

Chapter 4

MARKINGS

Section 4.1

CROSSWALKS IN HEAVY PEDESTRIAN CONCENTRATION AREAS

4.1.1 GENERAL

Heavy pedestrian generators such as beaches or hotels may create a need for channeling pedestrians across a State Highway at locations other than intersections.

To help ensure the use of marked crosswalks in heavy pedestrian concentration areas, special consideration should be given to their location relative to construction or proximity of sidewalks, paths, guardrails, retaining walls, or shrubbery as a means for controlling existing pedestrian crossing movements within a defined path.

4.1.2 MARKINGS

- (1) A marked crosswalk shall consist of 2 parallel white lines 1-foot wide. Lines should be placed not less than 6 feet apart and located to provide the least amount of walk time, whenever practical (see the [Department's Standard Plans Index Nos. 522-002 and 711-001](#)).
- (2) For added visibility, special emphasis markings may be used as shown in the [Department's Standard Plans, Index No. 711-001](#).

4.1.3 SIGNING

- (1) A PEDESTRIAN CROSSING (**W11-2**) sign, along with an arrow panel (**W16-7p**) shall be installed immediately adjacent to each marked pedestrian crossing location. This installation can be either ground-mounted or overhead on the mast arm or span wire.
- (2) A PEDESTRIAN CROSSING (**W11-2**) sign along with an AHEAD (**W16-9P**) supplemental panel shall be installed in advance of a series of marked crosswalks and may be installed in advance of each crosswalk location within a heavy pedestrian concentration area.
- (3) The need for advance crossing signs shall be based on engineering judgment considering relative spacing of crosswalks, roadside development, and other factors. The [Department's Standard Plans, Index No. 711-001](#) shall be used for mounting locations as related to approach speeds.

- (4) An END PEDESTRIAN CROSSING sign may be installed to notify motorists that the pedestrian zone has ended. The sign should be 3 x 8 feet with 8-inch letters if mounted overhead. The size of a ground-mounted sign shall be 24 x 30 inches. Sign format shall be similar to that used for the END SCHOOL ZONE (**FTP-32-04 or FTP-34-04**) sign as shown in the [Department's Speed Zoning Manual](#). The sign should be installed approximately 200 to 300 feet beyond the last marked crosswalk.

Section 4.2

PAVEMENT WORD, SYMBOL, AND ARROW MARKINGS

4.2.1 GENERAL

- (1) Pavement word, symbol, and arrows markings (**Figure 4.2-1** through **Figure 4.2-2**) may be used to supplement existing highway signing and/or to provide additional emphasis for regulatory, warning, or guidance messages as determined by engineering judgment.

Figure 4.2-1. Pavement Word Markings



- (2) The minimum requirements for word, symbol, and arrow markings are provided in [Section 3B.20 of the MUTCD](#). Additional requirements are provided in the [Department's Speed Zoning Manual](#), the [FDOT Standard Plans, Index No. 711-001](#) and [Index No. 711-002](#). Design of elongated shields are contained in [FDOT Standard Plans, Index 711-001](#).
- (3) Pavement word, symbol, and arrow markings shall not be used as a substitute for vertical sign installation unless overhead signing is impractical or impossible to install, such as when imposing on navigable airspace.
- (4) To recommend non-standard word or symbol pavement markings, an engineering study indicating how the application can be expected to optimize operations efficiency and/or safety is required to be forwarded through the District Traffic Operations Engineer to the State Traffic Operations Engineer in support of a FHWA Request for Experiment. If the request is accepted and approved by the FHWA, the District Traffic Operations office recommending the design will be responsible for submission of the required interim and final reports to Central Office for review and submission to the FHWA.

