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PREFACE

All projects and works on highways, roads and streets shall have a traffic control plan. All work shall be executed under the established plan and Department-approved procedures. This index contains information specific to the Federal and State guidelines and standards for the preparation of traffic control plans and for the execution of traffic control in work zones, for construction and maintenance operations and utility work on highways, roads and streets on the State Highway System. Certain requirements in this Index are based on the high volume nature of State Highways. For highways, roads and streets off the State Highway System, the local agency (City/County) having jurisdiction may adopt requirements based on the minimum requirements provided in the MUTCD.

Index 600 provides Department policy and standards. Changes are only to be made thru Department-approved procedures.

Indexes 601 thru 670 provide typical applications for various situations. Modification can be made to these Indexes as long as the changes comply with the MUTCD and Department Design Standards.

The sign spacing shown on the Indexes are typical (recommended) distances. These distances may be increased or decreased based on field conditions, in order to avoid conflicts or to improve site specific traffic controls.

Except for emergencies, any road closure on State Highway System shall comply with Section 335.15, F.S.

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

The Florida Department of Transportation has adopted the "Manual On Uniform Traffic Control Devices For Streets And Highways" (MUTCD) and subsequent revisions and addendums, as published by the U.S. Department of Transportation, Federal Highway Administration, for mandatory use on the State Maintained Highway System whenever there exists the need for construction, maintenance operations or utility work.

SYMBOLS

The symbols shown are found in the FDOT site menu under Traffic Control cell library on the CADD system. Symbols assigned to the 600 series Design Standards and applicable to traffic control plans, unless otherwise identified in the plans, are as follows:

Work Area, Hazard Or Work Phase (Any pattern within a boundary)

Channelizing Device

● ● Pedestrian Longitudinal Channelizing Device (LCD)

Type III Barricade

Work Zone Sign

Automated Flagger Assistance Device (AFAD)

Temporary Traffic Signal

Advance Warning Arrow Board

c. c. Crash Cushion

Stop Bar

X ¶ Shadow (S) Or Advance Warning (AW) Vehicle
With Advance Warning Arrow Board And Warning Sign

Truck/Trailer Mounted Attenuator (TMA)

Law Enforcement Officer

H Portable Regulatory Sign

Radar Speed Display Unit

——— Portable Changeable (Variable) Message Sign

Lane Identification + Direction Of Traffic

Traffic Control Officer

REVISION 11/01/16

DESCRIPTION:



DEFINITIONS

Regulatory Speed (In Work Zones)

The maximum permitted travel speed posted for the work zone is indicated by the regulatory speed limit signs. The work zone speed must be shown or noted in the plans. This speed should be used as the minimum design speed to determine runout lengths, departure rates, flare rates, lengths of need, clear zone widths, taper lengths, crash cushion requirements, marker spacings, superelevation and other similar features.

Advisory Speed

The maximum recommended travel speed through a curve or a hazardous area.

Travel Way

The portion of the roadway for the movement of vehicles. For traffic control through work zones, travel way may include the temporary use of shoulders and any other permanent or temporary surface intended for use as a lane for the movement of vehicular traffic.

- a. Travel Lane: The designated widths of roadway pavement marked to carry through traffic and to separate it from opposing traffic or traffic occupying other traffic lanes.
- b. Auxiliary Lane: The designated widths of roadway pavement marked to separate speed change, turning, passing and climbing maneuvers from through traffic.

Detour, Lane Shift, and Diversion

A detour is the redirection of traffic onto another roadway to bypass the temporary traffic control zone. A lane shift is the redirection of traffic onto a different section of the permanent pavement. A diversion is the redirection of traffic onto a temporary roadway, usually adjacent to the permanent roadway and within the limits of the right of way.

Aboveground Hazard

An aboveground hazard is any object, material or equipment other than traffic control devices that encroaches upon the travel way or that is located within the clear zone which does not meet the Department's safety criteria, i.e., anything that is greater than 4" in height and is firm and unyielding or doesn't meet breakaway requirements.

TEMPORARY TRAFFIC CONTROL DEVICES

All temporary traffic control devices shall be ON the Department's Approved Products List (APL). Ensure the appropriate APL number is permanently marked on the device in a readily visible location.

All temporary traffic control devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time, temporary traffic control devices that are no longer appropriate shall be removed or covered.

Arrow Boards, Portable Changeable Message Signs, Radar Speed Display Trailer, Portable Regulatory Signs, and any other trailer mounted device shall be delineated with a temporary traffic control device placed at each corner when in use and shall be moved outside the travel way and clear zone or be shielded by a barrier or crash cushion when not in use.

PEDESTRIAN AND BICYCLIST

When an existing pedestrian way or bicycle way is located within a traffic control work zone, accommodation must be maintained and provision for the disabled must be provided.

Only approved pedestrian longitudinal channelizing devices may be used to delineate a temporary traffic control zone pedestrian walkway.

Advanced notification of sidewalk closures and marked detours shall be provided by appropriate signs.

OVERHEAD WORK

Work is only allowed over a traffic lane when one of the following

OPTION 1 (OVERHEAD WORK USING A MODIFIED LANE CLOSURE)

Overhead work using a modified lane closure is allowed if all of the following conditions are met:

- a. Work operation is located in a signalized intersection and limited to signals, signs, lighting and utilities.
- b. Work operations are 60 minutes or less.
- c. Speed limit is 45 mph or less.
- d. Aerial lift equipment in the work area has high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- e. Aerial lift equipment is placed directly below the work area to close the
- f. Traffic control devices are placed in advance of the vehicle/equipment closing the lane using a minimum 100 foot taper.
- g. Volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic control officer.

OPTION 2 (OVERHEAD WORK ABOVE AN OPEN TRAFFIC LANE)

Overhead work above a open traffic lane is allowed if all of the following conditions are met:

- a. Work operation is located on a utility pole, light pole, signal pole, or their appurtenances.
- b. Work operations are 60 minutes or less.
- c. Speed limit is 45 mph or less.
- d. No encroachment by any part of the work activities and equipment within an area bounded by 2 feet outside the edge of travel way and
- e. Aerial lift equipment in the work area has high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- f. Volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic control officer.
- q. Adequate precautions are taken to prevent parts, tools, equipment and other objects from falling into open lanes of traffic.
- h. Other Governmental Agencies, Rail facilities, or Codes may require a greater clearance. The greater clearance required prevails as the rule.

OPTION 3 (OVERHEAD WORK ADJACENT TO AN OPEN TRAFFIC LANE)

Overhead work adjacent to an open traffic lane is allowed if all of the following conditions are met:

- a. Work operation is located on a utility pole, light pole, signal pole, or their appurtenances.
- b. Work operations are 1 day or less.
- c. Speed limit is 45 mph or less.
- d. No encroachment by any part of the work activities and equipment within 2 foot from the edge of travel way up to 18' height.
 - Above 18' in height, no encroachment by any part of the work activities and equipment over the open traffic lane (except as allowed in Option 2 for work operations of 60 minutes or less).
- e. Aerial lift equipment in the work area has high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- f. Volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic control officer.
- g. Adequate precautions are taken to prevent parts, tools, equipment and other objects from falling into open lanes of traffic.
- h. Other Governmental Agencies, Rail facilities, or Codes may require a greater clearance. The greater clearance required prevails as the rule.

OPTION 4 (OVERHEAD WORK MAINTAINING TRAFFIC WITH NO ENCROACHMENT BELOW THE OVERHEAD WORK AREA)

Traffic shall be detoured, shifted, diverted or paced as to not encroach in the area directly below the overhead work operations in accordance with the appropriate standard index drawing or detailed in the plans. This option applies to, but not limited to, the following construction activities:

- a. Beam, girder, segment, and bent/pier cap placement.
- b. Form and falsework placement and removal.
- c. Concrete placement.
- d. Railing construction located at edge of deck.
- e. Structure demolition.

OPTION 5 (CONDUCTOR/CABLE PULLING ABOVE AN OPEN TRAFFIC LANE)

Overhead cable and/or de-energized conductor installations initial pull to proper tension shall be done in accordance with the appropriate Standard Index or temporary traffic control plan.

Continuous pulling operations of secured cable and/or conductors are allowed over open lane(s) of traffic with no encroachment by any part of the work activities, materials or equipment within the minimal vertical clearance above the travel way. The utility shall take precautions to ensure that pull ropes and conductors/cables at no time fall below the minimum vertical clearance.

On Limited Access facilities, a site specific temporary traffic control plan is required. The temporary traffic control plan shall include:

- a. The temporary traffic control set up for the initial pulling of the pull rope
- b. During pulling operations, advance warning consisting of no less than a Changeable Message Sign upstream of the work area with alternating messages, "Overhead Work Ahead" and "Be Prepared to Stop" followed by a traffic control officer and police vehicle with blue lights flashing during the pulling operation.

RAILROADS

Railroad crossings affected by a construction project should be evaluated for traffic controls to reduce queuing on the tracks. The evaluation should include as a minimum: traffic volumes, distance from the tracks to the intersections, lane closure or taper locations, signal timing, etc.

SIGHT DISTANCE

Tapers: Transition tapers should be obvious to drivers. If restricted sight distance is a problem (e.g., a sharp vertical or horizontal curve), the taper should begin well in advance of the view obstruction. The beginning of tapers should not be hidden behind curves.

Intersections: Traffic control devices at intersections must provide sight distances for the road user to perceive potential conflicts and to traverse the intersection safely. Construction equipment and materials shall not restrict intersection sight distance.

ABOVEGROUND HAZARD

Aboveground hazards (see definitions) are to be considered work areas during working hours and treated with appropriate work zone traffic control procedures. During nonworking hours, all objects, materials and equipment that constitute an aboveground hazard must be stored/placed outside the travel way and clear zone or be shielded by a barrier or crash cushion.

For aboveground hazards within a work zone the clear zone required should be based on the regulatory speed posted during construction.

CLEAR ZONE WIDTHS FOR WORK ZONES						
WORK ZONE SPEED (MPH)	TRAVEL LANES & MULTILANE RAMPS (feet)	AUXILIARY LANES & SINGLE LANE RAMPS (feet)				
60-70	30	18				
55	24	14				
45-50	18	10				
30-40	14	10				
ALL SPEEDS CURB & GUTTER	4' BEHIND FACE OF CURB	4' BEHIND FACE OF CURB				

SUPERELEVATION

Horizontal curves constructed in conjunction with work zone traffic control should have the required superelevation applied to the design radii. Under conditions where normal crown controls curvature, the minimum radii that can be applied are listed in the table below.

MINIMUM RADII FOR					
NORMAL CROWN					
WORK ZONE POSTED SPEED	MINIMUM RADIUS				
MPH	feet				
65	3130				
60	2400				
55	1840				
50	1390				
45	1080				
40	820				
35	610				
30	430				
Superelevate	When Smaller				
Radii is	s Used				

OVERWEIGHT/OVERSIZE VEHICLES

Restrictions to Lane Widths, Heights or Load Capacity can greatly impact the movement of over dimensioned loads. The Contractor shall notify the Engineer who in turn shall notify the State Permits Office, phone no. (850) 410-5777, at least seven calendar days in advance of implementing a maintenance of traffic plan which will impact the flow of overweight/oversized vehicles. Information provided shall include location, type of restriction (height, width or weight) and restriction time frames. When the roadway is restored to normal service the State Permits Office shall be notified immediately.

LANE WIDTHS

Lane widths of through roadways should be maintained through work zone travel ways wherever practical. The minimum widths for work zone travel lanes shall be as follows: 11' for Interstate with at least one 12' lane provided in each direction, unless formally excepted by the Federal Highway Administration; 11' for freeways; and 10' for all other facilities.

HIGH-VISIBILITY SAFETY APPAREL

All high-visibility safety apparel shall meet the requirements of the International Safety Equipment Association (ISEA) and the American National Standards Institute (ANSI) for "High-Visibility Safety Apparel", and labeled as ANSI/ISEA 107-2004 or newer. The apparel background (outer) material color shall be either fluorescent orange-red or fluorescent yellow-green as defined by the standard. The retroreflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1,000 feet. Class 3 apparel may be substituted for Class 2 apparel. Replace apparel that is not visible at 1,000 feet.

WORKERS: All workers within the right-of-way shall wear ANSI/ISEA Class 2 apparel. Workers operating machinery or equipment in which loose clothing could become entangled during operation shall wear fitted high-visibility safety apparel. Workers inside the bucket of a bucket truck are not required to wear high-visibility safety apparel.

UTILITIES: When other industry apparel safety standards require utility workers to wear apparel that is inconsistent with FDOT requirements such as NFPA, OSHA, ANSI, etc., the other standards for apparel may prevail.

FLAGGERS: For daytime activities, Flaggers shall wear ANSI/ISEA Class 2 apparel. For nighttime activities, Flaggers shall wear ANSI/ISEA Class 3 apparel.

REGULATORY SPEEDS IN WORK ZONES

Traffic Control Plans (TCP's) for all projects must include specific regulatory speeds for each phase of work. This can either be the posted speed or a reduced speed. The speed shall be noted in the TCPs; this includes indicating the existing speed if no reduction is to be made. Regulatory speeds are to be uniformly established through each phase.

In general, the regulatory speed should be established to route vehicles safely through the work zone as close as to normal highway speed as possible. The regulatory speed should not be reduced more than 10 mph below the posted speed and never below the minimum statutory speed for the class of facility. When a speed reduction greater than 10 mph is imposed, the reduction is to be done in 10 mph per 500' increments.

Temporary regulatory speed signs shall be removed as soon as the conditions requiring the reduced speed no longer exist. Once the work zone regulatory speeds are removed, the regulatory speed existing prior to construction will automatically go back into effect unless new speed limit signing is provided for in the plans.

On projects with interspaced work activities, speed reductions should be located in proximity to those activities which merit a reduced speed, and not "blanketed" for the entire project. At the departure of such activities, the normal highway speed should be posted to give the motorist notice that normal speed can be resumed.

If the existing regulatory speed is to be used, consideration should be given to supplementing the existing signs when the construction work zone is between existing regulatory speed signs. For projects where the reduced speed conditions exist for greater than 1 mile in rural areas (non-interstate) and on rural or urban interstate, additional regulatory speed signs are to be placed at no more than 1 mile intervals. Engineering judgement should be used in placement of the additional signs. Locating these signs beyond ramp entrances and beyond major intersections are examples of proper placement. For urban situations (non-interstate), additional speed signs are to be placed at a maximum of 1000' apart.

When field conditions warrant speed reductions different from those shown in the TCP the contractor may submit to the project engineer for approval by the Department, a signed and sealed study to justify the need for further reducing the posted speed, or, the engineer may request the District Traffic Operations Engineer (DTOE) to investigate the need. It will not be necessary for the DTOE to issue regulations for regulatory speeds in work zones due to the revised provisions of F.S. 316.07451(2) (b). Advisory Speed plates will be used at the option of the field engineer for temporary use while processing a request to change the regulatory speed specified in the plans when deemed necessary. Advisory speed plates cannot be used alone but must be placed below the construction warning sign for which the advisory speed is required.

For additional information, refer to the Plans Preparation Manual, Volume I, Chapter 10.

LENGTH OF LANE CLOSURES

Lane closures must not exceed the following total lengths (includes taper, buffer space and work space) in any given direction on the interstate or on state highways with a posted speed of 55 MPH or greater:

- 1. 3 miles for Rumble Striping.
- 2. 2 miles for all other operations.

DESCRIPTION:

The flagger must be clearly visible to approaching traffic for a distance sufficient to permit proper response by the motorist to the flagging instructions, and to permit traffic to reduce speed or to stop as required before entering the work site. Flaggers shall be positioned to maintain maximum color contrast between the Flagger's high-visibility safety apparel and equipment and the work area background.

Hand-Signaling Devices

STOP/SLOW paddles are the primary hand-signaling device. The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. If the STOP/SLOW paddle is placed on a rigid staff, the minimum length of the staff, measured from the bottom of the paddle to the end of the staff that rests on the ground, must not be less than 6 ft. STOP/SLOW paddles shall be at least 24 inches wide with letters at least 6 inches high and should be fabricated from light semirigid material. The background of the STOP face shall be red with white letters and border. The background of the SLOW face shall be orange with black letters and border. When used at night-time, the STOP/SLOW paddle shall be retroreflectorized.

Flag use is limited to immediate emergencies, intersections, and when working on the centerline or shared left turn lanes where two (2) flaggers are required and there is opposing traffic in the adjacent lanes. Flags, when used, shall be a minimum of 24 inches square, made of a good grade of red material, and securely fastened to a staff that is approximately 36 inches in length. When used at nighttime, flags shall be retroreflectorized red.

Flashlight, lantern or other lighted signal that will display a red warning light shall be used at night

Flagger Stations

Flagger stations shall be located far enough in advance of the work space so that approaching road users will have sufficient distance to stop before entering the work space. When used at nighttime, the flagger station shall be illuminated.

SURVEY WORK ZONES

The SURVEY CREW AHEAD symbol or legend sign shall be the principal Advance Warning Sign used for Traffic Control Through Survey Work Zones and may replace the ROAD WORK AHEAD sign when lane closures occur, at the discretion of the Party Chief.

When Traffic Control Through Work Zones is being used for survey purposes only, the END ROAD WORK sign as called for on certain 600 Series Indexes should be omitted.

Survey Between Active Traffic Lanes or Shared Left Turn Lanes

The following provisions apply to Main Roadway Traffic Control Work Zones. These provisions must be adjusted by the Party Chief to fit roadway and traffic conditions when the Survey Work Zone includes intersections.

- (A) A STAY IN YOUR LANE (MOT-1-06) sign shall be added to the Advance Warning Sign sequence as the second most immediate sign from the work area.
- (B) Elevation Surveys-Cones may be used at the discretion of the Party Chief to protect prism holder and flagger(s). Cones, if used, may be placed at up to 50' intervals along the break line throughout the work zone.
- (C) Horizontal Control-With traffic flow in the same direction, cones shall be used to protect the backsight tripod and/or instrument. Cones shall be placed at the equipment, and up to 50' intervals for at least 200' towards the flow of traffic.
- (D) Horizontal Control-With traffic flow in opposite directions, cones shall be used to protect the backsight tripod and/or instrument. Cones shall be placed at the equipment, and up to 50' intervals for at least 200' in both directions towards the flow of traffic.

SIGNS

SIGN MATERIALS

Mesh signs and non-retroreflectice vinyl signs may only be used for daylight operations. Non-retroreflectice vinyl signs must meet the requirements of Specifications Section 994.

Retroreflective vinyl signs meeting the requirements of Specification Section 994 may be used for daylight or night operations not to exceed 1 day except as noted in the standards.

Rigid or Lightweight sign panels may be used in accordance with the vendor APL drawing for the sign stand to which they are attached.

INTERSECTING ROAD SIGNING

Signing for the control of traffic entering and leaving work zones by way of intersecting crossroads shall be adequate to make drivers aware of work zone conditions. When Work operations exceed 60 minutes, place the ROAD WORK AHEAD sign on the side street entering the work zone.

ADJOINING AND/OR OVERLAPPING WORK ZONE SIGNING

Adjoining work zones may not have sufficient spacing for standard placement of signs and other traffic control devices in their advance warning areas or in some cases other areas within their traffic control zones. Where such restraints or conflicts occur or are likely to occur, one of the following methods will be employed to avoid conflicts and prevent conditions that could lead to misunderstanding on the part of the traveling public as to the intended travel way by the traffic control procedure applied:

- (A) For scheduled projects the engineer in responsible charge of project design will resolve anticipated work zone conflicts during the development of the project traffic control plan. This may entail revision of plans on preceding projects and coordination of plans on concurrent projects.
- (B) Unanticipated conflicts arising between adjoining in progress highway construction projects will be resolved by the Resident Engineer for projects under his residency, and, by the District Construction Engineer for in progress projects under adjoining residencies.
- (C) The District Maintenance Engineer will resolve anticipated and occurring conflicts within scheduled maintenance operations.
- (D) The Unit Maintenance Engineer will resolve conflicts that occur within routine maintenance works; between routine maintenance work, unscheduled work and/or permitted work; and, between unit controlled maintenance works and highway construction projects.

SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING

Existing or temporary traffic control signs that are no longer applicable or are inconsistent with intended travel paths shall be removed or fully covered.

Sign blanks or other available coverings must completely cover the existing sign. Rigid sign coverings shall be the same size as the sign it is covering, and bolted in a manner to prevent

Sign covers are incidental to work operations and are not paid for separately.

SIGNING FOR DETOURS, LANE SHIFTS AND DIVERSIONS

Detours should be signed clearly over their entire length so that motorists can easily determine how to return to the original roadway. The reverse curve (W1-4) warning sign should be used for the advanced warning for a lane shift. A diversion should be signed as a lane shift.

EXTENDED DISTANCE ADVANCE WARNING SIGN

Advance Warning Signs shall be used at extended distance of one-half mile or more when limited sight distance or the nature of the obstruction may require a motorist to bring their vehicle to a stop. Extended distance Advanced Warning Signs may be required on any type roadway, but particularly be considered on multilane divided highways where vehicle speed is generally in the higher range (45 MPH or more).

UTILITY WORK AHEAD SIGN

The UTILITY WORK AHEAD (W21-7) sign may be used as an alternate to the ROAD WORK AHEAD or the ROAD WORK XX FT (W20-1) sign for utility operations on or adjacent to a

LENGTH OF ROAD WORK SIGN

The length of road work sign (G20-1) bearing the legend ROAD WORK NEXT MILES is required for all projects of more than 2 miles in length. The number of miles entered should be rounded up to the nearest mile. The sign shall be located at begin construction points.

SPEEDING FINES DOUBLED WHEN WORKERS PRESENT SIGN

The SPEEDING FINES DOUBLED WHEN WORKERS PRESENT sign should be installed on all projects, but may be omitted if the work operation is less than 1 day. The placement should be 500 feet beyond the ROAD WORK AHEAD sign or midway to the next sign whichever is less.

GROOVED PAVEMENT AHEAD SIGN

The GROOVED PAVEMENT AHEAD sign is required 500 feet in advance of a milled or grooved surface open to traffic. The W8-15P placard shall be used in conjuction with the GROOVED PAVEMENT AHEAD sign.

END ROAD WORK SIGN

The END ROAD WORK sign (G20-2) should be installed on all projects, but may be omitted where the work operation is less than 1 day. The sign should be placed approximately 500 feet beyond the end of a construction or maintenance project unless other distance is called for in the plans. When other Construction or Maintenance Operations occur within 1 mile this sign should be omitted and signing coordinated in accordance with Index No. 600. ADJOINING AND/OR OVERLAPPING WORK ZONE SIGNING.

PROJECT INFORMATION SIGN

The Project information sign shall be installed when called for in the plans.

- b. Pedestrian advanced warning or pedestrian regulatory signs mounted on sign supports in accordance with the vendor drawing shown on the APL.
- c. Median barrier mounted signs per Index 11871.

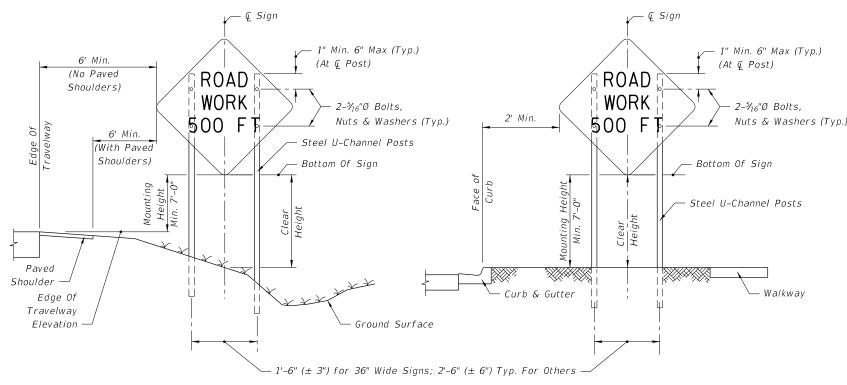
TEMPORARY SIGN SUPPORT NOTE:

1. Unless shielded with barrier or outside of the Clear Zone, signs mounted on temporary supports or barricades, and barricade/sign combination must be crashworthy in accordance with NCHRP 350 requirements and included on the Approved Products List (APL).

POST MOUNTED SIGN NOTES:

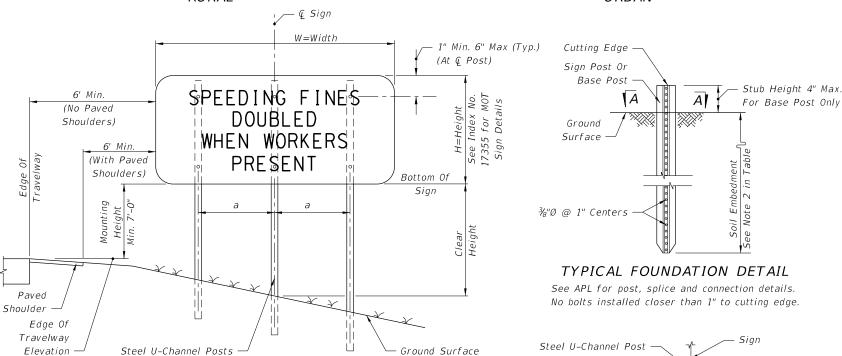
- 1. Use only approved systems listed on the Department's Approved Products List (APL).
- 2. Manufacturers seeking approval of U-Channel and steel square tube sign support assemblies for inclusion on the Approved Products List (APL) must submit a APL application, design calculations (for square tube only), and detailed drawings showing the product meets all the requirements of this Index.
- 3. Provide 3 lb/ft Steel U-Channel Posts with a minimum section modulus of 0.43 in³ for 60 ksi steel, a minimum section modulus of 0.37 in³ for 70 ksi steel, or a minimum section modulus of 0.34 in³ for 80 ksi steel
- 4. Provide 4 lb/ft Steel U-Channel Posts with a minimum section modulus of 0.56 in³ for 60 ksi steel, or a minimum section modulus of 0.47 in³ for 70 ksi or 80 ksi
- 5. U-channel posts shall conform with ASTM A 499, Grade 60, or ASTM A 576, Grade 1080 (with a minimum yield strength of 60 ksi). Square tube posts shall conform with ASTM A 653, Grade 50, or ASTM A 1011, Grade 50.
- 6. Sign attachment bolts, washers, nuts, and spacers shall conform with ASTM A307 or A 36.
- 7. For diamond warning signs with supplement plaque (up to 5 ft² in area), use 4 lb/ft posts for up to 10 ft Clear Height (measure to the bottom of diamond warning sign).
- 8. Install 4 lb/ft Steel U-Channel Posts with approved breakaway splice in accordance with the manufacturer's detail shown on the APL.
- 9. The contractor may install 3 lb/ft Steel U-Channel Posts with approved breakaway splice in accordance with the manufacturer's detail shown on the APL.
- 10. Install all posts plumb.
- 11. The contractor may set posts in preformed holes to the specified depth with suitable backfill tamped securely on all sides, or drive 3 lb/ft sign posts and any size base post in accordance with the manufacturer's detail shown on the APL.

DESCRIPTION:



2 POST SIGN SUPPORT MOUNTING DETAILS (SINGLE POST SIMILAR) RURAL

2 POST SIGN SUPPORT MOUNTING DETAILS (SINGLE POST SIMILAR) URBAN



3 POST SIGN SUPPORT MOUNTING DETAILS

Where W = 48": $a = 1' - 4\frac{1}{2}"$ $(\pm 1")$ W = 60'': $a = 1' - 9'' (\pm 1'')$ W = 72'': $a = 2' - 1'' (\pm 1'')$

SECTION A-A (SCHEMATIC) Lock Washer

 $(\frac{5}{16}"$ Nominal Size)

5/16" Steel Hex Nut

SIGN ATTACHMENT DETAIL (WITHOUT Z-BRACKET)

5/₁₆" Steel Hex

Head Bolt

Flat Washer

(5/16" Nominal Size)

POST AND FOUNDATION TABLE FOR WORK ZONE SIGNS

SIGN SHAPE	SIGN SIZE	NUMBER OF STEEL
SIGN SHAPE	(inches)	U CHANNEL POSTS
Octagon	30x30	1
	36x36x36	1
Triangle	48x48x48	1
	60x60x60	2
	24x18	1
	24x30	1
	30x24	1
	36 x 18	1
	36x24	1
Rectangle	48 x 18	1
]	48x24	1
(W x H)	36 x 48	2
	48x30	2
	48x36	2
	54x36	2
	48x60	3
	60x54	2 3 3 3
	72x48	3
	120x60*	4*
	30x30	1
Square	36 x 36	2
	48 x 48	2
Diamond (See Note 7)	48×48	2
Circle	36Ø	2

Notes For Table:

- 1. Use 3 lb/ft posts for Clear Height up to 10' and 4 lb/ft posts for Clear Height up to 12'.
- Use 4 lb/ft U-channel sign post with a mounting height of 7' min. and 8' max. Attach sign panel using Z-bracket detail on Sheet 6.
- 2. Minimum foundation depth is 4.0' for 3 lb/ft posts and 4.5' for 4 lb/ft posts.
- 3. For both 3 lb/ft and 4 lb/ft base or sign posts installed in rock, a minimum cumulative depth of 2' of rock layer is required.
- 4. The soil plate as shown on the APL vendor drawing is not required for base posts or sign posts installed in existing rock (as defined in Note 3), asphalt roadway, shoulder pavement or soil under sidewalk.

