ROADWAY AND TRAFFIC DESIGN STANDARDS

APPROVED BY: [Signature]

JANUARY 1985
This document was promulgated at an annual cost of $10.90 per copy to provide standards and criteria for the design, construction and maintenance of highway transportation facilities by governmental agencies, consultants, contractors and the citizens of the State of Florida.
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*1985*
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<thead>
<tr>
<th>INDEX NUMBER</th>
<th>SHEET NUMBER</th>
<th>DESCRIPTION</th>
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<td>104</td>
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<td>Notation added to criteria for paving shoulders on superelevated roadways. General Notes: No. 1 added; slope ratio changed to 3:1 in No. 3.</td>
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<tr>
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<td>Reference added to Note 2.</td>
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<td>Replacement manhole cover deleted. Method of payment added to eyebolt and chain detail.</td>
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<td>General Note No. 2 added. Other notes renumbered.</td>
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<tr>
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<td>Section AA &amp; Modification redrawn for placement of reinforcing steel. General Note No. 5 added. Other notes renumbered.</td>
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<td>Frame height added. Adjustable curb box notation added. Rebars deleted in Section GB.</td>
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<tr>
<td>217</td>
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<td>Dimension 4'-8&quot; changed to 4'-10&quot; on Section (Inlets Types 3, 4 &amp; 5).</td>
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<td>Maximum pipe size 30&quot; changed to 24&quot; for DBI Type H. General Notes: No. 2 reworded; No. 7 added; and, Nos. 8 and 9 renumbered. Sheet renumbered.</td>
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<td>Non-traversable slot details and sod and pavement details deleted. Sheet renumbered. Headings changed in pavement and sodding table.</td>
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<tr>
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<td>Permitted construction joint added to endwall. General Notes: No. 3 to cover all steel; No. 4 added and other notes renumbered. Class I concrete added to tables. Word &quot;corrugated&quot; added to metal pipe headings. Opening areas updated for concrete elliptical pipe</td>
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<td>General Note No. 7 expanded.</td>
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<tr>
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<td>General Note No. 6 added. Other notes renumbered.</td>
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<td>Design Note No. 1 revised to allow 12&quot; and 15&quot; pipe FES in clear zone.</td>
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<tr>
<td>272</td>
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<td>General Notes 10 and 11 revised to allow 12&quot;, 15&quot; and 24&quot; round and equivalent pipe MES in clear zone.</td>
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<tr>
<td>273</td>
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<td>General Notes: No. 9, bituminized fiber pipe deleted; Nos. 10 and 12 added; Nos. 11, 13 &amp; 14 renumbered.</td>
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<td>280</td>
<td>1 of 3</td>
<td>Extra base detail for pipe culverts deleted. Extra base detail for box culverts modified by notes and description. Pipe size and spacing remarked for gutter drains at retaining walls. Note added to concrete jacket detail.</td>
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<td>285</td>
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<td>Limits of pay added to longitudinal section. &quot;Standard&quot; added to dimensions of cross sections. General Notes: No. 7 added; Nos. 8, 9 and 10 renumbered; and, No. 10 expanded to include pipe plug cost. Design Notes: Added</td>
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<td>Method of payment added to details. Method of payment added to details and General Notes.</td>
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<tr>
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<td>1 of 4</td>
<td>Deleted joint sealant details. Deleted reference to joint sealant details in all drawings and deleted most joint dimensioning. Added note to reference all drawings to &quot;Joint Dimensions&quot;, Sheet 2 of 4. Changed title in tie bar chart.</td>
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<td>4 of 4</td>
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<td>All 4</td>
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<td>400</td>
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<td>General Note No. 10: Use of amber and clear reflector redefined.</td>
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<td></td>
<td>7 of 13</td>
<td>Timber break-away post surface described.</td>
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<td>8 of 13</td>
<td>Notation for 8' median shoulders added to Detail K and Standard Flare details.</td>
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<tr>
<td></td>
<td>9 of 13</td>
<td>Shoulder slope back of rail added.</td>
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<tr>
<td></td>
<td>10 of 13</td>
<td>Year reference deleted and aluminum alloy type corrected on reflector assembly. Safety pipe rail notation expanded. Slope rate added to Detail L.</td>
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<tr>
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<td>Concrete post reference deleted.</td>
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<tr>
<td>410</td>
<td>1&amp;2 of 3</td>
<td>Renumbered.</td>
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<td>3 of 3</td>
<td>New sheet.</td>
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<td>Lengths of approach, pull, end and corner posts reduced to 8'-6&quot;.</td>
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<td>452</td>
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<td>General Note No. 4: Galvanizing rate changed from 2.0 to 1.8 oz. per s.f. in A. through F. Offset dimension added to &quot;Fence Position At Locations Without Frontage Roads&quot;. &quot;Barbed Wire Attachment&quot; detail completely revised.</td>
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<td>500</td>
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<td>Underdrain sections modified to conform with new Index No. 286.</td>
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<tr>
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<td>Notes transferred to General Notes and reference notations. General Note No. 2 added (Muck defined).</td>
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<td>513</td>
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<td>General Notes added.</td>
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<tr>
<td>515</td>
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<td>Limits of base redefined on &quot;Limits of Clearing --- At Intersections&quot;. Pipe arch changed to 17&quot; x 13&quot; in &quot;Rural Turnout Construction&quot;.</td>
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<td>560</td>
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<td>Crossing &quot;Type G Modified&quot; revised to suit railroad shop drawings.</td>
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<td>Notation (1) added to &quot;Crossing Type P&quot;.</td>
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<td>600</td>
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<td>Guardrail added to left side approach (right departure) and pavement transition labeled.</td>
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<td>630</td>
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<td>Sign No. 3 at transition barricades relocated.</td>
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### STANDARD SYMBOLS FOR PLAN SHEETS

