow curb markings *may* be installed on state highways to restrict parking. Yellow curb markings **shall** be accompanied by No Parking Signs or covered in State Statute 346. WisDOT will not pay for or maintain these markings.

**Corrugated Median**

Corrugated medians are used to delineate the raised section of a median. If the raised part of the median is separating opposing directions of traffic it *should* be painted in a set of double yellow solid lines on both sides of the median and the raised part of the median *may* be painted in yellow. If the raised part of the median is separating traffic in the same direction of traffic a double set of while solid lines **shall** be used and the raised part of the median *may* be painted in white.

**Railroad markings**

Railroad markings **shall** follow SDD 15c9 and include the RR, X and 3 stop bars. The RR is set before the X to reduce the amount of wear on the marking from traffic. Railroad insurance is required if you are painting any part of the railroad marking.

**Outfall markings**

Outfall markings are white 8” x 8” Epoxy squares. Follow SDD 8d15 for placement.

## 3-2-4 Island Marking — March 2019

**PURPOSE**

This policy explains the concept of how islands **shall** be marked consistent with WISMUTCD Section 3B.23

**POLICY**

Channelizing lines **shall** be placed upstream and adjacent to islands. The color of the pavement marking adjacent to the island **shall** be indicative of the function of the island.

- If an island separates traffic flowing in the same direction, such as a right or left turn island, the pavement markings along the island *may* be left unmarked. If marked it **shall** be white.
- If an island separates opposing traffic, such as a median island, the pavement markings **shall** be yellow.

Channelizing lines *may* be extended to address a demonstrated problem.

Refer to SDD 15C18 and 15C27 for details on how to mark a Turn Lane Island, Median, and Corrugated Median

## 3-2-5 Roundabout Marking March 2026

### GENERAL

Roundabouts **shall** be marked to conform to the requirements in Section 3D.01 of the WMUTCD and the following guidelines.

Typical pavement marking for roundabouts consists of delineating the entries, exits, bike lane accommodations (only on approaches and exits), and marking the circulatory roadway. Single-lane roundabouts need no lane arrows or circulatory roadway pavement marking, except to continue edge line marking on the approaches. FDM 11-26 Attachment 12.1 shows pavement marking for compact roundabouts and Attachment 12.2 shows various samples of single and multilane roundabout pavement markings. In order for roundabout markings to be effective and sustainable, they must:

- Be integrated with and preferably designed at the same time as the roundabout geometry
- Be configured to guide proper usage of the roundabout
- Help the motorist identify the correct lane as early as possible using lane arrows on multilane approaches and circulatory roadways
- Be designed and implemented collaboratively between Regional Traffic Operations and project development staff with expertise in roundabouts and knowledge of maintenance considerations

Refer to TEOpS 3-10-1 for guidance on marking material selection. Markings not covered in this policy shall follow practices established by standard detail drawings or require the approval of the Regional Traffic Engineer in collaboration with others who have knowledge of the design of roundabouts. On connecting highways, (local jurisdiction), coordinate pavement marking with the Regional Traffic Engineer and the local agency to maintain consistency on the facility.

It is important to make sure field layout and pavement marking application on the circulatory pavement is located and positioned correctly. A pavement marking layout detail showing the exact locations is required on all multilane roundabouts. Consider wheel tracking when developing the pavement marking layout detail.

Proper pavement marking within the circulatory roadway will help prevent left turns from the outer lane and thus reduce exit crashes. Complex lane configurations should be reviewed by an experienced roundabout designer and the Regional Traffic Engineer.

## 3-2-11 Raised Pavement Markers March 2017

### PURPOSE

Raised pavement markers are used to either supplement or substitute longitudinal pavement markings. These retroreflective units are either placed on top of or embedded into the pavement. Section 3B.11 to 3B.14 of the WISMUTCD covers the installation of raised pavement markers, and Section 6F.79 covers temporary raised pavement markers. This policy will clarify application of raised pavement markers on WisDOT maintained roadways.

### POLICY

The color of the raised pavement markers **shall** match the color of the line that they supplement or substitute.

Plowable raised pavement markers **shall not** be used on state-maintained roadways. Existing plowable raised pavement markers **shall not** be covered over during a resurface project and **shall** be removed, prior to resurfacing the roadway.

Temporary Raised Pavement Markers, Type I (Pucks)

Temporary Raised Pavement Markers Type I *may* be used in construction zones to supplement pavement marking through shifting tapers. If used in shifting tapers within construction zones, temporary raised pavement markers **shall** remain in place until the traffic staging changes. They **shall** be placed every 50 feet.

Temporary Raised Pavement Markers, Type II (Tabs)

Temporary Raised Pavement Markers Type II **shall** be used to substitute pavement markings which are completely covered. Permanent markings **shall** be installed within 14 days of the marking being obliterated.

On undivided roadways, W8-12 “NO CENTER LINE” signs **shall** be used to warn motorists of a roadway without any centerline until temporary or permanent markings are installed. These signs **shall** be placed at the beginning

of the project, at two-mile intervals throughout the project, and at locations where traffic enters the project area from intersections with state trunk and county trunk highways.

On undivided roadways, prior to the existing marking being obliterated, the locations of the existing pavement markings, including no passing zones, **shall** be documented. In addition, prior to the existing marking being obliterated, the R4-1 DO NOT PASS sign **shall** be installed at the beginning of the no passing zones. Additional R4-1 DO NOT PASS signs **shall** be installed within any no-passing zone that continues beyond an intersection with a state or county trunk highway or that exceeds one mile in length. The R4-2 PASS WITH CARE sign **shall** be installed at the downstream end of the no passing zones. Once the permanent pavement marking has been re-established, the R4-1 and R4-2 signs **shall** be removed.

If the above signs are in place for less than seven continuous days and nights, rollup signs and stands *may* be used in lieu of post mounted signs.

Same-day pavement marking *may* be used in lieu of using Temporary Raised Pavement Markers, Type II.

The standard application of Temporary Raised Pavement Markers, Type II **shall** be installed as shown on Standard Detail Drawing 15C34.

## 6-2-55 Portable Changeable Message Sign Use in Construction & Maintenance Projects ~~December 2022~~March 2025~~6~~

### PURPOSE

The WisMUTCD section 6L.05 ~~6F.60~~ provides standards and options for the usage of Portable Changeable Message Signs(PCMS). This policy provides requirements and guidance on the proper use of PCMS in work zones on state highways.

See TEOpS 17-2-1, Portable Changeable Message Signs (PCMS) Policies & Procedures, for information regarding procurement, use of PCMS for special events, adverse weather, and other non-work zone related events, sign control, and training.

### APPLICATIONS

Since they are dynamic signs, PCMS must only be used to display real-time or changing traffic condition or traffic control information. They *may* also be used provide advance notice prior to projects or events expected to cause congestion or that will require drivers to use alternate routes.

PCMS *should not* be used to replace static warning or regulatory signs; they *may* be considered as a supplemental device to a required static sign. In the case of a ramp or lane closure, the PCMS would supplement the static warning signs informing motorists of the closure.

Nonstandard words such as DANGER, HAZARDOUS, or CAUTION **shall not** be used. These words do not contribute any information and *may* overly concern drivers as they approach the work zone.

PCMS **shall not** be used to display generic safety messages or any other messages not necessary for specific driver action at the site. Examples of generic messages not to be used are BUCKLE UP, WELCOME TO WISCONSIN, or DRIVE SAFELY. Use of these types of generic messages tends to lead to motorist disregard of critical messages and unnecessarily distracts driver attention from the roadway.

Improvement/Maintenance Projects

For improvement projects, designers must include a PCMS message plan with the Temporary Traffic Control Plans. PCMS *may* be include in an improvement project for the following reasons:

1. Provide up to 7 days advance notice to drivers of closures. These signs *should* be provided by the contractor, but when contract timing is an impediment, they *may* be provided by the department or county,
2. Advise travelers of alternate routes around construction,
3. Supplement static sign messages for changes in roadway alignment for up to 7 days,
4. Advise drivers of a change in speed,
5. On Pilot Cars to advise traffic to follow them. This is up to the contractor to used and does not need to be specified in the plans,
6. Use in smart work zone systems for queue warning, dynamic late merge, travel time information, truck entering warning.

When PCMS are used as part of a smart work zone system the costs are normally included in the cost of the system and do not need to be a separate bid item.

Do not include PCMS on improvement projects solely for the use of incident management. Consider smart work zone systems to reduce the potential of an incident instead. PCMS that are included on a project for other reason with the exception of a smart work zone, *may* be used for incident management. Primarily consider PCMS that are on freeway and expressway projects to have PCMS with communications.

All messages displayed must be preapproved by the project engineer. Any subsequent changes to messages due to changing traffic conditions or construction operations **shall** also require approval from the project engineer, except during off-hours incidents or emergencies when the project engineer is not reachable. In general, improvement projects *should* provide for project-specific contractor supply of desired portable work

zone management systems such as PCMS, subject to compliance with JamLogic or other standardized communications interface standards. Accessibility and operation control by the TMC *should* be accommodated, but not committed without their involvement and concurrence. When communications with the TMC is desired include the bid item (Item 643.1051, Traffic Control Signs PCMS with Cellular Communications) with the contract.

The department reserves the right to use/deploy signs from its inventory on an improvement project to improve safety and optimize the operational efficiency of a construction work zone. Contractor-provided signs *should* be used for aforementioned purposes if they can be made available and deployed expeditiously and cost-effectively. The department also reserves the right to remove department owned signs deployed to improvement projects as needed for incident response or higher priorities elsewhere.

Signs owned by the department and counties **shall** be used for the purposes of temporary traffic control for maintenance work, incident management, and adverse weather road condition advisories.

A PCMS that is used to simulate an Arrow Board **shall** only be used to indicate a lane closure and must meet all the visibility requirements of an Arrow Board in the WisMUTCD section 6L.06~~6F.61~~. PCMS messages shall not mix arrows and words on either a single frame or the same operation.

**DEVICE OWNERSHIP**

Signs for highway improvement projects **shall** be supplied and maintained by the contractor as part of the contract similar to flashing arrow boards, drums, and barricades. The department would not assume any ownership of these signs. There is to be no additional state-owned PCMS purchased by regions through improvement projects or otherwise, including implementation in smart work zone systems. If it proves absolutely necessary to procure new WisDOT-owned equipment, BTO will coordinate any procurement of this equipment and provide it for use by regions as needed.

See TEOpS 17-2-1 for provisions on the purchase of PCMS for highway maintenance work and other uses.

**MAINTENANCE**

A memorandum of understanding (MOU) **shall** be developed for any county highway department operating state-owned PCMS on the state highway system. A sample MOU is included in TEOpS 17-2-1.

For state- or county-supplied signs, arrangements *should* be made using state or county forces to maintain the signs while in use. For newly purchased signs, a warranty period is usually provided, requiring the supplier to repair any failures or breakdowns of the sign. When the county performs maintenance work on state-owned signs, charge project number 00XX-01-07 (non-interstate) or 00XX-01-08 (interstate), activity code 032. When the county provides county owned PCMS, all maintenance responsibility rests with the county and is covered under the rental rate.

On an improvement contract, the maintenance is included in the changeable message sign bid item in the contract (Item 643.1050 Traffic Control Signs PCMS). The contractor would be required to check the sign at regular intervals.

**PCMS USAGE**

For PCMS placed on the STH, the PCMS **shall** either be:

1. Owned and placed by WisDOT
2. Owned and placed by contractors under contract with WisDOT
3. Owned, rented, or borrowed and placed by county highway departments under contract or permit with WisDOT.

County sheriff's departments and other local agencies **shall** work with the county highway departments to place the signs and display proper messages consistent with WisDOT policy. This includes any PCMS purchased by a county sheriff's department and other local agencies through funds received from the Bureau of Transportation Safety (BOTS).

**ACCEPTABLE MESSAGES FOR WORK ZONES**

The signs are generally capable of sequencing up to six frames. However, for driver comprehension, messages **shall** be limited to two frames (see WisMUTCD Section 6L.05~~6F.60~~). Blank or other filler frames between the two frames of text **shall not** be used. It is desirable for the driver to be able to read the entire message sequence twice as they pass by the sign. For an interstate highway application, the total viewing time is about seven seconds. Each frame is usually displayed for 2.0 seconds or less. Using more than two frames makes it

difficult for drivers to read the entire message sequence twice. Do not flash any part of a message.

It is recommended that the first frame describe the traffic condition or problem ahead, which the motorist *may* encounter. The second frame would be used to advise the driver of an appropriate action. Examples are:

| 1st Frame | 2nd Frame |
|---|---|
| ROAD | USE |
| CLOSED | EXIT |
| 2 MILES | #394 |

See the message list that follows for more examples.

**MESSAGE EXAMPLES**

| EVENT | PANEL 1 | PANEL 2 | PANEL 1 Example | PANEL 2 Example | Duration | Reference |
|---|---|---|---|---|---|---|
| Project Prewarn (Long term) | ROAD WORK BEGINS | XXXXDAY XX/XX | ROAD WORK BEGINS | MONDAY 4/10 | 1 week prior | |
| Road Closure Prewarn (Long term) | ROAD TO CLOSE | XXXXDAY XX/XX | ROAD TO CLOSE | TUESDAY 10/8 | 1 week prior | L28 |
| Freeway Closure Prewarn(Overnight) | FREEWAY TO CLOSE | XXXXDAY XXPM-XXAM | FREEWAY TO CLOSE | WED 11PM-9AM | 3 days prior | |
| Bridge Closure Prewarn(Long term) | BRIDGE CLOSED BEGINS | XXXXDAY XX/XX | BRIDGE CLOSED BEGINS | THURS 6/1 | 1 week prior | |
| Rolling Closures Prewarn(Overnight) | ROLLING CLOSURES | XXXXDAY XXPM-XXAM | ROLLING CLOSURES | FRIDAY 11PM-4AM | 3 days prior | |
| Ramp Closure Prewarn (Long term) | RAMP CLOSED BEGINS | XXXXDAY XX/XX | RAMP CLOSED BEGINS | SAT 9/12 | 1 week prior | |
| Ramp Closure (Overnight) | RAMP TO CLOSE | XXXXDAY XXPM-XXAM | RAMP TO CLOSE | SUNDAY 8PM-6AM | 3 days prior | L67, L68, 15c2 15D16, 15d49 |
| System Ramp Closed | HWY XX RAMP CLOSED | USE ALT ROUTE | HWY 67 RAMP CLOSED | USE ALT ROUTE | During work | 15D49 |
| Moving Work | MOVING LANE CLOSURES | NEXT XX MILES | MOVING LANE CLOSURES | NEXT 8 MILES | During work | L37, L45, L47, 15d43 |
| Bridge Deck Curing | BRIDGE DECK CURING | DRIPPING WATER | | | | |
| Concrete Repair | CONCRETE CURING | LANE REOPENS XX/XX | CONCRETE CURING | LANE REOPENS 7/3 | During work | |
| Shoulder work | SHOULDER WORK AHEAD | NEXT XX MILES | SHOULDER WORK AHEAD | NEXT 10 MILES | During work | L7 |
| 2-way Left Turn Lane Closure | CENTER LANE CLOSED | NEXT XX MILES | CENTER LANE CLOSED | NEXT 1/4 MILE | DURING WORK | L32 |
| New Traffic Pattern | NEW TRAFFIC PATTERN | LANES SHIFT (LEFT/RIGHT) | NEW TRAFFIC PATTERN | LANES SHIFT LEFT | Up to 1 week after | |
| New Traffic Pattern | NEW TRAFFIC PATTERN | LANES NARROW | | | Up to 1 week after | |
| New Traffic Pattern | NEW TRAFFIC PATTERN | AHEAD XX MILES | NEW TRAFFIC PATTERN | AHEAD 3 MILES | During work | L36 |
| New Traffic Signal | NEW TRAFFIC SIGNAL | BE PREPARED TO STOP | | | Up to 2 weeks after | |
| New Stop Sign | NEW STOP SIGN | STOP AHEAD | | | Up to 2 weeks after | |
| Straddle Rumble Strips | LANE SHIFT (LEFT/RIGHT) | STRADDLE RUMBLE STRIPS | LANE SHIFT RIGHT | STRADDLE RUMBLE STRIPS | Up to 2 weeks after | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Lane Closures (Overnight) | NIGHTLY LANE CLOSURES | BEGIN XXXXDAY XXPM-XAM | NIGHTLY LANE CLOSURES | BEGIN MONDAY 8PM-7AM | 1 week prior | |
| Lane Closures (Weekly) | WEEKLY LANE CLOSURES | BEGINS XXXXDAY XX/XX | WEEKLY LANE CLOSURES | BEGINS SUNDAY 5/19 | 1 week prior | |
| Lane Closure | (LEFT/RIGHT) LANE CLOSED | AHEAD XX MILES | RIGHT LANE CLOSED | AHEAD 2 MILES | During work | L35, L38, L39, L41 |
| Freeway Closure | FREEWAY CLOSED | EXIT AHEAD | | | During work | 15d42 |
| Roundabout Flagging | ONE LANE ROAD AHEAD | BE PREPARED TO STOP | | | During work | L82 |
| Night Flagging | FLAGGER AHEAD | BE PREPARED TO STOP | | | During night work only | |
| Multilane Closure | 2 (LEFT/RIGHT) LANES CLOSED | AHEAD XX MILES | 2 RIGHT LANES CLOSED | AHEAD 4 MILES | During work | L54 |
| Oversize Vehicles | OVERSIZE TRUCKS | MUST EXIT | | | During work | |
| Ramp Closed | RAMP CLOSED AHEAD | | | | During work | L48, L49, L50 |
| Detour (Overnight) | HWY XX (DIRECTION) CLOSED | USE (ROUTE) XXX | HWY 60 EAST CLOSED | USE HWY P SOUTH | During work | |
| Detour Routing (Overnight) | HWY XX DETOUR TRAFFIC | USE (ROUTE) | HWY 60 DETOUR TRAFFIC | USE SHERMAN RD EB | During work | |
| End Detour (Overnight) | HWY XX DETOUR END | HWY XX AHEAD | HWY 60 DETOUR END | HWY 60 AHEAD | During work | |
| Dynamic Late Merge #1 | STOPPED TRAFFIC AHEAD | USE BOTH LANES | | | During speeds 0 to 39 mph | 15d12c |
| Dynamic Late Merge #2 | STAY IN LANE | DO NOT MERGE | | | During speeds 0 to 39 mph | 15d12c |
| Dynamic Late Merge #3 | MERGE HERE | TAKE TURNS | | | During speeds 0 to 39 mph | 15d12c |
| Queue Warning System | STOPPED TRAFFIC AHEAD | EXPECT DELAYS | | | During speeds 0 to 19 mph | 15d12e |
| Queue Warning System | SLOW TRAFFIC AHEAD | PREPARE TO STOP | | | During speeds 20 to 39 mph | 15d12e |

When creating messages for state or county highways, it is recommended that the abbreviation HWY is used. For interstates either I-XX or HWY XX maybe used.

A list of acceptable abbreviations can be found in the WisMUTCD Section 1D.08.

The Reference column lists either the Standard Detail Drawing or the Work Zone Field Manual Layout number the message is currently used on.

## 6-3-4.5 Width Restrictions May 2022

Some highway construction projects require temporary lane width restrictions that cause problems for over-width load movements. Many of these moves are operating under annual permit and the permittees are unaware of the width restrictions. To help prevent inconvenience and the prospect of damage, signs are used to warn and direct the movers.

Multiple trip or annual permits for mobile homes are issued for loads up to 15 feet wide. Loads over 15 feet travel under single trip permits, and prior to permit issuance the route is checked. When loads up to 15 feet wide (plus one foot for shyness) cannot be accommodated through the work zone the signs described in this guideline are used. Therefore, signs are used when the effective width is less than 16 feet.

