

Welcome to Inspecting Maintenance of Traffic Items on Projects



Presented by:

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FDOT Central Office Construction

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Goal

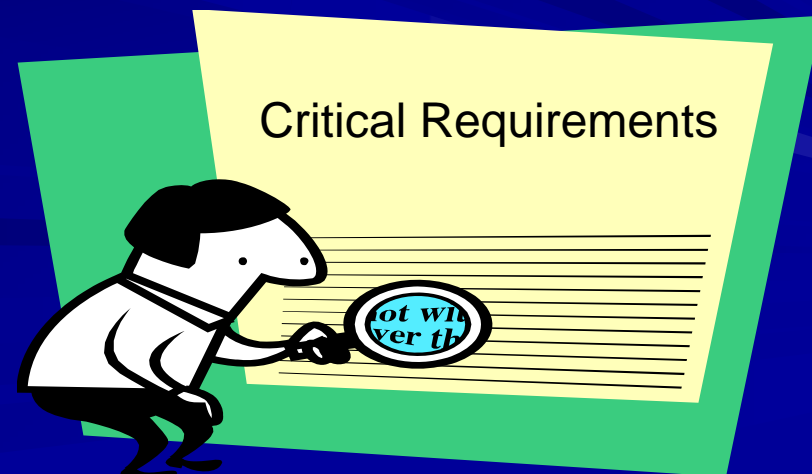
- Quickly and correctly inspect maintenance of traffic (MOT) items
- Using the tools provided
- Determine whether the MOT items are in compliance with the contract



How did we determine what MOT items?

■ MOT Process Reviews

- Review 4 districts per year
- Concurrence with the Contract
- **Resource:** Guidelists and Critical Requirements
- <http://www.dot.state.fl.us/construction/CONSTADM/guidelist/guideindex.shtm>



Outline

- Inspecting Pavement Markings
- Inspecting Work Zone Signs and Supports
- Inspecting Temporary Traffic Control Devices
- Miscellaneous MOT Issues



Inspecting Pavement Markings

Inspecting Pavement Markings

- Test pavement markings
 - Retroreflectivity
 - Thickness (Thermo)



Inspecting Pavement Markings

■ Florida Sampling and Testing Method FM 5-541

- Located on State Materials Office website:

- [Link to FSTM's](#)

- Retroreflectivity

- Average of 3 retroreflectivity measurements

- One at the beginning, middle, and end of each one mile section.

- Take in the direction of travel.

- Thickness (Thermo)

- Take average of 3 location measurement (avg. of 3 dial gauges) at the beginning, middle, and end of each one mile section of line type (i.e. color, solid, skip).

Inspecting Painted Pavement Markings

- Specifications 710-4.3
 - Retroreflectivity (Initial)
 - 300 white
 - 250 yellow
 - Minimum retroreflectivity
 - 150 for both white and yellow
 - Contractor to submit certification for retroreflectivity but FDOT has 3 days from receipt of the certification to verify that it meets initial values



Form number 700-050-70

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
**INITIAL RETROREFLECTIVITY READING CERTIFICATION
 (WORKSHEET)**

700-050-70
 CONSTRUCTION
 0506

Contractor: _____ Date: _____
 Financial Project ID: _____ Contract No.: _____ Federal Aid No.: _____ State Road No.: _____
 Type of meter used (check one): 15m 30m PERIOD REPRESENTED BY CERTIFICATION From: (Mo/Day/Yr) _____ To: (Mo/Day/Yr) _____

PAY ITEM NO.	QUALIFIED PRODUCTS LIST (QPL) NO.	LOCATION (STATION)	INITIAL READING	PASSED(P) OR FAILED(F)	SKIP/SOLID/ OTHER	NAME OF PERSON TAKING READINGS

I certify that, based on my personal knowledge and well-founded belief following my own reasonable investigation, the above counts, measurements, readings and quality of products are correct and accurate.

Contractor's Authorized Agent (Print Name & Co.): _____ Work Site Traffic Supervisor (Print Name): _____
 Contractor's Authorized Agent (Signature): _____ Date: _____ Work Site Traffic Supervisor's (Signature): _____

Inspecting Thermoplastic Pavement Markings

- Specifications 711-4.3
 - Retroreflectivity - Standard Double Drop Thermo
 - 450 white
 - 350 yellow
 - 180 days observation period
 - Contractor submits certification for retroreflectivity



Inspecting Thermoplastic Pavement Markings

- Thickness - Standard Double Drop Thermo
 - Minimum: 100 mils or 0.100 inches
 - Maximum: 150 mils or 0.150 inches



Inspecting Thermoplastic Pavement Markings

- Audible/Vibratory Markings
 - Retroreflectivity
 - 300 - white and 250 - yellow
 - Thickness
 - Base Line: 79 to 120 mils
 - Requires transverse bar/bump/cookie - min height 0.45 inches or 450 mils, including base line



Thermo Cookie



Thermo Bump

Inspecting Thermoplastic Pavement Markings

■ Wet Weather Markings

- Retroreflectivity

- 300 - white, 250 - yellow

- Thickness Measurements

- Profile Marking: 155 mils min. for profile height at one inch on center, base line of 35 to 50 mils height
- Flat line - 100 to 150 mils thickness



Profile Marking



Wet Reflective Elements in flat line

Inspecting Work Zone Signs

Work Zone Signs

- Sign supports in compliance with:
 - Vendor drawing on QPL
 - <http://www.dot.state.fl.us/specificationsoffice/ProductEvaluation/QPL/QPLMOTIndex.shtm>
 - Design Standards - 600 Series
 - <http://www.dot.state.fl.us/rddesign/rd/rtds/10/2010Standards.shtm>
 - Specs - Section 102
 - <http://www2.dot.state.fl.us/SpecificationsEstimates/Implemented/2010Bk/2010Bk.aspx>

Work Zone Signs

- QPL # labeled on sign support



Work Zone Signs

- Verify work zone sign supports are on QPL

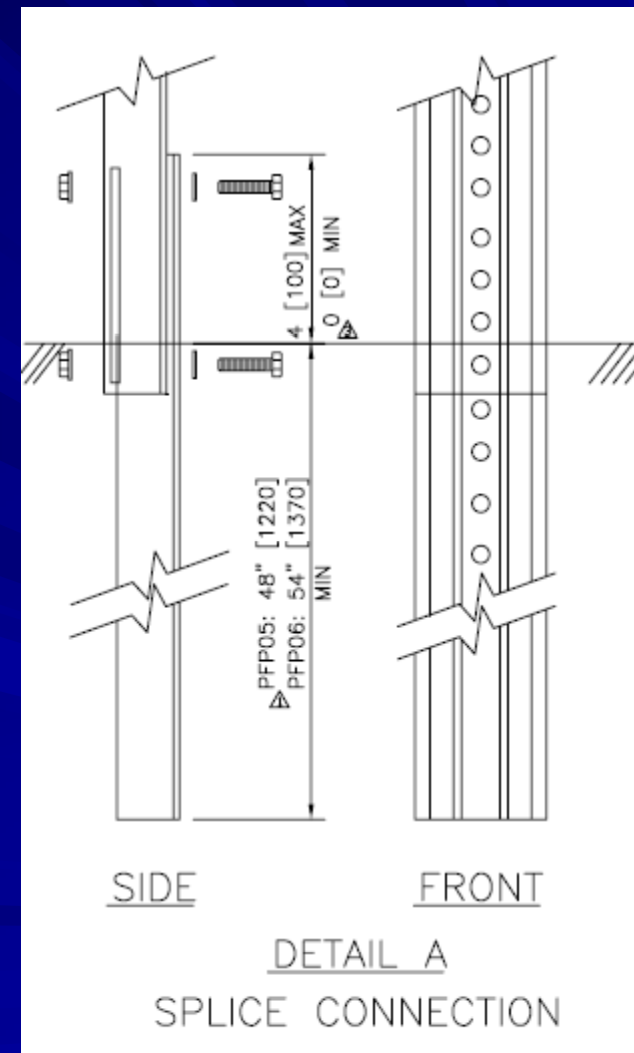
- QPL Website:

