

PART 3. MARKINGS
CHAPTER 3B. PAVEMENT AND CURB MARKINGS
Markings Technical Committee Recommendations
Approved by NCUTCD Council June 21, 2008

Yellow highlight indicates recommended changes to the NPA.

3B.01
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.01 Yellow Centerline Center Line Pavement Markings and Warrants

Standard:

~~Centerline~~ Center line pavement markings, when used, shall be the pavement markings used to delineate the separation of traffic lanes that have opposite directions of travel on a roadway and shall be yellow.

Option:

~~Centerline~~ Center line pavement markings may be placed at a location that is not the geometric center of the roadway.

On roadways without continuous ~~centerline~~ center line pavement markings, short sections may be marked with ~~centerline~~ center line pavement markings to control the position of traffic at specific locations, such as around curves, over hills, on approaches to highway-rail ~~road~~ grade crossings, at highway-rail ~~road~~ grade crossings, and at bridges.

Standard:

The ~~centerline~~ center line markings on two-lane, two-way roadways shall be one of the following as shown in Figure 3B-1:

Editorial

- A. Two-direction passing zone markings consisting of a normal broken yellow line where crossing the ~~centerline~~ center line markings for passing with care is permitted for traffic traveling in either direction;
- B. One-direction no-passing zone markings consisting of a double yellow line of which one is a normal broken yellow line and the other is a normal solid yellow line where crossing the ~~centerline~~ center line markings for passing with care is permitted for the traffic traveling adjacent to the broken line, but is prohibited for traffic traveling adjacent to the solid line; and or edited to increase accuracy
- C. Two-direction no-passing zone markings consisting of a double two normal solid yellow lines where crossing the ~~centerline~~ center line markings for passing is prohibited for traffic traveling in either direction.

editorial

A single solid yellow line shall not be used as a center line marking on a two-way roadway.

The ~~centerline~~ center line markings on undivided two-way roadways with four or more lanes for moving motor vehicle traffic always available shall be the two-direction no-passing zone markings consisting of two normal solid yellow lines as shown in Figure 3B-2.

Clarification of intent for support statement

Guidance:

On two-way roadways with three through lanes for moving motor vehicle traffic, two lanes should be designated for traffic in one direction by using one- or two-direction no-passing zone markings as shown in Figure 3B-3.

[Support:](#)

[Sections 11-301\(c\) and 11-311\(c\) of the “Uniform Vehicle Code \(UVC\) Revised” contain information regarding left turns across center line no-passing zone markings and paved medians, respectively. The “UVC” can be obtained from the National Committee on Uniform Traffic Laws and Ordinances at the address shown on Page i.](#)

[Section 11-301\(c\) does not](#)

[prohibit the crossing of the center line on an undivided highway in making a left turn into or from an alley, private road or driveway when it is done with care.](#)

Standard:

~~Centerline~~ [Center line](#) markings shall be placed on all paved urban arterials and collectors that have a traveled way of 6.1 m (20 ft) or more in width and an ADT of 6,000 vehicles per day or greater. ~~Centerline~~ [Center line](#) markings shall also be placed on all paved two-way streets or highways that have three or more lanes for moving motor vehicle traffic.

Guidance:

~~Centerline~~ [Center line](#) markings should be placed on paved urban arterials and collectors that have a traveled way of 6.1 m (20 ft) or more in width and an ADT of 4,000 vehicles per day or greater. ~~Centerline~~ [Center line](#) markings should also be placed on all rural arterials and collectors that have a traveled way of 5.5 m (18 ft) or more in width and an ADT of 3,000 vehicles per day or greater. ~~Centerline~~ [Center line](#) markings should also be placed on other traveled ways where an engineering study indicates such a need.

Engineering judgment should be used in determining whether to place ~~centerline~~ [center line](#) markings on traveled ways that are less than 4.9 m (16 ft) wide because of the potential for traffic encroaching on the pavement edges, traffic being affected by parked vehicles, and traffic encroaching into the opposing traffic lane.

Option:

~~Centerline~~ [Center line](#) markings may be placed on other paved two-way traveled ways that are 4.9 m (16 ft) or more in width.

If a traffic count is not available, the ADTs described in this Section may be estimates that are based on engineering judgment.

3B.02
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.02 No-Passing Zone Pavement Markings and Warrants paragraphs have been relocated within this Section

Standard:

No-passing zones shall be marked by either the one direction no-passing zone pavement markings or the two-direction no-passing zone pavement markings described ~~previously in Section 3B.01~~ and shown in Figures 3B-1 and 3B-3.

When ~~centerline~~ center line markings are used, no-passing zone markings shall be used on two-way roadways at lane-reduction transitions (see Section 3B.09) and on approaches to obstructions that must be passed on the right (see Section 3B.10).

On two-way, two- or three-lane roadways where ~~centerline~~ center line markings are installed, no-passing zones shall be established at vertical and horizontal curves and other locations where an engineering study indicates that passing must be prohibited because of inadequate sight distances or other special conditions.

On roadways with ~~centerline~~ center line markings, no-passing zone markings shall be used at horizontal or vertical curves where the passing sight distance is less than the minimum ~~shown in Table 3B-1 necessary for reasonably safe passing at~~ the 85th-percentile speed or the posted or statutory speed limit ~~as shown in Table 3B-1~~. The passing sight distance on a vertical curve is the distance at which an object 1.07 m (3.5 ft) above the pavement surface can be seen from a point 1.07 m (3.5 ft) above the pavement (see Figure 3B-4). Similarly, the passing sight distance on a horizontal curve is the distance measured along the ~~centerline~~ center line (or right-hand lane line of a three-lane roadway) between two points 1.07 m (3.5 ft) above the pavement on a line tangent to the embankment or other obstruction that cuts off the view on the inside of the curve (see Figure 3B-4).

Support:

The ~~beginning~~ upstream end of a no-passing zone at point “a” in Figure 3B-4 is that point where the sight distance first becomes less than that specified in Table 3B-1. The downstream end of the no-passing zone at point “b” in Figure 3B-4 is that point at which the sight distance again becomes greater than the minimum specified.

The values of the minimum passing sight distances that are shown in Table 3B-1 are for operational use in marking no-passing zones and are less than the values that are ~~recommended~~ used for the geometric designs of highways.

Guidance:

Where the distance between successive no-passing zones is less than 120 m (400 ft), no-passing markings should connect the zones.

Standard:

Where ~~centerline~~ center line markings are used, no-passing zone markings shall be used on approaches to highway-rail grade crossings in conformance with Section 8B.20.

Option:

In addition to pavement markings, no-passing zone signs (see Sections 2B.34, 2B.37, and 2C.47) may be used to emphasize the existence and extent of a no-passing zone.

The word, “recommended,” is proposed to reinforce that the passing sight distance design values in the AASHTO Green Book are considered as recommended guidelines and not as a standard or requirement.

Support:

Section 11-307 of the “Uniform Vehicle Code (UVC) Revised” contains further information regarding [required road user behavior in](#) no-passing zones. The “UVC” can be obtained from the National Committee on Uniform Traffic Laws and Ordinances at the address shown on Page i.

Standard:

On three-lane roadways where the direction of travel in the center lane transitions from one direction to the other, a no-passing buffer zone shall be provided in the center lane as shown in Figure 3B-5. A lane transition shall be provided at each end of the buffer zone.

The buffer zone shall be a [flush](#) median island [formed by two sets of double yellow center line markings](#) that is at least 15 m (50 ft) in length.

Option:

[Yellow diagonal markings may be placed in the neutral area between the two sets of no-passing zone markings as shown in Figure 3B-5.](#)

Guidance:

For three-lane roadways having a posted or statutory speed limit of 70 km/h (45 mph) or greater, the lane transition taper length should be computed by the formula $L = 0.62 WS$ for speeds in km/h ($L = WS$ for speeds in mph). For roadways where the posted or statutory speed limit is less than 70 km/h (45 mph), the formula $L = WS^2/155$ for speeds in km/h ($L = WS^2/60$ for speeds in mph) should be used to compute taper length. Under both formulas, L equals the taper length in meters (feet), W equals the width of the center lane or offset distance in meters (feet), and S equals the 85th-percentile speed or the posted or statutory speed limit, whichever is higher.

Standard:

The minimum lane transition taper length shall be 30 m (100 ft) in urban areas and 60 m (200 ft) in rural areas.

3B.03
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.03 Other Yellow Longitudinal Pavement Markings

Standard:

If reversible lanes are used, the lane line pavement markings on each side of reversible lanes shall consist of a normal double broken yellow line to delineate the edge of a lane in which the direction of travel is reversed from time to time, such that each of these markings serve as the ~~centerline~~ center line markings of the roadway during some period (see Figure 3B-6).

Signs (see Section 2B.25), lane-use control signals (see Chapter 4M), or both shall be used to supplement reversible lane pavement markings.

If a two-way left-turn lane that is never operated as a reversible lane is used, the lane line pavement markings on each side of the two-way left-turn lane shall consist of a normal broken yellow line and a normal solid yellow line to delineate the edges of a lane that can be used by traffic in either direction as part of a left-turn maneuver. These markings shall be placed with the broken line toward the two-way left-turn lane and the solid line toward the adjacent traffic lane as shown in Figure 3B-7.

Option Guidance:

A white two-way left-turn arrow pavement marking, with opposing arrows spaced as shown in Figure 3B-7, ~~may should~~ be used in conjunction with the longitudinal two-way left-turn markings as shown in Figure 3B-7 at or just downstream from the upstream end of the two-way left-turn lane and at other locations along the two-way left-turn lane where engineering judgment determines that such additional markings are needed to emphasize the proper use of the lane.

EDITORIAL NOTE: FHWA has put language about white arrows in the section dealing with yellow longitudinal markings. This language should be located in Section 3B.20, which addresses arrow markings.

Guidance:

Signs should be used in conjunction with the two-way left turn markings (see Section 2B.24).

Standard:

If a continuous flush median island formed by pavement markings separating travel in opposite directions is used, two sets of double solid yellow lines shall be used to form the island as shown in Figures 3B-2 and 3B-5. Other markings in the median island area shall also be yellow, except crosswalk markings which shall be white (see Section 3B.18).

editorial

3B.04
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.04 White Lane Line Pavement Markings and Warrants

paragraphs have been relocated within this Section and revisions and additions have been made – paragraphs previously in Section 3B.05 have been relocated to this Section

Standard:

When used, lane line pavement markings delineating the separation of traffic lanes that have the same direction of travel shall be white.