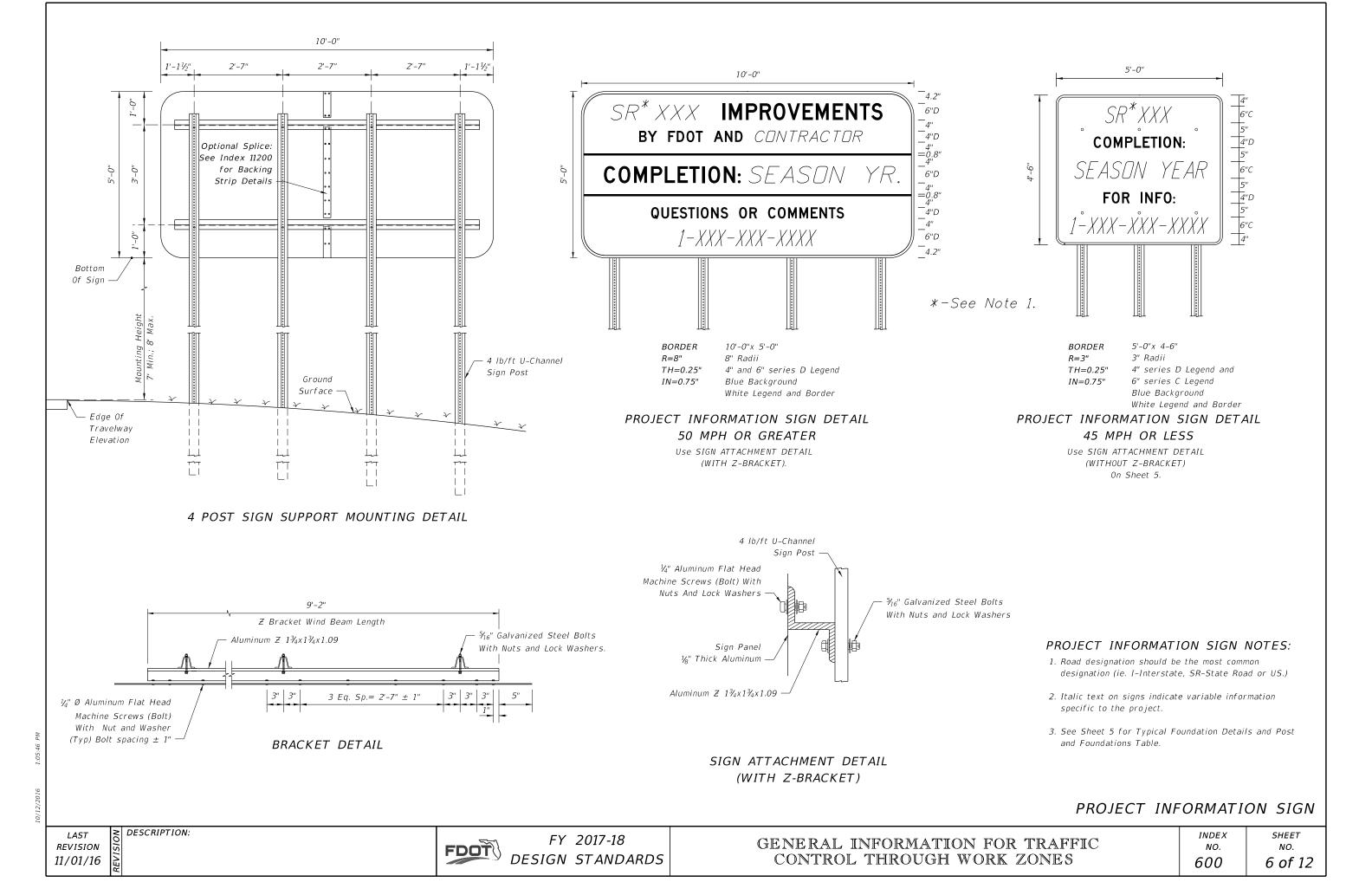
WORK ZONE SIGN SUPPORTS

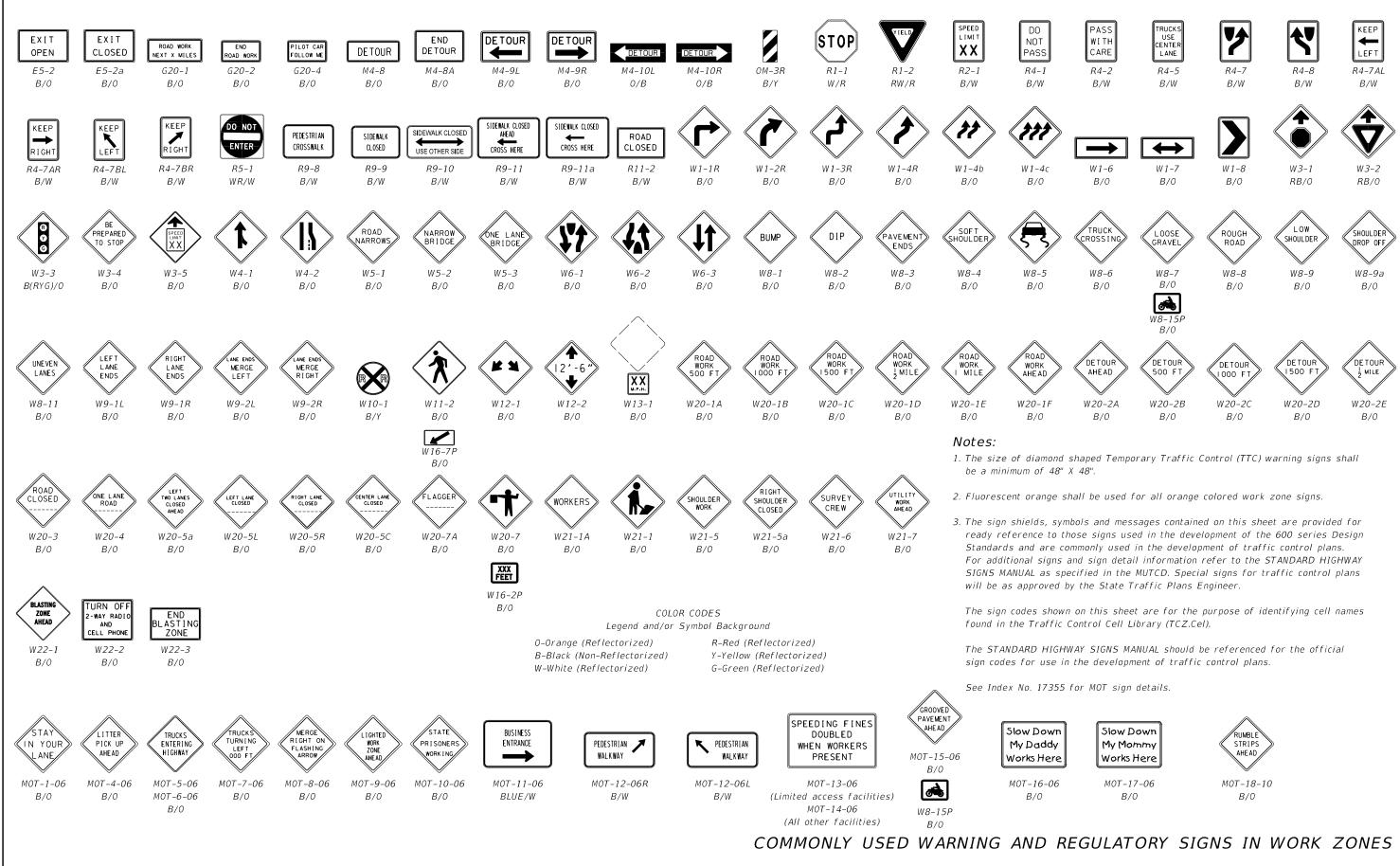
REVISION 11/01/16

FY 2017-18 DESIGN STANDARDS GENERAL INFORMATION FOR TRAFFIC

INDEX NO. 600

NO. 5 of 12

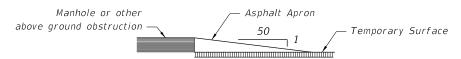




MANHOLES/CROSSWALKS/JOINTS

Manholes extending 1" or more above the travel lane and crosswalks having an uneven surface greater than $\frac{1}{4}$ " shall have a temporary asphalt apron constructed as shown in the diagram below.

All transverse joints that have a difference in elevation of 1" or more shall have a temporary asphalt apron constructed as shown in the diagram below.



The apron is to be removed prior to constructing the next lift of asphalt. The cost of the temporary asphalt shall be included in the contract unit price for Maintenance of Traffic, LS.

REMOVING PAVEMENT MARKINGS

Existing pavement markings that conflict with temporary work zone delineation shall be removed by any method approved by the Engineer, where operations exceed one daylight period. Remove conflicting pavement marking using a method that will not damage the surface texture of the pavement, unless the pavement will be restored prior to traffic use. Painting over existing pavement markings with black paint or spraying with asphalt shall not be accepted as substitute for removal or obliteration. Full pavement width overlays of either a structural or friction course (non-final surface) are an acceptable alternate means to achieve removal.

SIGNALS

Existing traffic signal operations that require modification in order to carry out work zone traffic control shall be included in the TCP and be approved by the District Traffic Operations

Maintain all existing actuated or traffic responsive mode signal operations for main and side street movements for the duration of the Contract and require restoration of any loss of detection within 12 hours. The contractor shall select only detection technology listed on the Department's Approved Products List (APL) and approved by the Engineer to restore detection capabilities.

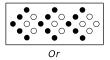
ADVANCE WARNING ARROW BOARDS

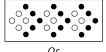
An arrow board in the arrow or chevron mode shall be used only for stationary or moving lane closures on multilane roadways.

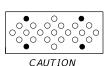
For shoulder work, blocking the shoulder, for roadside work near the shoulder, or for temporarily closing one lane on a two-lane, two-way roadway, an arrow board shall be used only in the caution mode.

A single arrow board shall not be used to merge traffic laterally more than one lane. When arrow boards are used to close multiple lanes, a single board shall be used at the merging taper for each closed lane.

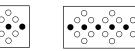
When Advance Warning Arrow Boards are used at night, the intensity of the flashers shall be reduced during darkness when lower intensities are desirable.













MOVE/MERGE LEFT

MOVE/MERGE RIGHT MOVE/MERGE RIGHT OR LEFT

- Minimum Required Lamps Additional Lamps Allowed
 - *MODES*

PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS)

The PCMS can be used to:

- 1. Supplement standard signing in construction or maintenance work zones
- 2. Reinforce static advance warning messages.
- 3 Provide motorists with updated guidance information.

PCMS should be placed approx, 500 to 800 feet in advance of the work zone conflicts or 0.5 to 2 miles in advance of complex traffic control schemes which require new and/or unusual traffic maneuvers.

If PCMS are to be used at night, the intensity of the flashers shall be reduced during darkness when lower intensities are desirable.

For additional information refer to the FDOT Plans Preparation Manual, Volume I, Chapter 10.

TRUCK/TRAILER-MOUNTED ATTENUATORS

Truck/Trailer-mounted attenuators (TMA) can be used for moving operations and short-term stationary operations. For moving operations, see Index Nos. 607 and 619. For short-term, stationary operations, see Part VI of the MUTCD.

CHANNELIZING DEVICES

Channelizing devices for work zone traffic control shall be as prescribed in Part VI of the MUTCD, subject to supplemental revisions provided in the contract documents and Index 600 requirements. Lighting Devices must not be used to supplement channelization.

CHANNELIZING DEVICE CONSISTENCY

Barricades, vertical panels, cones, tubular markers and drums shall not be intermixed within either the lateral transition or within the tangent alignment.

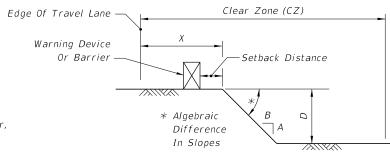
DROP-OFF CONDITION NOTES

- 1. These conditions and treatments can be applied only in work areas that fall within a properly signed work zone.
- 2. When drop-offs occur within the clear zone due to construction or maintenance activities, protection devices are required (See Table 1). A drop-off is defined as a drop in elevation, parallel to the adjacent travel lanes, greater than 3" with slope (A:B) steeper than 1:4 and an algebraic difference in slopes greater than 0.25 (See Drop-off Condition Detail).
- 3. Drop-offs may be mitigated by placement of slopes with optional base material per Specifications Section 285. Slopes shallower than 1:4 may be required to avoid algebraic difference in slopes greater than 0.25. Include the cost for the placement and removal of the material in Maintenance of Traffic, LSD. Use of this treatment in lieu of a barrier is not eligible for CSIP consideration. Conduct daily inspections for deficiencies related to erosion, excessive slopes, rutting or other adverse conditions. Repair any deficiencies immediately.
- 4. Distance X is to be the maximum practical under project conditions.
- 5. For Clear Zone widths, see Index No. 600, Sheet 3.
- 6. For Setback Distance, refer to the Standard Index drawing of the selected barrier for the required deflection space.
- 7. Distance from the travel lane to the barrier or warning device should be maximum practical for project conditions.
- 8. For Conditions 1 and 3 provided in Table 1, any drop- off condition that is created and restored within the same work period will not be subject to the use of barriers; however, warning devices will be required.
- 9. When permanent curb heights are \geq 6", no warning device will be required. For curb heights < 6", see Table 1.
- 10. Where a barrier is specified, any of the types below may be used in accordance with the applicable Index:

Index No.	Description
400	Guardrail
412	Low Profile Barrier
414	Type K Temporary Concrete Barrier System
415	Temporary Concrete Barrier
For other	types of temporary barriers see the APL.

11. Drop- off condition and protection requirements apply to all speeds.

Table 1 Drop-off Protection Requirements						
Condition	X (ft)	D (in.)	Device Required			
1	0-12	> 3	Barrier (See Note 8)			
2	> 12-CZ	> 3 to ≤ 5	Warning Device			
3	0-CZ	> 5	Barrier (See Note 8)			
4		of Bridge or Wall Barrier	Barrier			
5		f portions of ge Deck	Barrier			



DROP-OFF CONDITION DETAIL

WARNING DEVICE NOTES

- 1. The following are defined as acceptable warning devices:
- a. Vertical panel
- b. Type I Or Type II barricades
- c. Drum

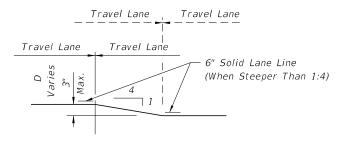
DESCRIPTION:

- d. Cone (where allowed)
- e. Tubular marker (where allowed)
- 2. Use the warning device spacing shown in Table 2.

Table 2						
Warning Device Spacing						
	Max.	Distance B	etween Dev	ices (ft)		
Speed (mph)	Cones or Tubular Markers Type I or Type II Barricades or Vertical Panels or Drums					
	Taper	per Tangent Taper Tangent				
25	25	50	25	50		
30 to 45	25	50	30	50		
50 to 70	25	50	50	100		

TRAVEL LANE TREATMENT FOR MILLING OR RESURFACING NOTES

- 1. This treatment applies to resurfacing or milling operations between adjacent travel lanes.
- 2. Whenever there is a difference in elevation between adjacent travel lanes, the W8-11 sign with "UNEVEN LANES" is required at intervals of $\frac{1}{2}$ mile maximum.
- 3. If D is 1½" or less, no treatment is required.
- 4. Treatment allowed only when D is 3" or less.
- 5. If the slope is steeper than 1:4 (not to be steeper than 1:1), the R4-1 and MOT-1-06 signs shall be used as a supplement to the W8-11; this condition should never exceed 3 miles in length.



TRAVEL LANE TREATMENT FOR MILLING OR RESURFACING DETAIL

PEDESTRIAN AND/OR BICYCLIST WAY DROP-OFF CONDITION NOTES

- 1. A pedestrian and/or bicyclist way drop-off is defined as:
- a. a drop in elevation greater than 10" that is closer than 2' from the edge of the pedestrian or bicyclist way
- b. a slope steeper than 1:2 that begins closer than 2' from the edge of the pedestrian or bicyclist way when the total drop-off is greater than 60"
- 2. Protect any drop-off adjacent to a pedestrian or bicyclist way with warning devices, temporary barrier wall, or approved handrail.

DROP-OFFS IN WORK ZONES

LAST REVISION 11/01/16







Standard Spacing

 $\overline{}$

 \Longrightarrow

BUSINESS

ENTRANCE

common driveway entrance.

DESCRIPTION:

40'

Reduced

Spacina

Index 17355 may be used when approved by the Engineer.

which is often the case with resurfacing type projects.

1. For single business entrances, place one 24" x 36" business sign for each

driveway entrance affected. Signs shall show specific business names. Logos

may be provided by business owners. Standard BUSINESS ENTRANCE sign in

2. When several businesses share a common driveway entrance, place one 24" x 36"

standard BUSINESS ENTRANCE sign in accordance with Index 17355 at the

3. Channelizing devices shall be placed at a reduced spacing on each side of the driveway entrance, but shall not restrict sight distance for the driveway users.

4. Business entrance signs are intended to guide motorist to business entrances moved/modified or disturbed during construction projects. Business entrance

signs are not required where there is minimal disruption to business driveways

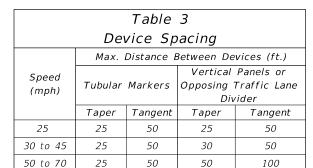
PLACEMENT OF BUSINESS ENTRANCE SIGNS AND

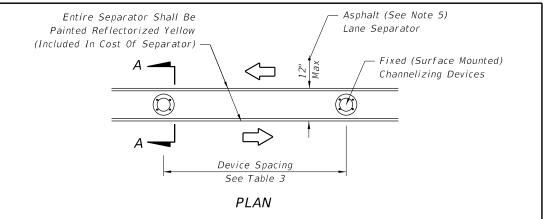
CHANNELIZING DEVICES AT BUSINESS ENTRANCE

Reduced

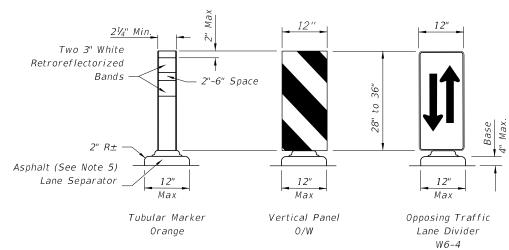
Spacina







B/0



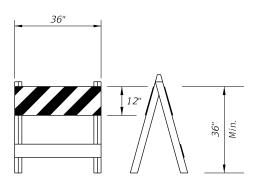
FIXED (SURFACE MOUNTED) CHANNELIZING DEVICES

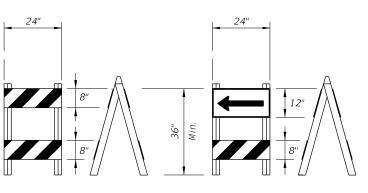
SECTION AA

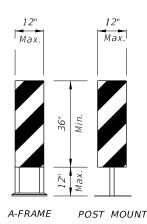
- 1. Temporary lane separators shall be supplemented with any of the following approved fixed (surface mounted) channelizing devices: tubular markers, vertical panels, or opposing traffic lane divider panels. Opposing traffic lane divider panels (W6-4) shall only be used as center lane dividers to separate opposing vehicular traffic on a two-lane, two-way operation. Tubular Markers, Vertical Panels and Opposing Traffic Lane Divider panels shall not be intermixed within the limits where the temporary lane separator is used. The connection between the channelizing device and the temporary lane separator curb shall hold the channelizing device in a vertical position.
- 2. Reflectorized materials shall have a smooth sealed outer surface which will display the same approximate color day and night. Furnish channelizing devices having retroreflective sheeting meeting the requirements of Section 990.
- 3. 12" openings for drainage shall be constructed in the asphalt and portable temporary lane separator at a maximum spacing of 25' in areas with grades of 1% or less or 50' in areas with grades over 1% as directed by the Engineer.
- 4. Tapered ends shall be used at the beginning and end of each run of the temporary lane separator to form a gradual increase in height from the pavement level to the top of the temporary lane separator.
- 5. The Contractor has the option of using portable temporary lane separators containing fixed channelizing devices in lieu of the temporary asphalt separator and channelizing devices detailed on this sheet. The portable temporary lane separator shall come in portable sections that can be connected to maintain continuous alignment between the separate curb sections. Each temporary lane separator section shall be 36 inches to 48 inches in total length. Portable temporary lane separators shall duplicate the color of the pavement marking. Portable temporary lane separators shall be one of those listed on the Approved Products List.
- 6. Any damage to existing pavement caused by the removal of temporary lane separator shall be satisfactorily repaired and the cost of such repairs are to be included in the cost of Maintenance of Traffic, LS.

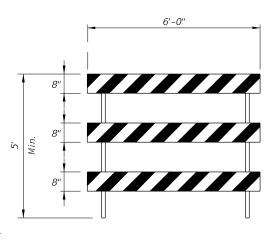
TEMPORARY LANE SEPARATOR

FY 2017-18









CONES TUBULAR MARKER PLASTIC DRUMS

TUBULAR NON-FIXED MARKER TO BE USED DURING DAYLIGHT ONLY TYPE I BARRICADE

TYPE II BARRICADE

DIRECTION INDICATOR BARRICADE VERTICAL PANEL

TYPE III BARRICADE

CHANNELIZING DEVICE NOTES

- 1. The details shown on this sheet are for the following purposes:
 - (a) For ease of identification and
 - (b) To provide information that supplements or supersedes that provided by the MUTCD.
- 2. The Type III Barricade shall have a unit length of 6'-0" only. When barricades of greater lengths are required those lengths shall be in multiples of the 6'-0" unit.
- 3. No sign panel should be mounted on any channelizing device unless the channelizing device/sign combination was found to be crashworthy and the sign panel is mounted in accordance with the vendor drawing for the channelizing device shown on the APL.
- 4. Ballast shall not be placed on top rails or any striped rails or higher than 13" above the driving surface.
- 5. The direction indicator barricade may be used in tapers and transitions where specific directional guidance to drivers is necessary. If used, direction indicator barricades shall be used in series to direct the driver through the transition and into the intended travel lane.
- 6. The splicing of sheeting is not permitted on either channelizing devices or MOT signs.
- 7. For rails less than 3'-0" long, 4" stripes shall be used.
- 8. Cones shall

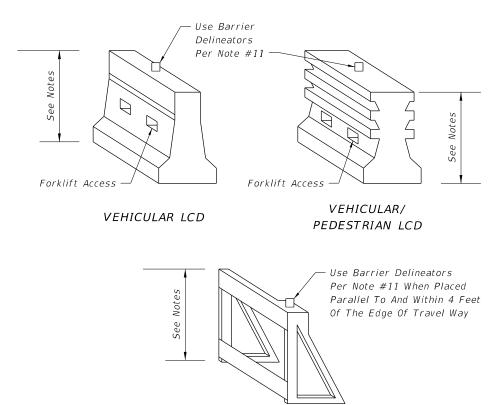
DESCRIPTION:

- a. Be used only in active work zones where workers are present.
- b. Not exceed 2 miles in length of use at any one time.
- c. Be reflectorized as per the MUTCD with Department-approved reflective collars when used at night.

- 9. Vehicular longitudinal channelizing devices shall not exceed 36" in height. For vehicular longitudinal channelizing devices (LCDs) less than 32" in height, the LCD shall be supplemented with approved fixed (surface mounted) channelizing devices (tubular markers, vertical panels, etc.) along the run of the LCD, at the ends, at 50' centers on tangents, and 25' centers on radii. The cost of the fixed supplemented channelizing devices shall be included in the cost of the LCD. LCDs less than 32" in height shall not be used for speeds greater than 45 mph.
- 10. For pedestrian longitudinal channelizing devices, the device shall have a minimum of 8" continuous detectable edging above the walkway. A gap not exceeding a height of 2" is allowed to facilitate drainage. The top surface of the device shall be a minimum height of 32" and have a \(\gamma_8" \) or less difference in any plane at all connection points between the devices to facilitate hand trailing. The bottom and the top surface of the device shall be in the same vertical plane. If pedestrian dropoff protection is required, the device shall have a footprint or offset of at least 2', otherwise the device must be at least 42" in height above the walkway and be anchored or ballasted to withstand a 200 lb lateral point load at the top of the device.

11. Barrier Delineators:

Meet Specifications Section 993. Place on top of unit so that retroreflective sheeting faces vehicular traffic. Spacing must be a maximum of 50' centers in transitions, 100' centers on curves and 200' centers on tangents. Color must match adjacent longitudinal pavement marking.



PEDESTRIAN LCD

LONGITUDINAL CHANNELIZING DEVICE

IDENTIFICATIONS - CHANNELIZING DEVICES

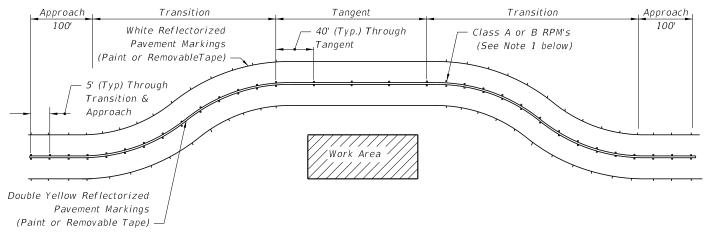
LAST REVISION 11/01/16



FY 2017-18 DESIGN STANDARDS

TEMPORARY SUBSTITUTION OF RPM'S FOR PAINT OR REMOVABLE TAPE

- 1. Paint or removable tape are the required work zone markings and shall be placed in accordance with the plans and specifications. If these work zone markings can not be placed due to weather restrictions identified in the appropriate specification, temporary substitution of RPM's for work zone markings will be allowed until the weather condition permits the placement of appropriate work zone marking. Temporary substitution of RPM's for work zone markings will be allowed for equipment malfunction, placement of the appropriate work zone marking shall be made within 3 days, or sooner if possible. When RPM's are used as a temporary substitution for work zone markings the following shall apply:
- a. Lane widths identified in the plans must be maintained. Placement of RPM's should consider where work zone markings will be placed as soon as conditions allow. If the RPM's can not be placed so that the lane width is maintained after the placement of the work zone markings, the conflicting RPM's must be removed.
- b. The color of the RPM body and the reflective face shall conform to the color of the marking for which they substitute.
- c. In work zones, B RPM's must be used to form lane lines, edge lines and temporary gore areas as a temporary substitute for paint or removable tape at the spacing shown above.

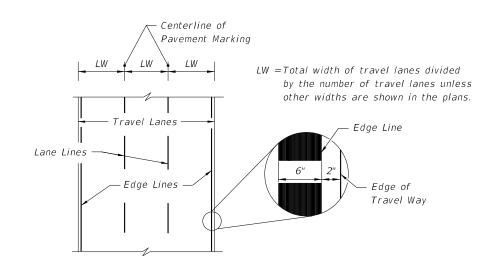


USE OF RPMS TO SUPPLEMENT PAINT OR REMOVABLE TAPE IN WORK ZONES

- 1. RPM's shall be installed as a supplement to:
- a. All lane lines.
- b. Edge lines in transition & approach areas.
- c. Edge lines of gore areas.
- 2. Placement of RPM's should be as shown in Index No. 17352 with the following exceptions: RPM's shall be placed at 5 feet center to center in approach and transition areas.

NOTES FOR RETROREFLECTIVE PAVEMENT MARKERS

- 1. The color of the raised pavement marker under both day and night conditions shall conform to the color of the marking for which they serve as a positioning guide, or for which they supplement or substitute.
- 2. To provide contrast on concrete pavement, or light asphalt, the five (5) white RPM's shall be followed by five black RPM's. The spacing between RPM's shall be 2'-6". Black RPM's will not be required for contrast with yellow RPM's.
- 3. RPM's used to supplement lane lines are to be paid for as Reflective Pavement Marker (Temporary), EA. RPM's used as a temporary substitute for paint or removable tape due to weather restrictions are to be paid for as Reflective Pavement Marker (Temporary), EA. RPM's used as a temporary substitute for paint or removable tape due to equipment malfunction are to be placed at the Contractor's expense.



PLACEMENT OF PAVEMENT MARKINGS

PAVEMENT MARKINGS

REVISION 01/01/16

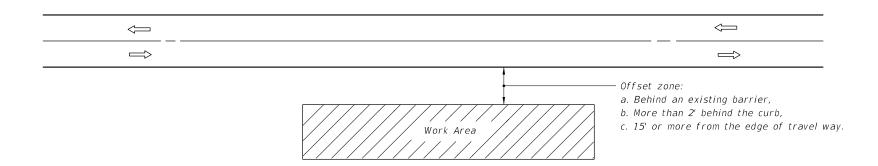
DESCRIPTION:

FY 2017-18 DESIGN STANDARDS

GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

INDEX NO. 600

SHEET NO. 12 of 12



GENERAL NOTES

- 1. If the work operation (excluding establishing and terminating the work area) requires that two or more work vehicles cross the offset zone in any one hour, traffic control will be in conformance with Index No. 602.
- 2. No special signing is required.
- 3. When a side road intersects the highway within the work area, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 4. When construction activities encroach on a sidewalk refer to Index No. 660.
- 5. For general TCZ requirements and additional information, refer to Index No. 600.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE BEHIND AN EXISTING BARRIER, MORE THAN 2' BEHIND THE CURB, OR 15' OR MORE FROM THE EDGE OF TRAVEL WAY.

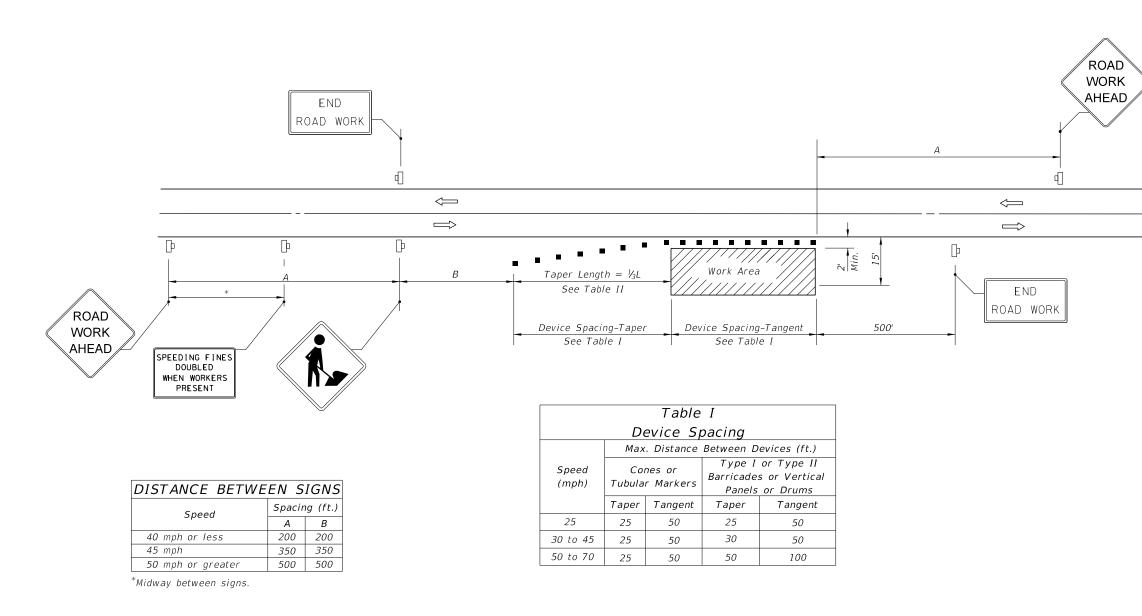
SYMBOLS



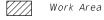
Work Area



Lane Identification + Direction of Traffic



SYMBOLS



- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Lane Identification + Direction of Traffic

DESCRIPTION:

GENERAL NOTES

- 1. When four or more work vehicles enter the through traffic lanes in a one hour period or less (excluding establishing and terminating the work area), the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs, see Index No. 603.
- 2. SHOULDER WORK sign may be used as an alternate to the WORKER symbol sign only on the side where the shoulder work is being performed.
- 3. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 4. For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

- 1. Signs and channelizing devices may be omitted if all of the following conditions are met:
- a. Work operations are 60 minutes or less.
- b. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

Taper Length - Shoulder						
Speed		Natas				
(mph)	8'	10'	12'	Notes		
	Shldr.	Shldr.	Shldr.			
25	28	35	42			
30	40	50	60	$L = \frac{WS^2}{}$		
35	55	68	82	60		
40	72	90	107			
45	120	150	180			
50	133	167	200			
55	147	183	220			

L=WS

Table II

187 minimum shoulder width

160

173

65

70

 V_3L = Length of shoulder taper in feet

200

217

233

240

260

280

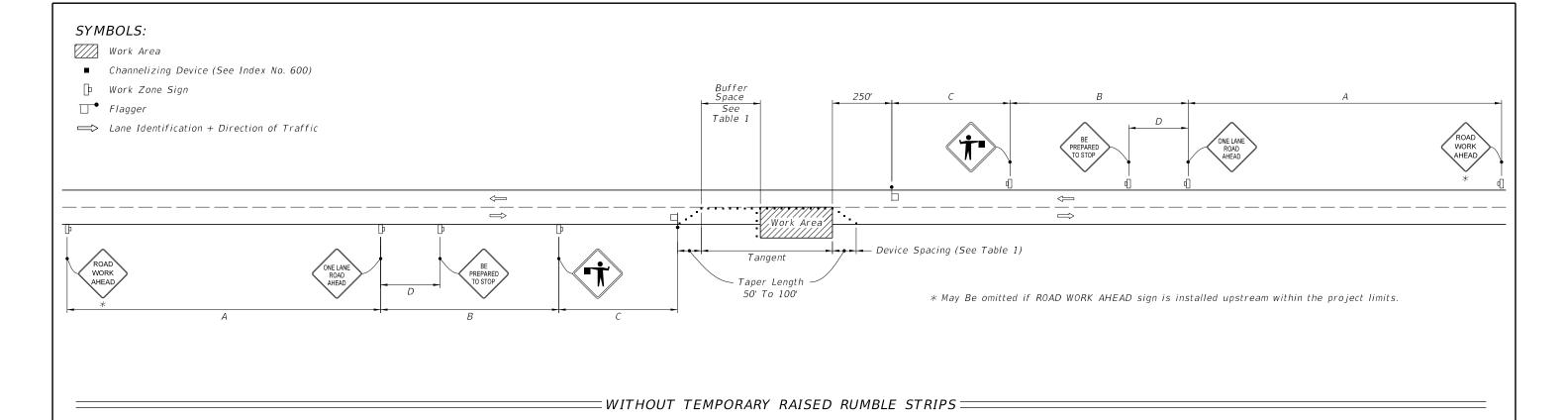
- W = Width of total shoulder in feet(combined paved and unpaved width)
- S = Posted speed limit (mph)

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF TRAVEL WAY.

REVISION 07/01/15





GENERAL NOTES:

- 1. Special Conditions may be required in accordance with these notes and the following sheets:
- A. Railroad Crossings:
- a. If an active railroad crossing is located closer to the Work Area than the queue length plus 300 feet, extend the Buffer Space as shown on Sheet 3.
- b. If the queuing of vehicles across an active railroad crossing cannot be avoided, provide a uniformed traffic control officer or flagger at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic train warning devices are in place.
- B. If the Work Area encroaches on the Centerline, use the Layout for Temporary Lane Shift to Shoulder on Sheet 3 only if the Existing Paved Shoulder width is sufficient to provide for an 11' lane between the Work Area and the Edge of Existing Paved Shoulder. Reduce the posted speed when appropriate.
- 2. Temporary Raised Rumble Strips:
- A. Use when both of the following conditions are met concurrently: a. Existing Posted Speed is 55 mph or greater;
- b. Work duration is greater than 60 minutes.
- B. Use a consistent Strip color throughout the work zone.
- C. Place each Rumble Strip Set transversely across the lane at locations
- D. Use Option 1 or Option 2 as shown on Sheet 2. Use only one option throughout work zone.
- 3. Additional one-way control may be provided by the following means:
- A. Flag-carrying vehicle;

DESCRIPTION:

- B. Official vehicle;
- C. Pilot vehicles;
- D. Traffic signals.

When flaggers are the sole means of one-way control, the flaggers must be in sight of each other or in direct communication at all times.