Figure 4.2-2. Pavement Symbol and Arrow Markings



4.2.2 LANE USE ARROW AND “ONLY” PAVEMENT MARKINGS ON INTERSECTION APPROACHES

- (1) Lane-use arrow symbols should not be routinely applied in through lanes at intersections except with overhead lane-use control signs. However, where unusual geometrics or alignment of through lanes may result in driver confusion, a straight arrow symbol may be used to provide additional guidance for drivers in the through lanes.
- (2) The word “ONLY” is not required if the arrow symbol for an exclusive turn lane is used under the following conditions:

 - (a) Lane is developed at a mid-block location.
 - (b) Lane is clearly delineated by appropriate channelization.
 - (c) Lane requires lateral vehicle movement from an established lane for proper positioning to execute the turn.
- (3) However, the word “ONLY” shall be used with the arrow symbol where unusual geometrics or alignment of an exclusive turn lane may result in driver confusion or misunderstanding.
- (4) Where an established through lane becomes an exclusive turn lane, the word “ONLY” shall be used with the arrow symbol indicating the allowed turning movement.

- (5) Whenever the word “ONLY” is used with an arrow symbol, these markings shall be accompanied by the appropriate signs as specified in [Sections 2B-18, 2B-19 2B-20](#), and [3B-20 of the MUTCD](#).
- (6) Design and placement details for pavement arrows and the ONLY message are found in the [FDOT Standard Plans, Index No. 711-001](#).

4.2.3 ROUTE SHIELD PAVEMENT MARKINGS

- (1) Route Shield Pavement Markings (Figure 4.2-3) shall be justified for use due to cost. Public feedback about a specific location should be considered. Route shield pavement markings are justified for each of the following conditions:
 - (a) Increased crash history where high traffic volumes worsen complex lane assignments such as lane drops, double lane exits with optional lanes, gores where crash cushions are hit frequently, and unusual geometries.
 - (b) Underutilization of the optional lane or excess lane where changing maneuvers could cause congestion in an area not expected from volume/capacity analyses.
 - (c) Complicated lane assignments and alignment shifts.
 - (d) Where an overhead sign structure is not practical and the turn-lane from an arterial to the on-ramp of a limited access facility may appear to provide access to establishments in the vicinity.

Figure 4.2-3. Route Shield Pavement Markings



- (2) Route shield pavement markings are to be installed for optimum visibility.
 - (a) Place after at least one overhead guide sign for interchange.
 - (b) Place far enough upstream of the decision point to allow motorist to safely change lanes.
 - (c) Do not install under or immediately adjacent to overpasses as they can cast shadows on the shields. Note that placement on downhill slopes may reduce their effectiveness.
 - (d) Place no more than two sets of markings (shield, with arrow or message) before the gore or decision point.
 - (e) Install them within 1 mile in advance, taking into consideration existing signs and other traffic control devices.
- (3) Route shield pavement markings shall be installed as follows:
 - (a) All Route shields shall be pre-formed thermoplastic.
 - (b) All Route shield pavement markings shall be 15 feet in length.
 - (c) US Route shields shall have contrast for both asphalt and concrete pavement.
 - (d) Align the symbol in the center of the lane.

- (e) Install the route shields in a single line across the roadway. Do not stagger.
- (f) Arrows or messages (TO, LEFT, RIGHT, NORTH, SOUTH), may be used to supplement route shields and shall follow the route shield.
- (g) Use an 80-foot gap between markings. However, cardinal directions (if used) may be 40 foot from a route shield marking.

Figure 4.2-4. Cardinal Direction Markings



4.2.4 ROUTE SHIELDS FOR WRONG WAY TREATMENT

- (1) Route Shield Pavement Markings provide proper guidance to motorists on arterials adjoining limited access facilities. **Figure 4.2-5** and **Figure 4.2-6** show the plan view of the E Bearss Avenue interchange with Interstate-275 in Tampa. **Figure 4.2-6** shows the left turn arrow marking in the westbound dual left turn lanes east of the off-ramp intersection. These figures illustrate the possible existing typical treatments and, if present, will need modifications as noted in this section. Such treatments shall not be used on future projects.