<http://www.dot.state.fl.us/specificationsoffice/ProductEvaluation/QPL/QPLMOTIndex.shtm>

Arrow Board, Portable	Types: Diesel Gas Solar Vehicle
Barricades	Types: I II & III
Barricade Sheeting	Types: I II & III
Barrier Wall Types:	Temporary Concrete Temporary Water Filled
Portable Changeable (Variable) Message Board, Portable	Types: Diesel Solar Incident Management Trailer Radar Speed Display Units
Cones	Reflective Collars for Traffic Cone
Drum	Plastic Drum Sheeting
Glare Screen	Temporary
Highway Advisory Radio	
Lights	Types: A B C & D
Raised Pavement Marker	Types: D & E
Regulatory Sign	Portable
Safety Warning Transmitter	
Sign Support Types:	Temporary Post-Mounted Portable Temporary
Stop-Slow Paddle	
Tape	Preformed Non-Removable Pavement Marking Film
Tape	Preformed Removable Pavement Marking Film
Traffic Separator	Temporary
Truck Mounted Attenuator	Trailer Mounted Attenuator
Tubular Markers:	Fixed Non-Fixed
Vertical Panel	

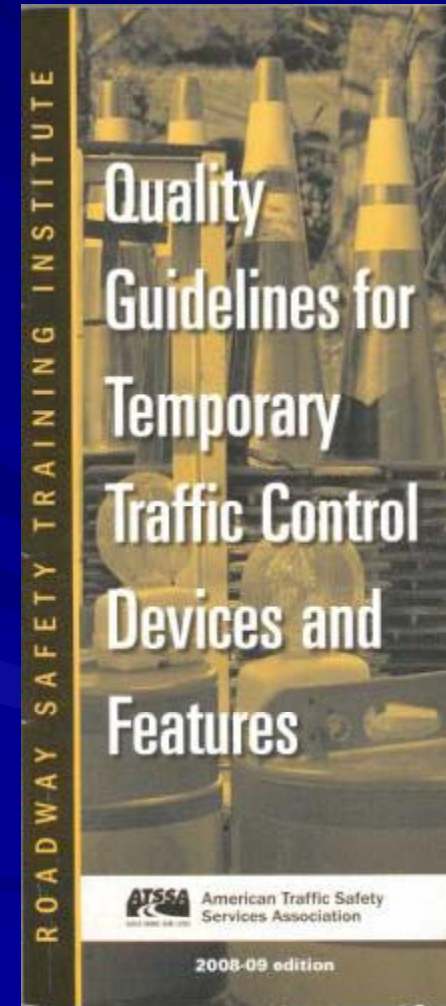
Work Zone Signs

- Verify sign supports are installed in accordance with the Vendor Drawings on QPL



Work Zone Signs

- Verify Sheeting Retroreflectivity
 - Specifications 994-5
 - ASTM-4956
 - 80% of values in table
 - Specifications 102-9
 - ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features



Work Zone Signs

Design Standard Index #600, Sheet 6

GENERAL NOTES:

1. All signs shall be post mounted when work operations exceed one day except for:
 a. Road closure signs mounted in accordance with the vendor drawing for the Type III Barricade shown on the OPL.

b. Pedestrian advanced warning or regulatory signs mounted on sign supports in accordance with the vendor drawing shown on the OPL.

TEMPORARY SIGN SUPPORT NOTE:

1. Signs mounted on temporary supports or barricades, and barricade/sign combination shall be crashworthy in accordance with NCIRP 350 requirements and included on the Qualified Products List (QPL).

POST MOUNTED SIGN NOTES:

1. Use only approved systems listed on the Department's Qualified Products List.

2. Manufacturers seeking approval of U-Channel and steel square tube sign support assemblies for inclusion on the Qualified Products List (QPL) must submit a QPL 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 steel.

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.

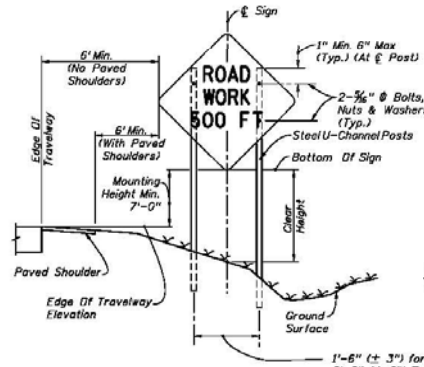
7. For diamond warning signs with supplement plaque (up to 3 ft² in area), use 4 lb/ft posts for up to 10 ft Clear Height (measure to the bottom of diamond warning sign).

8. Install 4 lb/ft Steel-U-Channel Posts with approved breakaway splice in accordance with the manufacturer's detail shown on the OPL.

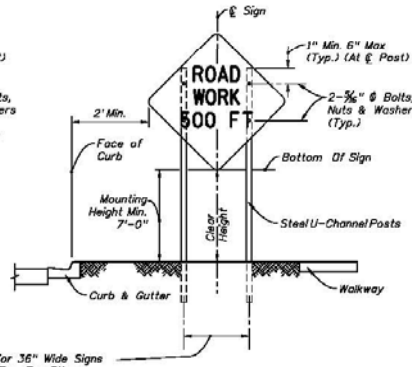
9. The contractor may install 3 lb/ft Steel-U-Channel Posts with approved breakaway splice in accordance with the manufacturer's detail shown on the OPL.

10. Install all posts plumb.

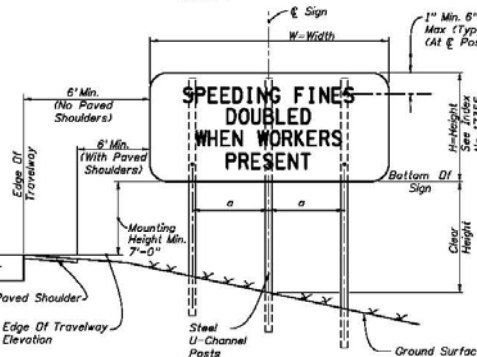
11. The contractor may set posts in preformed holes to the specified depth with suitable backfill tamped securely on all sides, or drive 3 lb/ft sign posts and any size base post in accordance with the manufacturer's detail shown on the OPL.



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

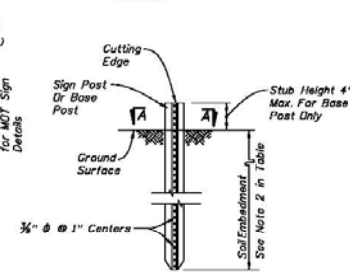


2 POST SIGN SUPPORT MOUNTING DETAILS (SINGLE POST SIMILAR) URBAN



3 POST SIGN SUPPORT MOUNTING DETAILS

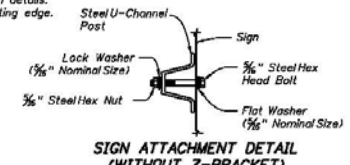
Where $W = 48''$; $a = 1' - 4\frac{1}{2}'' (\pm 1'')$
 $W = 60''$; $a = 1' - 9'' (\pm 1'')$
 $W = 72''$; $a = 2' - 1'' (\pm 1'')$
WORK ZONE SIGN SUPPORTS



TYPICAL FOUNDATION DETAIL
 See OPL for post, splice and connection details.
 No bolts installed closer than 1" to cutting edge.



SECTION A-A (SCHEMATIC)



SIGN ATTACHMENT DETAIL (WITHOUT Z-BRACKET)

POST AND FOUNDATION TABLE FOR WORK ZONE SIGNS		
SIGN SHAPE	SIGN SIZE (Inches)	NUMBER OF STEEL U CHANNEL POSTS
Octagon	30x30	1
	36x36x36	1
	48x48x48	1
	60x60x60	2
	74x74	1
Triangle	24x18	1
	30x24	1
	36x18	1
	36x24	1
	48x18	1
	36x48	2
	48x30	2
	48x36	2
	54x36	2
	48x60	3
Rectangle (W x H)	60x54	3
	72x48	3
	120x84	4
	30x30	1
	36x36	2
	48x48	2
Square	36x36	2
	48x48	2
Diamond (See Note 6)	48x48	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'.
 2. 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 7.
 3. Minimum foundation depth is 4.0' for 3 lb/ft posts and 4.5' for 4 lb/ft posts.
 4. 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.
 5. The soil plate as shown on the OPL 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.