- 4. When a side road intersects the highway within the TTC zone, place additional TTC devices in accordance with other applicable TCZ Indexes.
- 5. The two channelizing devices directly in front of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- 6. When Buffer Space cannot be attained due to geometric constraints, use the greatest attainable length, not less than 200 ft, for posted speeds greater than 25 mph.
- 7. ROAD WORK AHEAD and the BE PREPARED TO STOP signs may be omitted if all of the following conditions are met:
 - A. Work operations are 60 minutes or less.
 - B. Speed limit is 45 mph or less.
- C. There are no sight obstructions to vehicles approaching the work area for a distance equal to the Buffer Space shown in Table 1
- D. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- E. Volume and complexity of the roadway has been considered.
- F. If a railroad crossing is present, vehicles will not queue across rail tracks.
- G. AFADs are not in use.
- 8. See Index 600 for general TCZ requirements and additional information.
- 9. Automated Flagger Assistance Devices (AFADs) may be used in accordance with Specifications Section 102, 990 and the APL vendor drawings.

	TABLE 1								
	DEVICE SPACING								
Posted Speed	of Co	n Spacing nes or Markers	Maximum Spacing of Type I or Type II Barricades/Panels/Drums		Distance Between Signs			Buffer Space	
	On a Taper	On a Tangent	On a Taper	On a Tangent	A	В	С	D	
25	20'	50'	20'	50'	200'	200'	200'	100'	155'
30	20'	50'	20'	50'	200'	200'	200'	100'	200'
35	20'	50'	20'	50'	200'	200'	200'	100'	250'
40	20'	50'	20'	50'	200'	200'	200'	100'	305'
45	20'	50'	20'	50'	350'	350'	350'	175'	360'
50	20'	50'	20'	100'	500'	500'	500'	250'	425'
55	20'	50'	20'	100'	2640'	1500'	1000'	500'	495'
60	20'	50'	20'	100'	2640'	1500'	1000'	500'	570'
65	20'	50'	20'	100'	2640'	1500'	1000'	500'	645'
70	20'	50'	20'	100'	2640'	1500'	1000'	500'	730'

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF TRAVEL WAY.

FY 2017-18 **DESIGN STANDARDS**

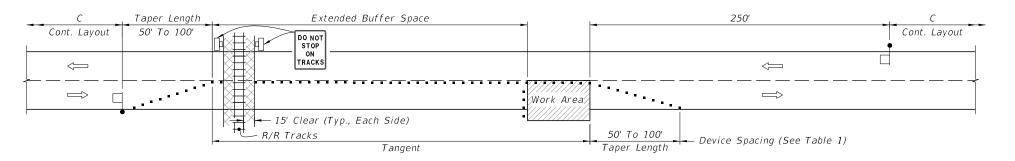
SYMBOLS:

Work Area

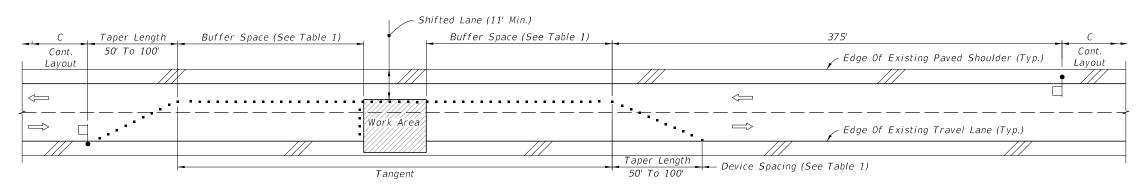
■ Channelizing Device (See Index No. 600)

₩ork Zone Sign

→ Flagger



TEMPORARY RAILROAD CROSSING BUFFER SPACE EXTENSION



TEMPORARY LANE SHIFT TO SHOULDER WHEN WORK AREA ENCROACHES ON THE CENTERLINE

SPECIAL CONDITIONS

Cross Rererence:

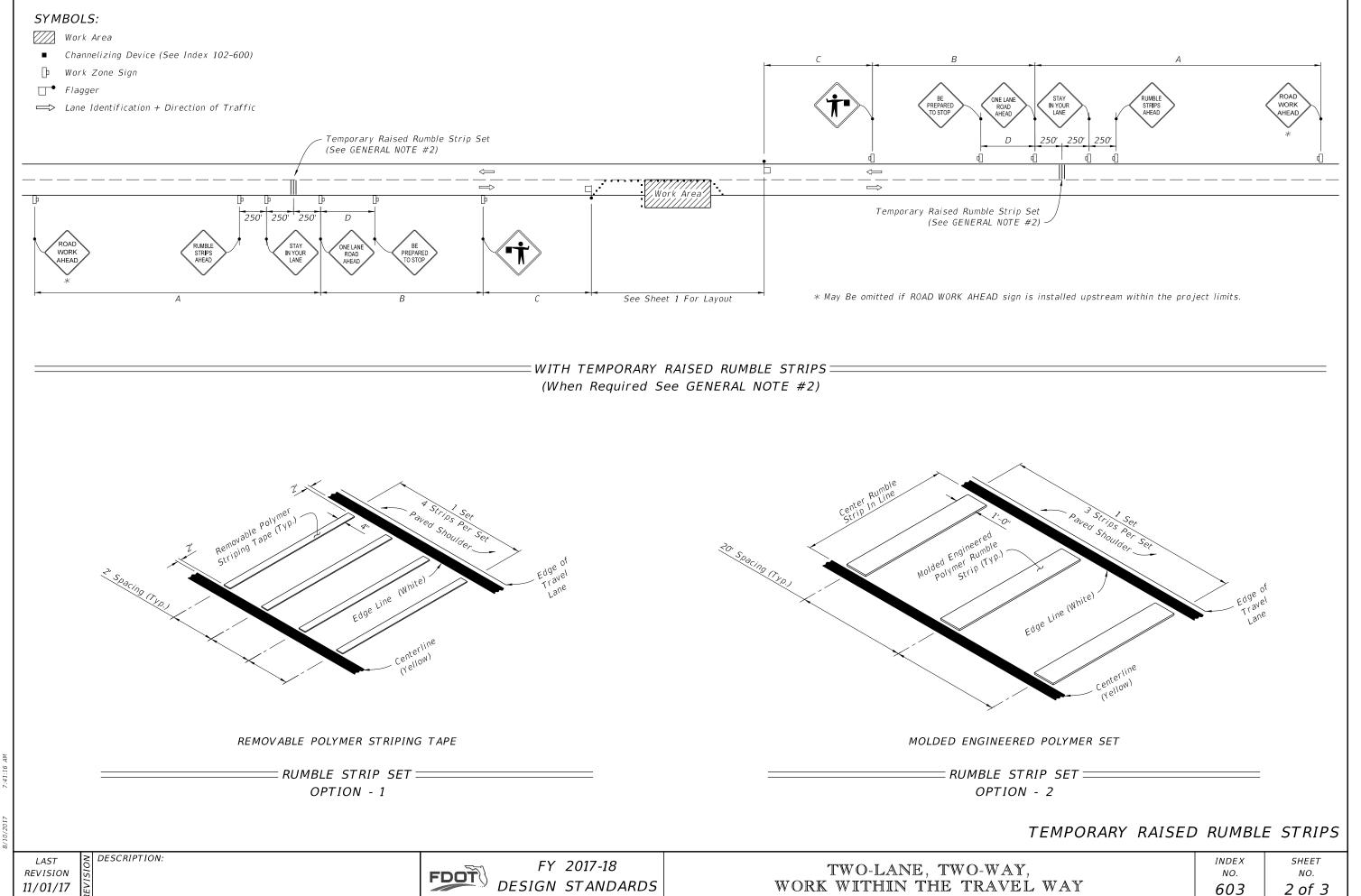
1. See General Note #1, Sheet 1 for more information.

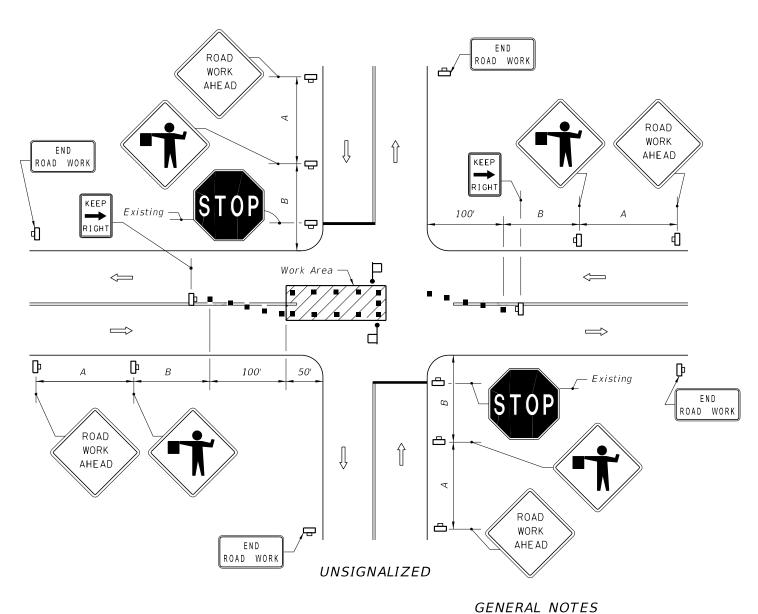
SPECIAL CONDITIONS

LAST REVISION 01/01/16

DESCRIPTION:

FDOT





SYMBOLS

Work Area

Channelizing Device (See Index No. 600)

Work Zone Sign

Flagger

Stop Bar

Lane Identification + Direction of Traffic

DESCRIPTION:

- 1. The FLAGGER legend sign may be substituted for the symbol sign.
- 2. When vehicles in a parking zone block the line of sight to TCZ signs, the signs shall be post mounted and located in accordance with Index No. 17302.
- 3. If the work space extends across a crosswalk, the crosswalk should be closed using the information in Index No. 660.
- 4. Flaggers shall be located where they can control more than one direction of

Flaggers shall be in sight of each other or in direct communication at all times.

- 5. Maximum spacing between channelizing devices shall be not greater than 20'.
- 6. Temporary signal phasing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.
- 7. For general TCZ requirements and additional information, refer to Index No. 600.
- 8. For unsignalized intersections, use Temporary Raised Rumble Strips in accordance with Index 603. Placement of Rumble Strips and additional signs should begin at FLAGGER sign location.

ROAD WORK WORK AHEAD AHEAD 100' ROAD WORK \Leftrightarrow \Leftrightarrow \Longrightarrow \Longrightarrow 100' END ROAD WORK ROAD WORK AHEAD ROAD WORK AHEAD END ROAD WORK SIGNALIZED

DURATION NOTES

- 1. ROAD WORK AHEAD AND END ROAD WORK sign may be omitted if all of the following conditions are met:
 - a. Work operations are 60 minutes or less.
 - b. Speed is 45 mph or less.
 - c. No sight obstructions to vehicles approaching the work area for a distance equal to A plus B.
 - d. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - e. Volume and complexity of the roadway has been considered.

DISTANCE BETWEEN SIGNS					
Speed Spacing (ft.)					
Speed	Α	В			
40 mph or less	200	200			
45 mph	350	350			

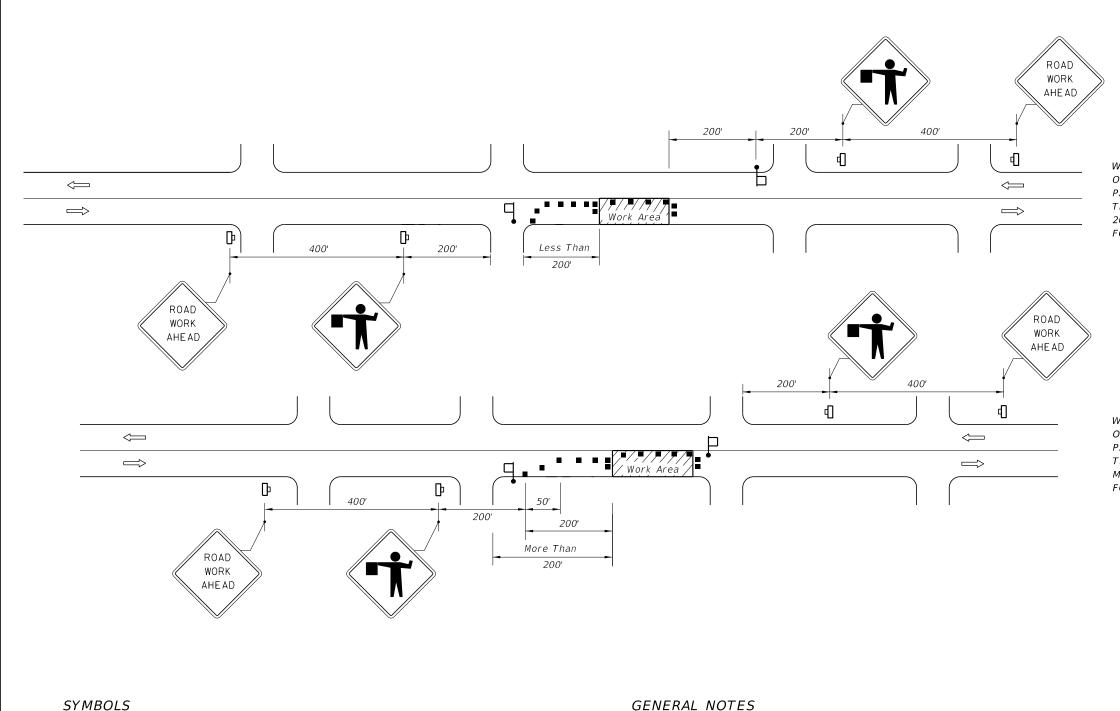
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF A PORTION OF ONE OR MORE TRAFFIC LANES IN AN INTERSECTION.

REVISION 07/01/15

FY 2017-18 **DESIGN STANDARDS**

SHEET NO. 1 of 1



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF ONE TRAFFIC LANE, FOR WORK AREAS LESS THAN 200' DOWNSTREAM FROM AN INTERSECTION FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF ONE TRAFFIC LANE, FOR WORK AREAS 200' OR MORE DOWNSTREAM FROM AN INTERSECTION FOR A PERIOD OF MORE THAN 60 MINUTES.

DURATION NOTES

Work Area

Channelizing Device (See Index No. 600)

- Work Zone Sign
- Flagger
- Lane Identification + Direction of Traffic

DESCRIPTION:

- 1. Work operations shall be confined to one travel lane, leaving the opposing travel lane open to traffic.
- 2. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17302.
- 3. If work area is confined to an outside auxiliary lane, the work area shall be barricaded and the FLAGGER signs replaced by ROAD WORK AHEAD signs. Flaggers are not required.
- 4. Flaggers shall be in sight of each other or in direct communication at all times.

- 5. The FLAGGER legend sign may be substituted for the symbol sign.
- 6. The maximum spacing between devices shall be no greater than 25.
- 7. For general TCZ requirements and additional information, refer to Index No. 600.
- 8. The two channelizing devices directly in front and directly at the end of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- 9. Use Temporary Raised Rumble Strips in accordance with Index 603. Placement of Rumble Strips and additional signs should begin at FLAGGER sign location.

- 1. ROAD WORK AHEAD sign may be omitted if all of the following conditions are met:
- a. Work operations are 60 minutes or less.
- b. Speed is 45 mph or less.
- c. No sight obstructions to vehicles approaching the work area for a distance of 600 feet.
- d. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- e. Volume and complexity of the roadway has been considered.

REVISION 07/01/15

FY 2017-18 **DESIGN STANDARDS**

INDEX NO. 605

SHEET NO.

1 of 1

Temporary Signals can either be portable signals or span wire signals and shall include two signal faces for each approach.

2. The installation and timing of signals shall be approved by the District Traffic Operations Engineer prior to signals being placed in operation.

Where sight distance to the signal is limited, the temporary traffic signals may be relocated at the discretion of the Engineer. Timing adjustments must be made by the Worksite Traffic Supervisor based on changing field conditions. Changes to timing (either reoccurring or lasting more than 24 hours) must be approved by the District Traffic Operation Engineer.

Whether the signals are in automatic mode or being controlled manually, in no case will the distance between the portable signals (receiver/controllers) exceed the maximum distance at which the portable signals can be positively and safely operated in accordance with manufacturer's recommendations. When distances between signals exceed 0.25 miles, a combination of a pilot vehicle with manually controlled temporary traffic signals are required.

- 3. Additional signals or flaggers may be required to assure safe movements between traffic and operating equipment, as determined by the Engineer.
- 4. An additional warning sign may be required in advance of the ROAD WORK AHEAD sign, as determined by the Engineer. The distance between successive signs shall be 500'.
- 5. The SIGNAL AHEAD legend sign may be substituted for the symbol sign.
- 6. SIGNAL AHEAD and EQUIPMENT CROSSING AHEAD signs are to be removed or fully covered when no work is being performed and the highway is open to two-way traffic. Type III Barricades shall be in place to block haul road access when the haul road is not in operation and a flagger/signal operator is not on duty, except when the haul road is an existing properly marked road.
- 7. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 8. For general TCZ requirements and additional information, refer to Index No. 600.
- 9. Temporary traffic signals are to be used only in work zones with workers present, where the contractor can monitor signal operation and maintain traffic with flaggers in the event of a power failure.
- 10. Use Temporary Raised Rumble Strips in accordance with Index 603.

SYMBOLS

Work Area

Work Zone Sign

Temporary Traffic Signal

Channelizing Device (See Index No. 600)

Type III Barricade

Stop Bar

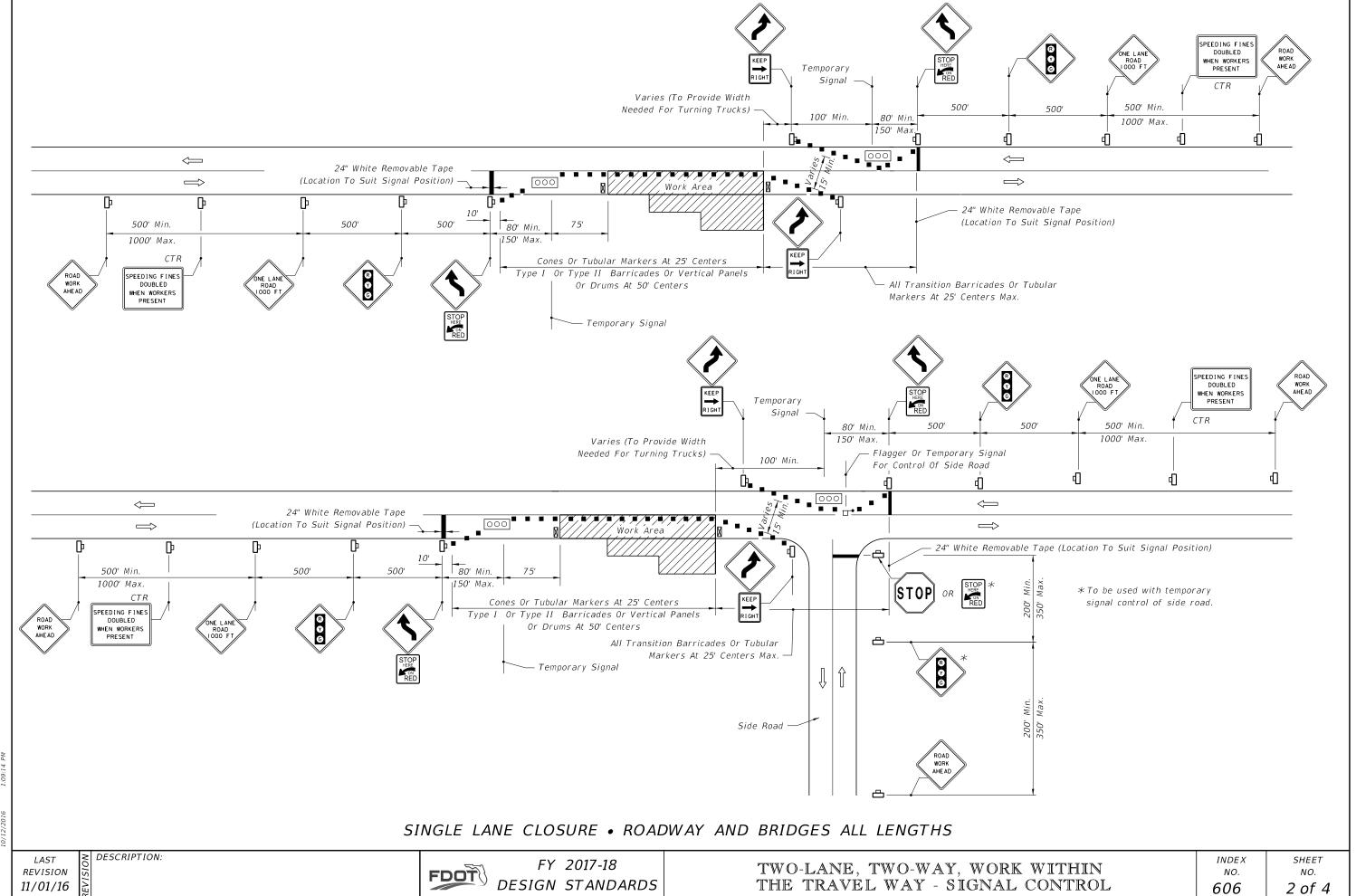
Flagger

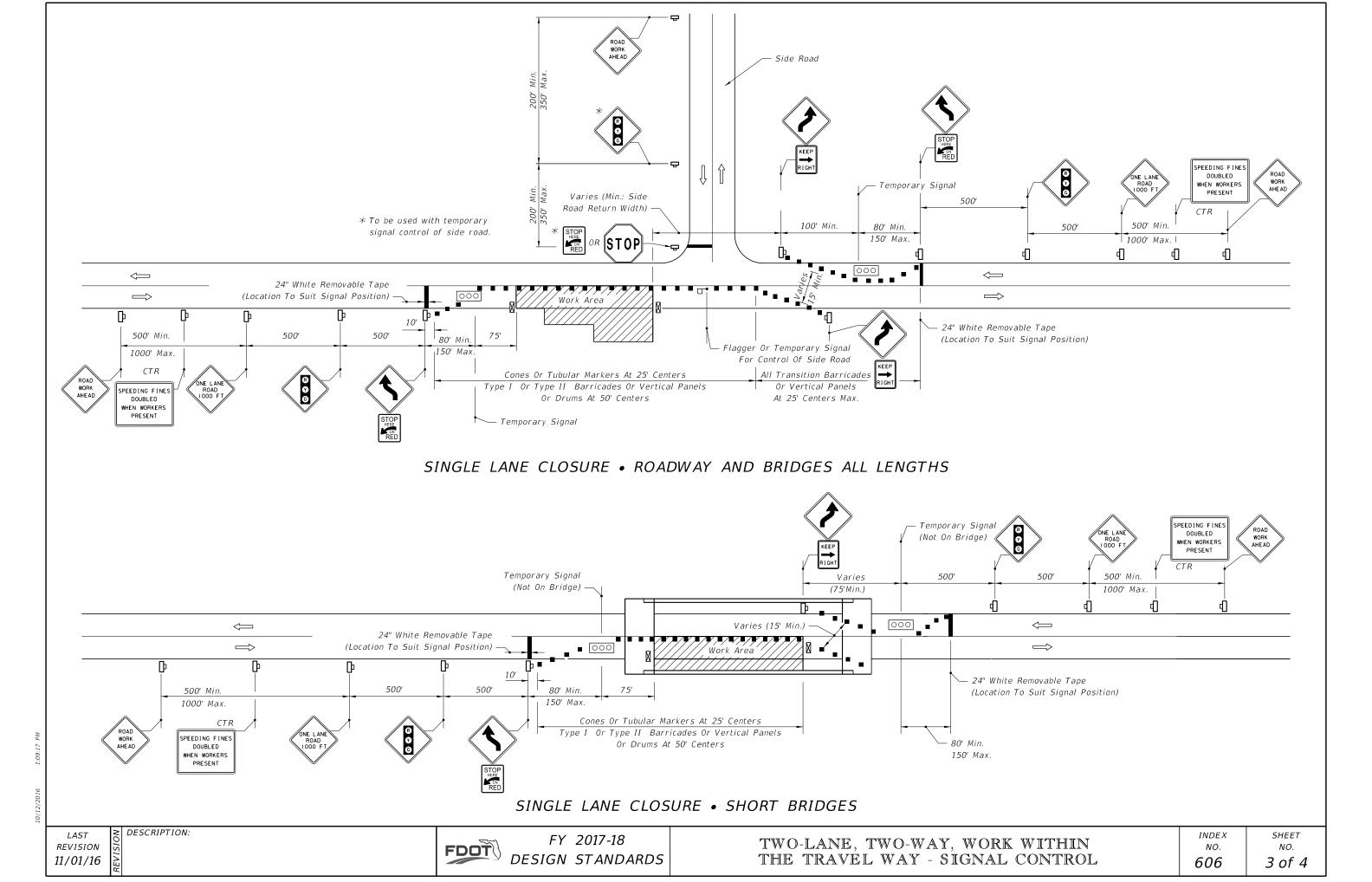
Lane Identification + Direction of Traffic

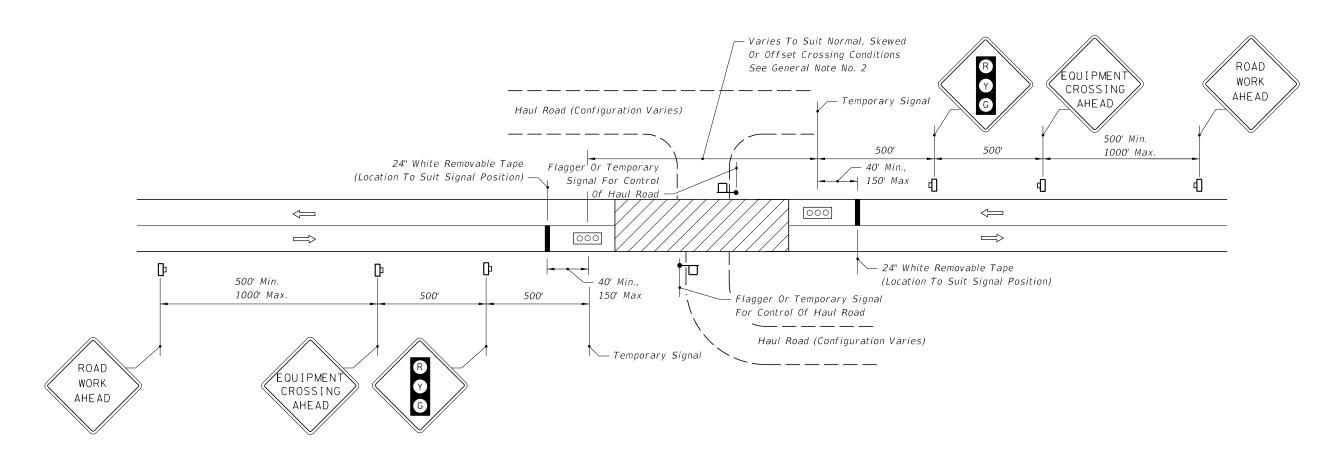
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCROACH ON ONE LANE OR MOMENTARILY ENCROACH ON BOTH LANES OF A TWO-LANE TWO-WAY ROADWAY AND TRAFFIC SIGNALS ARE NEEDED.

DESCRIPTION:





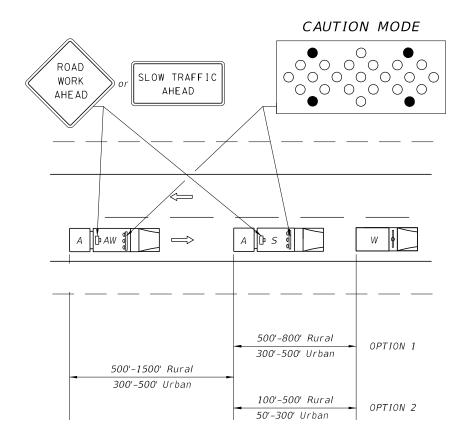


MOMENTARY ROADWAY CLOSURE . HAUL ROUTE CROSSING

REVISION 11/01/16

DESCRIPTION:





OPTION 1: Advanced Warning Vehicle is optional and to be operated on the shoulder when feasible. If an Advance Warning Vehicle is operated in the shoulder, an approved Truck Mounted Attenuator is required on both the Advance Warning and Shadow Vehicles. If an Advance Warning Vehicle is operated in the lane behind the Shadow Vehicle, an approved Truck Mounted Attenuator will be required on the Advance Warning Vehicle, but not required on the Shadow Vehicle. The Advance Waning Arrow Board and Warning Sign is required on both the Advance warning and Shadow Vehicles.

OPTION 2: Advanced Warning Vehicle is required and must be operated in the lane behind the shadow vehicle. An approved Truck Mounted Attenuator will be required on the Advanced Warning Vehicle but not required on the Shadow Vehicle. The Advance Warning Arrow Board and Warning Sign is required on both the Advance Warning and Shadow Vehicles.

> WORK IN TRAVEL WAY (Option 2 Shown, Option 1 Similar)

SYMBOLS

Work Area



Work Zone Sign

DESCRIPTION:



Lane Identification + Direction of Traffic Work Vehicle With Rotating/Strobe Lights



Shadow (S) Or Advance Warning (AW) Vehicle with Advance Warning Arrow



Truck/Trailer Mounted Attenuator (TMA)



Advanced Warning Arrow Board

Board and Sign Message

GENERAL NOTES

- 1. Where work activities within 2' of the edge of travel way are incidental (i.e., Mowing, Litter Removal), the Engineer may delete requirements for signs and the advance warning vehicle provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- 2. If an arrow board is used, the caution mode shall be used.
- 3. Shadow and Advance Warning Vehicle shall display rotating/strobe lights.
- 4. For general TCZ requirements and additional information, refer to Index 600.

CONDITIONS

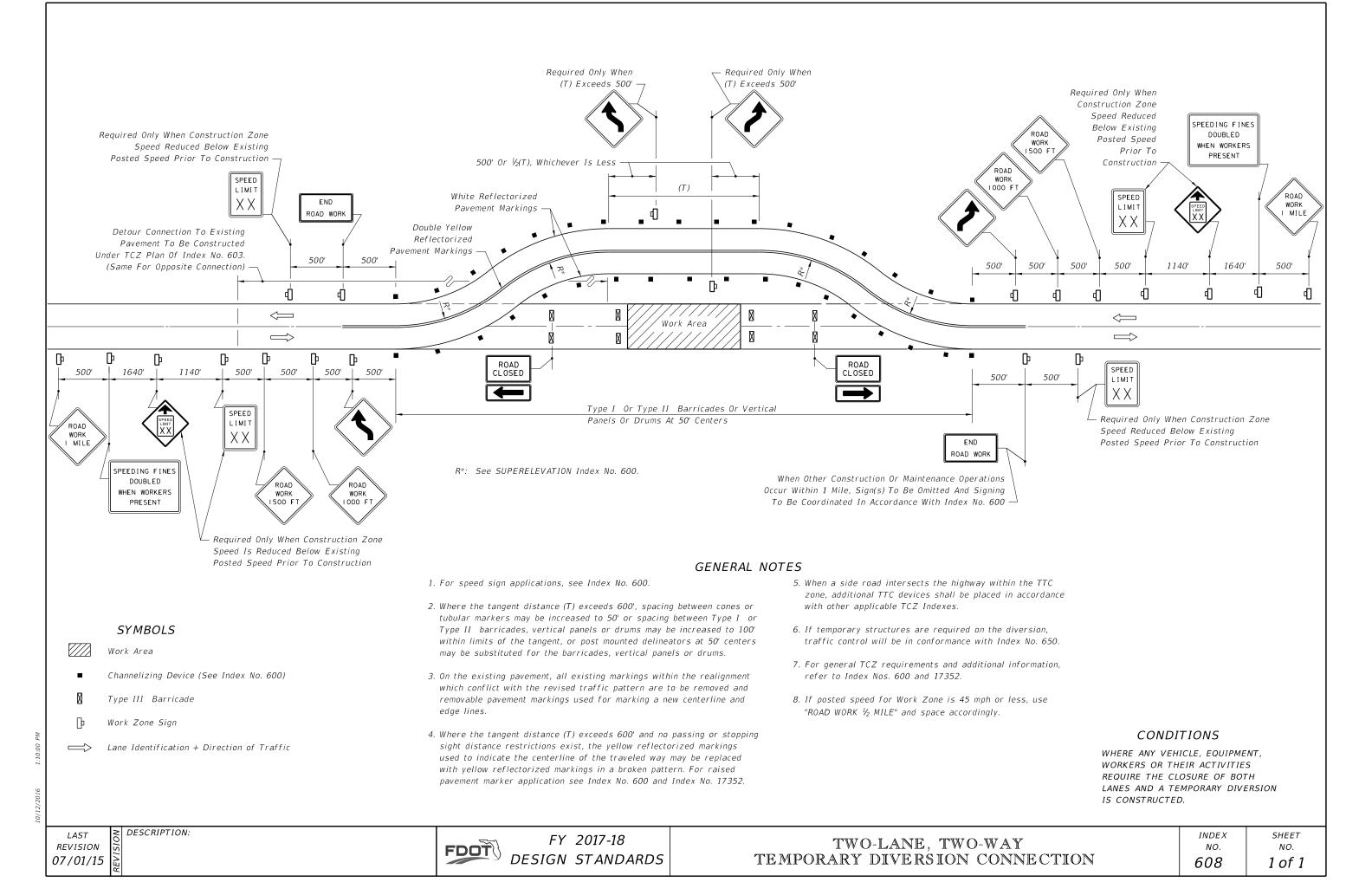
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERMITTENT OR CONTINUOUS MOVING OPERATION.

