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MEMORANDUM

DATE: March 24, 1998

TO: District Secretaries

FROM: Billy L. Hattaway, PE State Roadway Design Engineer

COPIES: See Attached List

SUBJECT: January 1998 - Roadway and Traffic Design Standards Implementation

Copies of the subject standard indexes have been forwarded to offices within your Districts for further distribution to District staff.

Consultants, contractors, and others outside the Department may purchase copies from Central Office Maps and Publications, 605 Suwannee Street, MS-12, Tallahassee, FL 32399-0450, Telephone (850) 414-4050, Suncom 994-4050. The price per copy is $24.50 plus tax.

Application of the 1994, 1996 and 1998 Standards shall be as follows:

• Metric Projects - Lettings PRIOR to July 1, 1998:

The 1996 Standards and subsequent revisions shall continue to be applied to all metric projects to be let PRIOR to July 1, 1998. No projects with the 1998 Standards transmitted to Tallahassee for letting PRIOR to July 1, 1998 can be processed. This is necessary due to changes to Specifications and Pay Items that will not be implemented until July 1, 1998.

• Metric Projects - Lettings AFTER July 1, 1998 and PRIOR to October 1, 1998

For projects let after July 1, 1998 and prior to October 1, 1998 either the 1998 Standards or the 1996 Standards may be used. However, It is recommended the 1998 Standards be used if at all possible. NOTE to Specifications Engineers: The July, 1998 Workbook will only support the 1998 Standards. For projects using the 1996 Standards it will be necessary to use the appropriate materials for the January, 1998 Workbook and subsequent mandatories.

continued...
Memorandum to District Secretaries
March 24, 1998
Page 2

• Metric Projects - Lettings AFTER October 1, 1998

The 1998 Standards shall be applied to all metric projects to be let AFTER October 1, 1998.

• English Projects:

The 1994 Standards and subsequent revisions shall continue to be applied to all English projects.

Please contact this office (850) 414-4310, Suncom 994-4310 if you have any questions.
INTRODUCTION


The Department has adopted a standard practice for use of the m and mm designations and the use of the decal that applies to the standards of this booklet, metric contract plans and other metric documents. That practice along with applied symbology are as follows:

(a) Meter shall be indicated in decimal when the m designation unless needed for clarity for examples: 30.5; 1.6, and 0.5mm.

(b) Millimeter shall be a whole number without the mm designation unless the designation is needed for clarity. Anytime a fractional millimeter is required, the decimal form shall be labeled with mm, for example: 0.0040 mm. Wherever the whole number may be misunderstood, for example, a 4mm joint or 150mm square.

(c) Designations in m or mm are not applied to dimensional information on dimension lines with line terminators unless needed for clarity. Designations in m or mm are applied to dimensional information when tagged directly to a drawing feature by a leader line.

(d) Designations in m or mm are not applied to rapid unless needed for clarity; for example, 5.0D R (without the m) and 0.0R (without the mm).

(e) In notes, the mm designation is not to be used when the terms depth, thickness, length, width, slopes, curv., height, half, corrugation, timber and similar terms follow the number unless needed for clarity.

(f) All general and design notes and other notation should show the m and mm after any numbers for clarification.

(g) For round holes, diameter may be specified in one of the following forms:

- Examples: 15 mm Ø Hole (Preferred)
- Ø 15 Hole or Ø 15 Dia. Hole (Acceptable)
- 15 mm Ø Hole (2 Rear) (Preferred)
- 2-15 mm Ø Hole (Acceptable)

(h) Designations in m or mm are not applied to established trade sizes or identifiers unless needed for clarity; for example: 1/2 x 89 x 7.1 for a steel shape, 1.5 for steel reinforcing bars No. 5 for reinforcing strands and 2006 type F50. Since the diameter is understood by the industry to be in millimeters.

(i) All tables should be labeled in m and mm in the headings of columns including tabulations for those items where the industry has specified a single designation.

(j) Pig item units are labeled with upper case letters as shown in the 1998 Metric Basis Of Estimated Handbooks, and duplicated an index No. 600.

(k) For drawings and description information, use the small superscript for examples: m² not m².

This 1994 Appropriations Act was signed into law on October 07, 1993. This Act forbids the expenditure of Federal Funds for highway signs displaying speed limits, distance or other measurements using the metric system. Therefore, all speed and all distances will be displayed in English units.

The equations for determining taper lengths, lane lengths and lane transition lengths (L), (for example L = w/51.5 and L = w/4.5) are for metric units. Distance speed in kilometers per hour (km/h) will be substituted for "S" in the equations unless otherwise noted. These equations are applied on those standards indexes where the assumed value is the posted speed (English), conversion tables for English to metric speeds have been included.

This booklet is the third publication of metric roadway and traffic design standards by the Department. Users of these standards are encouraged to seek improvements to the standards. Suggestions should be submitted only after thorough study has been made and supporting background data can be furnished with the suggestions. Suggestions shall be submitted to the State Roadway Design Engineer, Florida Department Of Transportation, 625 Summerville St, MS 32, Tallahassee, F.L. 32399-0450. The Department will make changes to the standards by special provisions, or where necessary by interim standards, until the next regular publication of metric standards is implemented.
## Comprehensive Changes (These changes are not listed in the Index tabulations below)

- Where physical speeds in miles per hour (mph) are effective in determining the application of certain features in the standard drawings of this booklet, the speeds indicated appear as a maximum per hour (mph) and mph need to be used as a minimum. mph values are given, e.g., 40 mph (56 km) or 50 mph (80 km) at 50 mph. Speed designations shown in the Index are not to be used for establishing project design speeds.

## Tabulated Changes

### General Information

- The changes required herein generally address functional changes in the standard drawings included in the Revisions Roadway and Traffic Design Standards booklet. The changes below are shown in the Index tabulations, whereas additional changes are incorporated directly into standard references between this booklet and the 1996 booklet. These changes are taken to reflect any improvements that can occur when utilizing these text or the drawings. The changes are to be used in conjunction with the Index tabulations.

- The changes have been applied to a reference table as much as possible. The width, height, and location of the index table within the text is not changed. However, any page numbers indicated in the index are to be used as a reference to the page numbers in the index of this booklet.

### Tabulation Notes

- "Reference Notes" and "Reference Tabulations" are provided at the end of the index tabulations. These notes are intended to assist the user in understanding the changes made to the Index tabulations.

### Description of Symbols

- The symbols used in this booklet are given in the Symbols Index tabulation and are designed only for the reader's convenience. The symbols are not intended to be used in conjunction with the index tabulations unless specified.

### Index Tabulation

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### Specification Details

- The specification details included in this booklet are intended to provide a reference to the user. The details are not intended to be used as a replacement for the actual specifications provided in the project.

### Design and Construction

- The design and construction details included in this booklet are intended to provide a reference to the user. The details are not intended to be used as a replacement for the actual specifications provided in the project.

### Traffic Engineering

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### Structural Engineering

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1. Symbols on this index are for use on all roadway, signing and marking, signalization, and lighting projects. For work zone traffic control systems refer to index 600. When similar symbols are used, additional indications may be required for clarity.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STANDARD SYMBOLS
### STANDARD SYMBOLS FOR PLAN SHEETS

#### TRAFFIC SIGNALS SYMBOLS

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<td><img src="image1" alt="Symbol" /></td>
<td>Traffic Signal Head (Span Wire Mounted)</td>
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<td><img src="image2" alt="Symbol" /></td>
<td>Traffic Signal Head (Pedestal Mounted)</td>
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<tr>
<td><img src="image3" alt="Symbol" /></td>
<td>Traffic Signal Head (Detached Arm Mounted)</td>
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<tr>
<td><img src="image4" alt="Symbol" /></td>
<td>Traffic Signal Pole (Concrete, Wood, Metal)</td>
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<td><img src="image5" alt="Symbol" /></td>
<td>Vehicle Detector (Loop)</td>
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<tr>
<td><img src="image6" alt="Symbol" /></td>
<td>Signal Cable (On Messenger Wire)</td>
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<tr>
<td><img src="image7" alt="Symbol" /></td>
<td>Conduit</td>
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<tr>
<td><img src="image8" alt="Symbol" /></td>
<td>Pedestrian Detector</td>
</tr>
<tr>
<td><img src="image9" alt="Symbol" /></td>
<td>Pedestrian Signal Head (Pole Or Pedestal Mounted)</td>
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<tr>
<td><img src="image10" alt="Symbol" /></td>
<td>Controller Cabinet (Base Mounted)</td>
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<td><img src="image11" alt="Symbol" /></td>
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#### LIGHTING SYMBOLS

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<td><img src="image13" alt="Symbol" /></td>
<td>Existing Pole &amp; Luminaire To Be Removed</td>
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<tr>
<td><img src="image14" alt="Symbol" /></td>
<td>Final Position Of Relocated Or Adjusted Pole &amp; Luminaire</td>
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<td><img src="image15" alt="Symbol" /></td>
<td>High Mast Lighting Tower</td>
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<td><img src="image16" alt="Symbol" /></td>
<td>City Or Utility Owned Luminaire &amp; Pole</td>
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<td><img src="image17" alt="Symbol" /></td>
<td>PVC (Polyvinyl Chloride) Lighting Conduit And Conductors</td>
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<td><img src="image18" alt="Symbol" /></td>
<td>Rigid Galvanized Lighting Conduit And Conductors</td>
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<td><img src="image22" alt="Symbol" /></td>
<td>Pier Cap Underdeck Luminaire</td>
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<td><img src="image23" alt="Symbol" /></td>
<td>Pendant Hung Underdeck Luminaire</td>
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#### SIGNING AND PAVEMENT MARKING SYMBOLS

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<td><img src="image28" alt="Symbol" /></td>
<td>Stop Bar</td>
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<td><img src="image29" alt="Symbol" /></td>
<td>Traffic Sign (Post Mounted)</td>
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<td>Sign Item Number</td>
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<td><img src="image33" alt="Symbol" /></td>
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See General Notes, Sheet 1 of 3

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**SIGNAL DESIGN**

**STANDARD SYMBOLS**
**NOTE:** Spacing shown in this chart are based on generalized experience and should be adjusted based on actual site performance or equivalent competition.

FLOW RATES (m³/min.)
- Very Light: < 8
- Light: 8 ≤ < 16
- Moderate: 16 ≤ < 24
- Heavy: 24 ≤ < 40
- Very Heavy: ≥ 40

**SOILS**
- COHESIVE: CLAY, Silt, Gravel, Sand
- NON-COHESIVE: Sand, Gravel

**LEGEND**
- Flow Rate: FLOW RATES
- Soil Type: SOILS

**CHART I**
RECOMMENDED SPACING FOR TYPE I AND TYPE II HAY BALE BARRIERS, AND TYPE III SILT FENCES
TYPE III SILT FENCE

To be used at new locations.

TYPE IV SILT FENCE

To be used where large settlement lands are anticipated. Suggested use is where HLV flow is 1/2 or greater and length of slope exceeds 24 meters. Note: use where the unrestricted water may backs into travel lanes or off the right of way.

SILT FENCE APPLICATIONS

Note: SILT Fence to be paid for under the contract unit price for Staked SILT Fence Items.
## STANDARD CRITERIA

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<th>TEAR</th>
<th>SUPPLY</th>
<th>STRENGTH</th>
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</table>

### NOTES

1. The Designer should review this criteria and adopt the values as necessary to satisfy project requirements. These adjustments should be reflected in the project submittals.

### DESIGN NOTES

1. The Designer shall review this criteria and adopt the values as necessary to satisfy project requirements. These adjustments should be reflected in the project submittals.

### GENERAL NOTES

1. Specifications for geotextiles are Section 900. Physical criteria for each application is provided by the producer, in conjunction with these standards.

### TABLE 1

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### STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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## SLAB DESIGNS - SQUARE AND RECTANGULAR STRUCTURES

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### REINFORCING SCHEDULE

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<tr>
<th>SCHEDULE</th>
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<th>WIRE FABRIC 400 MPY</th>
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<tr>
<td>B</td>
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</tr>
<tr>
<td>C</td>
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---

### GENERAL NOTES

1. Slab reinforcement is appropriate for top, intermediate, and bottom slabs.
2. Wall reinforcement is appropriate for top, intermediate, and bottom walls.
3. Slab depth is measured from finish grade to top of slab.
4. Wall depth is measured from top of slab to grade for bases and to the top of the intermediate slab for fliers.
5. Wall height is the distance between top of lower slab to bottom of upper slab.
6. Slabs shown in parentheses () is the method used as shown on the plans.
7. Slabs in excess of 2000 require a structural design.

---

### STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**TYPE J AND P**

**STRUCTURE BOTTOMS**
### EYE BOLT AND CHAIN REQUIREMENTS

<table>
<thead>
<tr>
<th>Index Number</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Thread Dia.</th>
<th>Length of Bolt (In.)</th>
<th>Handing &amp; Moments</th>
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### MANHOLE TOPS

**NOTES:**

1. Manhole Top Type 7 plates shall be of Cast Iron or Galvanized Iron or Steel or Concrete as specified in Article 10H. When used for precast units, see General Note No. 1.

2. Manhole Top Type 7 plates may be of cast-in-place or precast construction. The optional key is for precast units only. Frames shall be provided and top flanges shall be ordered to suit the size of the framing. Frames can be adjusted to fit into the required voids.

3. Manhole Top Type 8 plates shall be cast in-place or precast concrete. The concrete and steel reinforcement shall be sized as the proper construction unit. The number of manholes per unit is not shown.

4. Manhole Top Type 8 plates shall be ordered with an optional construction joints as shown on Sheet 3 of 6.

5. Substitution of manhole top Type 8 for manhole top Type 7 is allowed provided that minimum channeling shown above are not reduced.

### DESIGN NOTES

1. Manhole Top Type 8 plates shall be specified in the joints where depths shown above can be interconnected.

### SUMP BOTTOM

**NOTES:**

- See Note A for material and finish types.
- Cost for each unit to be included in the contract unit price for each section of structure.
NOTES FOR THIN-WALL PRECAST OPTIONS

1. The details on Sheets 5, 6 & 8 are applicable for precast thin wall construction up to depths of 4.5 m. These details can be used with AASHTO Bridge Design. Cost of these details must be included in the estimate. Dimensions are not to the scale consistent with the referenced details.

2. Only the dimensions and reinforcement changes in the master details are indicated. The reinforcement tables showing details in those sections where the table is used to indicate the reinforcement is used with this detail. The reinforcement details of the master detail can be adjusted to reflect these thin wall changes.

3. Chloride which meets the requirements of ASTM C-135M shall be used for structures constructed to these details.

4. Reinforcement can be either deformed or round wire with a minimum yield strength of 500 MPa or 400 MPa. Minimum reinforcement size can be determined by the following equations:

   For Grades 400 MPa:
   \[ A_{min} = \frac{0.125 \times 1000}{f_{y}} \] mm²/cm

   For Grades 500 MPa:
   \[ A_{min} = \frac{0.125 \times 1000}{f_{y}} \] mm²/cm

   in which \( f_{y} \) is the yield strength of the reinforcing steel in MPa.

5. For the reinforcement classification, the minimum yield requirement is 500 MPa or 400 MPa for Grades 400 MPa or 500 MPa. Minimum reinforcement size shown shall be not less than 1.5 times the bar thickness with a maximum spacing of 300 mm or less for 1.5 times the bar thickness with a maximum spacing of 400 mm.

---

**EQUIVALENT STEEL AREA TABLE**

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<thead>
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<th>Grade 300 MPa</th>
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<th>Grade 500 MPa</th>
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<td>25 mm</td>
<td>370 m²</td>
<td>250 m²</td>
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<tr>
<td>22 mm</td>
<td>335 m²</td>
<td>220 m²</td>
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<tr>
<td>20 mm</td>
<td>295 m²</td>
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</table>

**SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS**

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<tr>
<th>Manhole Type</th>
<th>Details</th>
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<tr>
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<td>Type B</td>
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<td>Type C</td>
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<td>Type D</td>
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*Note: The details are subject to change without notice.*
### Round Pipe Dimensions

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<tr>
<th>Equiv. Dia. (mm)</th>
<th>Wall Thickness (mm)</th>
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<th>B WALL</th>
<th>C WALL</th>
<th>D WALL</th>
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<td>375</td>
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<td>57</td>
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<tr>
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*For information purposes only.*

### Round Pipe Installations

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<th>Class</th>
<th>Class</th>
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<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
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*For information purposes only.*

### Elliptical Pipe Dimensions

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<th>Height of Fill (m)</th>
<th>Pipe Class</th>
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<td>C</td>
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<td>HE II</td>
<td>C-Mobilized</td>
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### Elliptical Pipe Installations (All Sizes)

- **Horizontal:** 0.3-0.5 (HE II), 0.5-1.0 (HE II-Mobilized)
- **Vertical:** 0.3-0.5 (VE II), 0.5-1.0 (VE II-Mobilized)

Note: HE II and VE II pipe required for depths of cover less than 0.6 for 300, 400, and 600 equivalents.

### Maximum Cover for Reinforced Concrete Pipe Round and Elliptical

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<tr>
<th>Polyethylene Pipe</th>
<th>Polyvinyl Chloride Pipe</th>
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### Cover Height

Note: Height of fill/maximum cover is measured from top of finished grade to outside top of pipe.
### ROUND PIPE - 68 x 13 CORRUGATION

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<th>Area (ft²)</th>
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### ROUND PIPE - 75 x 25 CORRUGATION

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<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
<td>6</td>
</tr>
</tbody>
</table>

### ROUND PIPE - 125 x 25 CORRUGATION

<table>
<thead>
<tr>
<th>D (in)</th>
<th>Area (ft²)</th>
<th>Maximum Height of Fill/Sheet Thickness in Milimeters</th>
<th>Min. Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>0.35</td>
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<tr>
<td>875</td>
<td>0.37</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
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<tr>
<td>1,000</td>
<td>0.40</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
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</tr>
<tr>
<td>1,250</td>
<td>0.44</td>
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<tr>
<td>1,500</td>
<td>0.50</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
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<tr>
<td>2,000</td>
<td>0.67</td>
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</tr>
<tr>
<td>2,500</td>
<td>0.87</td>
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<tr>
<td>3,000</td>
<td>1.09</td>
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</tr>
<tr>
<td>3,500</td>
<td>1.33</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
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</table>

### PIPE ARCH - SPIRAL RIB: 19 x 9 x 96 RIB SPACING

<table>
<thead>
<tr>
<th>Span (in)</th>
<th>D (in)</th>
<th>Erla, Round Pipe</th>
<th>Area (ft²)</th>
<th>Minimum Sheet Thickness Required (milimeters)</th>
<th>Maximum Height of Fill/Sheet Thickness in Milimeters</th>
<th>Min. Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>144</td>
<td>0.17</td>
<td>0.83</td>
<td>10.30</td>
<td>20295</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
<td>6</td>
</tr>
<tr>
<td>144</td>
<td>0.18</td>
<td>0.83</td>
<td>10.30</td>
<td>20295</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
<td>6</td>
</tr>
<tr>
<td>144</td>
<td>0.19</td>
<td>0.83</td>
<td>10.30</td>
<td>20295</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
<td>6</td>
</tr>
<tr>
<td>144</td>
<td>0.20</td>
<td>0.83</td>
<td>10.30</td>
<td>20295</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
<td>6</td>
</tr>
<tr>
<td>144</td>
<td>0.21</td>
<td>0.83</td>
<td>10.30</td>
<td>20295</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
<td>6</td>
</tr>
<tr>
<td>144</td>
<td>0.22</td>
<td>0.83</td>
<td>10.30</td>
<td>20295</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
<td>6</td>
</tr>
<tr>
<td>144</td>
<td>0.23</td>
<td>0.83</td>
<td>10.30</td>
<td>20295</td>
<td>12.5, 2.0, 2.5, 2.7, 2.1, 1.5, 1.2, 1.0</td>
<td>6</td>
</tr>
</tbody>
</table>

### MAXIMUM COVER FOR CORRUGATED STEEL PIPE ROUND AND PIPE ARCH

<table>
<thead>
<tr>
<th>Cover Height</th>
<th>D (in)</th>
<th>Area (ft²)</th>
<th>Height (in)</th>
<th>Min. Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.77</td>
<td>1.8</td>
<td>0.35</td>
<td>2.0</td>
<td>6</td>
</tr>
<tr>
<td>2.77</td>
<td>1.9</td>
<td>0.35</td>
<td>2.0</td>
<td>6</td>
</tr>
<tr>
<td>2.77</td>
<td>2.0</td>
<td>0.35</td>
<td>2.0</td>
<td>6</td>
</tr>
</tbody>
</table>

Notes:
- Use the minimum cover values shown on Sheet 1 of 3 for 5 x 13 mm for gas and 5 x 13 mm for water wells below the heavy lines.
- Height of fill (maximum cover) is measured from top of finished grade to outside top of pipe.
- Encorugated and not available. May be considered for areas where side drain applications only. NA - Not Available
- NS - Not Suitable (For Highway H-20 Loadings)
- Limited availability of this product. Check availability before specifying.
- Depth of buried pipe for French drain pipe is not recommended. Do not specify without checking suitability and availability.
- Encorugated and not available. May be considered for areas where side drain applications only. NA - Not Available
- Limited availability of this product. Check availability before specifying.
- Depth of buried pipe for French drain pipe is not recommended. Do not specify without checking suitability and availability.
### ROUND PIPE - 68 x 15 CORRUGATION

<table>
<thead>
<tr>
<th>D (mm)</th>
<th>Area (in²)</th>
<th>Coefficient</th>
<th>Sheet Thickness (in.)</th>
<th>Wil. Cover (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1100</td>
<td>0.07</td>
<td>2.9</td>
<td>0.05</td>
<td>0.16</td>
</tr>
<tr>
<td>1600</td>
<td>0.05</td>
<td>2.9</td>
<td>0.07</td>
<td>0.17</td>
</tr>
<tr>
<td>2100</td>
<td>0.04</td>
<td>2.9</td>
<td>0.09</td>
<td>0.18</td>
</tr>
</tbody>
</table>

### ROUND PIPE - 75 x 25 CORRUGATION

<table>
<thead>
<tr>
<th>D (mm)</th>
<th>Area (in²)</th>
<th>Coefficient</th>
<th>Sheet Thickness (in.)</th>
<th>Wil. Cover (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1100</td>
<td>0.07</td>
<td>3.0</td>
<td>0.05</td>
<td>0.18</td>
</tr>
<tr>
<td>1600</td>
<td>0.05</td>
<td>3.0</td>
<td>0.07</td>
<td>0.19</td>
</tr>
<tr>
<td>2100</td>
<td>0.04</td>
<td>3.0</td>
<td>0.09</td>
<td>0.20</td>
</tr>
</tbody>
</table>

### SPIRAL RIB SPACING (10 x 9 x 0.9)

<table>
<thead>
<tr>
<th>D (mm)</th>
<th>Area (in²)</th>
<th>Coefficient</th>
<th>Sheet Thickness (in.)</th>
<th>Wil. Cover (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1100</td>
<td>0.07</td>
<td>3.1</td>
<td>0.05</td>
<td>0.19</td>
</tr>
<tr>
<td>1600</td>
<td>0.05</td>
<td>3.1</td>
<td>0.07</td>
<td>0.20</td>
</tr>
<tr>
<td>2100</td>
<td>0.04</td>
<td>3.1</td>
<td>0.09</td>
<td>0.21</td>
</tr>
</tbody>
</table>

### PIPE ARCH - 68 x 15 CORRUGATION

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Rise (in.)</th>
<th>Equiv. Round Dia. (in.)</th>
<th>Area (in²)</th>
<th>Coefficient</th>
<th>Wil. Cover (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>350</td>
<td>12</td>
<td>1.5</td>
<td>2.5</td>
<td>0.25</td>
</tr>
<tr>
<td>800</td>
<td>700</td>
<td>16</td>
<td>2.0</td>
<td>2.5</td>
<td>0.30</td>
</tr>
</tbody>
</table>

### PIPE ARCH - 75 x 25 CORRUGATION

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Rise (in.)</th>
<th>Equiv. Round Dia. (in.)</th>
<th>Area (in²)</th>
<th>Coefficient</th>
<th>Wil. Cover (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>350</td>
<td>18</td>
<td>2.0</td>
<td>3.0</td>
<td>0.35</td>
</tr>
<tr>
<td>800</td>
<td>700</td>
<td>24</td>
<td>3.0</td>
<td>3.0</td>
<td>0.40</td>
</tr>
</tbody>
</table>

### PIPE ARCH - SPIRAL RIB

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Rise (in.)</th>
<th>Equiv. Round Dia. (in.)</th>
<th>Area (in²)</th>
<th>Coefficient</th>
<th>Wil. Cover (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>450</td>
<td>20</td>
<td>2.5</td>
<td>3.5</td>
<td>0.45</td>
</tr>
<tr>
<td>1000</td>
<td>900</td>
<td>30</td>
<td>3.0</td>
<td>3.5</td>
<td>0.50</td>
</tr>
</tbody>
</table>

### MAXIMUM COVER FOR CORRUGATED ALUMINUM ALLOY ROUND PIPE AND PIPE ARCH

**Cover Height**

- State of Florida Department of Transportation
- **Note**: Specific cover details are not provided in the image. Further details should be obtained from the manufacturer or code requirements.
- **Coverage**: The coverage values are provided for the specified pipe sizes and cover requirements.

---

**Additional Notes**

- **As-Not-Supplied**: The as-supplied sizes and cover requirements should be confirmed with the manufacturer.
- **Design Pressure**: The design pressure should be confirmed with the manufacturer or code specifications.
- **Construction Details**: Special attention should be given to construction details, such as anchorage and butt welds, to ensure compliance with the specified requirements.
- **Code Compliance**: Compliance with relevant codes and standards is mandatory for the installation of corrugated aluminum alloy pipes and arches.
- **Material Selection**: The selection of materials should be based on the project's specific requirements, including the type of pipe and the environmental conditions.

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**Sheets**: 4 of 5

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**Date**: 12/05/92
**Revision**: 3

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**Year**: 2005
**Page**: 203

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**State**: FL
**City**: Tallahassee
**Agency**: Florida Department of Transportation

---

**Purpose**: To provide guidance on the installation and design of corrugated aluminum alloy pipes and arches, ensuring compliance with relevant codes and standards.

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**Contact**: For further information, contact the Florida Department of Transportation at (850) 245-5800.
### Aluminum Structural Plate Notes

1. Allowable stress (in ksi) & mismatch is measured from the outside edges of the plate to the outside edges of the plate. The nominal thickness of the plate is the not out of the plate.

2. To find the minimum thickness and mismatch for the structural plate thickness, use the following formula:
   - Gauge (in.) x (Factor) = Nominal Thickness of Plate (in.)

3. A structural plate with a thickness of 0.10 to 0.50 is considered a structural plate. Plates with thicknesses of 0.10 to 0.20 are generally used in structural applications.

4. Tables based on 0.05 millimeters (0.002 in).

#### Minimum and Maximum Cover for Aluminum Structural Plate

<table>
<thead>
<tr>
<th>Material</th>
<th>Designation</th>
<th>Minimum Cover</th>
<th>Maximum Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>A900-0</td>
<td>3/16</td>
<td>3/16</td>
<td>1/2</td>
</tr>
<tr>
<td>A900-1</td>
<td>1/4</td>
<td>3/16</td>
<td>1/2</td>
</tr>
<tr>
<td>A900-2</td>
<td>5/32</td>
<td>3/16</td>
<td>1/2</td>
</tr>
<tr>
<td>A900-3</td>
<td>1/8</td>
<td>3/16</td>
<td>1/2</td>
</tr>
<tr>
<td>A900-4</td>
<td>5/64</td>
<td>3/16</td>
<td>1/2</td>
</tr>
<tr>
<td>A900-5</td>
<td>3/32</td>
<td>3/16</td>
<td>1/2</td>
</tr>
</tbody>
</table>

### Design Notes

1. The plate must be cut to size, metal thickness, machining rib type and rib spacing.

2. High-strength and high-temperature steels will require high-strength deforming pressures against the plate's surface and thickness. The thickness of cover is generally affected by these deforming pressures. The surrounding area and thickness must be selected to ensure that they are made against these pressures to avoid inducing excessive stress in the plate.

