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2012 UPDATE

Maintenance of Traffic

Ezzeldin Benghuzzi, P.E.

Design Standards

Fatality Analysis Reporting System (FARS)

Work Zone Fatalities

Year	US	FL
2005	1074	162
2006	1004	118
2007	835	92
2008	720	81
2009	680	82
2010	576	43

01/04/12

Ezzeldin Benghuzzi, P.E. 2

Design Standards

2012 Design Standards

Summary of Major Changes

Effective July 1, 2012

Ezzeldin Benghuzzi, P.E. 3

Design Standards

Index 600 Sheet 3

High-Visibility Safety Apparel

Shall meet ANSI/ISEA 2010 and <u>2004</u>

– No changes to the Performance Class scheme
– Requirements for rainwear background fabric
– Changes related to design features
– Optional criteria for Flame Resistant items
– Guidance on service life of apparel

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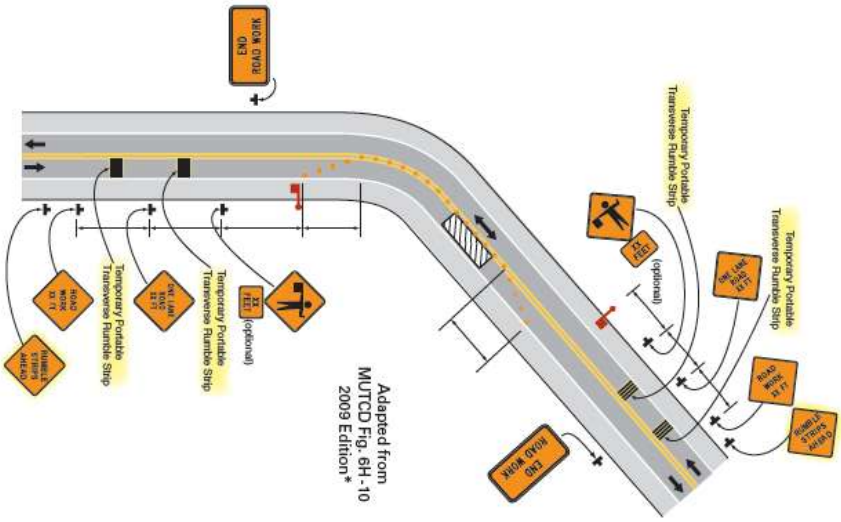
Design Standards

Index 600 Sheet 4



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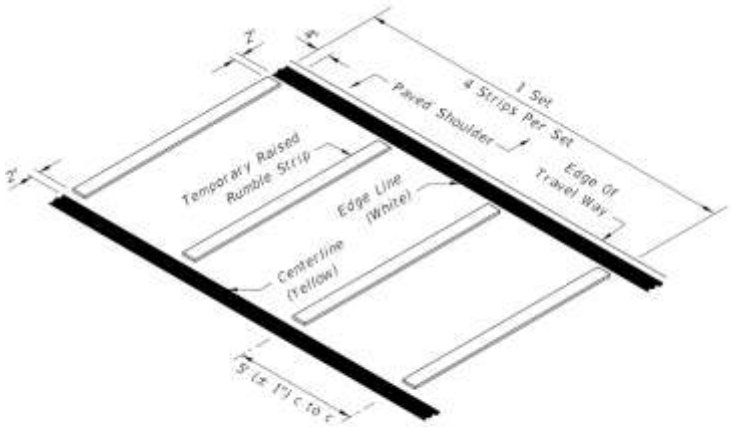
Design Standards

Index 600 Sheet 4

Removable Polymer Rumble Strip



REMOVABLE POLYMER RUMBLE STRIP SET
(PAVED SHOULDER SHOWN)

Ezzeldin Benghuzzi, P.E.