The width to be used on the signing is calculated by measuring laterally from centerline to object or object to object subtracting one foot for shyness. Drums, barricades, barriers and parapets also constitute lateral objects. Examples 1-5 at the end of this subject illustrate when width signing is required.

Post the W12-52, showing the numerical width in feet, in advance of one or more intersections or interchanges which will provide the mover an alternate route around the restriction. Check the adequacy of a logical alternate route when selecting the point at which the diversion is posted. Place a supplemental distance sign, WO57-52, installed beneath the W12-52. Post another W12-52 in advance of the restriction, generally along with the other construction warning signs. Install on both sides of a divided highway to enhance visibility

Post an R12-70 sign, Wide Loads Exceeding XX Ft, at the intersection or ramp where the diversion occurs, especially if the restricted highway is a freeway or expressway. An appropriate directional arrow is an acceptable supplement to this sign

Detour signing from the point of diversion to return to the highway is normally not needed. This is similar to a low clearance warning situation, where no alternate route is signed.

To avoid unnecessary signing and diversion of wide loads, accurate information must be obtained about the actual restriction. This information is entered into Lane Closure System (LCS) by Regional field staff. The information is used to update 511.

Projects having more than one lane open in a given direction, even though each lane might be somewhat narrowed, over-width traffic is often not diverted. Most multi-lane highways have shoulders that can be used temporarily to accommodate wide loads. An overhang from one lane to another can be tolerated for short distances such as ¼ mile. Therefore, width restriction signs are typically not necessary for restrictions on short stretches of multi-lane highways. Although, there may be higher volume segments where overhang from one lane to another is not desirable or longer stretches of multi-lane highways (1/4 mile or more) where adequate shoulders are not available, width restriction signs *may* be desirable. In these circumstances where the intent is to divert over width traffic, ensure LCS reflects what is represented on the width restriction signing.

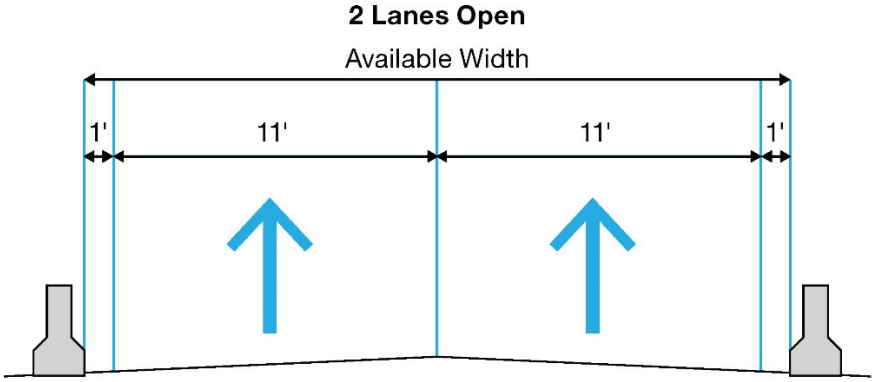
There may be staging situations where off-peak lane closures are utilized on multi-lane highways with closed shoulders. Width restriction signing is required during off-peak operations. Cover or remove width restriction signing during peak operations.

On roadways where one lane is open in each direction, width restriction signs are not needed if the available width including shoulder (including at bridges and crossovers) is more than 16 feet.

On 2-lane, 2-way roadways where only one lane is open with a flagging operation, width restriction signs are not required.

**Figure 1.** Width Restrictions and Lane Closure System

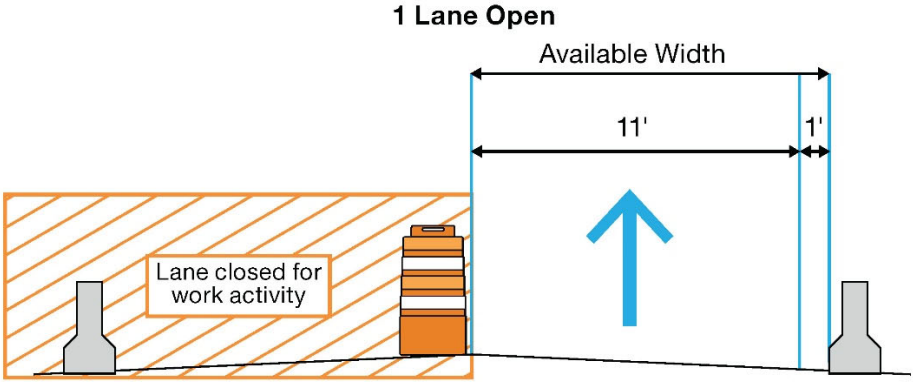
**Width Restrictions and Lane Closure System — Example 1**




**LCS Entry →** (1' + 11' + 11' + 1') – 1' buffer = **23' effective width**
available width

Available width ≥ 16': No width warning sign required

**Width Restrictions and Lane Closure System — Example 2**




**LCS Entry →** (11' + 1') – 1' buffer = **11' effective width**
available width

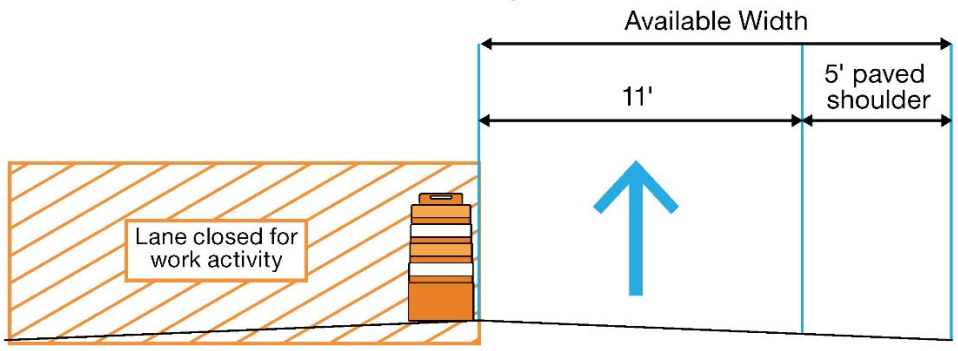
**Width Signing → 11' Max Width**

Available width < 16':
Width warning sign(s) required.

Recommend 2 locations:
- One in WZTC advanced warning area
- One at location where a wide load could exit with supplemental **XX AHEAD** sign below

**Width Restrictions and Lane Closure System — Example 3**

**1 Lane Open**

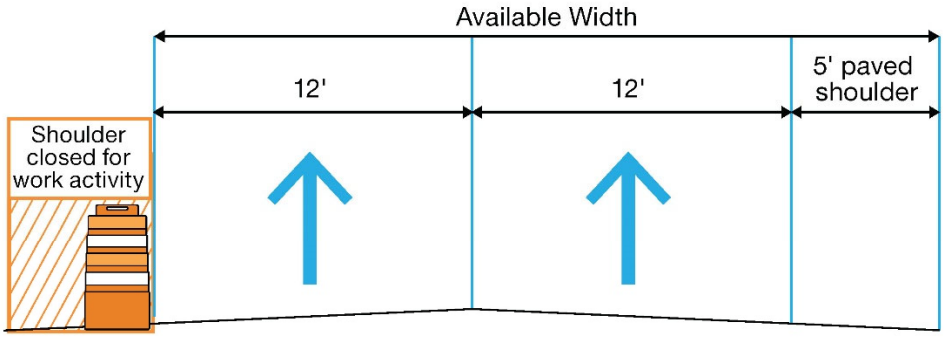



**LCS Entry →** (11' + 5') – 1' buffer = **15' effective width**
available width

Available width ≥ 16': No width warning sign(s) required.

**Width Restrictions and Lane Closure System — Example 4**

**Divided Highway Shoulder Closure**

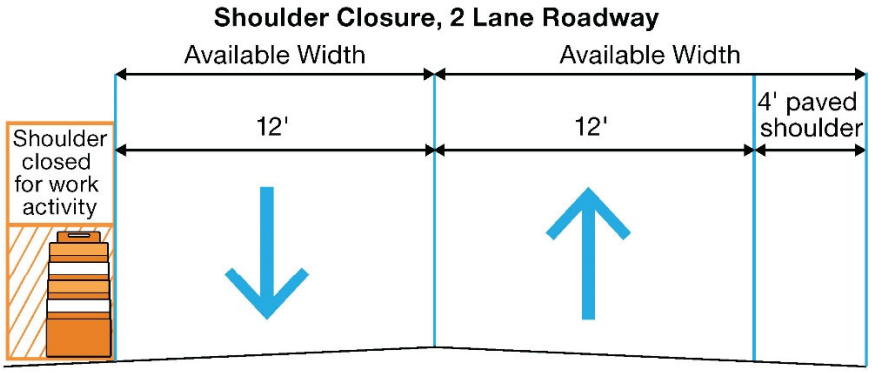



**LCS Entry →** (12' + 12' + 5') – 1' buffer = **28' effective width**
available width

Available width ≥ 16':
No width warning sign(s) required.

Not changing the typical width available for this facility.

**Width Restrictions and Lane Closure System — Example 5**




**SB LCS Entry** → (12') – 1' buffer = **11' effective width**
available width

**Width Signing → 11' Max Width**

Available width < 16':
Width warning sign(s) required.

Recommend 2 locations:
- One in WZTC advanced warning area
- One at location where a wide load could exit with supplemental XX AHEAD sign below

## 6-3-6 Freeway Service Team Policy and Procedure — January 2015

### GENERAL

The Freeway Service Team (FST) provides expedited relocation of disabled and crashed vehicles made possible by the presence of FST vehicles continuously patrolling designated segments of interstate and state highways during designated hours and through designated work zones. This continuous patrol will facilitate a quick response time to non-recurring traffic incidents such as breakdowns and traffic crashes, thus reducing the total time needed to clear the incident from the highway and restore normal traffic flow. Other examples of situations where FST services *may* be utilized include special events, inclement weather, and other highway emergencies. The primary goal of the service is safe, quick clearance of traffic incidents thereby improving safety and minimizing traffic delays and congestion. FST are frequently used as part of a project's work zone mitigation strategy and identified in the Transportation Management Plan (TMP). Please refer to FDM 11-50-5 Attachment 5.4: "Example TMP Type Mitigation Strategies and Elements" and FDM 11-50-30.8.

Goals and Objectives

The goals and objectives of FST are to:

1. Maintain capacity in work zones and high volume freeway segments
2. Provide assistance free of charge to disabled motorists
3. Maintain consistent service
4. Minimize work zone delay
5. Provide scene safety
6. Clear traffic incidents
7. Provide traffic control
8. Provide scene management (law enforcement FST only)
9. Detect and verify incidents
10. Remove debris.

Applicability

Law enforcement FST operates during specified hours of the day all year round. Work zone FST contracts will be for the duration of construction projects. If FST efforts are showing that traffic is moving better when they are providing service in peak hours than in non-peak hours, the project team could extend the FST hours of

operation. FST contracts include language for accommodating changing hours of service and mileage. Project managers must be aware of financial impacts as scope changes are developed.

The FST service will provide towing services to relocate a disabled vehicle to the designated drop-off locations of the highways or freeways. This service will enhance the safety and efficiency of subsequent operations by private towing service providers that remove vehicles from the designated drop-off locations.

All FST assistance and relocation services are provided free of charge to the motorist.

**RESPONSIBILITIES**

Bureau of Traffic Operations (BTO)

1. Management of the FST program via FST program manager
2. Procurement of FST services
3. Notify project teams of contractor and hourly rates

Regional Project Development Section

Funding to cover FST charges must be included in budget and have a chargeable project ID.

Regional Traffic Engineers

Notify contractor of project start dates and required meetings. Some meetings that *may* be required are:

1. Preconstruction
2. Incident management
3. First responders.

Other Stakeholders

1. Regional communications manager
2. Law enforcement, fire, and EMS
3. Counties and local officials
4. Towing contractors
    a. Patrolling contract work zones
    b. Attending required meetings listed in 42.2.3

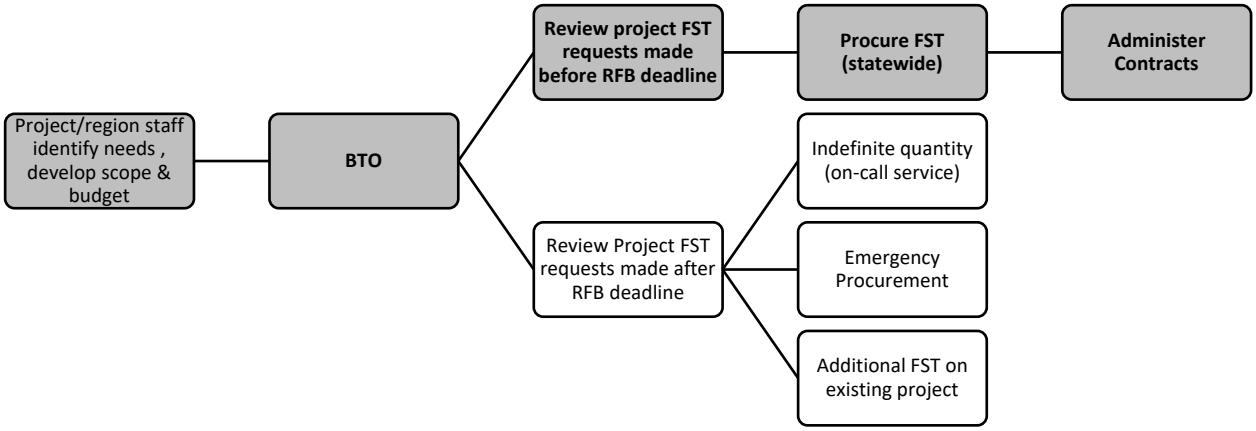
**WORK ZONE FST**

Project design staff will work with regional traffic operations to identify and quantify the need for FST for work zone mitigation. FST expense is paid from the project mitigation budget. Requests for work zone FST are made by December 15$^{th}$ of the year prior to construction via email to the FST program manager. All FST contracts are bid together in a statewide Request for Bids (RFB).

1. December 15: FST requests due for next construction year
2. February: RFB issued
3. March: RFB selections made for construction season

Figure 1 shows the flowchart for implementing work zone FST.

**Figure 3.** Work Zone FST Flowchart




Services to be Provided – General

The FST assists motorists whose vehicles have mechanical failure or have been involved in traffic crashes. The FST is responsible for clearing the highway of automobiles, motorcycles, small trucks, (vehicles with a gross vehicle weight of 8,000 pounds or less), and small nonhazardous debris. The FST relocates all cleared vehicles to the nearest drop-off location designated by the Contract Administrator. When responding to incident scenes, the FST provides assistance with traffic control as directed by law enforcement.

Assistance to Law Enforcement, Including Emergency Traffic Control

FST *may* be requested to lend assistance to law enforcement, specifically to assist with emergency traffic control at an incident scene. FST follows the instructions of the officer at the scene of any incident. Once temporary traffic control devices are established and it is determined that law enforcement does not need an immediate tow, the FST *should* continue to patrol the route until contacted by law enforcement for towing services or to remove the traffic control devices.

## 6-3-7 Freeway Service Team Sponsorship ~~November 2016~~March 202~~56~~

### GENERAL

The department initiated the Freeway Service Team (FST) Sponsorship Program as an innovative source of revenue. The Sponsorship Program is intended to improve the transportation system and benefit the traveling public by increasing their awareness of available services. Additional revenues further enable WisDOT to provide necessary services and enhance the safety and efficiency of the State's highway system.

FST sponsorships offer recognition to a business or other entity for supporting FSTs that improve work zone safety. Sponsorship agreements *may* include sponsor recognition placed on FST vehicles under contract with the department and or signs as outlined in Wi~~s~~MUTCD 2H.13 ~~2H.08~~.

### GOALS AND OBJECTIVES

The goals and objectives of FST Sponsorship are to:
- Create a public/private partnership to provide FST services
- Increase public awareness of program
- Provide sponsors an opportunities to promote traffic safety

### RESPONSIBILITIES

*Bureau of Traffic Operations (BTO)*
- Management of the FST program via FST Program Manager
- Procure FST services
- Procure FST sponsorship(s)

*Regional Traffic Engineers*

Notify BTO of preconstruction meetings and project start dates

*Other Stakeholders*

- Regional Communications Manager
- Law enforcement
- Counties and local officials
- Towing contractors

**ELIGIBLE SPONSORS**

Eligibility for participation in the sponsorship program is limited to individuals, businesses and organizations that abide by state and federal laws that prohibit discrimination based on race, religion, color, age, sex, national origin, or sexual orientation, that do not promote illegal products or activities, and that do not harm the public image of the state or department.

**SPONSORSHIP RECOGNITION**

*Vehicle marking, registered trademarks and lettering*

A. The Sponsorship Contractor *may* apply markings and trademarks onto the FST trucks operated by Operator Contractors. The sponsor **shall** submit a design to WisDOT for approval.

B. No other markings *may* be placed on or in the FST vehicles, unless otherwise approved by WisDOT.

C. Any painting, placing, maintaining, repairing, adding or removing Vehicle Markings, Logos and Lettering must be conducted in such a manner as to not reduce the FST Operator Contractor's contractually required level of performance and availability.

D. Operator Contractors are required to have backup trucks to be used in the event the primary truck is damaged. When the backup truck is in use the Sponsorship Contractor *may* provide magnetic markings to indicate that the truck is part of the FST. The sponsor **shall** submit a design to WisDOT for approval.

E. WisDOT will determine when FST Operator Contractor contracts will end.

F. The sponsor is responsible for removal of all markings, logos and lettering from operator vehicles within two weeks of notification by WisDOT.

G. The Sponsorship Contractor is responsible for any damage to Operator Contractor vehicles as a result of graphics placement or removal.

**ROADSIDE SIGNAGE**

The Sponsorship Contractor *may* indicate its sponsorship of the FST program through roadside signage placed at certain designated locations within or approaching work zones where FST Operator Contractor vehicles are operating.

A. All Sponsorship Contractor signage **shall** be approved by WisDOT inclusive of design and placement. WisDOT reserves the right to require in certain circumstances signs to be removed, or placed in other locations at WisDOT's sole discretion.

B. All signs **shall** comply at all times with Federal Highway Administration (FHWA) guidelines, and all applicable Federal and Wisconsin rules, regulations and laws in effect at the present and in the future.

C. Acknowledgement signs **shall** be designed and installed as follows:

   i. No more than two signs per direction along a single work zone, in locations approved by WisDOT.

   ii. Signs (in one direction) *may* be spaced no closer than 3 miles apart except where approved by WisDOT.

   iii. Sign logo, layout, size and design **shall** be in accordance with the requirements of the MUTCD.

   iv. Signs shall be considered temporary and will be mounted on wooden posts. Sign size will be approved by WisDOT.

D. WisDOT will approve all sign locations. The standard sign location will be 800' in advance of the "Road Work Ahead" sign.

E. The minimum spacing between sponsorship acknowledgement signs and other signs should be:

i. 150’ on roadways with posted speed limits of 25 MPH or less.

ii. 200’ on roadways with posted speed limits of 30 MPH to 45 MPH

iii. 500’ on roadways with posted speed limits greater than 45 MPH

F. WisDOT will determine when FST Operator Contractor contracts will end.

G. Placing, replacing, maintaining, repairing, removing, covering or relocating signs must be done in accordance with WisDOT specifications. For questions contact the State Signing and Marking Engineer.

**OPERATOR UNIFORMS**

The Sponsorship Contractor *may* choose to provide uniforms to FST Contractor Operator drivers. Uniforms must comply with the following:

A. ANSI Class III compliant safety vests and pants. Vests **shall** have the Sponsors logo worn above the left chest pocket. Contractor **shall** provide enough sets of vests and pants such that each vehicle operator has clean sets of pants and vests.