3. A structural plate with a thickness of 0.10 to 0.50 is considered a structural plate. Plates with thicknesses of 0.10 to 0.20 are generally used in structural applications.
# APPLICATION GUIDELINES TO CURB INLETS AND GUTTER INLETS

<table>
<thead>
<tr>
<th>INDEX NO.</th>
<th>INLET TYPE</th>
<th>CURB/GUTTER</th>
<th>GRADE CONSIDERATION</th>
<th>HYDRAULIC INTAKE (m³/s)</th>
<th>BICYCLE SAFE</th>
<th>PEDESTRIAN SAFE</th>
<th>UTILITY LOCATION FROM CURB</th>
<th>MAXIMUM PIPE SIZE WITH STANDARD BOTTOMS (mm)</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>E &amp; F</td>
<td>Continuous</td>
<td>0.05</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>750 mm</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>E &amp; F</td>
<td>Sag</td>
<td>0.255</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>750 mm</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>E &amp; F</td>
<td>Continuous</td>
<td>0.054</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>750 mm</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
<tr>
<td>204</td>
<td>E &amp; F</td>
<td>Sag</td>
<td>0.184</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>750 mm</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>E &amp; F</td>
<td>Continuous</td>
<td>0.008</td>
<td>Yes / Limited</td>
<td>Outside</td>
<td>750 mm</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
<tr>
<td>206</td>
<td>E &amp; F</td>
<td>Sag</td>
<td>0.022</td>
<td>Yes / Limited</td>
<td>Outside</td>
<td>750 mm</td>
<td></td>
<td>750 mm</td>
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</tr>
<tr>
<td>207</td>
<td>Separator I &amp; II</td>
<td>Continuous or Sag</td>
<td>0.125</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>600 mm Longitudinal</td>
<td>750 mm Transverse</td>
<td></td>
<td>750 mm</td>
</tr>
<tr>
<td>208</td>
<td>Separator III &amp; IV</td>
<td>Continuous or Sag</td>
<td>0.125</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>600 mm Longitudinal</td>
<td>750 mm Transverse</td>
<td></td>
<td>750 mm</td>
</tr>
<tr>
<td>209</td>
<td>D &amp; F</td>
<td>Continuous or Sag</td>
<td>0.014</td>
<td>Yes / Yes</td>
<td>Outside</td>
<td>750 mm</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>D &amp; F</td>
<td>Continuous or Sag</td>
<td>0.008</td>
<td>Yes / Yes</td>
<td>Outside</td>
<td>750 mm</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
<tr>
<td>211</td>
<td>Median Barrier Wall</td>
<td>Continuous</td>
<td>0.13</td>
<td>No / Yes</td>
<td>NA</td>
<td>750 mm Longitudinal</td>
<td>750 mm Transverse</td>
<td></td>
<td>750 mm</td>
</tr>
<tr>
<td>212</td>
<td>Median Barrier Wall</td>
<td>Continuous</td>
<td>0.162</td>
<td>No / No</td>
<td>NA</td>
<td>750 mm Longitudinal</td>
<td>750 mm Transverse</td>
<td></td>
<td>750 mm</td>
</tr>
<tr>
<td>213</td>
<td>Median Barrier Wall</td>
<td>Double Inlet Continuous</td>
<td>0.13</td>
<td>No / No</td>
<td>NA</td>
<td>750 mm Longitudinal</td>
<td>750 mm Transverse</td>
<td></td>
<td>750 mm</td>
</tr>
<tr>
<td>214</td>
<td>Median Barrier Wall</td>
<td>Double Inlet Continuous</td>
<td>0.142</td>
<td>No / No</td>
<td>NA</td>
<td>750 mm Longitudinal</td>
<td>750 mm Transverse</td>
<td></td>
<td>750 mm</td>
</tr>
<tr>
<td>215</td>
<td>Median Barrier Wall</td>
<td>Double Inlet Continuous</td>
<td>0.142</td>
<td>No / No</td>
<td>NA</td>
<td>750 mm Longitudinal</td>
<td>750 mm Transverse</td>
<td></td>
<td>750 mm</td>
</tr>
<tr>
<td>216</td>
<td>Barrier Wall</td>
<td>Continuous or Sag</td>
<td>0.147</td>
<td>Yes / Yes</td>
<td>NA</td>
<td>750 mm</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
<tr>
<td>217</td>
<td>Shoulder</td>
<td>Continuous</td>
<td>0.13</td>
<td>No / No</td>
<td>NA</td>
<td>750 mm Transverse</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
<tr>
<td>218</td>
<td>Valley</td>
<td>Continuous or Sag</td>
<td>0.142</td>
<td>Yes / Yes</td>
<td>NA</td>
<td>750 mm Transverse</td>
<td></td>
<td>750 mm</td>
<td></td>
</tr>
</tbody>
</table>

1. Hydraulic intake values do not represent hydraulic capacity but are shown to indicate inlets based on a 0.2% longitudinal slope. (CS2) cross slope and a 1:50, 1:200, 1:300, 1:1,000. For other cross slopes, the values shown should be considered for design flow or for design conditions. Sag inlet values are based on keeping the outside lane or sidewalk, where speeders often stop, and making the adjacent curb a convenient location for parking. The table is intended to be used as a guide only. A study of stormwater inlet capacity has been published by the University of South Florida.

2. Curb inlets and transitions should be checked with all design cross sections, preferably separate from these locations.

3. Double threshold inlets are usually not warranted unless the design flow is in excess of 0.5 meters (20 inches) or 200 cubic meters per second. A study of stormwater inlet capacity has been published by the University of South Florida.

4. Median Barrier Wells Types 2, 3, 4, 5 & Shoulder Inlet Type 5 can be made bicycle safe by specifying the exclusion zone.

5. Pipe sizes are circular, Class III B. Most concrete pipe, 18 inch and 24 inch size should be checked for CV is 200. A study of stormwater inlet capacity has been published by the University of South Florida.
GENERAL NOTES

1. The finished grade and slopes of the inlet tops are to conform with the finished grade and slope of the proposed street and/or pathway.

2. Where drains are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inset amounts accordingly. Bend steel when necessary.

3. All reinforcing steel shall have a minimum cover unless otherwise shown. Reinforced concrete shall be either plain or prestressed concrete.

4. Preparing of the inlet top will be permitted, Prestressed unit steel reinforcement to the dimensions shown or in accordance with approved shop drawings. Rebars for shop drawing approvals shall be submitted to the State Drawing Examiner.

5. Concrete casting the requirements of A.S.T.M. C-696 (2017) may be used in lieu of Class B aggregate for prestressed units manufactured in plants which are under the Standard Operating Procedures for the Inspection of prestressed products.

6. The concrete slab shown in the drawing, plans shall be necessary only when concrete is used in conjunction with aluminum channel bottoms or when used in areas with embankments

7. For joint details, see Index No. 230.

8. These inlet tops are designed for use with standard curb and gutter Type E and Type F. Locate outside of pedestrian walkway

9. See Index No. for supplementary details.

An index used for frame and cover steel meet the requirements of A.S.T.M. A-36.

Either cast iron covers or pre-cast may be used. Iron covers shall be Class No. 50

10. When Alternate "C" Cover is specified to place within the cast iron curb and pre-cast top, reinforcement shall be provided to the cast iron curb and frame must be used. Frames shall be grasped in accordance with the grading detail shown on Sheet F-2 of this file of this series. Alternate "C" Cover shall be used when specified.

11. It is to be noted for the contract unit price for Inlets (Curb Type E, I, E, A).
GENERAL NOTES

1. This curb is to be used only in traffic separators, Types II and III, as shown. It is designed and constructed to be in compliance with the appropriate AASHTO standards.

2. Marking is required at A1030, at A1033, and at A1034. See the drawing for details.

3.石油道路

4. Reinforcement details vary with the fabricator. Refer to the detailed drawings for the required reinforcement.

5. For additional details, see Index No. 203.
GENERAL NOTES

1. This sheet is intended for use with Type 3, 4, 5, and 6 concrete slabs. It is not intended for use with Type 1, 2, or 7 concrete slabs.

2. The design is for a 10-foot wide, 10-foot long, and 10-foot deep concrete slab.

3. The slab thickness should be determined based on the load and environmental conditions.

4. Reinforcement should be placed in accordance with the specification.

5. The slab should be poured in one continuous pour.

6. The slab edges should be finished to meet the required tolerances.

7. The slab should be cured according to the manufacturer's recommendations.

CURB INLET TOP

TYPE 1

Material:
Concrete

Size:
10-foot wide, 10-foot long, 10-foot deep

Thickness:
12-inch

Reinforcement:
2-inch diameter bars

Finishing:
Cured to meet the required tolerances

Grate Detail:
See details A and B

Efficiency Curve:

Approximate Grate Free Capacity (15 deep, 15 feet wide, 15 degrees)

Efficiency vs. Depth

Efficiency vs. Width

Frame and Grate:
See details A and B

frame.png

Curb Inlet Top

Type 1

Material:
Concrete

Size:
10-foot wide, 10-foot long, 10-foot deep

Thickness:
12-inch

Reinforcement:
2-inch diameter bars

Finishing:
Cured to meet the required tolerances

Grate Detail:
See details A and B

Efficiency Curve:

Approximate Grate Free Capacity (15 deep, 15 feet wide, 15 degrees)

Efficiency vs. Depth

Efficiency vs. Width

Frame and Grate:
See details A and B

frame.png
BARRIER WALL / RETAINING WALL  SINGLE FACE ROADWAY BARRIER

INLET SECTION AT WALLS

INLET WITH STRUCTURE BOTTOM

NOTES:
B. See Index No. 200 for Structure Bottom details and hole reinforcement.

GENERAL NOTES

1. This Inlet is primarily intended for use adjacent to concrete barriers walls on paved shoulders. Use of the Inlet adjacent to other wall types shall be approved by the roadway engineer. The Inlet is suitable for light and medium-size vehicles. If the Inlet is intended for use in a roadway engineering, other sizes or access points may also be required.

2. Inlets shall be designed based on the specific conditions at the location of the Inlet. The design considerations shall include the capacity of the Inlet, the flow characteristics, and the hydraulic performance.

3. Inlets shall be constructed in accordance with the Site Plan and the Construction Documents. The Inlets shall be constructed in such a way as to prevent damage to adjacent structures or utilities.

4. Exposed edges shall be protected with a weather resistant coating.

5. The Inlet shall be designed to prevent the entry of debris or vegetation.

6. For supplemental details see Index No. 200 and 2003.

7. Inlets to be used shall be selected from the chart attached to this section.
OPTIONAL STEEL GRATES

CROSS BAR OPTIONS

CROSS BAR

INSET B

SECTION EE

SECTION DD

INSET C

BAR STUB

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

BARRIER WALL INLET
CONCRETE BARRIER WALL (ROD 3 C & D)

DATE

REVISION

CHECKED

DRAFTED

approved on

drawn by

2 of 2

29
GENERAL NOTES

1. This inlet is designed for drainage areas, streets, or other areas subject to heavy vehicular loads, minimum radii, and subject to pedestrian and bicycle traffic.

2. When alternate "C" grate is specified in plans, the grate is to be bolted down and grouted after fabrication.

3. Reinforcing: .15 bars or 0.35 mm corr. bars. Cut or bend bars out of way of pipe to clear pipe 40.

4. All exposed edges and corners shall be rounded to 6 mm radius.

5. Recommended maximum pipe size shown are for concrete pipe.

6. For supplementary details see notes No. 201.

PLAN

SECTION BB

Recommended Maximum Pipe Sizes:

- 800 mm - 500 Size
- 600 mm - 500 Size

SECTION AA

INLET WITH STRUCTURE BOTTOM

STEEL GRATE

TWO REQUIRED PER INLET

- 20 mm Steel Grate
- Intermediate Bars 40 mm x 4 mm
- Reinforcing Bars 35 mm x 5 mm

Steel Grate: Manufactured by Remlok, Fairlane Steel, U.S. Foundry
Casting, Millrock, Durlast (or Equal)

GUTTER INLET TYPE V

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
# Application Guidelines for Ditch Bottom and Median Inlets

## Index No. | Type | Location | Capacity (m³/s) | Safety | Debris Tolerance | Pipe Size Limitation | Other Design Considerations
--- | --- | --- | --- | --- | --- | --- | ---
230 | A | Limited Access Facilities | 0.098 | 0.03 | NA | NA | NA | NA | Heavy Wheel Traffic | No | No | Good | 60 | 940 | 460 | 600 | See Index 900 | Debris build-up may occur on Type B fencing.
231 | B | Limited Access Facilities | 0.451 | 0.70 | NA | NA | NA | NA | Heavy Wheel Traffic | No | No | Excellent | 120 | 270 | 750 | 900 | See Note 4.
232 | C | Outside C2 | 0.042 | 0.07 | 0.51 | 0.227 | 0.09 | 0.40 | Intricate Traffic | Yes | Yes | Poor* | 60 | 940 | 460 | 600 | See Note 4.
233 | D | Outside C2 | 0.400 | 0.70 | 0.765 | 0.425 | 0.566 | 0.227 | Intricate Traffic | Yes | Yes | Poor* | 940 | 1240 | 600 | 600 | See Note 4.
234 | E | Outside C2 | 0.283 | 0.70 | 0.538 | 0.368 | 0.400 | 0.49 | Intricate Traffic | Yes | Yes | Poor* | 940 | 1240 | 600 | 600 | See Note 4.
235 | F | Inside C2 | 0.255 | 0.42 | NA | NA | NA | NA | Heavy Wheel Loads | Yes | Yes | Poor* | 940 | 1240 | 600 | 600 | See Note 4.
236 | G | Inside C2 | 0.255 | 0.42 | NA | NA | NA | NA | Heavy Wheel Loads | Yes | Yes | Poor* | 1240 | 1520 | 900 | 960 | See Note 4.
237 | H | Inside C2 | 0.255 | 0.42 | NA | NA | NA | NA | Heavy Wheel Loads | Yes | No | Fair | 940 | 1240 | 600 | 600 | See Note 4.

## General Notes
1. All inlets must be selected to satisfy hydraulic suitability, with proper consideration given to safety and economics.
2. C2 denotes clear zone, formerly C1A, defining clear recovery area.
3. Alternatives or grades should be specified when in doubt.
4. Inlets without slots or inlets with traversable slots are not allowed within the clear zone, inlets C, D and E. Capacity and debris tolerance may be increased if such inlets are located off a slope. Special inlets should be used in roadway clear zones and in areas accessible to pedestrians and have traversable slots. Traversable slots are not adaptable to inlet type.
5. Flow condition 4 is not recommended for inlets C2.
6. Pipe size limitations are based on circular Class III, B: Class Pipe. Elliptical pipe and corrugated pipe are to be checked for fit in accordance with Class III, D2O, and Class D2O should be considered using 3D mm x 15 mm corrugation up to 750 mm and 15 mm x 15 mm corrugation for larger sizes.
7. The capacity values shown are approximate and are intended as a guide to assist in describing relative performance. Inlets are assumed to be in a spill condition in the capacity flow. The effects of vortex flow have not been considered. Inlet design is based on the outlet conditions and design assumptions before accepting the capacity values shown. Outlet conditions are likely to control with minimum pipe sizes.

## Flow Condition A - Office Flow Conditions
1. Grates are 50% blocked with 75 mm of water depth above the grate.
2. The effective weir length is assumed to be equal to the inlet perimeter with no deduction for the grate or debris.
3. Flow Equation

## Flow Condition B - Weir Flow Conditions
1. Grates are 50% blocked with 75 mm of water depth above the grate.
2. The effective weir length is assumed to be equal to the inlet perimeter with no deduction for the grate or debris.
3. For inlets with slots, the effective head for the side of the inlet with the slot is 375 mm for standard 200 mm and 250 mm for traversable slots. The slot is assumed to be 25% blocked, in some instances the flow will be in office conditions and in other cases.
PLAN

SECTION AA

SECTION BB

SECTION CC

SECTION DD

SECTION EE

SECTION FF

SODDING, PAVEMENT AND DITCH BLOCK

NOTES:
A. B Structure Bottom Only. See Index No. 200
   for structure details and note revisions.
INLET WITH STRUCTURE BOTTOM

RECOMMENDED MAXIMUM PIPE BOTTOM

INLET WIDTH PIPE SIZE

NPS 150 300
UOPS 100

Notes: Recommended sizes are for concrete pipe.
Sizes for other types of pipe must be
verified for fit in accordance with Index
No. 250. For larger pipes see separate
detail above and Index No. 200.

GENERAL NOTES
1. NOTE:
   - Design intent for use only on that portion of United
     States facilities not subject to penetration and 1 3/4
     inches thick.

2. Inlet designed for ditches, washouts or other areas subject
   to heavy wheel loads, and where shear may be a problem,
   expansion joints will be placed 3 to 5 feet apart.

3. Reinforcing material 4 to 8 feet of 3 to 5 feet
   on center of wall, base and solution. Awa to
   be 2 inches for 48 inches. Reinforcement around pipe.

4. Where elements of 0.5 or greater are specified in the plans,
   the grates must be to be surprised or installed after
   installation.

5. Ditch piping to be installed in spot of lower. Sodding to be
   installed in this order to the contact and place for sodding, etc.

6. For supplementary data see Index No. 250.

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

DITCH BOTTOM INLET TYPE B

D - 237
TRaversable Top General Notes

1. The general purpose of the traversable traversable inlets and the traversable top is to provide a landscaped environment that is easily maintained.
2. Provide for water management and drainage for the traversable top.
3. Provide for water management and drainage for the traversable top.
4. Provide for water management and drainage for the traversable top.
5. Provide for water management and drainage for the traversable top.

On existing trot type B and type X inlets, it is recommended that the traversable top be constructed at each individual grassed area.

On existing trot type B and type X inlets, it is recommended that the traversable top be constructed at each individual grassed area.

1. The traversable top will be constructed at each individual grassed area.
2. The traversable top will be constructed at each individual grassed area.
3. The traversable top will be constructed at each individual grassed area.

Trench Bottom Inlets

Type B

For Conversions of Existing Inlets Type B and Type X

Concrete Inlet Pavement and Sodding

Estimated Quantities

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<thead>
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<th>Slot Type</th>
<th>Quantity</th>
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<tr>
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<tr>
<td>Double Slot</td>
<td>4.77</td>
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</table>

State of Florida Department of Transportation

Design Sheet Number 3

Ditch Bottom Inlets

Traversable Top Type

SECTION AA

SECTION CC

SECTION BB

Pictorial View

Pictorial View

Plan

Plan

SECTION AA

SINGLE SLOT

SECTION CC

DOUBLE SLOT

Notes:

1. The traversable top will be constructed at each individual grassed area.
2. The traversable top will be constructed at each individual grassed area.
3. The traversable top will be constructed at each individual grassed area.
4. The traversable top will be constructed at each individual grassed area.

Maintenance Notes

1. Traversable top soil that is constructed for maintenance or for maintenance purposes may cause the existing grasses that are protected by the maintenance engineer to be maintained, and then not maintained, as directed by the Maintenance Engineer. Existing grasses approved for use and new grasses may be maintained, maintained, or replaced as directed by the Maintenance Engineer.
SECTION AA  SECTION BB

NOTE: See Index No. 229 for Application Guidelines

NON-TRAVERSABLE SLOTS

NOTE: See General Notes No. 6 and 7

SOADING AND PAVEMENT FOR INLETS WITHOUT SLOTS AND INLETS WITH NON-TRAVERSABLE SLOTS

PAVEMENT AND SOADING QUANTITIES FOR TRAVERSABLE SLOTS

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<td>0.00</td>
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<tr>
<td>D</td>
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<td>6.00</td>
</tr>
<tr>
<td>E</td>
<td>0.60</td>
<td>6.00</td>
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SINGLE SLOT SHOWN (DOUBLE SLOTS SYMMETRICAL ABOUT CENTERLINE)

SECTION CC (CASE 1)

TRAVERSABLE SLOTS FOR EXISTING INLETS
GENERAL NOTES

1. These joints are designed for use in driveways, medians, pavement areas, or other areas subject to heavy wheel loads where pavement expansion is not to be precluded from proper drainage and traffic.

2. When otherwise not specified in plans, all joints are to be the 4 point type.

3. These joints may be used with all 5 structure joints, except 500. The concrete and asphaltic joints are to be placed for proper expansion and contraction and for proper stability of the pavement system.

4. For supplemental details (Type F only), see Index 20.

PAVEMENT AND SODDING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
PRESIGNED BY

DITCH BOTTOM INLETS TYPES F & G

PLAN B

SECTION AA

SECTION BB

SECTION CC

SECTION DD

STEEL GRATE
Sheet Steel, Straight Bars 75 x 6
Perforated Bars 50 x 5

TYPE F

PART, AND 500
1/2" Thck Concrete Pavement

500 ONLY

C-3418

DATE

2/3/93

S.P.O. APPROVED JUN 1993

DRAWN

2/3/93

S.P.O.

SCALE

1/2" = 1'-0"
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<th>INDEX NO.</th>
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<th>PIPE SIZE (mm)</th>
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<th>SIDERAIN</th>
<th>MEDIAN</th>
<th>APPLICABLE</th>
<th>HYDRAULIC PERFORMANCE</th>
<th>k_p</th>
<th>APPLICABLE</th>
<th>EROSION</th>
<th>TOLERANT</th>
<th>PROJETTED LOCATION</th>
<th>TRAFFIC CART RATE AVAILABLE</th>
<th>ECONOMIC RATING</th>
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<td>Excellent</td>
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<td>Limited</td>
<td>Good</td>
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<td>Fail</td>
<td>For best of internal location see index No. 282</td>
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<td>Good</td>
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<td>Good</td>
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<td>Fail</td>
<td></td>
<td></td>
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<td>Excellent</td>
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<td>Limited</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Fail</td>
<td></td>
<td></td>
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<td>Limited</td>
<td>Yes</td>
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<td>Limited</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Fail</td>
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<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside C2</td>
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<td>Good</td>
<td>Outside C2</td>
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<td>Fail</td>
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<td>257</td>
<td>Single 4000</td>
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<td>Excellent</td>
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<td>Good</td>
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<td>Fail</td>
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<td>258</td>
<td>Single 6000</td>
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<td>Good</td>
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<td>Fail</td>
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<tr>
<td>259</td>
<td>Single 8000</td>
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<td>No</td>
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<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside C2</td>
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<td>Fail</td>
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<td>Yes</td>
<td>Good</td>
<td>0.5</td>
<td>Very Good</td>
<td>Outside C2</td>
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<td>265</td>
<td>Fillet End Section</td>
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<td>266</td>
<td>Cross Shoulder</td>
<td>Single 375 thru 7500</td>
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</tbody>
</table>

1. All end treatments must be selected to satisfy hydraulic and stability requirements with proper consideration given to safety and economics.

2. C2 denotes clear zone, burying clear zone, clear zone area.

3. Groove should not be present on carbon steel unless positive cathodic protection is provided at least end.

4. Additional notes concerning application recommendations may be shown on individual orders.

5. Economic ratings are based on equipment average costs.

6. End treatments with a k_p of 0.05 or greater should be used in areas of low design velocities and negligible erosion.

7. Pipe sizes are single and multiple for all applications. Individual sizes and cross-sections are to be selected for pipe in accordance with Table 281. End pipe sizes should be selected using 67 mm (2.0) or corrogation up to 175 mm (7") or corrugation up to 25 mm (0.98) for larger sizes.
ENDWALL DIMENSIONS (EXCLUSIVE OF MULTIPLE PIPE SPACING)

STANDARD LOCATION CONTROL

OPTIONAL ENTRANCE FOR CONCRETE PIPE

NORMAL PIPE

SKEWED PIPE

ENDWALL POSITIONS FOR SINGLE AND MULTIPLE PIPE AND SPACING FOR MULTIPLE PIPE

GENERAL NOTES
1. Endwall dimensions, locations and positions are for round and rectangular concrete pipe and for round and pipe with corrugated metal pipe. Round concrete pipe shown.
2. Front slope and other transitions shall be in accordance with index No. 296.
3. Endwalls may be cast in plain or prestressed concrete. Prestressed structural units shall be in accordance with Sect. 700. Additional reinforcement necessary for bonding prestressed units shall be determined by the Engineer or the Contractor.
4. All required control and edge concrete are to be designated by the Engineer.
5. Concrete meeting the requirements of ASTM C-499 at 70°F (21°C) may be used in all Class 2 concrete in prestressed concrete structures in plants which are listed in the Standard Operating Procedure for the Engineer.
6. All cutouts shown with solid splayed forms shall be 30° and shall be cut to the finish to the splayed forms right of way permitting.
7. For selecting grade elevations see index No. 299.
8. Pipe shall be furnished at the pipe elevation.
9. Pipe shall not be delivered.
10. Pipe. Spacing and cutouts shall be based on the pipe and grout requirements in the standard operating procedures for the Engineer.
11. Spacing for pipe to pipe grooves shall be based on pipe quantities approved by the Engineer.
12. Endwalls to be paid for under the standard unit price for Concrete Class 2 (Concrete No. 34).
### Round Concrete and Corrugated Metal Pipe

<table>
<thead>
<tr>
<th>D (in)</th>
<th>Opening Area (in²)</th>
<th>Dimensions</th>
<th>Class I Concrete (ft)</th>
<th>Number And Type Of Pipe And Skew Angle Of Pipe</th>
<th>Quadruple</th>
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### Corrugated Metal Pipe Arch

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<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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### Concrete Elliptical Pipe

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<th>C</th>
<th>D</th>
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Note: See the guidelines of General Note No. 8 for selecting habitable quantities.
1. Workmanship may be in place or in place construction. Cast-in-place masonry shall conform to the limits of 313 codes and design specifications ASS/0/98. Precast construction which conform to this index, including any additional reinforcement required for handling, shall be accompanied by the plan and/or specification. All work shall conform to the limits of the State of California. Precast panel, where required, shall conform to the specifications of the Engineer prior to construction. For precast construction, see section No. 350 for opening and paving details.

2. Reinforcing shall be either 420 MPA or 450 MPA.

3. Concrete shall be Class 2 except for concrete with the requirements of AASHTO C 495 (27,973 psi) may be used in lieu of Class 2. For details, in general, in development in places which are under the jurisdiction of the City of San Francisco, for the inspection of precast structural products, this shall be the actual quantity.
### Bill of Reinforcing Steel

<table>
<thead>
<tr>
<th>Size</th>
<th>Length</th>
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<tr>
<td>A</td>
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<td>Shaker</td>
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<td>B</td>
<td>4</td>
<td>3600</td>
<td>Shaker</td>
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<tr>
<td>C</td>
<td>2</td>
<td>2900</td>
<td>Bond</td>
</tr>
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<td>D</td>
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<td>Bond</td>
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<tr>
<td>E</td>
<td>1</td>
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### Bending Diagram

[Diagram showing bending of bars]

### Estimated Quantities

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<th>CPM</th>
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<tr>
<td>Reinforcing Bar</td>
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**Note:** See Sheet of 2 for General Notes.

**State of Florida Department of Transportation**

**Highway Design**

**STRAIGHT CONCRETE ENDWALLS**

**Single and Double 1200 Pipe**

**Drawn By:**

**Approved By:**

**D.A. Engineering**

**Date:** 2 of 2
SECTION BB

PLAN
(Showing Bars to Facing)

SECTION AA

HALF ELEVATION
(Showing Bars in Back Face of Wall)

HALF ELEVATION
(Showing Bars in Front Face of Wall)

TYPICAL SECTION
THRU ENDWALL

GENERAL NOTES

1. Embedding may be cast in place or precast concrete. Cost to place precast steel depends on the volume and design specifications. ASHRAE/ASAPreceded by which project, including any additional reinforcement required for testing. Unless otherwise specified, all concrete is to be placed by the Contractor or supplier.

g. Steel pipe shall be direct-buried or cemented in contact with concrete and 300 mm beyond the boundary of contact. Any suitable bituminous material may be used to prevent contact.

3. Sealing shall be in accordance with ASA Preceded by 300 mm beyond the boundary of contact. Any suitable bituminous material may be used to prevent contact.

4. Sealing shall be in accordance with ASA Preceded by 300 mm beyond the boundary of contact. Any suitable bituminous material may be used to prevent contact.

5. Sealing shall be in accordance with ASA Preceded by 300 mm beyond the boundary of contact. Any suitable bituminous material may be used to prevent contact.

6. Sealing shall be in accordance with ASA Preceded by 300 mm beyond the boundary of contact. Any suitable bituminous material may be used to prevent contact.
BENDING DIAGRAM

END VIEW

SECTION AA

PLAN

DIMENSIONAL DETAILS

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Baffle Width</th>
<th>Baffle Height</th>
<th>Concrete Curb</th>
<th>Reinforc. Steel</th>
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SIDE VIEWS AND BACKWALL SECTIONS

REINFORCING DETAILS

ENDWALLS WITH AND WITHOUT BAFLES FOR 1:3, 1:4 AND 1:6 SLOPES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

U-TYPE CONCRETE ENDWALLS

BAFFLES AND GRATE OPTIONAL

375 TO 750 PIPE

TOTAL APPROVED: 261
ELEVATION

ANCHOR BOLT DETAIL

END VIEW

MOUNTING FOR STEEL GRATE

STEEL GRATING USE CRITERIA

1. Grates to be used on pipe curtain walls shall be limited within the designated user area. Positive deck drainage shall be provided to all exterior drainage openings. Grates shall not be used unless one or more of the following conditions exist:

A. Drainage area to sustain positive flow of water or rainfall or snowmelt or areas where positive deck drainage is not provided.

B. Drainage area to sustain excess on or against elements, such as snowdrifts or snowplow piles, where drainage is not provided.

C. Drainage area to sustain excess on or against elements, such as snowdrifts or snowplow piles, where drainage is not provided.

D. Drainage area to sustain excess on or against elements, such as snowdrifts or snowplow piles, where drainage is not provided.

2. Steel grating to be used only where called for in plans.

STEEL GRATE

<table>
<thead>
<tr>
<th>AREA OF PIPE</th>
<th>ONE BOLT</th>
<th>2.2</th>
<th>1.0 X 2.3</th>
<th>1.2 X 2.3</th>
<th>1.4 X 2.3</th>
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NOTE: U-TYPE CONCRETE ENDWALLS

BAFFLES AND GRATE OPTIONAL

375 TO 900 PIPE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

1. REVISED 12/18
2. APPROVED 12/18
3. SHEET 3 OF 5

268
TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES

PIPE CULVERT ENDWALLS WITH U - TYPE WINGS

<table>
<thead>
<tr>
<th>Drawing No.</th>
<th>Pipe Dia. (in.)</th>
<th>Number of Culverts</th>
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<th>Tie Bars</th>
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</table>

GENERAL NOTES

1. Cover all exposed edges 20 mm.
2. Concrete meeting the requirements of ASTM C-496 (27 P.S.I.) may be used in lieu of Class I concrete. To prevent units manufactured in plants which are under the Standard Operating Procedures for the Inspection of prestress grout products.
3. Endwall to be paid for under the standard unit price for Class I concrete.
4. Steel to be in accordance with Table No. 30, and paid for under the standard unit price.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

WINGED CONCRETE ENDWALLS
SINGLE ROUND PIPE

<table>
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<th>Receiving Date</th>
<th>Size</th>
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</table>
DETAILS FOR SINGLE METAL PIPE ARCH CULVERTS
NOTE: For multiple metal pipe culverts, spacing between pipe centers is 2 ft.