Figure 4.2-5. Plan View of an I-275 Interchange



Figure 4.2-6. Dual Left Turn Lanes with Left Turn Arrows



- ② At interchanges with a break in the arterial left turn lane(s) serving a ramp, the pavement markings preceding the break shall include the interstate shield, cardinal direction, and straight arrow. An example is shown in **Figure 4.2-7**.

Figure 4.2-7. Pavement Markings for Wrong Way Treatment



- (3) There shall be one combination of the interstate shield, cardinal direction and straight arrow per lane and preceding the break in the turn lane which then serves the entry ramp.
- (4) The lane designation at all newly designed interchanges shall follow this scheme.

Section 4.3

USE OF BLUE RAISED PAVEMENT MARKERS TO IDENTIFY FIRE HYDRANTS

Section rescinded. Requirements can now be found in [*FDOT Standard Plans Index 706-001, Sheet 6.*](#)

Section 4.4

ROUNDABOUT MARKINGS

The Department's standards for this section are shown in [Chapter 3C of the MUTCD](#).

Section 4.5

EXPRESS LANES MARKINGS

4.5.1 PURPOSE

Express lanes markings shall conform to the [Department's Design Manual](#) and to the [MUTCD](#). This section is intended only as a supplement to these documents to provide guidance on pavement markings for express lanes markings.

4.5.2 DEFINITIONS

Buffer Area. The pavement space between the express lane(s) and general use or general toll lanes that is designated by a pattern of standard longitudinal pavement markings that are wider than a normal or wide line marking.

Slip Ramp Access Type. Provides connections between the express lanes and general use or general toll lanes using breaks in the separation type and are typically facilitated by an exclusive lane.

Toll Gantry. Truss structure supporting toll equipment over the roadway.

Tolling Area. Section of roadway underneath the toll gantry.

Weave Lane Access Type. Provides interim access to express lanes using a break in the separation type that has an additional lane to accommodate weaving movements. Weaving and speed changes required for merging between the general use or general toll lanes and the express lanes occurs in a separate weave lane.

Weave Zone Access Type. Provides interim access to express lanes using a break in the separation type allowing for simultaneous ingress and egress.

4.5.3 THE WORDS 'EXPRESS' and 'ONLY' PAVEMENT MARKINGS IN EXPRESS LANES

- (1) The words 'EXPRESS' and 'ONLY' shall be placed in advance of express lanes access points and co-located with overhead advance guide signs under the following condition:
 - (a) When the general use or general toll lane transitions directly into an express lane.
 - (b) When the general use or general toll lane directly connects from a surface street (see [Figure 2G-26 of the MUTCD](#)).

- (2) The word 'EXPRESS' shall be placed at the immediate point of entry under the following conditions:
 - (a) When the slip ramp transitions directly into the express lanes.
 - (b) When the slip ramp from the general use lanes or general toll lanes merges directly into the express lanes.
- (3) The word 'ONLY' shall NOT be used under the following conditions:
 - (a) Weave zone access type.
 - (b) Weave lane access type.
 - (c) At any point beyond the entry gore where there is no legal option to exit or enter the express lanes.

4.5.4 CHEVRONS AND MARKERS IN BUFFER AREA

Chevrons crosshatch markings in buffer areas (**Figure 4.5-1**) with express lanes markers shall be installed as follows:

- (1) Buffer widths of 2' shall not have chevrons.
- (2) Buffer widths 2' to 12':
 - (a) For slip ramp access type, add 18" white chevrons spaced at 100' within the slip ramp transition.
 - (b) For weave lane access type, add 18" white chevrons spaced at 100' within the weave lane transition.
 - (c) For weave zone access type, add 18" white chevrons spaced at 100' for 1000' on both sides of the weave area.
 - (d) Buffer widths greater than 12' shall have 18" white chevrons spaced at 100'.