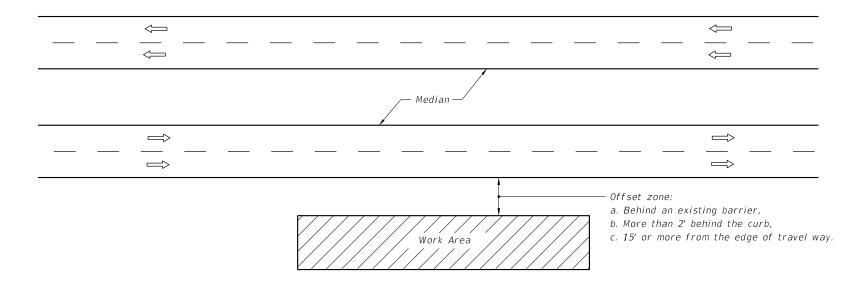
REVISION 07/01/15

FY 2017-18 **DESIGN STANDARDS**

INDEX NO. 607

SHEET NO. 1 of 1





GENERAL NOTES

- 1. If the work operation (excluding establishing and terminating the work area), requires that two or more work vehicles cross the offset zone in any one hour, traffic control will be in accordance with Index No. 612.
- 2. No special signing is required.
- 3. This index also applies when work is being performed on a multilane undivided
- 4. This index also applies to work performed in the median behind an existing barrier or more than 15' from the edge of travel way, both roadways. Work performed in the median behind curb and gutter shall be in accordance with Index No. 612.
- 5. When a side road intersects the highway within the work area, additional traffic control devices shall be placed in accordance with other applicable TCZ Indexes.
- 6. When construction activities encroach on a sidewalk, refer to Index No. 660.
- 7. For general TCZ requirements and additional information, refer to Index No. 600.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE BEHIND AN EXISTING BARRIER, MORE THAN 2' BEHIND THE CURB, OR 15' OR MORE FROM THE EDGE OF TRAVEL WAY.

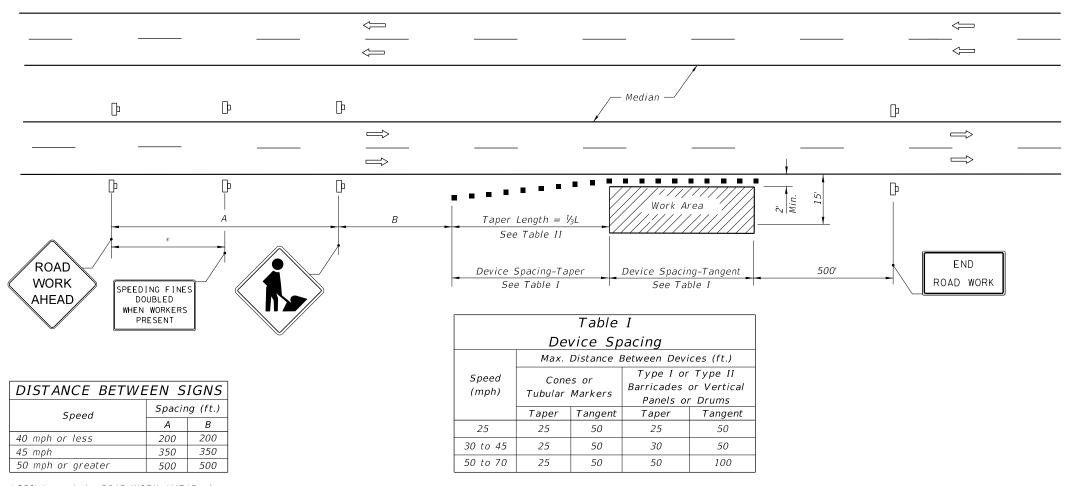
REVISION 07/01/05

SYMBOLS

Lane Identification + Direction of Traffic

Work Area

DESCRIPTION:



*250' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

GENERAL NOTES

- 1. When a high volume of work vehicles are entering and leaving the Work Area at speeds slower than 10 MPH below the posted speed, place an MOT-5-06 sign in the ROAD WORK AHEAD sign location and shift the ROAD WORK AHEAD sign upstream 500 ft.
- 2. This TCZ plan also applies to work performed in the median more than 2' but less than 15' from the edge of travelway.
- 3. When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
- 4. WORKERS signs to be removed or fully covered when no work is being performed.
- 5. SHOULDER WORK sign may be used as an alternate to the WORKER symbol sign.
- 6. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 7. For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

- 1. Signs and channelizing devices may be omitted if all of the following conditions are met:
- a. Work operations are 60 minutes or less.
- b. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

- 1					
	Tap	er	Length -	Shot	ulder
	Speed		⅓L (ft.)		Natas

Table II

Speed	⅓L (ft.)			Natas
(mph)	8'	10'	12'	Notes
	Shldr.	Shldr.	Shldr.	
25	28	35	42	
30	40	50	60	$L = \frac{WS^2}{}$
35	55	68	82	60
40	72	90	107	
45	120	150	180	
50	133	167	200	
55	147	183	220	, ,,,
60	160	200	240	L=WS
65	173	217	260	
70	187	233	280	

8' minimum shoulder width.

 $\frac{1}{3}L$ = Length of shoulder taper in feet

W = Width of total shoulder in feet(combined paved and unpaved width)

S = Posted speed limit (mph)

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, ENCROACH THE AREA CLOSER THAN

SYMBOLS

Work Area

Channelizing Device (See Index No. 600)

DESCRIPTION:

Work Zone Sign

Lane Identification + Direction of Traffic

WORKERS OR THEIR ACTIVITIES 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF TRAVEL WAY.

DISTANCE BET	WEE	V <i>SI</i> (GNS
Speed	Spacing (ft.)		
Speed	Α	В	С
40 mph or less	200	200	200
45 mph	350	350	350
50 mph	500	500	500
*55 mph or greater	2640	1640	1000

DOUBLED WHEN WORKERS PRESENT

- * The ROAD WORK 1 MILE sign may be used as an alternate to the ROAD WORK AHEAD sign and the RIGHT LANE CLOSED 1/2 MILE sign may be used as an alternate to the RIGHT LANE CLOSED AHEAD sign.
- ** 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

SYMBOLS

Work Area

- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Board

DESCRIPTION:

GENERAL NOTES

- 1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
- 2. On undivided highways the median signs as shown are to be omitted.
- 3. When work is performed in the median lane on divided highways, the channelizing device plan is inverted and left lane closed and lane ends signs substituted for the right lane closed and lane end signs.

The same applies to undivided highways with the following exceptions:

- a. Work shall be confined within one median lane.
- b. Additional barricades, cones, or drums shall be placed along the centerline abutting the work area and across the trailing end of the work area.

When work on undivided highways occurs across the centerline so as to encroach on both median lanes, the inverted plan is applied to the approach of both roadways.

- 4. Signs and traffic control devices are to be modified in accordance with INTERMITTENT WORK STOPPAGE details (sheet 2 of 2) when no work is being performed and the highway is open to traffic.
- 5. The two channelizing devices directly in front of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- 6. When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travel way. See Index No. 612 for shoulder taper formulas.
- 7. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 8. This TCZ plan does not apply when work is being performed in the middle lane(s) of a six or more lane highway. See Index No. 614.
- 9. For general TCZ requirements and additional information, refer to Index No. 600.

Table I							
Device Spacing							
Max.	Distance	Between D	evices (ft.)				
Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums					
Taper	Tangent	Taper	Tangent				
25	50	25	50				
25	50	30	50				
25	50	50	100				
	Cone Tubular Taper 25	Device S Max. Distance Cones or Tubular Markers Taper Tangent 25 50 25 50	Device Spacing Max. Distance Between D Cones or Tubular Markers Taper Tangent Taper 25 50 25 25 50 30				

	Τá	able II	
Buffer	Space	and Ta	per Lengti
Speed	Buffer Space	(12)	er Length ' Lateral ansition)
(mph)	Dist. (ft.)	L (ft.)	Notes (Merge)
25	155	125	
30	200	180	$L = \frac{WS^2}{}$
35	250	245	60
40	305	320	
45	360	540	
50	425	600	
55	495	660	, ,,,
60	570	720	L = WS
65	645	780	
70	730	840	

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in notes column. Where:

- L = Length of taper in feet
- W = Width of lateral transition in feet
- S = Posted speed limit (mph)

DURATION NOTES

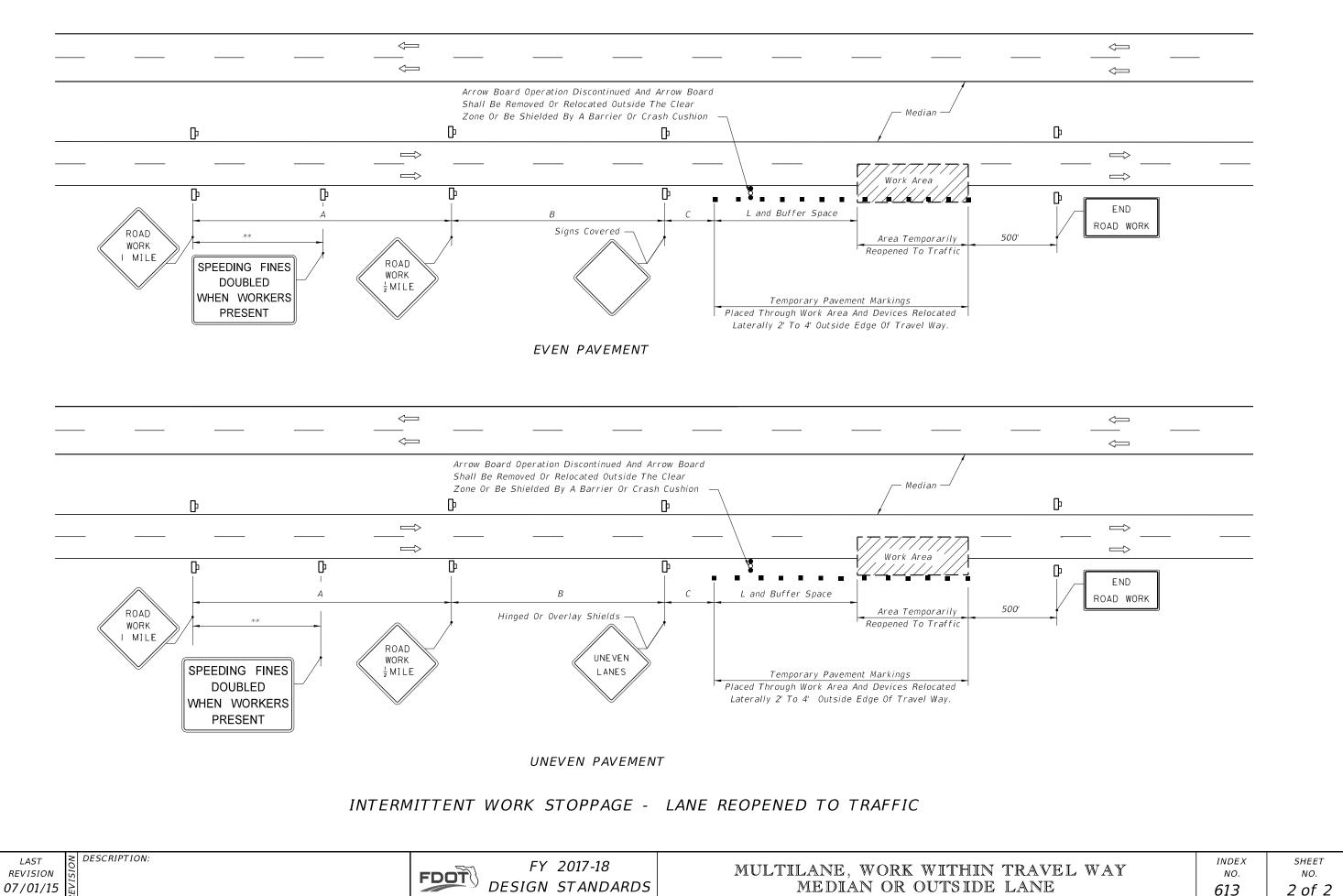
- 1. Temporary white edgeline may be omitted for work operations less than 3 consecutive calandar days.
- 2. For work operations up to approximately 15 minutes, signs, channelizing devices, arrow board, and buffer space may be omitted if all of the following conditions
- a. Speed limit is 45 mph or less.
- b. No sight obstructions to vehicles approaching the work area for a distance equal to the buffer space and the taper length combined.
- c. Volume and complexity of the roadway has been considered.
- d. The closed lane is occupied by a class 5 or larger, medium duty truck(s) with a minimum gross weight vehicle rating (GWVR) of 16,001 lb with high-intensity, rotating, flashing, oscillating, or strobe lights mounted above the cab height and operating.
- 3. For work operations up to 60 minutes, arrow board and buffer space may be omitted if conditions a, b, and c in DURATION NOTE 2 are met, and vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

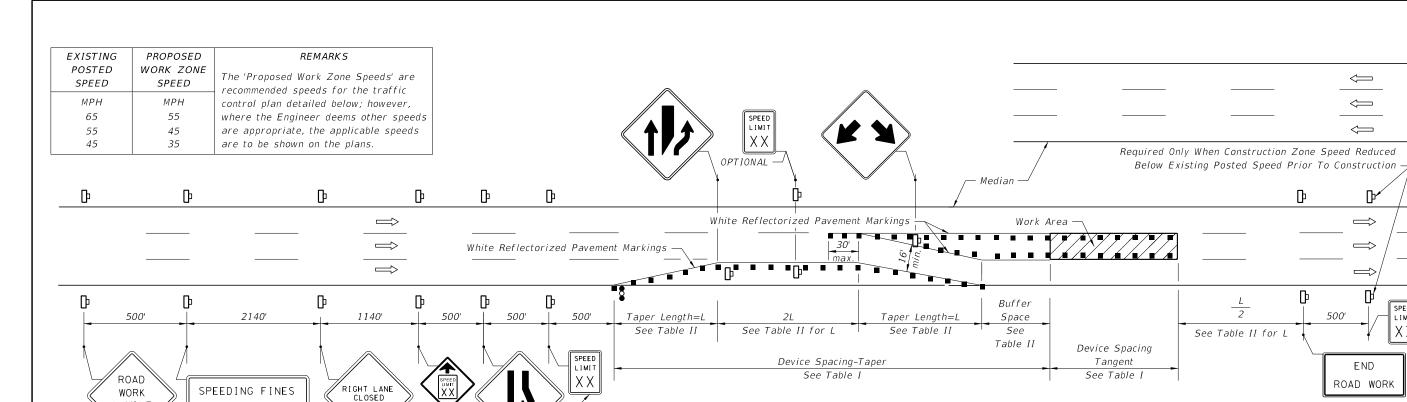
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF TRAVEL WAY.

REVISION 01/01/16

FY 2017-18 DESIGN STANDARDS





½ MILE Table I Device Spacing Max. Distance Between Devices (ft.) Required Only When Construction Zone Speed Reduced Type I or Type II Speed Cones or Below Existing Posted Speed Prior To Construction -Barricades or Vertical (mph) Tubular Markers Panels or Drums Tangent Taper Tangent Taper 25 25 25 50 30 to 45 25 50 30 50 to 70 25 50 100 50

CONDITION NOTES

- 1. The RIGHT LANE CLOSED and lane reduction signs are to be removed or fully covered when no work is being performed and the center lane is opened to traffic.
- 2. For work performed in the median or outside lane, refer to Index No. 613.
- 3. When the lane closure exceeds a continuous 24 hour period, all existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement marking used for marking new edge lines and centerline.

GENERAL NOTES

- 1. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 2. For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

1. Temporary pavement markings may be omitted for work operations less than 3 days.

Table II						
Buffer	Space	and Ta _l	per Length			
Speed	Buffer Space		er Length ral Transition)			
(mph)	Dist. (ft.)	L (ft.)	Notes (Merge)			
25	155	125				
30	200	180	. WS ²			
35	250	245	$L = \frac{\sqrt{5}}{60}$			
40	305	320				
45	360	540				
50	425	600				
<i>55</i>	495	660	L = WS			
60	570	720				
65	645	780				
70	730	840				

50

50

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column. Where:

- L = Length of taper in feet
- W = Width of lateral transition in feet
- S = Posted speed limit (mph)

CONDITIONS

 \Diamond

 $\overline{}$

 \leftarrow

 \Longrightarrow

 \Longrightarrow

END

ROAD WORK

XX

500'

₽

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON ANY PORTION OF A CENTER LANE OF A MULTILANE HIGHWAY, AND TWO DRIVING LANES ARE MAINTAINED ON THE TRAVEL

REVISION 07/01/15 MILE

SYMBOLS

Work Zone Sign

Channelizing Device (See Index No. 600)

Lane Identification + Direction of Traffic

Advance Warning Arrow Board

DESCRIPTION:

Work Area

DOUBLED

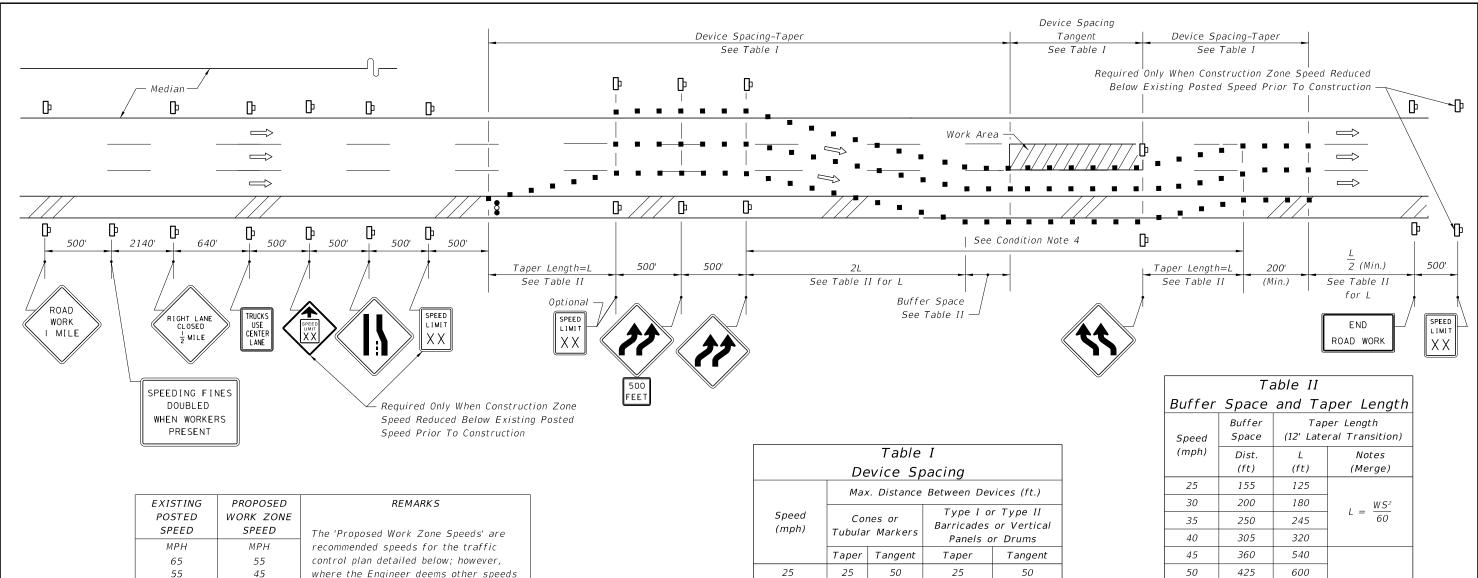
WHEN WORKERS

PRESENT

FY 2017-18 DESIGN STANDARDS

MULTILANE, WORK WITHIN TRAVEL WAY, CENTER LANE INDEX NO. 614

SHEET NO. 1 of 2



25

25

50

50

30

50

30 to 45

50 to 70

CONDITION	NOTES
CONDITION	NULLS

1. See General Notes, Sheet 1.

are appropriate, the applicable speeds.

- 2. Length of time that traffic is using shoulder should be minimized. For example, remove lane closure and lane shift at night (unless performing night work) if practical.
- 3. The RIGHT LANE CLOSED, lane reduction and reverse curve signs are to be removed or fully covered when no work is being performed and the travel way is open to traffic.
- 4. When the lane closure exceeds a continuous 24 hour period, all existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for marking new edge lines and centerlines.
- 5. For general TCZ requirements and additional information, refer to Index No. 600.

50 425 600 55 495 660 L = WS60 570 720 65 780 645 730 70

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column. Where:

L = Length of taper in feet

W = Width of lateral transition in feet

S = Posted speed limit (mph)

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON ANY PORTION OF A CENTER LANE OF A MULTILANE HIGHWAY, AND TWO DRIVING LANES ARE MAINTAINED, AND, THE OUTSIDE SHOULDER PAVEMENT IS TEMPORARILY USED AS A TRAVEL LANE.

SYMBOLS

Work Area

Channelizing Device (See Index No. 600)

45

35

Work Zone Sign

Advance Warning Arrow Board

DESCRIPTION:

REVISION 07/01/15

FY 2017-18 **DESIGN STANDARDS**

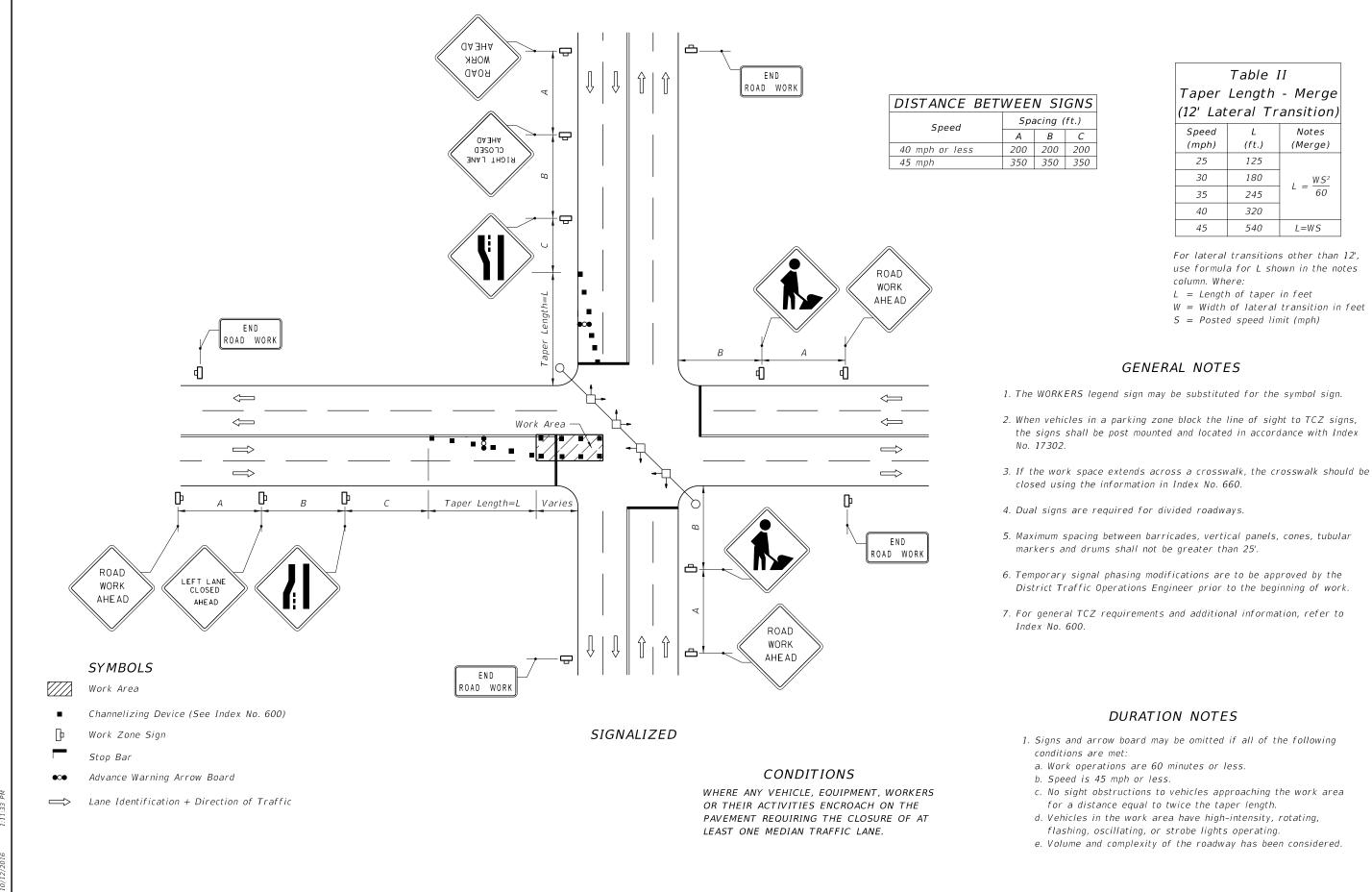
MULTILANE, WORK WITHIN TRAVEL WAY, CENTER LANE

50

100

INDEX NO. 614

SHEET NO. 2 of 2



REVISION

07/01/15

DESCRIPTION:

(ft.)

125

180

245

320

540

(Merge)

L=WS

GENERAL NOTES

- 1. Work operations shall be confined to either one lane, or lane combinations as follows:
- a. Outside travel lane;
- b. Outside auxiliary lane;
- c. Outside travel lane and adjoining auxiliary lane;
- d. Inside travel lane \triangle ;
- e. Inside auxiliary lane \triangle ;
- f. Inside travel lane and adjoining auxiliary lane \triangle
- △ See Sheet 3

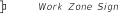
If the work area is confined to an auxiliary lane the work area shall be barricaded and the RIGHT (LEFT) LANE CLOSED AHEAD signs replaced by ROAD WORK AHEAD signs, and the merge symbol signs eliminated.

- 2. When vehicles in a parking zone block the line of sight to TCZ signs, the signs shall be post mounted and located in accordance with Index No. 17302.
- 3. If the work space extends across a crosswalk, the crosswalk should be closed using the information in Index No. 660.
- 4. Signs are required on the median side for divided highways.
- 5. The two channelizing devices directly in front and directly at the end of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- 6. For general TCZ requirements and additional information, refer to Index No. 600.

SYMBOLS



Work Area



Advance Warning Arrow Board

Type III Barricade

DESCRIPTION:

Channelizing Device (See Index No. 600)

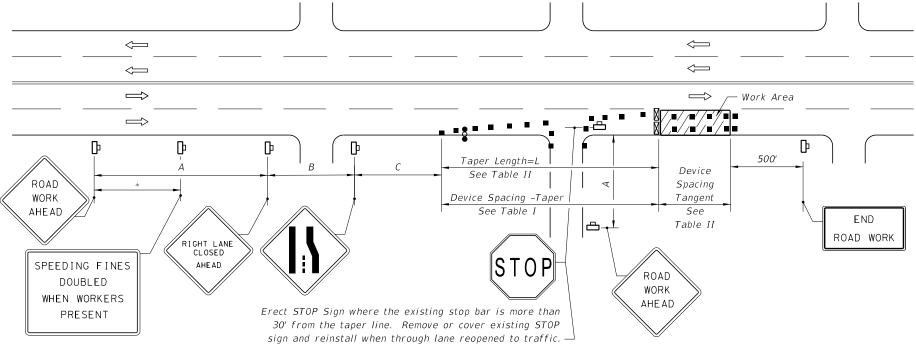
Lane Identification + Direction of Traffic

DURATION NOTES

- 1. For work operations up to approximately 15 minutes, signs, channelizing devices, and arrow board may be omitted if all of the following conditions are met:
- a. Speed limit is 45 mph or less.
- b. No sight obstructions to vehicles approaching the work area for a distance equal to twice the taper length.
- c. Volume and complexity of the roadway has been considered.
- d. The closed lane is occupied by a class 5 or larger, medium duty truck(s) with a minimum gross weight vehicle rating (GWVR) of 16,001 lb with high-intensity, rotating, flashing, oscillating, or strobe lights mounted above the cab height and operating.
- 2. For work operations up to 60 minutes, the arrow board may be omitted if conditions a, b, and c in DURATION NOTE 1 are met, and vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

REVISION 07/01/15





	DISTANCE BET	WEE	N SI	GNS
	Speed		acing (ft.)
			В	С
	40 mph or less	200	200	200
	45 mph	350	350	350

* 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

	Table I						
	Dev	ice Sp	pacing				
	Max.	Distance	Between Dev	rices (ft.)			
Speed (mph)	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums				
	Taper	Tangent	Taper	Tangent			
25	25	50	25	50			
30 to 45	25	50	30	50			

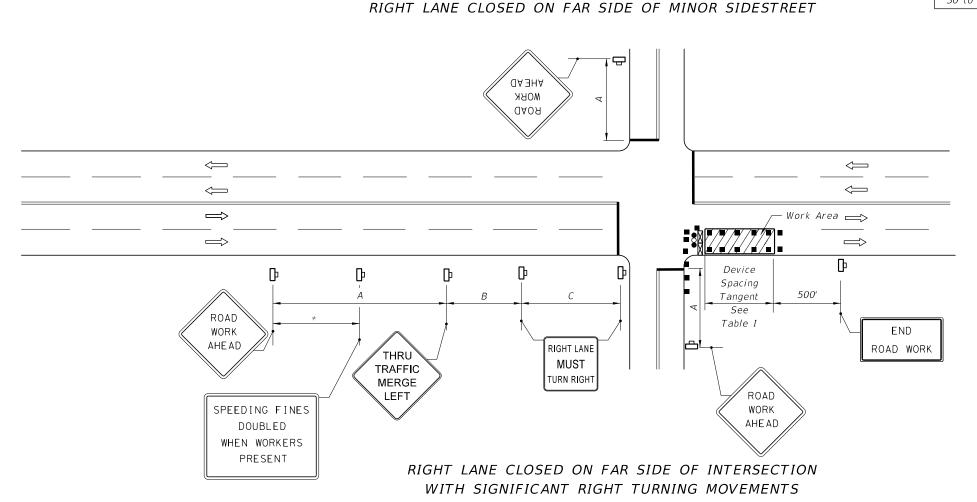


Table II Taper Length - Merge (12' Lateral Transition)						
Speed	L	Notes				
(mph)	(ft)	(Merge)				
25	125					
30	180	$L = \frac{WS^2}{60}$				
35	245	$L = \frac{1}{60}$				
40	320					
45	540	L=WS				

For lateral transitions other than 12', use formula for L shown in the notes column. Where:

L = Length of taper in feet

W = Width of lateral transition in feet

S = Posted speed limit (mph)

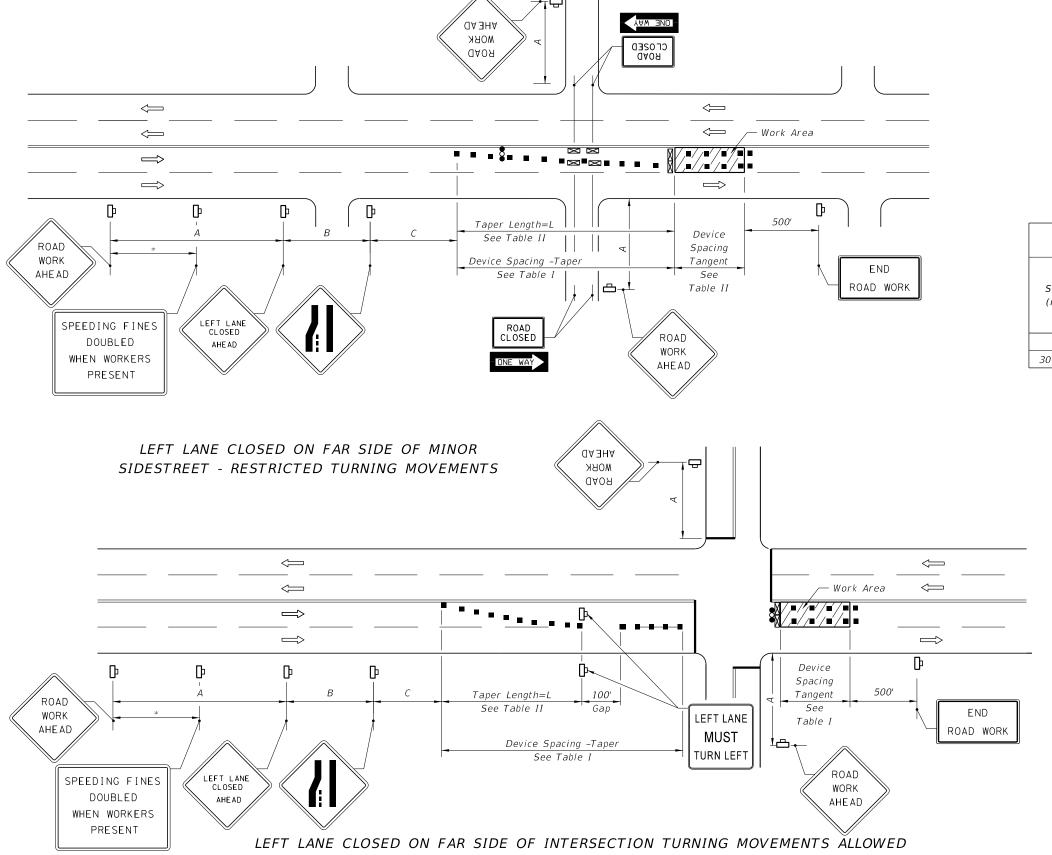
1. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a right lane having significant right turning movements, then the right lane may be restricted to right turns only as shown in this detail.