B. Sponsor colored baseball type hat. The hat **shall** be made entirely of fabric (no mesh style hats) and will have the Sponsor’s logo on the front of the hat above the brim. Contractor **shall** provide enough hats such that the Operator Contractor *may* provide clean, legible hats as needed. FST Operator Contractor operators are not required to wear hats.

C. Sponsorship Contractor supplied sponsor logo patches/embroideries/prints for the uniforms, **shall** be approved by WisDOT prior to ordering.

## 6-3-10 Work Zone Incident Management Plans (IMPs) December 2011

**INTRODUCTION**

An incident management plan is a set of strategies used to manage work zone traffic operations. These strategies include monitoring traffic conditions within the work zone and adjusting traffic operations based on changing conditions. IMPs address unplanned events or incidents for TMP project type 2 on freeways/expressways, and all TMP type 3 projects to ensure effective management of responses within the work zone. Formal IMP documents are not required for TMP type 2 projects on conventional highways, but if the project has detours or other temporary access restrictions, coordinate with emergency service providers regarding incident and access planning. Modify and update the IMP to address field issues as they occur. An IMP helps the contractor and the department to respond appropriately to incidents during construction within a reasonable timeframe in order to maintain traffic flow through the work zone safely. The IMP is part of the TMP and shall be submitted along with the TMP at the time of the completion of the draft PS&E. the draft IMP should be submitted along with the TMP worksheet at the time of the design study report (DSR).

It is the intent of WisDOT to minimize impacts and delays to motorists and to promote safety in work zones. Planning for traffic incidents that occur within work zones is a critical component of reducing delay and increasing the safety, mobility, and reliability of the highway system. The level of complexity of the IMP reflects the duration and complexity of the project and its impacts in the corridor/network. Long-term, complex reconstruction projects, such as the Marquette Interchange, necessitate comprehensive effort with procedures and processes to support the project. Short-term projects on lower-volume roads may simply require a meeting and/or some ongoing coordination with the appropriate local or regional emergency response agency.

Each project presents unique problems for emergency responders and the management of incidents that occur in the work zone. The intent of an IMP is to provide guidance and assistance in selecting mitigation strategies that meet the needs of WisDOT, the contractor, and emergency responders, while enhancing safety and mobility.

Answers to the questions listed below may help identify appropriate elements in the IMP.

1. How will this project impact emergency responses in this corridor?
2. Are there access issues for responding to incidents within the work zone?
3. If an incident closes the highway in one or both directions, how will traffic be rerouted?
4. Are there strategies to minimize project impacts on response agencies?
5. Are there strategies to minimize incident impacts on the public?

6. How will project personnel coordinate and assist emergency responders?

If it is determined that additional strategies are needed to ensure stakeholders' needs are met during construction, the strategies should be identified, documented, and implemented. They may include:

1. Contact lists for construction and utility personnel (include with IMP documentation when the contact lists become available)
2. Procedures for communicating with the contractor during an incident (include with IMP documentation when the procedures become available)
3. Procedures for updating response agencies on traffic control damages
4. Emergency access requirements
5. Variable message signs or other traveler information strategies
6. Detour routes to be used in the event of a long-term incident.

On more complex project where there is no traffic incident management in place, project staff and the contractor should meet with response agencies in the area to identify concerns and consider a full range of strategies to address these concerns. On project with multiple phases, it may be necessary to develop a plan for each phase of the project. The procedures and recommended strategies should be documented and distributed to all response agencies and construction personnel. Strategies that require implementation (e.g. signing, ITS devices, traffic management center, service patrol, etc.) should be planned and budgeted as part of the project and implemented at the start of the project. Training and follow-up sessions will be necessary to ensure that all agencies and construction personnel are familiar with the procedures in the plan. These should also be reviewed, revised, and updated as necessary throughout the life of the project.

Some of the tools that might be documented in the documentation include:

1. Incident levels and associated actions
2. List of response agencies
3. Roles and responsibilities of response agencies
4. Contact information and procedures
5. Scene management guidelines
6. Predetermined alternate routes
7. Resource information.

On any project, the minimum requirement should be to identify whether there is an existing program and determine the role of the contractor in implementing the program. Project staff or the contractor should also contact appropriate response agencies in the corridor to discuss their concerns with the proposed work zone and agree to procedures and strategies that will support traffic incident management. This communication and coordination is essential for any work zone. On more complex projects, this coordination will become more formalized and require the involvement of more stakeholders. It will necessitate a greater commitment of time and resources on the part of the contractor.

**IMP REQUIREMENTS**

Identity Stakeholders

In order to ensure work zones are safe and minimize the impact and delay to the traveling public, the plan should be developed in a collaborative effort with the emergency response and public safety community and incorporated into the transportation management plan. Planning for incidents that occur within work zones is a critical component for reducing delay and increasing the safety and reliability of the transportation system. Identify special events that may occur during the construction and may affect work times. Acquire special event coordinator contact information.

The regional project development section (PDS) is responsible for developing a project's TMP. The IMP should be developed by the regional PDS in coordination with the regional traffic section and Traffic Management Center (TMC).

Costs

Determining the costs to procure and deploy certain traffic control devices and types of mitigation strategies need to be identified during the scoping of the project. At the latest, the costs should be determined with the TMP.

Work Zone Incident Management Plan Standard Format (i.e., Incident Response Guide)

Each work zone IMP should include an incident response guide that provides a quick, in-the-field reference to response personnel. This ensures fast, effective, and consistent responses to incidents. The format listed below in Figure 1 is the standard table of contents that should be used when developing each IMP. The requirements of each section are described more in depth within this document.

**Figure 5.** Work Zone Incident Management Plan Outline

Project Summary
Checklists
- TMC Checklist
- Law Enforcement Checklist
- Project Leader Checklist
- Regional Incident Management Coordinator (RIMC) Checklist
- Regional Duty Officer (RDO) Checklist

Emergency Contact Information (when it becomes available)
Alternate Routes
Available Barricade Locations for Ramp Closures
Activation of Traveler Information Systems
- Normal Configuration
- Operational Backups (No Incident)
- Backups (Incident)
- Closed Highway

Appendices
- A. Alternate Route Maps (develop or insert if already available)
- B. Queue Backup and Work Zone Location Maps
- C. Emergency Access, Pullout and Traveler Information Equipment Location Map
- D. Project Location Map
- E. Traffic Volume Charts

Project Summary

The project summary and description should be described in the IMP. It may simply be the description used in the TMP document. The project summary should describe the location and type of project, the number of construction stages including where the closures will occur and anticipated dates and special events that may affect the work zone. Also include a brief description of traffic volumes and any extraordinary circumstances that need to be accounted for.

Checklists

Checklists are provided for use by the TMC, law enforcement, project leader, regional incident management coordinator (RIMC), and regional duty officer (RDO) in the event of an incident on the freeway/expressway system. Regular check-ins and after action reviews are recommended for all involved.

During an incident involving a work zone on the highway system, the TMC *should* follow the checklist below in order to collect the necessary information regarding the incident which occurred, contact the response team, and update the traveler information systems with appropriate up-to-date information.

TMC Checklist:

1. When receiving the call from law enforcement, ensure they provide the following information:
    a. Location of incident
    b. Whether it is located in a work zone
    c. Affected lanes
    d. Incident type
    e. Approximate incident duration
    f. Extent of backup
2. Must have immediate contact with:
    a. RIMC when there is a full highway closure in one or both directions that is expected to last greater than two hours
    b. RIMC whenever backups with or without an incident reach 3 miles or greater
    c. PIO, if available
    d. After incident and/or backup, ensure message boards are returned to lower level or normal configuration
    e. RDO if contractor or project staff assistance is needed in a work zone

   f. SINS email sent for an incident blocking 50% or more of the highway lanes and/or a system ramp
   g. Freeway Service Team (if available)
3. Once alternate routes are implemented, TMC will refer to the alternate route guide
4. Change traveler information in the following order:
   a. Message boards
   b. Message on highway advisory radio
   c. Place 511 message if necessary
5. Regular check-ins

During an incident involving a work zone on the highway system, the responsible law enforcement agency should follow the checklist listed below in order to report the necessary information regarding the incident which occurred, identify the severity of the incident, and deploy traffic control.

Law Enforcement Checklist:

1. Contact dispatch to report any incident or backups and the following information:
   a. Incident type
   b. Location of incident
   c. Best route to incident
   d. Extent of backup
   e. Establish a field command post
   f. Whether incident is located in a work zone
   g. Affected lanes
2. Identify incident classification
   a. Minor – less than 30 minutes duration
   b. Intermediate – 30 minutes to 2 hour duration
   c. Major – duration greater than 2 hours
3. Initiate traffic control as appropriate
   a. If traffic message boards are required, contact TMC
4. Inform media of highway incident (TIA)
5. State Patrol dispatch will contact TMC and advise the above information
6. If assistance is needed in work zone, contact TMC
7. If specialized equipment is needed in work zone, see contact list or list contacts:
   a. Equipment type: _____ Contractor Contact: _____
      (Example: crane to move barrier wall)
   b. At the conclusion of the incident, make appropriate demobilization notifications

The WisDOT project leader will follow the necessary steps during an incident.

Project Leader Checklist:

1. Project leader will contact event incident commander or State Patrol duty officer as situation warrants
2. Project leader will function as liaison for contractors
3. Project leader will contact project manager and/or project supervisor at backups of 5 miles or as situation warrants

The WisDOT regional incident management coordinator (RIMC) will follow the necessary steps during an incident.

RIMC Checklist:

1. RIMC will contact project leader as situation warrants
2. RIMC will contact event incident commander or State Patrol duty officer as situation warrants
3. RIMC will function as liaison for county highway departments
4. RIMC will contact DTSD regional duty officer at backups of 5 miles or as situation warrants

5. RIMC will perform regular check-ins

The WisDOT regional duty officer (RDO) will follow the necessary steps during an incident.

RDO Checklist:

1. RDO will coordinate project resources with contractor or regional staff as situation warrants
2. RDO will coordinate media release as situation warrants
3. RDO will mitigate traffic displays if possible

Emergency Contact Information

This table should be a complete list of contacts that may be notified during an incident within the work zone and completed at the time of the pre-construction meeting or as soon as the contact information is known. Additional persons may be identified.

*=Indicates number can be used 24 hours

| AGENCY | CONTACT | OFFICE | CELL/OTHER |
|---|---|---|---|
| **TRAFFIC MANAGEMENT CENTER (TMC)** | | | |
| TMC | Main Number | 800-375-7302* | 414-227-2166 (Office) |
| **LAW ENFORCEMENT** | | | |
| Wis. State Patrol Emergency | | | |
| State Patrol Dispatch | | | |
| State Patrol Officers | | | |
| _____ County Sheriff | | | |
| _____ County Sheriff | | | |
| _____ Police Dept. | | | |
| _____ Police Dept. | | | |
| _____ Police Dept. | | | |
| _____ Police Dept. | | | |
| _____ Police Dept. | | | |
| _____ Fire Dept. | | | |
| _____ EMS | | | |
| | | | |
| **DOT REGION MANAGEMENT** | | | |
| Regional Duty Officer | | | |
| RIMC | | | |
| DOT Supervisor – PDS | | | |
| DOT Manager – PDS | | | |
| Regional Director | | | |
| Maintenance Supervisor | | | |
| Traffic Supervisor | | | |
| | | | |
| **COUNTY PERSONNEL** | | | |
| _____ County Commissioner | | | |
| _____ County Commissioner | | | |
| | | | |
| **PROJECT STAFF** | | | |
| Project Field Office | | | |
| Project Leader | | | |
| Project Manager | | | |
| | | | |
| **PRIME CONTRACTOR** | | | |
| | | | |
| | | | |
| Specialized Equipment Contractor | | | |
| **TRAFFIC CONTROL - GENERAL** | | | |
| General _____ | | | |
| Message Boards _____ | | | |
| | | | |
| **OTHER TRAFFIC/EMERGENCY CONTACTS** | | | |
| DOT Public Information Officer | | | |
| Freeway Service Team | | | |
| Special Events Coordinators | | | |

Alternate Routes

If the corridor does not already have alternate routes established, project-specific alternate routes should be identified with each work zone on the highway system. Consistency in selecting alternate routes is an important aspect of the program. The following criteria provide a common starting point for evaluating potential alternate routes.

1. Use state highways whenever possible.
2. Consider long truck routes when available.
3. Avoid alternate routes with weight restrictions.
4. Avoid height restrictions imposed by bridge clearances, power lines, etc.
5. Avoid routes that require traffic to make 90-degree turns.
6. Avoid at-grade railroad crossings, especially those with a high number of trains.
7. Avoid four-way stops.
8. Select routes that carry traffic in the same general direction as the Interstate.
9. Minimize length of alternate routes.
10. Consider routes with coordinated signal timing plans or avoid routes with multiple uncoordinated signals.
11. Avoid traversing residential areas and school zones.
12. Carefully consider all routes options and closure requirements at interchanges, especially system interchanges.

Based on these criteria, a preliminary list of emergency alternate routes can be identified for freeway segments within a given study area. Potential routes should be evaluated to ensure that the roadway can handle freeway-type traffic volumes. A field review of potential emergency alternate routes should be conducted to confirm route selection. For further guidance in determining appropriate alternate routes, contact the TMC.

Provide a brief explanation of alternate routes. For example, “The preferred alternate routes for I-94 are the existing frontage roads. These provide quick access by traffic and limit the amount of adverse travel. If traffic backups extend beyond the listed access points, longer alternate routes can be implemented.

Explain alternate routes in detail below and provide alternate route maps in an appendix. For example, “For SB: Traffic can be diverted west on WIS 100 (Ryan Rd) to WIS 36, southwest on WIS 36 to US 45 to WIS 20 back to I-94. For NB: Traffic can be diverted west on WIS 20 to US 45, north on US 45 to WIS 36 to WIS 100 (Ryan Rd) and then east on WIS 100 back to I-94.”

If traffic backups extend beyond the access points of the barricade locations listed, longer alternate routes can be implemented.

Provide information on who needs to be contacted for each alternate route option. For example, “Contact TMC, State Patrol, Racine County, Village of Caledonia when alternate routes are implemented. See contact list.”

See appendix for alternate route map to be used for this project.

Available Barricade Locations for Ramp Closures

The IMP shall identify a list of the available barricade locations. During an incident, the incident commander organizes the ramp closures. Locations of barricades shall be included on the specialized equipment location map in the appendix.

Available Barricade Locations

| Highway Ramp & Direction | Number of Barricades | Distance from Work Zone |
|---|---|---|
| *Ex. Hwy KR to I-94 East (SB) ramp* | *1 ramp gate* | *1 mile* |
| | | |
| | | |

Activation of Traveler Information Systems Scenario Examples

Contact the TMC for activation of traveler information systems. Choose the sample messages below for use on traveler information devices.

**Normal Configuration**

Contact TMC

**Operational Backups (No Incident)**

*Radio Message:*

There are significant delays affecting motorists heading <direction> on <mainline highway> between <highway> and <highway> in <county> County. Motorists are encouraged to use alternate routes to avoid delays.

*Message Board # _____ at _____:*

Traffic Delay Ahead/Alternate Route Exit ##

Traffic Delay Ahead/Use Alternate Route

Delays XX Miles Ahead/Tune to AM ####

*Additional message boards can be placed along the highway to notify the motorist.*

**Backups (Incident)**

*Radio Message:*

As of <date/time>, law enforcement is reporting that a traffic incident is adversely impacting motorists heading <direction> on <mainline highway> between <highway> and <highway> in <county> County. Motorists are encouraged to use alternate routes to avoid delays.

*Message Board # _____ at _____:*

Incident Ahead Use/Alternate Route Exit ##

Incident Ahead/Use Alternate Route

<Left/Right/Center> Lane Blocked/Expect Delays

<Left/Right/Center> Lane Blocked/Use Alternate Route

Delays XX Miles Ahead/Tune to AM ####

*Additional message boards can be placed along the highway to notify the motorist.*

**Blocked Highway**

*Radio Message:*

As of <date/time>, law enforcement has closed <mainline highway> between <highway> and <highway> in <county> County to <direction> traffic. Motorists traveling <direction> must exit <mainline highway> and use alternate routes.

*Message Board #_____ at _____:*

Incident Ahead Use/Alternate Route Exit ##

Highway Closed Ahead/Exit at <highway>

Highway Closed Ahead/Follow Alternate Route

Highway Closed Ahead/Tune to AM ####

*Additional message boards can be placed along the highway to notify the motorist.*

Regularly review and revise the IMP to monitor current practices, identify and resolve issues to minimize frequency of incidents and severity. Assign an individual(s) on complex projects with the responsibilities of ensuring the IMP is up to date.

## 8-~~21~~-1 Grade Crossing Sign Installation — March 2026

### PURPOSE

Railroad corporations have unique legal abilities and responsibilities. Due to this fact, some signage responsibility for highway traffic falls to the railroad. These requirements are listed in various sections of the Wisconsin State Statutes. This policy will clarify furnishing, installation and maintenance responsibilities for traffic signs at at-grade crossings.

### DEFINITIONS

Passive Grade Crossings are defined as at-grade highway-railroad crossings without automatic gates or flashing-light signals.

Maintaining Authority is defined as the unit of government with the responsibility for roadway maintenance at a given crossing.

### POLICY AND GUIDELINES

The following table summarizes the installation and maintenance responsibilities of various sign installed in conjunction with at-grade railroad crossings. See the text following the table for further details.

| SIGN | | NAME | FURNISHED BY | INSTALLED BY | MAINTAINED BY |
|---|---|---|---|---|---|
| R1-1 |  | Stop | Maintaining Authority | Maintaining Authority | Maintaining Authority |
| R1-2 |  | Yield | Railroad | Railroad | Railroad |
| R8-9 |  | Tracks Out of Service | Railroad | Railroad | Railroad |
| R15-1 |  | Crossbucks | Railroad | Railroad | Railroad |
| R15-2P |  | # of Track | Railroad | Railroad | Railroad |
| R15-3P |  | Exempt | Maintaining Authority | Railroad | Railroad |
| W10-1 |  | Grade Crossing Advance Warning | * | * | Maintaining Authority |
| W10-1aP |  | Exempt (Advance) | Maintaining Authority | Maintaining Authority | Maintaining Authority |
| W10-52P |  | Tracks Out of Service | Maintaining Authority | Maintaining Authority | Maintaining Authority |
| Other W10 series signs |  | Other Advance Warning | Maintaining Authority | Maintaining Authority | Maintaining Authority |
| I-13 |  | Emergency Notification System | Railroad | Railroad | Railroad |

REGULATORY SIGNS

R1-1 (Stop) signs: These signs *may* be installed at at-grade crossings when deemed necessary for the public safety by the Office of the Commissioner of Railroads or the local authority. If installed, these signs shall be furnished, installed and maintained by the maintaining authority, per State Statute 195.28 or 349.085. See WMUTCD 8B.04 for additional guidance.

R1-2 (Yield) signs: These signs shall be furnished, installed and maintained by the Railroad at all non-stop controlled passive grade crossings, per State Statute 192.29(5)(b). See WMUTCD 8B.04 for additional guidance.

R8-9 (Tracks Out of Service) signs or W10-52P (Tracks Out of Service) plaques: These signs should be used in place of crossbucks when railroad tracks have been taken out of service as described in the WMUTCD 8B.08. These signs shall be furnished, installed and maintained by the Railroad. These plaques shall be used below the Grade Crossing Advance Warning (W10-1 through W10-4) sign when the R8-9 sign is used as described in the WMUTCD 8B.08. These plaques should be furnished, installed, and maintained by the maintaining authority.

R15-1 (Crossbuck) and R15-2P (Number of Tracks) signs: These signs shall be furnished, installed and maintained by the Railroad at all at-grade crossings, per State Statute 192.29(5)(a). The railroad shall also furnish, install and maintain an R15-2P (Number of Tracks) sign below the R15-1 at all grade crossings with multiple tracks. See WMUTCD 8B.03 for additional guidance.