Lane line markings shall be used on all freeways and Interstate highways.

Guidance:

Lane line markings should be used on all roadways that are intended to operate with two or more adjacent traffic lanes that have in the same direction of travel, except as otherwise required for reversible lanes. Lane line markings should also be used at congested locations where the roadway will accommodate more traffic lanes with lane line markings than without the markings.

Support:

Examples of lane line markings are shown in Figures 3B-2, 3B-3, and 3B-7 through 3B-13, ~~3B-22, 3B-24, and 3B-26.~~

Standard:

Except as noted below in the next paragraph, where crossing the lane line markings with care is permitted, the lane line markings shall consist of a normal broken white line.

On an approach to or a departure from an interchange or intersection, a A dotted white line broken white lane line marking shall not be used as the lane line to separate a through lane that continues beyond the interchange or intersection from an adjacent lane for of any of the following conditions types:

- A. A through lane that becomes a mandatory exit or turn lane,
- B. An auxiliary lane 3.2 km (2 mi) or less in length between an entrance ramp and an exit ramp,
- C. An auxiliary lane 1.6 km (1 mi) or less in length between two or more adjacent intersections, or
- D. An acceleration or deceleration lane.

For the conditions listed in the previous paragraph, a dotted white line shall be used as the lane line.

For exit ramps with a parallel deceleration lane, a dotted white line shall be installed from the upstream end of the full-width deceleration lane to the theoretical gore or to the upstream end of a solid white lane line, if used, that extends upstream from the theoretical gore as shown in Drawing A of Figure 3B-8.

~~With a parallel deceleration lane, a lane line shall be extended from the beginning of the channelizing line upstream for a distance of one-half the length of the full-width deceleration lane as shown in Figure 3B-8.~~

Option:

For exit ramps with a parallel deceleration lane, a dotted white line extension may be installed in the taper area upstream from the full-width deceleration lane as shown in Drawing A of Figure 3B-8.

Editorial

Edited to
clarify

Deleted as
repetitive of
revised
language

For an exit ramp with a tapered deceleration lane, a dotted white line may be installed from the theoretical gore through the taper area such that it meets the edge line at the upstream end of the taper as shown in Drawing B of Figure 3B-8.

Standard:

~~For entrance ramps with a parallel acceleration lane, a lane line should be extended from the end of the channelizing line for a distance of one-half the length of the full-width acceleration lane~~ dotted white line shall be installed from the theoretical gore or from the downstream end of a solid white lane line, if used, that extends downstream from the theoretical gore, to a point at least one-half the distance from the theoretical gore to the downstream end of the acceleration taper, as shown in Drawing A of Figure 3B-9.

Option:

For entrance ramps with a parallel acceleration lane, a dotted white line extension may be installed from the downstream end of the dotted white lane line to the downstream end of the acceleration taper.

~~For entrance ramps with a tapered acceleration lane, lane line markings may be placed to extend the channelizing line, but not beyond a point where the tapered lane meets the near side of the through traffic lane~~ a dotted white line extension may be installed from the through lane channelizing line theoretical gore to the downstream end of the acceleration taper, as shown in Drawing B and C of Figure 3B-9.

Revised due to recommended changes in language

Standard:

A wide dotted white line (see Drawings A and B of Figure 3B-10) shall be used as a lane drop marking ~~as shown in Figure 3B-10 may be used~~ in advance of lane drops at exit ramps to distinguish a lane drop from a normal exit ramp or from an auxiliary lane.

A wide dotted white line (see Drawing C of Figure 3B-8) shall be used to separate a through lane that continues beyond an interchange from an adjacent auxiliary lane between an entrance ramp and an exit ramp.

A normal or wide dotted white line (see Drawing C of Figure 3B-10) shall be used as a lane drop marking in advance of lane drops at intersections to distinguish a lane drop from an intersection through lane.

A normal or wide dotted white line (see Drawing D of Figure 3B-10) shall be used to separate a through lane that continues beyond an intersection from an adjacent auxiliary lane between two or more intersections.

Guidance:

A normal dotted white line should be used as a lane drop marking for lane reduction transitions (see Section 3B-09 and Figure 3B-13).

~~If used,~~ Lane drop markings used in advance of lane drops at freeway and expressway exit ramps should begin at least added to be consistent with Figure 3B-10, which shows a solid line of variable length after 0.5 miles of lane drop markings 800 m (0.5 mi) in advance of the theoretical gore point.

On the approach to a multi-lane exit ramp having an optional exit lane that also carries through traffic, lane line markings should be used as illustrated in drawing B of Figure 3B-10. In this case, if the right-most exit lane is an added lane such as a parallel deceleration lane, the lane drop marking should begin at the upstream end of the full-width deceleration lane.

Deleted as repetitive

Lane drop markings used in advance of lane drops at intersections should begin a distance in advance of the intersection that is determined by engineering judgment as suitable to enable drivers who do not desire to make the mandatory turn to move out of the lane being dropped prior to reaching the queue of vehicles that are waiting to make the turn.

The dotted white lines that are used for lane drop markings ~~may~~ and that are used as a lane line separating through lanes from auxiliary lanes should consist of ~~a wide dotted white line with~~ line segments that are 0.9 m (3 ft) in length separated by 2.7 m (9 ft) gaps.

Support:

Section 3B.20 contains information regarding other markings that are associated with lane drops, such as lane-use arrow markings and ONLY word markings.

Option:

Where lane changes might cause conflicts, a wide solid white ~~channelizing lane~~ line may extend upstream from the theoretical gore point of an ~~multilane exit ramp or~~ ~~for multi-lane exits~~, as shown in Drawing B of Figure 3B-10.

Where lane changes might cause conflicts, a wide or normal solid white lane line may extend upstream from an intersection.

Support:

Section 3B.09 contains information about the lane line markings that are to be used for transition areas where the number of through lanes is reduced.

Standard:

Where crossing the lane line markings is discouraged, the lane line markings shall consist of a ~~normal~~ solid white line.

Guidance:

On approaches to intersections, a solid white lane line marking should be used to separate a through lane from an added mandatory turn lane. ~~For a lane drop at an intersection, a solid white lane line marking should be used to separate the dropped lane from the adjacent through lane for a distance upstream of the intersection as determined by engineering judgment (see Drawing C of Figure 3B-10).~~

Option:

~~They~~ On approaches to intersections, solid white lane line markings may ~~also~~ be used to separate ~~traffic~~ adjacent through lanes or adjacent mandatory turn lanes from each other ~~approaching an intersection.~~

Where the median width allows the left-turn lanes to be separated from the through lanes to give drivers on opposing approaches a less obstructed view of opposing through traffic, white pavement markings may be used to form channelizing islands as shown in Figure 2B-20.

Solid white lane line markings may be used to separate through traffic lanes from auxiliary lanes, such as an added uphill truck lanes, ~~left or right turn lanes, and~~ or a preferential lanes (see Section 3B.25).

Wide solid lane line markings may be used for greater emphasis.

Standard:

Where crossing the lane line markings is prohibited, the lane line markings shall consist of ~~a double two-normal~~ solid white lines (see Figure 3B-11).

Edited for clarity

repetitive

editorial

3B.05
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.05 Other White Longitudinal Pavement Markings paragraphs have been relocated within this Section and revisions and additions have been made – paragraphs previously in this Section have been relocated to Section 3B.04

Standard:

A channelizing line shall be a wide or double solid white line.

Option:

Channelizing lines may be used to form channelizing islands where traffic traveling in the same direction is permitted on both sides of the island.

Standard:

Other pavement markings in the channelizing island area shall be white.

Support:

Examples of channelizing line applications are shown in Figures 3B-8, 3B-9, [3B-10](#), and 3B-11.

Channelizing lines at exit ramps as shown in Figure 3B-8 define the neutral area, direct exiting traffic at the proper angle for smooth divergence from the main lanes into the ramp, and reduce the probability of colliding with objects adjacent to the roadway.

Channelizing lines at entrance ramps as shown in Figure 3B-9 promote ~~reasonably safe~~ orderly and efficient merging with the through traffic.

Standard:

For exit and entrance ramps, channelizing lines shall be placed ~~along the on both~~ sides of the neutral area ~~adjacent to the through traffic lane and the ramp lane~~.

For exit ramps, the channelizing lines for the ramp and through lanes shall begin at the theoretical gore and extend downstream on each side of the neutral area to the physical gore.

For parallel entrance ramps, the channelizing lines for the ramp and through lanes shall begin at the physical gore and extend downstream on each side of the neutral area to the theoretical gore.

For tapered entrance ramps, the channelizing lines for the ramp and through lanes shall begin at the physical gore and extend downstream on each side of the neutral area at least one-half the distance to the theoretical gore.

Option:

For tapered entrance ramps, white channelizing lines may extend to the theoretical gore as shown in [Figure 3B-9C](#).

White chevron markings may be placed in the neutral area of exit ramp and entrance ramp gores for special emphasis as shown in Figure 3B-8. The channelizing lines and the optional chevron markings at exit ramp and entrance ramp gores may be supplemented with white retroreflective or internally illuminated raised pavement markers (see Sections 3B.11 and 3B.13) for enhanced nighttime visibility.

~~**Guidance:**~~

~~**For entrance ramps, a channelizing line should be placed along the side of the neutral area adjacent to the ramp lane.**~~

Revised to
reflect current
practice
shown in
NCHRP
synthesis

3B.06

Approved by
NC without
revisions to
NPA.

Section 3B.06 Edge Line Pavement Markings

Standard:

If used, edge line pavement markings shall delineate the right or left edges of a roadway.

Except for dotted edge line extensions (see Section 3B.08), edge line markings shall not be continued through intersections or major driveways.

If used on the roadways of divided highways or one-way streets, or on any ramp in the direction of travel, left edge line pavement markings shall consist of a normal solid yellow line to delineate the left-hand **edited to increase clarity** edge of a roadway or to indicate driving or passing restrictions left of these markings.

If used, ~~the~~ right edge line pavement markings shall consist of a normal solid white line to delineate the right-hand **edited to increase clarity** edge of the roadway.

Guidance:

Edge line markings should not be broken for minor driveways.

Support:

Edge line markings have unique value as visual references to guide road users during adverse weather and visibility conditions.

Option:

Wide solid edge line markings may be used for greater emphasis.