2. For intersection approaches reduced to a single lane, left turning movements may be prohibited to maintain capacity for through vehicular traffic.

REVISION 07/01/15

DESCRIPTION:

FY 2017-18



	DISTANCE BET	WEE	N SI	GNS	
	Speed		Spacing (ft.)		
			В	С	
	40 mph or less	200	200	200	
	45 mph	350	350	350	

* 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

Table I						
	De	vice S	pacing			
	Max.	Distance	Between Dev	vices (ft.)		
Speed (mph)	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums			
	Taper	Tangent	Taper	Tangent		
25	25	50	25	50		
30 to 45	25	50	30	50		

Table II							
Taper Length - Merge							
(12' Lateral Transition)							
Speed	L	Notes					
(mph)	(ft.)	(Merge)					
25	125						
30	180	$L = \frac{WS^2}{60}$					
35	245	60					
40	320						
45	540	L = WS					

For lateral transitions other than 12', use formula for L shown in the notes column. Where:

L = Length of taper in feet

W = Width of lateral transition in feet

S = Posted speed limit (mph)

1. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a left lane having significant left turning movements, then the left lane may be reopened as a turn bay for left turns only as show in this detail.

REVISION 07/01/15

DESCRIPTION:

FDOT

FY 2017-18 DESIGN STANDARDS

INDEX NO. 616

SHEET NO. 3 of 3

DISTANCE BETWEEN SIGNS				
Sneed	Spacing (ft.)			
Speed		В		
40 mph or less	200	200		
45 mph	350	350		
	Speed 40 mph or less	Speed		

Table I							
Device Spacing							
	Max. Distance Between Devices (ft.)						
Speed (mph)	Cones or Tubular Markers		Barricades or Vertical Type I or Type II Panels or Drums				
	Taper	Tangent	Taper	Tangent			
25	25	50	25	50			
30 to 45	25	50	30	50			

Table II							
Buffer	Space	and Ta	per Length				
Speed (mph)	Buffer Space	Taper Length (12' Lateral Transition)					
	Dist. (ft.)	L (ft.)	Notes (Merge)				
25	155	125					
30	200	180	$L = \frac{WS^2}{60}$				
35	250	245	60				
40	305	320					
45	360	540	L = WS				

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column.

L = Length of taper in feet

W = Width of lateral transition in feet

S = Posted speed limit (mph)

OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE CENTER LANE NEAR AN INTERSECTION.

GENERAL NOTES

- 1. Work operations shall be confined to one center travel lane, leaving the adjacent travel lanes open to traffic.
- 2. The merging taper shall direct vehicular traffic into either the right or left lane, but not both.
- 3. When vehicles in a parking zone block the line of sight to TCZ signs, the signs shall be post mounted and located in accordance with Index No. 17302.
- 4. If the work space extends across a crosswalk, the crosswalk should be closed using the information in Index No. 660.
- 5. For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

- 1. Signs and buffer space may be omitted if all of the following conditions are met:
- a. Work operations are 60 minutes or less.
- b. Speed limit is 45 mph or less.
- c. No sight obstructions to vehicles approaching the work area for a distance equal to the buffer space and the taper length combined.
- d. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- e. Volume and complexity of the roadway has been considered.

SYMBOLS

Work Area

■ Channelizing Device (See Index No. 600)

DOUBLED

WHEN WORKERS PRESENT

** 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

CENTER LANE CLOSED

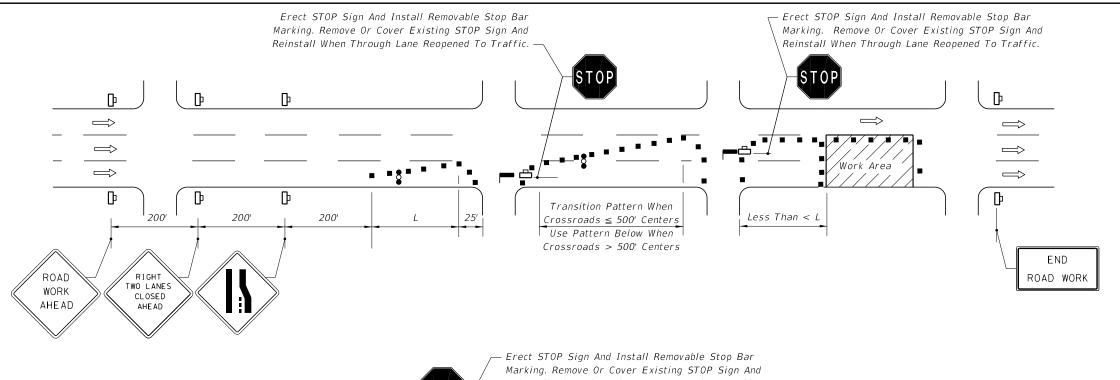
AHEAD

- Work Zone Sign
- Advance Warning Arrow Board

DESCRIPTION:

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS

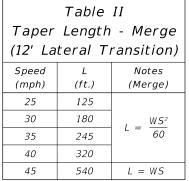


CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF EITHER THE OUTSIDE AND CENTER TRAVEL LANES OR THE MEDIAN AND CENTER TRAVEL LANES, WITH OR WITHOUT CLOSURE OF ADJOINING AUXILIARY LANES, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF EITHER THE OUTSIDE AND CENTER TRAVEL LANES OR THE MEDIAN AND CENTER TRAVEL LANES, WITH OR WITHOUT CLOSURE OF ADJOINING AUXILIARY LANES, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.



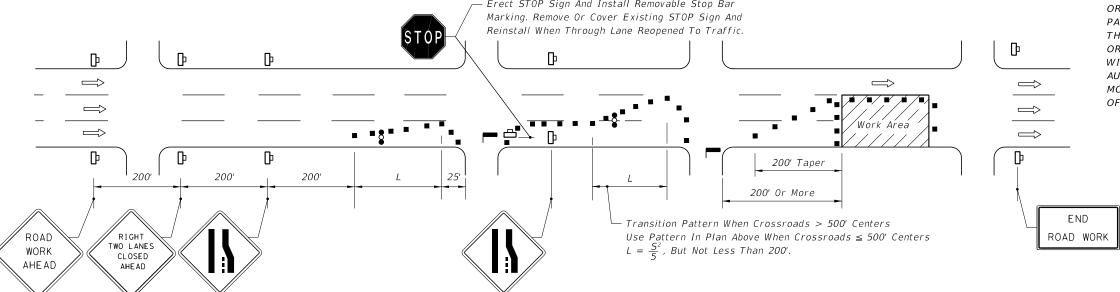
- W = Width of lateral transition in feet
- S = Posted speed limit (mph)

WHERE ANY VEHICLE, EQUIPMENT, WORKERS

Table II Taper Length - Merge (12' Lateral Transition)							
Speed	L	Notes					
(mph)	(mph) (ft.)						
25	125						
30	180	$L = \frac{WS^2}{60}$					
35	245	60					
40	320						
45	540	L = WS					

For lateral transitions other than 12', use formula for L shown in the notes column. Where:

- L = Length of taper in feet



SYMBOLS

Work Area

Channelizing Device (See Index No. 600)

Work Zone Sign

Advance Warning Arrow Board

DESCRIPTION:

Lane Identification + Direction of Traffic

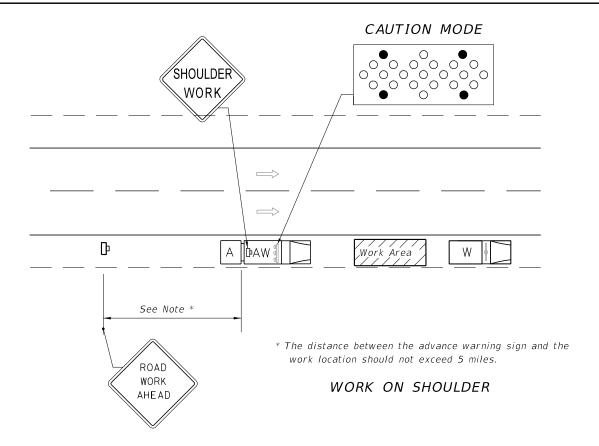
1. If the work space extends across a crosswalk, the crosswalk should be closed using the information in

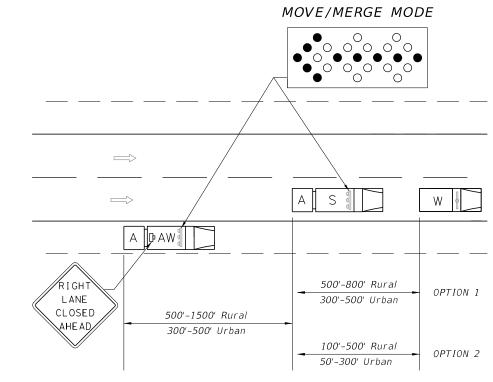
GENERAL NOTES

- 2. Signs are required on the median side for divided highways.
- 3. The two channelizing devices directly in front and directly at the end of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- 4. Within the lateral transitions, the maximum spacing between cones and tubular markers shall be 25'. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH.

Spacing for devices parallel to the travel lanes shall be 25' centers for cones or tubular markers and 50' centers for Type I or Type II barricades or vertical panels or drums for 250', thereafter, cones or tubular markers at 50' centers and Type I or Type II barricades or vertical panels or drums at 100' centers.

5. For general TCZ requirements and additional information, refer to Index No. 600.





OPTION 1: Advanced Warning Vehicle may be operated in the lane behind the Shadow Vehicle where adequate shoulder width is not available. Approved Truck Mounted Attenuators are required on both the Advance Warning Vehicle and the Shadow Vehicle.

OPTION 2: Advance Warning Vehicle must be operated in the lane behind the Shadow Vehicle. Approved Truck Mounted Attenuators are required on both the Advance Warning Vehicle and the Shadow Vehicle.

> WORK WITHIN TRAVEL LANE (Option 1 Shown, Option 2 Similar)

GENERAL NOTES

- 1. These illustrations are representative of general conditions.
- 2. The figures illustrate closing the right shoulder or right lanes for various lane configurations. When work is required on left side of roadways, the inverted plan is to be applied. The intent of this index is to allow passing on only one side of the work convoy.
- 3. Arrow boards shall not be obscured by equipment, supplies, signs, or the enclosure.
- 4. Vehicle-mounted signs shall be mounted with the bottom of the sign at a minimum height of 48 inches above the pavement. Vehicle mounted changeable message signs may be used in lieu of truck mounted static signs. Changeable message signs shall flash alternately to read "Left or Right Lane" or "Two Left or Two Right Lanes", "Closed Ahead", and the arrow symbol. Arrow boards shall not be used with truck mounted changeable message signs. Sign legends shall be covered or turned from view when work is not in progress.
- 5. On freeway facilities (interstates, toll roads, and expressways), a traffic control officer is required for all nighttime non-emergency operations for work within the travel lane.

- 6. If the work vehicle speed exceeds the minimum legal speed limit on limited access facilities and one half the posted speed limit on other facilities, the Engineer may delete requirements for shadow vehicle and attenuator. The work vehicle will be required to have an arrow board and sign message.
- 7. Where work activities within 2' of the edge of travel way are Incidental (i.e. Mowing, Litter Removal), the Engineer may delete requirements for signs and the advance warning vehicle provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- 8. Work, Shadow, and Advance Warning Vehicles shall have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- 9. Functional two-way communication is required between all vehicles in the mobile operation convoy.
- 10. For general TCZ requirements and additional information, refer to Index No. 600.

SYMBOLS

W

Work Vehicle

SI

Shadow (S) Vehicle with Arrow Board

PAW!

Advance Warning (AW) Vehicle with Arrow Board and Sign Message or Changeable Message Sign

Truck/Trailer Mounted Attenuator (TMA)

 \Longrightarrow

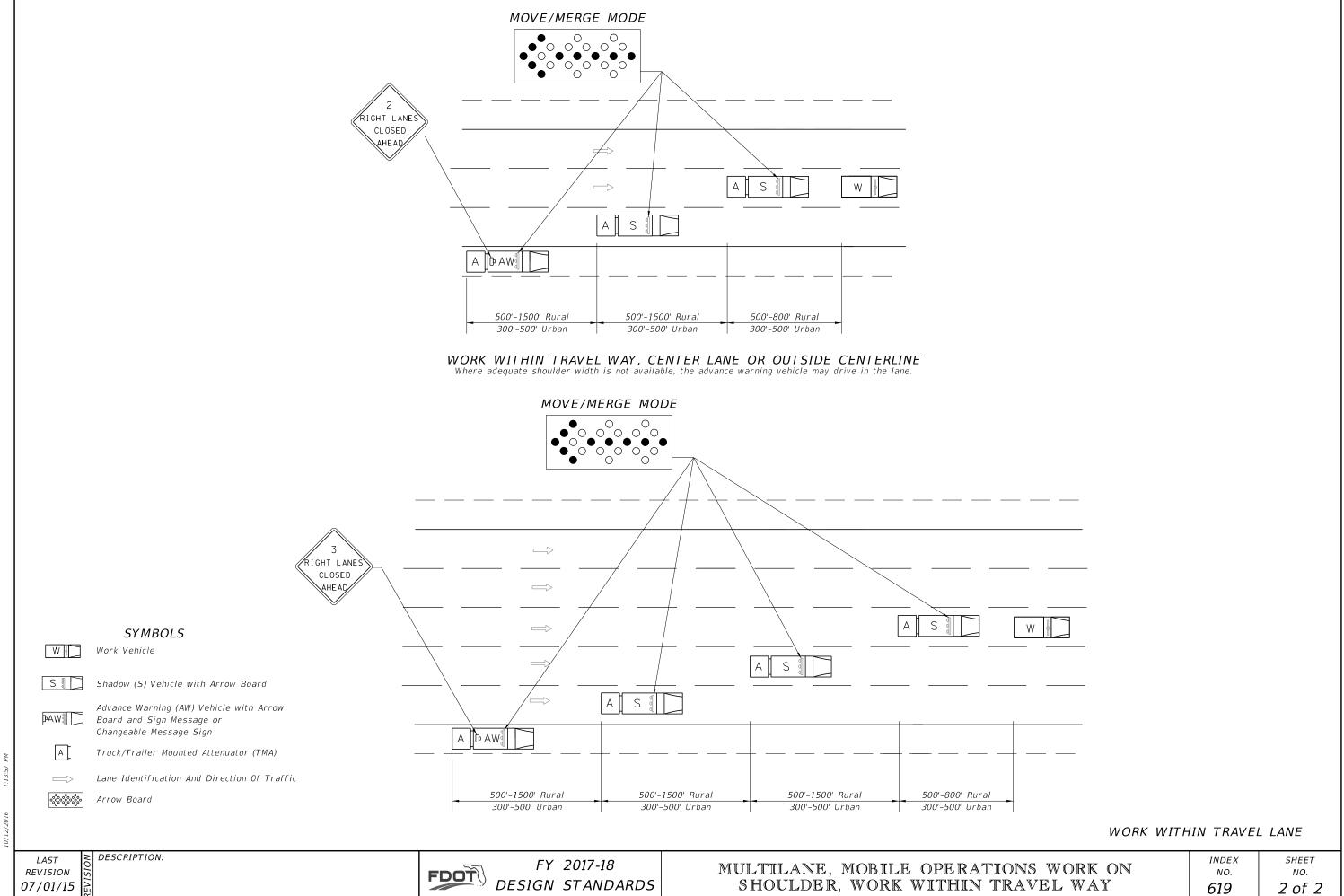
Lane Identification And Direction Of Traffic



Arrow Board

DESCRIPTION:

REVISION 01/01/16



GENERAL NOTES

- 1. TWO-WAY TRAFFIC sign(s) shall be repeated every $\frac{1}{4}$ mile in each direction, throughout the tangent distance (T).
- 2. L (min.) = WS for speeds ≥ 45 mph

 $=\frac{WS^2}{60}$ for speeds ≤ 40 mph

Where:

W= Width of lateral transition in feet. S= Posted speed limit (mph).

- 3. Where the tangent distance (T) exceeds 250', spacing between Type I or II barricades or vertical panels or drums may be increased to 100' within the limits of the tangent, or post mounted delineators at 50' centers may be substituted for barricades, vertical panels or drums.
- 4. All existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for making new edge lines.
- 5. When side roads, cross roads or interchanges intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 6. For general TCZ requirements and additional information, refer to Index No. 600.

SCHEME APPLICATIONS

- Scheme 1: Restricted Construction Limits.
- Scheme 2: Unrestricted Construction Limits And Light To Moderate Traffic.
- Scheme 3: Unrestricted Construction Limits And Moderate To Heavy Traffic.
 - Where: Construction Limits Are The Outward Beginning Or Ending Of Lane Reductions.
 - Where: Unless A Specific Scheme Is Called For In The Plans, Scheme Selection Shall Be At The Contractor's Option And As Approved By The Engineer.

CONDITIONS

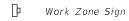
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF ONE ROADWAY AND THE OPPOSING ROADWAY IS CONVERTED TO TEMPORARY TWO-WAY TRAVEL BY WAY OF CROSSOVERS.

SYMBOLS



Work Area

Channelizing Device (See Index No. 600)

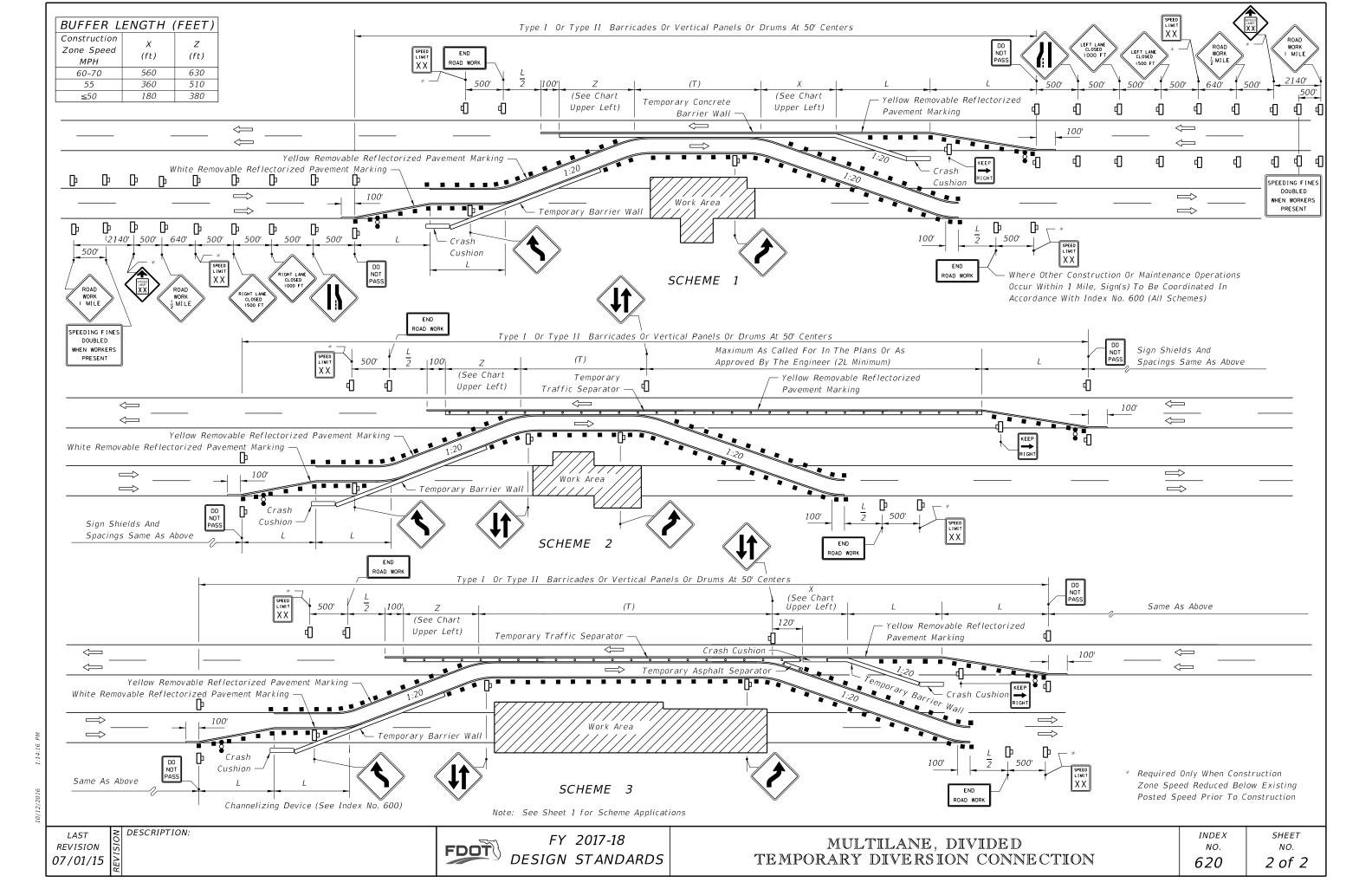


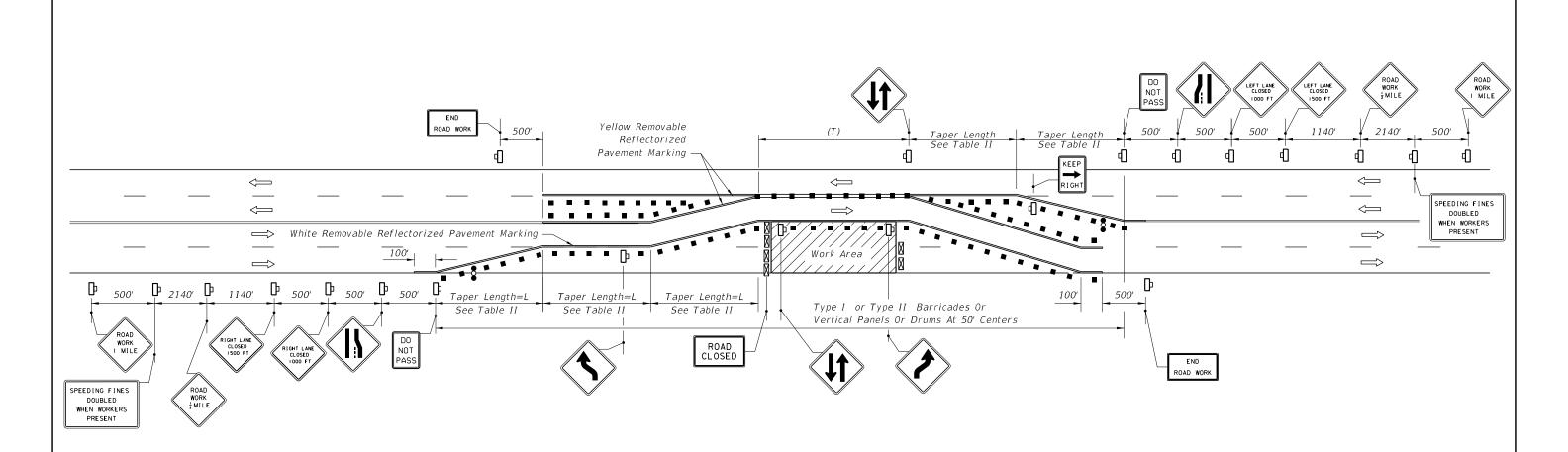
DESCRIPTION:

Advance Warning Arrow Board

Lane Identification + Direction of Traffic

REVISION 07/01/15





GENERAL NOTES

- 1. TWO-WAY TRAFFIC signs shall be repeated every $\frac{1}{4}$ mile in each direction, through the tangent distance (T).
- 2. When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travel way. See Index No. 612 for shoulder taper formulas.
- 3. Where the tangent distance (T) exceeds 250', spacing between cones or tubular markers may be increased to 50' or spacing between Type I or Type II barricades or vertical panels or drums may be increased to 100' within the limits of the tangent.
- 4. This index does not apply when work is being performed in the middle lane(s) of a six or more lane highway. Special maintenance of traffic details will be required.
- 5. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 6. For general TCZ requirements and additional information, refer to Index No. 600.

Table II Taper Length - Merge (12' Lateral Transition)						
Speed L Notes (mph) (ft.) (Merge						
25	125	w.c.2				
30	180	$L = \frac{WS^2}{60}$				
35	245					
40	320					
45	540					
50	600					
55	660	L=WS				
60	720	L-W3				
65	780					
70	840					

For lateral transitions other than 12' use formula for L shown in the notes column. Where:

L = Length of taper in feet

W = Width of lateral transition in feet

S = Posted speed limit (mph)

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF THE LANES IN ONE DIRECTION AND A DIVERSION IS PROVIDED BY UTILIZING ONE LANE OF THE OPPOSING TRAFFIC LANES.

S	Y	Μ	В	0	LS

Work Area

Channelizing Device (See Index No. 600)

Type III Barricade

Work Zone Sign

Advance Warning Arrow Board

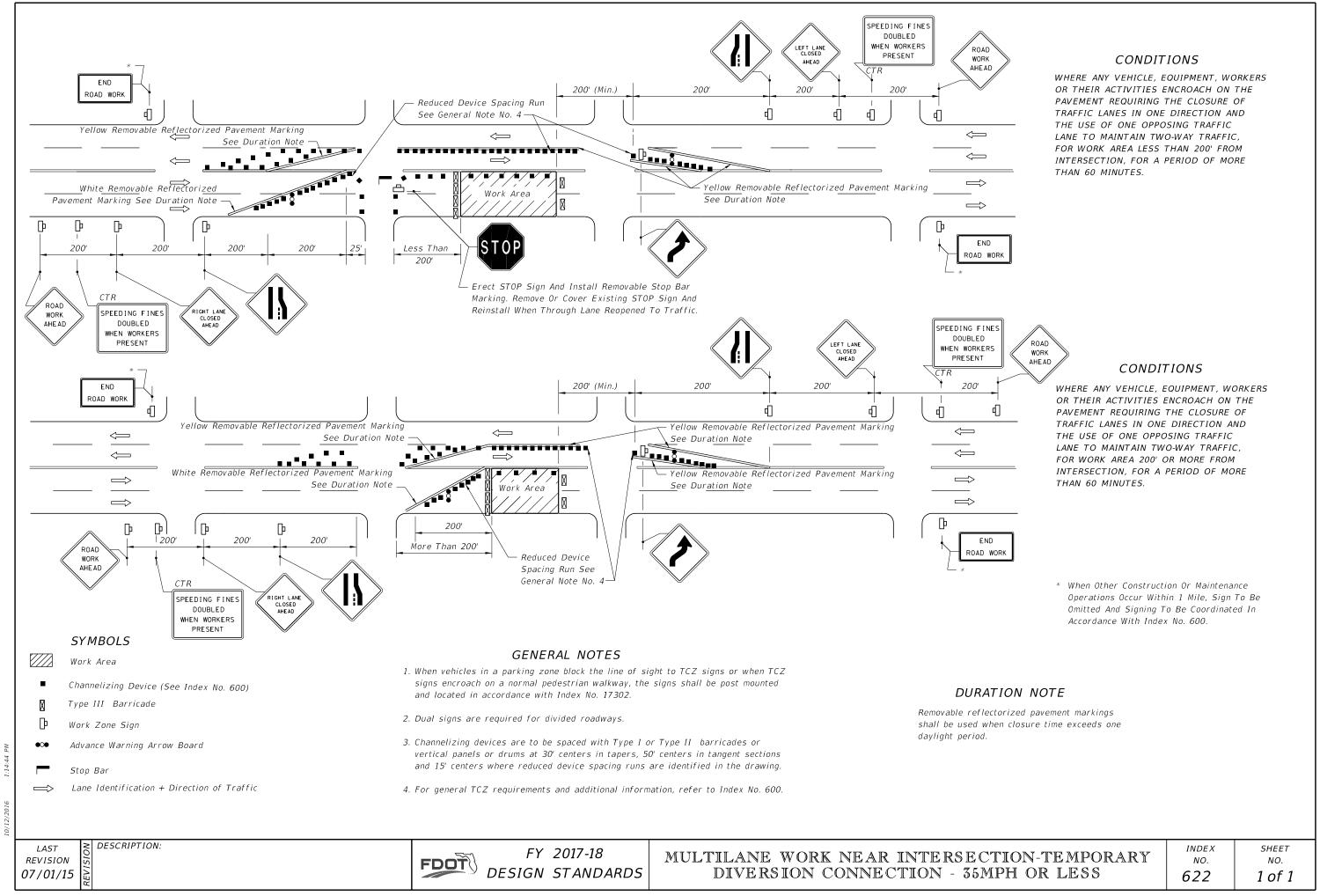
DESCRIPTION:

Lane Identification + Direction of Traffic

REVISION 07/01/15

FY 2017-18 **DESIGN STANDARDS**

MULTILANE, UNDIVIDED TEMPORARY DIVERSION CONNECTION INDEX NO. 621



DISTANCE BETWEEN SIGNS				
Enood	Spacing (ft.)			
Speed	Α	В	С	D**
40 mph or less	200	200	200	L
45 mph	350	350	350	L
50 mph	500	500	500	L
*55 mph or greater	2640	1640	1000	L

- * The ROAD WORK 1 MILE sign may be used as an alternate to the ROAD WORK AHEAD sign MILE sign may be used as an alternate to the RIGHT LANE CLOSED AHEAD sign.
- ** See Table II for L
- *** 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

Table I						
	Device Spacing					
	Max. Distance Between Devices (ft.)					
Speed	Cone	oc or	Type I	or Type II		
(mph)	Cones or Tubular Markers		Barricades or Vertical			
(****)	Tubulai	Markers	Panels or Drums			
	Taper	Tangent	Taper	Tangent		
25	25	50	25	50		
30 to 45	25	50	30	50		
50 to 70	25	50	50	100		

Table II							
Buffe	Buffer Space and Taper Length						
Speed	'						
(mph)	Dist. (ft.)	L (ft.)	Notes (Merge)	2L (ft.)			
25	155	125		250			
30	200	180	$L = \frac{WS^z}{60}$	360			
35	250	245		490			
40	305	320		640			
45	360	540		1080			
50	425	600		1200			
55	495	660		1320			
60	570	720	L = WS	1440			
65	645	780		1560			
70	730	840		1680			

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column. Where:

L= Length of taper in feet

W= Width of lateral transition in feet

S= Posted speed limit (mph)

GENERAL NOTES

- 1. Work operations shall be confined to the two outside traffic lanes, leaving the adjacent lane(s) open to traffic.
- 2. On undivided highways the median signs as shown are to be
- 3. When work is performed in the median lane on divided highways, the channelizing device plan is inverted and left lanes closed and lane ends signs substituted for the right lanes closed and lane end signs.
- 4. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 5. For general TCZ requirements and additional information, refer to Index No. 600.
- 6. When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travel way. See Index No. 612 for shoulder taper formulas.

DURATION

Temporary white edgeline may be omitted for work operations less than three (3) days.

CONDITIONS

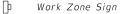
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE TWO LANES ADJACENT TO EITHER SHOULDER.