REVISIONS						2010 Interim Design Standard		GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	Index No.	Sheet No.		
07/25/09	MFP	Multiple revisions to notes, details and table.				01/01/10	8 of 13		
12/23/09	CA	Corrected TYPICAL FOUNDATION DETAIL to show only 4 holes above ground level related to POST AND FOUNDATION TABLE FOR WORK ZONE SIGN SUPPORT SIGN above 60x54 and 120x84 and changed notes 1 & 4 and added 8-60" to 3 POST SIGN SUPPORT MOUNTING DETAILS.				Index No. 600			

Work Zone Signs

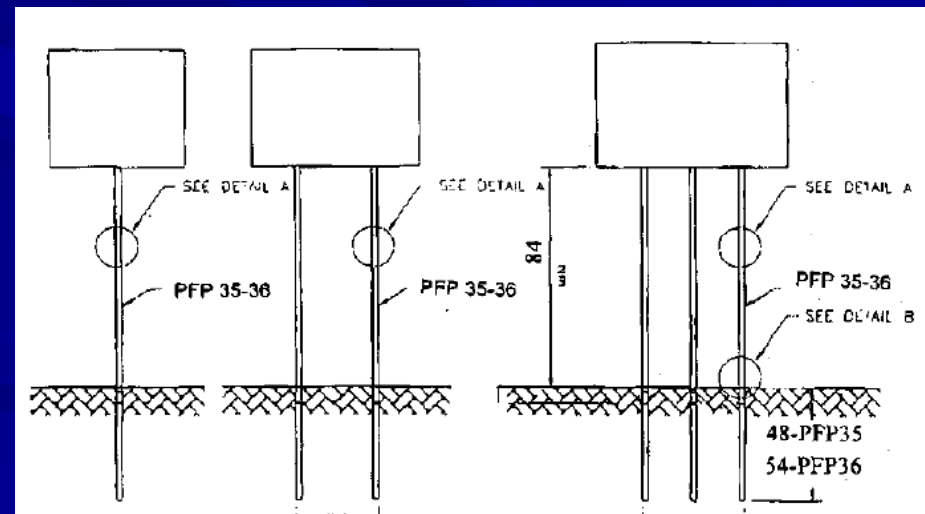
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Octagon	30x30	1
Triangle	36x36x36	1
	48x48x48	1
	60x60x60	2
Rectangle (W x H)	24x18	1
	24x30	1
	30x24	1
	36x18	1
	36x24	1
	48x18	1
	36x48	2
	48x30	2
	48x36	2
	54x36	2
	48x60	3
	60x54	3
	72x48	3
120x60*	4*	
Square	30x30	1
	36x36	2
	48x48	2
Diamond (See Note 6)	48x48	2
Circle	36 ϕ	2

Notes For Table:

- Use 3 lb/ft posts for Clear Height up to 10' and 4 lb/ft posts for Clear Height up to 12'.
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Attach sign panel using Z-bracket detail on Sheet 7.
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- 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.
- The soilplate as shown on the QPL 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.

Number of u-channel Posts depends on Sign Size

1 u-channel 2 u-channels 3 u-channels



Work Zone Signs

POST AND FOUNDATION TABLE FOR WORK ZONE SIGNS			
SIGN SHAPE	SIGN SIZE (inches)	NUMBER OF STEEL U CHANNEL POSTS	
Octagon	30x30	1	
	36x36x36	1	
	48x48x48	1	
Triangle	60x60x60	2	
	24x18	1	
	24x30	1	
Rectangle (W x H)	30x24	1	
	36x18	1	
	36x24	1	
	48x18	1	
	36x48	2	
	48x30	2	
	48x36	2	
	54x36	2	
	48x60	3	
	60x54	3	
	72x48	3	
	120x60*	4*	
	Square	30x30	1
		36x36	2
48x48		2	
Diamond (See Note 6)	48x48	2	
Circle	36 ϕ	2	

Notes For Table:

- 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 7.
- Minimum foundation depth is 4.0' for 3 lb/ft posts and 4.5' for 4 lb/ft posts.
- 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.
- The soilplate as shown on the QPL 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.

Clear height depends on **Post size**:

- 3 lb/ft up to 10 feet clear height
- 4 lb/ft up to 12 feet clear height

Foundation Depth depends on **post size**:

- 4 feet for 3 lb/ft
- 4.5 feet for 4 lb/ft

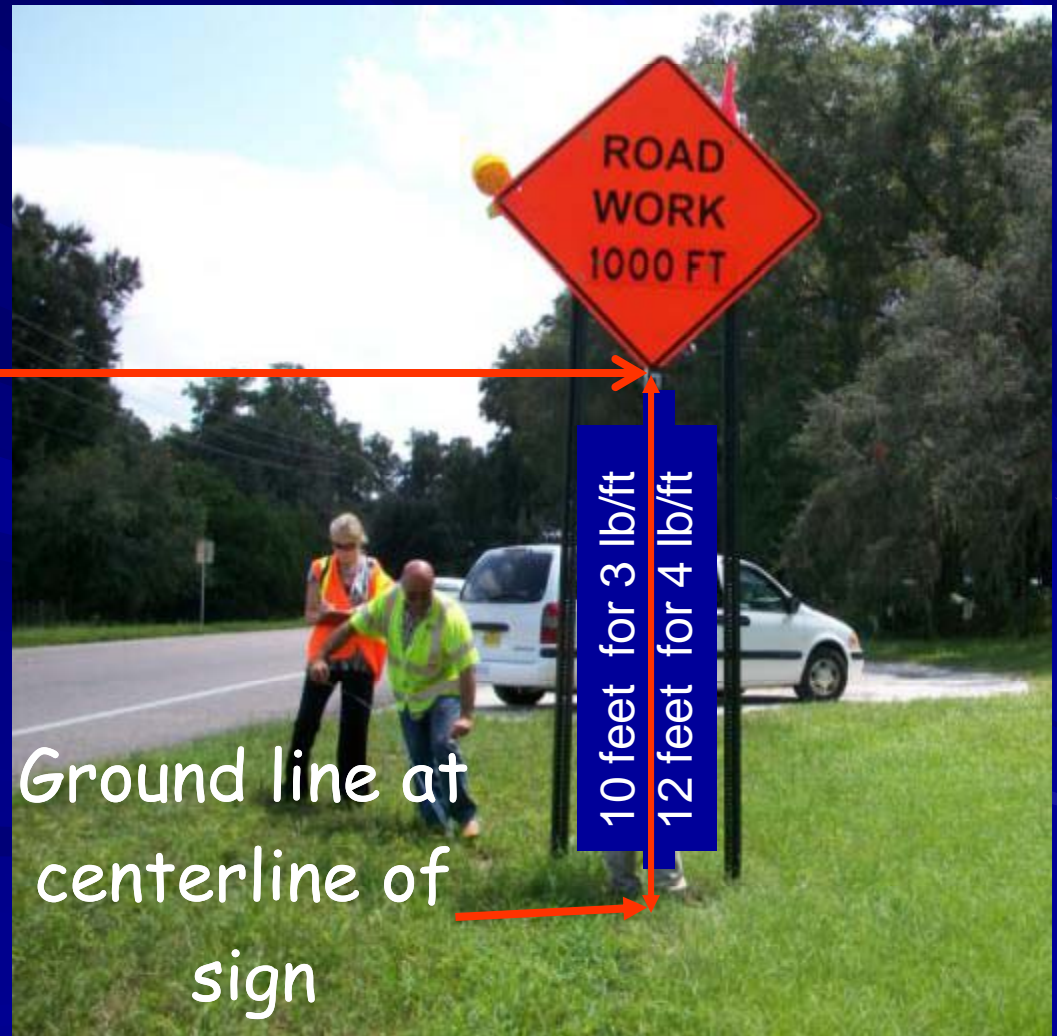
Exceptions:

- Foundation depth in rock
- Soil plate not required in rock, asphalt and shoulder pavement, and sidewalk.