R15-3P (Exempt): These signs shall be installed underneath the R15-1 sign (or R15-2P sign, if present) at crossings declared Exempt by the Office of the Commissioner of Railroads. The initial furnishing of these signs shall be the responsibility of the maintaining authority but shall be installed and maintained by the Railroad. See State Statutes 195.285 and 346.45(3)(d). See also WMUTCD 8B.11 for additional guidance.

WARNING SIGNS

*W10-1 (Grade Crossing Advance Warning) sign: These signs shall be installed at all at-grade highway crossings, unless specifically not required in the WMUTCD 8B.06. When used, these signs (and any needed replacements) shall be furnished, upon request, by the Railroad for at-grade crossings of county or township maintained roadways, and by the maintaining authority for at-grade crossings of state, city, or village maintained roadways. These signs shall be installed and maintained by the maintaining authority. See State Statute 195.286(1).

W10-1aPA (Exempt) sign: These signs shall be installed underneath the W10-1 sign at crossings declared Exempt by the Office of the Commissioner of Railroads. These signs shall be installed and maintained by the maintaining authority. See State Statutes 195.285 and 346.45(3)(d). See WMUTCD 8B.11 for additional guidance.

All other W10 series signs – If used, these signs shall be furnished, installed and maintained by the maintaining authority.

OTHER SIGNS

I-13 (Emergency Notification System Sign): These signs shall be furnished, installed and maintained by the Railroad at all at-grade highway crossings. These signs shall also be furnished, installed and maintained by the Railroad at all private at-grade crossings, per State Statute 192.29(6) and Federal Code 23 CFR 655.603. See WMUTCD 8B.27 for additional guidance.

## 8-~~2~~1-10 Dynamic Envelope and Do Not Block Pavement Markings — March 2026

**PURPOSE** The dynamic envelope and do not block pavement markings (see WMUTCD 8C.06, Figure 8C-3 and Figure 8C-4) are intended to encourage drivers to stop and remain at the stop bar. The transverse markings with associated cross-hatch provide a clear indication to drivers of where it is unsafe to stop their vehicle.

**POLICY AND GUIDELINES**

The cross-hatching associated with the dynamic envelope markings presents a potential safety hazard to bicycles and motorcyclists, as pavement marking material offers significantly less surface friction than unmarked pavement. In addition, this large amount of marking creates a maintenance issue for the department. For these reasons, the following policies shall apply to dynamic envelope marking installations on state-maintained roadways:

1. Dynamic envelope and do not block pavement markings shall not be installed on state-maintained roadways.
2. If installed along a detour route, the pavement markings shall be either temporary paint or temporary epoxy. After construction, the department will not remove the pavement markings. The maintaining authority of the roadway *may* remove the pavement markings, maintain the pavement markings, or allow the pavement

markings to fade away.

For more information regarding dynamic envelope and do not block pavement markings, refer to WMUTCD 8C.06 as well as Figures 8C-3 and 8C-4, pictured below.

**Figure 8C-3. Example of Dynamic Envelope Pavement Markings at Grade Crossings**

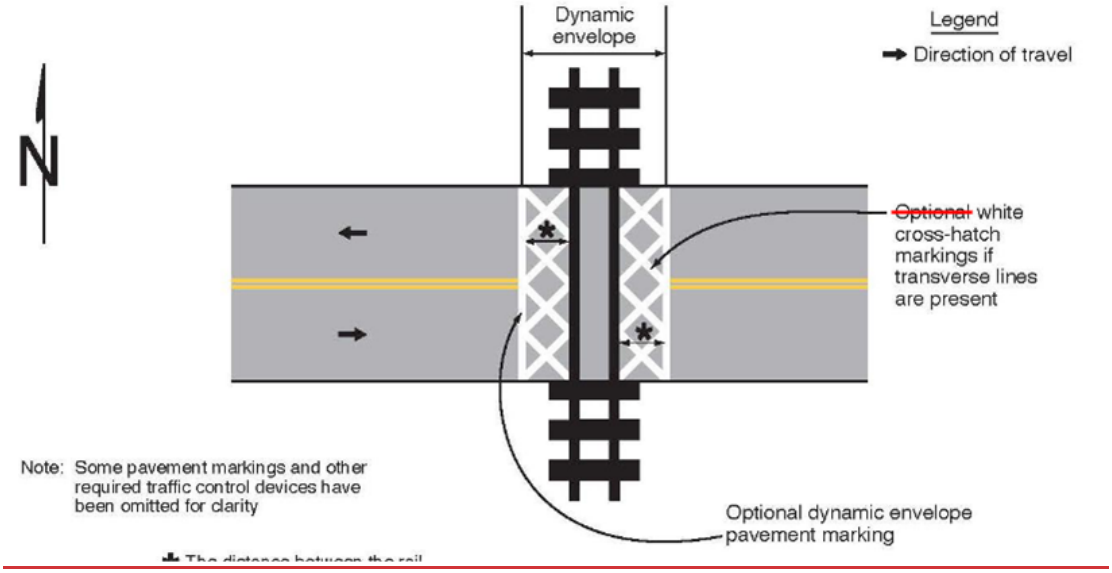
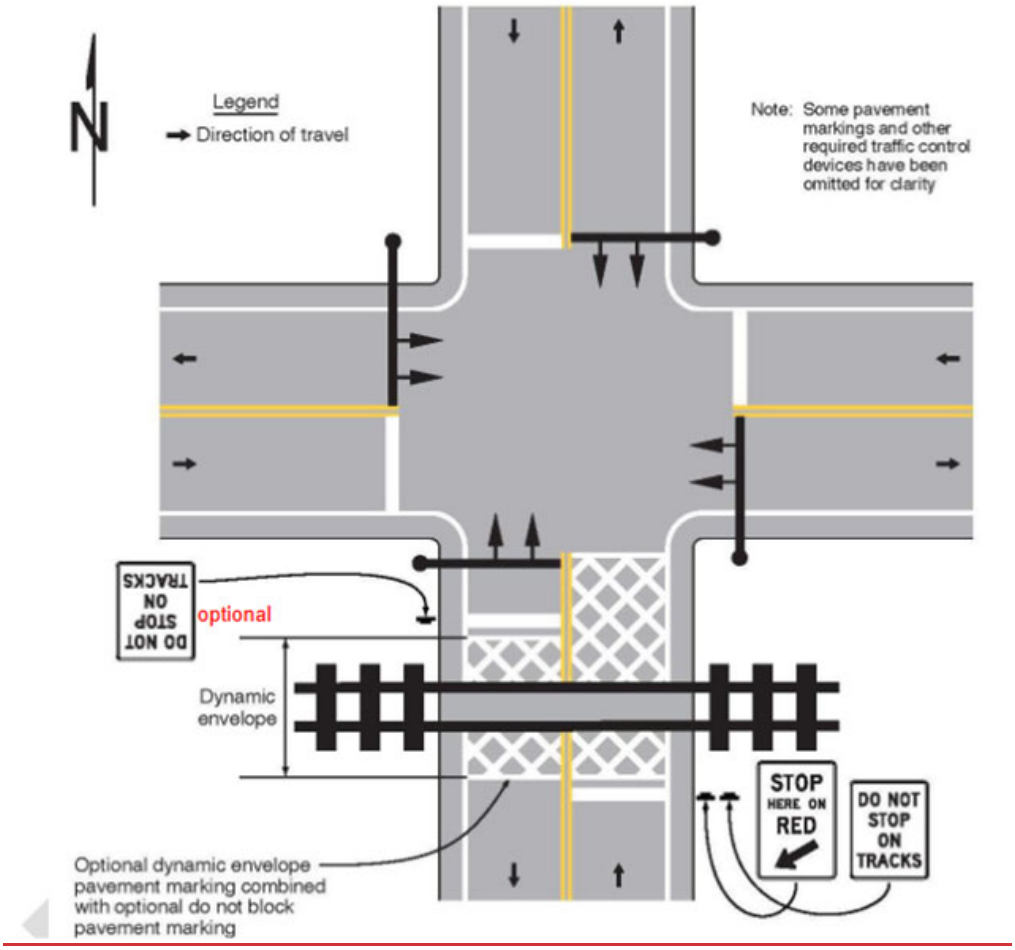


**Figure 8C-4. Example of Dynamic Envelope and Do Not Block Pavement Markings at Grade Crossings**




## 8-1-20 Active Advance Warning Systems (AAWS) March 2026

### BACKGROUND

WMUTCD 8D.13 allows for the use of warning beacons to supplement warning signs installed on an approach to a grade crossing. Per the WMUTCD, these systems may flash continuously or may flash only on the approach or presence of rail traffic. Any system which does not flash continuously is considered an Active Advance Warning System (AAWS) and should be interconnected to the railroad grade crossing warning system.

Reference is made to WMUTCD 8A.01, "As provided in Wisconsin Statutes, Chapters 189, 191, 192, and 195, the Office of the Commissioner of Railroads (OCR) has jurisdiction at grade crossings regarding, but not limited to, determination of adequacy of warning devices, approval of new grade crossings, and approval of alterations at grade crossings." Thus, OCR has authority to supersede the policy below when deciding on adequacy of warning devices per Wisconsin State Statute 195.28.

### GUIDELINES

An AAWS should be installed on any state trunk highway approach to an at-grade railroad crossing with a posted speed limit of 65 mph or higher.

An AAWS *may* be installed on the state trunk highway system only under the following two scenarios:

- On high-speed approaches (posted speeds of 55 mph or above) to grade crossings, or
- On blind approaches (defined as crossings that are not visible from the W10-1 sign due to site specific characteristics that cannot be otherwise addressed).

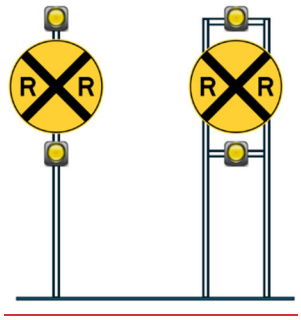
### DESIGN

An AAWS consists of a post mounted flasher cabinet with interconnection to the railroad grade crossing warning system. The flasher cabinet should be hard-wired for electricity, not solar powered. Each individual flasher unit

should include the following elements:

- Sign support (two posts required with a 48" diameter sign, single post will suffice for the 36" sign)
- Grade Crossing Advance Warning Sign (W10-1)
- Two (2) 12-inch CIRCULAR YELLOW signal indications of a standard traffic signal face. These flasher units should be mounted in a vertical configuration with one above and one below the sign. See **Figure 1**.

**Figure 1.** AAWS Flasher Unit Mounting Options




The WHEN FLASHING (W16-13P) plaque should not be included as part of the flasher unit. Therefore, battery backup is not required since the flashing beacons do not change the meaning of the sign.

The Diagnostic team's recommendation to OCR, as defined in WMUTCD, should include location of flasher units. The number and location of flasher unit(s) depends upon the number of approach lanes:

- On single lane approaches, a single flasher unit installed on the right-hand side of the roadway is required. A second flasher unit should be considered on the left-hand side of the roadway, particularly if the approach roadway geometry limits visibility of the flasher unit on the right-hand side of the roadway.
- For multi-lane approaches, two flasher units should be installed: one on each side of the roadway.

## OPERATION

The AAWS flasher units should begin flashing in advance of the flashing light signals located at the grade crossing. The CIRCULAR YELLOW signal indications should alternate flashing. If two flasher units are installed, they should flash in unison.

The minimum amount of time that the AAWS flasher units should begin flashing ahead of the signals located at the grade crossing is equal to the amount of time it takes to travel from the flasher unit to the center of the grade crossing at the posted speed, rounded to the nearest half second. See **Table 1**. The distances provided in **Table 1** for the placement of the flasher units are provided in WMUTCD Table 2C-3 and represent the standard placement of W10-1 signs. The flasher units may be placed an additional distance (150 feet, typical) upstream from the crossing stop bar if queues are regularly present and pose an additional risk beyond the presence of the crossing itself. In these situations, additional Advance Preemption Time (APT) will be required.

***Table 1** – Advance Preemption Time (APT) by Posted Speed Limit*

| Posted Speed Limit (mph) | Flasher Unit Distance from Stop Bar (feet)* | APT (s) |
|---|---|---|
| 25 | 155 | 4.5 |
| 30 | 200 | 4.5 |
| 35 | 250 | 5.0 |
| 40 | 305 | 5.5 |
| 45 | 360 | 5.5 |
| 50 | 425 | 6.0 |
| 55 | 495 | 6.5 |

| | | |
|---|---|---|
| 60 | 570 | 6.5 |
| 65 | 645 | 7.0 |

*Distances are from WMUTCD Table 2C-3.

The flasher units should continue flashing until the flashing light signals at the crossing stop flashing.

**MAINTENANCE**

The AAWS flasher units should be subject to joint annual inspection and filing requirements with the OCR in accordance with 49 CFR 234 Subpart D and WMUTCD 8D.09 to ensure operation remains as designed. Similar to other interconnected systems, the railroad company will have ongoing maintenance responsibility for the components of the grade crossing warning system and bungalow. The roadway authority will be responsible for ongoing maintenance of the AAWS flasher units and associated signal cabinet.

## 12-5-1 General — April 2023

Safety countermeasures are facility improvements that have been proven to reduce the severity of crashes. Countermeasures range from additional signage to complete reconfiguration of roadways. This section does not detail all available countermeasures that WisDOT implements. Many other countermeasures are detailed in WisDOT's Facilities Development Manual (FDM) and throughout the Traffic Engineering, Operations & Safety (TEOpS) manual.

## 12-5-3 Intersection Conflict Warning Systems — ~~August 2021~~March 2025~~6~~

### BACKGROUND

Intelligent Transportation System (ITS) technologies can be used to provide enhanced warning information to drivers approaching intersections compared to static signing and marking applications. One type of ITS installation that *may* reduce crashes at intersections is an Intersection Conflict Warning System (ICWS). An ICWS is an actuated system which provides advance warning of a condition that may require a vehicle to stop but the condition is not always present. These systems have a broad spectrum of types and applications but are all categorized as ICWSs. An ICWS is a countermeasure intended to address locations that are experiencing crash issues, have unusual geometry, or restricted sight distances. An ICWS *should* only be used where other countermeasures have failed or *may* not be feasible.

### GUIDELINES

Three criteria are to be considered when reviewing a location for an ICWS. These criteria are as follows:

1. Demonstrated crash issue
2. Visibility restrictions
3. Unusual geometrics

Due to the long-term maintenance of these systems, other countermeasures *should* be considered first to address safety concerns prior to the installation of an ICWS. These include:

- Improving sight distance (clearing vegetation, obstructions, or brush)
- Installing an advance intersection warning sign (W2 series)
- Increasing sign sizes
- Double-marking signs
- Installing advanced crossroad name signs (D series), if applicable. See TEOpS 2-4-50.
- Installing permanent flags on signs
- Electrical countermeasures (beacons, etc.)

### THROUGH ROUTE ACTIVATED WARNING SYSTEMS

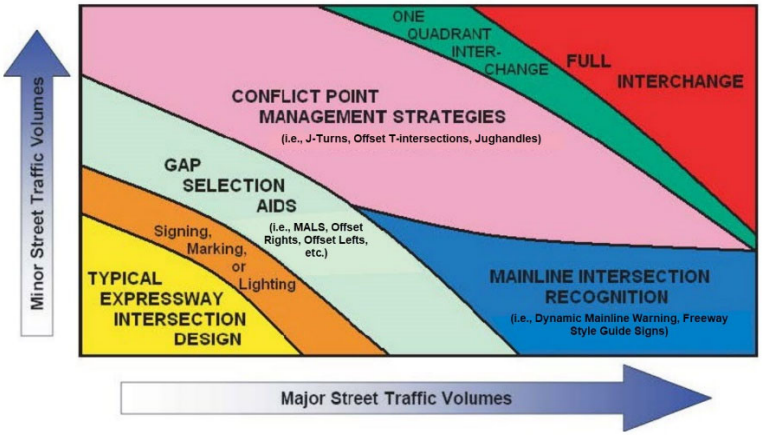
Introduction

The frequency of crashes at two-way stop-controlled (TWSC) intersections is typically lower than at signalized intersections; however, the crashes are often more severe. The most common crash type at TWSC intersections is a multi-vehicle angle crash where a vehicle stopped on the minor road enters the intersection without an acceptable gap, resulting in a collision with a through vehicle on the major road. On higher speed roadways, these crashes are often severe because of the nature of the impact. In many cases, a primary factor in these crashes is misjudgment of approaching traffic on the major road by the minor road vehicle, not failure to stop at the minor road approach.

Several countermeasures are available to mitigate these angle crashes with varying costs and effectiveness.

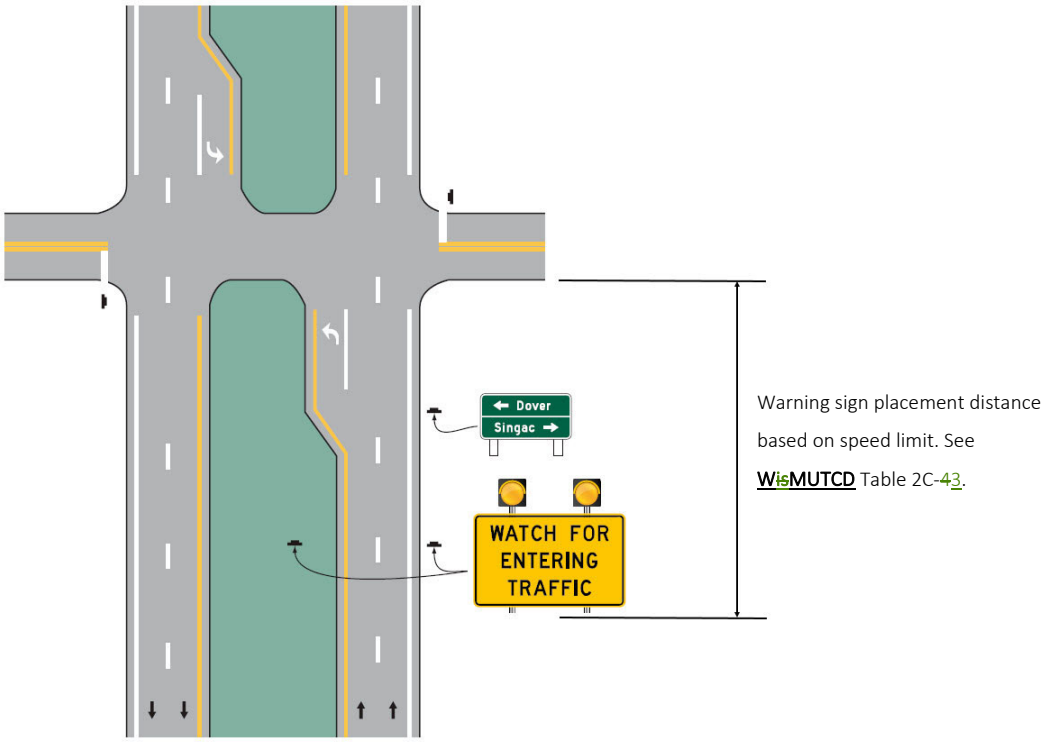
Figure ***1*** ~~Figure 1~~ shows several categories of countermeasures for reducing crashes at TWSC intersections. Some countermeasures are more appropriate for divided highways and some are more appropriate for undivided highways. The most appropriate countermeasure *should* be based on the crash trends and contributing factors of those crashes at the intersection in question.

**Figure 1.** TWSC Rural Expressway Intersection Countermeasure Categories




One type of ICWS which has been implemented in several states is a Through Route Activated Warning System (TRAWS). A TRAWS detects vehicles on the minor road of a TWSC intersection to warn traffic on the major road. Detected vehicles activate flashing beacons that are attached to static warning signs. The flashing beacons are activated to warn major road traffic that vehicles on the minor road *may* enter the intersection. An evaluation by FHWA showed that a TRAWS has the ability to reduce right angle crashes at TWSC intersections. Figure 2~~Figure 2~~ shows a conceptual layout of a TRAWS.