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<th>Traffic Signals Symbols</th>
<th>Lighting Symbols</th>
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<tr>
<td><strong>TRAFFIC SIGNAL HEAD</strong></td>
<td><strong>NEW POLE &amp; LUMINAIRE</strong></td>
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<tr>
<td>(SPN WIRE MOUNTED)</td>
<td><strong>EXISTING POLE &amp; LUMINAIRE</strong></td>
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<td>(PEDESTAL MOUNTED)</td>
<td><strong>EXISTING POLE &amp; LUMINAIRE TO BE REMOVED</strong></td>
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<td>(MAST ARM MOUNTED)</td>
<td><strong>FINAL POSITION OF RELOCATED OR ADJUSTED POLE &amp; LUMINAIRE</strong></td>
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<td><strong>TRAFFIC SIGNAL POLE</strong></td>
<td><strong>NEW HIGH MAST LIGHTING TOWER</strong></td>
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<tr>
<td>(CONCRETE, WOOD, METAL)</td>
<td><strong>CITY OR UTILITY OWNED LUMINAIRE &amp; POLE</strong></td>
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<td><strong>VEHICLE DETECTOR (LOOPS)</strong></td>
<td><strong>PVC (POLYVINYL CHLORIDE) LIGHTING CONDUIT AND CONDUCTORS</strong></td>
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<td><strong>CONDUIT</strong></td>
<td><strong>RIGID GALVANIZED LIGHTING CONDUIT AND CONDUCTORS</strong></td>
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<td><strong>VEHICLE DETECTOR (OTHERS)</strong></td>
<td><strong>CONCRETE LIGHTING PULL-BOX</strong></td>
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<td><strong>PEDESTRIAN DETECTOR</strong></td>
<td><strong>WATERPROOF LIGHTING PULL-BOX</strong></td>
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<td>(PUSHBUTTON)</td>
<td><strong>LIGHTING DISTRIBUTION POINT</strong></td>
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<td><strong>PEDESTRIAN SIGNAL HEAD</strong></td>
<td><strong>NEW JOINT USE POLE</strong></td>
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<td>(POLE OR PEDESTAL MOUNTED)</td>
<td><strong>EXISTING USE POLE</strong></td>
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<td><strong>CONTROLLER CABINET (BASE MOUNTED)</strong></td>
<td><strong>UNDER DECK LIGHTING FIXTURE</strong></td>
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<tr>
<td><strong>CONTROLLER CABINET (POLE MOUNTED)</strong></td>
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- **WALK - DON'T WALK**  
- **FLASH**  
- **SIGNAL FACE NUMBER**  
- **ITEM NUMBER**  
- **SIGNAL LENS**  
- **PROGRAMMED SIGNAL HEAD**  
- **MESSAGER WIRE**  
- **POLE TABULATION CROSS REFERENCE**  
- **POLE TABULATION CROSS REFERENCE (JOINT USE POLE)**  
- **SIGNAL PHASE**

### Signing and Pavement Marking Symbols

- **PAVEMENT ARROW**  
- **SINGLE SOLID LINE**  
- **DOUBLE SOLID LINE**  
- **SKIP LINE**  
- **STOP BAR**  
- **TRAFFIC SIGN (POST MOUNTED)**  
- **TRAFFIC SIGN (OVERHEAD)**  
- **SIGN NUMBER**  
- **SIGN ITEM NUMBER**  
- **TRAFFIC FLOW ARROW**
**GENERAL DESIGN NOTES**

1. Booms should be as deep as practical with a minimum depth of 2.0 feet.
2. In Type A, when the top of embankment is below high water, force main will rise above the top of the embankment.
3. In Type B, the weir shall be located as far from the embankment as practicable. On steep ditch grades two or more weirs may be required. Intermediate weirs shall be constructed without stirring beams.
4. In Type B, the 6" PVC pipe shall be constructed unless shown otherwise in the plans.

**GENERAL CONSTRUCTION NOTES**

1. Fence materials shall be aluminum or concrete only.
2. Aluminum pipe shall be 3" diameter minimum. Minimum pipe diameter shall be in accordance with Index 452. Concrete pipe and rail bridges shall be in accordance with Index 452. All pipe to be set in concrete.
3. Fabric shall be minimum to reduce damage and to keep to posts and trees at least 6' centers.
4. For additional details of framing, see Index Nos. 400 and 402.
5. All boom steps to be 1 foot unless otherwise in the plans.
6. Sediment basins to be constructed prior to commencement of final construction maintenance and clean out to be done by the Contractor with acceptance of project by the Engineer.

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**TRASH RETAINER AND SEDIMENT BASIN**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**Road Design**

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**DETAIL**

**Scale:** 1/2" = 1'-0"
NOTE: Spacings shown in this chart are based on generalized conditions and should be adjusted based on actual site performance or hydraulic computations.

FLOW RATES (CF S)

- Very Light: < 5
- Light: 5 - 10
- Moderate: 10 - 15
- Heavy: 15 - 25
- Very Heavy: > 25 - 40

LEGEND

Flow
Soils

SOILS

- Cohesive
  - Clayey
  - Clayey - Silty
  - Clayey - Silty - Silt

- Non-Cohesive
  - Gravelly
  - Silt Loam
  - Sandy Loam
  - Course Sand
  - Fine Sand

Consider Use Of Temporary Soil

Chart I

RECOMMENDED SPACING FOR TYPE I AND TYPE II HAY BALES BARRIERS, TYPE III STAKED SILT BARRIERS, TYPE IV SILT FENCE AND PAVED DITCH HAY BALES BARRIERS
PROTECTION AROUND INLETS OR SIMILAR STRUCTURES

BALES BACKED BY FENCE

DITCH INSTALLATIONS AT DRAINAGE STRUCTURES

DITCH BOTTOM INLET

ANCHOR BALE WITH 2-2½ X 2½ X 4' SKEINS PER Bale

ANCHOR BALE WITH 2-2½ X 2½ X 4' SKEINS PER Bale

Type A or B Fence
Note: Stakes to be checked at the discretion of the engineer.
Loose Soil Flushed By Seward And Lightly Compacted Along Usable Face Of Ditch.