Work Zone Signs

Clear Height

Bottom of Sign



Work Zone Signs

Mounting height

Bottom of Sign

Measured from a line projected from the edge of travel way elevation

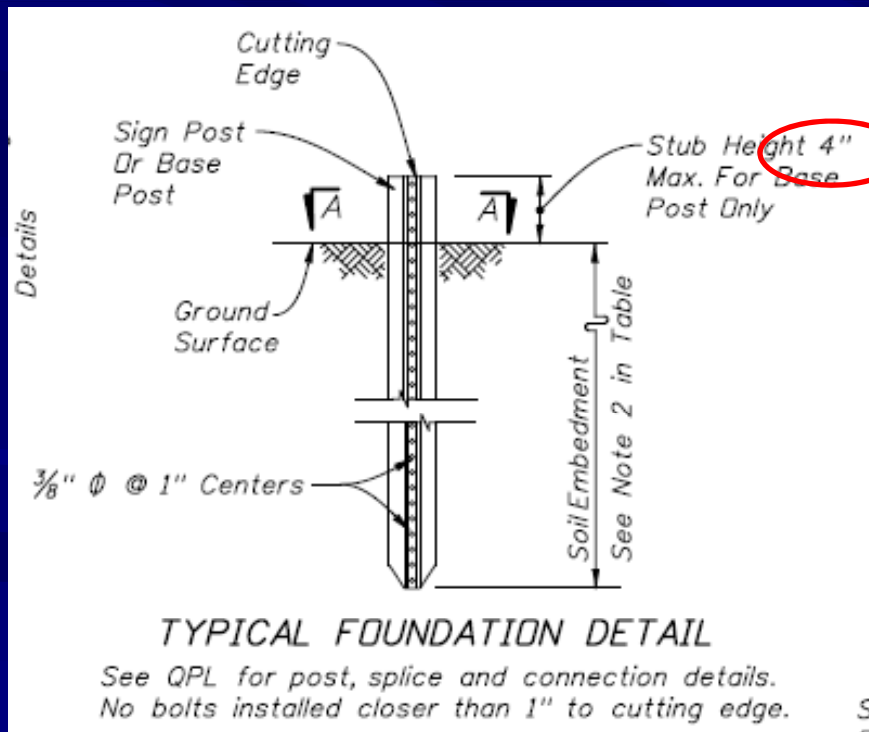


Work Zone Signs

Spliced Post Mounted Supports

■ Stub Height

- Design Std - Maximum Stub height is 4 inches
- Vendor Drawing allows 0 to 4 inches from existing ground (cannot be below ground)



Stub Height > 4"

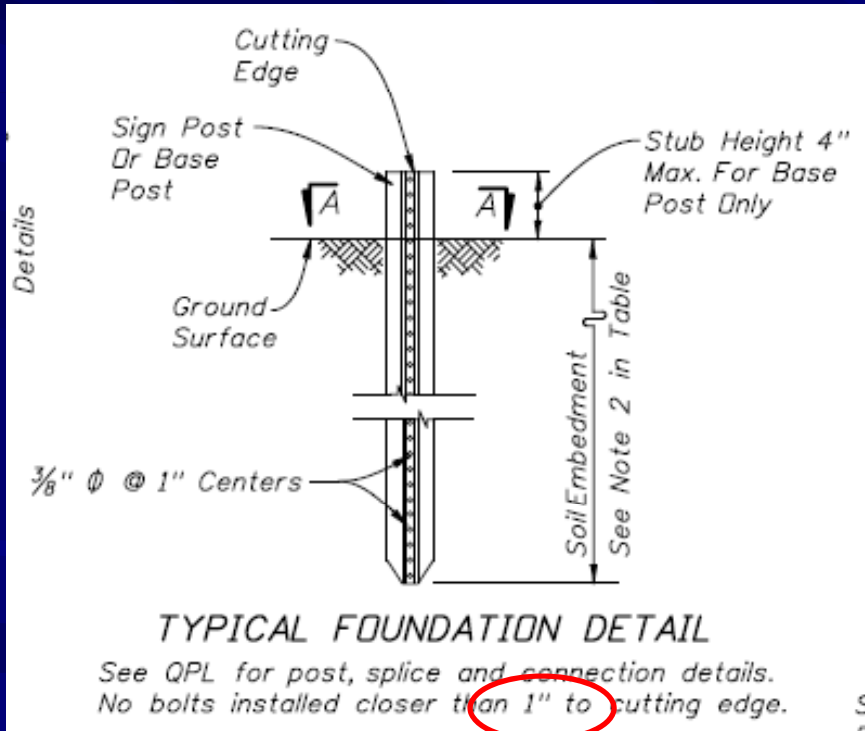


Work Zone Signs

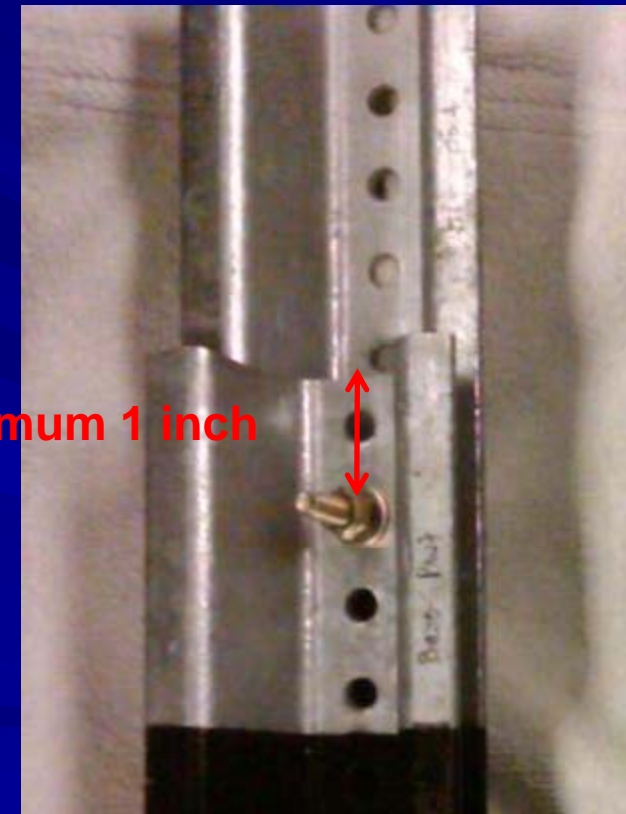
Spliced Post Mounted Supports

■ Top Bolt

- 1 inch minimum from top of stub or cutting edge



Minimum 1 inch



Work Zone Signs

Spliced Post Mounted Supports

- Vendor Drawings require
 - Base Post in Front (traffic approaching)
 - Sign Post in Back

Sign Post

Base Post



Work Zone Signs

Spliced Post Mounted Supports

- Splice overlap
 - Vendor Drawings require 6 inches for both types

**Minimum
6 inches
overlap**

INSTALLATION

A base post (48 inch min for PFP35 and 54 inch min for PFP36), with an anchor plate (PLS02) bolted on 4 inch below grade, is driven into the ground with a 4 inch max stub height. Two base-bolted spacers with grade 9 bolts, nuts and lock washers are used to attach an upright to the base post as shown in detail B. The spacer assemblies are bolted 4 inch on center, in the first and fifth hole of the base post, for a total splice length of 6 inch.