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Design Standards

Index 600 Sheet 4

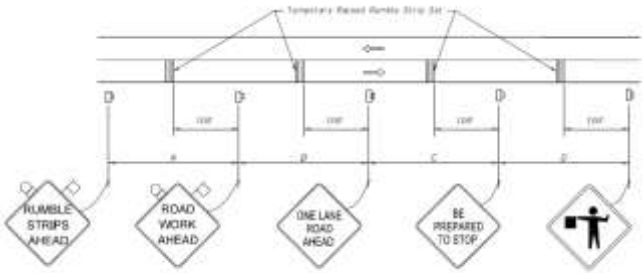
Removable Polymer Rumble Strip

Ezzeldin Benghuzzi, P.E. 7

Design Standards

Index 600 Sheet 4

Removable Polymer Rumble Strip



TYPICAL PLACEMENT OF TEMPORARY RAISED RUMBLE STRIPS

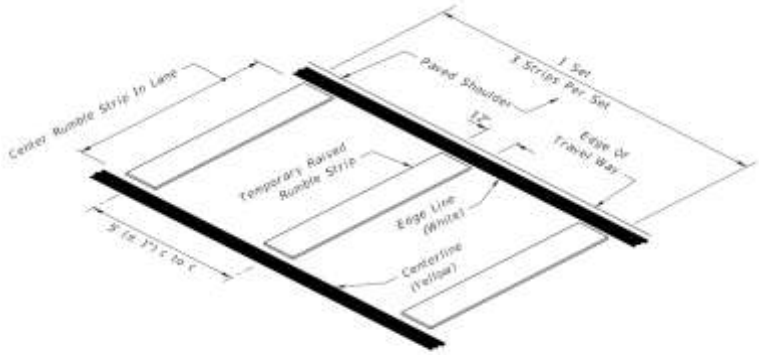
DISTANCE BETWEEN SIGNS				
Speed (mph)	Spacing (ft.)			
	A	B	C	D
40 or less	200	200	200	100
45	350	350	350	175
50	500	500	500	250
55 or greater	500	1640	1000	500

Ezzeldin Benghuzzi, P.E. 8

Design Standards

Index 600 Sheet 4

Molded Engineered Polymer Rumble Strip



MOLDED ENGINEERED POLYMER RUMBLE STRIP SET
(PAVED SHOULDER SHOWN)

Ezzeldin Benghuzzi, P.E. 9

Design Standards

Index 600 Sheet 4

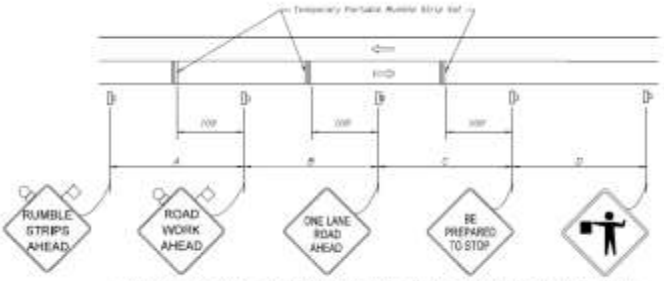
Molded Engineered Polymer Rumble Strip

Ezzeldin Benghuzzi, P.E. 10

Design Standards

Index 600 Sheet 4

Molded Engineered Polymer Rumble Strip



TYPICAL PLACEMENT OF TEMPORARY INTERNALLY BALLASTED RUMBLE STRIPS

DISTANCE BETWEEN SIGNS				
Speed (mph)	Spacing (ft.)			
	A	B	C	D
40 or less	200	200	200	100
45	350	350	350	175
50	500	500	500	250
55 or greater	500	1640	1000	500

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Design Standards

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Molded Engineered Polymer Rumble Strip

[redacted]

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Design Standards

Index 600 Sheet 4

PLAN PREPARATION MANUAL

10.12.16 Temporary Raised Rumble Strip Sets

Temporary raised rumble strips should be considered in addition to normally used warning signs/devices on the approach to flagging operations where additional alertness is desired of drivers approaching flagging operations. Work zones in an isolated location or with sharp horizontal or vertical curves may benefit from the additional advance warning by alerting drivers visually, audibly, and tactilely of the approaching work zone.