4.5.5 SPECIAL PAVEMENT MARKINGS WITHIN THE TOLLING AREA

- (1) When there is more than one express lane, a solid 8" white stripe shall separate the lanes for 300' prior to the toll gantry and 50' past the toll gantry as shown in **Figure 4.5-2**.
- (2) Express Lanes Marker Placement Within the Tolling Area:

- (a)** Buffer widths between 8' and 12' shall have two (2) express lane markers evenly spaced transversely.
- (b)** Buffer widths 12' and greater shall have three (3) express lane markers evenly spaced transversely.
- (c)** Express lane markers or raised pavement markings shall not be installed on top of the loop or lead-in saw cut or sealant.

The diagram illustrates the cross-section of a 3-lane highway with the following components and dimensions:

- EXPRESS LANE MARKERS AT 5' SPACING:** Indicated by black dots along the left edge of the Express Lane.
- WHITE/RED RPM'S AT 10' SPACING:** Indicated by red dots along the left edge of the Express Lane.
- 8" WHITE:** The width of the white line separating the Express Lane from the GP Lane.
- 1" OFFSET:** The offset of the white line from the center of the lane.
- 6' WHITE (10'-30' SKIP):** The width of the white line separating the GP Lane from the GP Lane.
- EXPRESS LANE MARKERS AT 5' SPACING:** Indicated by black dots along the right edge of the Express Lane.
- WHITE/RED RPM'S AT 10' SPACING:** Indicated by red dots along the right edge of the Express Lane.
- 8" WHITE:** The width of the white line separating the Express Lane from the GP Lane.
- 1" OFFSET:** The offset of the white line from the center of the lane.
- 6' WHITE (10'-30' SKIP):** The width of the white line separating the GP Lane from the GP Lane.
- EXPRESS LANE:** The leftmost lane, labeled "EXPRESS LANE" with an upward arrow.
- GP LANE:** The middle lane, labeled "GP LANE" with an upward arrow.
- GP LANE:** The rightmost lane, labeled "GP LANE" with an upward arrow.
- VARIES:** A label indicating that the width of the Express Lane can vary.

The diagram illustrates the layout for a mainline toll pavement marking. A vertical blue line represents the 'TOLL EQUIPMENT STRUCTURE'. To its right, a horizontal line segment is marked with red dots, indicating the placement of '8" WHITE WITH WHITE/RED RPMs AT 40' SPACING'. The distance from the structure to the start of this segment is 50', and the total length of the segment is 300'. The diagram also shows the lane markings for a multi-lane highway.

Mainline Toll Pavement Marking

R.T.S.

Section 4.6

USE OF INTERNALLY ILLUMINATED RAISED PAVEMENT MARKERS

4.6.1 PURPOSE

To provide guidance for the uniform application of Internally Illuminated Raised Pavement Markers (IIRPMs) on the State Highway System.

4.6.2 DEFINITIONS

Raised pavement markers are traffic control devices used as a positioning guide to supplement longitudinal pavement markings for enhanced nighttime and wet weather visibility. IIRPMs are permitted for use by [Chapter 3B of the MUTCD](#) as an equivalent alternative to Retroreflective Raised Pavement Markers (RRPMs). IIRPMs are steady-burn internally illuminated raised pavement markers installed in the roadway surface.

4.6.3 APPLICATION

RRPMs are the Department's standard type of raised pavement marker. The use of IIRPMs should be limited to mitigation strategies for curves with any of the following:

- Substandard horizontal alignment or super-elevation
- Substandard lane widths
- Substandard shoulder widths

4.6.4 PROCEDURE

- (1) For supplementing or substituting longitudinal line markings, IIRPM spacing must comply with [Sections 3B.12 through 3B.14 of the MUTCD](#).
- (2) For all IIRPM applications on the State Highway System, a signed and sealed Traffic Engineering and Safety Study must be conducted to justify the use. District Traffic Operations Engineers will coordinate with the District Maintenance Engineer to consult the location of these installations.