<table>
<thead>
<tr>
<th>Dimensions and Quantities for Metal Pipe Arch Culverts</th>
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<tbody>
<tr>
<td><strong>Pipe O.D. (in.)</strong></td>
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</tr>
<tr>
<td>240</td>
</tr>
</tbody>
</table>

*NOTE: For multiple metal pipe culverts, spacing between pipe centers is 2 ft.*
### Dimensions and Quantities

| D | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 300 | 1.79 | 0.76 | 0.38 | 2.06 | 0.22 | 0.05 | 1.79 | 0.76 | 0.38 | 2.06 | 0.22 | 0.05 | 1.79 | 0.76 | 0.38 | 2.06 | 0.22 | 0.05 | 1.79 | 0.76 | 0.38 | 2.06 | 0.22 | 0.05 | 1.79 |
| 400 | 2.11 | 0.86 | 0.45 | 2.58 | 0.27 | 0.07 | 2.11 | 0.86 | 0.45 | 2.58 | 0.27 | 0.07 | 2.11 | 0.86 | 0.45 | 2.58 | 0.27 | 0.07 | 2.11 | 0.86 | 0.45 | 2.58 | 0.27 | 0.07 | 2.11 |
| 500 | 2.44 | 0.96 | 0.53 | 3.11 | 0.33 | 0.09 | 2.44 | 0.96 | 0.53 | 3.11 | 0.33 | 0.09 | 2.44 | 0.96 | 0.53 | 3.11 | 0.33 | 0.09 | 2.44 | 0.96 | 0.53 | 3.11 | 0.33 | 0.09 | 2.44 |
| 600 | 2.77 | 1.07 | 0.62 | 3.66 | 0.40 | 0.11 | 2.77 | 1.07 | 0.62 | 3.66 | 0.40 | 0.11 | 2.77 | 1.07 | 0.62 | 3.66 | 0.40 | 0.11 | 2.77 | 1.07 | 0.62 | 3.66 | 0.40 | 0.11 | 2.77 |
| 700 | 3.10 | 1.18 | 0.72 | 4.24 | 0.48 | 0.13 | 3.10 | 1.18 | 0.72 | 4.24 | 0.48 | 0.13 | 3.10 | 1.18 | 0.72 | 4.24 | 0.48 | 0.13 | 3.10 | 1.18 | 0.72 | 4.24 | 0.48 | 0.13 | 3.10 |
| 800 | 3.44 | 1.29 | 0.82 | 4.84 | 0.57 | 0.15 | 3.44 | 1.29 | 0.82 | 4.84 | 0.57 | 0.15 | 3.44 | 1.29 | 0.82 | 4.84 | 0.57 | 0.15 | 3.44 | 1.29 | 0.82 | 4.84 | 0.57 | 0.15 | 3.44 |

**Notes:**
- G = A + B
- E = A + D
- D = C + E

**See General Note No. 3:**
- See Sheet 5 of 6 for 75 mm and Smaller Quantities

- Dimensions permitted to show use of 2,44 standard pipe lengths.
- Dimensions permitted to show use of 3,66 standard pipe lengths.

- Concrete slab shall be designed to form bridge across crown of pipe. See section below.
CROSS DRAIN
MITERED END SECTION
SINGLE AND MULTIPLE LAYERS CORRUGATED METAL PIPE

**SECTION**

- Pipe for All Pipe Classes

- Arched End Required

- Edge of Pipe Inside Edge of Pipe for Mitered End Sections

- Dimensions and Quantities

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<th>X</th>
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**NOTES:**
- See Sheet 6 for Details and Notes.
### Dimensions and Quantities

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<th>Shape</th>
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<td>1.5&quot; x 6&quot;</td>
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</table>

**Top View - Single Pipe**

Concrete slab 75 mm or 150 mm thick. Reinforced with W150-C50 reinforcing.

**Top View - Multiple Pipe**

Concrete slab 75 mm or 150 mm thick. Reinforced with W150-C50 reinforcing.

**Section**

Pipe with 1/4" holes 1/8" for air lines and 1/2" for water lines.

**Note:** See Sheet 6 for details and notes.
### Dimensions & Quantities

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
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</table>

- See General Note No. 2.
- See Sheet 9 of 6 for 75 mm Size Quantities.

#### Cross Drain

**Mitered End Section**

**Single and Multiple Elliptical Concrete Pipe**

**NOTE:** See Sheet 9 for Details and Notes.

---

**Dimensions:**

- Height: 300 mm
- Width: 150 mm
- Depth: 100 mm

**Materials:**

- Concrete
- Steel

**Instructions:**

- For all pipes, use concrete or steel as specified.
- Ensure proper alignment and support.

---

**Table:**

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>A</th>
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<th>C</th>
<th>D</th>
<th>E</th>
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<th>G</th>
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---

**Key Points:**

- Use standard units for all measurements.
- Ensure all dimensions are accurate.
- Consult the general notes for additional requirements.
### Quantities for 75 mm Thick Concrete Slabs (m³)

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<th>Shape</th>
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<th>Triple Pipe</th>
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<table>
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<th>Double Pipe</th>
<th>Triple Pipe</th>
<th>Quadruple Pipe</th>
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</thead>
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<td>0.35</td>
<td>0.48</td>
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<tr>
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### CWP-ARCH

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<th>Quadruple Pipe</th>
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</thead>
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<tr>
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<td>0.20</td>
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### Elliptical Concrete

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<tbody>
<tr>
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<td>0.20</td>
<td>0.30</td>
<td>0.40</td>
<td>0.60</td>
</tr>
<tr>
<td>1:4</td>
<td>0.10</td>
<td>0.15</td>
<td>0.20</td>
<td>0.30</td>
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</tbody>
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### Cross Drain Mitered End Section

- State of Florida Department of Transportation
- Approved by [Signature]

- Sheet: 5 of 6
- Drawn by [Name]
- Checked by [Name]
- 9/22/20__13

- [Data and Diagrams Related to Cross Drain Mitered End Section]
GENERAL NOTES

1. Mitered and sections for pipe sizes 105 mm, 305 mm and 600 mm round or equivalent pipe other than elliptical pipe are permitted within the clear area.
   When the wall intersection permits, the mitered and sections may be located with the curvilinear offsets as close as 25 mm beyond the curvilinear edge of the shoulder.

2. Slope and ditch transitions shall be used when the required roadway slope must be flattened to plan and section outside clear area.
   See details.

3. The reinforced concrete sides shall be constructed for all pipes of cross drain pipe and cast in place with Class 3 concrete.
   Slope shall be 12° max. unless 75 mm thickness specified for in place.

4. Concrete pipe used in the mitering of mitered and sections shall be designed heights to avoid excessive connections.

5. Cast-in-place, special 75 mm thick reinforced concrete pipe shall be specified for mitered and sections.
   Reinforcement and sections shall be designed to avoid excessive connections.

6. The portion of mitered concrete pipe in direct contact with the concrete slab shall be finished prior to placing the concrete.

7. Unless otherwise specified in the plans, concrete pipe sections and sections may be used with any type of cross drain pipe; substitute for the construction of the concrete pipe sections and sections with any type of cross drain pipe other than elliptical pipe and cast in place with Class 3 concrete.

8. Concrete pipe sections and sections shall be specified for cross drain pipe, mitered and sections shall be cast in place with Class 3 concrete.

9. When the mitered section pipe is subject to the cross drain pipe, a concrete section shall be constructed in accordance with standard pipe 750 mm.

10. When exculding multiple cross drain pipes are spaced other than the dimensions shown in this detail, or those not previously stated, the concrete pipe sections and sections shall be determined either separately or considered as separate pipe sections and sections as directed by the Engineer; however, mitered and sections shall be paid for each based on the total pipe length.

11. The cost of all pipes 12.5 mm. Reinforcing, connecting, anchoring, concrete, cement, asphalt, and concrete shall be included in the cost of the concrete pipe sections. Sediment and Michelle shall be provided when the standard weight of shipping 350 KG.

12. Mitered and sections shall be paid for under the contract with price for Mitered and Sections 105 mm, 150 mm and 200 mm in aggregate, the sections shall be paid for under the contract with price for Mitered and Sections 105 mm, 150 mm and 200 mm in aggregate.

ANCHOR DETAIL

CONCRETE PIPE CONNECTOR

Anchors required for CAR only.

Anchor, washers and nuts to be furnished there.

Sloping anchor to be furnished by the Contractor. Anchors are to be sized to stabilize a distance equal to 4/10 of the pipe diameter. Place the anchors in the outside area of pipe.

Note: In the mitered and sections on the outside, anchor bars shall be provided for the carriageway, turning and parapet.
The image contains a technical drawing and textual information related to fasteners and anchor details for specific drainage pipe systems. The text and diagrams are detailed, focusing on dimensions, sizes, and installation specifics. The content is technical and likely intended for construction or maintenance professionals who work with drainage systems.
**GENERAL NOTES**

1. Unless otherwise designated in the plans, concrete pipe under two sections may be used with any type of side drain pipe, corrugated steel pipe, and sections may be used with any type of side drain pipe except aluminum pipe. When corrodable metallic pipe is specified for side drain pipe, concrete and sections shall be connected with the pipe or concrete pipe. When the metal end section is disconnection to the side drain pipe, a concrete gasket shall be constructed in accordance with index No. 280.

2. Concrete pipe used in the assembly of inlet end sections shall be of sufficient lengths to avoid excessive connections.

3. Corrugated metal pipe gasketing material shall be damaged during disposal and handling for the inlet end section shall be repaired.

4. Any portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing the concrete.

5. Corrugated polyethylene pipe (PE pipe) for side drain application of 375 mm, 450 mm or 600 mm diameter shall utilize either corrugated metal or concrete inlet end sections. When used in conjunction with corrugated metal inlet and sections, connection shall be by either a formed seal or specifically designated to join CPE pipe and metal pipe or other coupling approved by the District Drainage Engineer. When used in conjunction with a concrete inlet end section, connection shall be by concrete gasket constructed in accordance with index No. 280.

6. When installing multiple side drain pipes spaced other than the dimensions shown in this drawing, or having non-uniform sections, the inlet end sections shall be constructed either separately as single pipe inlet end sections or simultaneously as multiple pipe end sections as directed by the Engineer. Heaters, inlet and sections shall be bolted for each bore on each independent pipe end.

7. In addition to the requirements of Section 430-A, side drain invert shall comply with the lower requirements shown on index No. 250.

8. The reinforced concrete inlet end sections shall be constructed for all sizes of side drain pipe and cast in place with Class 2 concrete.

9. Reinforced concrete pipe 150 mm or greater, pipe corrugated 150 mm x 600 mm or greater and corrugated pipe 190 mm x 190 mm or greater shall be anchored unless otherwise specified in the plans. Smaller sizes of pipe shall be anchored only when specified in the plans. The anchor shall be placed downstream or divided highway shall be omitted.

10. Grates are to be fabricated from steel ASTM A 36, Grade S, pipe. The oval grate on all approach ends shall be Schedule 40 and all remaining grates shall be Schedule 80. Grates subject to spall, corrosion, or service in early environment may be fabricated from galvanized steel, with base metal exposed during fabrication required to have a minimum of 7.5% zinc coating conforming to ASTM A 525. The galvanized steel shall be fabricated in accordance with ASTM A 525. Each grate shall be bolted to the invert in accordance with ASTM A 25.

11. Ditch transitions shall be used in all grades in excess of 3%, as directed by the Engineer.

12. The project engineer shall contact the District Drainage Engineer for possible alternate treatment prior to constructing side drain pipe and sections where a minimum spacing of 2.9 m will result between the two points of the inlet and sections.

13. The use of side pipe 4.8, 6.0, 8.0 grates, fasteners, reinforcing, connections, sockets, sockets, sections, flanges and coupling bands shall be included in the cost for the inlet and sections.Socket shall be used separately under the contract and price for Socket, 40.

14. Inlet and sections shall be paid for under the contract and price for Inverted End Section 150-L EA, based on each independent pipe end.

**DESIGN NOTES**

1. In critical hydraulic locations, grates shall not be used until potential陕ley transport has been evaluated by the drainage engineer and appropriate adjustments made. Silt gates in excess of 2% of area with less than 450 mm of debris and grates in excess of 1% will require both on evaluation (General Note 5).

2. The design engineer shall determine high roadway locations and specify the grates when the grates shall be fasten and specified to have fabrication (General Note 21).

3. The design engineer shall determine and designate the grates in the plans which alternate types of inlet end section will not be permitted. The conclusion shall be based on corrosive or structural requirements.
CONCRETE COLLAR FOR EXTENSION OF EXISTING PIPE CULVERTS

CONCRETE COLLAR FOR JOINING MAINLINE PIPE AND STUB PIPE

MISCELLANEOUS DRAINAGE DETAILS

FILTER FABRIC JACKET

CONCRETE JACKET FOR CONNECTING DISSIMILAR TYPES OF PIPE AND CONCRETE PIPES WITH DISSIMILAR JOINTS

PIPE PLUG

Ellipse Collar Construction Required For DEEP Pipe Sections. Corrugated Steel, Corrugated Asbestos Or Corrugated Phenolic Pipe.

Note: Cost of concrete and Ellipsoidal opening to be included in operation unit price for a new pipe. In addition, the Ellipsoidal opening must be made in accordance with Type 2. A concrete jacket shall not be used to join:

1. Concrete pipe in asbestos materials.
2. Concrete pipe where the minimum cover is equal to or greater than 20", Corrugated Jacket cannot be used.

Ellipsoidal Opening Required For Deep Pipe Sections. Ellipsoidal Opening shall be made in accordance with Type 2. A concrete jacket shall not be used to join 1. Concrete pipe in asbestos materials. 2. Concrete pipe where the minimum cover is equal to or greater than 20". Corrugated Jacket cannot be used.
CONCRETE GUTTER AND DRAINS AT RETAINING WALLS

SECTION CC

SECTION BB

CONCRETE GUTTER AND DRAINS AT RETAINING WALLS

INLETS, MANHOLES OR JUNCTION BOXES ON INTEGRAL PRECAST CONCRETE RISER FOR CONCRETE PIPE

PLAN OF TOP

SECTION

RAILROAD COMPANY

CLEARANCE

STRENGTH

LATERAL (TYPICAL)

ASSESSMENT LETTER

SIDE VIEW

CUT LINES

C

MINIMUM DISTANCE REQUIRED TO CLEARLY IDENTIFY WITH SAFETY DEVICES

PLAN VIEW

METHOD FOR DETERMINING THE LENGTH OF SPECIAL PIPE REQUIRED UNDER RAILROADS

MISCELLANEOUS DRAINAGE DETAILS

GUARD AT PIPE ENDS

DRAWING NUMBER

SHEET

DRAWN BY

CHECKED BY

SCALE

DATE

1. 0.75 in. (19 mm) 1.0 in. (25 mm)
2. 0.75 in. (19 mm)
3. 0.75 in. (19 mm)

METHOD FOR SETTING LIMITS OF VARIABLE FRONT SLOPES AT DRAINAGE STRUCTURES

NOTE:

All dimensions are shown in inches. The following table provides a list of materials and specifications for various components of the drainage system.

<table>
<thead>
<tr>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Riser</td>
<td>TYPICAL LATERAL</td>
</tr>
<tr>
<td>Concrete Pipe</td>
<td>TYPICAL LATERAL</td>
</tr>
<tr>
<td>Concrete Manhole</td>
<td>TYPICAL LATERAL</td>
</tr>
<tr>
<td>Concrete Inlet</td>
<td>TYPICAL LATERAL</td>
</tr>
</tbody>
</table>

Notes to drawings:

1. All dimensions are shown in inches.
2. All materials are to be specified in accordance with the American Society for Testing and Materials (ASTM) standards.
3. All work is to be performed in accordance with the applicable local codes and regulations.

Legend:

- "C" denotes the centerline of the drainage structure.
- "B" denotes the bottom of the structure.
- "T" denotes the top of the structure.
- "L" denotes the length of the structure.
- "W" denotes the width of the structure.
- "D" denotes the depth of the structure.

Drawn to scale 1/2" = 1'-0" on Tracing Paper.
**BRIDGE CULVERT NUMBER LOCATION**

The number of culverts in the center of the top surface of all bridge supports is 5. This will be marked by a “G” or “R” groove.

**TOP VIEW OF HEADWALL**

**PLAN INLET TYPE A GRATE**

**PLAN INLET TYPE B GRATE**

**SECTION BB**

**SECTION CC**

**FRAGIBLE BASE**

**ASPHALTIC CONCRETE BASE**

**EXTRA BASE FOR CROSS BOX CULVERTS UNDER FLEXIBLE PAVEMENT**

**MISCELLANEOUS DRAINAGE DETAILS**

**NOTE:** Extra base is required when cross box culverts are capped on facilities subject to high water flows (100 year) or high water volumes (1000 AITP) and the cover is within the range specified in the section above.
GENERAL NOTES

1. This detail is not recommended for grades steeper than 0.5% or channels exceeding 0.09 m full.

ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Ditch Pavement (75 mm Thick)</td>
<td>m³</td>
<td>9.09</td>
</tr>
</tbody>
</table>

*Quantity shown above includes pavement for 3.0 m "Length of Slope".
For each additional meter of slope length add 0.06 m³.
1. Spillway to be built for as shoulder gutter.
2. If spillway emptied into a shallow or median ditch, the ditch should be modified as necessary.

DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER

(TO BE USED WHERE INLETS, PIPES & EMBANKMENTS ARE IMPRACTICAL)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
PRELIMINARY DESIGN

CONCRETE SPILLWAYS
SHOULDER GUTTER SPILLWAY
SLOTTED PIPE OPTIONS

OPTION A - ROUND PIPE

OPTION B - ROUND OR ELLIPTICAL PIPE
DESIGN NOTES FOR UNDERDRAIN

1. The type of underdrain should be selected to meet design, water flow, and erosion conditions. Changes in the type of underdrain may be necessary to meet required conditions.

2. Type II underdrain is intended for maximum water removal conditions. The use of Type II underdrain may be necessary to meet design conditions.

3. Type III underdrain is intended for maximum water removal conditions. The use of Type III underdrain may be necessary to meet design conditions.

4. Type V underdrain is intended for maximum water removal conditions. The use of Type V underdrain may be necessary to meet design conditions.

5. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

6. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

7. General Notes

   a. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

   b. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

   c. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

   d. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

   e. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

   f. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

   g. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

   h. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.

   i. The designer shall review the design of the underdrain system. The designer shall review the design of the underdrain system.
SAFETY MODIFICATION FOR INLETS IN BOX CULVERTS
SHOWING LOCATION OF INLETS ON RETURN

TYPICAL RETURN PROFILES

Note:
Profile grades should be established that will allow loads to be crossed without the return elements creating conflicts. When required to cross maintain a minimum separation distance. Dimensions may be subjected to prevailing conditions and permits shall be provided ramps for the crossings. For information on public access curve ramps refer to Index No. 304.
GENERAL NOTES

1. Public sidewalk curb ramps shall be constructed in the public right-of-way at locations that are needed to provide accessible pedestrian facilities in pedestrian areas, intersections and facilities in the public right-of-way and at accessible pedestrian routes in public streets. Curb ramps shall be constructed without sidewalks being in line with the sidewalk at the return end of the curb ramp.

2. Where curb ramps are used to provide accessibility to pedestrian areas, they shall be constructed at a gradient of not greater than 1:20. The maximum grade of the intersecting street shall be 1:20. If the maximum grade of an intersecting street exceeds 1:20, the maximum grade of the intersecting street shall be reduced to the grade of the curb ramp. The maximum grade of the intersecting street shall be 1:20 or shall be reduced to the maximum grade of the curb ramp when the maximum grade of the curb ramp is less than 1:20. The maximum grade of the intersecting street shall be reduced to the grade of the curb ramp when the maximum grade of the curb ramp is less than 1:20.

3. Curb ramps shall be located at pedestrian facilities in the public right-of-way and at accessible pedestrian route in public streets. Curb ramps shall be constructed without sidewalks being in line with the sidewalk at the return end of the curb ramp.

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6. Curb ramps shall be located at pedestrian facilities in the public right-of-way and at accessible pedestrian routes in public streets. Curb ramps shall be constructed without sidewalks being in line with the sidewalk at the return end of the curb ramp.

7. Curb ramps shall be located at pedestrian facilities in the public right-of-way and at accessible pedestrian routes in public streets. Curb ramps shall be constructed without sidewalks being in line with the sidewalk at the return end of the curb ramp.

TYPICAL PLACEMENT OF PUBLIC SIDEWALK CURB RAMPS AT CURBED RETURNS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PUBLIC SIDEWALK CURB RAMPS
DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS WHERE RAMP AND LANDING DEPTH ARE NOT RESTRICTED BY RIGHT OF WAY

* For back of sidewalk curb and gutter transition and fu ramp and sidewalk curb options see sheet 4.
DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS WHERE RAMP AND LANDING DEPTH ARE RESTRICTED BY RIGHT OF WAY

* For back of sidewalk curb or buffer transition and for ramp and sidewalk curb options see sheet A.
DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS FOR LINEAR PEDESTRIAN TRAFFIC

MONOLITHIC CAST CURB
SEPARATELY CAST CURB

RAMP AND SIDEWALK CURB OPTIONS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PUBLIC SIDEWALK CURB RAMPS

BACK OF SIDEWALK CURB
OR BUFFER TRANSITION

SECTION AA

DIAGONAL RAMPS
FOR CONDITION OF INFEASIBILITY
SECTION CC

MEDIAN CROSSWALKS

LANDINGS FOR RAMPS WITHIN PUBLIC RIGHT OF WAY CONSTRUCTED AT LOCATIONS WHERE FUTURE SIDEWALKS ARE PROPOSED, WHERE STABLE SURFACES OTHER THAN SIDEWALKS ARE PART OF A CONTINUOUS PASSAGE OR WHERE A CURB FALLS ALONG THE CIRCULATION PATH TO PEDESTRIAN ROUTES ON ADJACENT SITES
CONTRACTION ASSEMBLY

Expansion Cap

SECTION BB

Speaker Bar

Foam Insert

Joint Seal

Preformed Joint Filler

Staking Pin

SECTION AA

Flow Support Wire

SECTION BB

Speaker Bar

Foam Insert

Joint Filter

Flow Support Wire

Joint Seal

Preformed Joint Filler

Staking Pin

SECTION AA

CONTRIBUTED ASSEMBLY

EXPANSION ASSEMBLY

NOTE:
Proprietary contraction and expansion assemblies may be used.
Products shall be introduced to the Iowa Construction Office in accordance with section 171 of the Product Evaluation Procedure.
ALTERNATE KEYWAY AND HOOK BOLT

NOTE: After the concrete has set to the extent that the firmed concrete is firm to the touch and a 2 in. portion of the test beam assembly shall be allowed remaining prior to placing of concrete in the adjacent area.

STEEL HOOK BOLT ASSEMBLY

Anchor bolts shall be Grade C in accordance with ASTM A 307. Threaded anchor bolts develop the full strength of the bolt and meet the material and thread requirements of ASTM A 307.

DETAIL OF JOINT ARRANGEMENT

NOTES
1. Longitudinal joints will not be required for single lane pavement 4.5 m or less in width. For outside and fill road joint details, see sheet 3 of 5.
2. When pavement width necessitates five or more longitudinal joints while work amounts to less than one or more, United Keyed Joints (KJN) be done when the total of asphaltic concrete placed per shift does not exceed 2 in. (51 mm) or less in a single day. Arrangement of longitudinal joints are to be as directed by the Engineer.
3. No conduits, water lines and other projections into the pavement shall be located in such a manner as to prevent expansion joint materials.
2-THRU LANES WITH SINGLE LANE ENTRANCE RAMP

ENTRANCE RAMP WITH ADDED LANE

2-THRU LANES WITH SINGLE LANE EXIT RAMP

3-THRU LANES WITH AUXILIARY LANE AND 2-LANE EXIT RAMP

JOINT LAYOUT AT ENTRANCE AND EXIT RAMP TERMINALS
CONCRETE SIDEWALK FOR CURBED ROADWAYS
GENERAL NOTES

1. The illustrations are not applicable for guardrails.

2. The tables and figures do not apply to the other illustrations shown.

3. The guide rail shown is not applicable for guardrail.

4. The illustrations and tables do not apply to the other illustrations shown.

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99. The guide rail shown is not applicable for guardrail.

100. The illustrations and tables do not apply to the other illustrations shown.
GUARDRAIL LENGTHS (m)

| Length (m) | 0.00 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 |
|------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Front Left | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Front Right| 0.00 | 1.00 | 0.90 | 0.80 | 0.70 | 0.60 | 0.50 | 0.40 | 0.30 | 0.20 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Note: For approaches and exchange assemblies see additional types W/17, S/200, T/2000, B/57, and ET.

WHEN END TERMINAL IS OUTSIDE OF OPPosing ROADWAY CLEAR ZONE

GUARDRAIL TREATMENTS FOR BRIDGE APPROACHES IN WIDE MEDIAN WITH FLUSH SHOULDERS

GUARDRAIL
GUARDRAIL

APPROACH TREATMENT FOR CURB AND GUTTER

DETAIL O
END ANCHORAGE ASSEMBLY TYPE BEST

**BEST NOTES**

1. The guardrail and exchange system represented on this standard drawing is a proprietary design by Interstate Steel Corporation and warranted under the trade name BEST. Any infringement on the rights of the designer shall be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation for the use by the Department and its employers. This standard drawing provides the general geometry and information necessary to fabricate equipment parts of the BEST and their installation into a specific application.

3. This standard drawing is sufficient for guide details for the BEST when installed in conjunction with standard guardrail and provides the requirement for blue printing addenda unless the plans otherwise call for such addenda.

4. The BEST is intended for use as an expansion and guardrail enclosure for standard guardrail panels. PErth is available for expansion in any direction or over the full length of the guardrail. The BEST can be installed over the guardrail at any rate or angle.

5. The BEST can be used in any design where the design/evaluation requires the use of a barrier.

6. The BEST shall be installed in accordance with the manufacturer's sheeted drawings, procedures, and specifications.

7. The BEST can be expanded over the full length of the guardrail with special high strength foundation tubes without end plates. The plates at location Nos. 3, 4, 5, and 6 shall be CFT/FT plates.

8. See the General Notes for geometry requirements of various components.

9. The pipe specification for expansion assembly type ET-10000/LEST-LE, the connection has the option to install either the ET-10000 or LEST assembly. If the pipe call for the BEST/LEST, an additional expansion or LEST-LE (as shown) for the steel or the CFT/FT (as shown) for the steel and CFT/FT in accordance with the pipes for the manufacturer's sheet drawings, procedures, and specifications.

**DESIGN NOTES**

1. A special site evaluation should be conducted prior to using the BEST, where there is less than 1.62 m clear area on the side of the guardrail.

2. The BEST is suitable for all design speeds.
GENERAL NOTES

1. Where an existing bridge is to be raised, repaired or replaced, a determination must be made independent of any information contained in this Index.

2. The schemes on this Index are not to be used for use in this Index is to be used in new bridge designs. The provision of a separate scheme number, size, shape, and material and for roadway and approachway arrangements, should be as follows: 30° Voids can be incorporated in the design of individual members or structural systems. For roadway and approachway arrangements, such as driveways or grade separations.

3. The schemes shown in the Index are divided into sections and can be used as an alternative guide. A scheme selection guide is provided under "Bridge Design Standards" and "Bridge Design Specifications." The scheme selection guide is intended to assist in the design of individual members or structural systems. For roadway and approachway arrangements, such as driveways or grade separations.

4. Existing bridge features shown in these schemes are intended to assist in the design of individual members or structural systems. For roadway and approachway arrangements, such as driveways or grade separations.

5. Details that are represented on the schemes are intended to assist in the design of individual members or structural systems. For roadway and approachway arrangements, such as driveways or grade separations.

6. All schemes are right side or right hand directions for traffic, four right lanes, left side applications are possible.

7. For undivided two way bridges, the right hand direction, as used in this Index, is to the driver of the vehicle.

8. All connections of guardrail, special and standard concrete, and other special stress and safety devices are to be made in accordance with the manufacturers' recommendations to be understood as designs of the Engineer.

9. Grooves otherwise carved in the Index show concrete surfaces shall be a Class I surface finish and Class II. The guide for leading in accordance with Section 400 of the Standard Specifications.

10. The guardrail and anchorage schemes on this Index do not include cost for payment of guarantee. See Index 400 below for cost of guarantee measurement.

11. Each independent anchor described in these schemes shall be a lead for a bridge and approachway assembly under the anchorage unit price for Bridge Anchorage Assembly, i.e.

   1. Not for use in existing bridges.

   2. The unit price shall be reduced to encourage the use of this scheme.

   3. Each guardrail shall be shown on the drawings of the bridge.

   4. Approachway and guardrail assemblies are included.

   5. The unit price shall include the cost of all elements prescribed under index 400 and the unit price for each special feature shall be included in the unit price for the corresponding scheme.