PAY ITEM

102-910- TEMPORARY RAISED RUMBLE STRIP SET

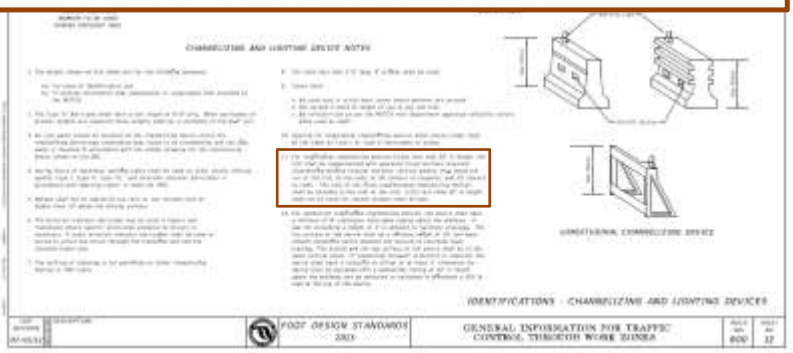
Ezzeldin Benghuzzi, P.E. 13

Design Standards

Index 600 Sheet 12

Longitudinal Channelizing Devices (LCD)

11. For 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.



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Design Standards

Index 600 Sheet 12

Longitudinal Channelizing Devices (LCD)

Design Standards

Index 600 Sheet 12

Longitudinal Channelizing Devices (LCD)

Vehicle Longitudinal Channelizing Devices

Design Standards

Index 600 Sheet 12

Longitudinal Channelizing Devices (LCD)

12. 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 smooth 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 drop-off protection is required, the device shall have a footprint or offset of at least 2', otherwise the device must be equipped with a pedestrian railing at 42" in height above the walkway and be anchored or ballasted to withstand a 200 lb load at the top of the device.

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Design Standards

Index 600 Sheet 12

Longitudinal Channelizing Devices (LCD)

Pedestrian Longitudinal Channelizing Devices

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Longitudinal Channelizing Devices (LCD)

Pedestrian Longitudinal Channelizing Devices

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Longitudinal Channelizing Devices (LCD)

Pedestrian Longitudinal Channelizing Devices

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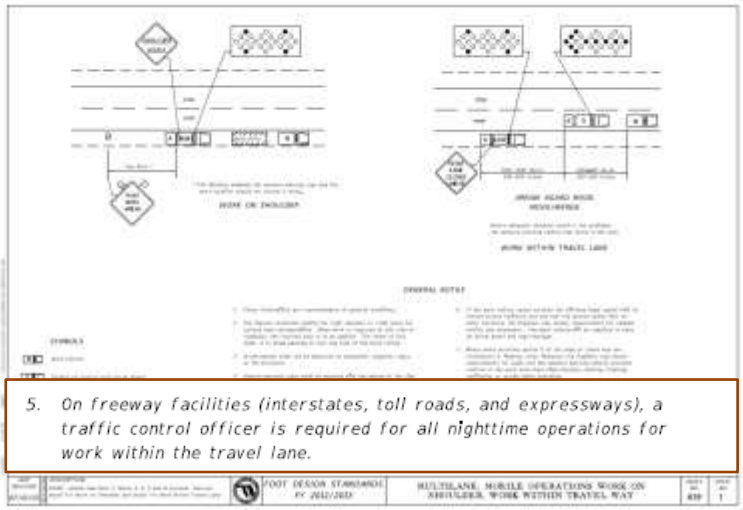
Design Standards

Index 619 Sheet 1

Multilane, Mobile Operations Work on Shoulder, Work Within Travel Way



5. On freeway facilities (interstates, toll roads, and expressways), a traffic control officer is required for all nighttime operations for work within the travel lane.

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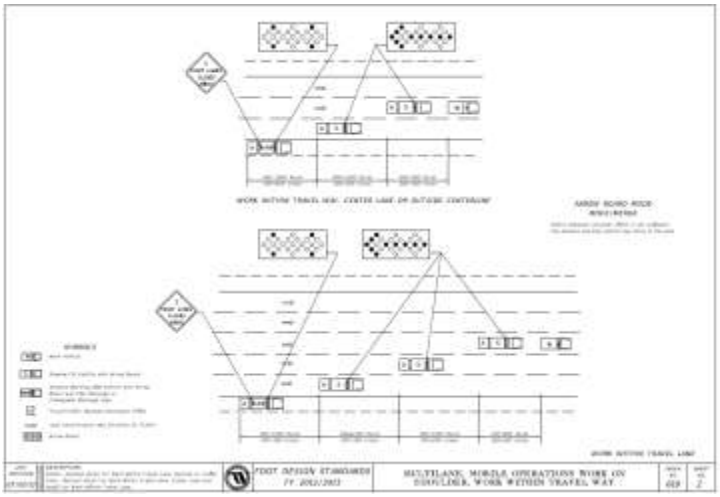
Design Standards