3B.07
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.07 Warrants for Use of Edge Lines

Standard:

Edge line markings shall be placed on paved streets or highways with the following characteristics:

- A. Freeways,**
- B. Expressways, and**
- C. Rural arterials with a traveled way of 6.1 m (20 ft) or more in width and an ADT of 6,000 vehicles per day or greater.**

Guidance:

Edge line markings should be placed on paved streets or highways with the following characteristics:

- A. Rural arterials and collectors with a traveled way of 6.1 m (20 ft) or more in width and an ADT of 3,000 vehicles per day or greater.
- B. At other paved streets and highways where an engineering study indicates a need for edge line markings.

Edge line markings should not be placed where an engineering study or engineering judgment indicates that providing them is likely to decrease safety.

Option:

Edge line markings may be placed on streets and highways with or without ~~centerline~~ center line markings.

Edge line markings may be excluded, based on engineering judgment, for reasons such as if the traveled way edges are delineated by curbs, parking, ~~bicycle lanes~~, or other markings.

If a bicycle lane is marked on the outside portion of the traveled way, the edge line that would mark the right-hand outside edge of the bicycle lane may be omitted.

Edge line markings may be used where edge delineation is desirable to minimize unnecessary driving on paved shoulders or on refuge areas that have lesser structural pavement strength than the adjacent roadway.

Changed to
clarify intent

3B.08

Approved by
NC without
revisions to
NPA.

Section 3B.08 Extensions Through Intersections or Interchanges

Standard:

Except as noted in the Option below, edited to increase clarity pavement markings extended into or continued through an intersection or interchange area shall be the same color and at least the same width as the line markings they extend (see Figure 3B-12).

Option:

A normal line may be used to extend a wide line through an intersection.

Guidance:

Where highway design or reduced visibility conditions make it desirable to provide control or to guide vehicles through an intersection or interchange, such as at offset, skewed, complex, or multilegged intersections, on curved roadways, ~~or~~ where multiple turn lanes are used, or where offset left turn lanes might cause driver confusion, dotted line markings consisting of 0.6 m (2 ft) line segments and 0.6 m (2 ft) to 1.8 m (6 ft) gaps should be used to extend longitudinal line markings through an intersection or interchange area.

Option:

Dotted edge line extensions may be placed through intersections or major driveways.

Guidance:

Where greater restriction is required, solid lane lines or channelizing lines should be extended into or continued through intersections or major driveways. However, edge lines should not be extended into or continued through intersections or major driveways as solid lines.

~~A single line of equal width to one of the lines of the double line should be used to extend~~ Where a double line is extended through an intersection, a single line of equal width to one of the lines of the double line should be used. edited to increase clarity

To the extent possible, pavement marking extensions through intersections should be designed in a manner that minimizes potential confusion for drivers in adjacent or opposing lanes.

3B.09
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.09 Lane-Reduction Transition Markings

Standard:

Except as noted in the Option below, where pavement markings are used, lane-reduction transition markings shall be used to guide traffic through transition areas where the number of through lanes is reduced, as shown in Figure 3B-13. On two-way roadways, no-passing zone markings shall be used to prohibit passing in the direction of the convergence, and shall continue through the transition area.

Option:

On low-speed urban roadways where curbs clearly define the roadway edge in the lane-reduction transition, the edge line and/or delineators shown in Figure 3B-13 may be deleted as determined by engineering judgment.

Guidance:

For roadways having a posted or statutory speed limit of 70 km/h (45 mph) or greater, the transition taper length for a lane-reduction transition added to increase consistency should be computed by the formula $L = 0.62 WS$ for speeds in km/h ($L = WS$ for speeds in mph). For roadways where the posted or statutory speed limit is less than 70 km/h (45 mph), the formula $L = WS^2/155$ for speeds in km/h ($L = WS^2/60$ for speeds in mph) should be used to compute taper length. Under both formulas, L equals the taper length in meters (feet), W equals the width of the offset distance in meters (feet), and S equals the 85th-percentile speed or the posted or statutory speed limit, whichever is higher.

Where observed speeds exceed posted or statutory speed limits, longer tapers should be used.

Option:

On new construction, where no posted or statutory speed limit ~~is~~ has been established, the design speed may be used in the transition taper length formula.

Guidance:

Broken lane line markings should be discontinued one-quarter of the distance downstream of between ~~at~~ the Lane Ends sign (see Section 2C.41) and a dotted lane drop marking (see Section 3A.05) should be used to extend the lane line to the point where upstream end of the transition taper begins.

Except as noted in the Option above for low-speed urban roadways, the edge line markings shown in Figure 3B-13 should be installed at from the location of the Lane Ends warning sign and extend downstream to beyond the end of the transition taper beginning of the narrower roadway.

Option:

A dotted line may be used instead of a broken line from ¼D upstream the Lane Ends sign to ¼D downstream of the Lane Ends sign.

Support:

Pavement markings at lane-reduction transitions supplement the standard signs.

Restore 2003
MUTCD
language and
add new
language to
allow marking
as shown in
2003 MUTCD
or with dotted
line

3B.10
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.10 Approach Markings for Obstructions

Standard:

Pavement markings shall be used to guide traffic away from fixed obstructions within a paved roadway, including toll islands beeths at toll plazas. Approach markings for bridge supports, refuge islands, median islands, and raised channelization islands shall consist of a tapered line or lines extending from the ~~centerline~~ center line or the lane line to a point 0.3 to 0.6 m (1 to 2 ft) to the right-hand edited to increase clarity side, or to both sides, of the approach end of the obstruction (see Figure 3B-14).

Support:

See Section 3B.29 for information on approach markings for toll islands.

Guidance:

For roadways having a posted or statutory speed limit of 70 km/h (45 mph) or greater, the taper length of the tapered line markings should be computed by the formula $L = 0.62 WS$ for speeds in km/h ($L = WS$ for speeds in mph). For roadways where the posted or statutory speed limit is less than 70 km/h (45 mph), the formula $L = WS^2/155$ for speeds in km/h ($L = WS^2/60$ for speeds in mph) should be used to compute taper length. Under both formulas, L equals the taper length in meters (feet), W equals the width of the offset distance in meters (feet), and S equals the 85th-percentile speed or the posted or statutory speed limit, whichever is higher.

Standard:

The minimum taper length shall be 30 m (100 ft) in urban areas and 60 m (200 ft) in rural areas.

Support:

Examples of approach markings for obstructions in the roadway are shown in Figure 3B-14.

~~Option~~ Guidance:

Where observed speeds exceed posted or statutory speed limits, longer tapers ~~may~~ should be used.

Standard:

If traffic is required to pass only to the right of the obstruction, the markings shall consist of a two-direction no-passing zone marking at least twice the length of the diagonal portion as determined by the appropriate taper formula (see Figure 3B-14).

Option:

If traffic is required to pass only to the right of the obstruction, yellow diagonal approach markings may be placed in the neutral area between the no-passing zone markings as shown in Figure 3B-14. Other markings, such as yellow delineators, yellow channelizing devices, yellow raised pavement markers, and white crosswalk pavement markings, may also be placed in the neutral area.

Standard:

If traffic can pass either to the right or left of the obstruction, the markings shall consist of two channelizing lines diverging from the lane line, one to each side of the obstruction. In advance of the point of divergence, a solid wide white line or solid double normal white line shall be extended in place of the broken lane line for a distance equal to the length of the diverging lines (see Figure 3B-14).

Option:

If traffic can pass either to the right or left of the obstruction, additional white markings may be placed in the neutral area between the channelizing lines as shown in Figure 3B-14. [Other markings, such as white delineators, white channelizing devices, white raised pavement markers, and white crosswalk markings may also be placed in the neutral area.](#)

3B.11
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Revised to
allow chip seal
markers

Revised to
allow red
RRPMs to be
used on far
left side of
two-way
roadway based
on research¹

Revised to
specifically
indicate that it
is okay to use
blue RRPM to
indicate
hydrant
locations.

Section 3B.11 Raised Pavement Markers

Standard:

A raised pavement marker shall be a device ~~with a height of at least 10 mm (0.4 in)~~ mounted on or in a road surface that has a height generally not exceeding approximately 25 mm (1 in) above the road surface for a permanent marker, or 50 mm (2 in) above the road surface for a temporary flexible marker, and that is intended to be used as a positioning guide and/or to supplement or substitute for pavement markings ~~or to mark the position of a fire hydrant.~~

The color of raised pavement markers under both daylight and nighttime conditions shall conform to the color of the marking for which they serve as a positioning guide, or for which they supplement or substitute.

Option:

~~Blue raised pavement markers may be used to mark the positions of fire hydrants.~~

The side of a raised pavement marker that is visible to traffic proceeding in the wrong direction of a one-way roadway or ramp may be red. ~~relocated from Section 3B.14 and modified by adding “of a one-way roadway or ramp”~~

Retroreflective or internally illuminated raised pavement markers may be used in the roadway immediately adjacent to curbed noses of raised medians and curbs of islands, or on top of such curbs (see Section 3B.23).

Support:

Blue raised pavement markers can be used to indicate locations of fire hydrants along a roadway.

Retroreflective and internally illuminated raised pavement markers are available in monodirectional and bidirectional configurations. The bidirectional marker is capable of displaying the applicable color for each direction of travel.

Standard:

When used, internally illuminated raised pavement markers shall be steadily illuminated and shall not be flashed.

Support:

Flashing raised pavement markers are considered to be In-Roadway Lights (see Chapter 4N).

Guidance:

Nonretroreflective raised pavement markers should not be used alone, without supplemental retroreflective or internally illuminated markers, as a substitute for other types of pavement markings.

Directional configurations should be used to maximize correct information and to minimize confusing information provided to the road user. Directional configurations also should be used to avoid confusion resulting from visibility of markers that do not apply to the road user.

The spacing of raised pavement markers used to supplement or substitute for other types of longitudinal markings should correspond with the pattern of broken lines for which the markers supplement or substitute.

¹http://tcd.tamu.edu/Documents/Driver_Understanding_of_Red_RPMs.pdf

Standard:

The value of N cited in Sections 3B.12 through 3B.14 for the spacing of raised pavement markers ~~for a broken or dotted line~~ shall equal the length of one line segment plus one gap of the broken lines used on the highway. ~~The value of N referenced for solid lines shall equal the N for the broken or dotted lines that might be adjacent to or might extend the solid lines (see Sections 3B.13 and 3B.14).~~

Guidance:

Where additional emphasis is needed, as determined by engineering judgment or engineering study, consideration should be given to spacing retroreflective raised pavement markers more closely together than the maximum spacings recommended or required in Sections 3B.12 through 3B.14.