ANCHOR BALE WITH 2-2½ X 2½ X 4' SKEINS PER Bale

ANCHOR BALE WITH 2-2½ X 2½ X 4' SKEINS PER Bale

Loose Soil Flushed By Seward And Lightly Compacted Along Usable Face Of Ditch.

ANCHOR BALE WITH 2-2½ X 2½ X 4' SKEINS PER Bale

ANCHOR BALE WITH 2-2½ X 2½ X 4' SKEINS PER Bale

Loose Soil Flushed By Seward And Lightly Compacted Along Usable Face Of Ditch.

ELEVATION

APPLICATION AND SPACING: The use of Types I & II bale barriers shall be limited to the conditions outlined in Chart 1, Sheet 2 of 2, Index No. 103.

ELEVATION

ELEVATION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

BALED HAY OR STRAW BARRIERS

DRAWN BY:
CHECKED BY:
APPROVED BY:

1 OF 1

103
SHOULDER AND SLOPE TREATMENT FOR SUPERELEVATED ROADWAYS

SECTION AA
(Symmetrical About L)

SECTION BB
(Symmetrical About L)

OVERLAPPED 500 FLUME

SHOULDER AND SLOPE TREATMENT IN SAG VERTICAL CURVES

Erosion Control Details for Permanent Construction

GENERAL NOTES
1. Erosion control details are applicable to new construction, reconstruction and RRB projects.
2. For grading adjacent to ditches and or headwalls, see Item No. 280.
3. All front slopes steeper than 1:1 are to be seeded.

RURAL UNDIVIDED

Criteria for Paving Should for
DIVIDED AND UNDIVIDED FACILITIES

<table>
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<th>Design Speed</th>
<th>Degree of Curve</th>
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<tr>
<td>40</td>
<td>7° or greater</td>
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<tr>
<td>50</td>
<td>5° or greater</td>
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<tr>
<td>60</td>
<td>4° or greater</td>
</tr>
<tr>
<td>80</td>
<td>3° or greater</td>
</tr>
<tr>
<td>100</td>
<td>2° or greater</td>
</tr>
</tbody>
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Note: Paved shoulders are required on all curves meeting the criteria tabulated above. For curves not meeting the criteria, shoulders are to be paved where erosion of the shoulder is evident or anticipated.

RURAL DIVIDED
**SHOULDER SODDING AND REWORKING ON EXISTING FACILITIES**

**SHOULDER SODDING**

**SHOULDER REWORKING**

**GENERAL NOTES**
1. Special attention is to be directed to the construction of the required slope at the bottom of ditch.
2. Fertilize entire improved shoulder and front slope of any slope or bottom of ditch.
3. Topsoil obtained from borrow pits or other sources may be used in lieu of excavated turf and topsoil when economically feasible. No additional payment will be made for substituting topsoil for excavated turf or topsoil.
4. Payment for excavation of turf and topsoil and for backfill of this material is Detal 1 R-2.

**SEEDING RATES (Lbs/Ac)**

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<th>TYPE OF SEED</th>
<th>ZONE I</th>
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<td>Co/In</td>
<td>Co/In</td>
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<tr>
<td><strong>PERMANENT GRASS</strong></td>
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<tr>
<td>Unhulled Bermuda</td>
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<tr>
<td>Bahia Argentina Or Passaqui</td>
<td>30</td>
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<tr>
<td><strong>QUICK GROWING</strong></td>
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<td>Brown Top Moler</td>
<td>20</td>
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<tr>
<td>Annual Rye Grass</td>
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<td>20</td>
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<tr>
<td><strong>TOTAL POUNDS PER ACRE</strong></td>
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<td>35</td>
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</table>

**Note:** The seeding rates shown in this table apply only when seed is spread by an approved mechanical spreader meeting the requirements of Section 57.0 and 577 of the Standard Specifications.
**EYE BOLT AND CHAIN REQUIREMENTS**

<table>
<thead>
<tr>
<th>Index</th>
<th>Nut Type</th>
<th>Eye Bolts</th>
<th>Chain Length</th>
<th>Handling &amp; Remarks</th>
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<tbody>
<tr>
<td>217</td>
<td>M8 x 1.25</td>
<td>1 x 2&quot;</td>
<td>Side &amp; Span</td>
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<tr>
<td>218</td>
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<td>219</td>
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<td>2 x 2.5&quot;</td>
<td>Side &amp; Span</td>
<td></td>
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<tr>
<td>220</td>
<td>M8 x 1.25</td>
<td>2 x 3&quot;</td>
<td>Side &amp; Span</td>
<td></td>
</tr>
</tbody>
</table>

**Note**
- When Alternate Grade is specified, the chain, nut, washer, and cold shoe shall be galvanized in accordance with the specifications for the pipe.
- The size of eye bolt and chain to be used in the contract unit price for chains.

**CHANNELIZATION**

Channelization required at all drainage structures with two or more pipes.

Smooth flow channels composed of concrete or brick and mortar shall be constructed in the bottoms of all structures to a depth equal to half the diameter of the largest pipe.

**LADDER BARS FOR STRUCTURES OVER 10' IN DEPTH**

**ALTERNATE LOCATION OF PIPE IN STRUCTURE WHEN PREFABRICATED FLOOR SLAB IS USED**

Complete flow channel is required when there is flow through the structure.
### General Notes

1. The tabulated values are recommended minimum dimensions to withstand anticipated highway traffic loads. Additional cover may be required to support construction equipment loads or highway traffic loads before pavement is completed.

2. Less than the tabulated minimum cover may be used provided suitable methods are utilized in the plans. These features may include but are not limited to extra strength pipe, select bedding, select backfill, encroachment and etc.

3. Values shown in parentheses are for T.A. corrugations which must be specified to utilize the lesser cover.

4. Commercial and noncommercial refers to typical vehicular utilization of unpaved roads and drives where rutting and cover displacement may occur.