Index 619 Sheet 2

Multilane, Mobile Operations Work on Shoulder, Work Within Travel Way



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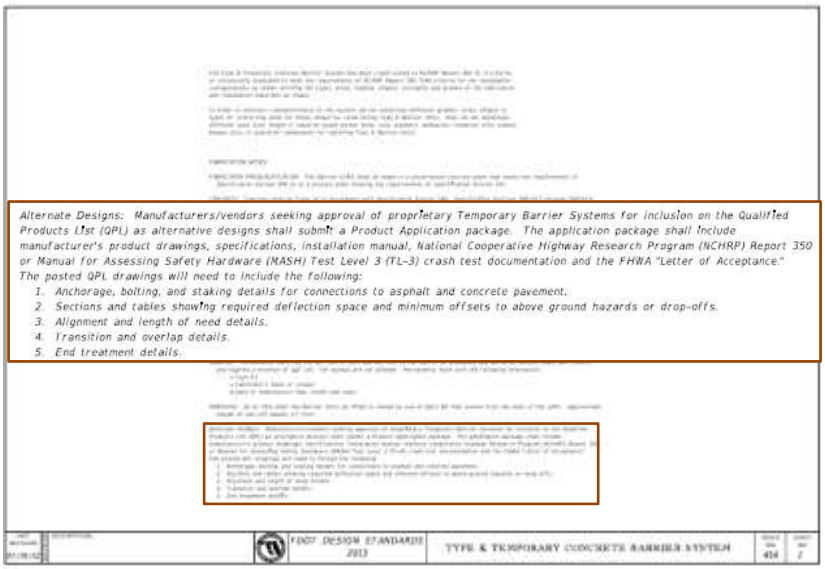
Design Standards

Concrete Barrier System Index 414



Alternate Designs: Manufacturers/vendors seeking approval of proprietary Temporary Barrier Systems for inclusion on the Qualified Products List (QPL) as alternative designs shall submit a Product Application package. The application package shall include manufacturer's product drawings, specifications, installation manual, National Cooperative Highway Research Program (NCHRP) Report 350 or Manual for Assessing Safety Hardware (MASH) Test Level 3 (TL-3) crash test documentation and the FHWA "Letter of Acceptance."
The posted QPL drawings will need to include the following:

1. *Anchorage, bolting, and staking details for connections to asphalt and concrete pavement.*
2. *Sections and tables showing required deflection space and minimum offsets to above ground hazards or drop-offs.*
3. *Alignment and length of need details.*
4. *Transition and overlap details.*
5. *End treatment details.*

FDOT DESIGN STANDARDS 2013 | TYPE K TEMPORARY CONCRETE BARRIER SYSTEM | 414

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Design Standards

Steel Barrier System Index 414

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Design Standards

Steel Barrier System Index 414 & QPL

Struct.	102- 71- AB	TEMPORARY BARRIER WALL	LF

A = Operation
1 (Furnish & Install)
2 (Relocate)

B = Material
1 (Concrete)
2 (Water filled)
3 (Low Profile Concrete)
4 (Type K) bridge applications

Steel Barrier is alternate design to Type K Barrier!

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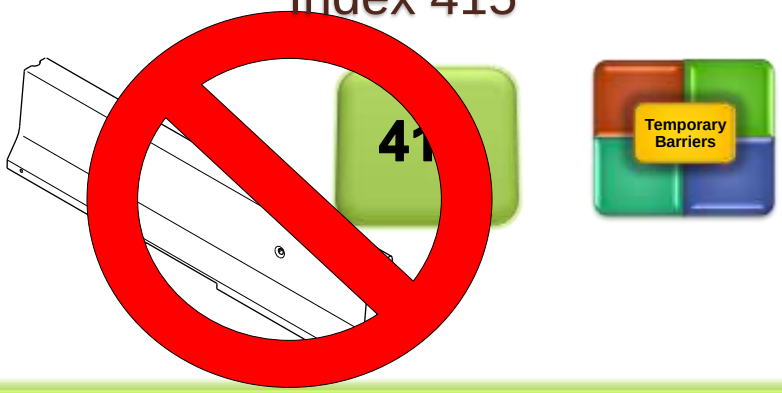
Design Standards