Work Zone Signs

Spliced Post Mounted Supports

- Bolt Spacing
 - Vendor Drawings require 4 inches for both types

Bolts spacing should be 4"



Work Zone Signs

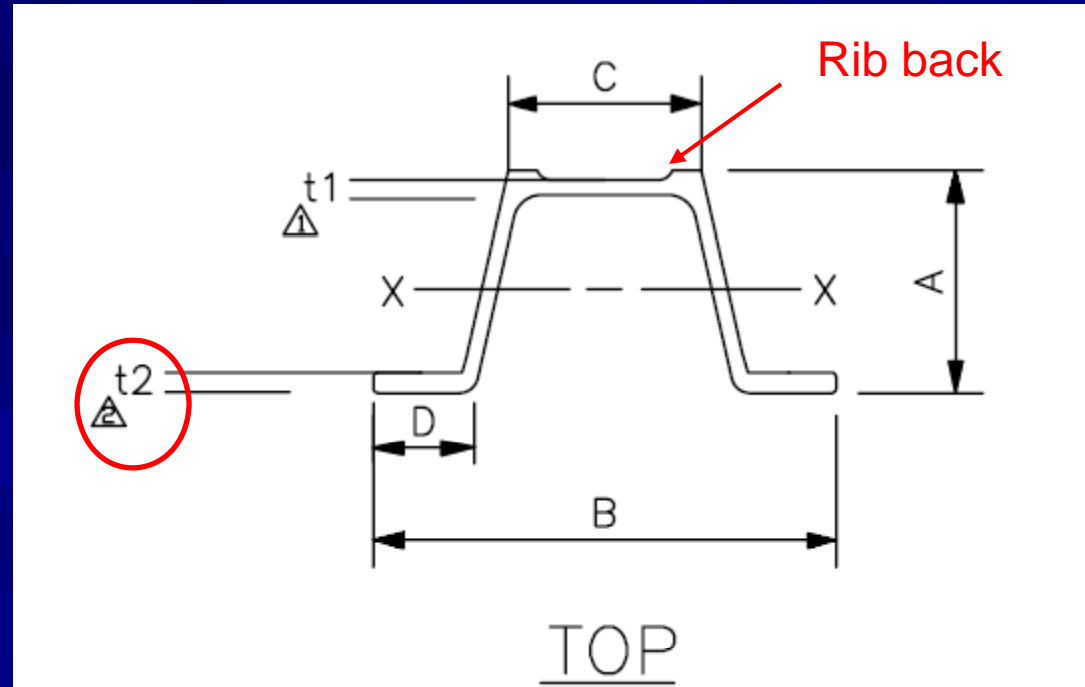
Spliced Post Mounted Supports

- Same size posts for splice
 - Vendor Drawings require base post and sign post to be the same size.



Work Zone Signs

- Post mounted Work Zone Sign Supports
 - Nucor Marion



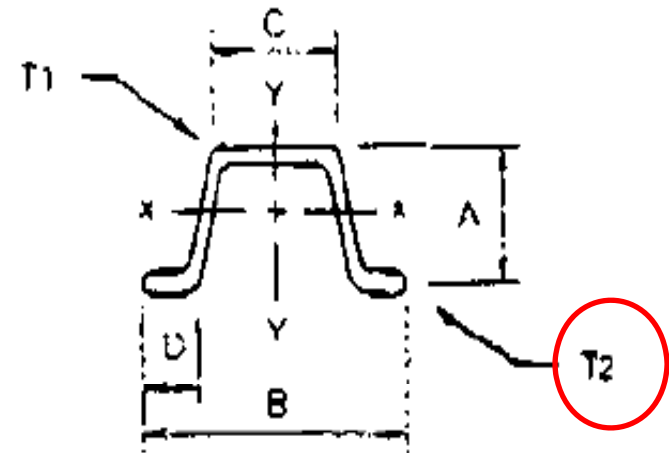
FLANGE THICKNESS (t2) \triangle

3 #/ft	PFP05	: .185	[5]
4 #/ft	PFP06	: .272	[7]

Work Zone Signs

- Post mounted Work Zone Sign Supports
- Franklin

Post Designator	Weight lb/ft	Dimensions (In)	
		T1	T2
PFP35	3.0	0.160	0.160
PFP38	4.0	0.230	0.260



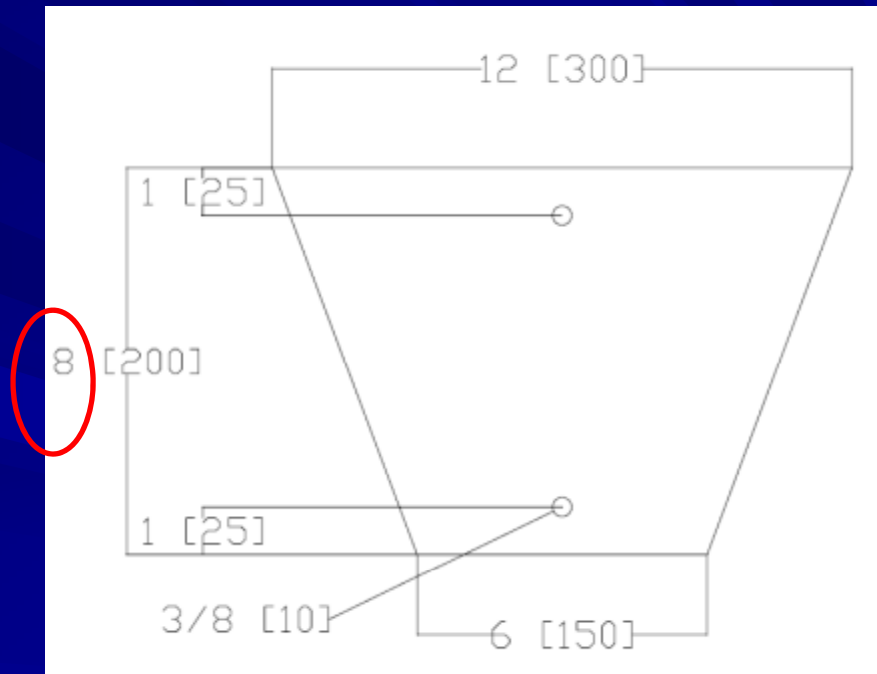
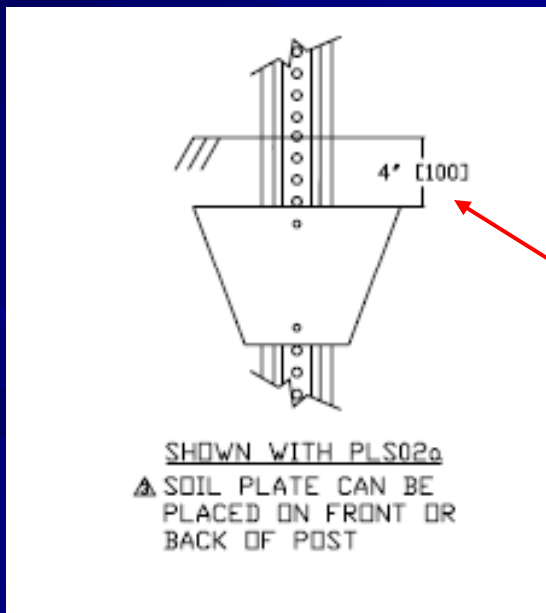
TOP