   6. Index 400 and this Index.

SCHEME SELECTION GUIDE (NUMBERS)

WITH ROADWAY CURVES APPROACHING BRIDGES

<table>
<thead>
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<th>ONE-WAY BRIDGES</th>
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<th>MODE OF TRAVEL</th>
<th>APPROACH END</th>
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<tr>
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<td>3.4, 5</td>
<td>2.2, 26, 27, 30</td>
<td>21.7, 30</td>
</tr>
<tr>
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<td>2.3, 10</td>
<td>20.2, 18, 26.15</td>
<td>21.7, 30</td>
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<tr>
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<td>1.2, 4, 5, 6</td>
<td>8.20, 20</td>
<td>9.21, 29</td>
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<th>APPROACH AND TRAILING ENDS</th>
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<tr>
<td>Narrow (C)</td>
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<tr>
<td>Sidewalks</td>
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GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES

<table>
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<td>8.20, 20</td>
<td>9.21, 29</td>
</tr>
</tbody>
</table>
BRIDGES WITH APPROACHING ROADWAY CURB

SCHHEME 6
CAST IN PLACE PANELS

SCHHEME 7
CAST IN PLACE PANELS

APPLICATIONS
SAFETY CURB 225 mm TO 305 mm WIDE
CONCRETE CONTINUOUS BEAM PANELING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH AND TRAILING ENDS OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

APPLICATIONS
SAFETY CURB 225 mm TO 305 mm WIDE
CONCRETE CONTINUOUS BEAM PANELING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH AND TRAILING ENDS OF ONE-WAY BRIDGES

Note: For Curbs Less Than 305 mm Wide Remove Top Face Panel and Call Contractor Watr Same As SCHHEME 3 D-K. For Safety Curbs Over 305 mm See SCHHEME 5, 6 & 8.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
W.A. BEECHER
GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES

P.C.R.A. APPROVAL
CAST IN PLACE TRANSITION WALL

BRIDGE WITH APPROACHING ROADWAY CURB
LIGHT POLE MOUNTING IN MEDIAN BARRIER WALL

JUNCTION BOX - ELECTRICAL

1. Junction boxes are to be fabricated from mild-steel conforming to ASTM A53. Box sizes are sectioned up to 1200 mm wide. The bottom of the junction box is to be painted with a water-tight cover. The cover screws must be fully galvanized.

2. Rods shall be made of high-quality steel, galvanized in accordance with the section's specifications.

3. The junction box assembly and conduit rings are to be included in the construction contract.

NOTE: For foundation design and details, see Notes No. 79003. Refer to roadway lighting plans for size of conduit. Complete the 3600 mm conduit short. The conduit length may be included in the contract unit price for light pole complete, CA.
CANTILEVER WALL

L-WALL

DIMENSIONS AND QUANTITIES

REINFORCING STEEL MODIFICATIONS

REINFORCED CONCRETE BARRIER WALL (SHOULDER)
REINFORCED CONCRETE BARRIER WALL (RETAINING)

BENDING DIAGRAMS

NOTE: All reinforcement 3/8 bars.

For use in areas where obstacles require concrete reinforcement of the barrier. Bar spacing must be 12 in. for 3/8 in. bars.

Reinforcing Steel: 24 gage

CONCRETE BARRIER WALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE BARRIER WALL

DATE: 5/0-5

PREPARED BY:

CHECKED BY:

APPROVED BY:

SHEET: 3 of 22

410
CONCRETE BARRIER WALL

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENTS • WITH ADJACENT BICYCLE LANE
WITH OR WITHOUT UTILITY STRAP
NEAT LINE PICTORIAL VIEW

NEAT LINE PICTORIAL VIEW

SIDEWALK DRAINAGE SLOT FOR BARRIER WALL (RIGID) (CURB & GUTTER)

PLAN
WITH UTILITY STRAP

PLAN
WITHOUT UTILITY STRAP

NOTE:
Transitions Segments Shall Be Provided Into The End Of The Benefit Area. The Following Transitions Shall Be Provided:

1. 30 mm Expansion Joint shall be installed in each end of the benefit area at 20-meter intervals. The ends of the segments providing the transition shall be wrapped with two layers of Type I Expansion Sheathing followed by a 1.2mm polyethylene (PE) geomembrane (type B) with the poly striping.

2. When Construction joints are utilized for Transition Segments, the Steel UDL shall be stowed to The Finishing in the Following Manner:

Type 1, 300 mm long x 60 mm wide x 60 mm thick. The deck shall be spaced 300 mm on center with the steel UDL placed behind 300 mm from the edge. These UDLs may be placed either above or adjacent to the deck.
**Concrete Barrier Wall (Rigid) (Curb & Gutter)**

**Curb and Gutter with Utility Strip and Without Adjacent Bicycle Lane**
TWO-WAY TRAFFIC (UNDIVIDED)

ONE-WAY TRAFFIC

BRIDGE END HAZARD

NOTE: Tension length of reinforcement in meters for near
wet hardening concrete varies. See Sheet 1-1.
For locations with utility strips see Sheet 1-2.
For transition, sidewalk and partitioned
utilities see Sheet 1-3 & 1-4.
The TWH are often used to tie barriers well
and keep water from getting under the road;
however, hazards related to the entry of the
water may be addressed by the design
on Sheet 1-5.

Hazard 1.2 m or less from face of curb

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
CURB AND GUTTER WITHOUT UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE
**BARRIER WALL AT SQUARE OR RECTANGULAR SHAPED HAZARD**

**PARTIAL PLAN**

- Right Hand (Bridge Pier or Pipe Shown)
- Left Hand (Bridge Pier or Pipe Shown)
- Front View of roadway
- Top View of roadway
- Plan View of roadway

**BARRIER WALL AT ROUND HAZARD**

**PARTIAL PLAN**

- Right Hand (Bridge Pier or Pipe Shown)
- Left Hand (Bridge Pier or Pipe Shown)
- Front View of roadway
- Top View of roadway
- Plan View of roadway

**SECTION AA**

- Plan View
- Elevation View
- Details of barrier wall

**SECTION BB**

- Plan View
- Elevation View
- Details of barrier wall

**SECTION CC**

- Plan View
- Elevation View
- Details of barrier wall

**PLAN FOR DESIGN SPEED ≤ 70 km/h (≤ 45 mph)**

- Standard Timber Offset Block
- Partial Trimming, See Section Above

**PLAN FOR DESIGN SPEED 280 km/h (≤ 175 mph)**

- Standard Timber Offset Block
- Partial Trimming, See Section Above

**SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS**

**WHEN GUARDRAIL OFFSET FROM HAZARD LESS THAN 0.9 METERS**
HAZARD PENETRATING STEM OF RIGID CONCRETE BARRIER WALLS

TOP VIEWS

RIGID HIZARD
12 mm Bridge Pier Or Pipe Shear

CONCRETE BARRIER WALL WHEN SPAN BETWEEN BENT SUPPORTS OR PIER COLUMNS EXCEEDS 4.0 m

CONCRETE BARRIER WALL WHEN GUARDRAIL OFFSET FROM BENT OR PIER LESS THAN 0.9 METER OR WHERE WALL STEM ABUTS SUPPORTS OR PIER COLUMN

The details on this sheet are intended for the F-shaped concrete barrier walls employed on these highways. The shapes and sections are to be used in conjunction with the requirements and dimensions shown in the details. These are adaptable to regular and occasional occurrences for the highways and are to be used as a guide for the design and construction of the concrete barrier walls.
GUARDRAIL CONNECTION TO TRAPEZOIDAL BARRIER WALL

NOTES

1. Where nesting is necessary to fit nested boxes the nested surface shall be finished in accordance with note No. 400.

2. The nested boxes shall not be nested in the posts and brackets of post hangers 111.135 and 150.

3. For additional wall widths, see Sheet 21.

4. For additional guardrail information refer to note No. 400.
OPTIONAL END TREATMENTS FOR WALL UNITS

ROUND BAR CONNECTOR

WIRE ROPE CONNECTOR

STEEL CONNECTING PIN

STEEL PIPE KEEPER

WATER-KEEPER required between all units except bridge and approach end mounted units.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
PRECAST CONCRETE
TEMPORARY BARRIER WALL

Drawing No. 445 02/11/90

Drawn by:

Approved by:

Drawn Date:

Approved Date:

P.A.A. Date: 11/15/90

Sheet 4 of 4
TEMPORARY CONCRETE BARRIER WALL END TREATMENT

WHEN SHIELDED BY A G-R-E-A-T22 CRASH CUSHION

NOTES FOR TEMPORARY CONCRETE BARRIER WALL END SHIELDING:

1. All temporary crash cushions shall be installed in accordance with the manufacturer’s specifications and recommendations. Temporary crash cushions as either new or functionally sound used devices. Performance or increased function is the only solution for obstacles, whether the crash cushion is new or used. Instructions, provided, must be followed, reviewed, and maintained to shield between projects, or made up of various new and used components.

2. The temporary crash cushions used herein when are standard lengths and widths as specified by the manufacturer. The selected lengths are either new or functionally sound used devices. Performance or increased function is the only solution for obstacles, whether the crash cushion is new or used. Instructions, provided, must be followed, reviewed, and maintained to shield between projects, or made up of various new and used components.

3. The REACT 350, BSH, ASHR 350 and G-R-E-A-T22 are reflective crash cushions. When any of these crash cushions are subjected to impact forces, they will be subjected to reorientation, their crash cushion will absorb a portion of the impact energy. The crash cushion, when applied, will be attached to the barrier by using anchor bolts as specified in ANSI AASHTO M213, AWS D1.4, A2.5, and AS2056.5 respectively.

4. The temporary crash, which is a Hence the crash cushion shown in this index must be custom engineered for the installation and design, to the extent and then the following approach:

5. Temporary crash cushions are not acceptable for split-eave installations.

6. A yellow and green Type B Reflective Barrier must be installed (3.0 in. in front of the edge of the crash cushion. The reflective barrier shall be in accordance with ASTM F662 and F1885.

7. Temporary reflective crash cushions are to be used for guide installation only). It is essential that the anchor bolts be installed in the proper position of the crash cushion as specified in ANSI AASHTO M213, AWS D1.4, A2.5, and AS2056.5 respectively.}

TEMPORARY CONCRETE BARRIER WALL END SHIELDING

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SURFACE ANCHORAGE REQUIREMENTS

END ANCHORAGE NOTES

1. For temporary barrier wall end anchorage installation, see "TEMPORARY CONCRETE BARRIER WALL ALIGNMENT and NOTES FOR TEMPORARY CONCRETE BARRIER WALL END SHIELDING" note 5.

2. The temporary concrete barrier wall end anchorage system depicted is a proprietary design by Energy Association Systems, Inc. Other temporary anchorage methods can be substituted when well-designed to prevent failure in any of the following conditions:
   a. Wind loads
   b. Vertical loads due to associated crash barrier or reinforcing crash wall, or
   c. Horizontal or vertical loads on a sideways or rear projection barrier.
   d. A combination of any of the above.

3. The cost for extending the wall segment will be included in the cost for the adjoining reinforcing crash wall.

BARRIER WALL END ANCHORAGE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PRECAST CONCRETE TEMPORARY BARRIER WALL

PAGE 4 OF 4
When the approach end of a TRITON BARRIER system is reached within the closure plan, and the installation is to stop at 750 mm (30 in) or less for the TRITON BARRIER can serve as it two continuity and termination by existing water backed from the next section and by placing the connecting pin on the interior end. Parallel elements other FIS 100 end sections, 750 mm (30 in) and shall be used to form the system with strength fixed to the clear zone.

SUPPLEMENTAL GENERAL NOTES FOR THE TRITON BARRIER

1. The system presented on this standard drawing is to be used as a proprietary system under the label TRITON BARRIER and is to be used under the Standard BARRIER.

2. The contractor shall provide all necessary fabrication and installation necessary to fabricate this system as a system under the Standard BARRIER.

3. The TRITON BARRIER system can be designed as a for unknown systems in combination with other Department: the permanent barrier system, each of different proprietary systems or equipment without proprietary filler barrier systems.

4. The TRITON BARRIER system for unknown systems is to be used in the TRITON BARRIER TRANSITION INTERIM ASSOCIATION, which shall be in accordance with fabrication of the system is to be used in the TRITON BARRIER section for the system is to be used as a proprietary product or when the system is to be used in the TRITON BARRIER section or sections are not to be used as proprietary road closure barriers, whether connected, unconnected, filled or unfilled.

5. Sections shall be fabricated in accordance with the system section for proprietary products, whether connected, unconnected, filled or unfilled.

6. Sections shall be fabricated in accordance with the system section for proprietary products, whether connected, unconnected, filled or unfilled.

7. Sections shall be fabricated in accordance with the system section for proprietary products, whether connected, unconnected, filled or unfilled.

GENERAL NOTES

1. The system presented on this standard drawing is to be used as a proprietary system under the label TRITON BARRIER and is to be used under the Standard BARRIER.

2. The system presented on this standard drawing is to be used as a proprietary system under the label TRITON BARRIER and is to be used under the Standard BARRIER.

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4. The system presented on this standard drawing is to be used as a proprietary system under the label TRITON BARRIER and is to be used under the Standard BARRIER.

SUPPLEMENTAL DESIGN NOTES AND GUIDELINES FOR THE TRITON BARRIER

1. The system presented on this standard drawing is to be used as a proprietary system under the label TRITON BARRIER and is to be used under the Standard BARRIER.

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TRITON BARRIER SYSTEM
TRANSITION - TCBEAM TO TRITON BARRIER

TRANSITION NOTES
1. Transitions shown on this sheet are typically used at speeds of 40 mph or less.
2. Transition hardware can be placed on either end of TRITON section.
3. Transition hardware can be specified as left or right side of roadway, right side shown.
4. TRITON Barrier end sections must be filled with water when using transition hardware assemblies.
5. Transiton transition hardware to accommodate the manufacturer's recommendations and specifications.

TRITON BARRIER TRANSITION HARDWARE ASSEMBLIES
SUPPLEMENTAL GENERAL NOTES FOR THE GUARDIAN BARRIER

1. The barrier units presented on this standard drawing (hereafter referred to as the "GUARDIAN") are proprietary and exclusive to Safety Barrier Systems and are covered under the trade name GUARDIAN Safety Barrier.

2. This table provides general specifications and information necessary to install a GUARDIAN barrier at the proper height and position. The table includes the following:
   - **Height and Position**: Specifies the height and position of the GUARDIAN barrier unit.
   - **Impact Resistance**: Indicates the impact resistance of the GUARDIAN barrier unit.
   - **Weight**: Indicates the weight of the GUARDIAN barrier unit.

3. The GUARDIAN units are designed for installation in conjunction with the "GUARDIAN 350 HIGHWAY KIT" which is incorporated throughout the system in use.

4. **GUARDIAN** units can be used only in a standard system, i.e., not connected to other types or brands of barriers.

5. The GUARDIAN units can be used only as a longitudinal barrier on the State maintained highway system. Any longitudinal system must have a minimum of at least 10 feet (3.05 meters) of clear space between the top of the barrier and the shoulder of the highway to prevent vehicles from being propelled over the barrier.

6. The GUARDIAN system must be installed in a manner that provides a functional structure between the system and the road to accommodate with the lane below.

7. The GUARDIAN barrier units should be placed in such a way as to provide maximum safety and performance for both passengers and vehicles when the GUARDIAN barrier is installed with this system, with the purpose of reducing the risk of injury to passengers and vehicles, and to ensure the proper installation of the GUARDIAN barrier units.

SUPPLEMENTAL DESIGN NOTES FOR THE GUARDIAN BARRIER

1. All绘制 of products on this standard are based on data that was available to provide a consistent and well-engineered design for the GUARDIAN barrier. The design may vary depending on the specific requirements of the project and the site conditions.

2. Systems included in any maintenance or repair plans will require detailed evaluation and implementation.

3. The installation of the GUARDIAN barrier must be done in accordance with the manufacturer's installation instructions. The GUARDIAN barrier units can be used against other proprietary units, as long as the proper installation instructions are followed.
GENERAL NOTES

1. The aesthetic elements represented on this standard drawing is a proprietary design by SPRE, Inc. and remains under the trade name C-A-T (1981) Inc.

2. The design criteria and standards for this system were determined in accordance with the applicable governmental regulations and codes. The designer must be familiar with the codes and with the applicable standards for each application.

3. The C-A-T system is designed for use in conjunction with single and double pipe systems. The designer must be familiar with the applicable standards for each application.

4. The C-A-T system is designed to provide a means of conveying and distributing fluids in underground applications. The designer must be familiar with the applicable standards for each application.

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9. The C-A-T system is designed to provide a means of conveying and distributing fluids in underground applications. The designer must be familiar with the applicable standards for each application.
GENERAL NOTES

1. The escape deflection system represented on this standard drawing is a proprietary design by
Freightliner Systems, Inc. and cannot be used without their consent.

2. This standard drawing shows the complete system design for Line 305, and any adjustment to its design will be
permitted only by the manufacturer.

3. The standard drawing is intended for use by the manufacturer in the manufacture of the system; it is not
intended for use by anyone else.

4. The Brakemaster 350 system shall be installed in accordance with the manufacturer's
detailed drawings, procedures, and specifications.

5. The Brakemaster 350 system shall be used only on stages 1-15 or flatter.

6. The Brakemaster 350 system shall not be used on grades greater than 3.5%.

7. This standard drawing represents the complete system in conjunction with simple and specific grades
in accordance with the requirements of the manufacturer.

8. The Brakemaster 350 system is designed in accordance with the standard drawings, procedures, and
specifications of the manufacturer.

9. Metal components must meet the manufacturer's requirements for materials, except No. 400.

10. All work is considered complete at the time the final inspection is completed.

11. The Brakemaster 350 system will be paid for under the contract with the party.

DESIGN NOTES AND GUIDELINES

1. The Brakemaster 350 system is designed to operate without any auxiliary equipment.

2. The Brakemaster 350 system is designed to operate without any auxiliary equipment.

3. The manufacturer's design and installation require the installation of the system to be
completed in accordance with the standard drawings, procedures, and specifications.

4. The manufacturer's design and installation require the installation of the system to be
completed in accordance with the standard drawings, procedures, and specifications.

5. The manufacturer's design and installation require the installation of the system to be
completed in accordance with the standard drawings, procedures, and specifications.

6. The manufacturer's design and installation require the installation of the system to be
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10. The manufacturer's design and installation require the installation of the system to be
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11. The manufacturer's design and installation require the installation of the system to be
completed in accordance with the standard drawings, procedures, and specifications.

12. The manufacturer's design and installation require the installation of the system to be
completed in accordance with the standard drawings, procedures, and specifications.
REINFORCED AND NONREINFORCED CONCRETE PAD SYSTEMS
CEMENT CONCRETE FOUNDATIONS

TEMPORARY FOUNDATIONS

RIGID FOUNDATION NOTES

1. The construction permit permit permit permit (RFD) Foundation is designed to meet the
   minimum requirements of the foundation system. The rigid foundations shall be constructed
   with 28 MPa concrete as a strength concrete. The rigid foundation shall be placed at the top
   of the soil at the surface and be checked before setting anchors in the absence of other
   requirements. The rigid foundation shall be designed to provide 10 kips (45 MPa) of bearing
   resistance as specified in RIGID CONCRETE FOUNDATIONS. The foundation shall be
   designed for the most severe combination of loads as specified by RIGID CONCRETE FOUNDATIONS.

2. The non-reinforced rigid foundation permits (RFD) Foundation shall be a Class 3 concrete,
   with a strength equal to or greater than 28 MPa. The RFD Foundation shall be designed
   to accommodate a load on an expandable pad, being a thickness of not
   less than 25 mm, depending on the load to be supported. The rigid foundation shall be
   designed to accommodate the loads specified in RIGID CONCRETE FOUNDATIONS.

3. For additional information see the General Notes.
**Bidirectional Plan**

**Bidirectional Elevation**

**Unidirectional Plan**

**Unidirectional Elevation**

**Bidirectional Section**

**Unidirectional Section**

**Bidirectional Transition**

**Unidirectional Transition**

**QuadGuard System**

**QuadGuard To Concrete Barrier Wall**

**Barrier Wall Transition Note**

- QuadGuard System
- Concrete Barrier Wall
- Transition Note
- Barrier Wall Type
- Transition System
- Placement and Installation

**QuadGuard System**

600/160/95

435
UNIT PLAN

UNIT ELEVATION

PITURAL VIEW

INSET

UNIT PLAN

UNIT ELEVATION

SHEET "C" (FOR BAY 1, 2, 3, 4, 5, 6)

DETAiL "A"

DETAiL "B"

DETAiL "C"

SHEET "C" (FOR BAY 1, 2, 3, 4, 5, 6)

CONSTRUCTION ZONE

G-R-E-A-T

TENSION STRUT BACKUP ASSEMBLY

3 BAY UNIT

6 BAY UNIT

Sheet: 2 of 6

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

EVEN 4439

1-5-01

CONTRACT NO.

3-16-05

CONTRACT PERIOD

08/01/05 TO 07/31/08
FOUNDATION PAD & MISCELLANEOUS ASPHALT PAVEMENT

MP-3 LONGBOLT ANCHOR SYSTEM

FLEXIBLE FOUNDATIONS
RIGID FOUNDATIONS NOTES

1. The reinforced concrete pad system (RPCC) foundation is designed to meet the C-1-1-71 load classification criteria. The RPCC foundation shall be constructed with 28 MPa (4000 psi) concrete strength concrete. The top slab shall be cast as the top of the model. The surface of the model shall be finished for each construction phase. The finished surface shall be placed in accordance with the standards of the General Notes for the Precast Concrete Assembly. The C-1-1-71 load shall be defined as a load with the 605 mm (24 in) eccentricity, unless otherwise specified in the plans.

2. The reinforced concrete pad system (RPCC) foundation shall be designed as a Class 3 concrete, having plain concrete equal to or greater than 100 psi in load classification. The RPCC foundation shall be constructed with 28 MPa (4000 psi) concrete strength concrete. The finished surface of the model shall be placed in accordance with the standards of the General Notes for the Precast Concrete Assembly. The C-1-1-71 load shall be defined as a load with the 605 mm (24 in) eccentricity, unless otherwise specified in the plans.

3. For additional information see the General Notes.
GUARDRAIL TRANSITION TO TEMPORARY DETOUR STRUCTURES

Note: Timber or sheet piling may be used, timber piling shown.
GENERAL NOTES

1. The opaque visual barrier is designed to function as a visual barrier, and is not intended to resist vehicle impact loads or to withstand impact from vehicles. The barrier is designed to withstand wind while being struck by light debris, and is designed to yield to exaggerated strikes by vehicles or trucks, and to absorb and dissipate energies of the barrier when yielding to such strikes.

2. When the opaque visual barrier is constructed in conjunction with prefabricated concrete barrier walls, dowels may be set in the reinforced slab, as required by the designer, and installed in the prefabricated barrier segments to provide vertical and horizontal connectivity between the segments.

3. For both double and single faced concrete barrier walls and the opaque visual barrier it is to be located in the center of the top of the wall.

4. In the reinforcement shown the Contractor may substitute equivalent reinforcement with less developed stress in any area, when approved by the Engineer. Details shall be submitted with requests for construction.

5. The Contractor may construct contiguous or precast concrete panels as a part of the system to save the time and inconvenience to the roadway users. The Contractor shall submit shop drawings for the Engineer's approval.

6. In the construction of the opaque visual barrier, the Contractor may construct prefabricated concrete panels as a part of the system to save the time and inconvenience to the roadway users. The Contractor shall submit construction shop drawings for the Engineer's approval.

7. Payment for opaque visual barrier shall be full compensation for costs, expenses, labor, materials, equipment, transportation, storage, erection, installation, handling, finishing, and work incidental thereto, and shall be paid upon the approval and final inspection of the Department of Transportation.
IN RURAL CONSTRUCTION

REMOVAL OF ORGANIC MATERIAL

GENERAL NOTES

1. All values shown in this index for removal of organic and plastic materials are based only on values shown in the plan.
2. Limitations of soil material shall be in accordance with Index No. 505.
3. Where organic or plastic material is to be removed, the material shall be removed in accordance with Index No. 505, unless otherwise shown on the plans.
4. The term "Plastic Materials" used in this index is in conjunction with removal of plastic and is defined under Index 500 for Plastic (P) and Plastic (P) for Organic (O).
5. The term "Organic Material" as used in this index is defined as any soil which has an organic content greater than 10.0 percent, or an individual organic content test result which exceeds seven (7) percent. Organic material shall be removed in accordance with Index No. 505, unless otherwise shown.
6. The nominal depth of slips at which shall be 1.0 m below the structure point (where applicable) or in accordance with the plans.
7. In urban areas, the structure point at which shall be 1.0 m below the structure point shall be defined by the owner of the property where the foundation is to be built.
8. See Index No. 500 for plastic or plastic material.

DESIGN NOTES

1. All conditions where organic material or other soil (clay, loam, sand, etc.) shall be designated as organic material, the construction of a geotechnical foundation over those soils shall be considered. The State Geotechnical Engineer shall review the design and make recommendations to the owner of the property about the construction of a foundation over those soils.
2. The designer shall take into consideration the effects of runway loading on the structure, and the owner of the property shall take into account the effects of runway loading on the structure.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
REMOVAL OF ORGANIC AND PLASTIC MATERIALS
REMOVAL OF PLASTIC MATERIAL

REMOVAL OF PLASTIC MATERIAL ON DIVIDED FREEWAYS, ARTERIALS AND MAJOR COLLECTORS HAVING FLUSH MEDIANS AND ON UNDIVIDED MATERIALS AND MAJOR COLLECTORS

REMOVAL OF PLASTIC MATERIAL ON INTERSTATE FACILITIES, FREEWAYS, DIVIDED ARTERIALS AND MAJOR COLLECTORS HAVING DEPRESSED MEDIANS

NOTE: For GENERAL NOTES see Sheet C.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
HIGHWAY DESIGN

REMOVAL OF ORGANIC AND PLASTIC MATERIAL

F.D.M.A. APPROVED
5/15/70
DIVIDED ROADSWAYS

UNDIVIDED ROADWAY

SWAY | SOIL | CLASSIFICATION (AASHO AW-1)
-----|------|-----------------------------
S    | Select| A-1, A-3, A-2.4 **
S*   | Special Select| A-3.25 ** with minimum Average Lab Permeability of 50,000 as per FM-1705
P    | Plastic| A-0.5, A-0.25, A-5-1, A-5.5-2, A-7 (ALL with LL > 50)
K    | High Plastic| A-0.2, A-2-1, A-5-0, A-5-2 (ALL with LL > 50)
M    | Mud| A-8

* Classification varies with right in order of preference.

** See General Notes Nos. 4 & 5 for utilization of soils classified as organic, material, or mach.

State shown by the group. Some types of 0-2.4 materials may be approved by writing to the District Materials Engineer.

The materials must meet the minimum lab permeability requirements, be non-plastic, and not exceed 12% passing the 75 micron sieve.

**:** Some types of 0-2.4 materials are likely to retain excess moisture and may be difficult to compact. This should be noted in the embankment above the water level during the period of construction.

For soils in this classification with 10% passing the 100 micron sieve, the 20% passing the 90 micron sieve shall not exceed 12%.

For soils in this classification with 10% passing the 100 micron sieve, the 0.05 passing the 90 micron sieve shall not exceed 12%.

15% of 0-2.4 Coarse Aggregates allowed to Top 100 mesh.
NOTES
1. All material in the shaded area is excess base to be removed.
2. The cost for removal of excess base material shall be included in the contract unit price for base.
3. Shoulder for base shall be constructed using normal width.

REMOVAL OF EXCESS BASE MATERIAL

MEDIAN STABILIZING DETAILS

MISCELLANEOUS
EARTHWORK DETAILS
SUPERELEVATION RATES (\(e\)) FOR RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS

\(e_{max} = 0.10\)

CHARTED VALUES

TABULATED VALUES

\(R\) (m) \quad \text{Design Speed (km/h)}

<table>
<thead>
<tr>
<th>4000</th>
<th>6000</th>
<th>8000</th>
<th>10000</th>
</tr>
</thead>
<tbody>
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<tr>
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</table>

SUPERELEVATION FOR RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS
8-LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN
### Tabulated Values

<table>
<thead>
<tr>
<th>Radius (m)</th>
<th>Design Speed (km/h)</th>
<th>CHARTED VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>30</td>
<td>Taper at 0.5%</td>
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<tr>
<td>250</td>
<td>40</td>
<td>Taper at 0.5%</td>
</tr>
<tr>
<td>300</td>
<td>50</td>
<td>Taper at 0.5%</td>
</tr>
<tr>
<td>400</td>
<td>60</td>
<td>Taper at 0.5%</td>
</tr>
<tr>
<td>500</td>
<td>70</td>
<td>Taper at 0.5%</td>
</tr>
<tr>
<td>600</td>
<td>80</td>
<td>Taper at 0.5%</td>
</tr>
</tbody>
</table>

**Notes:**
- NC: Normal Crown
- RC: Reverse Crown (0.020)

**General Notes:**
1. Maximum rate of super elevation for urban highways and high speed urban streets shall be 0.5%.
2. Super elevation shall be obtained by rolling a plane successively about the break points of the section until the plane has reached a slope equal to the required by the design. Such the calculation involves the entire section and further super elevation shall be required for the rolling construction of the plane shall be added to the edge of the plane. Irregularities in the rolling plane also result in the plane developing higher or lower edges. The plane shall be laid in accordance with the requirements of the section only when the super elevation plane is to be maintained in the plane plane of the curve.
3. When positive super elevation is required, the slope of the gutter on the high side should be a continuation of the slope of the super elevation plane.
4. In construction, plan vertical curves shall be laid out on an equal profile basis within the limits of the super elevation transition.
5. The vertical super elevation transition length "r" shall have a minimum value of 0.5 m for design speeds under 60 km/h and 2.5 m for design speeds of 60 km/h or greater.
6. Roadway sections having lane arrangements different from those shown, shall be superimposed in a similar manner.
7. For super elevation of lower speed urban streets, see the I.S.O. "General Standards for Design, Construction and Maintenance For Streets And Highways." For super elevation of roads on urban highways, urban freeways and high speed urban highways, see noted No. 60.