### Minimum Cover for Pipe Culverts

<table>
<thead>
<tr>
<th>PIPE TYPE/SIZE &amp; SHAPE</th>
<th>MINIMUM COVER</th>
<th>NON COVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONCRETE All Round</td>
<td>15&quot; 9&quot;</td>
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<tr>
<td>15&quot;-20 Round</td>
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### Supplemental Table

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<th>PIPE TYPE/SIZE &amp; SHAPE</th>
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<th>NON COVER</th>
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</table>

### Diagram

- **Rigid Pavement** (Dowel Joints and Good Condition)
- **Flexible Pavement** (Joints Not Dowel Or Poor Condition (Fractured))
- **Unpaved**

Minimum Cover

Minimum Cover See Extra Base Detail Right
<table>
<thead>
<tr>
<th>INDEX NO.</th>
<th>INLET TYPE</th>
<th>CURB / GUTTER</th>
<th>GRADE CONSIDERATION</th>
<th>HYDRAULIC INTAKE (CF/S)</th>
<th>BICYCLE SAFE PEDESTRIAN SAFE</th>
<th>UTILITY LOCATION FROM CURB</th>
<th>MAXIMUM PIPE SIZE WITH STANDARD BOTTOMS</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>210</td>
<td>E &amp; F</td>
<td>Continuous</td>
<td>4.1</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>30°</td>
<td></td>
<td></td>
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<tr>
<td>211</td>
<td>E &amp; F</td>
<td>Seg</td>
<td>9.0</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>30°</td>
<td></td>
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<tr>
<td>212</td>
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<td>213</td>
<td>E &amp; F</td>
<td>Seg</td>
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<td>Yes / Limited</td>
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<td>30°</td>
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<td>E &amp; F</td>
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<tr>
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<td>E &amp; F</td>
<td>Seg</td>
<td>7.5</td>
<td>Yes / Limited</td>
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<td>30°</td>
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<tr>
<td>216</td>
<td>Separator 1</td>
<td>Continuous / Seg</td>
<td>4.4</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>24° Longitudinal 30° Transverse</td>
<td>To be used only where flows are light to moderate and R&amp;W does not permit the use of channelized curb inlets. Should be directed to major flow direction.</td>
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<tr>
<td>217</td>
<td>Separator 2</td>
<td>Continuous / Seg</td>
<td>4.4</td>
<td>Yes / Limited</td>
<td>Inside 24° Longitudinal 30° Transverse</td>
<td>To be used only where flows are light and R&amp;W does not permit the use of channelized curb inlets.</td>
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<tr>
<td>218</td>
<td>F</td>
<td>Continuous / Seg</td>
<td>0.5</td>
<td>Yes / Yes</td>
<td>Outside 30°</td>
<td>To be used only where flows are light and R&amp;W does not permit the use of channelized curb inlets.</td>
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<tr>
<td>219</td>
<td>F</td>
<td>Continuous / Seg</td>
<td>0.3</td>
<td>Yes / Yes</td>
<td>Outside 30°</td>
<td>To be used only where flows are light and R&amp;W does not permit the use of channelized curb inlets.</td>
<td></td>
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</tbody>
</table>

**Legend:**
- **Hydraulic intake values do not represent hydraulic capacity but are shown to compare inlets based on a 0.2% longitudinal slope, 0.2% cross slope and a 90% efficiency factor. For other conditions, the values shown should be adjusted for bypass flow or debris blockage. Seg intake value is based on flooding the outside lane or shoulder, where spread rather than hydraulic intake may dictate inlet selection or spacing. Full design data and additional information is available in "A Study of Stormwater Inlet Capacities" by U.S.P.
- **Pipe sizes are circular, class III B wall, concrete pipe Elliptical pipe and corrugated pipe are to be checked for fit in accordance with Index No. 200. Metal pipe sizes should be reviewed using 2.5 X 2.5 corrugation up to 30° and 3.4 X 1 corrugation for larger sizes.**
- **Curb inlets and transitions should be located outside pedestrian crosswalk areas, preferably upgrade from these locations.**
- **Double channelized inlets are usually not warranted unless maximum flow is in excess of 5 feet distance or 0.5 cfs.**
- **Median Barrier inlets types 1, 2, 3, 4, 5 can be made bicycle and pedestrian safe by specifying the roughness grade.**
GENERAL NOTES

1. The finished grade and shape of the wall tops are to conform with the finished cross slopes and
grade of the proposed embankment and the header wall.
2. All arches are to be constructed as a spandrel to the plans to prevent the failure of the abutments, where
necessary, comply with the most resistant spandrel detail shown. Bond steel when necessary.
3. All shear in sheared top angle 1/4" with a 1/8" dowel unless otherwise shown. Steel top angle shall be either
used in plain or protected concrete.
4. The die will portion of steel top angle types 2, 3, 5, 6 may be constructed with break. Details to top out required
5. Only round reinforcing bars will be used unless otherwise shown.
6. For supplemental details see index No. 201.
7. These plans are to be used with Curb and Gutter Types 2, 3, 6 unless otherwise noted. Further details of
   pedestrian crossings are shown.
8. For structure bottoms see index No. 200.

INLET TYPE 1

SECTION AA

INLET TYPE 3

SECTION BB

INLET TYPE 4

SECTION BB

SECTION BB

DIMENSIONAL SECTION

DIMENSIONAL SECTION

DIMENSIONAL SECTION

REINFORCING SECTION

3'-6" DIA. STRUCTURE BOTTOM (SECTION AA)

REINFORCING SECTION

4'-0" DIA. STRUCTURE BOTTOM (SECTION AA)

DIMENSION B REINFORCING

SECTION FOR TYPE C CURB

SLAB REINFORCING INLETS 1, 2, 3 and 4

TABLE OF VARIABLE DIMENSIONS

| DIMENSION | 3'-6" | 4'-0"
|-----------|-------|-------
| Width     | 1'-0" | 1'-0"
| Depth     | 1'-0" | 1'-0"
| Height    | 1'-0" | 1'-0"
| Length    | 1'-0" | 1'-0"