Concrete Barrier System Index 415



Index 415 units constructed prior to October 1, 2002 may be used ~~until September 30, 2012~~ THROUGH JUNE 30, 2012 LETTING with usage of 'FDOT Snake Pin' Interconnection

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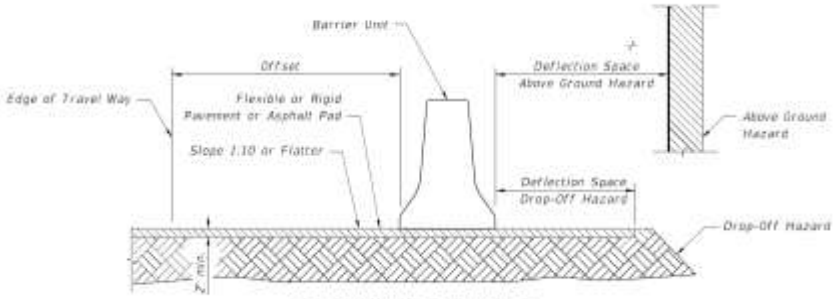
Design Standards

Concrete Barrier System Index 415



ROADWAY INSTALLATION

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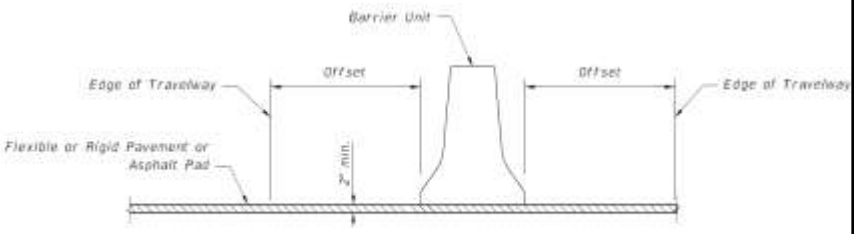
Design Standards

Concrete Barrier System Index 415



MEDIAN INSTALLATION

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Design Standards

Concrete Barrier System Index 415

OFFSET AND DEFLECTION SPACE REQUIREMENTS				
Installation	Shielding	Work Zone Speed	Offset to Travelway	Deflection Space
Right Shoulder	Above Ground Hazards	45 mph or Less	1' min, 2' preferred	2' min.
		50 mph and Greater	2' min, 4' preferred	4' min.
	Drop-Off Hazards	45 mph or Less	1' min, 2' preferred	2' min.
		50 mph and Greater		
		a. Drop-offs 4' or Less and NO traffic below	2' min, 4' preferred	2' min.
		b. All drop-off conditions other than 'a'	2' min, 4' preferred	4' min.
Separating Traffic	Adjacent Opposing Traffic	45 mph or Less	1' min, 2' preferred	1' min., 2' prefered
		50 mph and Greater	2' min, 4' preferred	2' min., 4' preferred

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Design Standards

Concrete Barrier system Index 415

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Design Standards

Concrete Barrier system Index 415

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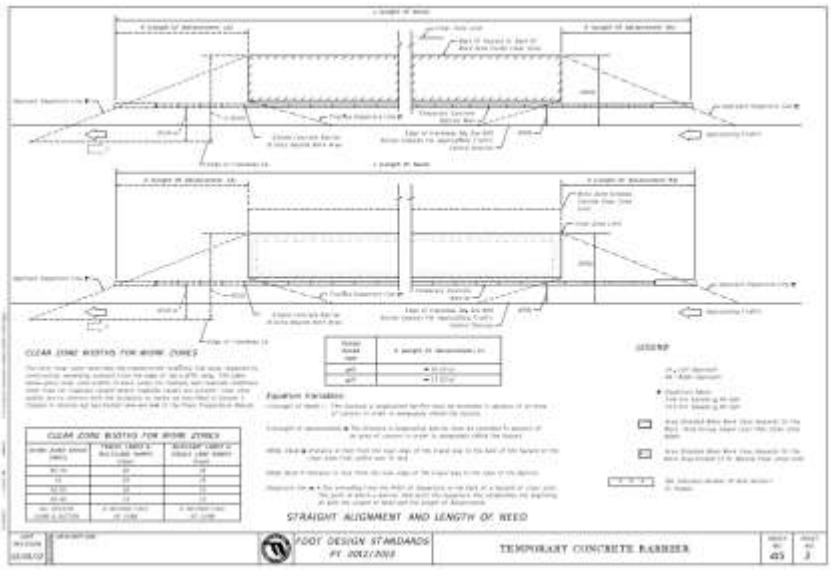
Design Standards