**Superelevation for Urban Highways and High Speed Urban Streets**
SUPERELEVATION TRANSITION SECTIONS FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS

UNDIVIDED FACILITIES

DIVIDED FACILITIES

TWO TRAVEL LANES EACH DIRECTION

TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN

TWO TRAVEL LANES EACH DIRECTION WITH MEDIUM AND AUXILIARY LANES

THREE TRAVEL LANES EACH DIRECTION

THREE TRAVEL LANES EACH DIRECTION WITH MEDIAN

STATE OF UTAH DEPARTMENT OF TRANSPORTATION
HIGHWAY DESIGN

SUPERELEVATION

URBAN HIGHWAYS AND STREETS
TWO LANTES EACH DIRECTION

PROFILE

TWO LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANE

PROFILE

EXAMPLE SUPERELEVATION SECTIONS AND PROFILES FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS
**Layer Thickness for Asphalt Concrete Structural Courses**

(Layers Are Listed in Sequence of Construction)

<table>
<thead>
<tr>
<th>COURSE THICKNESS (mm)</th>
<th>Type 5-20 mm T</th>
<th>Type 5-20 mm T</th>
<th>Type 5-20 mm</th>
<th>Type 5-20 mm T</th>
<th>Type 5-20 mm T</th>
<th>Type 5-20 mm T</th>
<th>Type 5-20 mm T</th>
<th>Type 5-20 mm T</th>
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<td>100</td>
<td>100</td>
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</tr>
</tbody>
</table>

* Denotes multiple combinations available. Combination selected must be consistent with the General Notes shown below and the total number of layers shown by (*) used.

**General Notes**

1. For combinations not shown in the table, the thickness must be consistent with the following thickness ranges:
   - Type 2: Minimum: 30 mm, Maximum: 50 mm
   - Type 1: Minimum: 50 mm, Maximum: 70 mm
   - Type 2-2: Minimum: 70 mm, Maximum: 90 mm

2. Additional combinations of thicknesses shown in the above table may be used provided the minimum and maximum thickness requirements are met.

3. When quantities are less than 1000 tons, equivalent thickness is determined by multiplying the required number of layers by the thickness of each layer.

4. The designer should consider the asphalt for surface courses for surface courses for thicknesses greater than 100 mm.

5. More than one layer may be used for the upper pavement layer and should be the same and paved in a single pass, unless shown differently in plans. See Design Notes.

6. A minimum of 40 mm is required over an Asphalt Rubber Interlayer (ARM).
GENERAL NOTES

1. On all new construction projects and replacement reconstruction projects where an entire new base is to be built, the design engineer may specify that the Base Group and any of the unrestricted General Use Optional Bases shown in the Base Group may be used. Note, however, that these bases are limited to widening which prevents their general use.

2. On any type of widening project, the base option to be used must be specified by the designer and shown in the plans.

3. Where base options are specified in the plans, only these options may be bid and used.

4. The designer may require the use of a single base option, for instance ABC-3, in a high water condition. This will still be bid as Optional Base.

5. The contractor will indicate the basis for his bid by designating the three digit option code on the bid blank.

---

<table>
<thead>
<tr>
<th>Base Group &amp; Structural Range</th>
<th>Base Group Poly (per 100 ft. 20097-705)</th>
<th>Unit Structural Number (per cm of thickness)</th>
<th>Base Type</th>
<th>Base Code</th>
<th>Base Number</th>
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<tr>
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<td>1.000</td>
<td>0.14</td>
<td>0.14</td>
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LEGEND

- For granular base, the construction, of both the subbase and ABC-3 will be paid for under the contract unit price for Optional Base. Granular bases include: Limerock, Cemented Coquina, Shell Rock, Bank Run Shell and Graded Aggregate Base of LRR-100. The base thickness shown is ABC-3. All subbase thicknesses are 100 mm. The base structural number shown is for the composite base.

- To be used for widening only, one meter or less.

- Base Group 1, based on minimum practical thicknesses.

- Restricted to non-limited Access shoulder base construction.
### Limited Use Optional Base Groups and Structural Numbers

<table>
<thead>
<tr>
<th>Base Group</th>
<th>Structural Range</th>
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<tr>
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<td>(650-2000)</td>
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<tr>
<td>2</td>
<td>(1800-4000)</td>
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<td>3</td>
<td>(1500-3200)</td>
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<tr>
<td>4</td>
<td>(1200-2500)</td>
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<td>5</td>
<td>(1000-2000)</td>
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<td>6</td>
<td>(800-1800)</td>
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<td>7</td>
<td>(600-1600)</td>
</tr>
<tr>
<td>8</td>
<td>(400-1400)</td>
</tr>
</tbody>
</table>

**LEGEND**

- **Base Type**
  - Base Group
  - Structural Range

- **Unit Structural Number (per mm of thickness)**
  - Base Group
  - Structural Range

- **Base Thickness (mm)**
  - Base Structural Number

- **Note:** These base materials may be used on FDOT projects when approved by the District Materials Engineer and shown in the plans.
**SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS**

**GENERAL NOTES**

1. Where a connection is intended to angle across the highway, the through lanes are to align directly with the connecting through lanes.

2. For new connections and for expansions or existing connections being constructed or reconstructed, guidance requirements and minimum clearances should be reviewed with the responsible authority before selecting the final design.

3. Turnout design considerations are to be in accordance with geometric requirements for the interstate highways as defined under the Interstate Highway System.
MODIFICATIONS OF 'ADVERSE' AND 'MARGINAL' APPLICATIONS

ADVERSE* AND MARGINAL* SECTIONS MODIFIED TO ACHIEVE GENERAL* APPLICATION

ADVERSE* SECTIONS MODIFIED TO ACHIEVE MARGINAL* APPLICATION

* See DESIGN NOTES FOR URBAN ENCLOSED TURNOUTS on Sheet C.
* Minimum Width Appropriate up to 125' with a Fixing of Inapplicability.

SIDEWALK ADJACENT TO CURB
SIDEWALK WITH UTILITY STRIP ON 0.02 SLOPE
SIDEWALK WITH UTILITY STRIP ON 0.04 SLOPE

MODIFICATIONS TO ADVERSE AND MARGINAL SECTIONS
LIMITED ACCESS FACILITIES

SHOULDER GROUND-IN RUMBLE STRIP PLACEMENT

ARRAYS

GENERAL NOTES FOR
SHOULDER GROUND-IN RUMBLE STRIPS

1. Shoulder in rumble strips shall be constructed on freeway and other limited access projects only and only when allowed for in the plans.
2. The skip array shall be spaced uniform, except where a change in speed or a change in grade makes it necessary for the skip array to be spaced non-uniform. The skip array may be spaced non-uniformly for the entire series of rumble strips and may be spaced non-uniformly for other specific sections or elevations as called for in the plans.
3. Shoulder in rumble strips are to be constructed in accordance with Section 56b of the Specifications.
4. When mixed grades are installed, the grade of the outer mating lane, the extended friction course shall be placed off edge by the 0.3-in. lane, prior to rumble strip grouting.
5. Both arrays shall be paid for under the standard unit price for Rumble Strips (Graded O.14). Each price and payment shall be full compensation for all work and materials required.

DESIGN NOTE

1. The rumble strips described on this sheet are intended for use on flexible pavement sections. When constructing rumble strips on rigid concrete sections, the rumble strips should be spaced closer than 0.5 m from any pavement edge. When constructing rumble strips for slip lane systems on existing rigid sections, they should be located as described above.
2. Other methods and types of applications described here are used unless approved in writing by the State Roadway Design Engineer. Approval will be considered only with sufficient engineering justification for workmanship from this standard.

RUMBLE STRIPS

LOCATION ALONG SHOULDER (FLEXIBLE PAVEMENT)

SHOULDER GROUND-IN RUMBLE STRIPS
GRAVITY WALL

ESTIMATED QUANTITIES FOR WALL

<table>
<thead>
<tr>
<th>LENGTH (M)</th>
<th>AREA (M²)</th>
<th>WEIGHT (KGS)</th>
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</table>

GRAVITY WALL NOTES

1. Gravity wall to be constructed as extensions of reinforced concrete retaining walls, except work of grading and backfill below the same face. Finish on the internal and external face of the wall shall be finished to the grade elevation of the retaining wall.

2. Cost of reinforcing steel, face finish, and joint work to be included in the estimate and priced for Class Concrete Finishing Wall No. 3.

STATE OF IOWA DEPARTMENT OF TRANSPORTATION

ALUMINUM PIPE HANDRAILS,
GRAVITY WALLS AND STEPS
GENERAL NOTES
1. Each entrance terminal at exit only shall be used on ramps for
   within a series of 60 such or greater shall be constructed. For lane
   widths of 24' or 30' it 3,000 square feet shall be used in place of
   lengths set according to AASHO.

2. 5.2. PCC Pavement Projects:
   5.2.1. Where shoulder pavement adjacent to shoulder gutter is less
   than 15', it shall be extended as per PCC Pavement Project
   beginning with the PCC pavement joint nearest to the adjacent roadway
   pavement.

3. 5.3. Flexible Pavement Projects:
   5.3.1. Where a flexible pavement is used in conjunction with shoulder gutter is
   unsuitable, the shoulder pavement shall be extended to the adjacent
   roadway pavement.

4. For entrance or exit terminals, use Table No. 305.

5. Shoulder gutter specifications will be determined by storage design.
ACCELERATION LANE WITH SHOULDER GUTTER

DECELERATION LANE WITH SHOULDER GUTTER

ACCELERATION LANE WITHOUT SHOULDER GUTTER

DECELERATION LANE WITHOUT SHOULDER GUTTER

SHOULDER TREATMENT AT SPEED CHANGE LANES AT EXPRESSWAY RAMP TERMINALS

EXPRESSWAY RAMP TERMINALS
4-LANE UNDIVIDED WITH OPTIONAL LANE

4-LANE UNDIVIDED FLARED - SYMMETRICAL

INTERSECTION TURNS AND STORAGE
LEFT SIDE WIDENING

CENTERED WIDENING

RIGHT SIDE WIDENING

FLARED & PAINTED LEFT TURNS FOR 2-LANE 2-WAY ROADWAYS
4-LANE DIVIDED TO 4-LANE UNDIVIDED

4-LANE DIVIDED TO 2-LANE UNDIVIDED

4-LANE UNDIVIDED TO 2-LANE UNDIVIDED

LANE DIVERGENCE AND CONVERGENCE FOR CENTERED ROADWAYS
CONNECTING FLARE WITH PAVED SHOULDERS TO EXISTING ROADWAY WITHOUT PAVED SHOULDERS

CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING SYMMETRICAL FLARE WITHOUT PAVED SHOULDERS

CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING ASYMMETRICAL FLARE WITHOUT PAVED SHOULDERS

CONNECTING SIMILAR WIDTH PAVEMENTS

CONNECTING DIFFERENT WIDTH PAVEMENTS

FLARED - PAVED SHOULDERS

PAVED SHOULDER TREATMENT AT TRANSITIONS AND CONNECTIONS
NOTES FOR SHEETS 5 THRU 8

1. The transition geometry shown on sheets 5 thru 8 are applicable to tangent alignments and median widths shown. The geometric of these schemes are associated with the standard substandard spacing for side roads, but in any case will require modification to accommodate different road length, utilities and/or divided side roads, oblique side roads, crossover widths, storage and speed change lane requirements, design speeds 50 km/h, and other related features. The walk lines are cut lines where the transitions may be moved back on approach roadway and ahead on departing roadways to accommodate immediate access, storage lanes and other related features.

2. Approach lane departures (Δ-L) are suitable for design speeds up to 80 km/h. Interior curves (R=250.0) are suitable for manual control for design speeds up to 80 km/h. Merging curves (R=350.0) will require super-elevation.
ROADWAY TRANSITIONS

RIGHT ROADWAY CENTERED ON APPROACH ROADWAY

TWO LANE TO FOUR LANE TRANSITION

* This note can be increased in order to make this transition geometry clear. Please refer to sheet 5.
RIGHT ROADWAY CENTERED ON THRU ROADWAY
FOUR LANE TO TWO LANE TRANSITION
CONCRETE
Concrete: 4000 psi Class C
Reinforcing Bars: ASTM A615/A615m, Grade 40, 1.0 in.
Vapor Barrier: Black 6 mil Polythene.

STEEL
Galvanized Steel Plates: ASTM A570
Galvanized Tubular: A653, with zinc coating, ASTM A53.
Generators: Select models, to be equipped with high zinc dust content paint, complying with SDPSP-20.

WOOD
Comply with American Institute of Timber Construction
ATC 69, "Standard for Timber Truss Construction."
For Solid Wood Decking, comply with ATC 40, "Standard for Timber and Engineered Wood and Other Heavy Timber Structural Members."
Species: Douglas Fir, Hem Fir, or Southern Pine, at fabricator's option.
Preservative Treatments: Pressure-treated, preservative-treated members with nonresilient solution for rain, wind and air, complying with AWPA 13.
Wood Decking: Prefabricated decking for brick, concrete, or similar materials, complying with AWPA 12.

PICNIC TABLES
Picnic Tables And Benches: Steel frame, with 1 1/2 in. x 1 1/2 in. channel-shaped pipe frame and regular poles.
Wood Seat And Table Tops: All tables shall be made of 2x4 inch lumber for exterior lumber, tables at accessible level shall be made from the requirements of the American with Disabilities Act/ADA.

PICNIC PAVILIONS
State of Florida Department of Transportation
Pavilion Design

REST AREA EQUIPMENT

SPECIFICATIONS
GENERAL NOTES

1. The location and construction of mailboxes shall conform to the rules and regulations of the United States Postal Service as modified by this design statement.

2. Mailboxes will not be permitted on interstate highways, freeways, or other highways where prohibited by law or regulation.

3. The contractor shall give the Postmaster of the delivery route a written notice of any pilot construction 7 days prior to the beginning of work, Saturdays, Sundays and holidays excluded.

4. Mailboxes shall be metal construction only. In traditional style only, and only in size as prescribed by the Domestic Mail Manual of the U.S. Postal Service (DMM). Mailbox production standards, lists of approved manufacturers and suppliers of mailboxes, design approval and guidance may be obtained by writing to the Rural Delivery Division, Delivery Service Department, Operations Group, USPS Headquarters, Washington, DC 20260.

5. Mailboxes shall be installed on the right-hand side of the roadway in the direction of the delivery route, except on one-way roads and streets where they may be placed on the left-hand side.

6. Mailboxes on rural highways shall be set with the roadside face of the box 4 feet from the traveled way a minimum distance of the greater of the following:
   a. Shoulder width plus 200 to 300 feet.
   b. 5 feet for ADT over 20,000 vpd.
   c. 2.5 feet for ADT 100 to 20,000 vpd.
   d. 1.5 feet for ADT under 100 vpd.

7. When a mailbox is installed within the limits of a guardrail it should be placed behind the guardrail wherever practicable.

8. Mailboxes on curbed highways, roads and streets shall be set with the face of the box between 60 mm and 300 mm back of the face of such curbs. If the sidewalk darts the curb or if an unusual condition exists which makes it difficult or impractical to install or service boxes at the curb, the contractor with the approval of the local postal authority may be permitted to install all mailboxes at the back edge of the sidewalks, where they can be served by the carrier from the sidewalk.

9. Wood and steel supports for both single and double mailbox mountings shall be installed no more than 600 mm into the ground.

10. Concrete, brick, block, stone or other rigid foundation structure or support, either above or below the finished ground line, will not be permitted for mailboxes on rural highways. On urban roads and streets where mailbox support posts are set within rigid pavement back of curb, the support posts shall be separated from the pavement by a minimum of 25 mm expansion material.

11. Support posts shall not be tilted nor installed with surface mount base plates.

12. At driveways entrances mailboxes shall be placed on the far side of the driveway in the direction of the delivery route.

13. At intersecting roads mailboxes shall be placed 30.5 mm or more from the centerline of the intersecting road on the far side in the direction of the delivery route, with the distance increased to 60.0 mm when the route volume exceeds 500 vehicles per day.

14. Wood support posts shall be in conformance with the material and dimensional requirements of Section 902 and the treatment requirements of Section 905 of the Standard Specifications.

15. Street support posts shall have an external finish equal to or better than two coats of weather resistant, oil-based or latex paint or enamel. Surfaces shall be cleaned of all loose scale prior to finishing. The Postmaster prefers that posts be painted white, but other colors may be used when approved by the Engineer. When painted posts are used painting is not required.

16. Mounting brackets, plates, platforms, shelves and necessary hardware and surface finishes are to be subject to support post finish.

17. Mailboxes shall be paid for under the contract unit price for Mailboxes, E.A.

18. Payment shall be full compensation for boxes, parts and accessories items essential for installation in accordance with this standard, excluding adjustments to suit construction needs, and for identification letters and numbers.

19. Payment shall be limited to one mailbox per patron address whether the mailbox is new, replaced, salvaged, reset or relocated. Payment shall be per mailbox regardless of the number of mailboxes per support or grouping arrangement.

20. The above compensation shall include any work and cost incurred by the contractor for removal and disposal of existing mailboxes.

There shall be no payment participation for NODBO furnishing, assembly, installation, resetting or relocation.
REINFORCED CONCRETE
TYPE A

TREATED TIMBER
TYPE B

TRACTOR CROSSINGS

TRACTOR CROSSINGS SHALL BE PAID FOR UNDER THE CONTRACT UNIT PRICE FOR TRACTOR CROSSING TA.
Threaded Or Socket Type Cap

GENERAL NOTES

1. Construction of the top of each length of member shall be demonstrated as soon as it is finished and also immediately before the next length of member pipe is added.

2. Settlement plate locations shall be placed and protected from damage or relocation until piping has been set. If settlement plates are disturbed, they shall be replaced in kind.

3. Observe the information provided and update the length of member pipe, any other information that is necessary.

4. The settlement plates shall be used for the contract unit price for Settlement Plate Assembly Kit.
GENERAL NOTES

1. The purpose of shrubs is to create a natural look of greenery to simulate land maintenance in those areas.

2. Shrubs are to be planted approximately 0.5 m apart from guardrail posts and medians. Arrow plant areas are to have at least one row of shrubs as directed by the Engineer.

3. Shrubs are to be planted approximately 0.5 m on centers in rows with 0.5 m spacing.

4. Shrubs are to be offset 0.5 m on successive rows to create a zigzag pattern between any two rows.

5. Shrubs shall be specified in the plans by landscape architect's order No. 13100.

6. Only one variety of shrubs shall be planted within any given landscape area and no shrub variety shall be massed within a distance of 1.0 m.

7. Where guardrail painting is specified, it shall be done in accordance with existing specifications or shall be in accordance with Section 33B of the Standard Specifications.

8. For use of clear sign limits see Index No. 546.

LANDSCAPING

BACK OF GUARDRAIL APPLICATION

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<th>Item</th>
<th>Quantity</th>
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<tbody>
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<td>Guardrail</td>
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CONTENTS

PREFACE

SYMBOLS

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 manual 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 zone, for construction and maintenance operations and utility work on highways, roads and streets.

Index 600 provides Department policy and standards. Changes are only to be made thru Department approved procedures. Indexes 650 thru 660 provide typical application for various situations. Modification can be made to these indexes as long as the changes comply with the MUTCD and Department standards.

The sign spacings shown on the indexes are typical (recommended) distances. These distances may be increased or decreased based on local conditions, in order to avoid conflicts or to improve site specific traffic control.

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 additions, 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.

ABBREVIATIONS

Abbreviations assigned to the 600 series Roadway Design Standards and applicable to traffic control plans, unless otherwise identified in the plans, are as follows:

TCP Traffic control plan(s)
MUTCD "Manual On Uniform Traffic Control Devices For Streets And Highways"
TCZ Traffic control through work zone
L Taper length, buffer length or taper length plus buffer space
W Width of taper transition in meters, i.e., lateral offset
S Sign Covering And Internment Work Stoppage Sign
RPM Raised reflectorized pavement marker
TMA Truck mounted attenuator
COMM Traffic Control Standards Committee

SYMBOLS

The symbols shown are found in the Traffic Control Zone Cell Library (TCZ Cell) on the CAID system. Symbols assigned to the 600 series Roadway 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)
  - Sign With 450 mm x 450 mm (Min.) Orange Flag And Type B Light
  - Type I Or Type II Barricade Or Vertical Panel Or Drum
  - Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only)
  - Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)
  - Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
  - Cone Or Tubular Marker
  - Type I, Type II Or Type III Barricades Or Vertical Panel Or Drum
  - Type I, Type II Or Type III Barricades Or Vertical Panel Or Drum (With Flashing Light)
  - Type I, Type II Or Type III Barricades Or Vertical Panel Or Drum (With Steady Burning Light)
  - Type III Barricade
  - Type III Barricade (With Flashing Light)
  - Type III Barricade (With Steady Burning Light)
  - Work Zone Sign
  - Flagger
  - Traffic Signal
  - Advance Warning Arrow Panel
  - Portable Signal
  - Crash Cushion
  - Stop Bar
  - Work Vehicle With Flashing Beacon
  - Snow (S) Or Advance Warning (AW) Vehicle
  - Truck Mounted Attenuator (TMA)
  - Orange Flag For TCZ Signs
  - Type B Light For TCZ Signs
DEFINITIONS

Regulatory Speed (in Work Zones)
The maximum permitted travel speed posted for the work zone as indicated by the regulatory speed limit signs. The work zone speed limit shall be shown or noted in the plans.
This speed shall be used as the minimum design speed to determine runway lengths, departure rates, flare rates, lengths of need, clear 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 intended path for vehicular traffic through or around obstructions in construction, maintenance, utility and other work zones on highways, roads and streets. For traffic control through work zones, travel way includes auxiliary lanes, shoulders and any other permanent or temporary surface intended for the path of vehicular traffic.

Detour
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 temporary roadway, usually adjacent to the permanent roadway and within the limits of the right-of-way.

Above Ground Hazard
An above ground hazard is any object, material or equipment 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 100 mm in height and is firm and unmoving or doesn’t meet breakdown requirements.

EXTENDED DISTANCE ADVANCE WARNING SIGNS

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 Advance Warning Signs may be required on any type roadway, but particularly be considered on multi-lane divided highways where vehicle speed is generally in the higher range (45 M.P.H., or more).

REGULATORY SPEEDS IN WORK ZONES

Traffic Control Plans (TCPs) 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 TCP, this includes including 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 shall be established to route vehicles safely through the work zone as close 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 50% in 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 speed signs 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 interposed work activities, speed reductions should be located in proximity to those activities which merit a reduced speed, and not "blanked out" 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 1.6 kilometers in rural areas (non-interstate) and on rural or urban interstate, additional regulatory speed signs are to be placed at no more than 1.6 kilometer intervals. Engineering judgement should be used in placement of the additional signs. Location of 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 minimum of 300.0 meters 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 the FHWA GK-51(6-91). Advisory speed plates will be used in 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 signs for which the advisory speed is required.

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

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 zones other areas within their traffic control zones. Where such restrictions 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:

1. 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 or procedures and coordination of plans on concurrent projects.

2. 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.

3. The District Maintenance Engineer will resolve anticipated and occurring conflicts under the following work zone conditions.

   a. Within scheduled maintenance operations.

   b. Between scheduled maintenance operations, maintenance construction, permitted works and/or in progress highway construction projects.

   c. The Unit Maintenance Engineer will resolve conflicts that occur within routine maintenance works; between routine maintenance work, unplanned work and/or permitted works; and between unit controlled maintenance works and highway construction projects.

INTERSECTING ROAD SIGNING

Signage for the control of traffic entering and leaving work zones by way of intersecting highways, roads and streets shall be adequate to make drivers aware of work zone conditions, under no condition will intersecting road signs be less than a ROAD WORK AHEAD sign, including light and flag, for approaching vehicles and a END ROAD WORK sign for departure vehicles.

SIGNS

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 Engineer. The need for temporary signal loops or other methods of operation shall be determined by the District Traffic Operations Engineer and the designer and included in the TCP.
CHANNELIZING AND LIGHTING DEVICES

Channelizing and lighting devices for work zone traffic control shall be as prescribed in Part II of the MUTCD, subject to supplemental revision and approval by the office of Construction.

Primary work zone traffic control devices are shown on Sheet 8 for the purpose of ready identification. Specifications for the devices are under the authority of the office of Construction. Approved devices are listed on the Department’s Qualified Product List.

DROP-OFFS IN WORK ZONES

Acceptable warning and barrier devices for traffic control at drop-offs in work areas are detailed on Sheet 6. Unless otherwise specified in the plans, the contractor may use any of the barrier types shown in note 3 on sheet 6.

WARNING LIGHTS

Warning lights shall be in accordance with Section 65-5 of the MUTCD except for the application limitations and methods of payment stipulated below.

Flashing

Type A Low Intensity Flashing Warning Lights are to be mounted on bollardes, drums, vertical panels or advance warning signs (except as noted below) and are intended to continuously 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 shall be placed with spacings that will form a continuous line to the driver's eye. The Type A light will be used to mark obstructions that are located adjacent to or in the intended travel way. Type A lights shall not be used in conjunction with the first advance warning sign nor the second such sign when used.

Type B High Intensity Flashing Warning Lights shall be mounted on the first advanced warning sign and on the second and second advanced warning sign where two or more signs are used, this applies to all approaches to any work zone.

Steady-Burn

Type C Steady-Burn Lights are to be mounted on bollardes, drums, concrete barrier walls, or other areas and incorporated in combination with these devices to delineate the travel path on lane closures, lane changes, detour areas and other similar conditions. They 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. They are intended to warn drivers that they are approaching or proceeding through a hazardous area.

SIGHT DISTANCE TO DELINEATION DEVICES

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

CHANNELIZING AND LIGHTING DEVICE CONSISTENCY

Barrioles, vertical panels, cones, tubular markers and drums shall not be interspersed within either the lateral transition or within the median alignment.

FLAGGING OPERATIONS

When operations are such that signs, signals and barrioles do not provide adequate protection and or adjacent to a highway or street, flaggers and/or other appropriate traffic control shall be provided. Flagger shall be located far enough ahead of the work space so that approaching traffic has sufficient distance to stop before entering the work space.

Flag/Slow Paddles are the primary hand-signal devices. Flag is limited to immediate Emergencies, Intersection and when working on centerline or shared left turn lanes where two (2) flaggers are required and there is approaching traffic in the adjacent traffic lanes.

Where flags are used, a FLAGMAN symbol or legend sign must replace the WORKERS symbol or legend sign.

NIGHTTIME FLAGGING

Nighttime flagging will require proper illumination of the Flagger. A well lighted flagging station and/or a reflexed or reflective flag, plus a flashlight, lantern or other lighted signal that will display a red warning light shall be used.

Lights, reflexed or reflective flags, reflective or reflexed vests, shirts or jackets approved by the Department must be used to flag traffic at night. The STOP face of paddles shall be reflexed red with white reflexed letters and border, and the SLOW face shall be reflexed orange with black letters and border. Flagger vests, shirts or jackets shall be reflexed orange.

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 flaggers' reflective garments and the work area background.

REMOVING PAVEMENT MARKINGS

Existing pavement markings that conflict with permanent work zone delineation shall be removed by the method approved by the Engineer, where operations exceed one (1) day per period; however, peeling over existing pavement markings will not be permitted. Full pavement width overlays of either asphalt concrete Type III, or FC-3 is a positive means to achieve obliteration.

SUPERELEVATION

Horizontal curves constructed in conjunction with work zone traffic control should have the required super-elevation applied to the design radius. Under conditions where normal cross slope controls curvature, the minimum radius that can be applied are listed in the table below.

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<tr>
<th>Maximum Speed</th>
<th>Minimum Radius</th>
<th>Super-elevation</th>
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<td>20 mph</td>
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Footnotes when Speed Below 20 mph
END ROAD WORK SIGNS

The END ROAD WORK sign (220-2) should be erected approximately 150 meters beyond the end of a construction or maintenance project, unless other distance called for in the plans. Where other Construction or Maintenance Operations occur within 1.6 kilometers this sign should be omitted and signing coordinated in accordance with Index No. 600, ADJACENCY AND/OR OVERLAPPING WORK ZONE SIGNING.

DETOURS

Detours should be signed clearly over their entire length so that motorists can easily determine how to return to the original roadway. The W-4, W-12, and W-13 warning signs are to be used for the advanced warning for a lane shift. A diversion should be signed as a lane shift.

VARIABLE MESSAGE SIGNS (VMS)

The VMS can be used to:
1. Supplement standard signing in construction/maintenance work zones.
2. Reinforce static advance warning messages.
3. Provide motorists with updated guidance information.

The message should be visible and legible at a minimum distance of 270 meters. All messages should be cycled so that two message cycles are displayed to a driver while approaching the sign from 2700 meters to 55 mph.

VMS should be placed at places, 50.0 to 240.0 meters in advance of the work zone conflicts or 2.4 to 3.2 kilometers in advance of complex traffic control schemes which require new and/or unusual traffic maneuvers.

If VMS 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 FLDOT Roadway Plans Preparation Manual, Chapter 10.

ROADSIDE BARRIERS

When connecting temporary concrete barrier wall to guardrail the connection shall be made in accordance with Index No. 450. All guardrail end anchors to be included in the cast of Temporary Guardrail.

ABOVE GROUND HAZARD

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

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

WORK ZONE SIGN SUPPORTS

All post mounted Work Zone signs shall be installed on either round aluminum or steel channel post as specified in the table below.

<table>
<thead>
<tr>
<th>SUPPORTS FOR MAINTENANCE OF TRAFFIC SIGNS</th>
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<tbody>
<tr>
<td>SIGN SIZE</td>
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<td>1500 x 600</td>
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</tbody>
</table>

* F/M indicates Type F or Type M
** Requires two 1.36 kg/m steel channel (F/M) at 762 mm center to center.

All sign brackets shall be Type I. The total number of brackets shall be per post as tabulated, except the "Diamond" sign which shall use two Type 1 brackets per post.

The 1.36 kg/m steel channel shall be installed with approved breakaway bases. Refer to Design Standard HB60, Sheet 2, for round aluminum sign bracket details, and HB60 Sheet 1 for steel channel breakaway bases, and notes.

CLEAR ZONE WIDTHS

The term "clear zone" describes the unobstructed relatively flat area, impacted by construction, extending outward from the edge of the travel way. The table below gives clear zone widths in work zones for medians and roadside conditions other than for roadside canals where roadside canals are present clear zone widths are to conform with the clear zone widths as specified in Ch. 4, Sec. 4.2, and Exhibit 14-5 of the Plans Preparation Manual.

