

**MARKINGS TECHNICAL COMMITTEE
PROPOSED CHANGES TO PART 3 RELATED TO TRUNCATED DOMES**

Rational for Proposed Change

New section 3A.06

This section includes the specifications of the truncated dome detectable warning surface. These specifications are consistent with the specifications in the Americans with Disabilities Act Accessibility Guidelines. Because it can be quite difficult for those who are unfamiliar with the details of ADAAG to locate specific text (and ADAAG is being revised, including the numbering system), and because there is a great deal of confusion in the transportation engineering community regarding these requirements, it's important for these specifications to also appear in the MUTCD.

Additions to 3B.17 Crosswalk markings

New standard, support statement and figures

The standard requires truncated dome detectable warnings at the back of curb line at locations where crosswalks are marked, as currently required by ADAAG and referenced in the FHWA memo on detectable warnings of May 6, 2002. As we have discussed in the last two Markings Committee meetings, repeated research has confirmed that pedestrians who are blind often walk into the roadway when they approach the street at a curb ramp. Truncated dome detectable warnings provide a tactile cue to the edge of the street.

Changes and additions to 3B. 21 Curb Markings

Additions to current language, new standard, support statement and figures

Add 'or curb line' to the support statement since detectable warnings are used in the absence of a curb to indicate the edge of the street (curb line).

Add 'indicating parking regulations' to the standard regarding the use of signs for parking regulations in addition to curb markings. The standard regarding signs would not apply to detectable warnings markings so it seems appropriate to clarify that here.

This standard requires truncated dome detectable warnings when curb ramps are installed at unmarked crosswalk locations, since ramps are required and often installed at those locations. Pedestrians who are blind need notification that they are about to enter the roadway at all curb ramp locations.

Guidance is provided here for installation of detectable warnings at cut-through medians. (If medians have curb ramps, detectable warnings will be installed as at other curb ramps.) Pedestrians who are blind are often unaware of the presence of a median refuge island that is cut through to provide access for persons who use wheelchairs

While median refuge islands should be wider than 4 feet, there have been some questions about how detectable warnings should be installed in narrow medians, where there is not adequate space for a gap between the two two-foot deep surfaces. International experience with detectable

warnings extending the full depth of narrow medians indicates that this is a good solution to this problem. The suggested language clarifies appropriate installation to provide information to pedestrians who are blind and to allow them to recognize the median location. The option allows the installation of the detectable warnings a few inches closer to the street, and possibly encourages greater separation of the surfaces at narrower medians.

The support statement provides information about the use of detectable warnings by pedestrians who are blind.

Chapter 3A. General

Add NEW SECTION:

Section 3A.06 Specifications for Truncated Dome Detectable Warning Surfaces

Standard:

Detectable warning surfaces shall consist of a surface of truncated domes as follows:

Dome size: Truncated domes in a detectable warning surface shall have a base diameter of 23 mm (0.9 inches) minimum to 36 mm (1.4 inches) maximum, a top diameter of 50% of the base diameter minimum to 65% of the base diameter maximum, and a height of 5 mm (0.2 inches).

Dome spacing: Truncated domes in a detectable warning surface shall have a center-to-center spacing of 41 mm (1.6 inches) minimum and 61 mm (2.4 inches) maximum, and a base-to-base spacing of 16 mm (0.65 inches) minimum, measured between the most adjacent domes on a square grid.

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

Support:

These specifications are consistent with the standards for detectable warnings provided in the ADA Accessibility Guidelines. The truncated dome surface has been found to be consistently detectable by pedestrians who are blind, both underfoot and with use of a long cane.

3B PAVEMENT AND CURB MARKINGS

Section 3B.17 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.

Crosswalk markings also serve to alert road users of a pedestrian crossing point across roadways not controlled by highway traffic 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 be not less than 150 mm (6 in) nor greater than 600 mm (24 in) in width.

Add new standard, support statement and figures

Standard:

Truncated dome detectable warning surfaces shall be provided at the back of curb line, where a curb ramp, landing or blended transition connects to the crosswalk. Detectable warnings surfaces shall extend 600mm (24 inches) minimum in the pedestrian direction of travel and the full width of the curb ramp, landing or blended transition. Detectable warning surfaces shall comply with Section 3A.06.