Curb Inlet Tops

Types 1, 2, 3, 4

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Curtis: 1/201
CAST IRON COVER AND GALVANIZED STEEL FRAME

ALTERNATE G DETAIL

FRAME

(For Cast Iron Cover)

SECTION FF

(For Cast Iron Cover)
FRAME AND GRATE

TOP SLABS

GENERAL NOTES
1. This inlet is primarily intended for locations with right to centerline flows where right of way does not permit the use of traditional curb inlets. Types I through 6. The typical application is on curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.
2. This inlet is to be located in vertical headed curb such as curb and gutter Type F. Grate shall be secured with nuts secured toward centerline flow. inlet to be located outside sidewalk intersection where practical.
3. For structure bottoms see Index No. 200. For supplemental details see Index No. 200.
4. All steel in slab top shall have 1/2" minimum cover unless otherwise shown. Type shall be either cast in place or precast concrete.
5. For alternate B applications, top slab openings shall be placed such that 2 edges of inlet frame will be located directly above bottom or center wall.
6. For bottom Type J applications without use top type J-T Index No. 200. From opening in top into as detailed above.
7. Frames may be adjusted with one in six courses of bricks.
8. Inlet and grate detail shown is nominal R-350EL-L. Viewed grates with approximately equal opening shall be permitted. See AASHTO H-20 loading. Inlet and grate shall be Class 30 castings in accordance with ASTM A 46. Grates shall be reversible, right or left.

CURB INLET TOP

TYPE 9
## APPLICATION AND SELECTION GUIDE FOR DITCH BOTTOM AND MEDIAN INLETs

<table>
<thead>
<tr>
<th>INDEX NO.</th>
<th>TYPE</th>
<th>LOCATION</th>
<th>CAPACITY</th>
<th>SAFETY</th>
<th>PIPE SIZE LIMITATION</th>
<th>OTHER DESIGN CONSIDERATIONS</th>
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<td>230 A</td>
<td>C</td>
<td>Limited Access Facilities</td>
<td>5</td>
<td>Heavy Wheel Loads</td>
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<td>No</td>
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<td>231 B</td>
<td>C</td>
<td>Limited Access Facilities</td>
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<td>Heavy Wheel Loads</td>
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<td>Yes</td>
<td>Poor</td>
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<td>Heavy Wheel Loads</td>
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<td>Yes</td>
<td>Poor</td>
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</table>
| 232 G     | Inside CZ | 21 **    | Heavy Wheel Loads | Yes | Yes | Poor | 4'-4" | 36" | 5'-0" | 42" | *
| 234 J     | Inside CZ | 10 **    | Heavy Wheel Loads | Yes | No | Fair | 2'-11" | 24" | 4'-0" | 36" |
| 235 K     | Outside CZ | -- **   | N/A      | NA | NA | Good | 3'-0" | 36" |

### GENERAL NOTES

1. All inlets must be selected to satisfy hydraulic suitability, with proper consideration given to safety and economics.
2. CZ denotes clear zone, formerly CRA denoting clear recovery area.
3. Alternate G grates should be specified when in salt water environment.
4. Inlets C, D and E capacity and debris tolerance may be increased by the addition of a slot. Traversable slots should be utilized when subject to high speed traffic or when pedestrians are anticipated. Traversable slots are not adaptable to inlet Type F.
5. Special ditch blocks require plan details.
6. Pipe size limitations are based on circular Class III, B Well, Concrete Pipe. Elliptical pipe and corrugated pipe are to be checked to fill in accordance with Inlet No. 205. Metal pipe sizes should be reviewed using 24" x 3" corrugation up through 30" and 3½" corrugation for larger sizes.
7. Figures shown for capacity are approximate, and are intended as a guide to assist in determining relative performance.
8. Debris buildup may occur on Type B grating.

---

**DITCH BOTTOM AND MEDIAN INLET SELECTION GUIDE**

<table>
<thead>
<tr>
<th>No</th>
<th>Date</th>
<th>Document Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>229</td>
<td>7/1/2006</td>
<td>THE PHILADELPHIA \ TRAFFIC BOARD</td>
</tr>
</tbody>
</table>

---

**STATE OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION**

**HIGHWAY DEPARTMENT**

**DITCH BOTTOM AND MEDIAN INLET SELECTION GUIDE**

**Design No.** | **Sheet No.** | **Scale** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>229</td>
<td>1 of 1</td>
<td>1/1</td>
</tr>
</tbody>
</table>
SODDING, PAVEMENT AND DITCH BLOCK

SECTION AA

SECTION BB

SECTION CC

SECTION DD

INLET WITH BOTTOM TYPE J

RECOMMENDED MAXIMUM PIPE SIZES

<table>
<thead>
<tr>
<th>INLET WIDTH</th>
<th>Pipe Size</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'</td>
<td>3&quot;</td>
<td>A</td>
</tr>
<tr>
<td>8'</td>
<td>4&quot;</td>
<td>B</td>
</tr>
<tr>
<td>10'</td>
<td>6&quot;</td>
<td>C</td>
</tr>
<tr>
<td>Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be approved by the Engineer. See index no 200 for sizes.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. NOTICE: Care should be exercised with regard to the portion of limited access facilities not subject to pedestrian and/or vehicle access.

2. Note: See notes for: streets, sidewalks or other areas subject to heavy wheeled loads, where DPCD may be a problem, and/or where other 2" or more.

3. Sectioning must be 2" unless otherwise noted. It is recommended that all work be fully supported by 6" minimum reinforcement from pipe.

4. Where sewer 6" or greater are specified in the plans, the pipes must be backfill and/or top surface groundcreased after construction.

5. Ditch paving to be considered in cost of inlet. Paving to be paid for under the contract and price for Sodding SY.

6. For supplementary notes see index no 200.

DITCH BOTTOM INLET TYPE B

STATE OF OHIO DEPARTMENT OF TRANSPORTATION

DESIGN NO.
GENERAL NOTES

1. These units are designed for use on driveways, parking, pedestrian areas, or other areas subject to heavy wheel loads where direct embedment in soil is undesirable and is subject to undergo
   severe bicycle traffic.