<table>
<thead>
<tr>
<th>CLEAR ZONE WIDTHS FOR WORK ZONES</th>
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<tbody>
<tr>
<td>WORK ZONE SPEED (M.P.H)</td>
</tr>
<tr>
<td>60-70</td>
</tr>
<tr>
<td>55</td>
</tr>
<tr>
<td>45-50</td>
</tr>
<tr>
<td>70-80</td>
</tr>
<tr>
<td>ALL SPEEDS</td>
</tr>
</tbody>
</table>

SIGN MATERIALS

VMS signs may be used only for Daylight Operations as noted in the standards. Type B Lights and Orange F-lights are not required.

VMS signs may be used for Day or Night Operations not to exceed 12 hours except as noted in the standards. Type B Lights and Orange F-lights are not required.

All signs shall be post mounted if operation exceeds 12 hours except as noted in the standards.
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 Police Chief, Type B Light or dual orange Flags shall be used at all times to enhance the SURVEY CREW AHEAD sign, even with flash signs.

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 Police Chief to fit roadway and traffic conditions when the Work Zone includes intersections.

( A ) A TRACK IN YOUR LANE ( M0-J-1 ) 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 Police Chief to protect prism holder and flagger’s. Cones, if used, may be placed at up to 15 feet intervals along the shoulder 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 feet intervals for at least 60 meters in both directions 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 15 feet intervals for at least 60 meters in both directions towards the Flow of traffic.

PEDESTRIANS AND BICYCLIST

When an existing pedestrian way or bicycle way is located within a traffic control work zone, accommodation must be maintained.

RAILROADS

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

SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING

Existing signs that conflict with temporary work zone signage shall be removed or covered as approved by the engineer. Traffic control signs that require covers when no work is being performed in the work area shall be fully covered with a durable opaque sheet material.

Plastic film and woven fabrics including tarps will not be permitted. Covering of only the legend or symbol will not be permitted. Reflective coverings will not be permitted.

Hinged signs designed to cover when folded and sign blanks will be permitted. Covers, blanks, hinged panels and intermittent work stoppage shields and plaques are incidental to work operation signs and are not to be paid separately.

LANE WIDTHS

Lane widths of through roadways should be maintained through work zone travel with no more than 2 or 3 feet. The minimum widths for work zone travel lanes shall be as follows: 3.5 meters for interstate with at least one 3.6 meter lane provided in each direction, unless formally accepted by the Federal Highway Administration 3.3 meters for freeways and 3.0 meters for all other facilities.

LENGTH OF ROAD WORK SIGN

The length of road work sign ( G0-1 ) bearing the legend ROAD WORK NEXT ... MILES is required for all projects of more than 3.2 kilometers in length. The number of miles entered should be rounded up to the nearest mile. The sign shall be located at or near construction points.

MANHOLES

Manholes left extending 25 feet or more above the traveled way shall have a temporary asphalt apron constructed around it to minimize driver discomfort. The apron should have a slope of 1:50 or flatter (see diagram below). The apron is to be removed prior to constructing the new lift of asphalt. The cost of the temporary asphalt shall be included in 2002-1, Lump Sum Maintenance of Traffic.

Manhole cover or other above ground obstruction

Asphalt Apron

Temporary Surface

TRUCK MOUNTED ATTENUATORS

Truck mounted attenuators (TMA) can be used for moving operations and short-term stationary operations. For moving operations, see Index No. 627. For short-term stationary operations, see Part VI of the MUTCD.

SPEEDING FINES DOUBLED SIGN

The SPEEDING FINES DOUBLED sign should be installed on all projects. The placement should be ISO i beyond the ROAD WORK AHEAD sign or midway to the next sign whenever less. Speed reductions which do not occur within 3.2 km of the ROAD WORK AHEAD sign should have an additional SPEEDING FINES DOUBLED sign located approximately 350 m in advance of the speed reduction sign.
DROPOFF CONDITION

1. A dropoff is defined as a drop in elevation, parallel to the adjacent travel lanes, greater than 15 cm with slopes (A/B) steeper than 1:3. When dropoffs occur within the clear zone during construction or maintenance activities, protection devices will be required, see chart.

2. Distance X is to be the maximum practical under project conditions.

3. Distance from the travel lane to the barrier or warning device should be maximum practical for project conditions.

4. Any dropoff 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.

5. When permanent curb heights are ≥ 150mm, no warning device will be required. For curb heights < 150mm, see chart.

DROPOFF PROTECTION REQUIREMENTS ALL SPEEDS NO CURB AND GUTTER

<table>
<thead>
<tr>
<th>X (m)</th>
<th>D (m)</th>
<th>Device Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.75</td>
<td>1.75</td>
<td>Warning Device</td>
</tr>
<tr>
<td>0.30</td>
<td>1.50</td>
<td>Shoulder Barriers</td>
</tr>
<tr>
<td>0.25</td>
<td>1.00</td>
<td>Shoulder Barriers</td>
</tr>
<tr>
<td>0.30</td>
<td>1.50</td>
<td>Shoulder Barriers</td>
</tr>
</tbody>
</table>

For Clear Zone widths, see Index No. 600 sheet 1.

NOTES

1. The contractor may use shoulder treatment in lieu of barriers. Warning devices are required.

2. Daily inspections shall be conducted to ensure no erosion, excessive slopes, rutting, or other adverse conditions exist. Any deficiencies shall be repaired immediately.

3. Compensation for the placement and removal of the barrier/lid required for the shoulder treatment shall be included in the cost for Maintenance Of Traffic (MOT). Use of shoulder treatment in lieu of a barrier is not eligible for VECP consideration.

SHOULDER TREATMENT

1. This treatment applies to surfacing or milling operations between adjacent travel lanes.

2. Whenever there is a difference in elevation between adjacent travel lanes, the WB-9A sign with "UNEVEN PAVEMENT" plaque is required at intervals of 0.8 m maximum.

3. If D is less than 40 cm, no treatment is required.

4. Treatment allowed only when D is 75 cm or less.

5. If the slope is steeper than 1:4 but not to be steeper than 1:1.5, the "A" and "D" signs shall be used as a supplement to the WB-9A; this condition should never exceed 0.5 km (0.3 miles) in length.

TRAVEL LANE TREATMENT FOR MILLING OR RESURFACING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES

GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

6 of 6

DROPOFFS IN WORK ZONES
**TEMPORARY CURB**

1. Application: Temporary curb shall not be used on facilities with posted speed greater than 45 km/hr (28 mph) or driveway greater than 2.5 meters (8 ft) that are not used for intersection or limited access facilities.

2. Edges shall be provided in accordance with the following specifications, including reflective beads. The top of the curb shall be placed flush with or slightly below the road surface and then painted or yellow spray applied to the edge of the curb if on the right side of the street, and orange when the curb is on the left side of the street.

3. The temporary edge shall be placed to the edge of the roadway to prevent vehicles from entering or leaving.

4. Where temporary edges are not feasible, the editor may select an alternative plan for the construction temporary edge of apron, curb and other Department approved materials.

5. The temporary edge shall be used to construct temporary curb as soon as the edge of the roadway can be constructed and a curb shall be installed in or near the curbs of GCR-100 meters (32 ft) for temporary edges.

6. The temporary edge shall be utilized in the construction of temporary curb, if driveway or other areas are not sufficient to allow temporary curb, designated edges may be used to provide temporary curb, if necessary.

7. At openings such as driveways and bus stops, the temporary edge should be placed at least 100 meters (32 ft) from the edge of the curb to avoid the potential hazard of the end points.

8. Temporary edges shall be used for under the contract unit for temporary curb, and the Editor shall determine the proposed curb opening of temporary edges, number of times, etc. Temporary curb openings shall be placed in the curb of GCR-100 meters (32 ft) for temporary edges, and the Editor shall be responsible for any damage to existing pavement caused by the removal of temporary curb and the Editor shall be responsible for the cost of such repairs and the Editor shall be responsible for the cost of temporary curb.
CONES
TUBULAR MARKER
PLASTIC DRUMS
VERTICAL PANEL
TYPE I BARRICADE
TYPE II BARRICADE
TYPE III BARRICADE

CHANNELIZING AND LIGHTING DEVICES

1. Only approved traffic control devices may be used.

2. The GDOT approval number shall be engraved on the device in a visible and readily visible location. Where engraving is not practical, a water-resistant type label may be used.

3. The details shown on this sheet are for the following purposed: (a) To ease of identification and (b) To provide information that supplements or supersedes that provided by the MUTCD.

4. The Type III Barricade shall have a unit length of 1.8 meters only. When barricades of greater lengths are required those lengths shall be in multiples of the 1.8 meter unit. Signs used in conjunction with Type III Barricades shall be mounted on or above the Barricade as specified in the MUTCD.

5. During hours of darkness, warning lights shall be used on drums, vertical panels, Type I, Type II or Type III barricades.

6. Bollards shall not be placed on top rolls or any striped rolls or higher than 325 millimeters above the driving surface.

7. For rolls less than 900 millimeters long, 100 millimeter stripes shall be used.

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

9. When used at night, cones shall:
   a. Be used only in active work zones, such as milling and resurfacing or other moving operations where cones can be monitored.
   b. Be reflectorized as per the MUTCD.
   c. Be used only with Department approved reflective collars.

10. The splicing of sheathing is not permitted on either channelizing devices or MUT signs.
TRANSITIONS FOR TEMPORARY CONCRETE BARRIER WALL ON FREEWAY FACILITIES

TRANSPORTATION NOTES
1. Barrier wall within the transition area will have reflective markers installed at the transition of the wall, 250 millimeters below the top line at the center.
2. Arrows denote direction of travel only and do not reflect pavement markings.
3. For lighting information see the Plan Specifications, WSDOT and other TCE Standards.

RURAL DIVIDED - TWO OR MORE LANES EACH WAY
LANE DROP - PLAN SHOWN FOR RIGHT LANE MERGE LEFT - INVERTED PLAN FOR LEFT LANE MERGE RIGHT

Type 1 For Type K Barrels (or Vertical Poles on Drums) / FHWA Model Terminal With Stepped Burying Lights At Night Only

L-WSU6 For Speeds ≤ 70 mph, WSU6 For Speeds > 70 mph

L-WSU6 For Speeds ≤ 50 mph, WSU6 For Speeds > 50 mph

Type 1 For Type K Barrels (or Vertical Poles on Drums) / FHWA Model Terminal With Stepped Burying Lights At Night Only

L-WSU6 For Speeds ≤ 70 mph, WSU6 For Speeds > 70 mph

L-WSU6 For Speeds ≤ 50 mph, WSU6 For Speeds > 50 mph

RURAL DIVIDED - TWO OR MORE LANES ONE WAY
LANE DROP AND LANE SHIFTS - PLAN SHOWN FOR RIGHT LANE MERGE LEFT - INVERTED PLAN FOR LEFT LANE MERGE RIGHT

Type 1 For Type K Barrels (or Vertical Poles on Drums) / FHWA Model Terminal With Stepped Burying Lights At Night Only

L-WSU6 For Speeds ≤ 70 mph, WSU6 For Speeds > 70 mph

L-WSU6 For Speeds ≤ 50 mph, WSU6 For Speeds > 50 mph

RURAL DIVIDED OR UNDIVIDED - TWO OR MORE LANES EACH WAY
LANE DROP - PLAN SHOWN FOR RIGHT LANE MERGE LEFT - INVERTED PLAN FOR LEFT LANE MERGE RIGHT

Type 1 For Type K Barrels (or Vertical Poles on Drums) / FHWA Model Terminal With Stepped Burying Lights At Night Only

L-WSU6 For Speeds ≤ 70 mph, WSU6 For Speeds > 70 mph

L-WSU6 For Speeds ≤ 50 mph, WSU6 For Speeds > 50 mph

Note: The diagram includes various regulatory and safety measures for traffic control during work zones, such as temporary concrete barrier walls, reflective markers, and lane shifts.
CLASS
A Permanent Applications in Non-Traffic Areas or Can Be Used in Work Zone Applications For Traffic and Non-Traffic Areas.
B Permanent Application In Traffic And Non-Traffic Areas Or Can Be Used In Work Zone Applications For Traffic And Non-Traffic Areas.
D Work Zone Application Only, For Traffic And Non-Traffic Areas.
E Temporary Work Zone Application Only, Not Exceeding Five (5) Continuous Days, For Traffic And Non-Traffic Areas.

NOTES
1. RPMS shall be installed as a supplement to all lane lines and the edge lines of of gore areas during construction. Placement should be as shown on Exhibit 13.
2. In work zones, CLASS A, B, or D RPMS may be used to form lane lines, edge lines and temporary gore areas. In lieu of or paint or yellow However, red or green must be used in all transition areas. In addition to RPMS, see Item 32C.33.1 days shall be considered a transition area and shall be marked with Class A or B RPMS.
3. Basic colors: White reflectors supplement white lines and amber reflectors supplement yellow lines.
4. To provide contrast on concrete pavement, and light asphalt, the five (5) red/yellow RPMS shall be followed by five black RPMS. The spacing between RPMS shall be 0.75 meters. Black RPMS will not be required for contrast with amber RPMS.
5. It shall be the contractors responsibility to replace damaged or missing RPMS.
6. RPMS used to supplement lane lines are to be paid for as Pavement Markers Reflective. Temporary, e.g., RPMS used to form of temporary lane or paint one to be paid for as Pavement Marking Removable, etc.

USE OF RPMS TO SUPPLEMENT PAINT OR TAPE

REFLECTIVE PAVEMENT MARKERS
GENERAL NOTES

1. If the work operation requires that two or more work vehicles cross the 4.5 m zone in any one hour, traffic control will be in accordance with Index No. 660.

2. No special signing is required.

3. Arrows denote direction of traffic only and do not reflect pavement markings.

4. When a side road intersects the highway on which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.

5. For general TCZ requirements and additional information refer to Index No. 660.

TYPICAL APPLICATIONS

Landscaping Work
Utility Work
Fencing Work
Cleaning Drainage Structures
Reworking Ditches

CONDITIONS

Where any vehicle, equipment, workers and their activities are more than 4.5 m from the edge of pavement.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TWO-LANE, TWO-WAY - RURAL
DAY OR NIGHT OPERATIONS

601
Maximum spacing between cones and tubular markers shall be 7.5 m. Maximum spacing between Type I or Type II Barricades or vertical panels or drums shall be based on the speed limit as follows: 5.0 m up to 25 MPH, 10.0 m for 30 MPH - 40 MPH, 15.0 m for 45 MPH and greater.

**General Notes**

1. All vehicles, equipment, workers (except flaggers) and their activities are restricted to all lanes to one side of the roadway.
2. If the work operation does not exceed 60 minutes, traffic control will be in accordance with index No. 602.
3. If the work operation encroaches on the through traffic lanes or when four or more work vehicles enter the through traffic lane in a one-hour period a flagger shall be provided and the advanced FLASHER sign shall be substituted for the WORKERS sign. For location of flaggers and FLASHER sign see Index No. 603.
4. The first two warning signs shall have a 450 mm x 450 mm (18 in.) orange flag and a Type B light attached and operating at all times. Warning signs may be used for (1) daylight only operations and (2) daylight only operations Type B lights and Orange Flags are not required.
5. The WORKERS legend sign may be substituted for the symbol sign.
6. All signs shall be post mounted if the closure time exceeds 12 hours.
7. G = 1.0 mph for speeds ≤ 60 mph
   - 0.35 for speeds ≤ 60 mph
   - 0.5 for speeds > 60 mph

- Arrrows denote direction of traffic only and do not reflect pavement markings.
- Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
- WORKERS sign to be removed or fully covered when no work is being performed.
- END CONSTRUCTION sign required only when work exceeds one daylight period.
- When a side road intersects the highway on which work is being performed additional traffic control sections shall be erected in accordance with other applicable TSC Indexes.
- For general TSC requirements and additional information refer to Index No. 600.

**Symbols**

- Work Area
- Sign with 450 mm x 450 mm (18 in.) Orange Flag and Type B Light
- Type I or Type II Barricade or Vertical Panel or Drum (With Steady Burning Light at Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used - See Index No. 602).
- Work Zone Sign

**Typical Applications**

- Utility Work
- Culvert Extensions
- Side Slope Work
- Guardrail Work
- Landscaping Work
- Cleaning Drainage Structures
- Re-Opening Ditches
- Sign Installation And Maintenance
- Shoulder Repair

**Conditions**

- Where any Vehicle, Equipment, Workers or their Activities Encompass The Area Closer Than 4.5 m But Not Closer Than 0.6 m To The Edge of Pavement

**State of Florida Department of Transportation**

**TWO-LANE, TWO-WAY • RURAL DAY OR NIGHT OPERATIONS**
Symbols:
- Work Area
- Orange Flag and Type B Light
- Type I, II, or III Barricade or Vertical Panel or Drum
- Type I or II Barricade or Vertical Panel or Cone or Tubular Marker or Drum
- Work Zone Sign
- Flagger

General Notes:
1. Work operations shall be confined to one traffic lane, unless the opposite lane is not a traffic lane.
2. All vehicles, equipment, workers (except flaggers), and their activities are restricted to all lanes to one side of the pavement.
3. If the work operation does not exceed 60 minutes, traffic control will be in accordance with Index No. 607.
4. Additional one-way control may be applied by the following means: (1) flagged vehicle; (2) divided vehicle; (3) pilot vehicles; (4) traffic signals.
   When flaggers are the sole means of one-way control, the flaggers shall be in sight of each other or in direct communication at all times.
5. The first two warnings signs shall have a 450 mm x 450 mm (18 in.) orange flag and a Type B light attached and operating at all times.
   Mesh signs may be used for day/night only operations. Type B lights and orange flags are not required.
6. The FLAPER sign legend may be substituted for the symbol sign.

Typical Applications:
- Pavement Resurfacing
- Pavement Repair
- Utility Work
- Bridge Repair
- Guardrail Work

Conditions:
Where any vehicle, equipment, workers or their activities encroach the area between the centerline and a line 0.6 m outside the edge of pavement.

State of Florida Department of Transportation

Two Lane, Two Way Rural Operations ONE DAYLIGHT PERIOD OR LESS

T.D. 107

Scale:
1/2" = 1'-0"
Maximum Spacing Between Cones And Tubular Workers Shall Be 7.5 m.
Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows:
5.0 m Up To 25 MPH; 10.0 m For 30 MPH - 40 MPH;
15.0 m For 45 MPH And Greater.

SYMBOLS

Work Area

Sign With 450 mm x 450 mm (Min.) Orange Flag And Type B Light

Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only.) (Tubular Markers May Be Used During Daylight Only. Cones May Be Used - See Index No. 21)

Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum (With Flashing Light)

Work Zone Sign

Flagger

GENERAL NOTES

1. Construction operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.
2. All vehicles, equipment, workers, except flaggers and their activities are restricted to one side of the roadway.
3. Additional one-way control may be effected by the following means:
   1. Sign-operating vehicle.
   2. Signal vehicle.
   3. Temporary traffic signals.
4. When flaggers are the only means of one-way control, the flaggers shall be in sight of each other or in direct communication of all times.
5. The flagger legend sign may be substituted for the symbol sign.
6. All signs shall be post-mounted if the closure time exceeds 12 hours.

7. L (min) = 5.0 For speeds of 70 km/h
   = 7.5 For speeds of 60 km/h
   = 10.0 For speeds of 50 km/h
   = 15.0 For speeds of 40 km/h

   Where:
   B = Width of lateral transition to meters,
   S = Planned speed limit (converted to km/h).

8. The ONE LANE ROAD signs are to be fully covered and the flagger signs either removed or fully covered when no work is being performed and the highway is open to two-way traffic.
9. Arrows denote direction of traffic only and do not reflect pavement markings.
10. Lengths and dimensions are to be adjusted to fit field conditions. See Index No. 600.
11. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TC2 indexes.
12. For general TC2 requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Pavement Repair
Culvert Construction
Utility Work
Bridge Repair

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT WORKS ON THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINE AND A LINE 0.6 m OUTSIDE THE EDGE OF PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TWO-LANE, TWO-WAY, RURAL NIGHT OPERATIONS OR OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD

[Diagram showing traffic control signs and symbols]
Maximum Spacing Between Cones And Tubular Workers Shall Be 7.5 m.
Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows:
5.0 m Up To 25 MPH; 10.0 m For 30 MPH - 40 MPH; 15.0 m For 45 MPH And Greater.

CONSTRUCTION SITE

1. All vehicles, equipment, workers (except flaggers), and their activities are restricted at all times to one side of the roadway.
2. If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.
3. If the work operation encroaches on the through traffic lanes or when four or more work vehicles enter the work zone, the following traffic control devices shall be provided:
   a. Worker sign
   b. Orange flagger
   c. Flagger and Flagger signs
4. The first two warning signs shall be a 450 mm x 450 mm (18 in. x 18 in.) orange flag and a Type B Light attached and operating at all times.
5. The Workers' name and sign may be added for the entire work zone.
6. Where work activities within 0.6 meters of the edge of pavement are incidental (i.e., Mowing, Litter Removal) the engineer may delete requirements for cones and signs provided a vehicle with flashing warning lights is present.

GENERAL NOTES

TYPICAL APPLICATIONS

Shoulder And Slope Work
Utility Work
Guardrail Work
Landscape Work
Delineator Installation And Maintenance
Mowing
Litter Removal

CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERRUPTED OR CONTINUOUS MOVING OPERATIONS ON THE SHOULDER OR SHOULDER AND SLOPES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TWO LANE, TWO WAY ▪ RURAL
MOVING OPERATIONS - DAYLIGHT ONLY

1 of 1

605
GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers), and their activities are restricted at all times to one side of the work area.

2. Minimum length of work area is 60.0 meters. Maximum length is to be determined by the Engineer, but in no case shall exceed the length of one-half (1/2) days operation or 3.2 kilometers whichever is less.

3. If the work operation does not exceed 60 minutes, traffic control will be in accordance with Index No. 877.

4. Additional one-way control may be effected by the following means:
   (1) Flag carrying vehicle
   (2) Official vehicle
   (3) Pilot vehicles
   (4) Traffic signals

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

6. The FLASHER warning light may be substituted for the flag sign.

7. The ONE LANE ROAD AHEAD and FLASHER signs are to be removed or fully covered when no work is being performed on the highway or is open to two-way traffic.

8. Arrows denote direction of traffic only and do not reflect pavement markings.

9. Longitudinal dimensions are to be adjusted to fit field conditions, see Index No. 600.

10. When a side road intersects the highway on which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TC2 Indexes.

TYPICAL APPLICATIONS

- Pavement Repair
- Pavement Surfacing
- Utility Work
- Delimiter Maintenance
- Crack Sealing
- Core Boring

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERRUPTED OR CONTINUOUS WORKING OPERATION ON THE SURFACE WHERE THE AVERAGE SPEED OF MOVEMENT IS LESS THAN 6.4 KILOMETERS PER HOUR
CONDITIONS
FOR ANY OPERATION THAT ENCOMPASSES IN THE AREA BETWEEN THE CENTERLINE AND A LINE 0.6 m OUTSIDE THE EDGE OF THE PAVEMENT FOR A PERIOD IN EXCESS OF 15 MINUTES BUT LESS THAN 60 MINUTES.

CONDITIONS
FOR ANY OPERATION THAT ENCOMPASSES IN THE AREA BETWEEN THE CENTERLINE AND A LINE 0.6 m OUTSIDE THE EDGE OF THE PAVEMENT FOR A PERIOD OF LESS THAN 60 MINUTES.

CONDITIONS
FOR ANY OPERATION THAT IS 0.6 m OR MORE OUTSIDE THE EDGE OF THE PAVEMENT FOR A PERIOD OF LESS THAN 60 MINUTES.

GENERAL NOTES
1. The maximum length of work area to be determined by the Engineer, but in no case to exceed the length of one-half (1/2) days operation or 3.2 kilometers whichever is less.
2. All vehicles, equipment and workers (except flagger) and their activities are restricted at times to one side of the pavement.
3. Additional one-way control may be affected by the following means:
   1) Flag-carrying vehicle
   2) Official vehicle
   3) Pilot vehicle
   4) Traffic signals
5. The FLASHER legend sign may be substituted for the symbol sign.
6. Arrows denote direction of traffic only and do not reflect pavement markings.
7. Longitudinal dimensions are to be adjusted to fit field conditions. See index No. 600.
8. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCI materials.
9. For general TCI requirements and additional information refer to index No. 600.

TYPICAL APPLICATIONS
Marking Patches
Field Patches
String Line
Utility Work
Cleaning Up Debris Or Pavement
Pavement Curing And Straight Edging
**GENERAL NOTES**

1. Work operations shall be confined to one traffic lane, except for
   (B) guard rail crossings, when the opposite lane is open to traffic.

2. All vehicles, equipment, workers (except flaggers) and their
   activities are restricted to areas to one side of the pavement,
   except for guard rail crossings.

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

4. Faggers to supplement the signal operation/flagger shall be
   used when needed to assure safe movement between traffic
   and operating equipment, as determined by the Engineer.

5. The first two warning signs shall have a 450 mm x 450 mm (Min)
   orange flag and a Type B light attached and operating at all times.

6. When needed, an additional warning sign may be installed in
   absence of the Portable WORK AHEAD sign. The distance
   between successive signs shall be 150.0 meters.

7. The SIGNAL AHEAD warning sign may be substituted for the
   signal sign.

8. All signs shall be post mounted if the closure time exceeds
   12 hours.

9. 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 legal road access when the haul road
   is not in operation and a flagger/flagger operator is not on duty,
   except when the haul road is on existing property marked road.

10. Arrows denote direction of traffic only and do not reflect
     pavement markings.

11. Length/directional dimensions are to be adjusted to fit field
     conditions. See index No. 600.

12. When a pile cap intersects the highway on which work is
     being performed additional traffic control devices shall be
     erected in accordance with other applicable TCC Indexes.

13. For general TCC requirements and additional information
     refer to index No. 600.

14. Span wire signals are to be used only in active work zones,
     where the contractor can monitor signal operation and
     maintain traffic with flaggers in the event of a power failure.
SINGLE LANE CLOSURE • ROADWAY AND BRIDGES ALL LENGTHS

SINGLE LANE CLOSURE • SHORT BRIDGES
MOMENTARY ROADWAY CLOSURE • HAUL ROUTE CROSSING
GENERAL NOTES

1. The first two warning signs shall be at an 450 mm x 450 mm (Min.) orange flag and a Type B light attached and operating at all times.
2. For speed sign applications see index No. 620.
3. Where the tangent distance IT exceeds 900 meters, spacing between signs or higher markers may be increased to 300 meters or spacing between Type I or Type II barriers, or vertical panels or drums, may be increased to 300 meters within limits of the speed limit or post mounted reflectorized of 300 meters centerline or edge lines.
4. On the existing pavement marking within the realignment which conflict with the revised traffic pattern are to be removed and replace pavement markings using for speed a new centerline and edge lines.
5. Where the tangent distance IT exceeds 900 meters and no passing or stopping sight distance restrictions exist, the yellow reflectorized markings used to indicate the centerline of the traveled way may be replaced with yellow reflectorized markings in a broken pattern. For reduced pavement marker application see index No. 600 and index No. 1350.
6. Arrows denote direction of traffic only and do not reflect pavement markings.
7. longitudinal dimensions are to be adjusted to fit field conditions. See index No. 600.
8. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCE Indexes.
9. If temporary structures are required on the detour traffic control will be in conformance with index No. 620.
10. For general TCE requirements and additional information refer to indexes N300 and 1350.

SYMBOLS

- Work Area
- Sign With 450 mm x 450 mm (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricades Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)
- Type III Barricade (With Flashing Light)
- Work Zone Sign

TYPICAL APPLICATIONS

Bridge Construction
Subgrade Restoration
Culvert Repair Or Construction

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF BOTH LANES AND A TEMPORARY DETOUR IS CONSTRUCTED
GENERAL NOTES
1. If the work operation requires that two or more work vehicles cross the 4.5 m zone in any one hour, traffic control will be in accordance with Index No. 660.
2. No special signing is required.
3. This index also applies when work is being performed on a multilane undivided highway.
4. This index also applies to work performed in the median more than 4.5 m from edge of travel way, both roadways.
5. Arrows denote direction of traffic only and do not reflect pavement markings.
6. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCC Indexes.
7. For general TCC requirements and additional information refer to Index No. 660.

TYPICAL APPLICATIONS
Landscaping Work
Utility Work
Fencing Work
Cleaning Drainage Structures
Rerouting Ditches

CONDITIONS
WHERE ALL VEHICLES, EQUIPMENT,
WORKERS AND THEIR ACTIVITIES
ARE MORE THAN 4.5 m FROM THE
EDGE OF PAVEMENT
CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 4.5 m BUT NOT CLOSER THAN 0.6 m TO THE EDGE OF PAVEMENT FOR A PERIOD OF LESS THAN 60 MINUTES

GENERAL NOTES

1. All vehicles, equipment, workers, and their activities are restricted to times to one side of the roadway.
2. If the work operation encroaches on the through traffic lanes or where it or where work vehicles enter the through traffic lanes in a one-hour period a trigger shall be provided and a FLASHER sign shall be substituted for the WORKERS sign. The trigger shall be positioned at the point of vehicle entry or departure from the work area.
3. This TCC sign also applies to work performed in the median more than 0.6 meters out from the edge of either pavement.
4. The first two warning signs, each side, shall have a 450 mm x 450 mm area. One orange flag and a Type B light attached and operating at all times.
5. Mesh signs may be used for (Daylight Only) operations Type B lights and orange flags are not required.
6. The WORKERS hazard sign may be substituted for the symbol sign.
7. Arrows denote direction of traffic only and do not reflect pavement markings.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. When work is being performed on a multilane undivided roadway the signs normally required in the median lane shown shall be omitted.
10. WORKERS signs to be removed or fully covered when no work is being performed.
11. END ROAD WORK signs required only when work exceeds one stoplight period.
12. When a side road intersects the highway on which work is being performed additional traffic control devices shall be installed in accordance with other applicable TCC indexes.
13. If the work operation does not exceed 15 minutes, signs, barricades, warning panels, cones, tubular markers, or lights shall not be required; provided vehicles in the work area have warning lights operating.
14. For general TCC requirements and additional information refer to Index No. 600.