Franklin

Work Zone Sign Supports

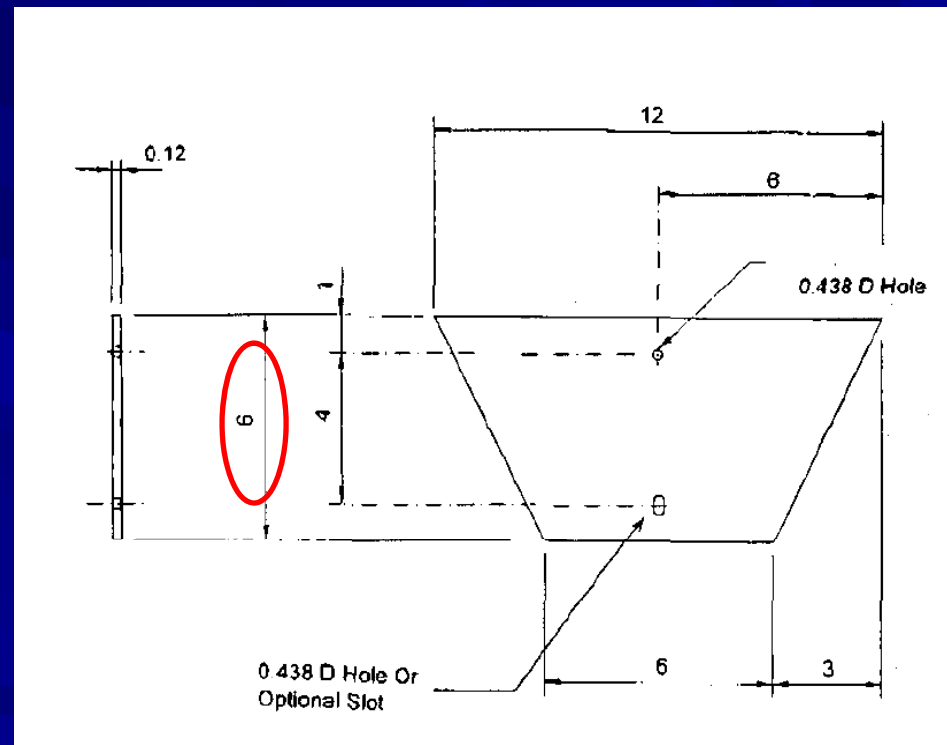
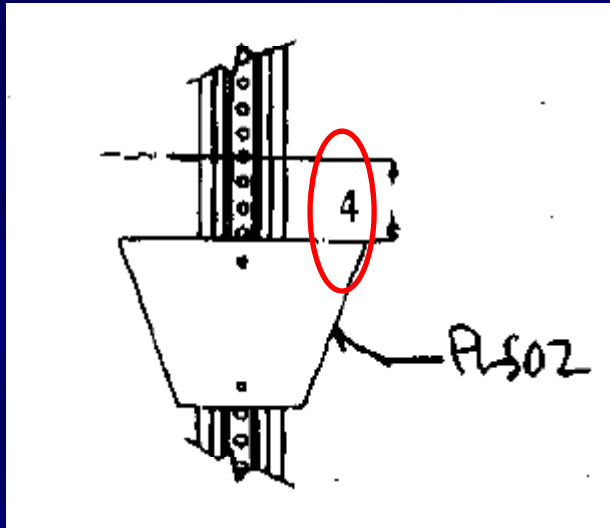
Nucor Marion soil plate

PLATE THICKNESS
1/8 in [3.2] mm



Work Zone Sign Supports

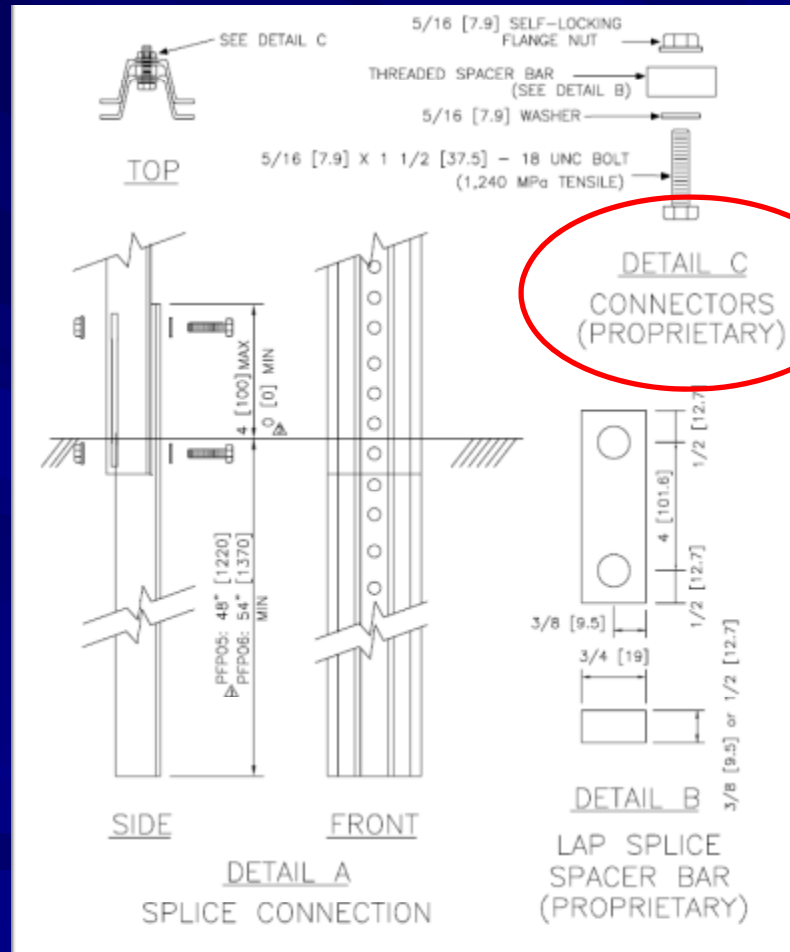
Franklin soil plate



Franklin

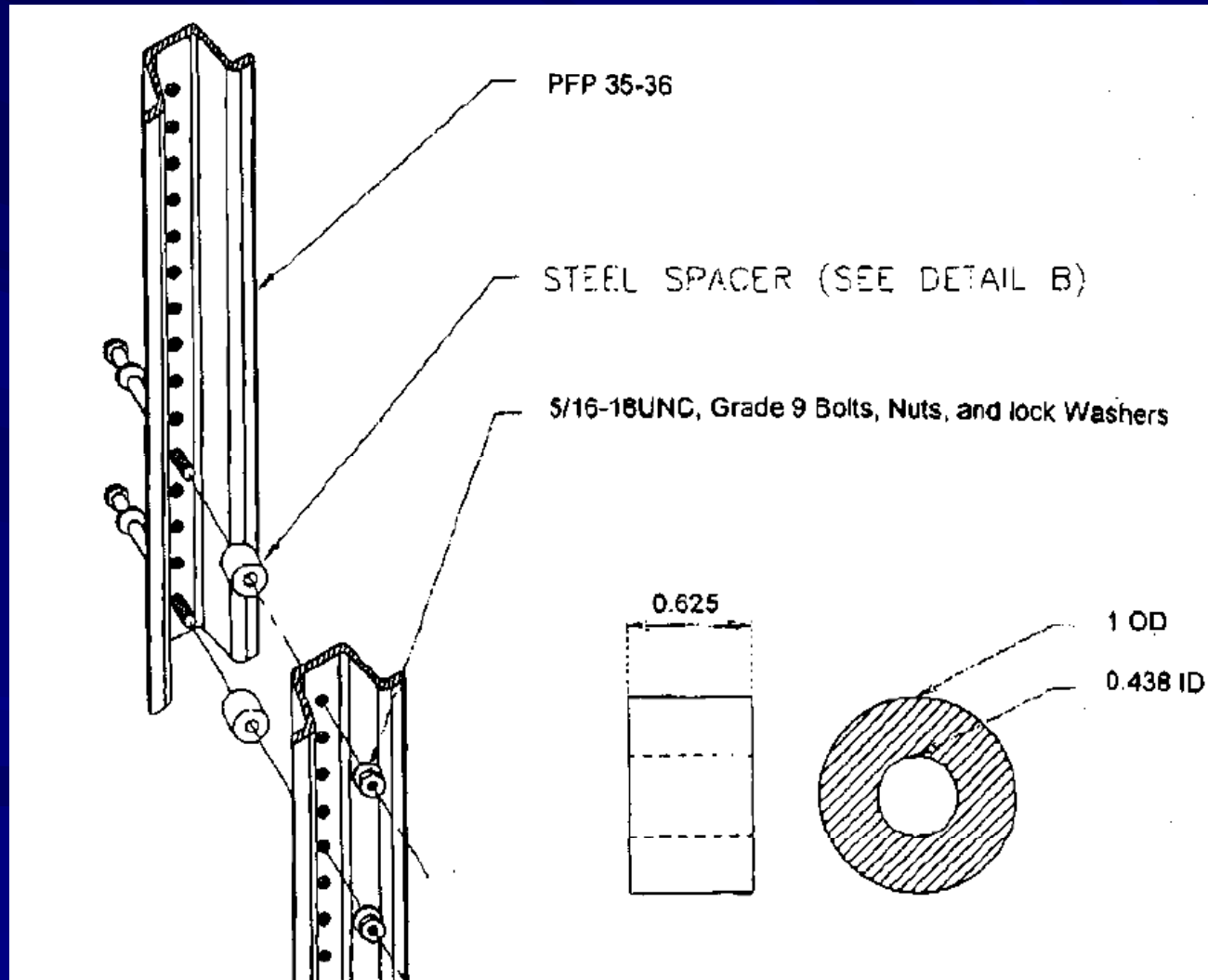
Work Zone Sign Supports

Nucor Marion splice detail - connectors



Work Zone Sign Supports

Franklin splice detail - connectors



Franklin

Work Zone Sign Supports

- The project information sign shall be used when called for in the plans
- 4 #/ft spliced posts required