Option:

Retroreflective raised pavement markers may be spaced closer than described in Sections 3B.12 through 3B.14, as determined by engineering judgment or engineering study.

Support:

Figures 9-20 through 9-22 in the “Traffic Control Devices Handbook” (see Section 1A.11) contain additional information regarding the spacing of raised pavement markers on longitudinal markings.

Changed from should to may as this is what the original guidance statement actually represents.

3B.12
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Edited for
clarity

Section 3B.12 Raised Pavement Markers as Vehicle Positioning Guides with Other Longitudinal Markings

Option:

Retroreflective or internally illuminated raised pavement markers may be used as positioning guides with longitudinal line markings without necessarily conveying information to the road user about passing or lane-use restrictions. In such applications, markers may be positioned between the two lines of a ~~one-way one-direction~~ or ~~two-way two-direction~~ no-passing zone marking or positioned in line with or immediately adjacent to a single ~~solid or~~ broken yellow centerline center line or a white single broken or solid lane line markings.

~~Support~~ Guidance:

~~A typical~~ The spacing for such applications ~~is~~ should be 2N, where N equals the length of one line segment plus one gap (see Section 3B.11).

Option:

Where it is desired to alert the road user to changes in the travel path, such as on sharp curves or on transitions that reduce the number of lanes or that shift traffic laterally, the spacing may be reduced to N or less.

On freeways and expressways, ~~a~~ the spacing ~~of 3N~~ may be ~~used~~ increased to 3N for relatively straight and level roadway segments where engineering judgment indicates that such spacing will provide adequate delineation under wet night conditions.

3B.13
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Revised to
allow
white/red
RRPMs to be
used to
supplement
edge lines to
indicate wrong
way travel on
two-lane
roads¹.

Section 3B.13 Raised Pavement Markers Supplementing Other Markings

Guidance:

The use of retroreflective or internally illuminated raised pavement markers for supplementing longitudinal line markings should ~~conform to~~ comply with the following:

A. Lateral Positioning

1. When supplementing double line markings, pairs of raised pavement markers placed laterally in line with or immediately outside of the two lines should be used.
2. When supplementing wide line markings, pairs of raised pavement markers placed laterally adjacent to each other should be used.

B. Longitudinal Spacing

1. When supplementing solid line markings, raised pavement markers at a spacing no greater than N (see Section 3B.11) should be used, except that when supplementing channelizing lines or left edge line markings, a spacing of no greater than N/2 should be used. ~~Raised markers should not supplement right edge line markings.~~
2. When supplementing broken line markings, a spacing no greater than 3N should be used. However, when supplementing broken line markings identifying reversible lanes, a spacing of no greater than N should be used.
3. When supplementing dotted line markings for applications such as lane drops or auxiliary lanes, a spacing appropriate for the application should be used.
4. When supplementing longitudinal line extension markings through at-grade intersections, one raised pavement marker for each short line segment should be used.
5. When supplementing edge line extensions through freeway interchanges, a spacing of no greater than N should be used.

Option:

Raised pavement markers also may be used to supplement other markings ~~for~~ such as channelizing islands, gore areas, ~~or~~ approaches to obstructions, or wrong-way arrows.

To improve the visibility of horizontal curves, centerlines may be supplemented with retroreflective or internally illuminated raised pavement markers for the entire curved section as well as for a distance in advance of the curve that approximates 5 seconds of travel time.

¹http://tcd.tamu.edu/Documents/Driver_Understanding_of_Red_RPMs.pdf

3B.14
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Text deleted
as it is covered
in Section
3B.11

Section 3B.14 Raised Pavement Markers Substituting for Pavement Markings

Option:

Retroreflective or internally illuminated raised pavement markers, or nonretroreflective raised pavement markers supplemented by retroreflective or internally illuminated markers, may be substituted for markings of other types.

~~Standard:~~

~~If used, the color of the raised pavement markers shall simulate the color of the markings for which they substitute.~~ **changed from Guidance (see next paragraph) to Standard**

Guidance:

If used, the pattern ~~and color~~ of the raised pavement markers should simulate the pattern ~~and color~~ of the markings for which they substitute. **moved to previous paragraph**

~~The normal spacing of raised pavement markers, when substituting for other markings, should be determined in terms of the standard length of the broken line segment.~~

~~Option:~~

~~The side of a raised pavement marker that is visible to traffic proceeding in the wrong direction may be red.~~ **relocated to Section 3B.11**

Standard:

If raised pavement markers are used to substitute for broken line markings, a group of three to five markers equally spaced at a distance no greater than $N/8$ (see Section 3B.11) shall be used. If N is other than 12 m (40 ft), the markers shall be equally spaced over the line segment length (at $1/2$ points for 3 markers, at $1/3$ points for 4 markers, and at $1/4$ points for 5 markers). At least one retroreflective or internally illuminated marker per group shall be used or a retroreflective or internally illuminated marker shall be installed midway in each gap between successive groups of nonretroreflective markers.

When raised pavement markers substitute for solid ~~lane~~ line markings, the markers shall be equally spaced at no greater than $N/4$, with retroreflective or internally illuminated units at a spacing no greater than $N/2$.

Guidance:

Raised pavement markers should not substitute for right edge line markings.

Standard:

When raised pavement markers substitute for dotted lines, they shall be spaced at no greater than $N/4$, with not less than one raised pavement marker per dotted line segment. At least one raised marker every N shall be retroreflective or internally illuminated.

Option:

When substituting for wide lines, raised pavement markers may be placed laterally adjacent to each other to simulate the width of the line.

3B.15

Approved by
NC without
revisions to
NPA.

Section 3B.15 Transverse Markings

Standard:

Transverse markings, which include shoulder markings, word and symbol markings, [arrows](#), stop lines, yield lines, crosswalk lines, speed measurement markings, [speed reduction markings](#), speed hump markings, parking space markings, and others, shall be white unless otherwise specified herein.

Guidance:

Because of the low approach angle at which pavement markings are viewed, transverse lines should be proportioned to provide visibility [at least](#) equal to that of longitudinal lines.

Standard:

Pavement marking letters, numerals, [arrows](#), and symbols shall be installed in accordance with the [design details in the](#) Pavement Markings chapter of the “Standard Highway Signs [and Markings](#)” book (see Section 1A.11).

3B.16
Approved by
NC without
revisions to
NPA.

Section 3B.16 Stop and Yield Lines ~~some of the paragraphs in this Section have been relocated to improve continuity~~

Guidance:

Stop lines should be used to indicate the point behind which vehicles are required to stop in compliance with a ~~STOP (R1-1) sign, traffic control signal, or some other traffic control device, except YIELD signs.~~ ~~relocated to next paragraph~~

Option:

Stop lines may be used to indicate the point behind which vehicles are required to stop in compliance with a STOP (R1-1) sign, a Stop Here For Pedestrians (R1-5b or R1-5c) sign, or some other traffic control device that requires vehicles to stop, except YIELD signs. ~~phrase at end of sentence relocated from previous paragraph~~

Yield lines may be used to indicate the point behind which vehicles are required to yield in compliance with a YIELD (R1-2) sign or a Yield Here To Pedestrians (R1-5 or R1-5a) sign.

Standard:

Stop lines shall not be used at locations where drivers are required to yield in compliance with a YIELD (R1-2) sign or a Yield Here To Pedestrians (R1-5 or R1-5a) sign or at locations on uncontrolled approaches where drivers are required by State law to yield to pedestrians.

Yield lines shall not be used at locations where drivers are required to stop in compliance with a STOP (R1-1) sign, a Stop Here For Pedestrians (R1-5b or R1-5c) sign, a traffic control signal, or some other traffic control device.

~~If used,~~ Stop lines shall consist of solid white lines extending across approach lanes to indicate the point at which the stop is intended or required to be made.

~~If used,~~ Yield lines (see Figure 3B-15) shall consist of a row of solid white isosceles triangles pointing toward approaching vehicles extending across approach lanes to indicate the point at which the yield is intended or required to be made.

Guidance:

Stop lines should be 300 to 600 mm (12 to 24 in) wide.

The individual triangles comprising the yield line should have a base of 300 to 600 mm (12 to 24 in) wide and a height equal to 1.5 times the base. The space between the triangles should be 75 to 300 mm (3 to 12 in).

If used, stop and yield lines should be placed a minimum of 1.2 m (4 ft) in advance of the nearest crosswalk line at controlled intersections, except for yield lines at roundabouts ~~intersections~~ as provided for in Section 3C.04 and at midblock crosswalks. In the absence of a marked crosswalk, the stop line or yield line should be placed at the desired stopping or yielding point, but should not be placed ~~no~~ ~~edited to improve grammar~~ more than 9 m (30 ft) or less than 1.2 m (4 ft) from the nearest edge of the intersecting traveled way. ~~Stop lines should be placed to allow sufficient sight distance to all other approaches to an intersection.~~

Stop lines at midblock signalized locations should be placed at least 12 m (40 ft) in advance of the nearest signal indication (see Section 4D.14).

If yield or stop lines are used at ~~an unsignalized midblock~~ a crosswalk that crosses an uncontrolled multi-lane approach, ~~the~~ yield lines should be placed ~~adjacent to the Yield Here to Pedestrians sign located~~ 6.1 to 15 m (20 to 50 ft) in advance of the nearest crosswalk line, and parking should be prohibited in the area between the yield or stop line and the crosswalk (see Figure 3B-16).

Standard:

If yield (stop) lines are used at a crosswalk that crosses an uncontrolled multi-lane approach, Yield Here To (Stop Here For) Pedestrians (R1-5 series) signs (see Section 2B.11) shall be used.

Guidance:

Yield (stop) lines and Yield Here To (Stop Here For) Pedestrians signs should not be used in advance of crosswalks that cross an approach to or departure from a roundabout.

Support:

When drivers ~~who~~ yield too close to crosswalks ~~on~~ that cross uncontrolled multi-lane approaches, they place pedestrians at risk by blocking other drivers' views of pedestrians and by blocking pedestrians' views of vehicles approaching in the other lanes.

Option:

Stop and Yield lines may be staggered longitudinally on a lane-by-lane basis.

Support:

Staggered stop lines and staggered yield lines can improve the driver's view of pedestrians, provide better sight distance for turning vehicles, and increase the turning radius for left-turning vehicles.