**Figure 2.** Typical Installation of a TRAWS on a multi-lane highway




Policy

This policy contains provisions for proper site selection, application, design, and installation of a TRAWS on the State Trunk Highway (STH) system.

**Site Selection Criteria**

A TRAWS *should* be considered at an existing TWSC intersection if it meets all the following conditions:

1. Enhanced signing and marking treatments have failed to mitigate crashes
2. Conflict point management strategies such as Restricted Crossing U-Turn (RCUT) intersections or other access restrictions are not appropriate or are too costly to implement
3. Improving sight distance is too costly to implement, if applicable
4. The intersection experienced three or more angle crashes in the previous five years or since the most recent safety improvement, if one was installed, within the previous five years
5. The posted speed limit for the through route is greater than 45 mph

As traffic volumes on the side road increase, the amount of time the beacons are activated increases respectively. The total activation time per vehicle is dependent on several factors. Minor road Average Annual Daily Traffic (AADT) volumes of more than 3,000 vehicles per day *may* cause near continuous activation of the system which can lead to drivers ignoring the dynamic warning and diminish the effectiveness of the system. Average activation times **shall** be considered based on the site conditions and engineering judgement used to confirm the system will activate dynamically for drivers on the major road. To optimize the effectiveness of a TRAWS, the following maximum AADT volumes *should* be considered:

- Major Road AADT typically does not exceed 12,000
- Minor Road AADT typically does not exceed 3,000

**Design and Installation**

The following provisions pertain to the design and installation of the signing components for a TRAWS on the STH system:

1. Installations **shall** be in compliance with the requirements established in the Wisconsin MUTCD (~~WisMUTCD~~WMUTCD)
2. The sign legend **shall** follow WisDOT sign plate W8-75. Sign size varies by facility type. For sizing information, see TEOpS 2-1-35.
3. Number of signs, beacon details and sign installation
    a. The sign and beacon assembly **shall** be ground mounted in the lateral and vertical location as specified in the W~~is~~MUTCD
        i. The sign **shall** be located in accordance to W~~is~~MUTCD Table 2C-~~4~~3
        ii. See WisDOT sign plate A4-4 for information on roadway offsets, number of posts and post spacing required
        iii. Warning beacons **shall** be mounted on the same support as the warning sign. See W~~is~~MUTCD 4S~~L~~.01 and 4S~~L~~.03 for information. The beacon **shall** be mounted, at minimum, one foot above the sign with a maximum of two feet.
    b. The number of signs depends on the facility type and site condition. See Figure 2 for an illustration of a typical installation on a divided, multi-lane highway.
        i. For two-lane undivided highways, one sign **shall** be installed for each direction of travel
        ii. For four-lane divided highways, one sign **shall** be installed on each side of the highway for each direction of travel
    c. Two flashing beacons **shall** be used on all signs. When activated, the beacons **shall** operate with an alternating flashing, “wig-wag”, signal indication.

The following provisions pertain to the design and installation of the detection and electrical service for a TRAWS on the STH system:

1. Detection
    a. All stop approaches *should* have advance and stop bar detection. The type of detection *should* be controlled through radar detection. The equipment **shall** be furnished by the Department.
    b. Detection of a vehicle on the stop approaches **shall** be transmitted through a hard-wired connection from a detector to activate the beacons on the system
    c. Any poles needed for mounting detection equipment **shall** be in conformance with the standards in FDM 11-15-1
    d. System timing *should* be based on the operating speeds on the major and minor roads, major road sign placement, major road vehicle perception-reaction time, intersection geometrics, traffic volumes, vehicle mix and type of detection at each site
    e. The need to detect vehicles in the median who are making two-stage crossing maneuvers **shall** be evaluated during design

2. Electrical service
    a. Service **shall** be installed underground. The conduit **shall** run up and be attached to the control cabinet. The control cabinet **shall** be mounted on the pole at least three feet from the ground.
    b. Solar-powered installations **shall** not be allowed on the STH system

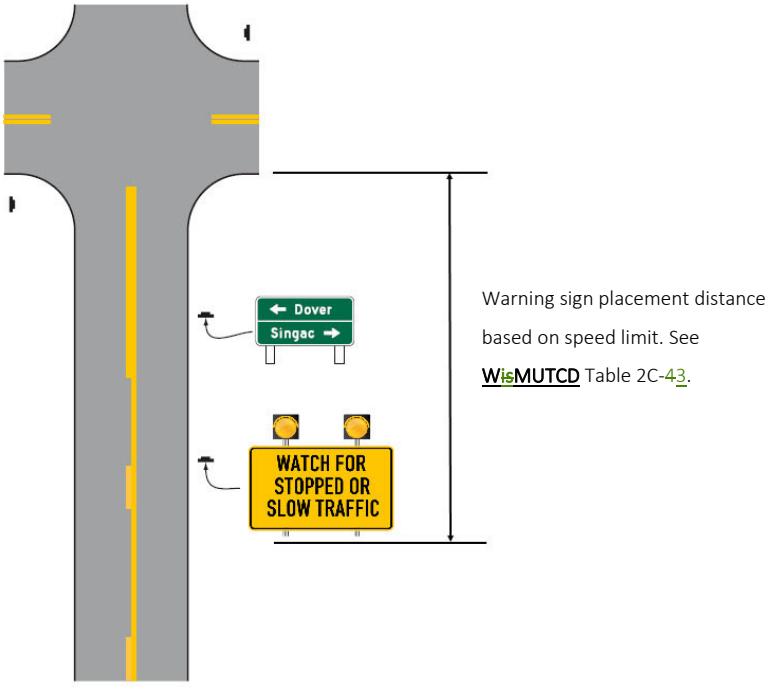
**STOPPED OR SLOW TRAFFIC AHEAD WARNING SYSTEM**

Introduction

A common crash type at a TWSC intersection where a separated left turn lane doesn’t exist is when a vehicle on the mainline slows to perform a turn or is stopped within a queue of vehicles due to turning traffic and is rear-ended by another vehicle. Several factors that could contribute to these types of crashes are restricted sight distance, unusual geometry, and roadway curvature.

A Stopped or Slow Traffic Ahead Warning System is a type of ICWS that detects vehicles on the major road to warn subsequent vehicles of a stopped/slowed vehicle ahead. A vehicle that is slowing prior to the intersection to perform a turn activates flashing beacons that are attached to a static warning sign. Figure 3 displays a typical installation on a two-lane undivided facility.

**Figure 3.** Typical Installation of a Stopped or Slow Traffic Ahead Warning System on a two-lane highway




Policy

This policy contains provisions for proper site selection, application, design, and installation of a Stopped or Slow Traffic Ahead Warning System on the STH system.

**Site Selection Criteria**

A Stopped or Slow Traffic Ahead Warning System *should* be considered at an existing TWSC intersection if it meets all the following conditions:

1. Enhanced signing and marking treatments have failed to mitigate crashes
2. The Stopping Sight Distance (SSD) does not meet minimum standards for a category 1 sight distance requirement or the intersection experienced three or more correctable crashes (mainline rear-ends relating to left-turning movements) in the previous five years or since the most recent safety improvement, if one was installed, within the previous five years. See FDM 11-10-5.1.1 for SSD requirements.
3. Installing geometric alternatives (turn lanes, bypass lanes, paved shoulders) is not feasible due to unusual geometrics, existing roadway features, or other factors
4. The posted speed limit for the through route is greater than 45 mph

**Design and Installation**

The following provisions pertain to the design and installation of the signing components for a Stopped or Slow Traffic Ahead Warning System on the STH system:

1. Installations **shall** be in compliance with the requirements established in the Wisconsin MUTCD (~~WisMUTCD~~WMUTCD)
2. The sign legend **shall** follow WisDOT sign plate W8-77. Sign size varies by facility type. For sizing information, see TEOpS 2-1-35.
3. Number of signs, beacon details and sign installation
    a. The sign and beacon assembly **shall** be ground mounted in the lateral and vertical location as specified in the ~~WisMUTCD~~WMUTCD
        i. The sign **shall** be located in accordance to W~~is~~MUTCD Table 2C-~~4~~3
        ii. See WisDOT sign plate A4-4 for information on roadway offsets, number of posts and post spacing required
        iii. Warning beacons **shall** be mounted on the same support as the warning sign. See W~~is~~MUTCD ~~4L~~4S.01 and ~~4L~~4S.03 for information. The beacon **shall** be mounted, at minimum, one foot above the sign with a maximum of two feet.

b. This system *should* only be used for two-lane undivided highways. One sign **shall** be installed for each direction of travel
c. Two flashing beacons **shall** be used on all signs. When activated, the beacons **shall** operate with an alternating flashing, “wig-wag”, signal indication.

The following provisions pertain to the design and installation of the detection and electrical service for a Stopped or Slow Traffic Ahead Warning System on the STH system:

1. Detection
    a. Detection *should* be camera-based in order to detect mainline vehicles slowing to perform a turn. The type of detection *should* be evaluated at each location. The equipment **shall** be furnished by the Department.
    b. Detection of a vehicle **shall** be transmitted through a hard-wired connection from a detector to activate the beacons on the system
    c. Any poles needed for mounting detection equipment **shall** be in conformance with the standards in FDM 11-15-1
    d. Considerations for system timing and system delays *should* be based on conditions at the site such as traffic volumes, vehicle type, vehicle speeds, major road vehicle perception-reaction time, intersection geometrics, and major road sign placement.

2. Electrical service
    a. Service **shall** be installed underground. The conduit **shall** run up and be attached to the control cabinet. The control cabinet **shall** be mounted on the pole at least three feet from the ground.
    b. Solar-powered installations **shall** not be allowed on the STH system

**PERMITTING OF INTERSECTION CONFLICT WARNING SYSTEMS**

See TEOpS 4-5-1 for provisions on permitting ICWSs.

**MAINTENANCE AND RELIABILITY OF INTERSECTION CONFLICT WARNING SYSTEMS**

Reliability of an ICWS is critical for public acceptance and successful crash mitigation. The provisions described in this policy have been developed to provide a high level of system reliability commensurate with other ITS devices deployed by the Department. Design of the detection system, electrical service and data transmission, and sign messaging all play a role in how drivers perceive and react to an ICWS during normal and fail-safe conditions. Once a system has been installed, the Region operations section **shall** be the primary caretaker of the system to provide any needed maintenance and repairs that keep the system functional on the STH system. Coordination with local maintenance forces, law enforcement and local stakeholders is needed to identify any system malfunctions so the appropriate personnel can promptly respond to any issues.

**REFERENCES**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2. Bryer, T. (2011). Stop-Controlled Intersection Safety: Through Route Activated Warning Systems. *Report No. FHWA-SA-11-015*. Federal Highway Administration, Washington, D.C.
3. Crowson, G., & Jackels, J. (2011). Design and Evaluation Guidance for Intersection Conflict Warning Systems (ICWS). *Report No. ENT-2011-1.* ENTERPRISE Transportation Pooled Fund Study TPF-5 (231).
4. Himes, S., Gross, F., Eccles, K., Persaud, B. (2016). Safety Evaluation of Intersection Conflict Warning Systems. *Report No. FHWA- HRT-16-035*. Federal Highway Administration, Washington, D.C.
5. “Planning Guidance for Intelligent Transportation Systems (ITS) Devices. Version 3.1” (2015). ENTERPRISE Transportation Pooled Fund Study TPF-5 (231).
6. Vaughan, I., & Jackson, S. (2016). Intersection Conflict Warning Systems Human Factors: Final Report. *Report No. FHWA-HRT-16-061*. Federal Highway Administration, Washington, D.C.


## 12-5-4 Friction Surface Treatment — August 2021

**BACKGROUND**

Maintaining pavement friction is a critical component of vehicles safely navigating a roadway. Almost 20% of all traffic fatalities result from lane departure crashes, while they only account for less than 5% of all traffic crashes. A “lane departure” crash is a “non-intersection crash which occurs after a vehicle crosses an edge line or a center line, or otherwise leaves the travel way.”

One of the primary causes for lane departure crashes is related to poor weather conditions, particularly snow/ice and wet weather conditions.

One method to address lane departure crashes is to provide friction enhancements to the pavement. Wisconsin has several types of surface treatments that are considered friction enhancements to existing roadway or bridge surfaces.

High Friction Surface Treatments (HFST) use a calcined bauxite aggregate with resin binder, which is an aggregate that maintains frictional resistance over time by resisting polishing and wear. A resin binder is applied to the roadway or bridge surface prior to the aggregate application. HFSTs are a proven low-cost countermeasure to reduce lane departure crashes in areas that have an observed crash history related to poor, especially wet, weather conditions.

Enhanced Friction Surface Treatments (EFST) include all other types of friction enhancements to roadway and bridge surfaces.

**GUIDANCE**

Areas that have vehicles changing lanes or braking excessively *may* experience pavement surfaces becoming prematurely polished which reduces pavement friction. These locations commonly are located on interchange ramps and horizontal or vertical curves. Locations that experience a high number of lane departure crashes that can be considered for friction treatment installation include:

- Interchange Ramps
- Horizontal or vertical curves
- Structures
- Roundabouts

A HFST **shall** be the preferred friction enhancement to mitigate lane departure crashes. Friction surface treatments **shall** be installed as spot treatments or on short segments to mitigate crashes related to pavement friction deficiencies. These treatments are not intended to be applied as a corridor treatment and *should* only be considered when warranted.

Placement and application

Crashes are likely to occur in the area where a driver recognizes an upcoming change of condition and applies the brakes to navigate the roadway feature. These crashes *may* be prevented by providing a HFST prior to the change of condition. Placement of a HFST *should* be based on the characteristics of the roadway and other indications that are specific to each site. These factors *may* include:

- Crash locations
- Presence of skid marks
- Damaged roadside barriers or other objects
- Presence and condition of previous low-cost countermeasures
- Superelevation
- Driver speeds
- Advisory speeds
- Driver behavior
- Point of curvature and point of tangent
- Horizontal and vertical sight distances
- Intersections near or within a curve
- Heavy vehicle use
- Speed differentials
- Presence of horizontal curves, vertical curves, or weaving areas
- Friction levels (if existing pavement will remain)

When applying a HFST to the roadway surface it **shall** be installed in a single layer unless it is being applied to a bridge deck. When applying either a Thin Polymer Overlay (TPO) or a HFST to the bridge deck it **shall** require a two-layer application for deck preservation against chloride infiltration. Additionally, the standard two-layer application provides protection against snowplow and snowmobile operations.

For bridge applications, the standard two-layer TPO consists of a two-component system of epoxy polymer and aggregates for a ¼-inch minimum total thickness. This TPO system does not require use of calcined bauxite aggregates and is considered an EFST. When a HFST is warranted, a two-layer TPO with calcined bauxite aggregates **shall** be applied. The bridge deck (driving lanes and shoulders) *should* be the only feature that receives the treatment. Other considerations *should* be evaluated to determine if the approach slabs or travel lanes prior to the bridge deck need to be treated such as the presence of a curve or areas where heavy weaving may occur. Use of a HFST on bridge decks will require additional coordination and prior approval from the Bureau of Structures. For additional information on friction treatments for bridge decks, refer to the thin polymer overlay section in Chapter 40 of the WisDOT Bridge Manual.

For applications prior to vertical curves and roundabouts, the above factors *should* be taken into consideration at each situation due to the unique properties of the site.

For horizontal curves, the braking distance can be used to provide an approximate location of where to begin placement of a HFST. Table 1 provides general placement guidance for horizontal curves prior to the point of curvature (PC).

**Table 1.** Recommended HFST placement distances prior to the point of curvature (PC)

| Approach Speed (mph) | Curve Advisory Speed (mph) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| 25 | 100 | 75 | 50 | - | - | - | - | - | - | - | - | - |
| 30 | 125 | 125 | 100 | 50 | - | - | - | - | - | - | - | - |
| 35 | 175 | 150 | 125 | 100 | 50 | - | - | - | - | - | - | - |
| 40 | 200 | 200 | 175 | 150 | 100 | 50 | - | - | - | - | - | - |
| 45 | 250 | 225 | 225 | 175 | 150 | 100 | 50 | - | - | - | - | - |
| 50 | 300 | 300 | 275 | 225 | 200 | 150 | 125 | 50 | - | - | - | - |
| 55 | 375 | 350 | 325 | 300 | 250 | 225 | 175 | 125 | 50 | - | - | - |
| 60 | 425 | 400 | 375 | 350 | 325 | 275 | 225 | 175 | 125 | 50 | - | - |
| 65 | 500 | 475 | 450 | 425 | 375 | 350 | 300 | 250 | 200 | 125 | 50 | - |
| 70 | 575 | 550 | 525 | 500 | 450 | 425 | 375 | 325 | 275 | 200 | 125 | 50 |
| 75 | 650 | 625 | 600 | 575 | 525 | 500 | 450 | 400 | 350 | 275 | 225 | 150 |

*Note: Recommended values are based on the braking distance with a conservative deceleration rate of 10 ft/s$^2$. All values include an added 50 feet and are rounded to the nearest 25 feet.*

## REFERENCES


1. "Frequently Asked Questions – High Friction Surface Treatments (HFST) – 2017" (2018, February). Federal Highway Administration, Washington, D.C. Retrieved from https://safety.fhwa.dot.gov/roadway_dept/pavement_friction/faqs_links_other/hfst_faqs/. Accessed August 9, 2021.
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3. "Horizontal Curve Safety" (2021, February). Federal Highway Administration, Washington, D.C. Retrieved from https://safety.fhwa.dot.gov/roadway_dept/countermeasures/horicurves/. Accessed August 9, 2021.
4. "Wisconsin Strategic Highway Safety Plan 2017-2020" (2017, November). Wisconsin Department of Transportation, Madison, WI. Retrieved from https://wisconsindot.gov/Documents/safety/education/frms-pubs/strategichwy-17-20.pdf. Accessed August 9, 2021.


## WISDOT SPECIAL PROVISIONS AND REFERENCES

1. Wisconsin Resin Binder High Friction Surface Treatment
2. WisDOT Bridge Manual: Chapter 40 – Bridge Rehabilitation, 40.5.1.1 Thin Polymer Overlay

## 13-5-1 Statutory Authority and the Approval Process — November 2024

Speed limits are absolute limits that are established for a roadway under ideal conditions. They also help traffic enforcement by setting standards for what is an unsafe speed. Setting speed limits appropriately helps to reduce the significant risks drivers impose on others – especially vulnerable road users.

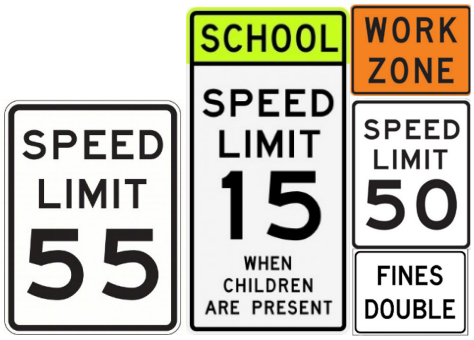
The concept of establishing speed limits is based upon the nationally accepted principle that the majority of drivers are cautious, prudent and drive at speeds that are reasonable, regardless of the posted speed limit. This "reasonable and prudent" theme is part of the Wisconsin State Statutes in ss. 346.57 (4) and ss. 349.11 (7).

The policy described within aligns with Wisconsin State Statutes and the Wisconsin Manual on Uniform Traffic Control Devices (WMUTCD) [1].