SYMBOLS



Work Area

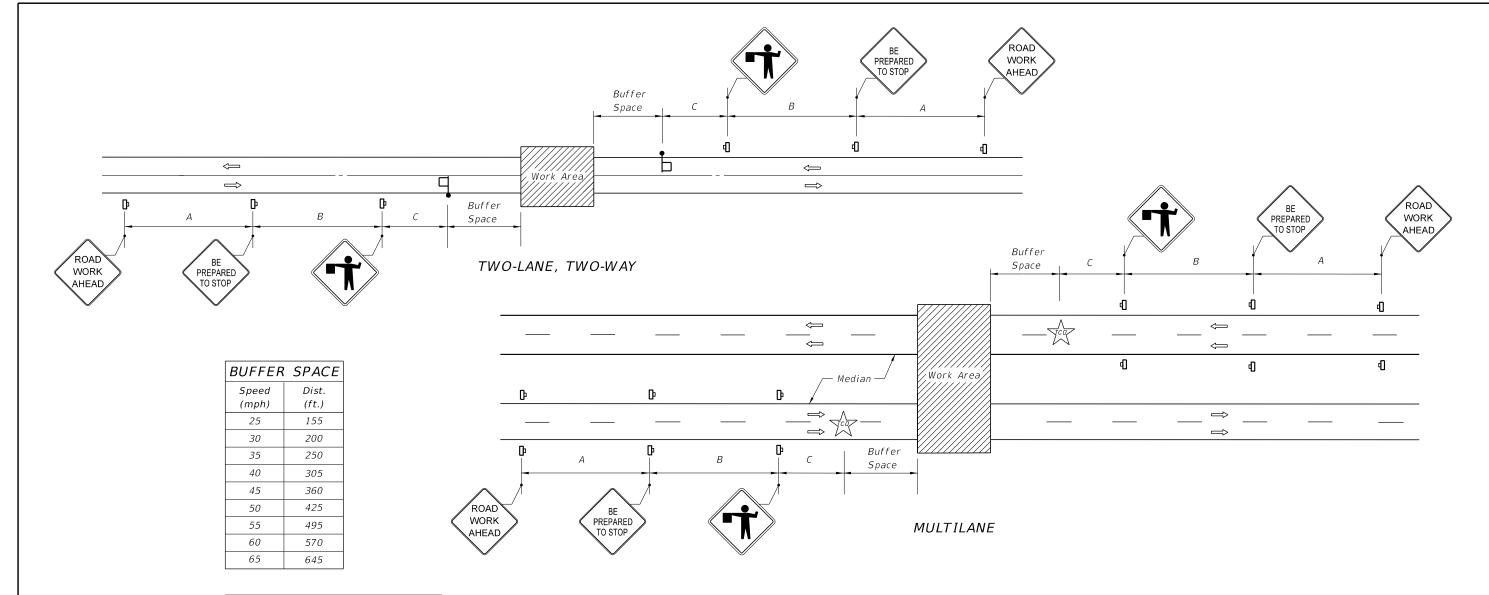
Channelizing Device (See Index No. 600)



Advance Warning Arrow Board

DESCRIPTION:

REVISION 07/01/15



SYMBOLS

Work Area

Work Zone Sign

Flagger

Traffic Control Officer

Lane Identification + Direction of Traffic

DESCRIPTION:

DISTANCE BETWEEN SIGNS

Speed

(mph)

40 or less

45

50 or greater

Spacing (ft.)

A B C

500 500 500

200 200

350 350

200

350

GENERAL NOTES

- 1. This Index does not apply to limited access facilities.
- 2. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with applicable TCZ Indexes.
- 3. Traffic volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic control officer.
- 4. The buffer space may be omitted if there are no sight obstructions to vehicles approaching the Flagger/Officer for distance equal to the buffer space.
- 5. A Flagger may be substituted for a Traffic Control Officer and the BE PREPARED TO STOP sign may be omitted, when the following conditions are met:
- a. Speed limit is 45 mph or less.
- b. No sight obstructions to vehicles approaching the Flagger/Officer for a distance equal to the buffer space.
- c. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- 6. On undivided highways the median sign as shown are to be omitted.

7. For general TCZ requirements and additional information refer to FDOT Index No. 600.

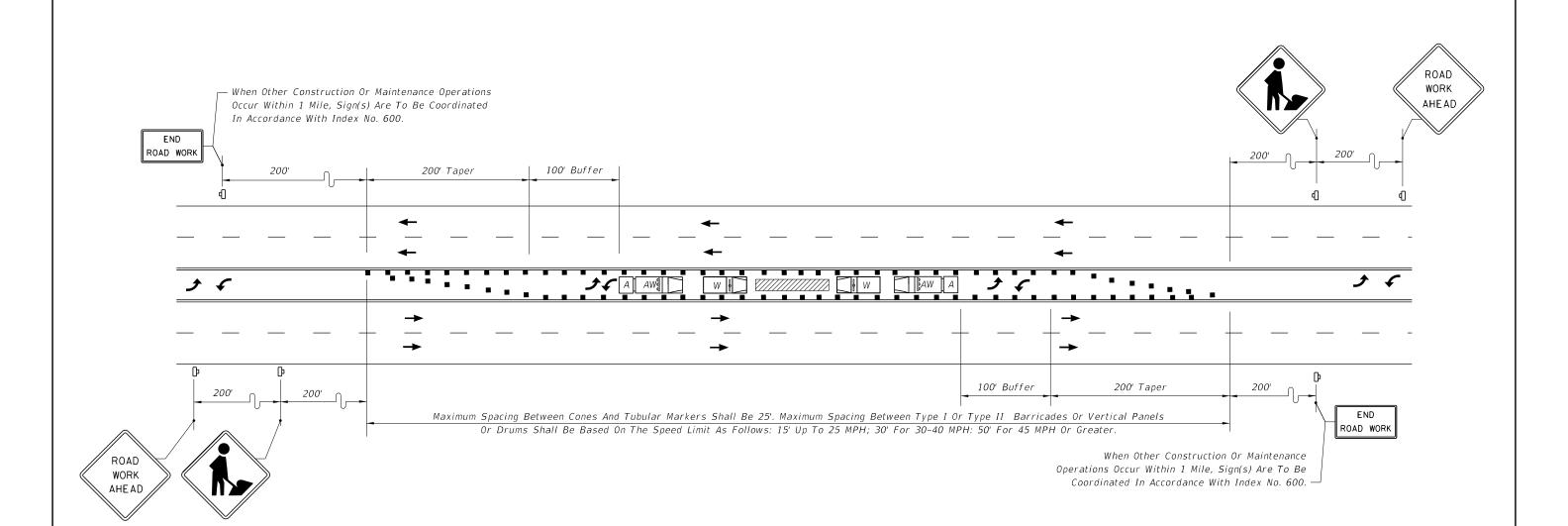
CONDITIONS

PLANNED CLOSURE NOT EXCEEDING 5 MINUTES

REVISION 07/01/15

FY 2017-18 **DESIGN STANDARDS**





SYMBOLS

Work Area

Channelizing Device (See Index No. 600)

₩ork Zone Sign

Work Vehicle With Rotating/Strobe Lights

Shadow (S) Or Advance Warning (AW) X Vehicle with Advance Warning Arrow Board and Sign Message

Truck/Trailer Mounted Attenuator (TMA)

GENERAL NOTES

- 1. Work operations shall be confined to two way left turn lane, leaving the adjacent lanes open to traffic.
- 2. Advance Warning Vehicle will have an Advanced Warning Arrow Board in the Warning Mode.
- 3. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- 4. For general TCZ requirements and additional information, refer to Index No. 600.

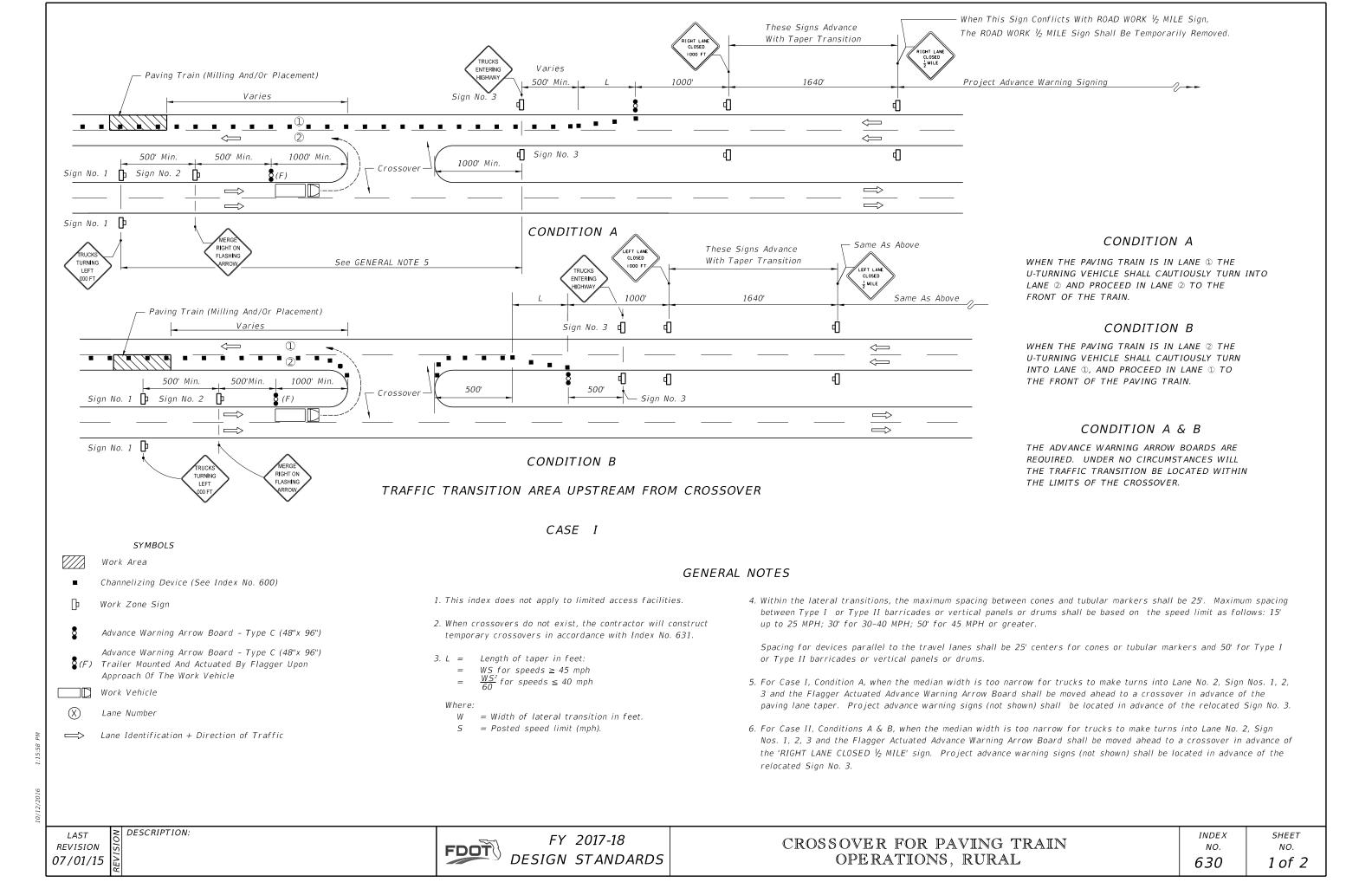
CONDITIONS

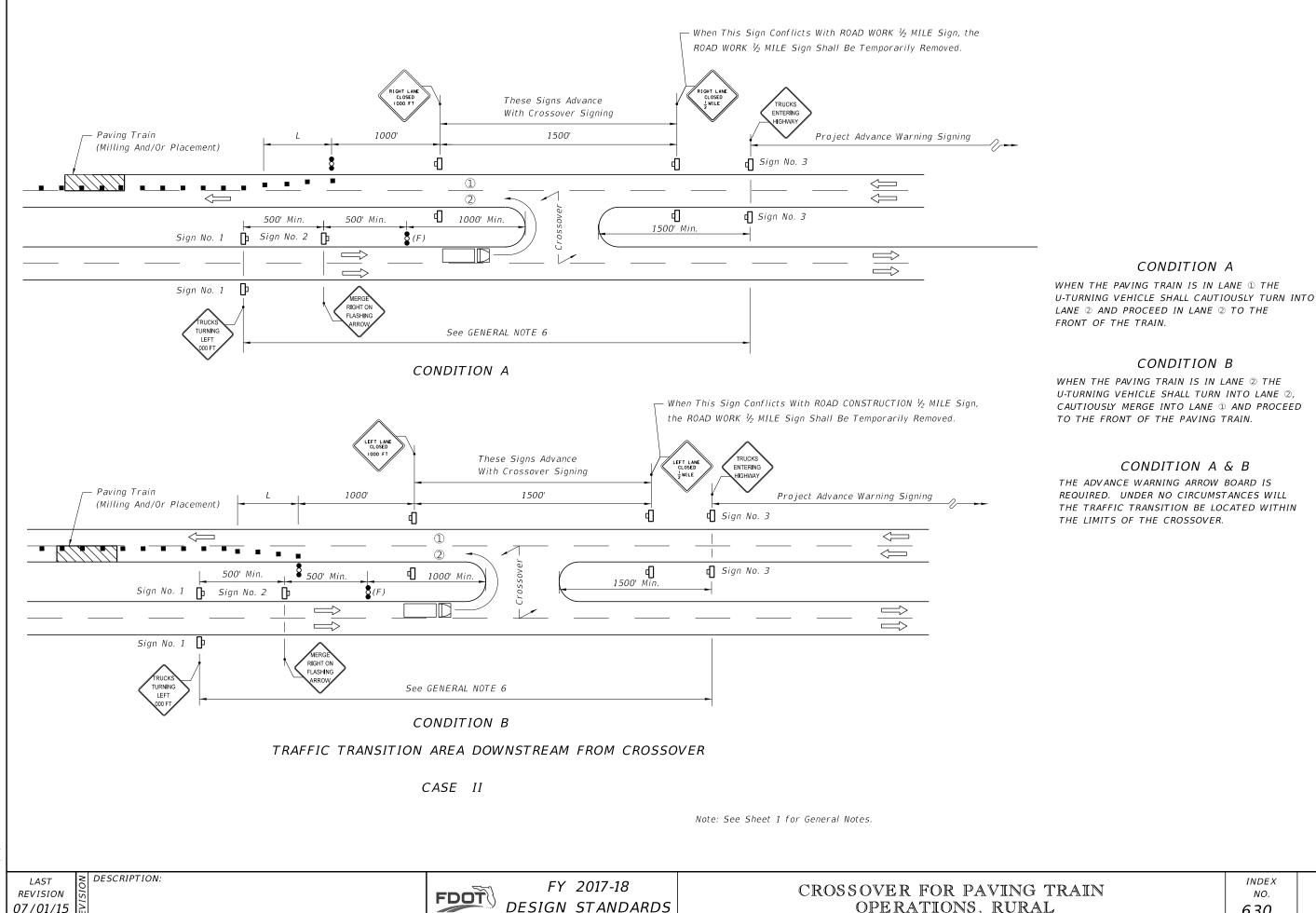
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ARE BEING CONDUCTED IN THE TWO WAY LEFT TURN LANE.

REVISION 07/01/15

FY 2017-18 DESIGN STANDARDS

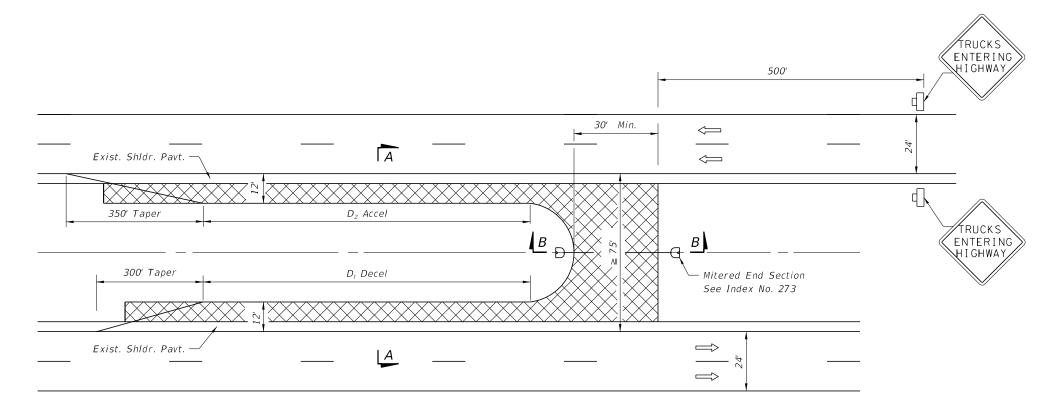
INDEX NO. 628





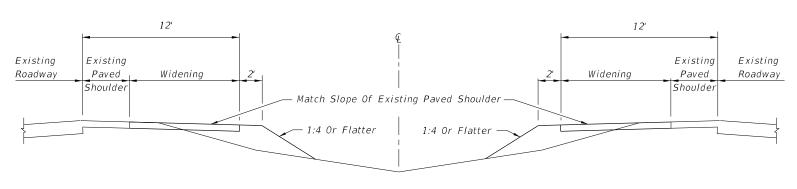
07/01/15

SHEET

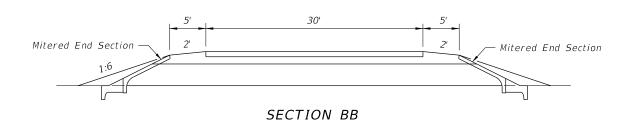


LENGTH OF ACCESS LANES (Ft.)				
LENGTH OF ACCESS LANES (TC.)				
Grade	D_1	D_2		
2% or less	590'	1540'		
3 to 4% Upgrade	530'	2310'		
3 to 4% Downgrade	710'	925'		

PLAN



SECTION AA



SYMBOLS

- Work Zone Sign
- Lane Identification + Direction of Traffic
- \boxtimes Temporary Pavement

DESCRIPTION:

GENERAL NOTES

- 1. Temporary median crossovers shall be within the project limits and shall not be used for transporting materials to or from any other project. The acceleration-deceleration surfaces shall be paved. RAP material is acceptable for crossing surfacing.
- 2. Temporary median crossovers shall be located only in areas having adequate sight distance. On limited access facilities temporary median crossovers shall not be located within 1.5 miles of interchanges nor within 2000 ft. of acceleration-deceleration lanes at rest areas, other access openings or other highway service areas.
- 3. For paving train operations at permanent crossovers, see Index No. 630.
- 4. All traffic control devices are to be removed when crossover will not be in use for one hour or longer.
- 5. Trailer mounted advance warning panel may be used in lieu of advance warning vehicle.
- 6. When a crossover is no longer needed, all temporary construction shall be immediately removed and the area restored to its original condition.
- 7. Cost of construction, maintenance, removal and restoration work related to temporary crossovers shall be included in the contract unit price for Maintenance of Traffic, LS.
- 8. Temporary crossovers on limited access right of way and use of this Index are prohibited unless specifically permitted in the Contract Plans or Special Provisions. When permitted in the Contract Plans or Special Provisions and prior to construction of any temporary crossover, the Contractor must submit, in writing, a request identifying specific locations for approval by the Engineer.
- 9. Pipe and mitered end sections are not required when crossover is located at the high point of a crest vertical curve.

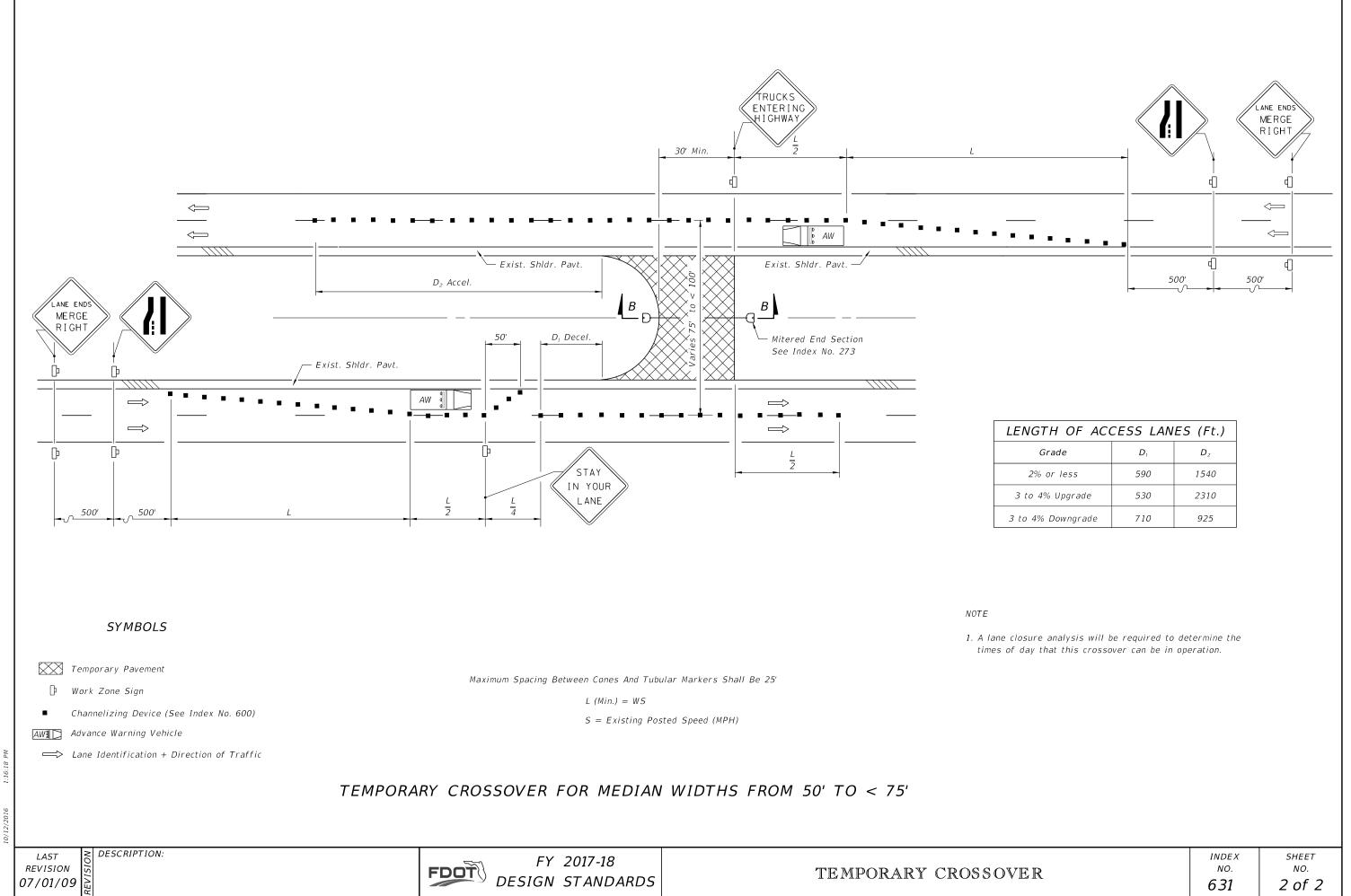
TEMPORARY CROSSOVER FOR MEDIAN WIDTHS ≥ 75'

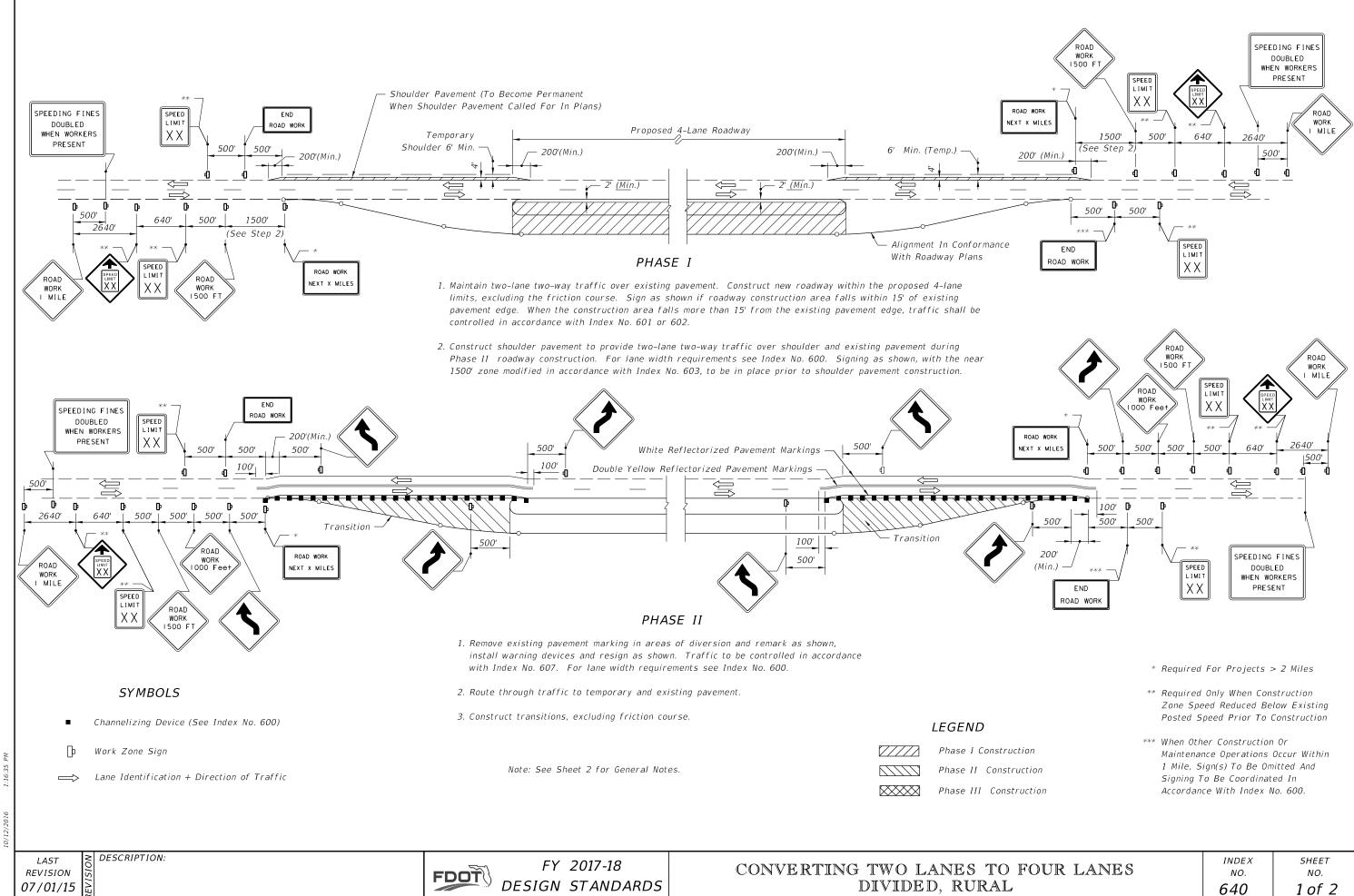
REVISION 07/01/13

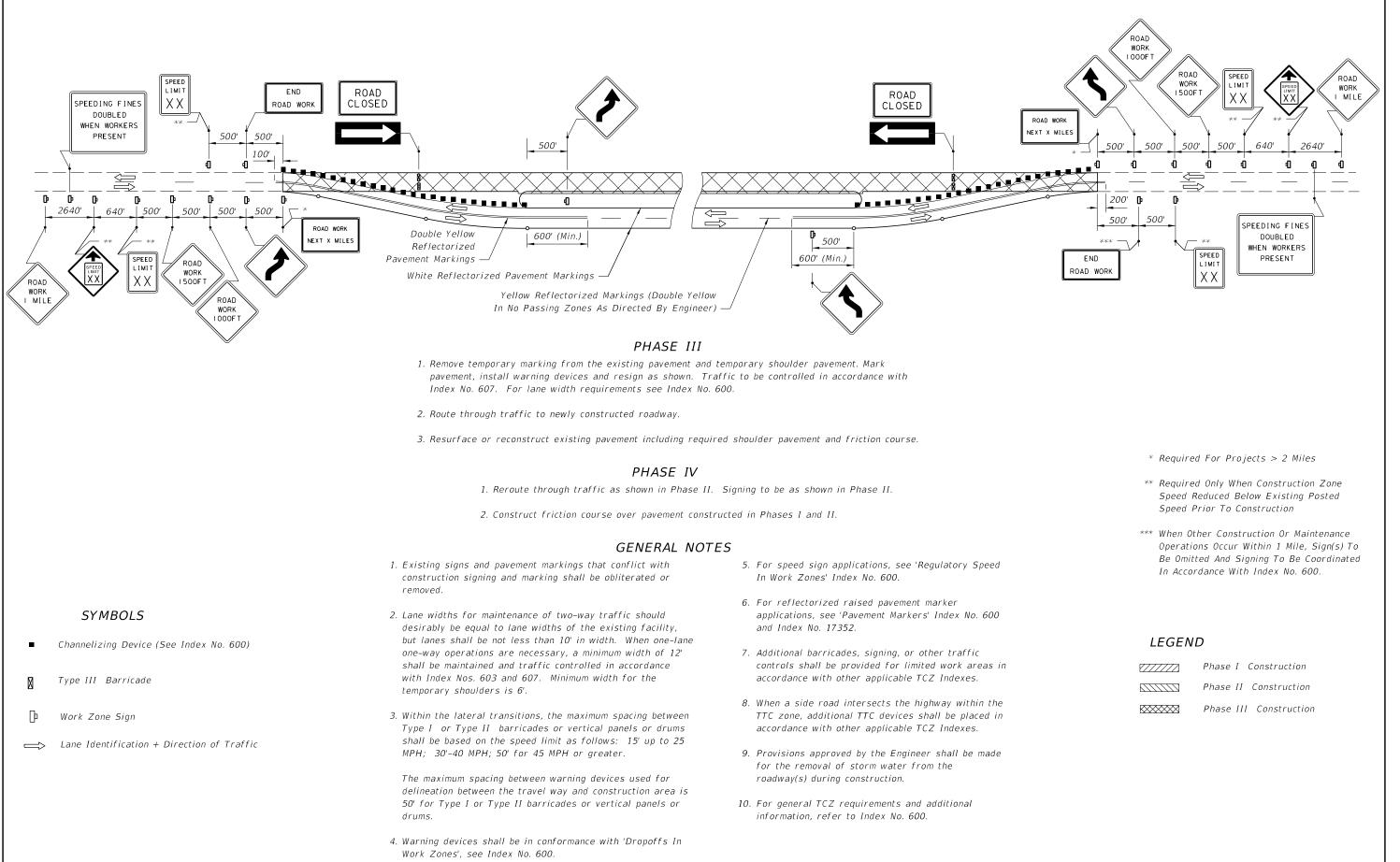
FY 2017-18 **DESIGN STANDARDS**

TEMPORARY CROSSOVER

INDEX NO. 631

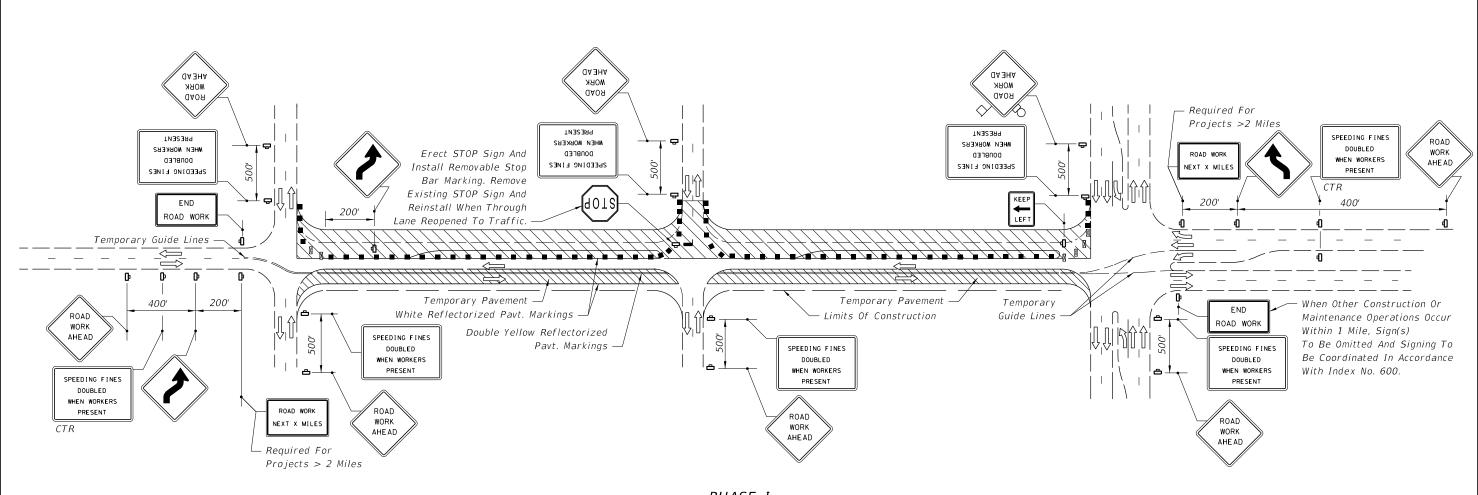






DESCRIPTION:

2 of 2



PHASE I

- 1. Maintain two-lane two-way traffic along existing facility. Install construction signing.
- 2. Remark existing pavement to facilitate temporary pavement construction. For lane width requirements see Index No. 600.
- 3. Construct temporary pavement of sufficient width to accommodate two-lane two-way traffic on the temporary pavement and a portion of the existing pavement during Phase I roadway construction. When two-lane two-way traffic can not be maintained during temporary pavement construction one-lane operations shall be maintained in accordance with Index No. 605. Channelizing devices shall be in conformance with 'Drop-Offs in Work Zones' of Index No. 600.
- 4. Mark the pavement in accordance with the Phase I diagram. Reroute through traffic to the temporary pavement and a portion of the existing pavement. For lane width requirements see Index No. 600.
- 5. Construct two lanes of the proposed roadway, excluding the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Index Nos. 604, 605 and 615. Barricading shall be in conformance with 'Drop-Offs in Work Zones', Index No. 600. When work extends through an intersection, temporarily reroute the cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (minimum) for two-lane two-way cross streets and one-lane access (minimum) each direction for four-lane two-way cross streets, in accordance with Index Nos. 604, 605 and 615.