Concrete Barrier System Index 415



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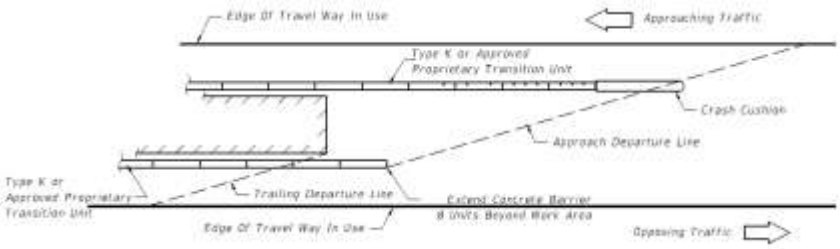
Design Standards

Concrete Barrier System Index 415



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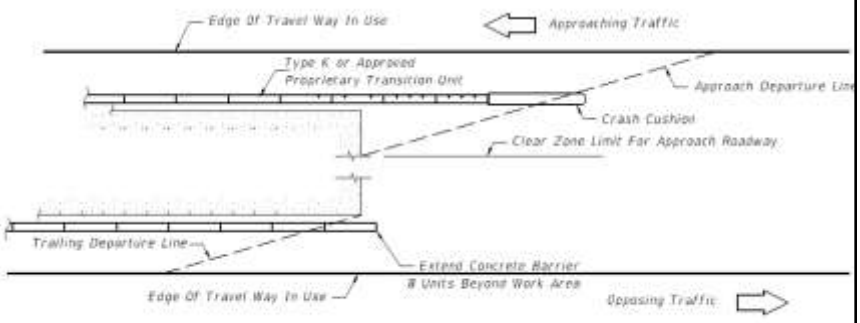
Design Standards

Concrete Barrier System Index 415



MEDIAN HAZARDS EXTENDS TO OR BEYOND CLEAR ZONES BOTH ROADWAYS

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Design Standards

Temporary Crash Cushions

FDOT Criteria

- VENDOR DRAWINGS
  - •TL-2 (45 mph or less)
  - •TL-3 (50 mph or greater)
- SPEEDS
  - • Interpolating at 5 mph increments
  - •Extrapolating for speeds above 60 mph is no longer allowed

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Design Standards

Temporary Crash Cushions

FDOT Design Requirements

- Station/Offset
- Type of Crash Cushion (TL-2 or TL-3)
- Speed
- Width - Narrow vs. Wide
- Length Restrictions
- MOT Phase (Temporary)
- Use Type K barrier pay item

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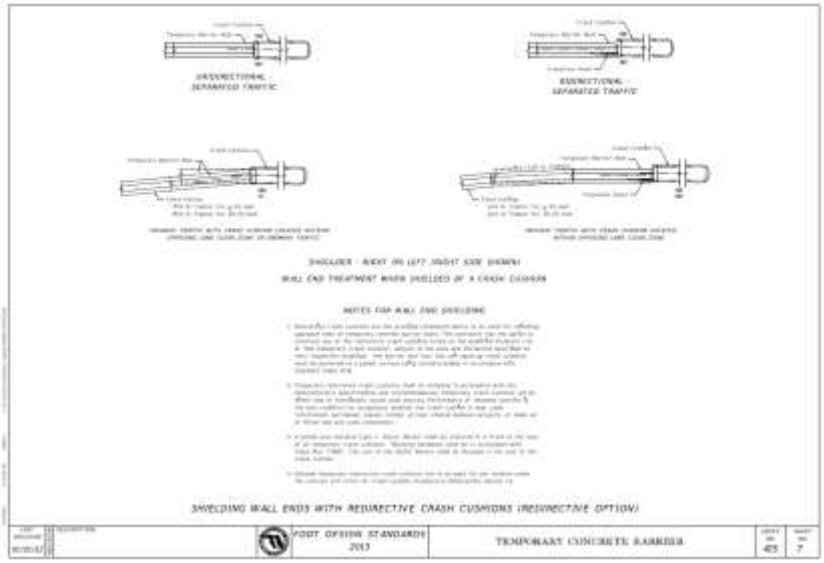
Design Standards