## 13-5-2 Types of Speed Limits — November 2024

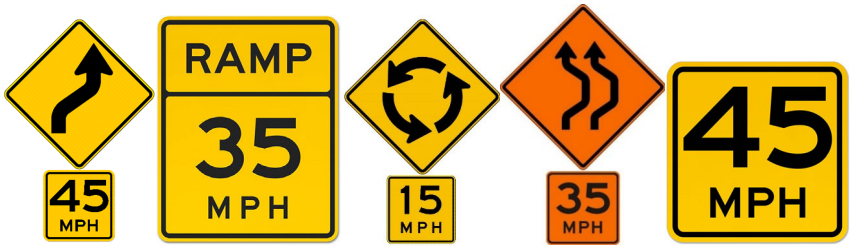
### Regulatory

Speed limits posted with a white background and black legend sign are maximum speed limits that a road user must adhere to under average or ideal conditions. These are referred to as regulatory speed limits and examples are shown below. Regulatory speed limits are absolute speed limits, above which it is unlawful to drive regardless of roadway conditions, traffic volumes, pedestrian presence, school activity, highway construction or maintenance workers or other factors.




### Advisory

Speed limits posted with a yellow or orange background with black legend sign are warning signs used to advise a road user of a recommended driving speed for an upcoming road condition or hazard. These are used in situations where there is a small section of road that *should* be traveled at a lower speed. These can be used at curves, intersections with reduced visibility, or within work zones. These signs are advisory and not enforceable in Wisconsin unless a driver is driving too fast for conditions. Below are examples of advisory speed limits.



## 13-5-3 Types of Regulatory Speed Limits — November 2024

### Statutory Speed Limits

Statutory speed limits are established by state law and are based on the classification (or type) of roadway (e.g., 70 mph on freeways, 45 mph on rustic roads). Statutory speed limits in Wisconsin are governed by ss. 346.57 which establish maximum/minimum speed limits for all roadways. These limits are established legislatively and are applied throughout Wisconsin on public roadways. Statutory speed limits ensure a limit is in place on all roads.

### Modified Speed Limits (Modifications to Statutory Speed Limits)

Modified speed limits are typically established on roadways where the statutory speed limit or existing limit is no longer appropriate due to a change in land use, road design, access, traffic volumes, construction/maintenance activity, or number of crashes or crash potential along a roadway. Modified speed limits *should not* be used to address spot safety issues. Often, other engineering countermeasures are more appropriate to address safety issues.

Unless speed limits are set initially by state statutes (statutory speed limits), all speed limits in Wisconsin must be established through an engineering and traffic investigation.

Speed limits that are not used in Wisconsin are as follows:

- Nighttime speed limits – limits that are adjusted based on day or night conditions.
- Minimum speed limits – limits establishing the lowest allowable speed for a roadway.
- Specialty vehicle speed limits (e.g., trucks, golf carts, etc.) – limits applied to certain classes of vehicles.
    - Exceptions include: All-Terrain Vehicles (ATV) and Utility Terrain Vehicles (UTV)
- Seasonal speed limits – limits that are applied for a specified period(s) during the year, generally at locations with significantly different levels of roadside activity at different times (e.g., high traffic tourist area popular in summer).

## 13-5-4 Definitions — November 2024

An engineering and traffic investigation is the analysis and evaluation of available pertinent information including, but not limited to, the safety and operational efficiency of all road users, and the application of appropriate principles, provisions, and practices as contained in the WMUTCD.

The following provides definitions of information typically included within an engineering and traffic investigation.

### Roadway Context Terminology

Roadway Geometry is information on the roadway facility's features and dimensions such as lane widths, shoulder widths, curb and gutter presence, curves, sidewalk/pathways, presence of lighting, and available sight distance.

Traffic Volume is used to describe the number of vehicles at a given location on an average day of the year. This is often expressed as either an Average Daily Traffic (ADT) or Annual Average Daily Traffic (AADT) count.

Area Type is a designation for the setting of the environment where the roadway facility is located. There are three area types:

- Urban – locations that have a population of 5,000 or greater. In urban settings there is minimal undeveloped land and several buildings including schools, commerce centers and others.
- Rural – locations that have a population less than 5,000. In rural settings there are typically large areas of undeveloped land with minimal buildings or residences. These may include small towns and unincorporated communities.
- Suburban – transitional areas between rural and urban settings. These typically are locations that are built up areas on the outskirts of cities and villages.

Functional Classification is a transportation planning term that defines how a route *should* perform in serving the flow of traffic through a highway network. It is the grouping of highways, roads and streets by the character of

service they provide (e.g., principal arterial, minor arterial, collector (major/minor), local street).

Vulnerable Road User encompasses non-motorists including people walking, biking or rolling. These include pedestrians, bicyclists, other cyclists, and individuals utilizing other means of personal transportation.

**Speed Terminology**

Operating Speed (Free-Flow Speed) is defined as the speed at which a driver operates a typical vehicle, or a speed at which the overall traffic operates during free-flow conditions. Free-flowing speed is defined as conditions in which a driver has the ability to choose a speed of travel without undue influence from other traffic, traffic control devices (e.g., traffic signals, roundabouts), conspicuous police presence, or environmental factors. In other words, the driver of a free-flowing vehicle chooses a speed that they find comfortable on the basis of the appearance of the road [2] [3]. WisDOT measures free-flowing vehicle speeds when there is a gap of five seconds or more between vehicles per lane.

Design Speed is the speed selected during the roadway design process that determines the various geometric design features of the roadway such as horizontal alignment, vertical alignment, and cross-section design elements [4]. This includes lane widths, shoulder widths, curb and gutter presence, curves, and available sight distance.

The following are definitions for speed-related performance metrics:

- 85th Percentile Speed is the speed at or below which 85 percent of the sample of free-flowing vehicles travel.
- 50th Percentile Speed (also known as the median speed) is the speed at which 50 percent of the sample of free-flowing vehicles travel.
- Average speed is the typical speed of the sample of free-flowing vehicles. This is calculated by taking the sum of all observed speeds within the same sample and dividing by the total number of observations.
- Pace is the 10-mph range of travel speeds containing the largest number of observed vehicles. This is a metric used to assess the speed dispersion or spread of vehicle speeds. A normal speed dispersion *should* have approximately 70% of the vehicles within this 10-mph range.
- Speed variance is the difference in travel speeds of vehicles traveling on the same stretch of roadway simultaneously. Large speed variances increase the potential for crashes.

**Roadway Classifications**

State Trunk Highways (STH) are highways that include both Wisconsin State Highways and United States (US) Highways that are maintained by WisDOT. In Wisconsin, these are highways designated with numbers.

County Trunk Highways are highways maintained by County Highway Departments or other municipalities. In Wisconsin, these are highways designated with letters.

Local Streets are roadways that are maintained by incorporated municipalities (i.e., villages/cities) that serve primarily residential traffic and provide a connection between highway systems.

Town Roads are typically low-volume roadways that are maintained by townships.

Rustic Roads are roadways designated by the Rustic Roads Board which have characteristics that promote natural features or wildlife and low volume for the purposes of recreational enjoyment. For more information see the Rustics Road webpage.

Alleys are roadways that are narrow passages between or behind development.

Freeways are high-speed roadways that are access-controlled, and all crossroads are grade-separated (i.e., interchanges/overpasses).

Expressways are high-speed roadways that are partially access-controlled, and crossroads can be either at-grade intersections or grade-separated (i.e., interchanges/overpasses).

**Other**

Variable speed limits are limits that can dynamically change based on traffic, weather or other conditions.

Connecting Highways are local streets and roads that carry state highway travel and are marked as STHs through cities and villages.

Outlying district is an area contiguous to any highway within the corporate limits of a city or village where on each side of the highway within any 1,000 feet, buildings are spaced on average more than 200 feet apart.

Semiurban district is an area contiguous to any highway where on either or both sides of the highway within any 1,000 feet, buildings are spaced on average less than 200 feet apart.

## 13-5-5 Background November 2024

Modified speed limits are typically established on roadways where the statutory speed limit or an existing speed zone is no longer appropriate due to changes in land use, access, traffic volumes, number of crashes or crash potential along the highway. Speed zoning is a means of establishing uniform regulatory speed limits for similar driving conditions throughout the state. It is a means of informing motorists who may be unfamiliar with the road of the "reasonable" driving speeds under ideal operating conditions. Speed limits are established under ideal conditions and not based on temporary situations (e.g., construction, seasonal variations in traffic/pedestrian volumes, special events).

Unreasonably low speed limits, also called irrational speed limits, are not effective in changing driver behavior and have several negative effects. While irrational speed limits do not result in desired driver behavior, resulting negative effects include higher financial cost due to the need for increased enforcement, higher potential for crashes due to larger variability in vehicle speeds, and encouragement of motorist disregard of other, rational posted speed limits. Irrationally low speed limits also promote a false sense of security among residents and pedestrians who may expect that posting lower limits will change drivers' speed behavior.

Driving environment is the main influence on motorists' speeds. Drivers rely heavily on cues from the roadway environment to judge how fast they are traveling. The primary basis for how a motorist estimates their speed is the visual sensation they observe from the roadway geometrics (e.g., lane width, presence of curves, on-street parking, access along the roadway, bicycle and pedestrian activity, sidewalks/pathways, presence of lighting, etc.) and other information about objects in their immediate vicinity. Roadway design and driving environment *should* be balanced to achieve the following goals [2]:

- The driver's perceptual experience of the roadway *should* be consistent with the intended travel speed
- There *should* be some consistency between relevant roadway cues and the posted regulatory speed.

## 13-5-6 Authority November 2024

The statutory authority for establishment of regulatory speed limits is provided in ss. 346.57 and ss. 349.11. These statutes vest WisDOT with the authority to establish regulatory speed limits on the state trunk highway system. Furthermore, the statutes provide WisDOT with approval authority (refer to ss. 349.11(3)(c)) for some regulatory speed limits that local units of government establish.

Statutes define that all speed limit changes **shall** be based on an engineering and traffic investigation, including modifications allowed under Statute. An engineering and traffic investigation **shall** be performed by a registered professional engineer with appropriate traffic engineering expertise and/or experience in traffic engineering studies, or by an individual working under the supervision of such an engineer, through the application of procedures and criteria established by the engineer. An engineering and traffic investigation **shall** be documented in writing.

### Connecting Highway

Connecting highways are local streets and roads that carry state highway traffic and are marked as State Trunk Highways. Wisconsin ss. 84.02(11) and ss. 86.32(1) define connecting highways and the funding provided to maintain these roadways. Connecting Highway funding aids are used to maintain these streets and roads at state trunk highway system standards and compensate local governments for the incremental costs of through-traffic routed over municipal streets. For more information see the Connecting Highway webpage.

Connecting Highway speed limits are maintained by the respective municipality. Wisconsin ss. 86.32 states such maintenance, operation and traffic control of the connecting highways and swing and lift bridges **shall** be subject to review and approval by WisDOT.

Municipalities that maintain connecting highways are responsible for the maintenance and traffic control of the roadway which includes establishing speed limits. Thus, local authorities responsible for these roadways **shall** follow information within Table 6.1~~Table 6.1~~ to establish speed limits. Proposed changes to speed limits on

these facilities that impact the operation of connecting highways **shall** be subject to review and approval by WisDOT.

**Approval Authority**

**Local Government**

- Local units of government, under their respective maintenance jurisdictions, can approve speed limit modifications as allowed in Table 6.1~~Table 6.1~~.
- When speed limits are recommended outside of the approval authority defined by ss. 349.11, local units of government are required to coordinate with WisDOT. For information on how to request WisDOT to review a speed limit modification, see TEOpS 13-5-7 Engineering and Traffic Investigation Procedure~~13-5-7.1~~.
- Local units of government *should* follow the guidance outlined within TEOpS 13-5 to satisfy the requirements of an engineering and traffic investigation.

**Table 6.1** Speed Limits and Local Authority

| **Statutory (Fixed) Limits per ss. 346.57(4)** | **What Local Governments[(a)] can do per ss. 349.11(3) and (7)** |
|---|---|
| 70 mph – Freeway/Expressway | N/A |
| 65 mph – Freeway/Expressway | N/A |
| 55 mph – State Trunk Highway | N/A |
| 55 mph – County Trunk Highway | Lower the speed limit to 50 or 45 mph |
| 55 mph – Town Road | Lower the speed limit to 50 or 45 mph |
| 45 mph – Rustic Road | Lower the speed limit to 40, 35 or 30 mph |
| 35 mph – Town Road<br>with average driveway spacing less than 150 feet | Lower the speed limit to 30 or 25 mph |
| 25 mph – Inside corporate limits of a city or village | Raise the speed limit up to 55 mph<br>Lower the speed limit to 20 or 15 mph |
| 15 mph – Street or Town Road<br>adjacent to a public park | Lower the speed limit to 10 or 5 mph |
| 15 mph – Alley | Lower the speed limit to 10 or 5 mph |
| 15 mph – Pedestrian Safety Zone<br>(with a public transit stop) | No changes permitted |
| Construction or temporary maintenance zones | See TEOpS 13-5-16 **Temporary Traffic Control Zones**~~13-5-16~~ and 13-5-17 **Maintenance Work Zones**~~13-5-17~~ |
| School zone/School crossing | See TEOpS 13-5-12 **School Zones**~~13-5-12~~ |
| Connecting Highway | Subject to WisDOT approval |
| (a) All speed limit changes shall be based on an engineering and traffic investigation, including modifications allowed under Statute. Local governments can implement speed limit changes on the local road system without WisDOT approval when proposals are within the constraints identified above. | |

**WisDOT Regional offices**

- Regional offices are authorized to approve speed limit changes on local roads and streets, including county trunk highways, where those changes fall outside the authorized limits that the local authorities *may* exercise as specified in the statutes.
- Regional offices are authorized to establish reductions in speed limits in construction zones on a temporary basis while the need for the reduction exists.
- Regional offices are authorized to approve speed limits which fall within 5 mph of the measured 85th percentile speed and no more than 2 mph below the measured average speed, or where speed limits are established based on statutory requirements. In the absence of speed information, regional staff **shall** coordinate with WisDOT Bureau of Traffic Operations (BTO). Exceptions include:
    - Adjusting speed limits due to relocations from development, access modifications or adjusting due to signage requirements. Extensions *should not* exceed 300' without BTO approval. Speed studies *may* be required for extensions due to these changes.

- Construction of new roadway facilities or reconstruction of existing facilities in which speeds are posted in accordance with the design speed. If speeds are posted below the design speed, coordination with BTO is required.

**WisDOT Bureau of Traffic Operations (BTO)**

- The following **shall** be approved by the Traffic Analysis and Safety Unit (TASU) within BTO:
  - Speed limits not meeting the criteria defined above and within Table 6.1~~Table 6.1~~.
  - Speed studies that are not able to collect speed data (e.g., short roadways).
  - Modifications or proposed modifications on expressways/freeways with posted speeds greater than or equal to 65 mph.
  - Use of variable speed limits.

## 13-5-7 Engineering and Traffic Investigation Procedure November 2024

**Request Process**

Requests to review a speed zone on the State Trunk Highway (STHs) **shall** be submitted in writing by a local unit of government or County Traffic Safety Commission and include the following:

- Current regulatory speed limit and begin/end points
- Proposed regulatory speed limit
- Proposed begin/end points of proposed zone(s)
- Reasoning for the request (e.g., change in land use, access, traffic volumes, crash trends)

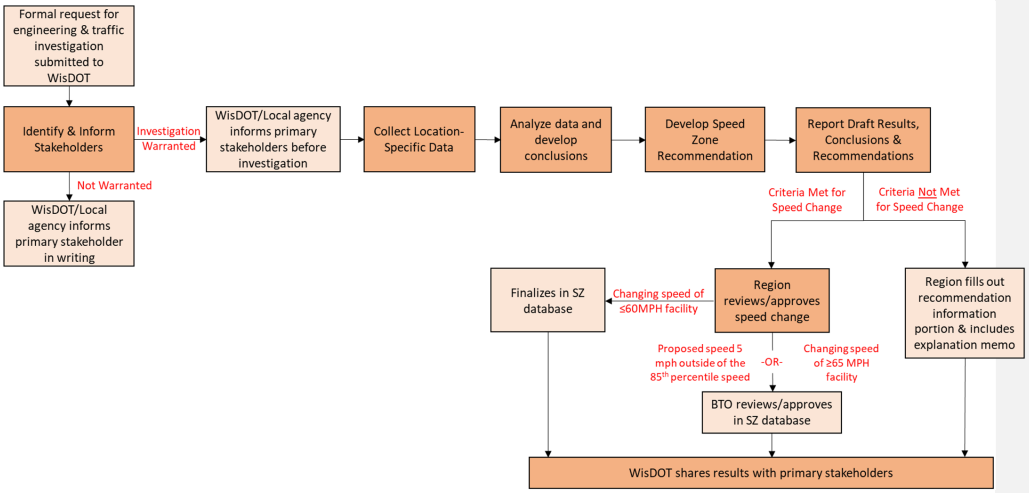
For contact information, please see the WisDOT Speed Limits webpage.

Upon receipt of request, WisDOT will then determine if a review of the speed limit is appropriate. WisDOT does not entertain requests to modify speed limits from individual citizens or advocacy groups. Considerations for speed limit adjustments **shall not** be based solely on the following:

- Noise complaints
- Accommodating specialty vehicles (e.g., ATV/UTV)
- Correcting spot safety concerns
- Future concerns that have not yet occurred (e.g., future development, future roadway improvements)

If an engineering and traffic investigation is warranted, WisDOT will then follow a process outlined in Figure 7.1~~Figure 7.1~~.

**Figure 7.1** Engineering and Traffic Investigation Process




**Requirements**

For a speed limit to be effective, it *should*:

- Reflect consistent application of traffic engineering principles
- Be a reasonable speed so the majority of drivers will comply voluntarily
- Be based on ideal or average conditions and not temporary situations (e.g., construction, seasonal variations in traffic/pedestrian volumes, special events)
- Local units of government *should* follow the guidance outlined within this manual to satisfy the requirements of an engineering and traffic investigation.
- For state-maintained highways, a traffic engineer with a Wisconsin Professional Engineer License is required to approve a speed limit modification.

An engineering and traffic investigation **shall** include the following section headings. Include information within each section as appropriate based on the study location.

1. Roadway Context Information
    - Primary function or purpose of roadway (e.g., residential street, thoroughfare, commuter route, freight route, recreational route, etc.)
    - Roadway environment (e.g., development adjacent to the road, average building setback, and types of land use)
    - Roadway characteristics (e.g., number of lanes, lane widths, shoulder type and width, roadway curvature, median type, sight distance, presence of curb and gutter, etc.)
    - Roadside features (e.g., presence of and distance to roadside hazards including trees, rock outcrops, street furniture, embankments, edge drop-off, side slopes, water bodies, etc.)
    - Area Type (e.g., urban, suburban, rural)
    - Access density (e.g., number and type of driveways and intersections, etc.)
    - Road users (e.g., pedestrians, bicyclists, ATV/UTV, horse and buggies, other vulnerable road users, etc.)
    - Traffic Volumes (e.g., AADT/ADT, truck volumes and proportions, pedestrian and bicycle volumes, etc.)

- Public transit volume and location or frequency of stops
- Other information relevant to the roadways purpose and function (e.g., parking practices, functional classification, design speed, etc.)

2. Safety Information
   - Years reviewed (minimum of 3 years of reported crash history)
   - Number and type of crashes
   - Number of injury and fatal injury crashes
   - Number of vulnerable road user crashes
3. Speed performance metrics
   - 85th percentile speed
   - 50th percentile speed
   - Average speed
   - Pace
4. Other relevant information
   - Review of past speed studies to identify any trends in operating speeds
   - Recent significant changes (traffic control changes, speed limit adjustments, lane adjustments, new development, etc.)
   - Current level of enforcement

For urban and suburban roadways, and on rural roadways that serve as main streets through developed areas of communities, speed performance metrics *should not* be used as the sole criterion to establish speed limits without consideration of roadway context factors described above. On a freeway, expressway, or rural highway (outside urbanized locations or conditions), the speed limit that is posted *should* be within 5 mph of the 85th percentile speed of free-flowing traffic as long as all the factors described within the roadway context section of this policy have been considered and determined to be non-mitigating.