2. When alternate B grade is specified in plans, the grate is to be hot dipped galvanised after fabrication.

3. These units may be used with structure:
   Aluminum Type A, A122 - order any lower combinations and note for upper the correct weight, i.e., 1/4" grate - Type A 61/16 #1 (Type F 12/3 #1).
**GENERAL NOTES**

1. This inlet is designed for ditches, railroads, or other areas subject to heavy wheel loads, where only light debris is expected, and pedestrian traffic is anticipated. **NOTICE:** Inlet not for use in areas subject to bicycle traffic.

2. **Reinforcing** - No. 4 bars of 1/2" centers both ways with 2" clearance to inside face. Cut-in bends bars out of way of pipe when necessary. Bars to clear pipe by 1/2.

3. When alternate 2 grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.

4. For supplemental details, see Index 201.

5. **Cost of ditch paving to be included in cost of inlet.**

Sodding to be paid for under contract unit price for sodding, 9 T.

---

**SECTION CC**

**SECTION BB**

**SECTION AA**

**SECTION DD**

**STEEL GRATING**

**Note:** Two required per inlet

Main Bars 5/8" x 1/2" (Nondield for Cross Bars)
Cross Bars 1/4" x 3/4" (Continuously Welded At Main Bar Nipples)
Main Bars and Cross Bars Flush On Top.

---

**DITCH BOTTOM INLET TYPE J**
<table>
<thead>
<tr>
<th>INDEX NO.</th>
<th>TYPE</th>
<th>PIPE SIZE</th>
<th>CROSSRAIN</th>
<th>SIDERAIN</th>
<th>MEDIAN</th>
<th>APPLICABLE</th>
<th>HYDRAULIC PERFORMANCE</th>
<th>Kg</th>
<th>APPLICABLE</th>
<th>EROSION TOLERANT</th>
<th>PERMITTED LOCATION</th>
<th>TRAFFIC-SAFE GRADE AVAILABLE</th>
<th>ECONOMIC RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>Straight Concrete</td>
<td>Single and Multiple 6&quot; Thru 24&quot;</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside CZ</td>
<td>No</td>
<td>Fair</td>
</tr>
<tr>
<td>251</td>
<td>Straight Concrete</td>
<td>Single and Double 60&quot;</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside CZ</td>
<td>No</td>
<td>Fair</td>
</tr>
<tr>
<td>252</td>
<td>Straight Concrete</td>
<td>Single and Double 66&quot;</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside CZ</td>
<td>No</td>
<td>Fair</td>
</tr>
<tr>
<td>253</td>
<td>Straight Concrete</td>
<td>Single and Double 72&quot;</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside CZ</td>
<td>No</td>
<td>Fair</td>
</tr>
<tr>
<td>255</td>
<td>Straight Concrete</td>
<td>Single 84&quot;</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside CZ</td>
<td>No</td>
<td>Fair</td>
</tr>
<tr>
<td>258</td>
<td>Straight Sand Cement</td>
<td>Single or Multiple 18&quot; Thru 64&quot;</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>260</td>
<td>U Type Concrete</td>
<td>Single 15&quot; Thru 30&quot;</td>
<td>Limited</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Fair</td>
<td>0.7</td>
<td>Yes</td>
<td>Very Good</td>
<td>Inside CZ</td>
<td>Required</td>
<td>Good</td>
</tr>
<tr>
<td>261</td>
<td>U Type Concrete</td>
<td>Single 15&quot; Thru 30&quot;</td>
<td>Limited</td>
<td>No</td>
<td>Yes</td>
<td>Limited</td>
<td>Good</td>
<td>0.5-0.7</td>
<td>Yes</td>
<td>Good</td>
<td>Inside CZ</td>
<td>Yes</td>
<td>Fair</td>
</tr>
<tr>
<td>264</td>
<td>Concrete</td>
<td>Single 30&quot; Thru 72&quot;</td>
<td>Limited</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>No</td>
<td>N/A</td>
<td>Outside CZ</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>266</td>
<td>Winged Concrete</td>
<td>Single 12&quot; Thru 48&quot;</td>
<td>Limited</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Very Good</td>
<td>0.3</td>
<td>Yes</td>
<td>Good</td>
<td>Outside CZ</td>
<td>No</td>
<td>Good</td>
</tr>
<tr>
<td>268</td>
<td>U Type Sand Cement</td>
<td>Single or Multiple 15&quot; Thru 60&quot;</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>270</td>
<td>Flared End Section Concrete</td>
<td>Single 12&quot; Thru 72&quot;</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td>0.5</td>
<td>Yes</td>
<td>Very Good</td>
<td>Outside CZ</td>
<td>No</td>
<td>Very Good</td>
</tr>
<tr>
<td>272</td>
<td>Cross Drain Mined End Section Concrete</td>
<td>Single 12&quot; Thru 72&quot;</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Fair</td>
<td>0.7</td>
<td>Yes</td>
<td>Very Good</td>
<td>Outside CZ</td>
<td>No</td>
<td>Very Good</td>
</tr>
<tr>
<td>273</td>
<td>Cross Drain Mined End Section Concrete</td>
<td>Single 12&quot; Thru 72&quot;</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Fair</td>
<td>0.7</td>
<td>Yes</td>
<td>Very Good</td>
<td>Inside CZ</td>
<td>Yes</td>
<td>Good</td>
</tr>
<tr>
<td>274</td>
<td>Cross Drain Mined End Section Concrete</td>
<td>Single 15&quot; Thru 24&quot;</td>
<td>No</td>
<td>Yes</td>
<td>*</td>
<td>Yes</td>
<td>Fair</td>
<td>0.7</td>
<td>Yes</td>
<td>Very Good</td>
<td>Inside CZ</td>
<td>No</td>
<td>Fair</td>
</tr>
</tbody>
</table>