SYMBOLS

WORK AREA
-- Work Area
\ -- Sign With 450 mm x 450 mm (Min.) Orange Flag And Type B Light
\ -- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
\ -- Cone May Be Used (See Index 600)
6.5 -- Work Zone Sign

CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 4.5 m BUT NOT CLOSER THAN 0.6 m TO THE EDGE OF PAVEMENT FOR A PERIOD OF 60 MINUTES OR GREATER

TYPICAL APPLICATIONS
Utility Work
Culvert Extensions
Side Slope Work
Guardrail Work
Landscape Work
Cleaning Drainage Structures
Recovering Drives
Sign Installation And Maintenance
Shoulder Repair

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
HIGHWAY ENGINEERING MANUAL

MULTILANE DIVIDED OR UNDIVIDED RURAL, DAY OR NIGHT OPERATIONS

TRAFFIC CONTROL PLANS - WORK ZONES

PLANNING HOURS - EXTENDED HOURS

SIGNAGE CONTROL OF TRAFFIC - MOTORWAY OPERATIONS

DATE: 8/2000

APPENDIX A
Maximum spacing between cones and tubular markers shall be 7.5 m. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 5 m up to 25 MPH, 50 m for 30 MPH - 40 MPH, and 75 m for 45 MPH and greater.

**SYMBOLS**
- Work Area
- Sign With 450 mm x 450 mm (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light) A Night Only L (Tubular Markers May Be Used During Daylight Only. Cones May Be Used See Index 600)
- Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum (With Flashing Light)
- Work Zone Sign
- Advance Warning Arrow Panel

**GENERAL NOTES**
1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
2. All vehicles, equipment, workers, and their activities are restricted to all lanes on the side of the pavement.
3. The first two warning signs, each side, shall be type B 450 mm x 450 mm (Min.), an orange flag and a type B light attached and operating at all times.
4. All signs shall be post-mounted if the closure time exceeds 12 hours.
5. On undivided highways the median signs as shown are to be omitted.
6. When work is performed in the median lane on divided highways the barricading plan is inverted and left lane closed and cone reduction signs substitute for the right lane closed and lane reduction signs.
7. The same applies to undivided highways with the following exceptions: I a) work shall be confined to one median lane; b) additional barricades, cones, or drums shall be placed along the centerline across the fronting end of the work area.
8. L (Min.) Length of taper in meters:
   - For speeds ≤ 70 km/h
   - For speeds ≤ 60 km/h
9. Arrows denote direction of traffic only and do not reflect pavement markings.
10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
11. When work is being performed on a divided roadway, the signs normally mounted in the median (as shown) shall be omitted.
12. When a side road intersects the highway over which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
13. For general TCZ requirements and additional information refer to Index No. 600.

**TYPICAL APPLICATIONS**
- Pavement Resurfacing
- Pavement Repair
- Utility Work
- Bridge Repair
- Guardrail Work

**CONDITIONS**
Where any vehicle, equipment, workers or their activities encroach on the lane adjacent to either shoulder and the area 0.6 m outside the edge of pavement
EVEN PAVEMENT

INTERMITTENT WORK STOPPAGE • RIGHT LANE REOPENED TO TRAFFIC • DAYTIME OR NIGHTIME
**DETAIL OF TEMPORARY ASPHALT TRAFFIC SEPARATOR**

**SYMBOLS**

- Work Area
- Sign With 450 mm x 450 mm (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel

**GENERAL NOTES**

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.
2. The first two warning signs, each shall have a 450 mm x 450 mm orange flag and a Type B light attached and operating at all times.
3. All signs shall be posted reassembled.
4. Two Way Traffic sign shall be replaced every four months (10.4 km) in each direction, throughout the tangent distance (T).
5. L = 1,500 ft. for speeds > 70 km/h
   
   \[ L = \frac{150}{v^2} \text{ for speeds} \leq 60 \text{ km/h} \]

   Where:
   
   - \( L \) = Length of lateral transition in meters
   - \( v \) = Speed of vehicle (km/h) converted to km/h

6. Where the tangent distance (T) exceeds 75.0 meters, spacing between Type I or II barricades or vertical panels or drums may be increased to 30.0 meters within the limits of the tangent, or post mounted deflectors at 15.0 meter centers may be substituted for barricades, vertical panels or drums.

**APPLICATIONS**

- Scheme 1: Restricted Construction Limits
- Scheme 2: Unrestricted Construction Limits And Light To Moderate Traffic
- Scheme 3: Unrestricted Construction Limits And Heavy Traffic

**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 CROSSES.
Type I or Type II Barricades Or Vertical Panels Or Drums At 15.0 m Centers

Required Only When Construction Zone Speed Reduced Below Existing Panel Speed Prior To Construction

Note: See Sheet 2 for Scheme Applications.
GENERAL NOTES

SYMBOLS

Work Area

- Sign With 450 mm x 450 mm (Min.)
- Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel
- Or Drum (With Steady Burning Light At Night Only)
- Type III Barricade (With Flashing Light)
- Advance Warning Arrow Panel

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the pavement.

2. The first two warning signs shall have a 450 mm x 450 mm (Min.) orange flag and a Type B light attached and operating at all times.

3. All signs, except those required in saved areas, shall be placed mounted if the closure time exceeds 12 hours.

4. Two-way TRAFFIC signs shall be repeated every four meters (13.1 ft) or 0.1 km (0.06 miles), as is more efficient, through the longest distance (T.I.)

5. L (meters) = 4S for speeds 70 km/hr
   L (feet) = 4S for speeds 40 km/hr
   Where:
   L = length of lateral transition in meters
   S = posted speed (km/h converted to km/hr)

6. Where the longest distance (T.I) exceeds 15.0 meters, spacing between cones or advisory markers may be increased to 15.0 meters or spending between Type I or Type II Barricades or vertical panel. The spacing may be increased to 30.3 meters within the limits of the tangent.

7. 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.

8. Arrows denote direction of traffic only and do not reflect pavement markings.

9. Longitudinal alignment are to be adjusted so that field conditions. See Index No. 600.

10. When a side road intersects the highway on which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TCEZ guidelines.

11. For general TCEZ requirements and additional information refer to Index No. 600.

CONDITIONS

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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TROTT LEWIS ENGINEERS

MULTILANE UNDIVIDED ROADWAY

TWO LANE ROADWAY

DOWNTOWN DAY OR NIGHT OPERATIONS

TWO LANE ROADWAY

DOWNTOWN DAY OR NIGHT OPERATIONS
### TYPICAL APPLICATIONS

Pavement Resurfacing
Pavement Repair

### 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**
- **Advance Warning Arrow Panel**
- **Cone Or Tubular marker (Except At Night Use Vertical Panels)**

- **Road Work Bell**
- **Cone Or Tubular Markers At 7.5 Meter Centers For First 75.0 Meters Thereafter At 15.0 Meter Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 15.0 Meter Centers For First 75.0 Meters Thereafter At 30.0 Meter Centers.**

### CONDITION NOTES

1. See General Notes, Sheet 1 of 2.
2. Markers spacing between devices (m) to be equal to the speed limit (mph) but not greater than 1.6 m for cones or tubular markers or 0.5 m for Type I or Type II Barricades or vertical panels or drums.

### NOTES

- 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 lane is open to traffic.

- When the lane closure extends a continuous 24 hour period all existing pavement markings within the work zone which conflict with the revised traffic pattern are to be removed and reasonable pavement markings used for marking new edge lines and centerlines.

- For general T.O. requirements and additional information refer to Index No. 600.

### EXISTING POSTED SPEED | PROPOSED WORK ZONE SPEED

<table>
<thead>
<tr>
<th>Mph</th>
<th>Mph</th>
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<tbody>
<tr>
<td>65</td>
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</tbody>
</table>
Symbols:

- Work Area
- Advance Warning Arrow Panel
- Median
- Work Zone Sign
- Speed Limit
- Cone or Tubular Workers At 7.5 Meters For 1st 75 Meters, Thereafter at 15.0 Meters Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 30.0 Meters Centers.
- GENERAL NOTES

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.
2. The first two warning signs at each site shall have a 450 mm x 450 mm (18 in.) orange flag and a Type B light attached and operating at all times.
3. Warning sign shall be kept mounted if closure time exceeds 2 hours.
4. L: km, 1: km/hr, W: Width, 50: Speed 30: 30 mph
5. The LEFT LANE CLOSED and lane reduction signs are to be removed or fully covered when no work is being performed and the inside lane is open to traffic.
6. Advance warning arrow panels are required for both day and night operation. Either the right flashing arrow or the right sequential-flashing arrow may be used, but caution signs shall not be used.
7. Arrows denote direction of traffic only and do not reflect pavement marking.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See index No. 600.
9. When a side road intersects the highway on which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TCC indexes.
10. For work performed in the outside lane refer to Index No. 600.

Conditions:
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCROACH ON ANY PORTION OF THE INSIDE LANE OF A MULTILANE HIGHWAY

State of Florida Department of Transportation

MULTILANE DIVIDED • RURAL

MULTICONTROL THROUGH WORK ZONES

[Diagram showing traffic control devices and lane closures with specific dimensions and instructions for implementation]
SYMBOLS

Work Area

Sign With 450 mm x 450 mm (18 in.) Orange Flag And Type B Light

Type I Or Type II Barricade Or Vertical Panel
Or Drum With Steady Burning Light At Night Only.
(Station Markers May Be Used During Daylight Only. Comes May Be Used See Index 600.)

Type I Or Type II Barricade Or Vertical Panel Or Drum With Flashing Light At Night Only.

Work Zone Sign

Flagger

GENERAL NOTES

1. Work operations shall be confined to one travel lane, leaving the opposing travel lane open to traffic.

2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the pavement.

3. For work operations of 60 minutes or less see Index No. 607.

4. When vehicles in a parking zone back the line of sight to TCZ signs or when TCZ signs approach an intersection, the signs shall be posted and secured in accordance with Index No. 1302.

5. If work area is confined to an outside auxiliary lane the work area shall be completed and the FLAGGER signs replaced by ROAD WORK AHEAD signs. Flaggers are not required.

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

7. The ROAD CONSTRUCTION AHEAD and FLAGGER signs shall have a 450 mm x 450 mm (18 in.) orange flag and a Type B light attached and operating at all times.

8. Warning signs may be used for daylight only operations Type B lights and orange flags are not required.

9. The FLAGGER legend sign may be substituted for the typical sign.

10. All signs shall be posted mounted if the closure time exceeds 12 hours.

11. The minimum spacing between devices shall be not greater than 7.5 meters.

12. Arrows denote direction of traffic only and do not reflect pavement markings.

13. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

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

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments
GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are forbidden in lane and intersection areas reserved for traffic.

2. For work operations of 60 minutes or less see Index No. 607.

3. The first two warning signs shall have a 450 mm x 450 mm (18 in.) orange flag and a Type B light attached and operating at all times. Work signs may be used for (Copyrigh Only) operations Type B lights and Orange Flags are not required.

4. All signs shall be posted if closure time exceeds 12 hours.

5. The WORKERS legend sign may be eliminated for the symbol sign.

6. Dual signs are required for divided roadways.

7. Arrows denote direction of traffic only and do not reflect pavement markings.

8. Maximum spacing between barriers, vertical panels, cones, luminous markers and drums shall not be greater than 1.5 m.

9. Temporary signal phasing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.

10. Work performed for a period of 60 minutes or less is to be conducted in accordance with Index No. 607 or emergency condition procedures as described in Index No. 600, whichever applies.

11. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

12. For general TCE requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OF THEIR ACTIVITIES ENTRAP ON THE PAVEMENT REQUIRING THE CLOSURE OF AT LEAST ONE MEDIAN TRAFFIC LANE 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 the outside travel lane and/or adjoining auxiliary lane, for work area less than 60.0 m from 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 the outside travel lane and/or adjoining auxiliary lane, for work area 60.0 m or more from intersection, for a period of more than 60 minutes.

SYMBOLS
- Work Area
- Sign With 450 mm x 450 mm (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)
- Road Work Ahead
- Right Lane Closed Ahead
- Advance Warning Arrow Panel
- Stop Bar

GENERAL NOTES
1. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times in one side of the roadway.
2. 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 auxiliary lane
3. Inside travel lane and adjoining auxiliary lane
4. If the work area is confined to an auxiliary lane the work area shall be patrolled and the Right (Left) Lane Closed Ahead signs replaced by Road Work Ahead signs, and the orange symbol signs eliminated.
5. For work operations of 60 minutes or less see Index No. 612.

TYPICAL APPLICATIONS
- Utility Work
- Pavement Repairs
- Structure Repairs

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
MULTILANE, TWO-WAY, URBAN DIVIDED OR UNDIVIDED
DAY OR NIGHT OPERATIONS

623

(Continued)
CONSIDERATIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCLOSE ON THE
PAVEMENT REQUIRING THE CLOSURE OF THE INSIDE TRAVEL LANE AND/OR ADJOINING
AUXILIARY LANE, FOR WORK AREA LESS THAN
60.0 m FROM INTERSECTION, FOR A PERIOD
OF MORE THAN 60 MINUTES.

SYMBOLS

- Work Area
- Sign With 450 mm x 450 mm (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel
- Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only.)
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only)
- Type III Barricade
- Work Zone Sign
- Advance Warning Arrow Panel

GENERAL NOTES (CONT.)

8. Within the lateral transitions, the maximum spacing between cones and
tubular markers shall be 7.5 meters. Maximum spacing between Type I or
Type II barricades or vertical panels or drums shall be based on the speed
limit as follows: 5.0 meters up to 25 MPH; 9.0 meters for 30 MPH-40 MPH;
15.0 meters for 45 MPH or greater.

Spacing for devices parallel to the travel lanes shall be 7.5 meter centers
for cones or tubular markers and 9.0 meter Centers for Type I or Type II
barricades or vertical panels or drums for 75.0 meters. Hereafter cones
or tubular markers at 9.0 meter Centers and Type I or Type II barricades
or vertical panels or drums at 30.0 meter Centers.

9. Arrows denote direction of traffic only and do not reflect pavement
markings.

10. Longitudinal dimensions are to be adjusted to fit field conditions.
See Index No. 600.

V. For general TCI requirements and additional information refer to Index
No. 600.

TYPICAL APPLICATIONS

Utility Work
Pavement Repairs
Structure Adjustments
GENERAL NOTES

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the pavement.

2. For work operations of 60 minutes or less (daylight only) see Index No. 607.

3. When vehicles in a parking zone block the line of sight to TCP signs or when TCP signs encroach on a non-pedestrian work area, the light shall be unmounted and located in accordance with Index No. 607.

4. The first two warning signs shall be a 450 mm x 450 mm (18 in.) Orange Flag and a Type B Light attached and operating at all times.

5. All signs shall be post-mounted if the closure time exceeds 12 hours.

6. Dust signs are required for divided roadways.

7. Channelizing devices are to be spaced with Type II bollards or vertical panels at a 60-meter center, except for temporary work areas spaced may be increased to 30.0 meters after the first 50.0 meters when approved by the engineer.

8. Removable reflectorized pavement markings shall be used when closure time exceeds one daylight period.

9. Arrows denote direction of traffic only and do not reflect pavement markings.

10. Length/width dimensions are to be adjusted to fit field conditions. See Index No. 600.

11. For general TCP requirements and additional information refer to Index No. 600.

SYMBOLS

Work Area

- Sign With 450 mm x 450 mm (Min.) Orange Flag and Type B Light
- Type I Or Type II Bollard Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)
- Type III Bollard (With Flashing Light)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF TRAFFIC LANES IN ONE DIRECTION AND THE USE OF ONE OPPOSING TRAFFIC LANE TO MAINTAIN TWO-WAY TRAFFIC, FOR WORK AREA LESS THAN 60.0 m FROM 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 TRAFFIC LANES IN ONE DIRECTION AND THE USE OF ONE OPPOSING TRAFFIC LANE TO MAINTAIN TWO-WAY TRAFFIC, FOR WORK AREA 60.0 m OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.
**SYMBOLS**

- **Work Area**
- **Stop Bar**
- **End Road Work**
- **Road Work Ahead**
- **Right Lane Closed Ahead**

**GENERAL NOTES**

1. All vehicles, equipment, workers, and their activities are restricted to the lane(s) to one side of the pavement.

2. Work operations shall be confined to either one lane or a combination of lanes as follows:
   - (1) One lane closed and alternating lane closed, or
   - (2) Two lane closed and alternating lane closed, or
   - (3) Three lane closed and alternating lane closed, or
   - (4) Four lane closed and alternating lane closed, or
   - (5) Five lane closed and alternating lane closed, or
   - (6) Six lane closed and alternating lane closed

3. If the work area is confined to an auxiliary lane or lane area, the right lane shall be closed and the ALTERNATE LANE CLOSED AHEAD signs replaces by ROAD WORK AHEAD signs and the merge right symbol signs eliminated.

4. When vehicles in a work zone block the lane of sight to TCB signs or when TCB signs are mounted on a normal pedestrian walkway, the signs shall be placed mounted and located in accordance with Index No. 001, 003, 005.

5. When work is performed in the median lane or median and auxiliary lane, the lane closing plans are inverted and the LEFT LANE CLOSED AHEAD and merge left symbol signs shall be substituted for the RIGHT LANE CLOSED AHEAD and merge right symbol signs.

6. If work is performed in the median auxiliary lane or travel lane, the work area shall be occupied and the ALTERNATE LANE CLOSED AHEAD signs replaced by ROAD WORK AHEAD signs and the merge right symbol signs eliminated.

7. The first two warning signs, each side, shall be a 450 mm x 450 mm (18 in.) orange flag and a Type B Light, and the remaining two signs shall be a Type B Light and Orange Flag.

8. The third to fifth warning signs, each side, shall be Type B Light with Orange Flag.

**TYPICAL APPLICATIONS**

- **Utility work**
- **Pavement Repair**
- **Structure Adjustments**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**MULTIPLE LANE ONE WAY OR MULTIPLE DIVIDED WITH NON-TRANSFERABLE MEDIAN = URBAN DAY OR NIGHT OPERATIONS**

**SOWموظنم**

**Initial Approval**

**NET**

**ARCH**

**DTP**

**3**

**625**

**(Continued)**
SPECIAL CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRE THE CLOSURE OF EITHER THE OUTSIDE AND CENTER TRAVEL LAKES OR THE MEDIAN AND CENTER TRAVEL LANES, WITH OR WITHOUT CLOSURE OF ADJOINING AUXILIARY LANES, FOR WORK AREA LESS THAN 60.0 M FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

SYMBOLS

- Work Area
- Sign With 450 mm x 450 mm (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel
- Work Bar

GENERAL NOTES (CONT.)

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
MULTILANE ONE-WAY OR MULTILANE OVERTAKING WITH NON-TRAVESSIBLE MEDIAN OR URBAN DAY OR NIGHT OPERATIONS

MATERIAL OPTIONS FOR OUTLINE REFLECTORS OR LIGHTED REFLECTORS

- Black
- Red
- Green
- Yellow
- Blue
- White
- Orange

2022
SP 2 of 2 625
Symbols:
- Work Area
- Sign with 450 mm x 450 mm (Min.) Orange Flag and Type B Light
- Type I or Type II Barricade or Vertical Panel or Drum (With Steady Burning Light at Night Only). Tubular Markers May Be Used During Daylight Only. Cones May Be Used (See Index 600). Type I or Type II Barricade or Vertical Panel or Drum (With Flashing Light at Night Only).
- Work Zone Sign
- Advance Warning Arrow Panel

General Notes:
1. All vehicles, equipment, workers and their activities are prohibited at all times from the lane areas reserved for traffic.
2. Work operations shall be confined to one center travel lane, leaving the adjacent travel lanes open to traffic.
3. For work operations of 60 minutes or less see Index No. 622.
4. When vehicles in a working zone block the line of sight to TCC signs or when TCC signs are on a median barrier or wall, the signs shall be placed and located in accordance with Index No. 7700.
5. The first two warning signs, each side, shall have a 450 mm x 450 mm orange flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.
6. All signs shall be post mounted if the closure time exceeds 12 hours.
7. Advance warning arrow panel is required for both day and night operations.
8. Channelizing devices are to be spaced with cones or tubular markers at 7.5 m centers. Type I or Type II Barricades or Vertical Panels or drums at 15.0 m centers for the first 15.0 m, thereafter cones or tubular markers at 7.5 m centers and Type I or Type II Barricades or Vertical Panels or drums at 30.0 m centers.
9. Arrows denote direction of traffic only and do not reflect pavement markings.
10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
11. For general TCC requirements and additional information refer to Index No. 600.

Typical Applications:
Utility Work
Pavement Repair
Structure Adjustments

Conditions:
Where any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of the center lane.
MODE • WARNING

GENERAL NOTES

1. These illustrations are representative of general conditions.

2. The intensity of light and the position of panels shall be as specified in Index No. 600.

3. The Advance Warning Vehicle (Optional) may be used at the discretion of the Engineer. If an Advance Warning Vehicle is operated within the travel way, an approved Truck Mounted Attenuator will be required on the Advance Warning Vehicle but not required on the Shadow Vehicle. For each vehicle, a Shadow Vehicle and Shadow Sign shall be required. A Truck Mounted Attenuator is not required on both the Advance Warning and Shadow Vehicles.

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

5. 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 in charge may dictate the requirements for shadow vehicle and attenuators. The work vehicle will be required to have an advance warning arrow panel and warning sign.

SYMBOLS

- Work Vehicle With Flashing Beacon
- Shadow (S) Or Advance Warning (AW) Vehicle
- Truck Mounted Attenuator (TMA)
- Lane Identification And Direction Of Traffic

TYPICAL APPLICATIONS

- Stripping
- RPM Placement
- Vegetation Control

CONDITIONS MOVING OPERATION
**CONDITION A**

**WHEN THE PAVING TRAIN IS IN LANE 1 THE U-TURN VEHICLE SHALL CAUTIOUSLY TURN INTO LANE 2 AND PROCEED IN LANE 2 TO THE FRONT OF THE TRAIN**

**CONDITION B**

**WHEN THE PAVING TRAIN IS IN LANE 2 THE U-TURN VEHICLE SHALL CAUTIOUSLY TURN INTO LANE 1 AND PROCEED IN LANE 1 TO THE FRONT OF THE PAVING TRAIN**

**CONDITION A & B**

The advance warning arrow panels are required. Under no circumstances will the traffic transition be located within the limits of the crossover.

**SYMBOLS**

- **Work Area**
- **Type I or Type II Barricade or Vertical Panel**
- **Drum (with steady burning light时装*)
- **Tubular Markers (may be used during daylight only)**
- **Cone or Tubular Marker or Drum**
- **Work Zone Sign**
- **Advance Warning Arrow Panel**
- **Work Vehicle**
- **Lane Number**

**TRAFFIC TRANSITION AREA UPSTREAM FROM CROSSTRADE**

**CASE I**

**GENERAL NOTES**

1. When crossovers do not exist, the contractor will construct temporary crossovers in accordance with Index No. 55.

2. L = Length of taper in meters
   - MF for speeds < 70 km/h
   - BST for speeds > 70 km/h

3. W = Width of lateral transition in meters

4. S = Speed limit (converted to km/h)

**TRUCKS TURNING LEFT OFF FT**

**MERGE RIGHT ON FLASHING ARROW**

**ADVANCE WARNING ARROW PANEL**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**TEMPORARY CROSSTRADE FOR PAVING TRAIN OPERATIONS**

**RURAL**

**ENGLISH**

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**TEMPORARY CROSSTRADE FOR PAVING TRAIN OPERATIONS**

**RURAL**
**CONDITION A**

When the paving train is in lane 1, the U-turning vehicle shall cautiously turn into lane 2 and proceed in lane 2 to the front of the train.

**CONDITION B**

When the paving train is in lane 2, the U-turning vehicle shall turn into lane 1, cautiously merge into lane 1 and proceed to the front of the paving train.

**CONDITION A & B**

The advance warning arrow panel is required unless circumstances will the traffic transition be located within the limits of the crossover.
PHASE I

1. Within two-lane two-way traffic over existing pavement, construct new roadway within the proposed 4-lane limits, excluding the friction course. Sign as shown if roadway construction area falls within 4.5 meters of existing pavement edges. When the construction area falls more than 4.5 meters from the existing pavement edges, traffic shall be controlled in accordance with indices Nos. 650, 659, or 662.

2. Construct shoulder pavement to provide two-lane two-way traffic over shoulder and existing pavement during Phase II roadway construction. For lane width requirements see Index 660. Sign as shown, with the near 450.0 m zone modified in accordance with Index 604, to be in place prior to shoulder pavement construction.

SYMBOLS

- Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)
- Work Zone Sign

LEGEND

- Phase I
- Phase II
- Phase III

NOTE: See Sheet 2 of 2 for General Notes.
SYMBOLS

- Stop Bar
- Work Zone Sign
- Type III Barricade (With Flashing Light)
- Drum (With Green Burning Light) or Vertical Panel
- Sign With 450 mm x 450 mm (Min.) Grind and Type B Light
- Orange Flag and Type B Light
- Horizontal Rectangular Plain, Markings
- Double Rectangular Reflectorized Plain, Markings
- Requirements For Projects > 3.2 Kilometers
- Requirements For Projects > 3.2 Kilometers
- End Road Work
- End Road Work
- Speed Fines Disabled
- Speed Fines Disabled
- END ROAD WORK
- END ROAD WORK

GENERAL NOTES

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic must conform to the requirements in the MUTCD. When work extends through an intersection, temporary reroutes cross traffic to other cross-arms. When closing one lane, provide one lane of travel for two-lane cross streets and one lane of travel for one-way cross streets.

LEGEND

- Phase I
- Phase II
- Phase III

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
CONVERTING TWO LANES TO FOUR LANES DIVIDED - URBAN
**SYMBOLS**

- \( \text{\textcircled{\text{}}} \) Sign With 450 mm x 450 mm (Min.)
- Orange Flag and Type B Light
- Type I or Type II Barricade or Vertical Panel
  or Drum (With Steady Burning Light At Night Only)
- Type III Barricade (With Flashing Light)
- Work Zone Sign

**LEGEND**

- \( \text{\textcircled{\text{}}} \) Phase I
- \( \text{\textcircled{\text{}}} \) Phase II

**GENERAL NOTES**

1. Re-align and mark as shown in Phase II plan.
2. Replace traffic diversion and maintain two way traffic on diversion, install Type III barriers.
3. Construct proposed structure and reconstruct or resurface existing approaches.

**PHASE II**

- Sign used when Alpine or Snow Bridge and Center False, Also vehicle Crash Cushion At Each End To Protect Center False.

**PHASE III** (See Sheet 2 of 2)
PHASE III

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

GENERAL NOTES

1. All signage, pavement marking, barriers, and warning lights necessary for the protection of traffic shall conform to Index No. 605.

2. The first two warning signs shall have a 450 mm x 450 mm (18 in.) orange flag and a Type B light attached and operating at all times.

3. For speed sign applications see Index No. 600.

4. For lane width requirements see Index No. 600. Where one-way one-lane operations are necessary, a minimum width of 3.0 meters shall be maintained and traffic controlled in accordance with Index Nos. 603, 604, 606, 607, or 608. Where the minimum width for the travel lanes is less than 3.0 meters, the Engineer shall indicate the special conditions.

5. Method of attaching temporary guardrail to the diversion structure to be approved by the Engineer.

6. Prior to installing the temporary structure, the Engineer shall be made aware of the presence of any underground utilities during construction.

7. Temporary crash cushions shall be the Type A or Type B in accordance with Index No. 450 or other equivalent as required by the plans.

8. Arrows denote direction of traffic only and do not reflect pavement markings.

9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

10. Where the temporary structure is not required the diversion may be constructed in accordance with Index No. 609, unless otherwise specified in the plans.

11. For reflective raised pavement marker application see Index No. 630 and Index No. 7352.

12. For general TC2 requirements and additional information refer to Index No. 600.
1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
2. The first two warning signs, each side, shall have a 450 mm x 450 mm (18 in.) orange flag and a Type B light attached and operating at all times.
3. All signs shall be posted mounted.
4. S-Posted speed limit (converted to km/h).
5. Within the lateral transitions, the maximum spacing between Type 1 or Type 2 barriers or vertical panels or drums shall be based on the speed limit as follows: 5.0 meters for 50 mph, 10.0 meters for 60 mph, and 15.0 meters for 45 mph or greater.
6. For speed sign applications see Index No. 600.
7. All existing pavement markings within the work area which conflict with the revised traffic pattern are to be removed and new pavement markings used for marking edge lines and lane lines.
8. Lengthened detector crosswalks are to be adjusted to fit fixed conditions. See Index No. 600.
9. When side roads, cross roads or interchanges are located within the limits for work zone temporary two-way travel, traffic signal control devices shall be erected and operated in accordance with other applicable TCT requirements.
10. For general TCT requirements and additional information refer to Index No. 600.
GENERAL NOTES

1. Arrows denote direction of traffic only and do not reflect pavement markings.
2. Only the signs controlling pedestrian flows are shown. Other work zone signs will be needed to control traffic on the streets.
3. For spacing of traffic control devices and general TCO requirements refer to NCDOT R024. Minimum spacing between bollardes, vertical markers, boards or tubular markers shall not be greater than 7.5 m.
4. Street lighting should be considered.
5. For nighttime closures use type A flashing warning lights on barricades supporting signs and closing sidewalks. Use type C steady-beam lights on demarcating devices separating the work area from vehicular traffic.
6. Pedestrian traffic signal display controlling closed crosswalks shall be covered or deactivated.
7. Temporary walkways shall be a minimum of 1.8 m wide and free of any obstructions and hazards such as holes, cracks, mud, construction equipment, stored materials and etc.
8. Pedestrian Signs located near or adjacent to a sidewalk shall have a 2.1m minimum clearance from the bottom of the sign to the sidewalk.
9. When construction activities involve walkways on both sides of the street, efforts should be made to balance the construction so that both sidewalks are not out of service at the same time.
10. In the event that walkways on both sides of the street are closed, then pedestrians shall be guided around the construction zone.