After analyzing information collected above as part of an engineering and traffic investigation, the analyst **shall** use it to develop and support speed zone recommendations. The engineering and traffic investigation **shall** provide a recommendation indicating whether conditions warrant a need to modify the speed limit of the studied section of roadway or not. Decisions regarding the potential change in a speed limit *should* be based on the objective findings of the engineering and traffic investigation and on conditions that exist at the time of the evaluation.

There are expert system tools available to aid in the process of determining appropriate speed limits which can be used to supplement the requirements listed above:

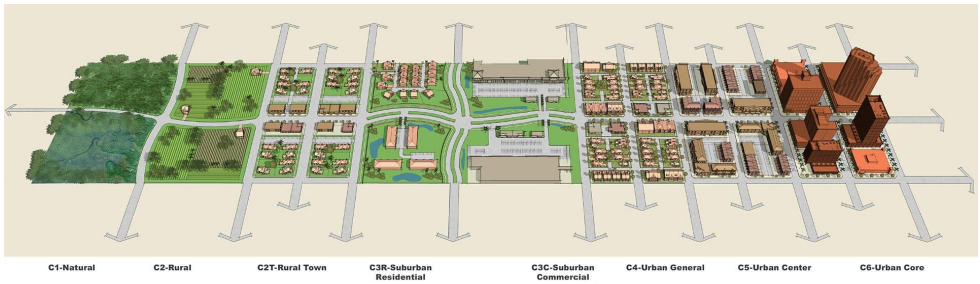
- USLIMITS2
- NCHRP 966: Posted Speed Limit Setting Procedure and Tool

### 13-5-8 Transitioning between Speed Limits — November 2024

Roadway context and environmental factors play a critical role in establishing appropriate speed limits. Drivers must perceive the need to transition from one speed to another. Development density adjacent to the roadway, building setback distance, the number of streets and driveways that access the roadway, sight distance, roadway features including the presence of curb and gutter, shoulders, medians, sidewalks, pedestrians, bicyclists, and other vulnerable road users provide cues to the driver based on their past experiences. Other aspects considered when setting appropriate speed limits are the number and type of crashes observed, traffic volumes, and observed speeds.

Figure 8.1~~Figure 8.1~~ illustrates several different roadway context scenarios.

**Figure 8.1** Roadway Context Classifications




Source: *Florida DOT's context classification, 2020* [5]

Table 8.1~~Table 8.1~~ provides planning-level speed limit recommendations based on the roadway context classifications.

**Table 8.1** Design speeds based on context classifications

| Context Category | Design Speeds (mph) |
|---|---|
| Natural | 55 |
| Rural | 45, 50, 55 |
| Rural Town | 40, 45 |
| Suburban Residential | 35, 40, 45 |
| Suburban Commercial | 35, 40, 45 |
| Urban General | 25, 30, 35 |
| Urban Center | 20, 25, 30 |
| Urban Core | 20, 25, 30 |

Minimum speed zone lengths *should* follow the guidance in Table 8.2~~Table 8.2~~. Engineering judgement *should* be used in determining the appropriate length given the roadway context. If conditions require lengths shorter than those described below, coordinate with BTO's Traffic Analysis and Safety Unit for approval.

**Table 8.2** Minimum length of speed zones

| Speed Limit (mph) | Minimum Length (miles) |
|---|---|
| ≤40 | 0.3 |
| 45, 50, 55 | 0.6 |
| 60, 65, 70 | 1.0 |

**Note:** *Adjusted values from Methods and Practices for Setting Speed Limits* **[6]**

**Speed Zone Termination Points**

The begin and end points of a speed zone *should* be located in locations with adequate sight distance and in advance of where the roadway environment changes (e.g., driveway density, lane transitions, curb and gutter presence, etc.) such that a driver may expect a different speed.

When the roadway environment or roadway characteristics change (e.g., driveway density, lane transitions, curb and gutter presence), the regulatory speed limit sign **shall** be located at the changed condition. Examples include placing speed limit signage within straight sections of roadway or prior to entering a community where there is minimal development, but the roadway characteristics change (e.g., unpaved shoulders to curb and gutter). In advance of the of changed condition, the reduced speed limit sign **shall** be located based on TEOpS 2-3-30. The location of the reduced speed limit sign *should* be adjusted based on engineering judgement such that it is located where adequate sight distance is available or in advance of the changed condition based on site conditions.

Both travel directions of speed zones *should* begin and end at the same location to align with driver expectation. Roadway conditions, existing signage and other factors play a role in locating where speed limit signs can be placed in the field. When posted, the beginning and end points of a speed zone **shall** match the ordinance/declaration description as close as possible.

Roadway characteristics such as access points and intersections sometimes prevent speed zones from being aligned in both directions. In situations where a speed zone is written to change at an intersection, the signs **shall** be posted on either side of the intersection. When reviewed as part of a study or within an improvement project, efforts *should* be made to modify these speed zones to align on one side of the intersection.

- For situations in which the separation of the begin and end points is significant or different speeds are posted for each direction, engineering judgement *should* be used.
- If conditions require an offset speed zone coordinate with BTO's Traffic Analysis and Safety Unit for approval.

**Gateway Treatments**

Gateway treatments are used to capture the attention of a driver to provide awareness of changes in the roadway environment and encourage them to reduce their speed. Examples of this include enhanced signing (e.g., additional warning signage, beacons, dynamic speed display signs), median islands, curb extensions/bump-outs, roundabouts, chicanes, etc. Gateway treatments are important tools to consider in areas where there are large reductions in the posted speed due to an abrupt change in the roadway environment.

## 13-5-9 Data Collection Best Practices ~~November~~ August ~~2024~~2025

A speed investigation *should* be performed during non-peak traffic conditions, during daylight hours, and under ideal weather conditions on a typical weekday, when motorists are likely to be traveling at uninterrupted/free-flow speeds. Collecting speed data during peak commute times, unique events, weekends, or holidays may unintentionally capture more variable travel characteristics.

A template for summarizing and reporting speed performance metrics is available on the Speed Limit References and Resources webpage.

Below are best practices for collecting speed performance metrics:

- The observer or speed-measuring device *should* be inconspicuous to the observed traffic so unusual driver behavior does not skew data.
- Speed data *should* be collected away from factors that might influence vehicle speeds, such as railroad crossings, intersections, horizontal and vertical curves, and work zones.
- Vehicle headway (the time between successive vehicles per lane) of five or more seconds *should* be present for reliable speed observations. Measurements collected with smaller headways may not reflect free-flow conditions, as the lead vehicle may influence the speed of the vehicle(s) behind it.

**Sample Size Requirements**

Selecting a sample size (number of observations) is an important step in collecting speed performance metrics. Below are requirements to help set an appropriate sample size:

- A minimum sample size for speed data collection *should not* be less than 100 vehicles per lane per direction. For example:
    - 200 vehicles for a roadway with one through lane in each direction
    - 400 vehicles for a roadway with two through lanes in each direction
- For roadways classified as very-low volume local roads, the minimum sample size *should not* be less than 30 vehicles. If the analyst anticipates that a sample of 30 vehicles cannot be collected within a reasonable amount of time, coordinate with BTO's Traffic Analysis and Safety Unit to identify alternative data sources or collection methods.

**Data Collection Methods**

A variety of methods are available to measure speeds. These methods can generally be grouped based on the installation location of the collection equipment:

- Manually operated, handheld devices that are portable and can be used in most places (e.g., radar gun, LiDAR gun)
- In-road devices that are installed into or on top of the roadway surface (e.g., pneumatic road tubes, loop detectors)
- Out-of-road devices that are installed overhead or to the side of the roadway surface (e.g., radar recorders, toll-tag readers)
- Probe vehicles that operate within the traffic stream

Ideally, data collection uses techniques that capture typical traffic behavior without affecting it. For example, vehicles equipped with radar detectors may detect the scatter from a radar beam measuring the speed of a vehicle ahead, causing those drivers to slow down before their speed can be measured. ~~An analyst can use a variety of data collection devices. These devices can be grouped into three categories, which for these purposes, are based on the location that the speed data collection device is installed.~~

- ~~Manually operated handheld devices that are portable and can be used in most places (e.g., radar gun and laser gun).~~
- ~~In-road devices that are installed into or on top of the roadway surface (e.g., pneumatic road tube).~~
- ~~Out-of-road devices that are installed overhead or to the side of the roadway surface (e.g., radar recorders).~~

Each device has distinct advantages and disadvantages for collecting and analyzing data that may factor in determining the appropriate device to use for a particular location. The analyst or agency should make a concerted effort to use devices that incorporate the most advanced data collection technologies available to them. In doing so, a more accurate representation of vehicle speeds can be obtained while minimizing observer-related biases. See WisDOT's Data Collection Methods document ~~on the Traffic Operations Manual webpage~~ for more information [7].

## 13-5-10 Documentation — November 2024

**Speed Zone Database**

The approval process for speed limit modifications proposed by WisDOT on the State Trunk Highway system is conducted electronically within the Speed Zone Database. The following summarizes the different levels of review and approval.

1. If an engineering and traffic investigation is completed on an established speed zone, the investigation findings and other relevant documents **shall** be stored within the database.
2. If WisDOT Regional office authority is met (see TEOpS 13-5-6 Authority~~13-5-6.~~2), the designated Regional approver **shall** electronically sign/approve the speed zone declaration.
3. If WisDOT Bureau of Traffic Operations (BTO) approval is needed, coordinate with BTO's Traffic Analysis and Safety Unit for approval of the speed zone declaration.

**Format**

Speed zone declarations **shall** reference recognizable and permanent landmarks (e.g., intersections or highways) and denote a distance to or from these landmarks. Landmarks that change (e.g., construction limits, city limits, building names, railroad crossings, etc.,) **shall not** be used.

## 13-5-11 Local Speed Limits — November 2024

**Request Process**

Coordinate with the appropriate government agency to discuss concerns or proposed modifications on county highways, city or village roads, or town roads. Upon receipt of request, local authorities can initiate action to modify a speed limit and create a new speed zone on a local road through an engineering and traffic

investigation. TEOpS 13-5 is provided to help guide local agencies in establishing appropriate speed limits. Wisconsin ss. 346.57 and ss. 349.11 are most applicable to modification of regulatory speed limits. These statutes, and local government authority are summarized in Table 6.1~~Table 6.1~~.

The following are common examples for local agencies:

- The roadway does not currently have a posted speed and is rural in nature (e.g., sparse development, no curb and gutter, gravel shoulders and grass ditches). In this scenario, by ss. 346.57, the speed limit is 55 mph.
- Lowering a 55-mph county trunk highway or rural roadway to 50 or 45 mph. In this scenario, the county or township *may* lower the speed limit to either 50 or 45 mph under the approval authority listed in ss. 346.57 and ss. 349.11 without WisDOT approval, but an engineering and traffic investigation is required to support the change.

**Ordinances**

It is recommended that the local approval process include legal adoption of the speed zone recommendation through passage of an ordinance. This establishes a legal record of the speed limit modification and allows the speed zone to be enforceable by law enforcement agencies. Proposed changes that lie outside the constraints presented in Table 6.1~~Table 6.1~~ **shall** be reviewed and approved by WisDOT before legal adoption by local authorities. It is recommended that the local process conclude with the local authority responding to the submitting party in writing, providing notification of approval or an explanation of the reasons for denial. The following is an example county ordinance.

**Sample Ordinance**

Establishment of Speed Zones

The Board of Supervisors of the County of Alpha do ordain as follows:

A traffic and engineering investigation having been made on the following described highways, the maximum permissible speed at which vehicles *may* be operated on said highways, which speed is herewith established as reasonable and safe pursuant to Section 349.11, Wisconsin Statutes, **shall** be as set forth herein subject to approval by the Wisconsin Department of Transportation, and upon the erection of standard signs giving notice thereof, all in Alpha County Wisconsin:

1. County Trunk Highway "A", Town of Soup, Alpha County.

   *Forty-five miles per hour from its intersection with County Trunk Highway "B", northerly to its intersection with State Trunk Highway 201.*

2. County Trunk Highway "B", Town of Blank, Alpha County.

   *Thirty miles per hour from the intersection of Rabbit's Foot Ave, northerly to a point 0.35 miles north of said intersection.*

**Documentation**

Typical documentation of an engineering and traffic investigation can include a cover letter, memo describing the background and roadway context, , map and/or photos of the area, safety information, speed performance metrics, findings, methodologies, and any other documentation to help support the recommendation. Contact the local WisDOT Regional office for an example of an engineering and traffic investigation or for any questions on the speed limit setting process. See WisDOT's Speed Limit webpage for contact information.

**Speed Limits Within and Outside Incorporated Areas (Outlying District and Semiurban District)**

Outlying District and Semiurban Districts are defined in ss. 346.57(1)(ar) and 346.57(1)(b) respectfully. These statutes are meant to establish speed limits based on access (building) density and *should not* be used as the sole criteria to establish a speed limit without consideration of other factors listed within TEOpS 13-5-7 Engineering and Traffic Investigation Procedure~~13-5-7.2~~.

## 13-5-12 School Zones November 2024

Wisconsin State Statutes require that school advance warning signs be installed and maintained on every highway where a school ground is contiguous to the highway. There is no requirement that a school speed limit be posted except where it differs from the 15-mph provision in ss. 346.57 (4)(a) and (b). These two provisions place the requirement on the motorist to reduce speed to 15 mph when children are present, even in the

absence of speed limit signs.

**Sign Requirements**

School speed limits require the use of a regulatory school speed zone sign. For more information on school signage, see TEOpS 2-3-54. If used, they *should* be posted at 10 mph less than the posted regulatory speed limit of the roadway.

The physical arrangements of schools along state trunk highways vary greatly. The following are examples to help illustrate guidelines within this policy. Other locations not fitting these will have to be reviewed to determine the appropriate use of school zone signs.

**Urban Areas**

- In a built-up section of a city or village, where the roadway speed limit is low (i.e., ≤30 mph) and sidewalks are present, many or most of the children walk to school. However, some children may be transported by vehicles which can lead to congestion.
- In developed areas, sudden stoppages and slowdowns are common. If the roadway is a higher speed facility (e.g., 35 mph or greater) it would be desirable to study the location to determine the appropriate school speed limit for the roadway.

**Rural Areas**

- In a rural area, the school may be the only development along the roadway. In these areas, speed limits often are higher and there are few to no children who bike or walk to school. It is WisDOT's policy to refrain from posting school speed limits under these conditions.
- Since children are unlikely to be present in vicinity of the roadway, school speed limit signs are ineffective at changing a motorist's behavior. If there are no children present, do not post a school speed limit sign. See TEOpS 2-3-54 for information on school signage.

**Conflicts with signs**

Where school speed limits are posted, it is considered good practice to omit the full-time regulatory speed limit signs in the school zone to prevent confusion or avoid giving motorists grounds for disobeying the school speed limit.

## 13-5-13 Dynamic Speed Display Signs — November 2024

See TEOpS 2-1-7 regarding policy for dynamic speed display signs.

## 13-5-14 Posted versus Design Speeds — November 2024

Design speed is used to establish design parameters for the various features of the roadway. The selected design speed *should not* be based on speed measurements but *should* be established based on factors such as the anticipated adjacent land use, topography, crash risks, and operating speed of the roadway. The posted speed **shall not** exceed the statutory speed limit and *should* be equal to or 5 mph lower than the selected design speed. When conditions prevent a roadway feature or element from meeting design speed requirements, the posted speed **shall not** be based on the individual design speed of the feature.

Local agencies *should* coordinate with the WisDOT regional offices if they have any questions with respect to design speeds and approval authorities outlined in Table 6.1~~Table 6.1~~.

**Policy**

For construction of new roadway facilities or reconstruction of existing facilities, the posted speed limit *should* be posted in accordance with the design speed. Below are considerations for establishing appropriate speed limits on new or reconstructed facilities:

- For WisDOT improvement projects, the project team **shall** coordinate with the regional traffic and planning sections to mutually agree upon an appropriate speed limit. The regional traffic unit **shall** document the speed zone with a speed zone declaration. See TEOpS 13-5-10 Documentation~~13-5-10~~.
- Posted speeds *should* generally be equal to or within 5 mph of the selected design speed.

  - There are cases, however, where the posted speeds *may* be higher or lower than the design speed for a section of highway.
  - For speed limits posted below the design speed, coordination with the Traffic Analysis and Safety Unit (TASU) in the Bureau of Traffic Operations (BTO) is required.
- Isolated intersections with reduced speed limits **shall** be investigated for design modifications rather than maintaining a posted reduced speed. See TEOpS 13-5-15 Speed Limits on Approach to Controlled Intersections~~13-5-15~~.
- Conversion of a two-lane roadway to a four-lane roadway **shall not** automatically constitute changing the speed limit from 55 mph to 45 mph.
- Where local roads are converted to state highways or built on relocation, such as bypasses, the speed limit *should* be based on the new geometrics of the roadway and the function and purpose of the highway as either an expressway or conventional highway.
  - The function of the highway includes adjacent land use, spacing of access points and proximity to the roadway.
  - The speed limit that existed prior to the conversion to a state highway *may not* necessarily be retained.

**Design parameter considerations**

Design parameters and features of the roadway are initially based on a design speed but careful consideration *should* be used to design a roadway to achieve an appropriate operating speed. Design speeds are used to design a roadway to operate safely and efficiently to serve its intended purpose. In some situations, there may be features that are unable to meet these design thresholds and may require a motorist to travel at a reduced speed. See FDM 11-10-1.5 for more information and documentation requirements.

Individual design features such as isolated horizontal and vertical curves **shall not** dictate posted speed limits unless safety issues are identified post-construction. Other examples include:

- **Free-flow ramps at system and service interchanges** - Ramps are signed with advisory speeds mounted under a horizontal alignment sign and ramp speed warning sign.
- **Curves and/or turns with a speed rating less than design speed on a section of highway** – Curves and/or turns are signed with horizontal alignment signs and an advisory speed that provides a motorist with the recommended safe operating speed of the curve or turn.
  - Example: A 55 mph rural section of highway often has turns and curves that necessitate the driver to lower their speed in order to safely negotiate the curve or turn. The regulatory speed limit is not changed for each one of these turns or curves.
- **At transition sections from 4 to 2 lanes** - The transition area where a divided highway becomes an undivided highway *should* use engineering judgement to determine the proper location of where these speed limit transitions occur.
- **Other design features -** such as the presence and offset of curb, curb type (e.g., vertical face, sloped face), wider or narrower shoulders, or other design features **shall not** be a determining factor in establishing an appropriate speed limit in isolation.

## 13-5-15 Speed Limits on Approach to Controlled Intersections — November 2024

Sections of the state highway system in the immediate vicinity of a controlled intersection *should not* be considered for a speed zone reduction due strictly to the presence (or planned presence) of an intersection control condition. Intersection control conditions include stop conditions (one-way, two-way or all-way), traffic signals, roundabouts, or access restrictions (controlled either by regulatory signs or channelizing islands).

If requests for a modified speed limit in advance of a controlled intersection stem from safety concerns, roadway improvements *should* be considered that pertain to the specific site (e.g., channelized or extended turn lanes, modification to signal phasing or timing, rumble strips, advance warning signs, warning beacons, signing/marking enhancements, etc.). Speed limit reductions in advance of the intersection will likely not influence safety and may even promote poor engineering decisions in the future (e.g., signal equipment

placement, signal timing or sign placement).

Existing locations that do not comply **shall** be allowed to remain until such time as the intersection is resurfaced or reconstructed.