Section 8B.21 contains information regarding the use of stop lines and yield lines at highway-rail grade crossings.

3B.17
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.17 Do Not Block Intersection Markings

Option:

Do Not Block Intersection markings may be used to mark the edges of an intersection area that is in close proximity to a signalized intersection, railroad crossing, or other nearby traffic control that might cause vehicles to stop within the intersection and impede other traffic entering the intersection. If authorized by law, Do Not Block Intersection markings with appropriate signs may also be used at other locations.

Standard:

If used, Do Not Block Intersection markings (see Figure 3B-17) shall consist of one of the following alternatives: **EDITORIAL NOTE: added single X to figure**

- A. Wide solid white lines that outline the intersection area that vehicles must not block;
- B. Wide solid white lines that outline the intersection area that vehicles must not block and a white word message such as DO NOT BLOCK or KEEP CLEAR;
- C. Wide solid white lines that outline the intersection area that vehicles must not block and white cross-hatching within the intersection area; or
- D. A white word message, such as DO NOT BLOCK or KEEP CLEAR, within the intersection area that vehicles must not block.

Do Not Block Intersection markings shall be accompanied by one or more DO NOT BLOCK INTERSECTION (R10-7) signs (see Section 2B.59), one or more DO NOT STOP ON TRACKS (R8-8) signs (see Section 8B.09), or one or more similar signs.

3B.18
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section ~~3B.17~~ 3B.18 Crosswalk Markings

Support:

Crosswalk markings provide guidance for pedestrians who are crossing roadways by defining and delineating paths on approaches to and within signalized intersections, and on approaches to other intersections where traffic stops.

In conjunction with signs and other measures, crosswalk markings ~~also serve~~ help to alert road users of a designated pedestrian crossing point across roadways at locations that are not controlled by ~~highway~~ traffic control signals or STOP signs.

At nonintersection locations, crosswalk markings legally establish the crosswalk.

Standard:

When crosswalk lines are used, they shall consist of solid white lines that mark the crosswalk. They shall not be less than 150 mm (6 in) or greater than 600 mm (24 in) in width.

Guidance:

If transverse lines are used to mark a crosswalk, the gap between the lines should not be less than 1.8 m (6 ft). If diagonal or longitudinal lines are used without transverse lines to mark a crosswalk, the crosswalk should be not less than 1.8 m (6 ft) wide.

Crosswalk lines, if used on both sides of the crosswalk, should extend across the full width of pavement or to the edge of the intersecting crosswalk to discourage diagonal walking between crosswalks (see Figures 3B-16 and 3B-18).

~~Crosswalks should be marked at all intersections where there is substantial conflict between vehicular and pedestrian movements.~~

~~Marked crosswalks also should be provided at other appropriate points of pedestrian concentration, such as at loading islands, midblock pedestrian crossings, or where pedestrians could not otherwise recognize the proper place to cross.~~

At locations controlled by traffic control signals or on approaches controlled by STOP signs, crosswalk lines should be installed where engineering judgment indicates they are needed to direct pedestrians to the proper crossing path(s).

Crosswalk lines should not be used indiscriminately. An engineering study should be performed before ~~they are~~ a marked crosswalk is installed at a locations away from a highway traffic control signals or an approach controlled by a STOP sign. The engineering study should consider the number of lanes, the presence of a median, the distance from adjacent signalized intersections, the pedestrian volumes and delays, the average daily traffic (ADT), the posted speed limit, the geometry of the location, the possible consolidation of multiple crossing points, the availability of street lighting, and other appropriate factors.

Marked crosswalks alone, without other **substantial** measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence, should not be installed across uncontrolled roadways where:

- A. The speed limit exceeds 60 km/h (40 mph);
- B. The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an ADT of 12,000 vehicles per day or greater; or
- C. The roadway has four or more lanes of travel with a raised median or pedestrian refuge island and an ADT of 15,000 vehicles per day or greater.

Use of
“substantial”
has
inappropriate
implications.

Support:

[Section 4L.03 contains information regarding Warning Beacons.](#) [Section 4N.02 contains information regarding In-Roadway Warning Lights at crosswalks.](#) [Chapter 7D contains information regarding school crossing supervision.](#)

Guidance:

Because nonintersection pedestrian crossings are generally unexpected by the road user, warning signs (see Section 2C.52) should be installed [for all marked crosswalks at nonintersection locations](#) and adequate visibility should be provided by parking prohibitions.

Support:

Section 3B.16 contains information regarding placement of stop line markings near crosswalk markings.

Option:

For added visibility, the area of the crosswalk may be marked with white diagonal lines at a 45-degree angle to the line of the crosswalk or with white longitudinal lines parallel to traffic flow as shown in Figure 3B-18.

When diagonal or longitudinal lines are used to mark a crosswalk, the transverse crosswalk lines may be omitted. This type of marking may be used at locations where substantial numbers of pedestrians cross without any other traffic control device, at locations where physical conditions are such that added visibility of the crosswalk is desired, or at places where a pedestrian crosswalk might not be expected.

Guidance:

If used, the diagonal or longitudinal lines should be 300 to 600 mm (12 to 24 in) wide and spaced 300 to 1500 mm (12 to 60 in) apart. The marking design should avoid the wheel paths, and the spacing should not exceed 2.5 times the line width.

Option:

When an exclusive pedestrian phase that permits diagonal crossing [of an intersection](#) is provided at a traffic control signal, a marking as shown in Figure 3B-19 may be used for the crosswalk.

Guidance:

[Crosswalk markings should be located so that the curb ramps are within the extension of the crosswalk markings \(see Figure 3B-20\).](#)

Support:

[Detectable warning surfaces mark boundaries between pedestrian and vehicular ways where there is no raised curb. Detectable warning surfaces are required by 49 CFR, Part 37 and by the Americans with Disabilities Act \(ADA\) where curb ramps are constructed at the junction of sidewalks and the roadway, for marked and unmarked crosswalks. The surfaces extend from the back of the curb line for a distance of at least 600 mm \(24 in\) in the pedestrian direction of travel and for the full width of the curb ramp, landing, or blended transition \(see Figure 3B-20\). The surfaces enable pedestrians who have visual disabilities to detect the warning under foot, by use of a long white cane, or by low vision, and to come to a stop before stepping into the roadway. The surfaces also alert pedestrians who have visual disabilities to the presence of hazards in their line of travel, thus indicating to them that they need to stop and determine the nature of the hazard before proceeding farther.](#)

The “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11) specifies that detectable warning surfaces consist of truncated domes having a base diameter of 23 to 36 mm (0.9 to 1.4 in), a top diameter of 12 to 23 mm (0.5 to 0.9 in), and a height of 5 mm (0.2 in). The center-to-center spacing of the domes is specified as 41 to 61 mm (1.6 to 2.4 in). The base-to-base spacing of the domes is specified as 16 mm (0.6 in) minimum, measured between the adjacent domes on a square grid.

Detectable warning surfaces contrast visually with adjacent walking surfaces, either light-on-dark, or dark-on-light.

3B.19
Approved by
NC without
revisions to
NPA.

Section ~~3B.18~~ 3B.19 Parking Space Markings

Support:

Marking of parking space boundaries encourages more orderly and efficient use of parking spaces where parking turnover is substantial. Parking space markings tend to prevent encroachment into fire hydrant zones, bus stops, loading zones, approaches to intersections, curb ramps, and clearance spaces for islands and other zones where parking is restricted. Examples of parking space markings are shown in Figure 3B-21.

Standard:

Parking space markings shall be white.

Option:

Blue lines may supplement white parking space markings of each parking space designated for use only by persons with disabilities.

Support:

Additional parking space markings for the purpose of designating spaces for use only by persons with disabilities are discussed in Section 3B.20 and illustrated in Figure 3B-22. [The design and layout of accessible parking spaces for persons with disabilities is specified in the “Americans with Disabilities Act Accessibility Guidelines \(ADAAG\)” \(see Section 1A.11\).](#)

3B.20
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

“YIELD” used
at roundabouts

Section ~~3B.19~~ 3B.20 Pavement Word, ~~and~~ Symbol, and Arrow Markings paragraphs were relocated within this Section

Support:

Word, ~~and~~ symbol, and arrow markings on the pavement are used for the purpose of guiding, warning, or regulating traffic. These pavement markings can be helpful to road users in some locations by supplementing signs and providing additional emphasis for important regulatory, warning, or guidance messages, because the markings do not require diversion of the road user’s attention from the roadway surface. Symbol messages are preferable to word messages. Examples of standard word and arrow pavement markings are shown in Figures 3B-23 and 3B-24.

Option:

Word, symbol, and arrow markings, including those contained in the “Standard Highway Signs and Markings” book (see Section 1A.11), may be used as determined by engineering judgment to supplement signs and/or to provide additional emphasis for regulatory, warning, or guidance messages. Among the word, ~~and~~ symbol, and arrow markings that may ~~include, but be used~~ are ~~not limited to~~, the following: ~~Other words or symbols may also be used under certain conditions.~~

A. Regulatory:

1. STOP
2. RIGHT (LEFT) TURN ONLY
3. 40 km/h (25 MPH)
4. Lane-use and wrong-way arrows ~~symbols~~
5. Diamond symbol for HOV lanes
6. Other preferential lane word markings
7. YIELD

B. Warning:

1. STOP AHEAD
2. YIELD AHEAD
3. YIELD AHEAD triangle symbol
4. SCHOOL XING
5. SIGNAL AHEAD
6. PED XING
7. SCHOOL
8. R X R
9. BUMP
10. HUMP
11. Lane-reduction arrows

C. Guide:

1. Route numbers (route shield pavement marking symbols and/or words such as I-81, US 40, STATE 135, or ROUTE 10)
2. ~~STATE 135~~ Cardinal directions (NORTH, SOUTH, EAST, or WEST)
3. ~~ROUTE 40 TO~~
4. Destination names or abbreviations thereof

Standard:

Word, ~~and~~ symbol, and arrow markings shall be white, except as otherwise noted in this Section.

Pavement marking letters, numerals, arrows, and symbols shall be installed in accordance with the design details in the Pavement Markings chapter of the “Standard Highway Signs and Markings” book (see Section 1A.11). **repeated from last paragraph of Section 3B.15**

Guidance:

Letters and numerals should be 1.8 m (6 ft) or more in height.

Word and symbol markings should not exceed three lines of information.