Work Zone Signs

- Portable sign supports do not require light or flag



WARNING LIGHTS

Warning lights shall be in accordance with the MUTCD except for the application limitations stipulated below:

Flashing

Type A Low Intensity Flashing Warning Lights are to be mounted on barricades, drums, vertical panels or advance warning signs (except as noted below) and are intended to continually warn drivers that they are approaching or proceeding in a hazardous area. Flashing lights shall not be used to delineate the intended path of travel, and not placed with spacings that will form a continuous line to the drivers eye. The Type A light will be used to mark obstructions that are located adjacent to or in the intended travelway. Type A lights shall not be used in conjunction with the first advance warning sign nor the second such sign when used.

For post-mounted signs, Type B High Intensity Flashing Warning Lights shall be mounted on the first advanced warning sign and on the first and second advanced warning sign where two or more signs are used; this applies to all approaches to any work zone. The light shall be mounted on the channelpost or on the upper edge of the sign nearest the traffic.

Steady-Burn

Type C Steady-Burn Lights are to be mounted on barricades, drums, concrete barrier walls or vertical panels and used in combination with those devices to delineate the travelway on lane closures, lane changes, diversion curves and other similar conditions. Steady-burn lights are intended to be placed in a line to delineate the traveled way through and around obstructions in the transition, buffer, work and termination areas of the traffic control zone. Their intended purpose is not for warning drivers that they are approaching or proceeding through a hazardous area.

STANDARD ORANGE FLAG

For post-mounted signs a standard orange flag 18"x 18" (min.) shall be mounted on the first advanced warning sign and on the first and second advanced warning sign where two or more signs are used; this applies to all approaches to any work zone. The flag shall be mounted on the channelpost or on the upper edge of the sign furthest from traffic.

Inspecting Temporary Traffic Control Devices

Temporary Traffic Control Devices

- Sheeting Retroreflectivity
- QPL # on device and light



Temporary Traffic Control Devices

- Qualified Products List contains many products
 - Pavement Markings - Paint, Thermo, RPMs, etc.
 - Traffic Control Devices - Barricades, Drums, Warning Lights, CMS, etc.
 - Work zone sign supports - effective July 2007



Temporary Traffic Control Devices

QPL Alleged Deficiency

Form # 630-020-01



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
NOTIFICATION OF ALLEGED DEFICIENCY
TRANSPORTATION PRODUCTS QUALIFIED PRODUCTS LIST (QPL)

FORM 630-020-01
ESTIMATES
07/98

PRODUCT/MATERIAL:

QPL NO: _____ Financial Project ID No. _____ State Project No: _____

Product/Material: _____ Manufacturer's Name: _____

Manufacturer's Address: _____

Prime Contractor: _____ Contractor Applying material/product: _____

DESCRIPTION OF ALLEGED DEFICIENCY:

Date(s) deficiency occurred: _____ Documented in Project daily reports: YES NO

Describe deficiency: _____

Possible reasons for deficiency: _____

Miscellaneous MOT Issues

High Visibility Safety Apparel

Index 600, Sheet 4

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. 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.

High Visibility Safety Apparel

All workers within Right-of-Way shall wear:
ANSI/ISEA 107-2004 Class 2 Apparel
Orange or Yellow/Green in Color



All flaggers within Right-of-Way shall wear:
Daytime - ANSI/ISEA 107-2004 Class 2
Apparel
Nighttime - ANSI/ISEA 107-2004 Class 3
Apparel
Orange or Yellow/Green in Color