Rather than establishing a lower speed limit in advance of a controlled intersection, consider design features such as:

- Stop Conditions – Proper placement of advance warning signs (per WMUTCD).
- Traffic Signals – Intersection lighting (per TEOpS 11-4-2) and Dilemma zone detection on high-speed approaches (per Traffic Signal Design Manual (TSDM) 8-1-6).
- Roundabouts – Proper geometric design of splitter islands, roadway curvature (per FDM 11-26) and lighting (per TEOpS 11-4-3).
- Corridor Access Management – Proper geometric design principles (per FDM 7-35).

## 13-5-16 Temporary Traffic Control Zones (Construction Work Zone Speed Limits) November 2024

Refer to Section 6B.01, Temporary Traffic Control Plans, of the WMUTCD for more information on reducing the speed in temporary traffic control zones (i.e., construction work zones). Reductions in speed limits for temporary traffic control zones *should* be evaluated according to the criteria in this policy. Table 16.1~~Table 16.1~~ provides an illustration of different temporary traffic control zone scenarios.

Commented [DB1]: updated

There is often less need for reduced speed limits in temporary traffic control zones on rural conventional highways. On rural conventional highways, drivers do not have the same expectation for free-flowing traffic as they do on rural freeways. With driveway access and crossing movements on conventional highways, drivers tend to be alert to such movements and other similar conflicts even without reduced speed limits.

Temporary traffic control zones which require lower operating speeds due to changes in alignment (e.g., crossovers and transitions) or other work activities that occupy a short work area, *should* use warning signs with advisory speed plaques in lieu of regulatory speed limit signs.

### Authority

The WisDOT work zone operations engineer within BTO has approval authority for temporary traffic control zone speed limits on all interstates and facilities with a posted speed of 65 mph or greater. The WisDOT regional work zone engineer has the authority to approve and establish temporary traffic control zone speed limits on all other roadways.

### Policy

Engineering judgment **shall** be used when determining appropriate speed zones. This policy is intended to assist with the development of an appropriate work zone speed limit. Contact the regional work zone engineer or BTO for assistance with applying this policy.

Speed zones provide drivers an indication of what is considered a reasonable speed for that section of roadway. Proximity to construction activities, drop offs, lane closures, narrow lanes/shoulders and pavement condition all influence the driver's determination of a reasonable speed. The type of construction work, project length, area type (i.e., urban vs. rural), facility type, occurrence of night work and traffic mix (e.g., commuter, recreational, truck percentages) all impact driver expectations and the determination of what is a reasonable speed. The policy criteria described below *should* only be used for facilities during intermediate-term and long-term work activities as defined in Part 6 of the WMUTCD.

Commented [DB2]: updated

Speed reductions in segments without active work can lead to disregard of the posted speed. Work with your project manager to incorporate standard special provisions for removing temporary speed zones when active work is not taking place.

Policy criteria 1 through 6 *should* be evaluated, along with engineering judgment, to develop an appropriate work zone speed limit. The most restrictive work zone impact *should* be used as the determining condition.

All reduced work zone speed limits **shall** be approved prior to approval of the 90% Transportation Management Plan (TMP).

### Temporary Traffic Control Zone Policy Criteria

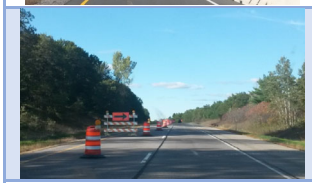
1. Interstates and Expressways with 70 or 65 mph speed limit:

- If bi-directional traffic separated by concrete barrier temporary precast, then speed limit *may* be lowered to 60 mph if warranted.
- If bi-directional traffic separated by tubular markers, then reduce to 55 mph.
- If workers are present within 12 feet of live traffic without positive protection* for any length or work area, then reduce to 55 mph.
- If work area is less than or equal to 0.5 miles in length with lane shifts or narrowed travel lanes and has positive protection*, then post warning signs with an advisory speed plaque.
- If work area is less than or equal to 0.5 miles in length with no lane shifts or narrowed travel lanes and has positive protection*, then do not lower the speed limit.
- If work is taking place outside the clear zone, then do not lower the speed limit.
- During periods of no work activity, restore speed limit to posted speed. Such speed limit reduction **shall** be subject to documented approval by the BTO work zone operations engineer. When a reduced work zone speed limit is recommended in the TMP, a temporary speed zone declaration **shall** be completed and sent to BTO for approval.

2. Expressways and other multi-lane highways with 55 or 50 mph speed limit:
   - Reduce to 45 mph only in situations that have a combination of extreme lane shifts, narrowed lanes, bi-directional traffic, or milled surfaces.
   - Restore speed limit to normal posted speed when reduction criteria are not present.
3. Multi-lane highways with 45 mph speed limit:
   - Reduce speed limit to 35 mph only in situations that have a combination of extreme lane shifts, narrowed lanes, bi-directional traffic, or milled surfaces.
4. Two-lane rural highways with 55 mph speed limit:
   - Reduce to 45 mph only in situations that have a combination of extreme lane shifts, narrowed lanes or milled surfaces.
   - A flagging operation in and of itself would typically not warrant a reduced speed limit since motorists are controlled by the flagging devices.
5. Two-lane rural roadways with speed limit of 45 mph or less:
   - Typically, no reduction in speed limit.
   - *May* consider a speed reduction up to 10 mph in increments of 5 mph in situations that have a combination of extreme lane shifts, narrowed lanes or milled/gravel surfaces.
6. Two-lane urban roadways with speed limit of 40 mph or less
   - No change in speed limit except reduction to 35 mph *may* be considered in situations that have a combination of extreme lane shifts, narrowed lanes or milled/gravel surface.

*Positive protection is defined by FHWA as a temporary precast concrete barrier that contains or redirects vehicles and separates workers from the active travel lanes.

**Table 16.1** Example Temporary Traffic Control Zone Scenarios

| | |
|---|---|
|  | Bi-directional traffic separated by flexible tubular markers |
|  | Active work areas within 12-ft. of live traffic without positive protection |
|  | Lane shift to shoulder or temporary pavement |
|  | Lane closure without positive protection |

**Work Zone Temporary Speed Zone Declarations**

Reduced speed limits in temporary traffic control zones are subject to approval by the BTO work zone operations engineer. A Temporary Speed Zone Declaration (TSZD) **shall** be submitted through the Department's online Wisconsin Transportation Management Plan (WisTMP) system.

- Complete the Temporary Speed Zone Declaration Form and attach it to Section 4 of the TMP.
- The TSZD will be approved by BTO and/or the regional work zone engineer by signing the 90% TMP.

## 13-5-17 Maintenance Work Zones November 2024

Wisconsin ss. 349.11(10) provides that a county *may* establish a speed limit through a maintenance work zone on a state trunk highway less than the authorized speed limit. This includes all freeways and interstate highways. The State Patrol will enforce the speed limit but need to be informed of its inauguration and the ordinance, resolution, or action enacting it.

Follow TEOpS 13-5-16 Temporary Traffic Control Zones~~13-5-16~~, policy criteria 1-6 when establishing a temporary speed zone reduction for maintenance activities.

Document the reduced regulatory speed in the Wisconsin Lane Closure system (WisLCS).

**13-5-18 References** ~~November~~ August ~~2024~~2025

[1] **Federal Highway Administration**, *Manual on Uniform Traffic Control Devices for Streets and Highways, 11th Edition*, FHWA, December 2023.

[2] **National Cooperative Highway Research Program**, *Human Factors Guidelines for Road Systems*, Washington D.C.: NCHRP, 2012.

[3] **Federal Highway Administration**, *Safe System Approach for Speed Management*, FHWA, May 2023.

[4] **American Association of State Highway and Transportation Officials**, *A Policy on Geometric Design of Highways and Streets, 7th Edition*, AASHTO, 2018.

[5] **Florida Department of Transportation**, *FDOT Context Classification Guide*, FDOT, July 2020.

[6] **Federal Highway Administration**, *Methods and Practices for Setting Speed Limits*, FHWA, 2012.

[7] **Federal Highway Administration**, *Speed Limit Setting Handbook*, FHWA, January 2025.

## 13-26-1 Passing on Right at Intersection xx 2026

### 1.1 Background

Passing on the right at intersections can present enforcement problems if the marking and signing are not clear as to whether a motorist can pass on the right where there is a standing left turner at an intersection. The intersection *may* have a paved shoulder, a paved right turn lane or a gravel shoulder.

The State Statutes "Rules of Road" indicate the following:

ss 346.08 When overtaking and passing on the right permitted. The operator of a vehicle *may* overtake and pass another vehicle upon the right only under conditions permitting such the movement in safety and only if the operator can do so while remaining on either the roadway or a paved shoulder, and then only under the following conditions:

1. When the vehicle overtaken is making or about to make a left turn or U-turn; or
2. Upon a street or highway with unobstructed pavement of sufficient width to enable 2 or more lines of vehicles lawfully to proceed, at the same time, in the direction in which the passing vehicle is proceeding; or
3. Upon a one-way street or divided highway with unobstructed pavement of sufficient width to enable 2 or more lines of vehicles lawfully to proceed in the same direction at the same time.

This language can be misunderstood. Therefore, it is important to provide the proper signing and pavement marking for intersection lane control. Refer to TEOpS 2-2-20 for additional lane control signage.

### 1.2 Policy

1. Provide pavement marking in accordance with Figure 1 if the intersection is to operate with a bypass option lane where the right lane functions as a right turn lane or bypass lane. If the intersection is to operate with a bypass option lane where the right lane functions as a bypass lane, provide pavement marking in accordance with Standard Detail Drawing 15C8-10b (Intersections).
2. Provide signing and pavement marking in accordance with Figure 2 if the intersection is to operate with an exclusive right turn lane.
3. Provide signing as optional in accordance with Figure 3 or Figure 4 if you desire to restrict drivers from making the maneuver to bypass a standing left turner. Typically, this sign is used only if you have a history of crash issues. The sign is intended for use at intersections.

Note: Figure 1 is used except in unusual cases, Figure 2 is used for higher crash locations. Evaluate the number of right turns versus left turns to determine the proper marking and signing for right turn only lane versus allowing the right-hand lane as a bypass lane.

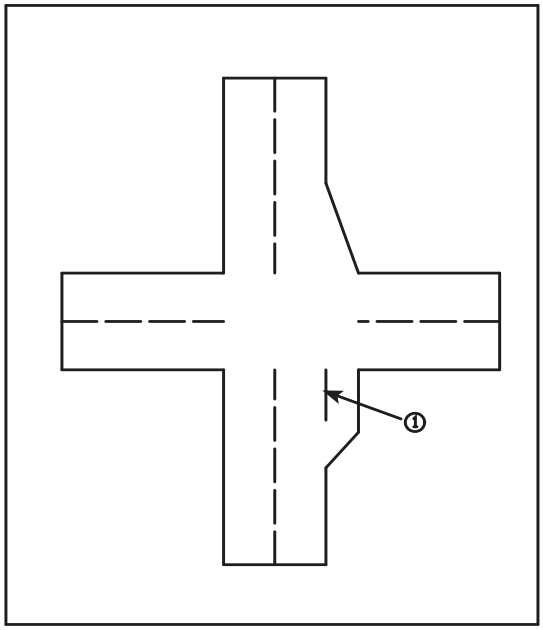



FIG. 1 PAVED BYPASS/RIGHT TURN LANE

① 8" CHANNELIZING PAVEMENT MARKING

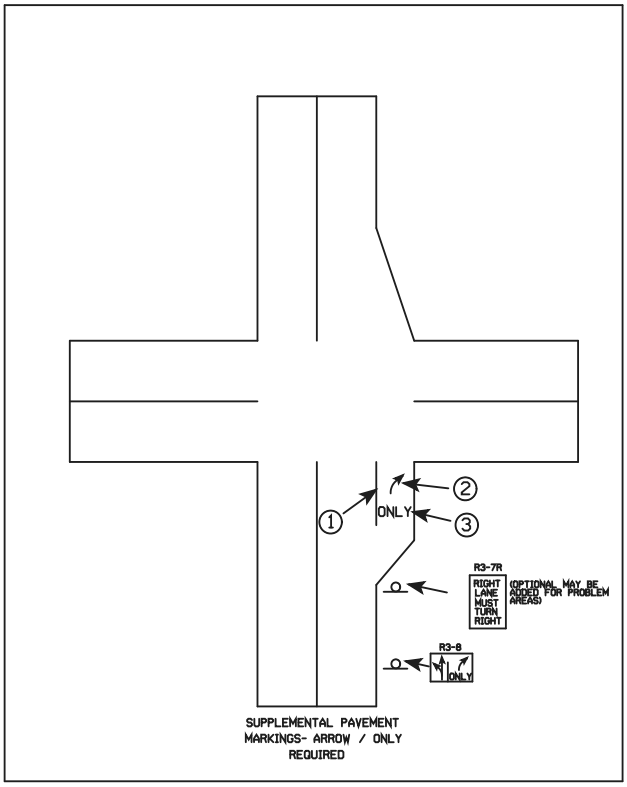



FIG. 2 EXCLUSIVE PAVED RIGHT TURN LANE

① 8" CHANNELIZING PAVEMENT MARKING
② TYPE 2 ARROW PAVEMENT MARKING
③ WORD PAVEMENT MARKING

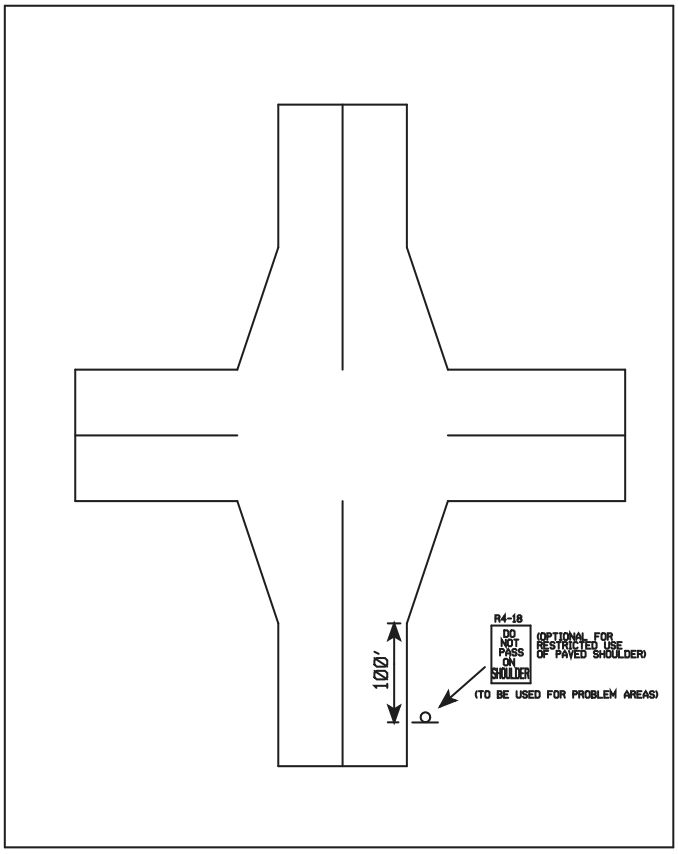



FIG. 3 PAVED RIGHT TURN LANE

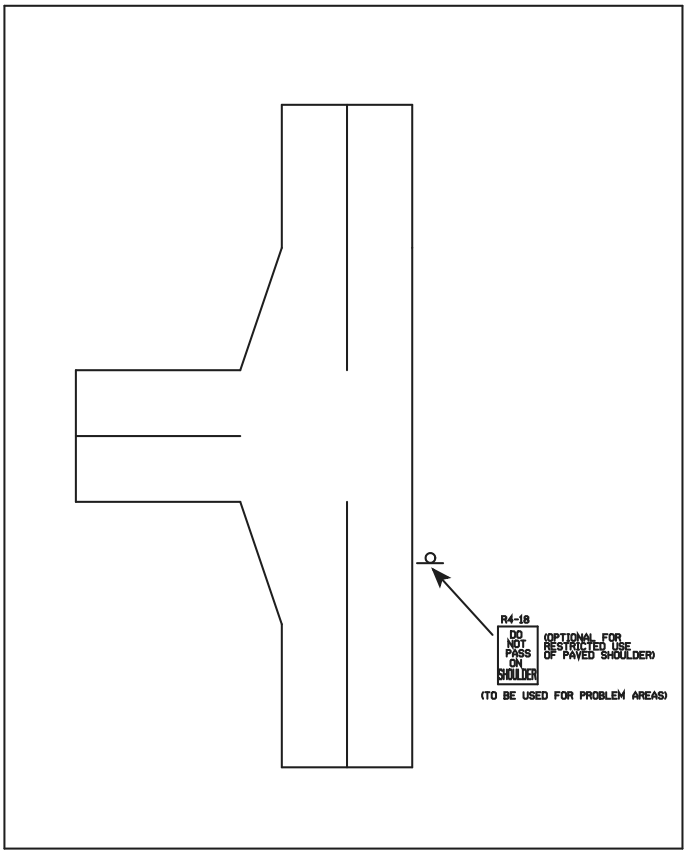



FIG. 4 T-INTERSECTION

## 13-26-5 All-Way Stop XX 2026

### 5.1 Purpose

This policy describes WisDOT's guidance regarding the use of all-way stop control (AWSC) as a permanent method of traffic control at State Trunk Highway (STH) intersections that are under WisDOT jurisdiction or State Trunk Highway intersections under local jurisdiction as a connecting highway (per State Statue 86.32 (1), WisDOT maintains statutory approval authority for any traffic control implemented on connecting highways).

### 5.2 Guidance

All STHs in Wisconsin are statutorily (s.s. 349.07) designated as "through" highways. In accordance with state statute and in an effort to maintain mobility, WisDOT strives to allow traffic to "free flow" as much as possible. As such, prior to stopping traffic on the STH, consideration *should* first be given to using less restrictive measures of traffic control. WMUTCD 2B.08 provides a list of alternative treatments to consider prior to installing AWSC as a permanent form of right-of-way control at an unsignalized intersection.

The decision to install (or not install) AWSC at an intersection *should* be based on an engineering study (see WMUTCD 2B.12 (03)).

### 5.3 Evaluation Criteria

Per WMUTCD 2B.12 the engineering study for AWSC *should* include an analysis of applicable factors related to the existing operation and safety at the intersection and the potential to improve these conditions. Factors to consider include crash experience, sight distance, the need for interim traffic control, and 8-hour traffic volumes (vehicular, pedestrians, bicycles). Review the volumes by approach, as intersections with substantially differing approach volumes may not operate as efficiently under AWSC as those with more balanced approach volumes. Traffic analysis of existing and proposed conditions can help assess whether the operations of the AWSC can effectively maintain mobility needs (i.e., the AWSC *should* provide the desired levels of service defined in FDM 11-5-3.2.2).

Other factors to consider in the engineering study include the need to control left turn conflicts, the intersection of two residential neighborhood streets (i.e., lower speed roadways in residential areas) with similar design and operating characteristics, and the need to support pedestrian and/or bicyclist movements. Refer to WMUTCD 2B.13-17 for a detailed description of each AWSC warrant. Utilize the WisDOT AWSC Warrant Criteria worksheet to assess whether there is justification for the installation of AWSC.

Warrants alone are not a substitute for engineering judgment. The satisfaction of one or more AWSC warrants shall not be the sole determinant as to whether to require the installation of AWSC at an unsignalized intersection. The unique characteristics of each intersection along with the engineering study will ultimately be the basis for determining whether to install AWSC.

### 5.4 Interim or Temporary AWSC

As noted in WMUTCD 2B.15, AWSC can be an effective interim (5 years or less) traffic control measure to improve safety while arrangements are made to construct a traffic signal, a roundabout or other type of reduced-conflict intersection. Reduced levels of operation from those defined in FDM 11-5-3.2.2 may be acceptable on an interim or temporary basis, however, long vehicle queues could create safety concerns and *should* be monitored. A clear plan is necessary to identify when and how to transition from the AWSC to the traffic signal, roundabout or other type of reduced-conflict intersection.