If a pavement marking word message consists of more than one line of information, it should read in the direction of travel. The first word of the message should be nearest to the road user.

Except for the two opposing arrows of a two-way left-turn lane marking (see Figure 3B-7), the longitudinal space between word or symbol message markings, including arrow markings, should be at least four times the height of the characters for low-speed roads, but not more than ten times the height of the characters under any conditions.

The number of different word and symbol markings used should be minimized to provide effective guidance and avoid misunderstanding.

Except ~~as noted in the Option~~ for the SCHOOL word marking, pavement word and symbol markings should be no more than one lane in width.

Option:

If used, the SCHOOL word marking may extend to the width of two approach lanes (see Section 7C.06).

Guidance:

When the SCHOOL word marking is extended to the width of two approach lanes, the ~~characters~~ letters **edited for consistency with Section 7C.06** should be 3 m (10 ft) or more in height (see Section 7C.06).

Pavement word and symbol markings should be proportionally scaled to fit within the width of the facility upon which they are applied.

Option:

On narrow, low-speed shared-use paths, the pavement words and symbols may be smaller than suggested, but to the relative scale.

Pavement markings simulating Interstate, U.S., State, and other official highway route shield signs (see Figure 2D-3) with appropriate route numbers, but elongated for proper proportioning when viewed as a marking, may be used to guide road users to their destinations (see Figure 3B-25).

Standard:

Except at the ends of aisles in parking lots, the word STOP shall not be used on the pavement unless accompanied by a stop line (see Section 3B.16) and STOP sign (see Section 2B.05). At the ends of aisles in parking lots, the word STOP shall not be used on the pavement unless accompanied by a stop line.

The word STOP shall not be placed on the pavement in advance of a stop line, unless every vehicle is required to stop at all times.

Option:

A yield-ahead triangle symbol or YIELD AHEAD word pavement marking may be used on approaches to intersections where the approaching traffic will encounter a YIELD sign at the intersection (see Figure 3B-26). **relocated from earlier in this Section**

Standard:

The yield-ahead triangle symbol or YIELD AHEAD word pavement marking shall not be used unless a YIELD sign (see Section 2B.08) is in place at the intersection. The yield-ahead symbol marking shall be as shown in Figure 3B-26.

Guidance:

The International Symbol of Accessibility parking space markings ~~may~~ **should** be placed in each parking space designated for use by persons with disabilities.

Option:

A blue background with white border may supplement the wheelchair symbol as shown in Figure 3B-21.

Support:

Lane-use arrow markings (see Figure 3B-23) are ~~often~~ used to ~~provide guidance in turn bays~~ **indicate the mandatory or permissible movements in certain lanes** (see Figure 3B-25), ~~where turns may or may not be mandatory~~, and in two-way left-turn lanes (see Figure 3B-7). **relocated from later in this Section**

Guidance:

Lane-use arrows (see Figure 3B-24) should be used in lanes designated for the exclusive use of a turning movement, including turn bays, except where engineering judgment determines that physical conditions or other markings (such as a dotted extension of the lane line through the taper into the turn bay) clearly discourage unintentional use of a turn bay by through vehicles. Lane-use arrows should also be used in lanes from which movements are allowed that are contrary to the normal rules of the road (see Drawing B of Figure 3B-12). An arrow should be used at the upstream end of the full-width turn lane. When used in turn lanes, at least two arrows should be used, one at or just downstream from the upstream end of the full-width turn lane and one 6.1 to 15 m (20 to 50 ft) upstream from the stop line or intersection (see Drawing C of Figure 3B-10). Where opposing offset channelized left-turn lanes exist, lane-use arrows should be placed near the downstream terminus of the offset left-turn lanes to reduce wrong-way movements (see Figure 2B-20).

Option:

An additional arrow or arrows may be used in a turn lane (see Drawing C of Figure 3B-10).

Support

An arrow at the downstream end of a turn lane can help to prevent wrong way movement.

Standard:

Where through ~~traffic~~ **deleted to increase consistency lanes approaching an intersection become mandatory turn lanes, lane-use arrow markings (see Figure 3B-24) shall be used and shall be accompanied by standard signs.**

Short turn lanes are often used by local agencies due to lower turning movement volumes, lack of space, or to geometrically line up with a left turn lane that is approaching the same intersection in the opposite direction. Under the current Manual, which regards the use of such arrows as optional, local agencies have successfully used one arrow in left turn lanes less than 125 feet long with no driver confusion or safety concerns.

Lane use arrows are inappropriate on freeways. They imply a turn rather than an exit.

Guidance:

Where through lanes approaching an intersection become mandatory turn lanes, ONLY word markings (see Figure 3B-23) should be used in addition to the required lane-use arrow markings and signs. ~~Where through lanes become mandatory turn lanes, signs or~~ These markings and signs should be placed well in advance of the turn and should be repeated as necessary to prevent entrapment and to help the road user select the appropriate lane in advance of reaching a queue of waiting vehicles (see Drawing C of Figure 3B-10).

Option:

On freeways or expressways where a through lane becomes a mandatory exit lane, lane-use arrow markings may be used in the optional and/or lane drop dropped lane on the approach to the exit.

ED NOTE: MTC recommends that FHWA develop a standard arrow design for use on freeway to indicate an optional lane or a lane drop or deceleration lane.

Standard:

Lane-use, lane-reduction, and wrong-way arrow markings shall be designed as shown in Figure 3B-24 and in Chapter 10 of the “Standard Highway Signs and Markings” book (see Section 1A.11).

Option:

~~Lane-use arrow markings (see Figure 3B-21) may be used to convey either guidance or mandatory messages.~~

The ONLY word marking (see Figure 3B-23) may be used to supplement the lane-use arrow markings in lanes that are designated for the exclusive use of a single movement (see Figure 3B-27).

Standard:

The ONLY word marking shall not be used in a lane that is shared by more than one movement.

Guidance:

~~In situations~~ Where a lane-reduction transition occurs on a roadway with a speed limit of 70 km/h (45 mph) or more, the lane-reduction arrow markings shown in Drawing F in Figure 3B-24 ~~may~~ should be used (see Figure 3B-13). Where a lane-reduction transition occurs on a roadway with a speed limit of less than 70 km/h (45 mph), the lane-reduction arrow markings shown in Drawing F in Figure 3B-24 should be used if determined to be appropriate based on engineering judgment.

Guidance:

Where crossroad channelization or ramp geometrics do not make wrong-way movements difficult, ~~a~~ the appropriate lane-use arrow should be placed in each lane of an exit ramp near the crossroad terminal where it will be clearly visible to a potential wrong-way road user (see Figure 3B-28).

Option:

The wrong-way arrow markings shown in Figure 3B-24 may be placed near the downstream terminus of a ramp as shown in Figures 3B-28 and 3B-29, or at other locations where lane-use arrows are not appropriate, to indicate the correct direction of traffic flow and to discourage drivers from traveling in the wrong direction.

3B.21
Approved by
NC without
revisions to
NPA.

Section ~~3B.20~~ 3B.21 Speed Measurement Markings

Support:

A speed measurement marking is a transverse marking placed on the roadway to assist the enforcement of speed regulations.

Standard:

Speed measurement markings, if used, shall be white, and shall not be greater than 600 mm (24 in) in width.

Option:

Speed measurement markings may extend 600 mm (24 in) on either side of the ~~centerline~~ center line or 600 mm (24 in) on either side of edge line markings at 400 m (0.25 mi) intervals over a 1.6 km (1 mi) length of roadway. When paved shoulders of sufficient width are available, the speed measurement markings may be placed entirely on these shoulders (see Drawing A of Figure 3B-10 and Figure 3B-29). Advisory signs may be used in conjunction with these markings (~~see Figure 3B-10~~).

3B.22
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Section 3B.22 Speed Reduction Markings

Support:

Speed reduction markings (see Figure 3B-30) are transverse markings that are placed on the roadway within a lane (along both edges of the lane) in a pattern of progressively reduced spacing to give drivers the impression that their speed is increasing. These markings might be placed in advance of an unexpectedly severe horizontal or vertical curve or other roadway feature where drivers need to decelerate prior to reaching the feature and where the desired reduction in speeds has not been achieved by the installation of warning signs and/or other traffic control devices.

Edited to
clarify that
these
markings will
most often be
used in
advance of
curves.

Standard:

If used, speed reduction markings shall be a series of white transverse lines on both sides of the lane that are perpendicular to the center line, edge line, or lane line. The longitudinal spacing between the markings shall be progressively reduced from the upstream to the downstream end of the marked portion of the lane.

Guidance:

Speed reduction markings should not be greater than 300 mm (12 in) in width, and should not extend more than 450 mm (18 in) into the lane.

Standard:

Speed reduction markings shall not be used in lanes that do not have a longitudinal line (center line, edge line, or lane line) on both sides of the lane.

Guidance:

Speed reduction markings should be used to supplement the appropriate warning signs and other traffic control devices rather than as a substitute for these devices.

Language
added to limit
use of this
marking.

Speed reduction markings should be reserved for unexpected curves and should not be used on long tangent sections of roadway or in areas frequented mainly by local or familiar drivers, (e.g., school zones).

3B.23
Approved by
NC without
revisions to
NPA.

Section ~~3B.21~~ 3B.23 Curb Markings paragraphs have been relocated
within this Section

Support:

Curb markings are most often used to indicate parking regulations or to delineate the curb.

Standard:

~~Signs shall be used with curb markings~~ Where curbs are marked to convey parking regulations in those areas where curb markings are frequently obliterated by snow and ice accumulation, signs shall be used with the curb markings except as noted in the Option below ~~unless the no parking zone is controlled by statute or local ordinance.~~

Guidance:

Except as noted in the Option below, when curb markings are used without signs to convey parking regulations, a legible word marking regarding the regulation (such as “No Parking” or “No Standing”) should be placed on the curb.

Option:

Curb markings without word markings or signs may be used to convey a general prohibition by statute of parking within a specified distance of a STOP sign, driveway, fire hydrant, or crosswalk.

Local highway agencies may prescribe special colors for curb markings to supplement standard signs for parking regulation.

Support:

Since yellow and white curb markings are frequently used for curb delineation and visibility, it is advisable to establish parking regulations through the installation of standard signs (see Sections 2B.53 through 2B.55).

Standard:

Where curbs are marked for delineation or visibility purposes, the colors shall ~~conform to~~ comply with the general principles of markings (see Section 3A.04).