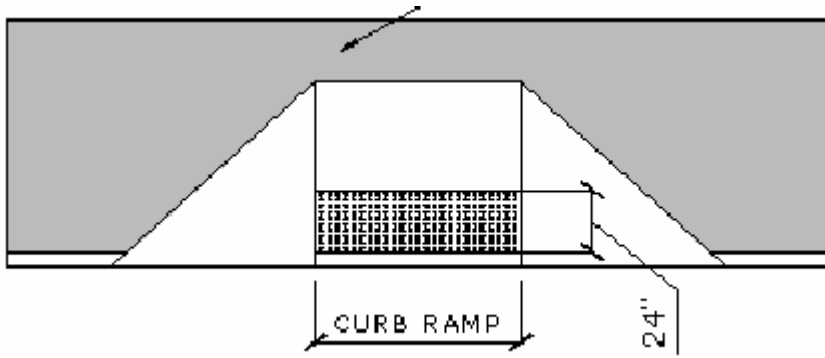
Support:

Truncated dome detectable warnings mark boundaries between pedestrian and vehicular ways where there is no raised curb. Placement of truncated dome detectable warnings at the back of curb, and extending 600 mm (24 inches) in the pedestrian direction of travel, enables pedestrians who are visually impaired to detect the warning under foot, by use of a long white cane, or by low vision, and come to a stop before stepping into the roadway.

Placement of detectable warnings at the back of curb line on curb ramps allows placement of the detectable warning behind depressed curbing.

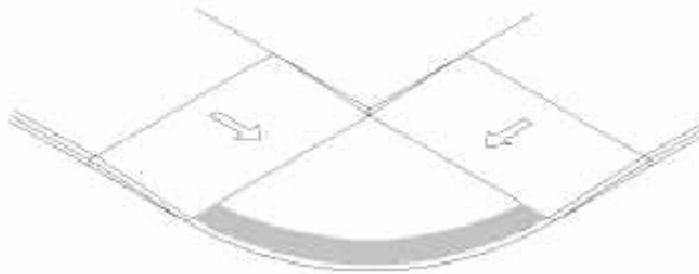
Figures xxxx: Examples of detectable warning installation

Perpendicular curb ramp:

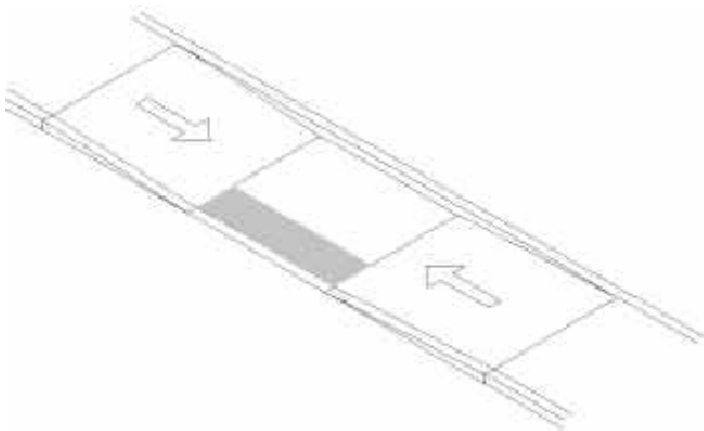


Need to revise above drawing to show an adequate landing on the curb ramp

Blended curb location:



Parallel Curb Ramp location



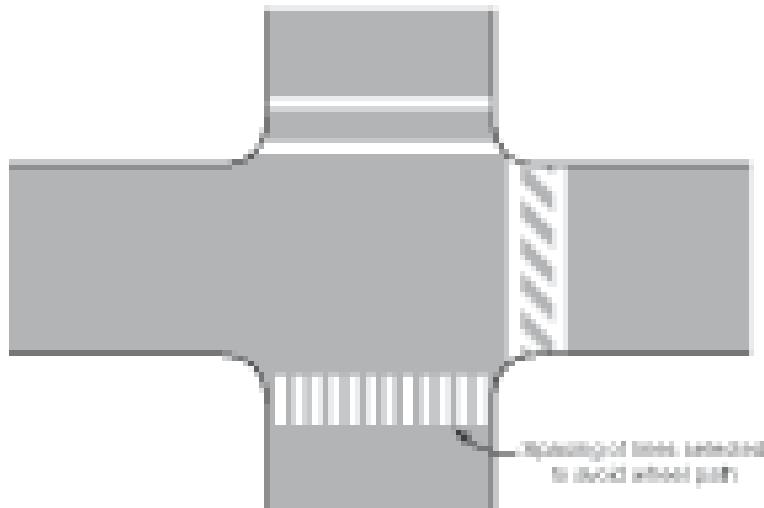
Guidance:

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 not be 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-15 and 3B-16).

Figure 3B-16 Examples of Crosswalk Markings

Figure 3B-16. Examples of Crosswalk Markings



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.

Crosswalk lines should not be used indiscriminately. An engineering study should be performed before they are installed at locations away from highway traffic signals or STOP signs.

Because nonintersection pedestrian crossings are generally unexpected by the road user, warning signs (see [Section 2C.41](#)) should be installed 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-16.

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 is provided at a traffic control signal, a marking as shown in Figure 3B-17 may be used for the crosswalk.

Figure 3B-17 Example of Crosswalk Markings for Exclusive Pedestrian Phase That Permits Diagonal Crossing

Section 3B.21 Curb Markings

Support:

Curb markings are most often used to indicate parking regulations or to delineate the curb [or curb line](#).

Standard:

Signs shall be used with curb markings [indicating parking regulations](#) in those areas where curb markings are frequently obliterated by snow and ice accumulation unless the no parking zone is controlled by statute or local ordinance.

Where curbs are marked, the colors shall conform to the general principles of markings (see [Section 3A.04](#)).

Guidance:

Except as noted in the Option, 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 specific distance of a STOP sign, driveway, fire hydrant, or crosswalk.

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 pass on either side of the island.

Option:

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.39](#) through [2B.41](#)).

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.

Add new standard, guidance, support and figure

Standard:

Truncated dome detectable warning surfaces shall be provided at the back of the curb line, where a curb ramp, landing or blended transition connects to a marked or unmarked crosswalk. Detectable warning surfaces shall extend 600mm (24 inches) minimum in the pedestrian direction of travel and the full width of the curb ramp, landing or blended transition. Detectable warning surfaces shall comply with Section 3A.06.

Support:

Examples are provided in 3B.17

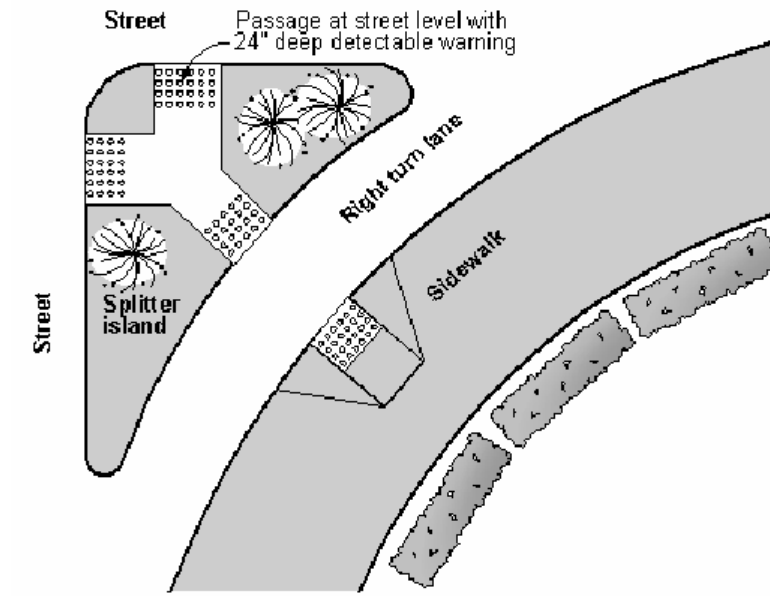
Guidance:

Where cut-through islands or medians are less than 1.2 m (4 feet) wide, the truncated dome detectable warning should extend the full width of the island or median.