SYMBOLS

- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Stop Bar
- Lane Identification + Direction of Traffic

DESCRIPTION:

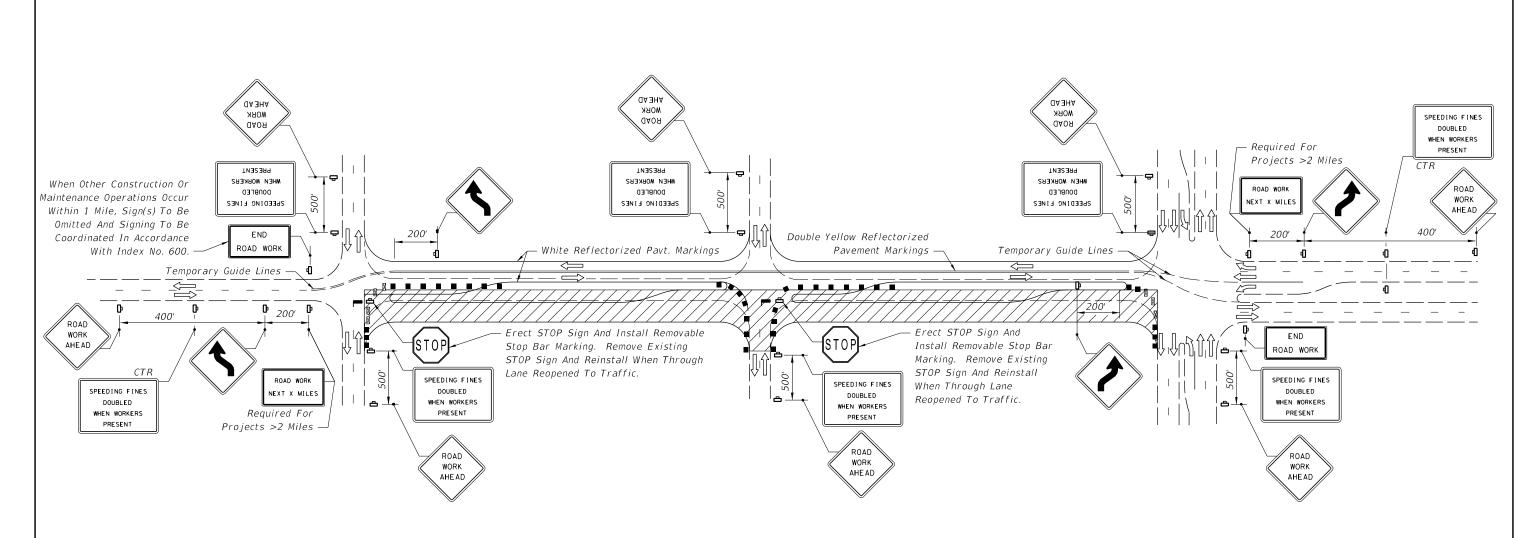
LEGEND

See Sheet 3 for General Notes.

Phase I Construction Phase II Construction

Phase III Construction

REVISION 07/01/15



PHASE II

- 1. Sign and mark Phase I pavement in accordance with the Phase II diagram. For lane width requirements see Index No. 600.
- 2. Reroute through traffic to Phase I pavement
- 3. Complete all Phase II construction, including the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Index Nos. 604, 605 and 615. Channelizing devices shall be in conformance with 'Drop-Offs in Work Zones' of Index No. 600. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (minimum) for two-lane two-way cross streets and one-lane access (minimum) each direction for four-lane two-way cross streets, in accordance with Index Nos. 604, 605 and 615.

SYMBOLS

- Channelizing Device (See Index No. 600)
- Type III Barricade

DESCRIPTION:

- Work Zone Sign
- Lane Identification + Direction of Traffic

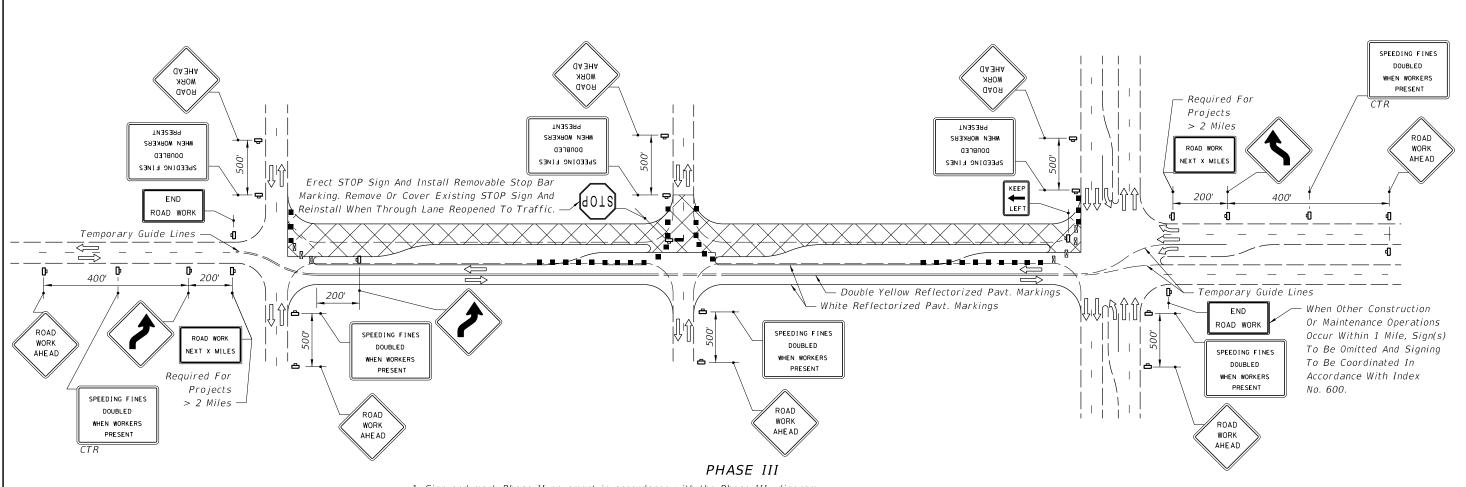
LEGEND

See Sheet 3 for General Notes.

Phase I Construction Phase II Construction

Phase III Construction

REVISION 07/01/15



- 1. Sign and mark Phase II pavement in accordance with the Phase III diagram.
- 2. Reroute through traffic to Phase II pavement.
- 3. Construct friction course over Phase I pavement. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Index Nos. 604, 605 or 615. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (minimum) for two-lane two-way cross streets and one-lane across (minimum) each direction for four-lane two-way cross streets.

GENERAL NOTES

- 1. All signing, pavement marking, and barricades necessary for maintenance of traffic shall conform to Index No. 600.
- 2. Lane widths for maintenance of two-way traffic should desirably be equal to lane widths of the existing facility, but lanes shall not be less than 10' in width. When one-lane one-way operations are necessary, a minimum width of 12' should be maintained and traffic controlled in accordance with Index Nos. 604, 605 or 615.
- 3. At signalized intersections, signals shall be directed or relocated as required to the center of relocated lanes.
- 4. For reflectorized raised pavement marker application, see Index Nos. 600 and 17352.
- 5. Additional barricades, signing, lighting or other traffic controls for limited work areas shall be provided in accordance with other applicable TCZ Indexes as conditions warrant in each phase.
- 6. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
- 7. For general TCZ requirements and additional information, refer to Index No. 600.

LEGEND

Phase I Construction

Phase II Construction

KXXX Phase III Construction

REVISION 07/01/15 **SYMBOLS**

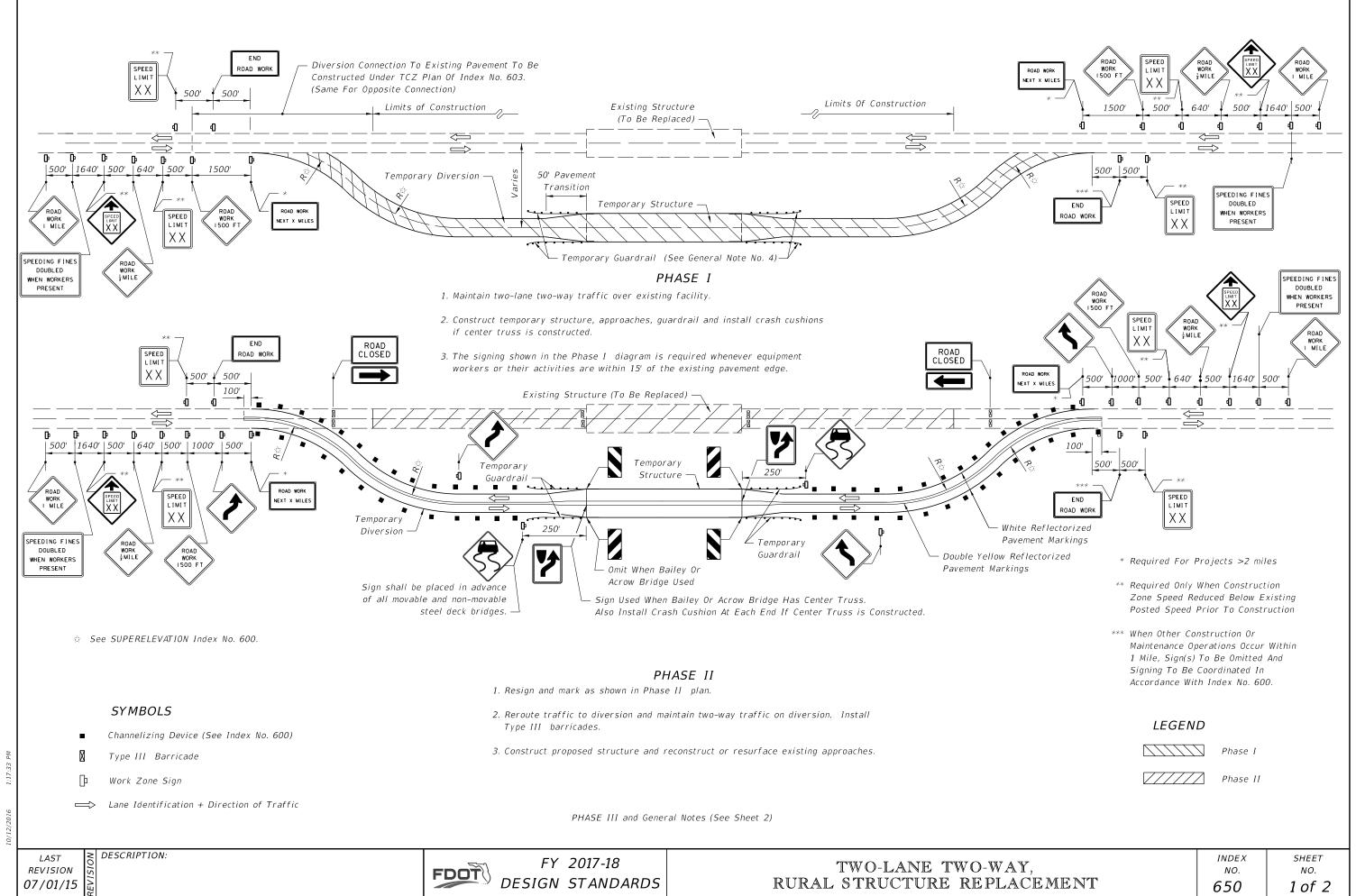
Type III Barricade

Work Zone Sign

DESCRIPTION:

Channelizing Device (See Index No. 600)

Lane Identification + Direction of Traffic



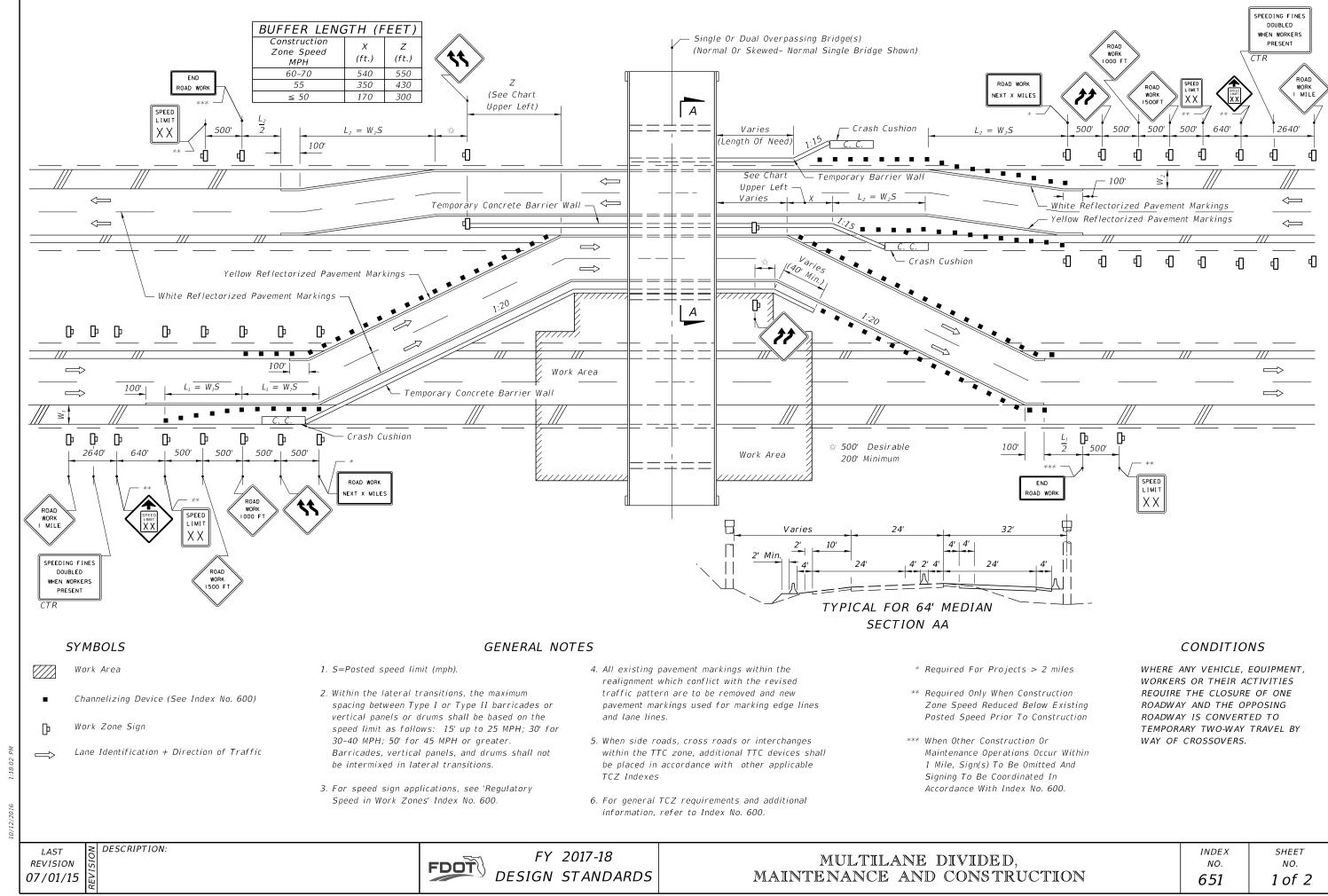
PHASE III

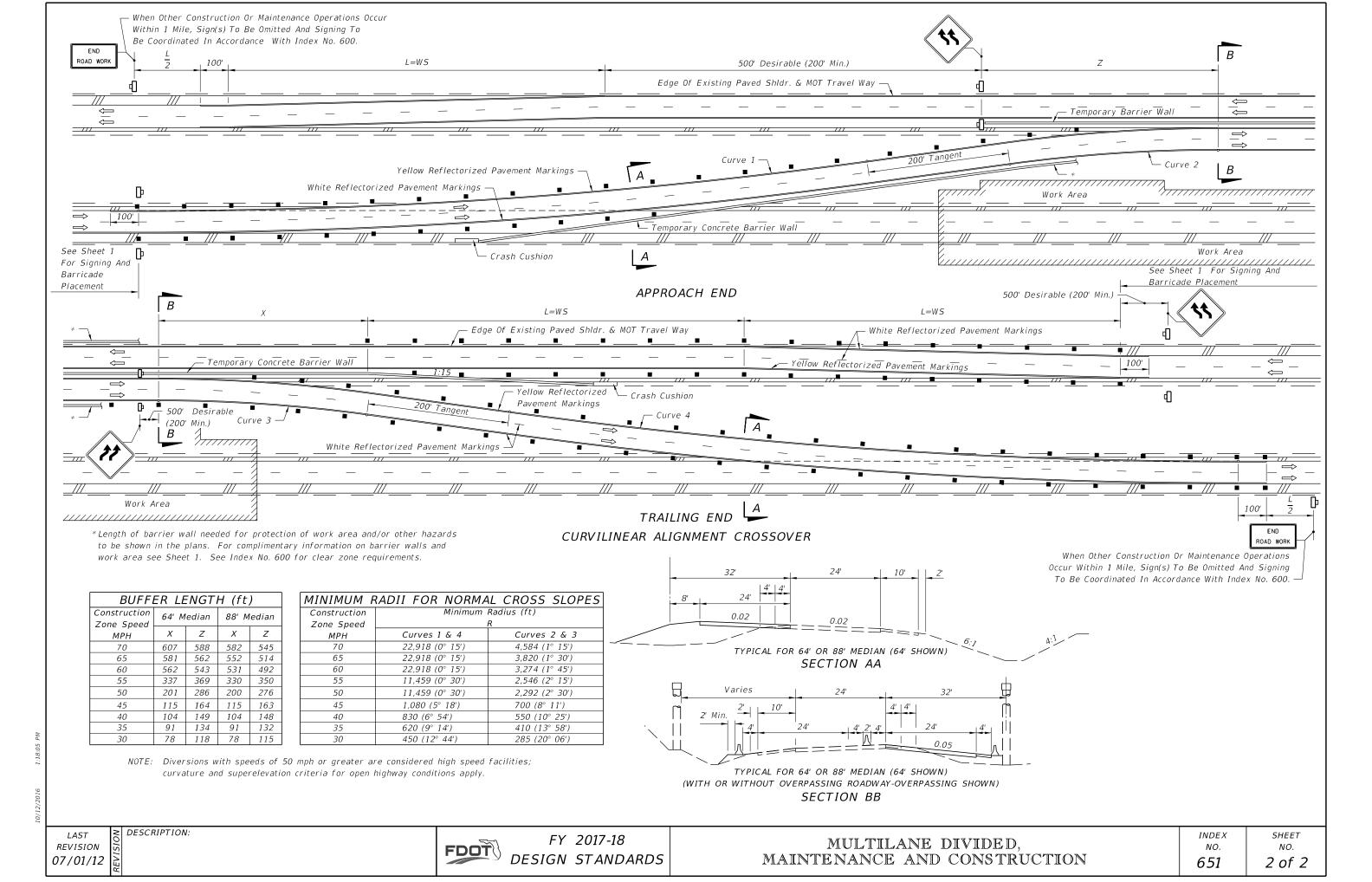
- 1. Reroute traffic to final alignment and maintain two-way traffic.
- 2. Remove all temporary construction items.

GENERAL NOTES

- 1. All signing, pavement marking, and barricades necessary for maintenance of traffic shall conform to Index No. 600.
- 2. For speed sign applications, see Index No. 600.
- 3. For lane width requirements see Index No. 600. When one-way one-lane operations are necessary, a minimum width of 12' shall be maintained and traffic controlled in accordance with Index Nos. 603, 606 or 607. Minimum width for the diversion shoulders is 6'.
- 4. Method of attaching temporary guardrail to the diversion structure to be approved by the Engineer. Cost of temporary guardrail systems, including end anchorage assemblies, transitions and attachment to temporary structures, are to be included in the contract unit price for Guardrail (Temporary) LF.
- 5. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
- 6. Only temporary crash cushions approved by the Department shall be used unless specified devices called for in the plans.
- 7. Where the temporary structure is not required, the diversion may be constructed in accordance with Index No. 608, unless otherwise stipulated in the plans.
- 8. For reflective raised pavement marker application, see Index Nos. 600 and 17352.
- 9. For general TCZ requirements and additional information, refer to Index No. 600.

DESCRIPTION: **REVISION** 07/01/15

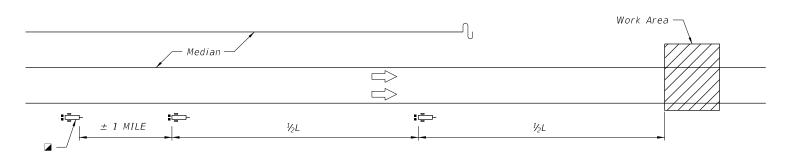




The traffic pacing begins with approval of the exact date of the activity that shall be made two weeks in advance. The District Public Information Office, the District Traffic Operations Engineer, Local Emergency Management Agencies and Project Personnel shall be notified of the location, date and time. Advance notification to the public shall begin at least one week in advance by using Changeable Message Signs.

The day of the traffic pacing operation, the Changeable Message Sign messages shall be revised to indicate the activity will occur that night or day. The traffic pacing operation begins with a Traffic Control Officer Supervisor at the work site initiating the pacing operation in accordance with pacing details shown on sheet 2. The intent is to keep traffic moving unless there is an emergency.

CHANGEABLE MESSAGE SIGNS (Typical Placement and Messages)



L = Length of Traffic Pacing Operation

CHANGEABLE MESSAGE SIGN MESSAGE (MAINLINE AND RAMPS)

EXPECT

ROAD

Symbols

Channelizing Device (See Index No. 600)

Marked Police Vehicle with Flashing Blue Lights

PCMS, Portable Changeable Message Sign

■ To be placed the day of pacing operation

DESCRIPTION:

ONE WEEK PRIOR TO PACING OPERATION

DELAYS DD-DD X AM - X AM

DURING DAY OF PACING OPERATION

DURING PACING OPERATION

PERIODIC WORK TONIGHT **DELAYS** SLOW ΒE PREPARED TRAFFIC AHEAD TO STOP

MMM

EXPECT

NOTICE

This Index applies to Limited Access Facilities.

This Index represents the minimum requirements for traffic pacing operations on the State Highway System.

A site specific traffic control plan shall be developed for each pacing operation.

TRAFFIC PACING GENERAL NOTES

- 1. Install ROAD CLOSED (W20-3) signs approximately 1000' prior to the work area. These signs shall remain covered until the pacing operation begins and covered when the pacing operation has ended.
- 2. Prior to requesting that the traffic control officer supervisor initiate the pacing operation, the contractor shall ensure that the necessary equipment is properly positioned (off the roadway) for the construction activity requiring the traffic pacing operation.
- 3. Truck mounted attenuator(s) with changeable message sign(s) are required to protect workers and/or equipment positioned in a travel lane(s) at the work area during the pacing operation from an errant vehicle. If no workers and/or equipment are positioned in a travel lane(s) at the work area, truck mounted attenuator(s) are not required.
- 4. A traffic control officer supervisor shall be stationed at the work area continuously throughout the pacing operation to insure radio communications between the contractor and/or the project administrator, and all the police vehicles involved in the pacing operation.
- 5. When more than one pacing operation is required in one work period the contractor shall allow sufficient time between pacing operations to permit traffic to return to normal speeds and flow. Additional time may be required between pacing operations to allow traffic to resume normal speeds and flow upstream of the work area as determined by the project administrator or traffic control officer supervisor.

TRAFFIC CONTROL PLANS OR TECHNICAL SPECIFICATION

- 1. The specific activities and locations, along with allowable times of day and days of the week, when pacing will be allowed should be clearly detailed in the traffic control plans or technical specification. If there are specific holiday or special event dates that, due to anticipated traffic congestion, pacing operations should not be allowed, these dates should also be spelled out in plans or specifications. When detailing the specific activities and locations of pacing activities, identify the minimum number of traffic control officers needed for each function and location of the pacing operation. If there are certain work activities that need to be completed prior to the contractor starting the work anticipated during the pacing operation, the activities should be clearly detailed in the plans or technical specification.
- 2. When developing a pacing plan, failsafe "stop points" should be identified for those work operations in which a construction problem could create a condition that could not be immediately cleared. A failsafe stop point is the last safe egress from the highway facility prior to traffic coming upon the work that is being completed during the operation. In the unlikely event that the work is not completed during the time estimated for the pacing, the plans or specification should direct the pacing to not proceed past the failsafe stop point until the highway is cleared. In the event of major construction problem that cannot be immediately cleared, traffic can then be diverted off the facility.
- 3. The traffic control plans or technical specification should require the contractor to submit a pacing plan in advance of the operation. The pacing plan should outline the contractors expected equipment and personnel, outline the operation, and include a contingency plan should any of the contractor's critical equipment break down. If the project includes a damage recovery clause, the traffic control plan or technical specification should be clear that the damage recovery applies to the pacing operation as well.
- 4. Changeable message signs shall be displayed one week prior to work using messages described in the traffic pacing plan. The number and location of changeable message signs shall be called out in the traffic control plans.

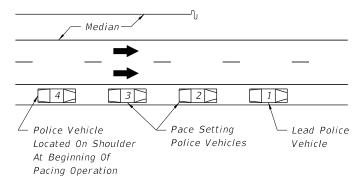
REVISION 07/01/09

FY 2017-18 DESIGN STANDARDS

TRAFFIC PACING

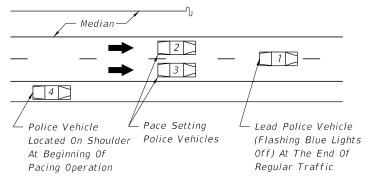
INDEX NO. 655

MAINLINE PACING DETAILS (1 DIRECTION OF FOUR LANE ROADWAY EXAMPLE)



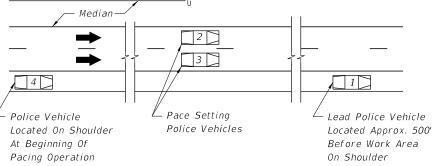
STAGE ONE

1. Four police vehicles located upstream of the work area at the beginning location of the traffic pacing operation with flashing blue lights off.



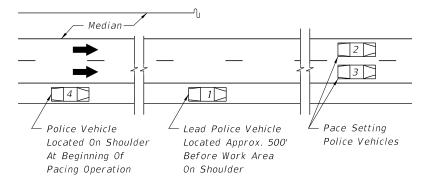
STAGE TWO

1. Once the police vehicles are in place and the traffic control officer supervisor at the work area notifies all officers to begin the traffic pacing operation, the last three police vehicles shall turn on their flashing blue lights. The first three police vehicles shall enter the travel lanes with the second and third police vehicles immediately forming a side by side "pacing operation" of all lanes behind the lead police vehicle (flashing blue lights off).



STAGE THREE

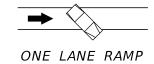
- 1. The two pace setting police vehicles shall begin to slow to the pacing speed (20 mph is preferred, 10 mph minimum), for the duration of the traffic pacing operation.
- 2. The lead police vehicle (flashing blue lights off) shall match the speed of the last vehicles ahead of the pacing vehicles and continue following traffic until a point approximately 500' in advance of the work area. The lead police vehicle shall then come to a complete stop on the right shoulder and turn on its flashing blue lights. If required, crash truck(s) with rear mounted impact attenuator(s) and changeable message sign(s) shall move into the travel lanes approximately 200 ft. upstream of the work area with the impact attenuators down and operating once traffic has cleared the work area.

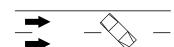


STAGE FOUR

- 1. When the pace setting police vehicles are within approximately two miles of the work area they shall notify the onsite traffic control officer supervisor who will immediately inform the contractors on site supervisor of their location. Once the contractors on site supervisor has been notified of the pacing vehicles location, the contractor shall begin to clear the travel lanes of all equipment and debris in order to reopen all travel lanes.
- 2. In case of emergency the pace setting police vehicles shall come to a complete stop once they reach the lead police vehicle. If no emergency is encountered, the crash truck(s) shall be moved from the travel lanes and the two pace setting police vehicles shall clear the work area and immediately move to the right shoulder or an area designated by the traffic control officer supervisor and turn off the flashing blue lights. Once the two pace setting police vehicles pass the work area, the traffic control officer supervisor shall instruct the lead and last police vehicles to turn off their flashing blue lights.

RAMP PACING DETAILS





TWO LANE RAMP

RAMP CLOSURE DETAIL

- 1. Once notified by the on site traffic control officer supervisor to begin the traffic pacing operation each police vehicle at the indicated ramp shall turn their flashing blue lights on and position the vehicle across the ramp lane(s) to close ramp access.
- 2. Once the pacing operation passes the closed on ramp the police vehicle on the ramp shall turn off the flashing blue lights and move from the ramp lane(s) to allow traffic to enter the mainline pacing operation.

GENERAL NOTES

1. Each Traffic Control Officer shall have a marked vehicle with flashing blue lights, for the pacing operation. The location and number of officers at each location will be as follows:

No. Of Traffic Control Officers With Vehicles	Function	Location
1 min.	Supervisor	Work Area
1 Lead Vehicle	Varies	Mobile operation
1 for each travel lane	Pacing Operation	Mobile operation beginning x miles upstream and terminating at the work area
1 Stationed at the Beginning of Pacing Operation	Advanced Warning to Motorist	Stationed at the Beginning of Pacing Operation
1 for each entrance ramp	Entrance Ramp Roadblocks	One at each of the entrance ramps upstream of the work area

DESCRIPTION:

DESIGN CONSIDERATIONS:

Pacing Operation

The design shall evaluate the actual distance required for the pacing operation based on site specific features such as: roadway geometrics, pacing speeds, regulatory speeds, interchange spacing, work duration, availability of traffic control officers, traffic volumes and maximum queue length.

The starting point of a traffic pacing operation must consider the following factors: the speed of the pacing vehicles, the location of entrance ramps, horizontal and vertical alignment of the

In some instances, it may be necessary to close a lane at the work site to position a crane(s) and the materials to be lifted.

All material to be installed shall be on-site before the traffic pacing operation begins.

It may be necessary to install temporary barrier walls to protect pre-positioned and assembled materials in the right of way.

The minimum speed allowed for a pacing operation is 10 mph with 20 mph the preferred speed.

The maximum allowed work duration is $\frac{1}{2}$ hour (30 min).

The maximum practical pacing operation length is 10 miles.

 $S_r = Regulatory speed (mph)$

 $S_n = Pacing speed (mph)$

 $t_w = Work duration (min)$

L = Total pacing distance in miles

$$L = \frac{t_w}{60} S_p \left(\frac{S_p}{S_r - S_p} + 1 \right)$$
$$L = L_c + L_w$$

 L_{c} = distance paced vehicles must travel before the vehicles at regulatory speed have cleared the work zone

$$\frac{1}{2}c = \left(\frac{\frac{t_W}{60} \times S_p^2}{S_r - S_p}\right)$$

 L_W = distance paced vehicles travel while work is performed

$$L_W = \left(\frac{t_W}{60} \times S_p\right)$$

 $F_{HV} = Heavy Vehicle Factor$

$$F_{HV} = 1 + \left(\frac{P_t}{100} \times 0.5\right)$$

 $P_t = \% Trucks$

TRAFFIC PACING DISTANCES (L) miles

$S_p=20$; $pcphpl \leq 1,750$

S _r	t _W (min)							
- <i>r</i>	5	10	15	20	25	30		
70	2.3	4.7	7.0	9.3	*	*		
65	2.4	4.8	7.2	9.6	*	*		
60	2.5	5.0	7.5	10.0	*	*		
55	2.6	5.2	7.9	*	*	*		
50	2.8	5.6	8.3	*	*	*		

* Site Specific design required.

NOTES FOR TABLE:

 t_w is the total time allowed for work activity in minutes. This time starts just after the last vehicle traveling at the pre-pacing regulatory speed clears the work area and ends just as the pacing operation reaches the work area. t_{W} must include the time required to clear the roadway of equipment, materials, and personnel.

Demand volume may not exceed 1,750 pcphpl (passenger cars per hour per lane) without a site specific design. Traffic counts can be obtained from the Office of Planning, or you may need to collect traffic counts. Hourly directional traffic volumes must be converted to pcphpl using the following:

$$pcphpl = \left(\frac{Hourly\ Directional\ Volume}{\#\ Lanes\ (each\ direction)}\right) x\ Heavy\ Vehicle\ Factor$$

For additional guidance for site specific designs refer to the Plans Preparation Manual, Volume 1 Chapter 10.