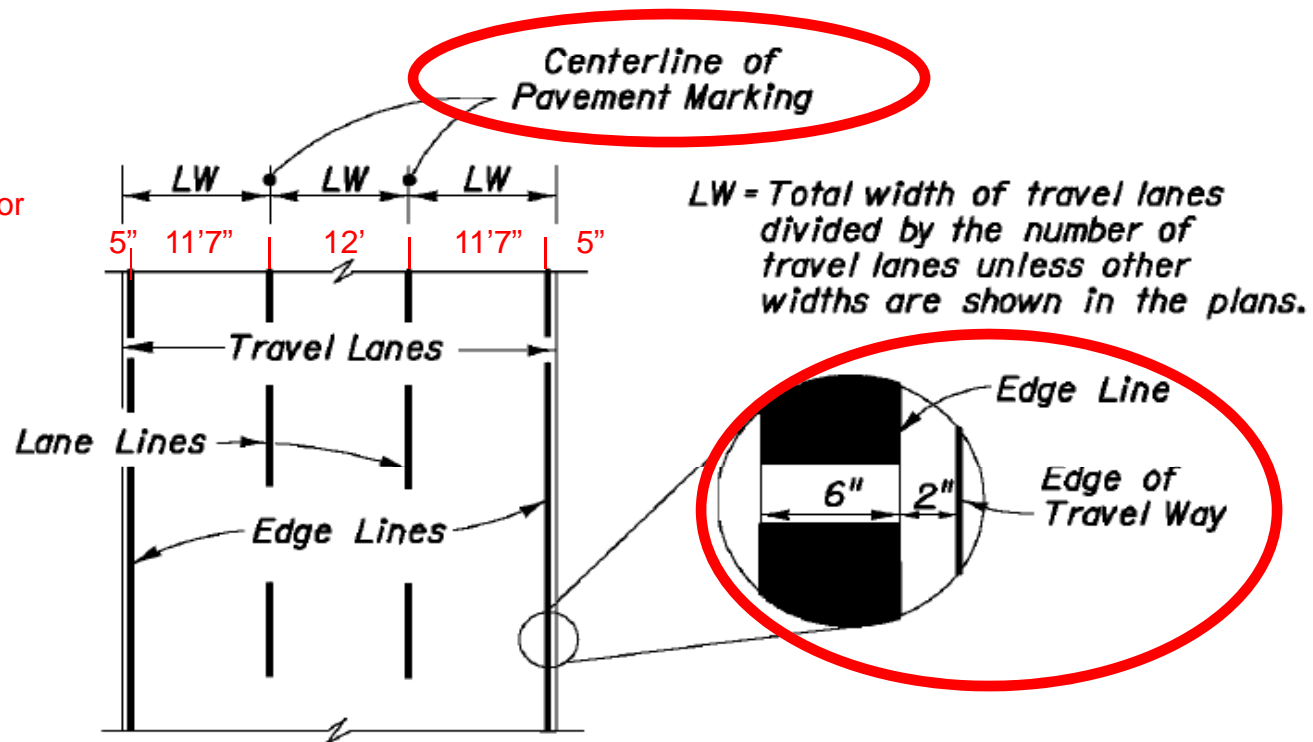
Placement of Stripe



24 foot roadway – includes stripes

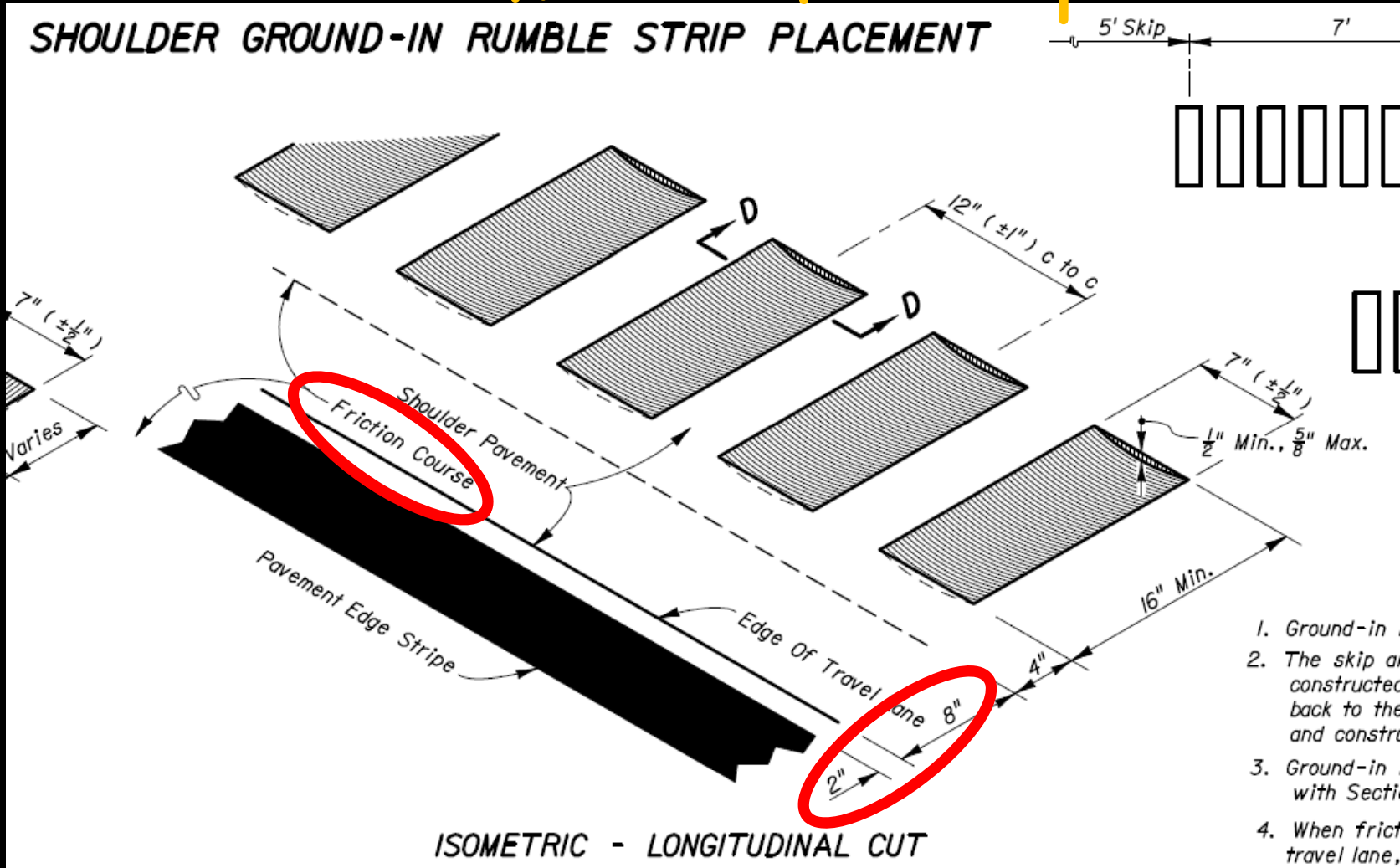
Placement of Stripe - Index 600

Striping layout for
3 - 12' lanes:
5", 11'7", 12',
11'7", 5" = 36'



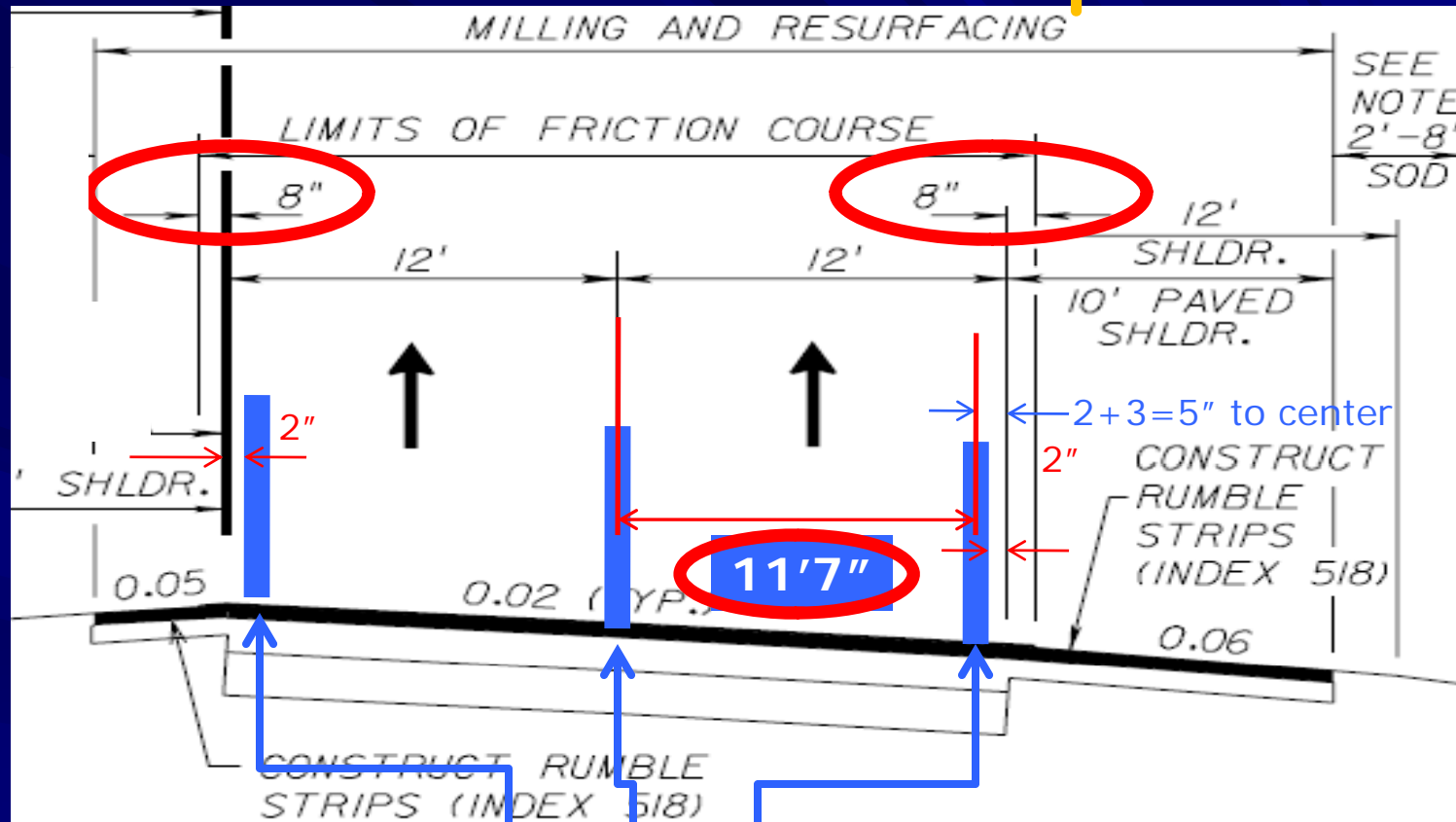
PLACEMENT OF PAVEMENT MARKINGS

Placement of Stripe



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Placement of Stripe



6 inch stripe

Placement of Stripe – 11'7" from center to center of stripes

Placement of Stripe



Center to Center will be 11'7"

Questions?

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