Guidance:

Retroreflective solid yellow markings should be placed on the noses of raised medians and curbs of islands that are located in the line of traffic flow where the curb serves to channel traffic to the right of the obstruction.

Retroreflective solid white markings should be used when traffic ~~may~~ is permitted to pass on either side of the island.

Support:

Where the curbs of the islands become parallel to the direction of traffic flow, it is not necessary to mark the curbs unless an engineering study indicates the need for this type of delineation.

Curbs at openings in a continuous median island need not be marked unless an engineering study indicates the need for this type of marking.

Option:

Retroreflective or internally illuminated raised pavement markers may be used as a substitute for or as a supplement to retroreflective white and yellow markings placed on the pavement in front of the curb and/or on the top of curbed noses of raised medians and curbs of islands.

3B.24
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

All revisions
to Section
3B.24 are
based on
recommenda-
tions of toll
road task
force.

Section ~~3B.22~~ 3B.24 Preferential Lane Word and Symbol Markings

Support:

Preferential lanes ~~identify~~ are established for one or more of a wide variety of special uses, including, but not limited to, high-occupancy vehicle (HOV) lanes, ~~lanes for use only by vehicles equipped with electronic toll collection (ETC) transponders, high-occupancy toll (HOT) lanes,~~ bicycle lanes, bus only lanes, taxi only lanes, and light rail transit only lanes. ~~A managed lane includes as an operational strategy, in real time in response to changing conditions, the designation of the lane as a preferential lane for use only by certain types of vehicles or occupancies during certain variable time periods.~~ **relocated from later in this Section**

Standard:

When a lane is assigned full or part time to a particular class or classes of vehicles, the preferential lane word and symbol markings described in this Section and the preferential lane longitudinal markings described in Section 3B.25 shall be used.

All longitudinal pavement markings, as well as word and symbol pavement markings, associated with a preferential lane shall end where the Preferential Lane Ends (R3-12a or R3-12c) sign (see Section 2B.30) designating the downstream end of the preferential only lane restriction is installed.

Static or changeable message regulatory signs (see Sections 2B.26 to 2B.30) or signals shall be used with preferential lane word or symbol markings.

All preferential lane word and symbol markings shall be white ~~and all preferential lane word and symbol markings~~ shall be positioned laterally in the center of the ~~preferred-use~~ preferential lane. **two paragraphs combined into one**

Where a preferential lane use ~~is established~~ exists contiguous to a general purpose lane, the preferential lane shall be marked with one or more of the following symbol or word markings for the preferential lane use specified:

- A. HOV lane—the preferential lane-use marking for high-occupancy vehicle lanes shall consist of white lines formed in a diamond shape symbol or the word message HOV. The diamond shall be at least 0.75 m (2.5 ft) wide and 3.7 m (12 ft) in length. The lines shall be at least 150 mm (6 in) in width.
- B. HOT lane or ETC Only lane— Except as noted in Option below, the preferential lane use marking for an a HOT lane or ETC only lane shall consist of a word marking using the name of the ETC payment system required for use of the lane, such as E Z PASS ONLY.
- C. Bicycle lane—the preferential lane-use marking for a bicycle lane shall consist of a bicycle symbol or the word marking BIKE LANE (see Chapter 9C and Figures 9C-1 and 9C-3 through 9C-6).
- D. Bus only lane—the preferential lane-use marking for a bus only lane shall consist of the word marking BUS ONLY.
- E. Taxi only lane—the preferential lane-use marking for a taxi only lane shall consist of the word marking TAXI ONLY.
- F. Light rail transit lane—the preferential lane-use marking for a light rail transit lane shall consist of the letter T or the word marking TRANSIT ONLY.

G. Other type of preferential lane—the preferential lane-use markings shall ~~be identified in accordance with Section 3B.23~~ consist of a word marking appropriate to the restriction.

If two or more preferential lane uses are permitted in a single lane, the symbol or word marking for each preferential lane use shall be installed.

Option:

Preferential lane use markings may be omitted where engineering judgment determines that signs clearly indicate the preferential lane restriction or at toll plazas where physical conditions preclude the use of the markings.

~~Support~~ Guidance:

The spacing of the markings ~~is an~~ should be based on engineering judgment that ~~is based on~~ considers the prevailing speed, block lengths, distance from intersections, and other factors that affect clear communication to the road user.

Support:

Markings spaced as close as 24 m (80 ft) apart might be appropriate on city streets, while markings spaced as far as 300 m (1,000 ft) apart might be appropriate for freeways.

Guidance:

In addition to a regular spacing interval, the preferential lane marking should be placed at strategic locations such as major decision points, direct exit ramp departures from the preferential lane, and along access openings to and from adjacent general purpose lanes. At decision points, the preferential lane marking should be placed on all applicable lanes and should be visible to approaching traffic for all available departures. At direct exits from preferential lanes where extra emphasis is needed, the use of word markings (such as “EXIT” or “EXIT ONLY) in the deceleration lane for the direct exit and/or on the direct exit ramp itself just beyond the exit gore should be considered.

Option:

A numeral indicating the vehicle occupancy requirements established for a high-occupancy vehicle lane may be included in sequence after the diamond symbol or HOV word message.

Guidance:

Engineering judgment should determine the need for supplemental devices such as tubular markers, or traffic cones, ~~or flashing lights.~~ relocated from earlier in this Section

3B.25
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

All revisions
to Section
3B.25 are
based on
recommenda-
tions of toll
road task
force.

Section ~~3B.23~~ 3B.25 Preferential Lane Longitudinal Markings for Motor Vehicles ~~this Section was reorganized~~

Support:

Preferential lanes can take many forms depending on the level of usage and the design of the facility. They might be barrier-separated (on a separate alignment or physically separated from the other travel lanes by a barrier, or median, or painted neutral area), or they might be concurrent with other travel lanes and be buffer-separated (separated from general purpose lanes only by a narrow buffer area created with longitudinal pavement markings) or contiguous with general purpose lanes (separated only by a lane line). ~~Further,~~ Physically separated preferential lanes might be operated in ~~the same~~ a constant direction or be operated as reversible lanes. Some reversible preferential lanes on a divided highway might be operated counter-flow to the direction of traffic on the immediately adjacent general purpose lanes.

A managed lane might include the designation of the lane as a preferential lane for use only by certain types of vehicles or occupancies during certain variable time periods as an operational strategy in real time in response to changing conditions. Additional information regarding signs for managed lanes is contained in Sections 2B.32 and 2E.61.

Option:

Preferential lanes ~~may~~ might be operated ~~either~~ grammar – more than two choices full-time (24 hours per day on all days), for extended periods of the day, ~~or~~ part-time (restricted usage during specific hours on specified days), or on a variable basis (such as a strategy for a managed lane).

Standard:

The following four items Longitudinal pavement markings for preferential lanes shall be as follows (these same requirements are presented in tabular form in Table 3B-2):

- A. Physically Barrier-separated, nonreversible preferential lane—the longitudinal pavement markings for preferential lanes that are physically separated from the other travel lanes by a barrier, or median, ~~or painted neutral area~~ shall consist of a single normal solid yellow line at the left-hand edited to increase clarity edge of the travel lane(s), and a single normal solid white line at the right-hand edited to increase clarity edge of the travel lane(s), ~~and if there are two or more preferential lanes, the preferential travel lanes shall be separated with a normal broken white line~~ (see Drawing A in Figure 3B-31).
- B. Physically Barrier-separated, reversible preferential lane—the longitudinal pavement markings for reversible preferential lanes that are physically separated from the other travel lanes by a barrier, or median, ~~or painted neutral area~~ shall consist of a single normal solid white line at both edges of the travel lane(s), ~~and if there are two or more preferential lanes, the preferential travel lanes shall be separated with a normal broken white line~~ (see Drawing B in Figure 3B-31).

C. Buffer-separated (left-hand side) preferential lane—the longitudinal pavement markings for a full-time or part-time preferential lane on the left-hand side of and separated from the other travel lanes by a neutral buffer space shall consist of a single normal solid yellow line at the left-hand edge of the preferential travel lane(s) and one of the following at the right-hand edge of the preferential travel lane(s):

1. A double solid wide white line along both edges of the buffer space where crossing the buffer space is prohibited (see Drawing A in Figure 3B-32).
2. A single solid wide white line along both edges of the buffer space where crossing the buffer space is discouraged (see Drawing B in Figure 3B-32).
3. A single broken wide white line along both edges of the buffer space, or a single broken wide white line within the allocated buffer space (resulting in wider lanes), where crossing the buffer space is permitted (see Drawing C in Figure 3B-32).

D. Buffer-separated (right-hand side) preferential lane—the longitudinal pavement markings for a full-time or part-time preferential lane on the right-hand side of and separated from the other travel lanes by a neutral buffer space shall consist of a single normal solid white line at the right-hand edge of the preferential travel lane(s) if warranted (see Section 3B.07) and one of the following at the left-hand edge of the preferential travel lane(s) (see Drawing D in Figure 3B-32):

1. A double solid wide white line along both edges of the buffer space where crossing the buffer space is prohibited.
2. A single solid wide white line along both edges of the buffer space where crossing of the buffer space is discouraged.
3. A single broken wide white line along both edges of the buffer space, or a single broken wide white line within the allocated buffer space (resulting in wider lanes), where crossing the buffer space is permitted.
4. A single dotted normal white line within the allocated buffer space (resulting in wider lanes) where crossing the buffer space is permitted for any vehicle to perform a right-turn maneuver.

E. ~~Concurrent flow~~ Contiguous (left-hand **edited to increase clarity** side) preferential lane—the longitudinal pavement markings for a full-time or part-time preferential lane on the left-hand **edited to increase clarity** side of and contiguous to the other travel lanes shall consist of a single normal solid yellow line at the left-hand **edited to increase clarity** edge of the preferential travel lane(s) and one of the following at the right-hand **edited to increase clarity** edge of the preferential travel lane(s):

1. A double solid wide white line where crossing is prohibited (see Drawing A in Figure 3B-33).
2. A single solid wide white line where crossing is discouraged (see Drawing B in Figure 3B-33).
3. A single broken wide white line where crossing is permitted (see Drawing C in Figure 3B-33).