REVISION 07/01/09

DESCRIPTION:

FY 2017-18 **DESIGN STANDARDS**

TRAFFIC PACING

INDEX NO. 655

SYMBOLS

Work Area

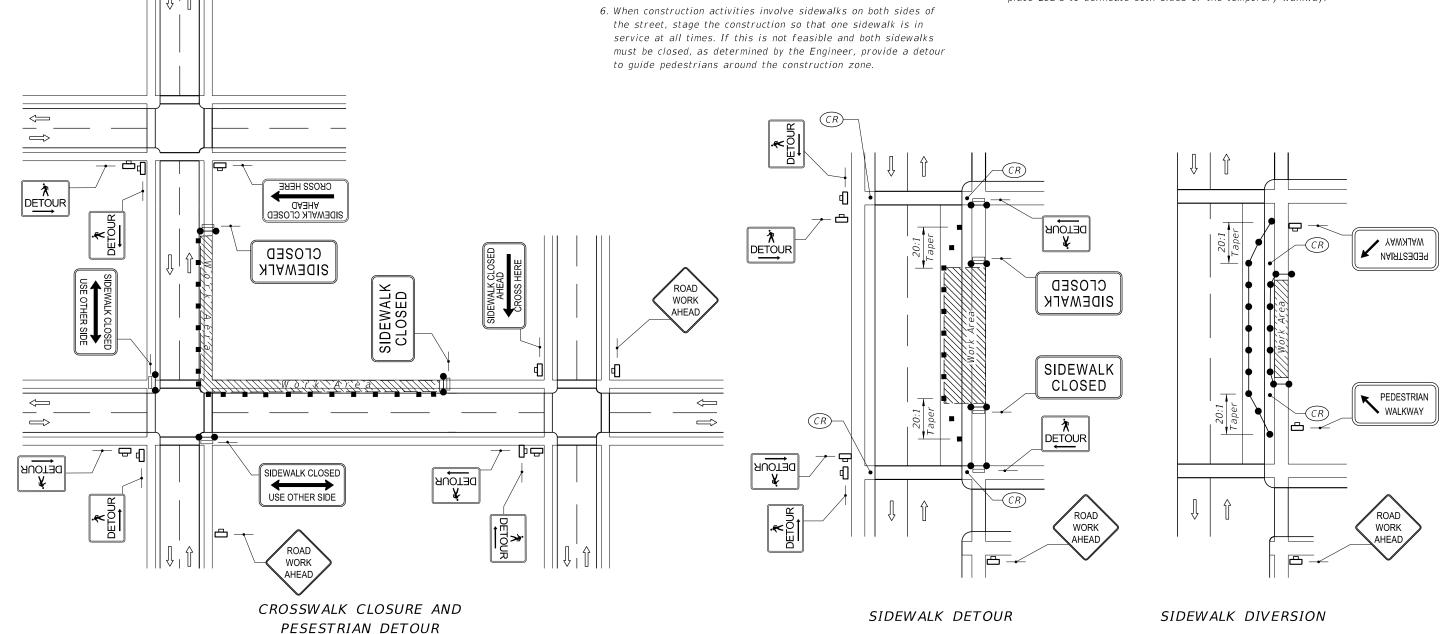
- Channelizing Device (See Index 600)
- Work Zone Sign

Required Locations For Either Temporary Or Permanent Curb Ramps.

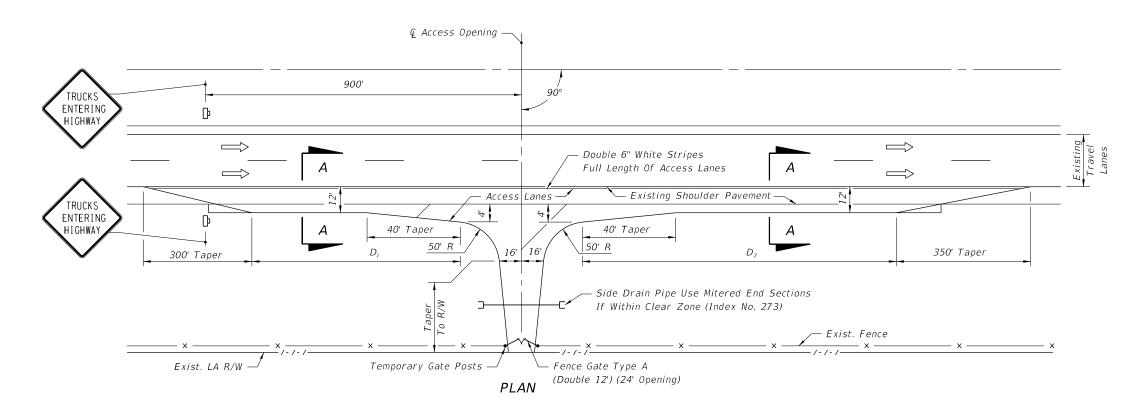
- Lane Identification + Direction of Traffic
- Pedestrian Longitudinal Channelizing Device (LCD) with Mounted Work Zone Sign or separate Work Zone Sign
- Pedestrian Longitudinal Channelizing Device (LCD)

- GENERAL NOTES
- 1. Route pedestrian traffic around work areas when construction activities encroach on the sidewalk for more than 60 minutes using the devices and remedies shown on this Index. Use project specific designs for scenarios not included on this Index.
- 2. For spacing of traffic control devices and general TCZ requirements refer to Index 600. The maximum spacing between barricades, vertical panels, drums or tubular markers is 25'.
- 3. Use delineators on longitudinal channelizing devices separating the work area from vehicular traffic.
- 4. Cover or deactivate pedestrian traffic signal display(s) controlling closed crosswalks.
- 5. Post mounted signs located near or adjacent to a sidewalk must have a 7' minimum clearance from the bottom of sign to the surface of the sidewalk.

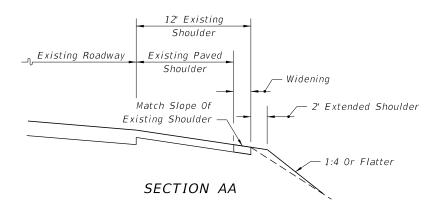
- 7. Provide a 5' wide temporary walkway, except where space restrictions warrant a minimum width of 4'. Provide a 5' x 5' passing space for temporary walkways less than 5' in width at intervals not to exceed 200'.
- 8. Provide a cross-slope with a maximum value of 0.02 for all temporary
- 9. Temporary walkway surfaces and ramps must be stable, firm, slip resistant, and kept free of any obstructions and hazards such as holes, debris, mud, construction equipment and stored materials.
- 10. Remove temporary walkways immediately after reopening of the sidewalk, unless otherwise noted in the plans.
- 11. Meet the requirements of Index 304 for temporary curb ramps.
- 12. Place pedestrian longitudinal channelizing device(s) across the full width of the closed sidewalk. For temporary walkways, similar to the Sidewalk Diversion, place LCD's to delineate both sides of the temporary walkway.







LENGTH OF ACCESS LANES (Ft.)					
2% or less	590	1540			
3 to 4% Upgrade	530	2310			
3 to 4% Downgrade	710	925			



- 1. Access openings across limited access right of way and use of this Index are prohibited unless specifically permitted in the Contract Plans or Special Provisions. When permitted in the Contract Plans or Special Provisions and prior to construction of any opening, the Contractor must submit, in writing, a request identifying specific locations for approval by the Engineer.
- 2. No more than two (2) access openings will be allowed on each project.
- 3. Access openings shall be located only in areas having adequate sight distance and shall not be located within 1.5 miles of interchanges nor within 2000 ft. of acceleration-deceleration lanes at rest areas, other access openings or other highway service areas.
- 4. Access openings shall not be constructed directly opposite temporary median crossovers nor within 2000 ft. of temporary median crossovers.
- 5. Access openings shall be within the project limits and shall not be used for transporting materials to or from any other project. The acceleration-deceleration surfaces shall be paved. RAP material is acceptable for driveway surfacing.
- 6. Any Motorist Aid Call Boxes affected by the temporary access openings shall be relocated outside the limits of access lanes and remain in use during construction. Upon removal of access lanes, call boxes shall be returned to their previous location. Temporary relocation and restoration of call boxes shall be at the contractor's expense.

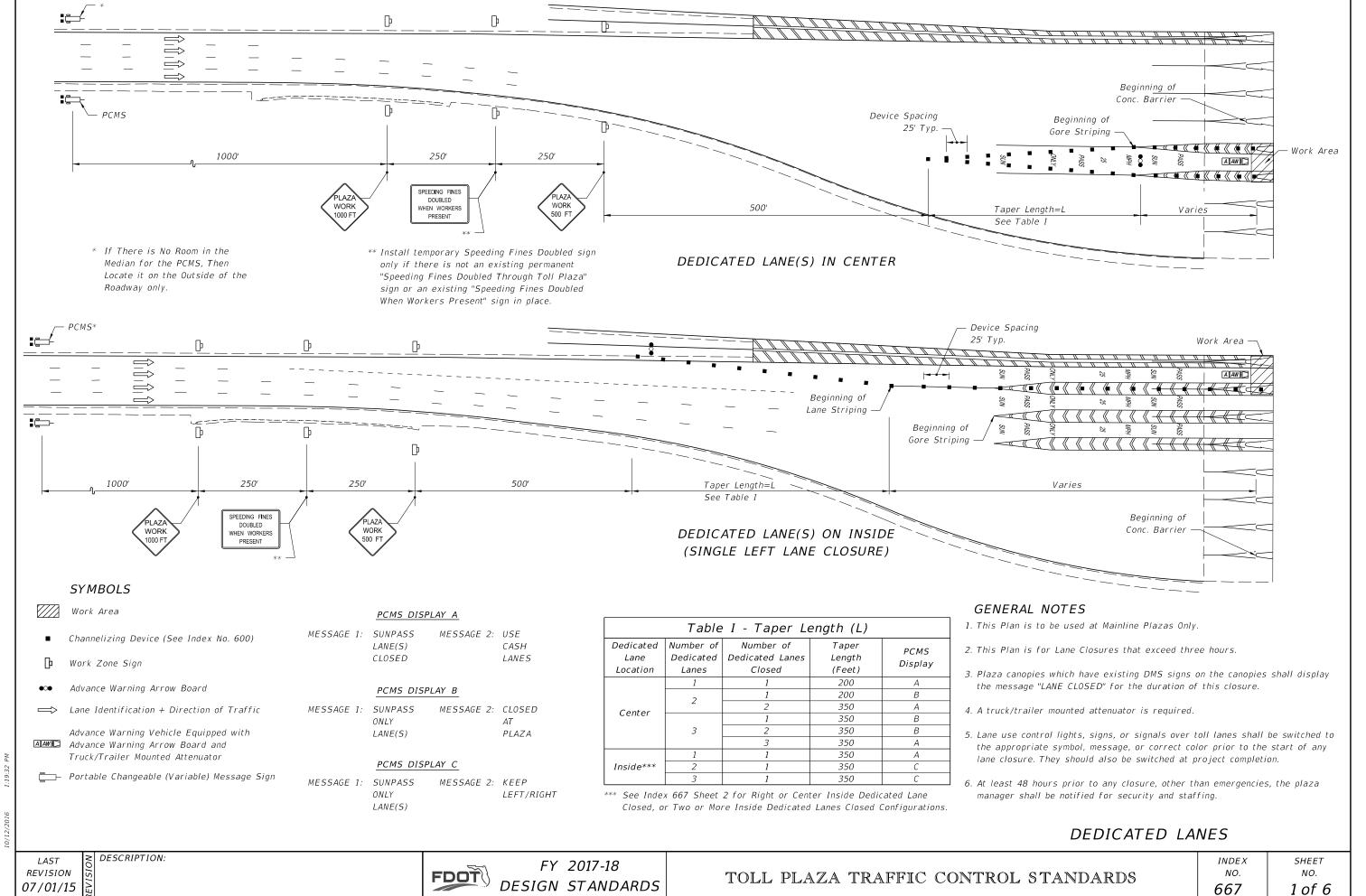
- GENERAL NOTES
 - 7. Access openings in the limited access fence shall have gates which are to be locked during nonwork hours or periods when the access is not in active use.
 - 8. The contractor shall take all precautions necessary to insure against entrance by livestock or unauthorized persons or vehicles.
 - 9. The contractor shall not vary from the plan detail without approval of the Engineer.
 - 10. Gates shall be removed and access opening locations shall be restored to preconstruction condition immediately upon completion of activities utilizing the materials being transported through the openings whether or not the project is completed.
 - 11. Failure to comply with any provision of the access opening plan shall be cause for terminating use of all openings. Upon notification by the Engineer, the contractor shall cease hauling and begin restoration of affected areas. Under this condition expense of removal, restoration and of additional hauling distances shall be borne by the contractor.
 - 12. No guardrail or barrier wall will be removed for access openings.
 - 13. Construction and removal of the access and restoring the area to preconstruction condition shall be included in the cost of Maintenance Of Traffic, LS.

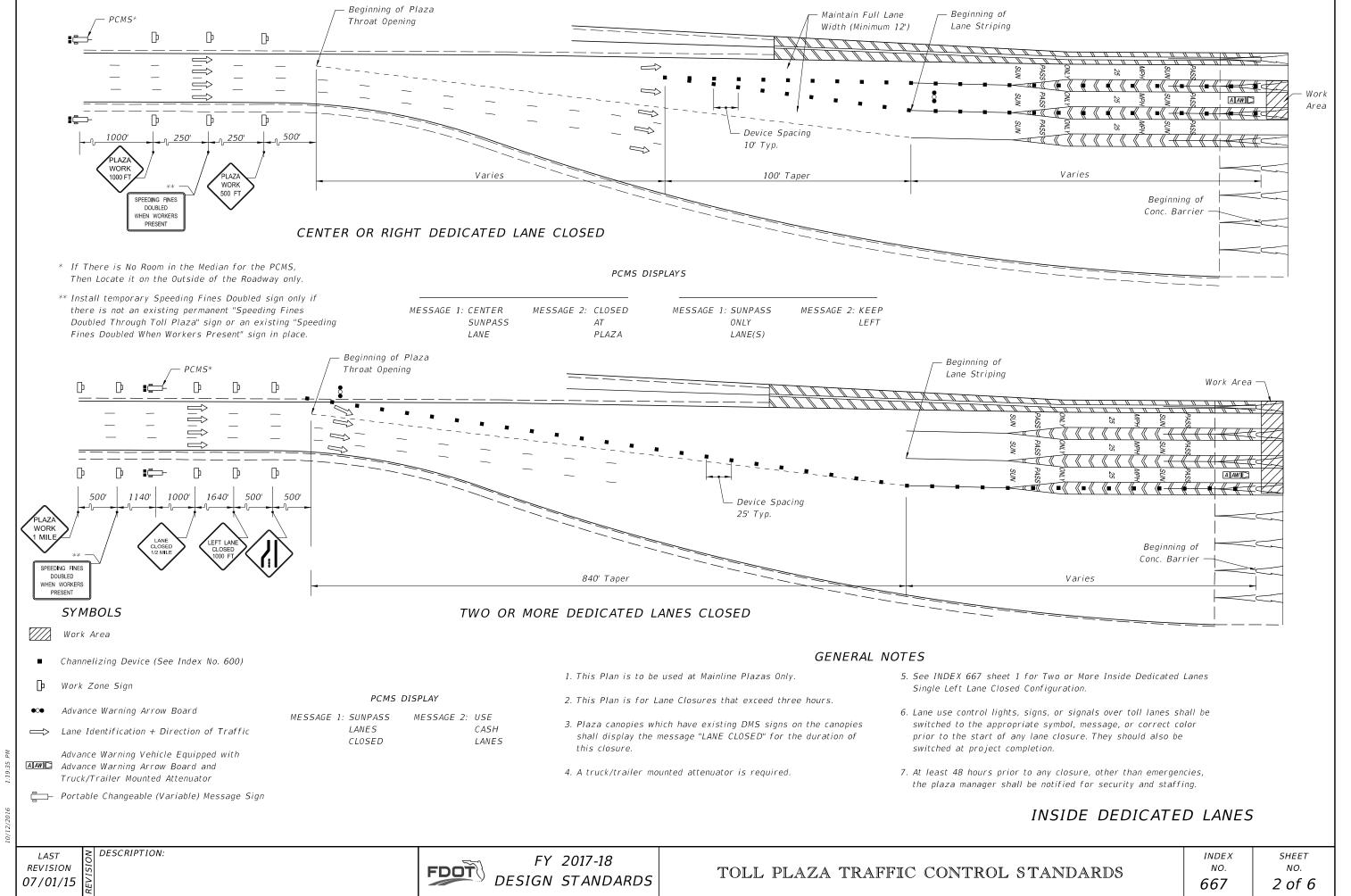
SYMBOLS

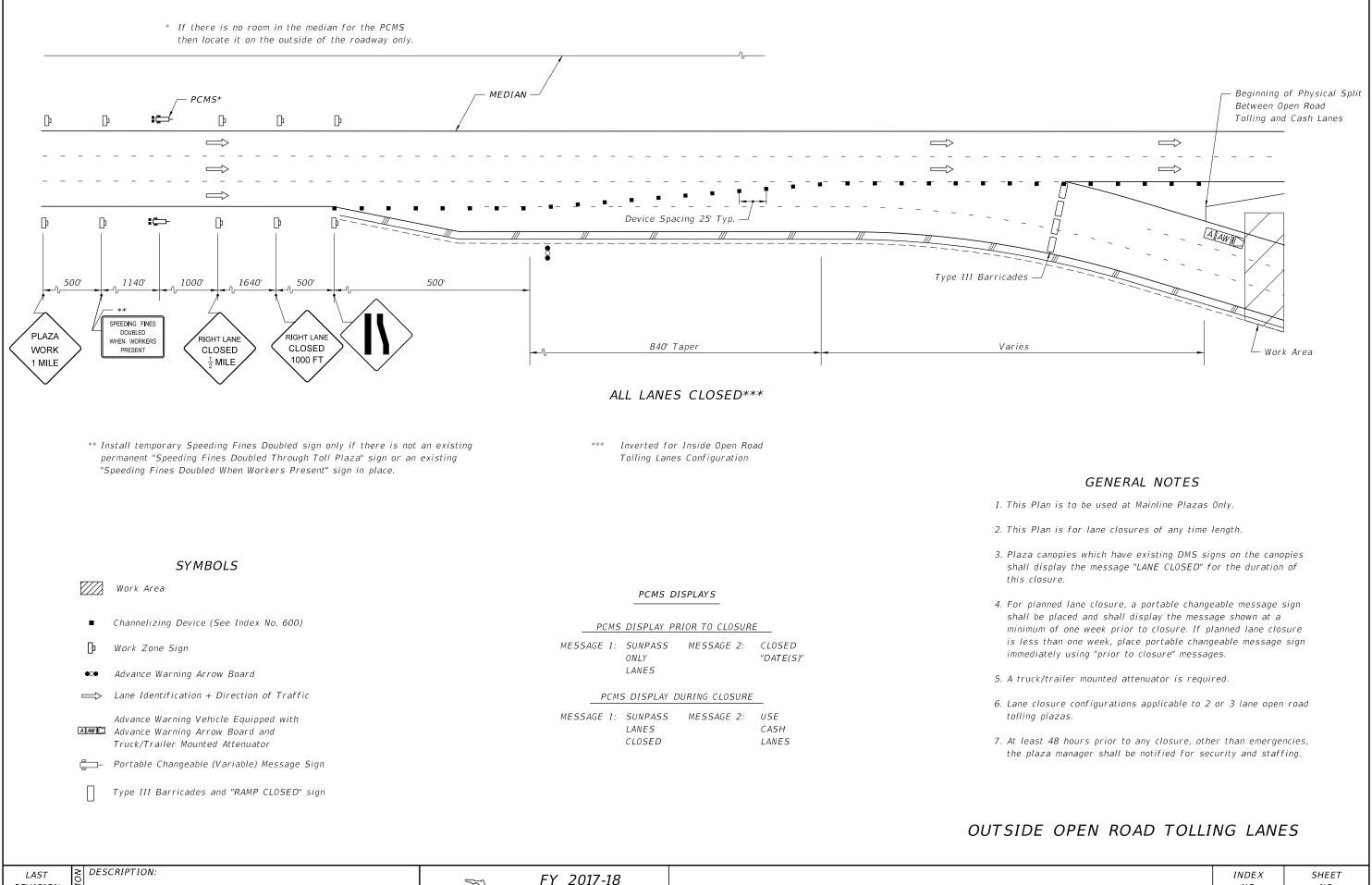
₩ork Zone Sign

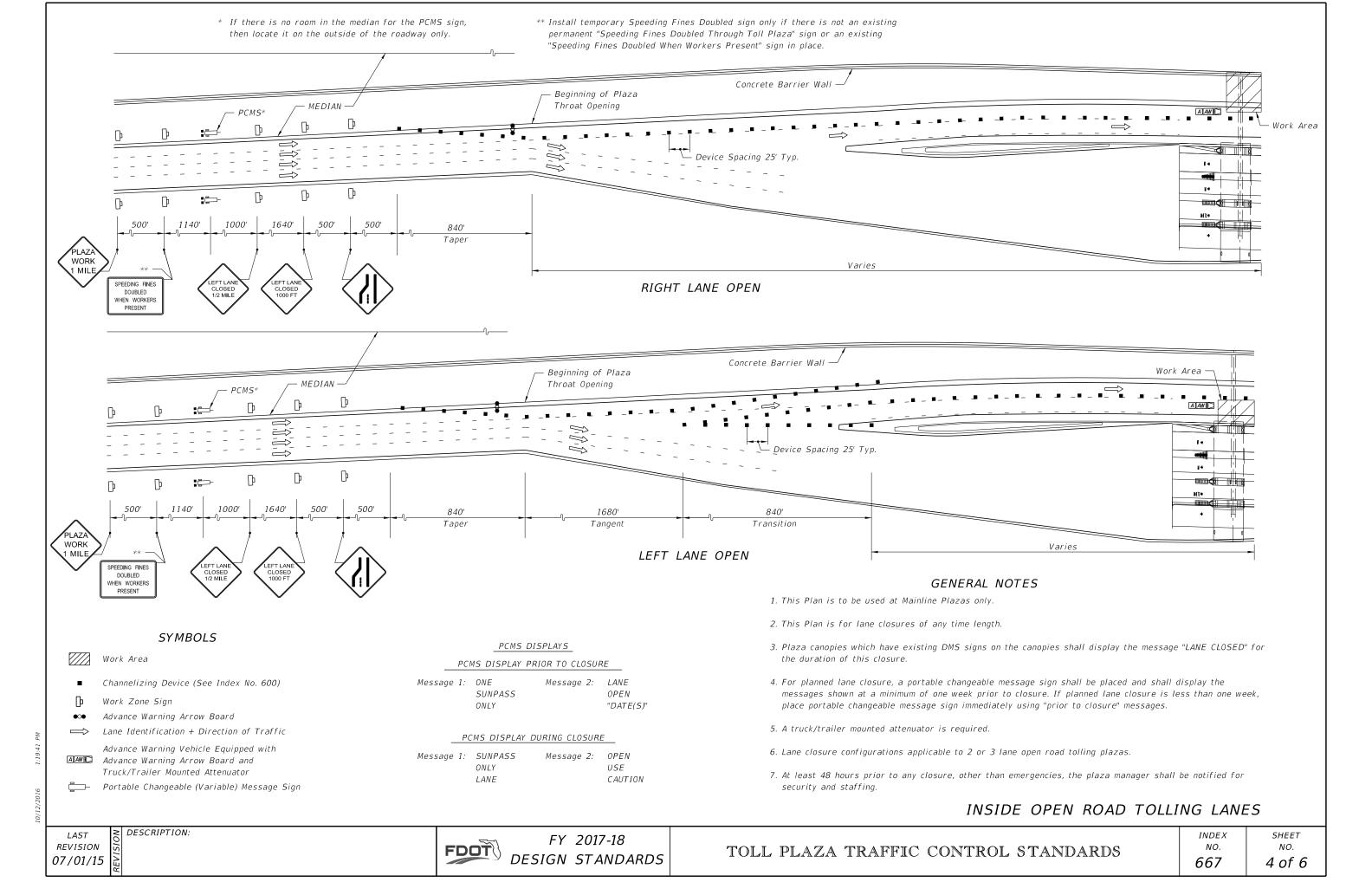
DESCRIPTION:

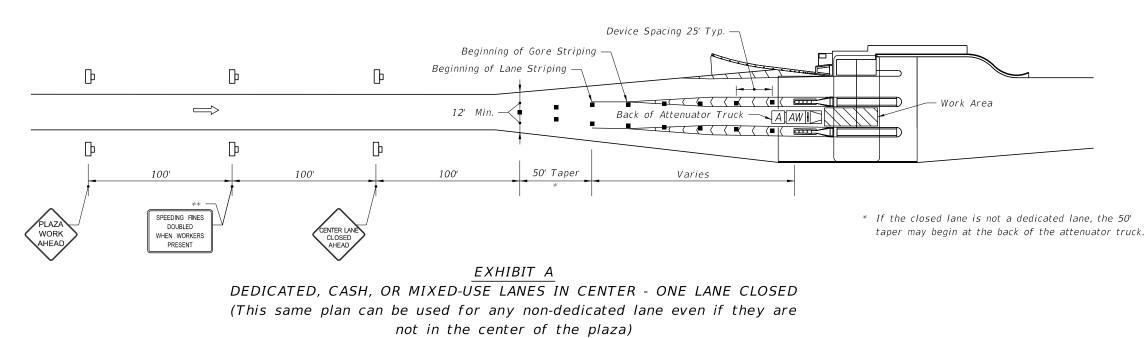
REVISION 07/01/00

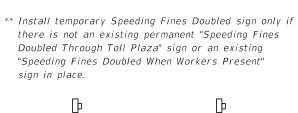












DOUBLED WHEN WORKERS PRESENT

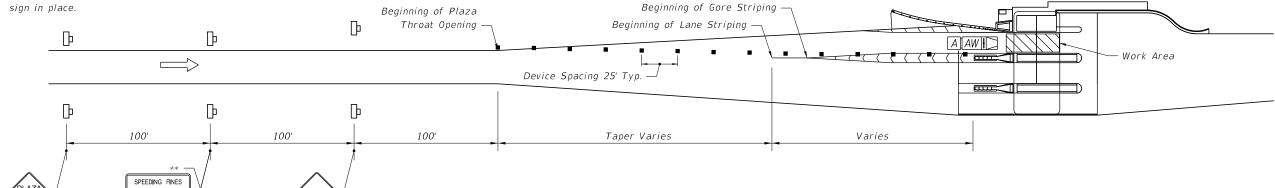


EXHIBIT B DEDICATED LANE INSIDE OR OUTSIDE - ONE LANE CLOSED (Outside Lane Closure is a Mirror Image of this Exhibit)

SYMBOLS

Work Area

Channelizing Device (See Index No. 600)

Work Zone Sign

DESCRIPTION:

Advance Warning Vehicle Equipped with Advance Warning Arrow Board and Truck/Trailer Mounted Attenuator

GENERAL NOTES

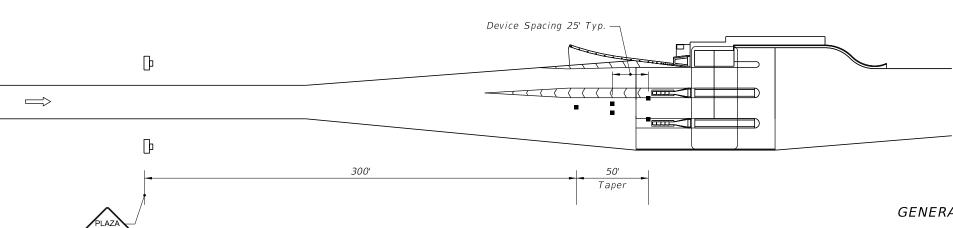
- 1. This Plan is for lane closures that exceed three hours.
- 2. If the closed lane is a dedicated lane, Exhibit A shall be used at Ramp Plazas only. If the closed lane is a cash or mixed-use lane, Exhibit A may be used at Ramp or Mainline Plazas.
- 3. A truck/trailer mounted attenuator is required.
- 4. Exhibit B shall be used at Ramp Plazas only.
- 5. Lane use control lights, signs, or signals over toll lanes shall be switched to the appropriate symbol, message, or correct color prior to the start of any lane closure. They should also be switched at project completion.
- 6. At least 48 hours prior to any closure, other than emergencies, the plaza manager shall be notified for security and staffing.

MAINLINE PLAZAS & RAMP PLAZAS

REVISION 07/01/15

FY 2017-18 **DESIGN STANDARDS**

INDEX NO. 667



WORK NOT DONE WITHIN TRAVEL LANE - ONE LANE CLOSED

SYMBOLS

Work Area

- Channelizing Device (See Index No. 600)
- Work Zone Sign

DESCRIPTION:

Lane Identification + Direction of Traffic

Advance Warning Vehicle Equipped with Advance Warning Arrow Board and Truck/Trailer Mounted Attenuator

GENERAL NOTES

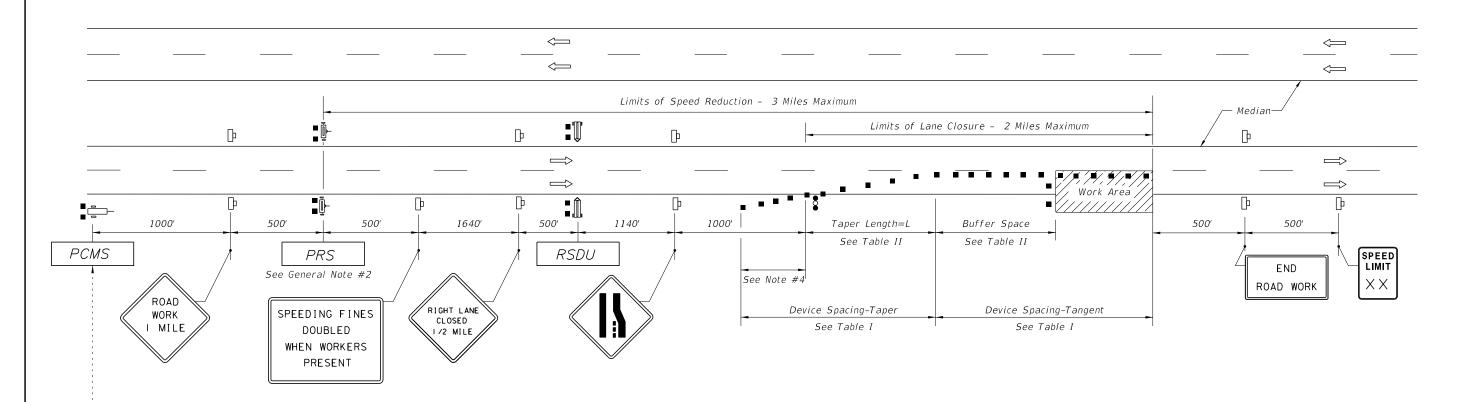
- 1. This Plan is for lane closures that are three hours or less.
- 2. This Plan is to be used at Ramp or Mainline Plazas.
- 3. This plan can be used for any lane, with appropriate modifications, even if it is not in the center of the Plaza.
- 4. Lane use control lights, signs, or signals over toll lanes shall be switched to the appropriate symbol, message, or correct color prior to the start of any lane closure. They should also be switched at project completion.
- 5. At least 48 hours prior to any closure, other than emergencies, the plaza manager shall be notified for security and staffing.
- 6. A Truck/Trailer Mounted Attenuator is required for all aerial work operations (lift truck). For non-aerial operations, the Truck Mounted Attenuator or additional devices may be required by the Engineer based on the work being performed.

SHORT-TERM CLOSURES

REVISION 07/01/15

FY 2017-18 DESIGN STANDARDS

INDEX NO. 667



TYPICAL PCMS DISPLAY

With speed reduction:

Message 1: WORKERS PRESENT AHEAD Message 2: SPEED REDUCED NEXT 3MI

Without speed reduction:

Message 1: WORKERS PRESENT AHEAD

Message 2: NEXT 3 MILES

Table I					
Device Spacing					
	Max.	Max. Distance Between Devices (ft.)			
Posted	Cone	es or	Type I or Type II		
Speed	Tub	oular	Barricades	or Vertical	
(mph)	Mar	kers	Panels (or Drums	
	Taper Tangent		Taper	Tangent	
55 to 70	25	50	50	100	

Table II						
Buffei	Buffer Space and Taper Length					
Posted Buffer Space Space		,	Length I Transition)			
(mph)	Dist. (ft.)	L (ft.)	Notes (Merge)			
55	495	660				
60	570	720)			
65	645	780				
70	730	840				

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column.

L= Length of taper in feet

W= Width of lateral transition in feet

S= Posted speed limit (mph)

SYMBOLS

Work Area

Channelizing Device (See Index No. 600)

Work Zone Sign

Advance Warning Arrow Board

Lane Identification + Direction of Traffic

(1) PCMS= Portable Changeable(Variable) Message Sign

(2) PRS= Portable Regulatory Sign- Speed Limit When Flashing

(2) RSDU= Radar Speed Display Unit

DESCRIPTION:

GENERAL NOTES:

- 1. Use the MAS for lane closures of 5 day or more on multilane divided facilities with a posted speed of 55 MPH or greater when workers are present and not protected by a barrier.
- 2. For posted speeds of 65 MPH or greater, reduce Work Zone Speeds by 10 MPH. For posted speeds of 60 MPH, use a Work Zone Speed of 55 MPH.
- 3. Right lane closure shown, left lane closure similar using left lane signing.
- 4. Use shoulder taper in accordance with Index 612 for shoulder widths 8 feet or greater.
- 5. See Index 600 for general TCZ requirements and additional information.

REVISION 11/01/16