Crash Cushions (QPL)



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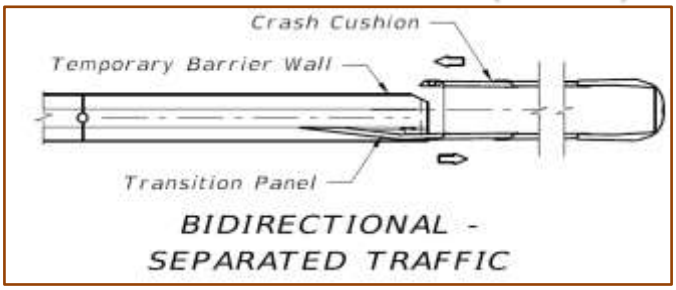
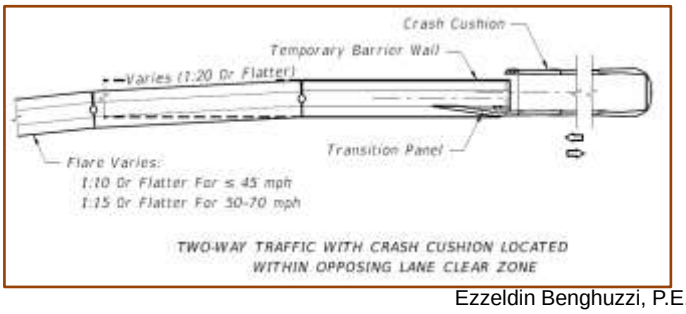
Design Standards

Crash Cushions (QPL)





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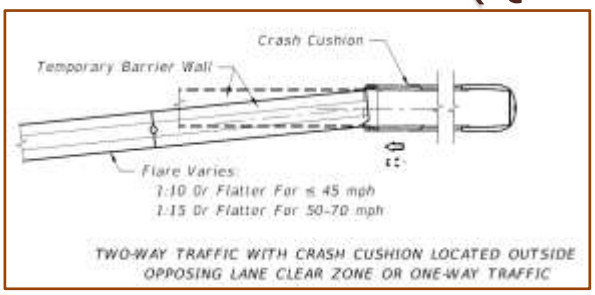
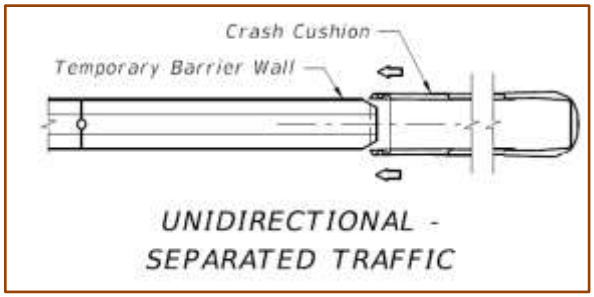
Design Standards

Crash Cushions (QPL)





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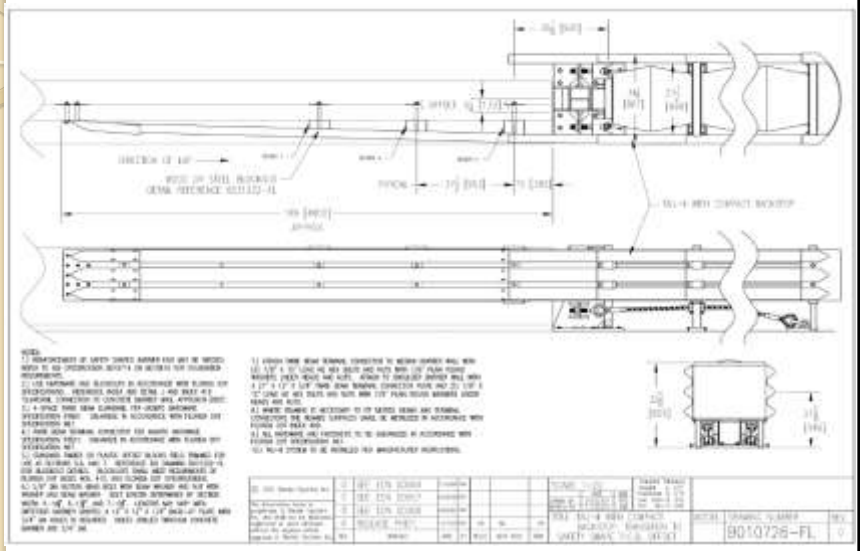
Design Standards