TYPICAL APPLICATIONS
Sidewalk Repairs
Pavement Widening
Utility Work

CONDITIONS
Where any vehicle, equipment, workers or their activities encroach on the sidewalk for a period of more than 60 minutes.
DESIGN WIND SPEEDS BY COUNTY

ZONE N: 150 mph

Note: No. Height Panel Spacing, Minimum Panel Section Width = 750 mm.

STAINLESS STEEL

Screws

Types of Screws

Panel Width

ALUMINUM MATERIALS

STANDARDIZATION OF MATERIALS

STEEL BELTS & NUTS

I-CHANNELS

CONCRETE

FRAMING MATERIALS

SHARPENING TOOLS

HIGH STRENGTH BOLTS (M56 & CLASS 8.8)

MINIMUM RESIDUAL TENSION

BOLT SIZE

TENSION (lbf)

STANDARD ROADSIDE SIGN BREAK-AWAY PANEL DETAIL

SIGN PANEL AND WIND BEAMS

STANDARDS FOR THE DESIGN OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNS, AASHTO M119: 1989

For any further to the street width, the wind load for wind in which are to be used on flat signs. These are intended to be used in the wind loads specified for wind in which are to be used on flat signs. The values of wind load for wind in which are to be used on flat signs.

DESIGN WIND LOAD

See Design Wind Speeds by County for wind in which are to be used on flat signs.

MINIMUM PANEL SECTION WIDTH = 750 mm

ALUMINUM MATERIALS

All aluminum materials must meet the requirements of the Aluminum Association's AS400-76 and shall comply with the following AAMA specifications: Sheets and plates, 5154-H14, 5154-H11, and 6061-T651. The sheets shall have an effective coating at least 0.0005 mm thick, and the plates shall have an effective coating at least 0.064 mm thick. The sheets shall have an effective coating at least 0.002 mm thick, and the plates shall have an effective coating at least 0.127 mm thick. The sheets shall have an effective coating at least 0.005 mm thick, and the plates shall have an effective coating at least 0.191 mm thick. The sheets shall have an effective coating at least 0.006 mm thick, and the plates shall have an effective coating at least 0.254 mm thick. The sheets shall have an effective coating at least 0.007 mm thick, and the plates shall have an effective coating at least 0.317 mm thick.

STAINLESS STEEL

All stainless steel materials shall meet the requirements of ASTM A434 Grade 316.

ALUMINUM BELTS & NUTS

All aluminum belts shall meet the requirements of Aluminum Association AS400-76 and 6061-T651. The sheets shall have an effective coating at least 0.0005 mm thick, and the plates shall have an effective coating at least 0.064 mm thick. The sheets shall have an effective coating at least 0.002 mm thick, and the plates shall have an effective coating at least 0.127 mm thick. The sheets shall have an effective coating at least 0.005 mm thick, and the plates shall have an effective coating at least 0.191 mm thick. The sheets shall have an effective coating at least 0.006 mm thick, and the plates shall have an effective coating at least 0.254 mm thick. The sheets shall have an effective coating at least 0.007 mm thick, and the plates shall have an effective coating at least 0.317 mm thick.

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**NOTES:**
1. The Core Exit Panel (FIP-3-L) is for identification and the labeling of locations.
2. Maximum weight to bottom of sign = 54°C.
3. Specify size in I.C.A. and stock number with 41-44 as prefix.
4. Type 3 brackets required for attachment.
5. See Type 3 Bracket sheet, Attachment and General Notes for index No. 0820.
6. For footing size and 5/8 Base Defl. see index No. 1132.

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**
**SINGLE COLUMN GROUND SIGNS**

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- **Second Page**
- **Third Page**

*Index Numbers*
- 0820
- 1132
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**NOTES:**
1. This Standard uses the American Society of Civil Engineers' units of measurement and dimensions. The dimensions shown are in inches and feet.
2. All dimensions are approximate and should be used for design purposes only. Final dimensions should be verified by a qualified professional.
3. Steel Channel and Beam sizes are specified by their thickness and width. For example, a 12" x 12" Beam is 12" wide and 12" deep.
4. Column footings are designed to support the weight of the column and are typically poured in concrete.
GENERAL NOTES

DESIGN SPECIFICATION: Latest Standard specifications for structural supports for highway signs, lanterns and

traffic signals, AASHO.

SHEETS AND PLATES: Material used shall meet the requirements of American Association A500-76 and A572-82.

Sheets not to be degreased, painted, or machined with abrasives. Mils of 3,6,8,11,12,14,18,20,22,30,40,48,56.

MATERIALS: All aluminium retainer sheet shall meet the requirements of the Aluminum Association A900-76 and

class the following ASTM specification for the following: Sheets and plates 3003-O, extruded shapes 6061-T6 and

standard structural shapes 5052-O, 5056-O.

ALUMINUM SCREWS & LUG WASHERS: Aluminum bolts shall meet the requirements of the Aluminum Association A606-14 or A606-16 / AFSM (Z63). The bolts shall have an annual coating of at least 0.002 inch and be chrome inserted.

Lugwashes shall meet the requirements of aluminum association A809-76 / AFSM (Z63). Nuts shall meet the

requirements of aluminum association A811-76 / AFSM (Z63).

METALLIC STIFFENERS: All metallic stiffeners shall be adequate to withstand specifications for structural supports for

highway signs, lanterns and traffic signals, AASHO for all materials shown in the plans.

For mounting details, refer to index No. 4637.
9. TRAFFIC CONTROL DEVICES AT SCHOOL ENTRANCES WITH LOW VOLUMES OF WALKING STUDENTS

These signs are intended for use only at those few locations where the school entrance is not evident to the motorist and must be approved in advance by the responsible traffic engineering authority.

10. TRAFFIC CONTROL DEVICES FOR A TYPICAL SCHOOL ZONE FRONTPING THE SCHOOL PROPERTY

Note:
The school bus stop area sign is to be used in advance of locations where there is a school bus which enters or leaves an area or crossing pedestrians, is not visible for a distance of 150 ft. in advance. In such cases, a sign giving the distance or a description of the area may be used wherever a school bus stop is to be established. These signs are intended for use only when the condition and traffic needs dictate the proper use of a school bus stop area sign. The vertical distance and where there is no opportunity to install a stop sign in another location with adequate visibility.
WARNING
1. Standard size signs should be used wherever practical. Minimum sizes may be used only on advance warning signs.
2. The size of the speed limit sign should not be less than the 00 or 000. It should be at least the 00 or 000.
3. See index No. 0733 for sign details.

NOTES
1. Existing ground mount school speed limit signs utilizing a single speed limit sign, e.g., the 0-00, are acceptable and should be maintained by the transportation regulatory authorities.
NOTE:
Yellow left-turn stage markings may be used primarily to signal trucks or gross vehicles if lane use is not clearly apparent to drivers approaching a left-turn storage lane.

Turn lane length greater than 60.0 ft add one marker for each 90.0 ft additional length.

Arrows should be using standard between first and last arrow.

Pedestrian crossing ONLY is not required for corner (pedestrian) turn lanes single or dual, where the driver must exit the truck lane to enter a turn lane.

(Typical crosswalk markings for public sidewalk curb ramps)

Typical crosswalk markings for public sidewalk curb ramps.

(Typical crosswalk markings for public sidewalk curb ramps)

Typical crosswalk markings for public sidewalk curb ramps.

(Typical crosswalk markings for public sidewalk curb ramps)

Typical crosswalk markings for public sidewalk curb ramps.

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Typical crosswalk markings for public sidewalk curb ramps.
PAVEMENT MARKING FOR TRAFFIC SEPARATION
(TRAFFIC FLOWS IN OPPOSING DIRECTIONS)

PAVEMENT MARKINGS FOR TRAFFIC CHANNELIZATION AT GORE
(TRAFFIC FLOWS IN SAME DIRECTION)
TYPICAL TRANSITION MARKING
Point Where Pavement
Begins To Narrow

LEFT ROADWAY CENTERED ON EXISTING ROADWAY

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SPEED LIMIT (mph) $V_0$

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NOTE:

- White Delimiters Shall Be Used Throughout The Transition Where
  Approach Speeds Are Greater Than 60 mph.
- $L_x$ in feet
- White Delimiters Shall Be Used Throughout The Transition Where
  Approach Speeds Are Greater Than 60 mph.

Direction of Travel

SCHOLMS FOR TRANSITION - 2 LANE/4 LANE ROADWAY
Markings in or adjacent to bike lanes shall be constructed with a thickness of 0.50 percent gross area and 0.50 percent gross area of paint at a rate of 3.00 kg/m².

The clipper shall be used for the following pavement markings:

- C.S. (cm) Steel Size Paint
  - 0.05 6.00 0.05
  - 0.05 4.00 0.05
  - 0.05 2.00 0.05

- (Various Standard Spec. T-44)

Recommended spacing of element symbols, referencing other elements and radial arrows and a minimum spacing of 0.21 m² for standard symbols shall be 0.25 m for turning radius.

Provided pavement markings shall include the following symbols and text:

- Left turn arrow
- Right turn arrow
- Bicycle symbol
- "ONLY LANE" text
- "BIKE" text

For lanes adjacent to bike lanes, the bike symbol and "BIKE" text shall be included.

No other markings shall be applied to the pavement.

**Note:** When used on a bike lane adjacent to vehicle lanes, the marking shall be placed adjacent to markings for vehicles. Where a sign shall be placed and painted for vehicles.
GENERAL NOTES (Signaled & Non-Signaled)

1. Ensure that the width of the street does not exceed 6.0 m for streets, and 5.0 m for signalized intersections.
2. Parking lane lengths shall be determined based on the length of parked vehicles.
3. Parking lane lengths shall be determined based on the length of parked vehicles.
4. Parking lane lengths shall be determined based on the length of parked vehicles.
5. Refer to Chapter 101.7 for information on how to determine the length of parked vehicles.

MINIMUM PARKING RESTRICTION FOR NON-SIGNALIZED INTERSECTIONS

- Speed Limit
- Distance from curb

MINIMUM PARKING RESTRICTION FOR SIGNALIZED INTERSECTION

- Speed Limit
- Distance from curb

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SPECIAL MARKING AREAS (PARKING)

P AVEMENT MARKING FOR PUBLIC SIDEWALK CURB RAMPS IN REST AREAS

"UNIVERSAL SYMBOL OF ACCESSIBILITY"

TYPICAL MARKINGS FOR CROSSWALKS
STATE OF FLORIDA
WELCOME CENTER
1 MILE

STATE OF FLORIDA
WELCOME CENTER

STATE OF FLORIDA
OFFICIAL
WELCOME CENTER

WELCOME CENTER

Note:
- Shape and size may be altered slightly if conditions require.

Tourist Information Center
NEXT RIGHT

Sign No. F3P-20

Note: Sign F3P-20 shall be used as a supplemental guide sign of
interchange which have a Tourist Information Center approved for such
signing. Locate next way between normal guide sign.

FOR LIMITED ACCESS HIGHWAYS
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
WELCOME CENTER DESIGN

WELCOME CENTER SIGNING

Chalk & Latour

Scale 1"=100'
STATE OF FLORIDA
WELCOME CENTER
1 MILE

STATE OF FLORIDA
OFFICIAL
WELCOME CENTER

1/2 MILE

Note:
- One sign FTP-22A or 22B should be used depending on speed, roadside development, and geometric conditions.

NOTA:
- Roadway not shown to scale

Notes:
1) Signs and sign structures shall be erected in accordance with the specifics shown on sheet TP-55.
2) Sign FTP-20B shall be located on the Welcome Center grounds, in proximity to the building and as far from the main line ROW as possible (2 signs back to back)
3) All signs to be Series E.

WELCOME CENTER SIGNING

FOR PRIMARY HIGHWAYS
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION

Sheet D
09-27-93
Rev. 4

Drawn By: 

check by: 

Scale

Page 2 of 2

1735
1. Reflective Pavement Markers shall be spaced at 0.6 m on all solid lines and skip center lines. This spacing may be reduced to 0.4 m if specifically called for in the plans.

2. The spacing on solid lines and solid/skip combination lines shall be 0.3 m.

3. All R.P.M.s shall be offset 25 mm from solid lines.

4. These spacings may be reduced for sharp curves if required.

5. All R.P.M.s shall be class B.
NOTE

RPM PLACEMENT FOR TRAFFIC CHANNELIZATION AT GORE
(TRAFFIC FLOWS IN SAME DIRECTION)

NOTE

RPM PLACEMENT FOR TRAFFIC SEPARATION
(TRAFFIC FLOWS IN OPPOSITE DIRECTION)

PLACE OF RPMs ON SHOULDER MARKINGS

Shoulder Markings For Left Side Of Rampway Shall Be Yellow.
For Placement Of RPMs On Ramps See Island CPM.
STAY IN YOUR LANE

LITTER PICK UP AHEAD

SIDEWALK CLOSED

PEDESTRIAN WALKWAY

SIDEWALK CLOSED AHEAD

PEDESTRIAN CROSSWALK

SIDEWALK CLOSED CROSS HERE

SIDEWALK CLOSED

LIGHTED WORK ZONE AHEAD

STATE PRISONERS WORKING

SPECIAL SIGN DETAILS
### W20-1A
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**Background:** Orange

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### SPECIAL SIGN DETAILS

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**Background:** Orange
TYPICAL INSTALLATIONS FOR SIGN PANEL(S) MOUNTED ON SPAN WIRE

SIGN MOUNTING DETAIL

TYPICAL SPAN WIRE INSTALLATION
SIGN LOCATIONS TYPICAL

WEIGHT LIMIT RESTRICTION AHEAD

NOTE:
1. See Standard Highway Signs section
   for sign R9-0-B Scoter
2. Sign location No. 3 may require some field adjustment
3. Signs FTP-30, FTP-32 & FTP-50 shall have a
   15 ft. edge and 15 ft. barrier with a 50 ft. radius.
4. The Cross Road is not to enter around the restricted bridge
5. Sign location No. 3 should be established from
   the Cross Road for following approach stops
   intersection - 15 ft. minimum non-inferior - full clearance
6. See below (75 to) for sign modules.

BRIDGE WEIGHT RESTRICTIONS

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<th>BRIDGE NO.</th>
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</tr>
<tr>
<td>56.78</td>
<td>8,000</td>
<td>2024</td>
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</table>
NOTES:
1. Use water free curing sand ≤ 1% passing 45 mm sieve for base ≤ 100 mm.
2. Welded wire fabric shall meet the requirements of ASTM A480.
3. Concrete strength at 28 days shall be Fc = 20 MPa.
4. Outside edges of slab shall be cast against formwork.

SECTION B-B
5. Tie ≤ 0.5 mm expansion joint between sheet and slab shall be sealed with a not-saturated elastomeric joint sealant.
6. Slab to be placed around all Poles and Pull Boxes in circular fashion, in urban streets or where space is limited.
   Side dimensions may be adjusted as shown in the plans.
1. Ground rods shall have a resistance to ground not to exceed 25 ohms, where the resistance is greater than 25 ohms, the distance between the ground rod and the power company transformer shall be increased to maintain the 25 ohm resistance.

2. The contractor shall be responsible for connecting coil to the utility company prior to any underground work. The utility company will locate and identify their facilities.

3. Contractor shall arrange for service required for the power company transformer location at the pre-construction conference.

4. The power company reserves the right to locate the poles, which may be pre-arranged on power company poles of the owners of the corporation. Contact the power company for cost or for authorization for an alternative setting.

5. Any damaged portions of grounded steel poles and broken steel piles shall be replaced in accordance with Section 802 of the Standard Specifications.

6. Poles and transmission lines shall be designed in accordance with the utility company's requirements. The design and the construction of the transmission lines shall be in accordance with the American Society of Testing and Materials Standard Specifications for Structural Supports for High Voltage Transmission and Distribution Lines.

7. The minimum manufacturer's size of the conductors on the conductor running on which is required by the following information: Voltage, and type, deep drawn on design, type setting of conductor is 0.5 square meters with 6% wire gauge and 64% copper content. The minimum size of the conductor shall be based on the actual projected area of the lumens of 0.25 square meters per conductor.

8. Before final acceptance, contractor shall install 1.5 sets of twin sets as part of the maintenance program.

9. Conductor routing shall be in line with minimum pole spacing with minimum distance from edge of street. Any conductor routing in locations where traffic is proposed shall be 0.5 meters in front of the street line.

10. Pole positions and conductor routing may be adjusted, as approved by the Engineer, to prevent conflicts with utility, and prevent interference with traffic and other hazards.

11. Where gaps in the road are not adjacent, the gaps shall be placed at least 2 meters behind the face of the gap.

12. The ground clearance to the top of the foundation, measured from the center of the pads, shall be approximately equal to the height of the adjacent set. The transformer is existing grade and fully loaded.

13. The wires of the conductor shall have sufficient length to accommodate normal connections to the outside of the underground systems. The conductor shall be supported by insulators or through flattened insulators for feeding the system.

14. Insulators to be used without insulators. Do not use wire to silver-encrusted wires for underground construction.

15. Insulators are to be specified with black construction 50 percent conductivity. The ground clearance to the top of the foundation, measured from the center of the pads, shall be approximately equal to the height of the adjacent set. The transformer is existing grade and fully loaded.

BREAKER FEATURE

All operationalrating and system breakers shall be mounted on a rectangular metal base or panel system. Breakers shall be mounted on a rectangular metal base or panel system. The rectangular metal base or panel system shall be provided for each indoor and outdoor connection. The rectangular metal base or panel system shall be provided for each indoor and outdoor connection. The rectangular metal base or panel system shall be provided for each indoor and outdoor connection.

The design of the breaker feature shall be in accordance with the electrical performance requirements of the Standard Specifications for High Voltage Sine, Longitudinal, and Transverse Sine, and the Engineer shall provide the necessary information as to the type of breaker feature to be used. The breaker feature shall be provided for each indoor and outdoor connection. The rectangular metal base or panel system shall be provided for each indoor and outdoor connection.

Any additional necessary of a breaker feature, when it is broken away, should not project more than 50 mm as specified in Section 1 of the Standard Specifications for Sine, Longitudinal, and Transverse Sine, and the Engineer shall provide the necessary information as to the type of breaker feature to be used. The breaker feature shall be provided for each indoor and outdoor connection. The rectangular metal base or panel system shall be provided for each indoor and outdoor connection.
Notes:
1. All outlet boxes and pull boxes, ends of conductors to be spaced in accordance with Section 530 of The Standard Specifications for Roads and Bridges Construction.
2. 6 AWG insulated (TW Green) stranded Cu bare wire connecting all poles, and insulated (TW or TMWW) stranded copper circuit conductors to schedule 40 PVC conduit. Circuit conductors are conductors as shown in plates. (Typical)
3. Side tie to be placed around Poles and Pull Boxes.
4. For Pull Boxes between Poles refer to Index IT600 sheet 2 of 3.
NOTES:
1. Use Class IIIA torching rod < 1% passing 0.89 mm sieve for base (300 mm).
2. Retarder and curing shall meet the requirements of ASTM A951.
3. Concrete strength at 28 days shall be f'c = 25 MPa.
4. Outside edges of slab shall be cut against forms.
5. The 30 mm thick expansion joint between shaft and slab shall be sealed with a hot-applied asphalt joint sealer.
6. Firestop joints around pipes and pull boxes shall be sealed for under the contract only price for Class I Rubber Firestop. The slab for insulating sheath fins, shall be included in the price for Class I Concrete Insulation fins.

SLAB DETAILS

HIGHMAST LIGHTING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEPARTMENT

HIGHMAST LIGHTING

Page 4 of 4 17502
DETAIL A
AERIAL FEED

Notes:
1. Photoelectric control as required.
2. All neutral wires to have white insulation, do not use white or green insulated wires for ungrounded conductors.
3. A pull box is required at each service point.

Concrete Pole, Prefabricated Type A-2, 12.5 ft Long

Conductor Weatherhead Height As Required By Power Company.

P.C. Controller Box Required

Rigid or Intermediate Wire Conduct

Rigid or Intermediate Wire Conduct On All Above Ground Insulators

Guy Wire

U.I. Approved Ground Rod, 7/8" Dia.

300 mm Rod of 17 Gauge Galvanized Steel For Grounding.

NOTE:
- it shall be the contractor's responsibility to provide a complete service assembly as per the plans and service specifications.
- the service conductor shall meet the requirements of the national electric code and applicable state codes.
- shop drawings are not required for service equipment, unless noted in the plans.
FIGURE A

Pull Box Entry of Conduit Under Sidewalks

Note:
- Ends of conduit shall be capped in accordance with Section 630 of the Standard Specifications for Road and Bridge Construction.

FIGURE B

Roadway Plan

Note:
- Each run of conduit (between pull boxes) shall not exceed more than 300' of bend, including pull box bends.

FIGURE C

Conduit Installations Details

For use under railroads

Note:
- Minimum conduit depth to be 6 ft. or where required but not less than 1.2 m.
- After backfilling, recheck conduit position and alignment extending to full right of way limits.
FIGURE A
(No Meter Used)

FIGURE B

FIGURE C
(No Meter Used)

FIGURE D

TYPE "P" UNDERGROUND FEED
(METER USED)

FIGURE E

(UNDERGROUND CABINET MOUNTED)
(METER USED)

NOTES:

1. The lightning arrester can be located on the side or bottom of the
   main disconnect enclosure of the Contractor's Option.

2. Lightning flexible conduit is approved for use from the switch/last
   disconnect to the cabinet when both are installed on the same pole.

3. All grounding system connections shall be externally wired.
   This includes all wire connections, ground rod connections, rod to rod
   connections, and switch.
Notes:

1. As an option, the optimizers will be allowed to install pedestrian signals on separate poles and
   pedestrian with the use of one reflector 1/2 mile
   here size per Hub. in clay of the standard steel
   fixture.

2. Holes drilled or punched in metric poles or features shall be thoroughly removed, turned, and
   covered with two (2) coats of zinc-rich primer as
   specified in the standard specifications for road
   improvement. Holes in concrete shall be filled with
   a suitable concrete in a neat.

3. Grounding is to be in accordance with Section 630 of the Standard Specifications.

4. All grounding system connections shall be equally
   explored. This includes all other connections, ground
   bar connections, rail to rail connections, and
   power.
GENERAL NOTES
1. If the loop lead W is 22.5 m or less from the edge of the loop to the detector or passive cable, continue the buried part of the cable. If the loop lead W is greater than 22.5 m, continue the buried part of the cable to the specified point. The buried part of the cable is to be routed in a manner such as to avoid the detector or passive cable.
2. The width of all new cut outs shall be sufficient to allow unobstructed placement of loop wires as well as cables into the cut outs. The depth of all new cut outs, except those expressway joints, shall be 75 millimeters centered with a maximum of 50 millimeters.

3. In redrawing or new roadway construction projects, the loop wires and lead-in cables may be included in the project's structural design. The lead-in cables shall be placed in a manner that does not interfere with the structural design. The loop wires shall be placed in a manner that does not interfere with the structural design.

4. The finished driveway shall be in alignment with the road surface. The loop wires shall be placed in a manner that does not interfere with the driveway alignment. The finished driveway shall be in alignment with the road surface.

5. The finished driveway shall be in alignment with the road surface. The loop wires shall be placed in a manner that does not interfere with the driveway alignment. The finished driveway shall be in alignment with the road surface.

6. Splice connections in joint boxes may be made with U.L., listed, and approved by the Florida Department of Transportation.
Concrete Pavement Expansion Joints

Plan

Notes:
1. The "number of turns" indicated at the specified joint on the loop refers to the number of passes of loop wires which are placed in the pour-up forming the complete loop.
2. Loop types or a decision must be made.
3. Loop Types are constructed in a single line except Type E which is constructed on two lines.
4. The number of individual loops in the Type G loop may vary up to a maximum of four (4).
5. Loop (a) may be connected to either end of loop.
6. Three loops are used for Type A, B, and C loops. The loops may be attached at a minimum of 3.0 m. The spacing of these loops may be extended to a maximum of 3.0 m. Each connection would be individually designed and 10" shall not be less than required if it is not filled or placed in the joints.
7. Loop leads or wires should not be installed in the same joint but with signal power leads.

Loop Corner and Lead-In Details

Vehicle Loop Installation Details
WHITE BACKGROUND WITH BLACK LEGEND AND BORDER
WALK PLAQUE - WHITE LEGEND ON BLACK BACKGROUND
DON'T WALK PLAQUE - ORANGE LEGEND ON BLACK BACKGROUND
THE INTERNATIONAL SYMBOLS MAY BE USED FOR WALK AND DON'T WALK.

Note:
1. See folder FTPS for sign details.

PEDESTRIAN DETECTOR ASSEMBLY INSTALLATION DETAILS

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<td>DO NOT START FINISH CROSSING</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IF STARTED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DON'T WALK STANDY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DO NOT ENTER CROSSWALK</td>
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</tr>
</tbody>
</table>

CASE 1
POLE PARALLEL TO CURBLINE
ALTERNATE TO FIGURE F

CASE II
POLE DIAGONAL TO CURBLINE
**METAL POLE**

- Pole Plate with Sheet Bond
- Pole Plate with Sheet Bond or Lead Anchors and Bolts
- Pulling Elbow Type UB
- 25 mm PVC conductor

**CONCRETE POLE**

- Pole Plate with Sheet Bond or Lead Anchors and Bolts
- Pulling Elbow Type UB
- 25 mm PVC conductor

**WOD POLE**

- Pole Plate with Sheet Bond or Lead Anchors and Bolts
- Pulling Elbow Type UB
- 25 mm PVC conductor

**POLE MOUNTED CABINET**

- If used for cabinet mounting, the cabinet shall be fitted with a 3/4" schedule 40 pipe, with the 3/4" hole in the cabinet, and the pipe shall be flush-mounted.

**INTERCONNECT JUNCTION BOX**

- Junction Box
- Pole Hole with Sheet Bond or Lead Anchors and Bolts
- Pulling Elbow Type UB

**BASE MOUNTED CABINET**

- Ground Line or Gable
- 25 Channels
- Pull Box
- Ground Line or Gable

**BASE MOUNTED CABINET**

- Ground Line or Gable
- Pull Box
- Service Drop (Depth 6 mm to 25 mm for Driveways)
- Areas of Where PVC is Restricted

**PEDESTAL MOUNTED**

- Junction Box
- Anchor Bolts
- Conductor (Size)

**BASE MOUNTED INTERCONNECT JUNCTION BOX**

- Junction Box
- Ground Plate
- 25 mm PVC conductor
FIGURE 1

GATE LENGTH REQUIREMENTS

See Note 6 Sheet 3

General Notes
1. No signal is provided for signals, however, make type of signal, etc., used may be specified for handi-ness.
2. Number of gates to be closed will vary depending on size and length of gates to be closed, size and location of gates to be closed.
3. Sign of handi-ness shall be as high as physically possible.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RAILROAD GRADE CROSSING
TRAFFIC CONTROL DEVICES

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RAILROAD GRADE CROSSING
TRAFFIC CONTROL DEVICES
RAILROAD GATE ARM LIGHT SPACING

<table>
<thead>
<tr>
<th>Specified Length Of Gate Arm</th>
<th>Dimension A</th>
<th>Dimension B</th>
<th>Dimension C</th>
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<tbody>
<tr>
<td>4.5</td>
<td>700</td>
<td>900</td>
<td>1.5</td>
</tr>
<tr>
<td>4.6-5.99</td>
<td>650</td>
<td>900</td>
<td>1.5</td>
</tr>
<tr>
<td>5.0-5.99</td>
<td>700</td>
<td>925</td>
<td>1.5</td>
</tr>
<tr>
<td>6.0-7.88</td>
<td>750</td>
<td>975</td>
<td>1.5</td>
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<tr>
<td>7.9-8.7</td>
<td>800</td>
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</tr>
<tr>
<td>9.6-10.49</td>
<td>900</td>
<td>1140</td>
<td>1.5</td>
</tr>
<tr>
<td>11.5-12.79</td>
<td>950</td>
<td>1345</td>
<td>1.7</td>
</tr>
<tr>
<td>13.6-15</td>
<td>1000</td>
<td>1475</td>
<td>3.0</td>
</tr>
</tbody>
</table>

MEDIAN SECTION AT SIGNAL GATES

MEDIAN SIGNAL GATES FOR
MULTI LANE UNDIVIDED URBAN SECTIONS
(THREE OR MORE DRIVING LANES IN ONE DIRECTION, 45 mph (70 km/h) OR LESS)

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
DEPARTMENT OF HIGHWAYS

RAILROAD GRADE CROSSING
TRAFFIC CONTROL DEVICES

SIGNED:

[Signature]
[Name]
[Position]
[Date]

[Stamp]

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
DEPARTMENT OF HIGHWAYS

SIGNED:

[Signature]
[Name]
[Position]
[Date]

[Stamp]
DRAWBRIDGE SIGNAL

BLACK OPAQUE LEGEND AND BORDER ON REFLECTORIZED YELLOW BACKGROUND

TO BE USED WITH TYPE I OPERATION, AS SHOWN ON PREVIOUS SHEET
MONOTUBE SUPPORT MOUNTING

GATE & ARM DETAIL

1. Red flashing amber lights shall be mounted on gate and arm support, in the flashing mode only when gate arm is in the lower position or in the process of being lowered. The number of lights shall vary according to length of the gate arm.

TYPICAL LAMP PLACEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION SERVICES DIVISION

TRAFFIC CONTROL DEVICES FOR MOVABLE SPAN BRIDGE SIGNALS

CHUCK G. LEWIS

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17890