Option:

At cut-through islands or medians, the truncated dome detectable warning may be located so that the edge nearest the crosswalk is at the curb line.

Figure xxx: Example of detectable warning at cut-through island location



Support:

Truncated dome detectable warnings mark boundaries between pedestrian and vehicular ways where there is no raised curb. Placement of truncated dome detectable warnings at the back of curb, and extending 600 mm (24 inches) in the pedestrian direction of travel, enables pedestrians who are visually impaired to detect the warning under foot, by use of a long white cane, or by low vision, and come to a stop before stepping into the roadway.

Placement of detectable warnings at the back of curb line on curb ramps allows placement of the detectable warning behind depressed curbing. At cut-through islands and medians, there is typically no depressed curbing. Therefore detectable warnings can readily be placed at the curb line in these locations. Placement of detectable warnings at the curb line on islands and medians increases the separation between detectable warnings on both sides of islands and medians, better defining the area of refuge. More separation also provides a clearer cue for pedestrians who are blind.

NOTE: THE FOLLOWING IS PROVIDED TO MTC FOR INFORMATION ONLY. IT WILL NOT BE SENT TO SPONSORS AS PART OF THE MTC SPONSOR BALLOT EXCEPT FOR A CROSS-REFERENCE TO THE FACT THAT RR HAS A RELATED BALLOT ITEM

Additions to Part 8; also to Part 10?

Part 8 TRAFFIC CONTROLS FOR HIGHWAY-RAIL GRADE CROSSINGS

Section 8B.20 Pavement Markings

Standard:

All highway-rail grade crossing pavement markings shall be retroreflectorized white. All other markings shall be in accordance with [Part 3](#).

Pavement markings in advance of a highway-rail grade crossing shall consist of an X, the letters RR, a no-passing marking (two-lane highways where centerline markings are used), and certain transverse lines as shown in Figures 8B-6 and 8B-7.

Identical markings shall be placed in each approach lane on all paved approaches to highway-rail grade crossings where signals or automatic gates are located, and at all other highway-rail grade crossings where the posted or statutory highway speed is 60 km/h (40 mph) or greater.

Pavement markings shall not be required at highway-rail grade crossings where the posted or statutory highway speed is less than 60 km/h (40 mph), or in urban areas, if an engineering study indicates that other installed devices provide suitable warning and control.

Guidance:

When pavement markings are used, a portion of the X symbol should be directly opposite the Advance Warning sign. The X symbol and letters should be elongated to allow for the low angle at which they will be viewed.

Option:

When justified by engineering judgment, supplemental pavement marking symbol(s) may be placed between the Advance Warning sign and the highway-rail grade crossing.

Standard:

All pedestrian-rail grade crossings shall have truncated dome detectable warning surfaces complying with Section 3A.06, located so that the edge nearest the rail crossing is 150 mm (6 inches) minimum and 205 mm (8 inches) maximum from the vehicle dynamic envelope. The detectable warning surface shall extend 600mm (24 inches) minimum in the pedestrian direction of travel and the full width of the pedestrian way.

Where automatic gates across pedestrian ways limit pedestrian access to the rail crossing when rail vehicles are approaching or at the crossing, the detectable warning surface shall be located immediately outside the automatic gate, rather than closer to the trackway.

Support:

Pedestrians who have visual impairments do not have access to visual markings, signs, and contextual cues to the presence and exact location that rails cross pedestrian ways. Truncated dome detectable warnings inform them that their path of travel is about to cross the trackway. In the event of a warning signal or the sound of an approaching train, detectable warnings enable pedestrians with visual impairments to identify a waiting location that is a safe distance from the track.

Pedestrians who have visual impairments do not have visual cues to the presence and movement of automatic pedestrian gates at rail crossings. In the absence of detectable warnings preceding automatic pedestrian gates, pedestrians who have visual impairments may be harmed by the descending gate, or may encounter a barrier when they attempt to move to a safe location to wait for the passing of a train.