Section 3A.04  Colors

Standard:
Markings shall be yellow, white, red, or blue, or purple. The colors for markings shall conform to the standard highway colors. Black in conjunction with one of the above colors shall be a usable color.

When used, white markings for longitudinal lines shall delineate:
A. The separation of traffic flows in the same direction, or
B. The right-hand separated edge of the roadway.

When used, yellow markings for longitudinal lines shall delineate:
A. The separation of traffic traveling in opposite directions,
B. The left-hand separated edge of the roadways of divided and one-way highways and one-way streets or ramps, or
C. The separation of two-way left-turn lanes and reversible lanes from other lanes.

When used, red raised pavement markers or delineators shall delineate truck escape ramps and one-way roadways or ramps that shall not be entered or used in the direction from which the markers are visible.

When used, blue markings shall supplement white markings for parking spaces for persons with disabilities. When used, blue raised pavement markers shall indicate locations of fire hydrants along a roadway.

When used, purple markings shall supplement lane line or edge line markings for toll plaza approach lanes that are used only by vehicles that are equipped with electronic toll collection (ETC) transponders (see Section 3B.29).

Option:
Appropriate colors may be used in a route shield pavement marking symbol, such as red, white, and blue for an Interstate highway route shield pavement marking (see Figure 3B-25).

Black may be used in combination with the above colors where a light-colored pavement does not provide sufficient contrast with the markings.

Support:
When used in combination with other colors, black is not considered a marking color, but only a contrast-enhancing system for the markings.

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 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 or the lane line to a point 0.3 to 0.6 m (1 to 2 ft) to the right-hand 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 85\(^{th}\)-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 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.

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

**Support:**

Preferential lanes are established for one or more of a wide variety of special uses, including, but not limited to, high-occupancy vehicle (HOV) lanes, high-occupancy toll (HOT) lanes, bicycle lanes, bus only lanes, taxi only lanes, and light rail transit only lanes. As the start of the designated lane, a solid wide white line or solid double normal white line shall be extended from the point of divergence. Other markings, such as white delineators, channelizing devices, raised pavement markers, and crosswalk markings may also be placed in the neutral area.

**Standard:**

A managed lane includes as an operational strategy, in real time, the designation of the lane as a preferential lane for use only by certain types of vehicles or occupancies during certain variable time periods.
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.

Where a preferential lane use 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 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 EZ 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:

Preferred 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 should be based on engineering judgment that 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.

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 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.

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
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 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 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 side) preferential lane—the longitudinal pavement markings for a full-time or part-time preferential lane on the left-hand side of and contiguous to the other travel lanes 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 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 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 a full-time or part-time concurrent flow contiguous preferential lanes, the spacing or skip pattern of the line 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 lane, 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 centerline 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.

Section 3B.29 Markings for Toll Plazas

Support:
At toll plazas, pavement markings 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).

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

**Standard:**
Longitudinal pavement markings for lanes approaching a non-stop, dedicated ETC lane at a mainline toll plaza shall comply with Section 3B.25.

Support:
An ETC lane that is immediately adjacent to a mainline toll plaza shall be separated from adjacent cash payment toll plaza lanes by a curb or barrier, channelizing devices (see Section 3F.01), and/or 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).

**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.19 and Chapter 3G.
CHAPTER 3G. ISLANDS

Section 3G.01 General

Support:

Chapter 3G addresses the characteristics of islands as traffic-control devices. Criteria for the design of islands are set forth in “A Policy on Geometric Design of Highways and Streets” (see Section 1A.11).

Standard:

An island for traffic control purposes shall be the defined area between traffic lanes for control of vehicular movements, for toll collection, or for pedestrian refuge. Within an intersection area, a median or an outer separation shall be an island.

Option:

An island may be designated by curbs, pavement edges, pavement markings, channelizing devices, or other devices.

Section 3G.02 Approach-End Treatment

Guidance:

The ends of islands first approached by traffic should be preceded by gradually diverging longitudinal pavement markings on the roadway surface, to guide vehicles into desired paths of travel along the island edge.

Option Support:

The neutral area between approach-end markings that can be readily crossed even at considerable speed sometimes containing slightly raised (usually less than 25 mm (1 in) high) sections of coarse aggregate or other suitable materials to create rumble sections that provide increased visibility of the marked areas and that produce an audible warning to road users traveling across them. For additional discouragement to driving in the neutral area, bars or buttons projecting 25 to 75 mm (1 to 3 in) above the pavement surface are sometimes placed in the neutral area. These bars or buttons are designed so that any wheel encroachment within the area will be obvious to the vehicle operator, but will result in only minimal effects on control of the vehicle. Such bars or buttons are sometimes preceded by rumble sections or their height is gradually increased as approached by traffic.

Guidance:

When raised bars or buttons are used in these neutral areas, they should be marked with white or yellow retroreflective materials, as determined by the direction or directions of travel they separate. Relocated from Section 3G.03

Standard:

Rumble strips or other Channelizing devices, when used in advance of islands having raised curbs, shall not be placed in such a manner as to constitute an unexpected obstacle.

Guidance:

Bars or buttons should not project more than 25 to 75 mm (1 to 3 in) above the pavement surface and should be designed so that any wheel encroachment within the area will be obvious to the vehicle operator, but will not result in loss of control of the vehicle. Incorporated into the above Support paragraph.

Option:
Bars or buttons may be preceded by rumble sections, or their height may be gradually increased as approached by traffic. Pavement markings may be used with raised bars to better designate the island area.