~~If there are two or more preferential lanes, the preferential travel lanes shall be separated with a normal broken white line.~~

- F. ~~Concurrent flow~~ Contiguous (right-hand ~~edited to increase clarity~~ side) preferential lane—the longitudinal pavement markings for a full-time or part-time preferential lane on the right-hand side ~~edited to increase clarity~~ of and contiguous to the other travel lanes shall consist of a single normal solid white line at the right-hand ~~edited to increase clarity~~ edge of the preferential travel lane(s) if warranted (see Section 3B.07) and one of the following at the left-hand ~~edited to increase clarity~~ edge of the preferential travel lane(s) (see Drawing D in Figure 3B-33):
1. A double solid wide white line where crossing is prohibited.
 2. A single solid wide white line where crossing is discouraged.
 3. A single broken wide white line where crossing is permitted.
 4. A single dotted normal white line where crossing is permitted for any vehicle to perform a right-turn maneuver.

~~If there are two or more preferential lanes, the preferential travel lanes shall be separated with a normal broken white line.~~

Guidance:

When ~~concurrent flow~~ preferential lanes and other travel lanes are separated by ~~more~~ a buffer space wider than 1.2 m (4 ft) and crossing the buffer space is prohibited, chevron markings (see Section 3B.26) should be placed in the ~~neutral~~ buffer area (see Drawing A in Figure 3B-32). The chevron spacing should be 30 m (100 ft) or greater.

Option:

~~For~~ If a full-time or part-time ~~concurrent flow~~ contiguous preferential lanes, ~~the spacing or skip pattern of the~~ is separated from the other travel lanes by a single broken wide white line (see Drawing C in Figure 3B-33), ~~the spacing or skip pattern of the line~~ may be reduced; and the width of the ~~single broken wide white~~ line may be increased.

Standard:

If there are two or more preferential lanes, the lane lines between the preferential lanes shall be normal broken white lines.

Preferential lanes ~~longitudinal markings~~ for motor vehicles shall also be marked with the appropriate word or symbol pavement markings in accordance with Section 3B.24 and shall have appropriate regulatory signs in accordance with Sections 2B.26 through 2B.30.

Guidance:

At direct exits from a preferential lane, dotted white line markings should be used to separate the tapered or parallel deceleration lane for the direct exit (including the taper) from the adjacent continuing preferential through lane, to reduce the chance of unintended exit maneuvers.

Standard:

On a divided highway, a part-time counter-flow preferential lane that is contiguous to the travel lanes in the opposing direction shall be separated from the opposing direction lanes by the standard reversible lane longitudinal marking, a normal width double yellow broken line (see Section 3B.03 and Drawing A of Figure 3B-34). If a buffer space is provided between the part-time counter-flow preferential lane and the opposing direction lanes, a normal width double yellow broken line shall be placed along both edges of the buffer space (see Drawing B of Figure 3B-34). Signs (see Section 2B.25), lane-use control signals (see Chapter 4M), or both shall be used to supplement the reversible lane markings.

On a divided highway, a full-time counter-flow preferential lane that is contiguous to the travel lanes in the opposing direction shall be separated from the opposing direction lanes by a double solid yellow center line marking (see Drawing C of Figure 3B-34). If a buffer space is provided between the full-time counter-flow preferential lane and the opposing direction lanes, a normal width double solid yellow line shall be placed along both edges of the buffer space (see Drawing D of Figure 3B-34).

Option:

Cones, tubular markers, or other channelizing devices may also be used to separate the opposing lanes when a counter-flow preferential lane operation is in effect.

3B.26
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

Edited to
clarify and
improve
accuracy.

Eight inch wide
chevron or
diagonal
markings are
commonly used
by local agencies
in flush
channelizing
islands or
medians. They
are easier and
cheaper to
maintain, are
clearly visible at
lower speeds, and
have not
presented any
driver confusion
or safety
concerns.

Section 3B.26 Chevron and Diagonal ~~Crosshatching~~ Markings

Option:

Chevron and diagonal ~~crosshatching~~ markings may be used to discourage travel on certain paved areas, such as shoulders, gore areas, neutral areas between double solid yellow center line markings approaching obstructions in the roadway (see Section 3B.10 and Figure 3B-14), neutral areas between double solid yellow center line markings forming flush medians or channelized travel paths at intersections (see Figures 3B-2 and 3B-5), and buffer spaces between preferential lanes and general purpose lanes (see Figures 3B-32 and 3B-34).

Standard:

When ~~chevron crosshatching~~ markings are used in paved areas that separate traffic flows in the same general direction, they shall be white ~~and they shall be shaped as chevron markings~~, with the point of each chevron facing towards approaching traffic and with the diagonal lines that form the chevron slanting such that the downstream ends of the lines intersect the longitudinal lines at the edges of the adjacent travel lanes (see Figures 3B-8, 3B-11, and 3B-14, Sheet 2 of 2).

When ~~diagonal crosshatching~~ markings are used in paved areas that separate opposing directions of traffic, they shall be yellow ~~and diagonal markings that slant such that the downstream ends of the lines intersect the longitudinal lines at the edges of the adjacent travel lanes~~ (see Figures 3B-5 and 3B-14, Sheet 1 of 2).

When ~~diagonal crosshatching~~ markings ~~are~~ used on paved shoulders, they shall ~~be diagonal markings that~~ slant such that the downstream ends of the lines intersect the edge line of the adjacent travel lane. The diagonal markings shall be yellow when used on the left-hand shoulders of the roadways of divided highways and on the left-hand shoulders of one-way streets or ramps. The diagonal markings shall be white when used on right-hand shoulders.

Guidance:

~~The e~~Chevron and diagonal ~~lines used for crosshatching~~ markings should be at least 300 mm (12 in) wide ~~for roadways having a posted or statutory speed limit of 70 km/h (45 mph) or greater, and at least 200 mm (8 in) for roadways having posted or statutory speed limit of less than 70 km/h or (45 mph)~~. The longitudinal spacing of the chevron or diagonal lines should be determined by engineering judgment considering factors such as speeds and desired visual impacts. The chevron and diagonal lines should form an angle of approximately 45 degrees with the longitudinal lines that they intersect.

~~Section 3B.24 Markings for Roundabout Intersections~~ text relocated to
new Chapter 3C

~~Section 3B.25 Markings for Other Circular Intersections~~ text relocated to
new Chapter 3C

3B.27
Approved by
NC without
revisions to
NPA.

Section ~~3B.26~~ 3B.27 Speed Hump Markings **sequence of paragraphs has been revised**

Option:

Speed humps, except those ~~used for~~ where the speed hump also functions as a crosswalk or speed table, may be marked in accordance with Figure 3B-35. ~~The markings shown in Figure 3B-30 may be used where the~~ Speed humps that also function as a crosswalk or speed table may be marked in accordance with Figure 3B-36.

Standard:

~~If used,~~ speed hump markings are used, they shall be a series of white markings placed on a speed hump to identify its location. If markings are used for a speed hump that does not also function as a crosswalk or speed table, the markings shall comply with Option A, B, or C shown in Figure 3B-35. If markings are used for a speed hump that also functions as a crosswalk or speed table, the markings shall comply with Option A or B shown in Figure 3B-36.

3B.28
Approved by
NC without
revisions to
NPA.

Section ~~3B.27~~ 3B.28 Advance Speed Hump Markings **sequence of paragraphs has been revised**

Option:

Advance speed hump markings (see Figure 3B-37) may be used in advance of ~~an~~ speed humps or other engineered vertical roadway deflections such as dips where added visibility is desired or where such deflection is not expected.

Advance pavement wording such as BUMP or HUMP (see Section 3B.20) may be used on the approach to a speed hump either alone or in conjunction with advance speed hump markings. Appropriate advance warning signs may be used in conformance with Section 2C.28.

Standard:

~~If used,~~ advance speed hump markings are used, they shall be a special series of eight white marking 300 mm (12 in) transverse lines that become longer and are spaced closer together as the vehicle approaches the placed-in-advance-of speed humps or other engineered vertical roadway deflections such as dips. If advance markings are used, they shall comply with the detailed design shown in Figure 3B-37.

Guidance:

If used, advance speed hump markings should be installed in each approach lane.

3B.29
Approved by
NC with
revisions to
NPA.
Approved
revision
highlighted in
yellow.

All revisions
to Section
3B.29 are
based on
recommenda-
tions of toll
road task
force.

Section 3B.29 Markings for Toll Plazas

Support:

At toll plazas, pavement markings are important to help road users identify the proper lane(s) to use for the type of toll payment they plan to use, to channelize movements into the various lanes, and to delineate obstructions in the roadway.

Standard:

Pavement markings shall be used to guide traffic around the upstream end of toll islands within toll plazas. Approach markings for toll islands shall consist of tapered lines extending from a point located on the longitudinal centerline of the island to a point 1 to 2 ft. (0.3 to 0.6 m) on both sides of the island (see Figure 3B-XX).

The minimum taper length of approach markings at toll islands shall be 50 ft (15m).

Standard:

Longitudinal pavement markings for Electronic Toll Collection (ETC) Only lanes approaching a non-stop, dedicated ETC lane at a mainline toll plaza shall comply with Section 3B.25, except as noted in the Option below.

Guidance- Support:

If drivers using an An ORT ETC Only lane that is within or immediately adjacent to a mainline toll plaza are not required to stop at the plaza, the ETC Only lane should might be separated from adjacent cash payment toll plaza lanes by a curb or barrier, channelizing devices (see Section 3F.01), and/or single or double solid wide white longitudinal pavement markings that discourage or prohibit lane changing.

Guidance:

This form of separation should begin on the approach to the mainline toll plaza at approximately the point where the vehicle speeds in the adjacent cash lanes drop below 50 km/h (30 mph) during off-peak periods. This form of separation should extend downstream beyond the toll plaza approximately to the point where the vehicles departing the toll plaza in the adjacent cash lanes have accelerated to 50 km/h (30 mph).

Option:

For a toll plaza approach lane that is restricted to ETC Only, the solid white lane line or edge line on the right hand side of the ETC Only lane and the solid white lane line or solid yellow edge line on the left hand side of the ETC Only lane may be supplemented with purple solid longitudinal markings placed contiguous to the inside edges of the lines defining the lane.

Standard:

If used, the purple solid longitudinal marking described in the previous paragraph shall be a minimum of 25 mm (1 in) and a maximum of 75 mm (3 in) in width, and ETC Only preferential lane word markings (see Section 3B.24) shall be installed within the lane.

Toll booths and the islands on which they are located are considered to be obstructions in the roadway and they shall be provided with markings that comply with the provisions of Section 3B.10 and Chapter 3G.