Crash Cushions (QPL)



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Design Standards

Crash Cushions (QPL)

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Design Standards

Crash Cushions (QPL)

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Design Standards

Crash Cushions (QPL)

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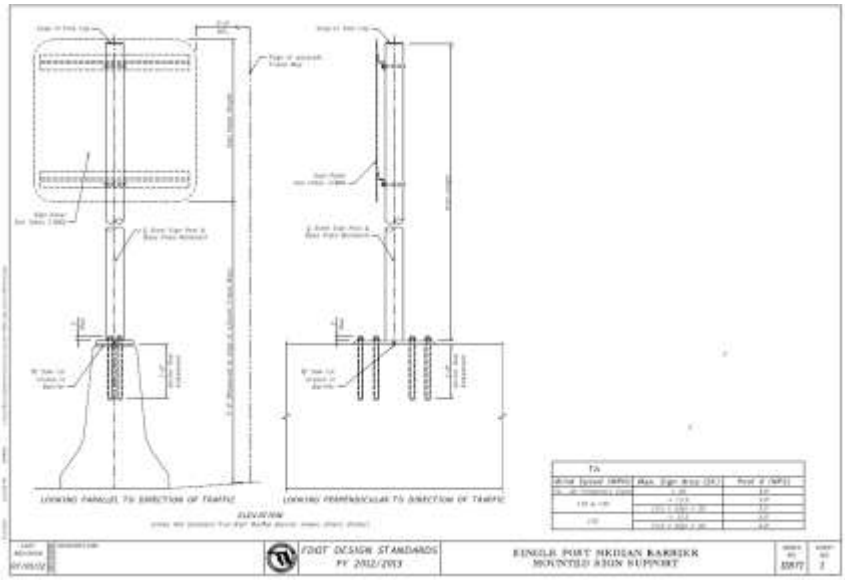
Design Standards

Temp. Signs Mounted on Barrier



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Design Standards

Temp. Signs Mounted on Barrier

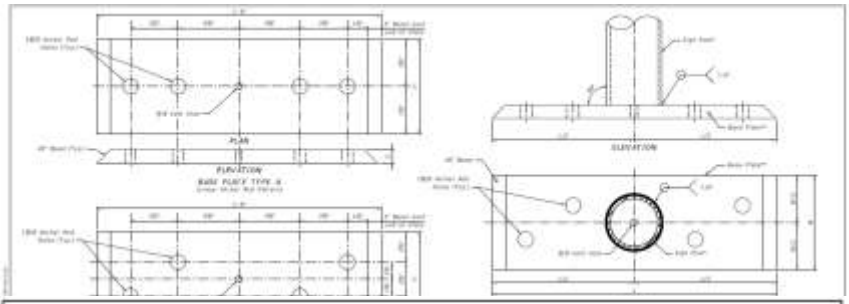

TABLE 2 - BASE PLATE TYPE AND ANCHOR ROD SIZING			
Index No.	Type/Application	Base Plate Type	Anchor Rod Ø
410	Full Wall	B	1"
410	Cantilever or 1-Wall	A	
420 & 425	When Clear Space between Dual Bridge Traffic Railing is ≤ 4'-0"	A	
421	All Applications	A	
All listed above Plus 414 & 415	Temporary Signs	C ***	½" ***

*** Place anchor rods in a staggered or linear pattern as necessary to avoid reinforcing. Use a staggered pattern for all temporary barriers.

Ezzeldin Benghuzzi, P.E. 45

Design Standards

Contact for more information

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  Phone: 850-414-4314
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Ezzeldin Benghuzzi, P.E. 46

Questions ……..

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