1. All end treatments must be selected to satisfy hydraulic considerations with proper consideration given to safety and economics.
2. CZ denotes clear zone, formerly CRA denoting clear recovery area.
3. Grates should not be placed on outlet ends unless positive debris protection is provided at inlet end.
4. Additional notes concerning application restrictions may be shown on individual indexes.
5. Economic ratings are based on statewide average costs.
6. End treatments with a Kg of 0.5 or greater should be used only in areas of low design velocities and negligible debris.
7. Pipe sizes are in inches, Class 23 S.W.M. concrete pipe. Elliptical pipe and corrugated pipe are not included for design in accordance with index No. 200. All pipe sizes 15" and smaller should be 24" or larger in size.
ENWWALL DIMENSIONS (EXCLUSIVE OF MULTIPLE PIPE SPACING)

ENDWALL POSITIONS FOR SINGLE AND MULTIPLE PIPE AND SPACING FOR MULTIPLE PIPE
### DATA AND ESTIMATED QUANTITIES FOR ONE ENDWALL

#### ROUND CONCRETE AND CORRUGATED METAL PIPE

<table>
<thead>
<tr>
<th>Opening Area (SF)</th>
<th>Dimensions</th>
<th>Class I Concrete (CY)</th>
<th>Number and Type of Pipe and Swell Angle of Pipe</th>
<th>Double</th>
<th>Triple</th>
<th>Quadruple</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Concrete</td>
<td>CM</td>
<td>Concrete</td>
<td>CM</td>
<td>Concrete</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single</td>
<td></td>
<td>Triple</td>
<td></td>
<td>Quadruple</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

#### CORRUGATED METAL PIPE ARCH

<table>
<thead>
<tr>
<th>Opening Area (SF)</th>
<th>Dimensions</th>
<th>Class I Concrete (CY)</th>
<th>Number of Pipe and Swell Angle of Pipe</th>
<th>Double</th>
<th>Triple</th>
<th>Quadruple</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### CONCRETE ELLIPTICAL PIPE

<table>
<thead>
<tr>
<th>Opening Area (SF)</th>
<th>Dimensions</th>
<th>Class I Concrete (CY)</th>
<th>Number of Pipe and Swell Angle of Pipe</th>
<th>Double</th>
<th>Triple</th>
<th>Quadruple</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Use the guidelines of General Note No. 7 for selecting tabular quantities.

---

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**HIGHWAY NOTE NO. 313**

**DESIGN AND SPECIFICATION**

**SINGLE AND MULTIPLE PIPE**

Data Sheet Z-451

Scale 1/4" = 1'-0" on State Project No.

Project No. 86-010

By: D. M. Fath

Date: 9-2-2000

Rev.: 1

Drawn By: S. S. Harvard

Sheet: 1

Scale: 1/4" = 1'-0"

SHEET 250
PLAN
(Showing Bars in Plan)

HALF ELEVATION
(Showing Bars in Beam Face of Wall)

TYPICAL SECTION
(Showing Bars in Beam Face of Wall)

NOTE: CUT AND FIELD BEND
BARS AS SHOWN

SYMMETRICAL ABOUT E

CONCRETE CLASS:
C 25

REINFORCING STEEL:
L. R. 25

BILL OF REINFORCING STEEL

<table>
<thead>
<tr>
<th>Item</th>
<th>Section</th>
<th>Size</th>
<th>No. of Req.</th>
<th>Length</th>
<th>Location</th>
<th>Bending</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>8D</td>
<td>42 4&quot;</td>
<td>FT O.C.</td>
<td>STRAIGHT</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>11D</td>
<td>42 4&quot;</td>
<td>TO POCKET</td>
<td>STRAIGHT</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>22D</td>
<td>36 4&quot;</td>
<td>WALL BEND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>18D</td>
<td>36 4&quot;</td>
<td>WALL STRAIGHT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>8D</td>
<td>27 4&quot;</td>
<td>WALL STRAIGHT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: All bar dimensions are cut out.

Estimate Quantities

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
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<td>C 25</td>
<td></td>
<td>1.53</td>
</tr>
<tr>
<td>L 25</td>
<td></td>
<td>1.45</td>
</tr>
</tbody>
</table>

State of Florida Department of Transportation
Endwall Design

STRAIGHT CONCRETE ENDMALLS
SINGLE AND DOUBLE 66'' CONCRETE PIPE

Note: See Sheet 1 of 2 for General Notes.
GENERAL NOTES
2. Reinforcing Steel: Grade 40 or 60
3. Concrete: Class II
4. Chamfer: All exposed edges and corners to be chamfered 1/2" unless otherwise shown.
5. Sizing shall be in accordance with sizes 2B6 and paid for under the contract unit price for Sizing SY.
6. Endwalls to be paid for under the contract unit price for Class II Concrete (End-walls) CY and Reinforcing Steel (Roadway) L.B.

BILL OF REINFORCING STEEL

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIZE</th>
<th>NO.</th>
<th>FEET</th>
<th>LENGTH</th>
<th>LOCATION</th>
<th>BENDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>5</td>
<td>1' - 6&quot;</td>
<td>6'</td>
<td>WALL</td>
<td>STRAIGHT</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>5</td>
<td>1' - 6&quot;</td>
<td>6'</td>
<td>WALL</td>
<td>STRAIGHT</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>5</td>
<td>1' - 6&quot;</td>
<td>6'</td>
<td>WALL</td>
<td>STRAIGHT</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>5</td>
<td>1' - 6&quot;</td>
<td>6'</td>
<td>WALL</td>
<td>STRAIGHT</td>
</tr>
<tr>
<td>E</td>
<td>E</td>
<td>5</td>
<td>1' - 6&quot;</td>
<td>6'</td>
<td>WALL</td>
<td>STRAIGHT</td>
</tr>
</tbody>
</table>

BENDING DIAGRAMS

<table>
<thead>
<tr>
<th>BAR</th>
<th>BEND</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>WALL</td>
</tr>
<tr>
<td>D</td>
<td>WALL</td>
</tr>
<tr>
<td>E</td>
<td>WALL</td>
</tr>
</tbody>
</table>

NOTE: All bar dimensions are 1/2" unless otherwise specified.

ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>FORM</th>
<th>UNIT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONCRETE</td>
<td>CY</td>
<td>1015 cu ft</td>
</tr>
<tr>
<td>REINFORCING STEEL</td>
<td>lb</td>
<td>924 lb</td>
</tr>
</tbody>
</table>

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 72" CONCRETE PIPE

ARCH. PROJECT # 09-92

[Signature]

253
GENERAL NOTES

1. Baffles to be constructed only when called for in plans.
2. When steel grating is required an endwall see Sheet 2 of 2 for details.
3. All reinforcing No. 4 bars with 2" clearance except as noted.
4. All angles, channels and bars to be ASTM A 598 weathering steel, except grates exposed to salt water shall be ASTM A 572 Grade 50 steel and galvanized in accordance with Section 962-7 of the Standard Specifications, and shall be designated on the plans as Alternate G.
5. Channel section C3 x 6" may be substituted for the C4 x 54" channel.
6. Concrete meeting the requirements of ASTM C 476 (4000 psi) may be used in lieu of Class I concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the inspection of precast drainage products.
7. Sizing shall be in accordance with Index No. 281, and paid for under the contract unit price for Sizing SY.
8. Endwall to be paid for under the contract unit price for Class I, Concrete (Endwall) CY and Reinforcing Steel (Roadway) LB: Cost of grates to be paid for under the contract unit price for Endwall Grate LB, plan quantity. Cost of galvanized bolts and nuts to be included in the bid price for the grate.
MOUNTING FOR STEEL GRATE

**STEEL GRATING USE CRITERIA**

1. **Access Margin:** All steel grates are to be used in pipe culverts which in the determined clear, unobstructed area and area off the following conditions:

2. **Drainage Area:** The presence of any pipe culvert or pipe drain area in the area where drainage and/or drainage is made visible.

3. **Drainage Area:** The presence of any pipe culvert or pipe drain area in the area where drainage and/or drainage is made visible.

4. **Drainage Area:** The presence of any pipe culvert or pipe drain area in the area where drainage and/or drainage is made visible.

5. **Drainage Area:** The presence of any pipe culvert or pipe drain area in the area where drainage and/or drainage is made visible.

6. **Drainage Area:** The presence of any pipe culvert or pipe drain area in the area where drainage and/or drainage is made visible.

7. **Drainage Area:** The presence of any pipe culvert or pipe drain area in the area where drainage and/or drainage is made visible.

8. **Drainage Area:** The presence of any pipe culvert or pipe drain area in the area where drainage and/or drainage is made visible.

9. **Drainage Area:** The presence of any pipe culvert or pipe drain area in the area where drainage and/or drainage is made visible.

**TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRADE**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Units</th>
<th>Quantity</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Concrete</td>
<td></td>
<td>1</td>
<td>12' x 30'</td>
</tr>
<tr>
<td>2</td>
<td>Steel Grate</td>
<td></td>
<td>1</td>
<td>30' x 30'</td>
</tr>
<tr>
<td>3</td>
<td>Anchor Bolt</td>
<td></td>
<td>2</td>
<td>6' x 6'</td>
</tr>
<tr>
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**STEEL GRATE**

**U-TYPE CONCRETE ENDWALLS**

**BAFFLES AND GRATE OPTIONAL**

**15" TO 30" PIPE**
### GENERAL NOTES

1. Flared end sections shall conform to the requirements of ASTM C-76 with the exception that dimensions and reinforcement shall be as prescribed in the table above. Circumferential reinforcement may consist of either one cage or two cages of steel. Shop drawings for flared end sections having dimensions other than above must be submitted for approval to the Engineer of Drainage.

2. Connections between the flared end section and the pipe culvert may be any of the following types unless otherwise shown on the plans;

   a. Joints meeting the requirements of Section 941-1.5 of the Standard Specifications. The manufacturer of the flared end section shall identify the manufacturer of the pipe culvert and certify that the flared end section is suitable for joining the pipe culvert.

   b. Joints sealed with performed plastic gaskets.

   c. Reinforced concrete jackets, as detailed on this drawing.

3. The gaskets shall meet the requirements of Section 942-2 of the Standard Specifications and the minimum sizes for gaskets shall be as specified for equivalent sizes of elliptical pipe.

4. Cost of the reinforced concrete jacket to be included in the contract unit price for the flared end section.

### DESIGN NOTES

1. Flared ends sections are intended for use outside the curb zone on median ditches in those drain installations, except that flared end sections for pipe sizes 12" and 15" are permitted within the curb zone. When the slope intersection permits, these flared end sections may be located with the culvert opening as close as 0" beyond the outside edge of the shoulder.

2. Flared ends are not intended for side drain installations.

3. Reinforced concrete jackets shall be used at all locations where high velocities and/or highly erosive soils may cause discharging. These locations are to be shown on the plans.

4. Toe walls shall be used when the anticipated velocity of discharge and soil type are such that erosion action would occur. The toe walls are not required where ditch pavement is provided, except when discharging would occur if the ditch pavement should fail.

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**FLARED END SECTION**
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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**CROSS DRAIN**

**MITERED END SECTION**

**SINGLE AND MULTIPLE RODS, CORRUGATED METAL PIPE**

**NOTE:** See Sheet 5 for Details and Notes.

**2.1 METER:** To E Pipe, for Pipes 3" and Smaller
2.1 For Pipes 24" and Larger

**1.1 METER:** To E Pipe, for Pipes 30" and Smaller
1.1 For Pipes 24" and Larger

**SHEET**

**272**
GENERAL NOTES

1. Mitered end sections shall be paid for as mitered end section, each, based on each independent pipe end.
2. The cost of all pipe, fasteners, reinforcing, connectors, anchors, concrete, sealants, jacks, and coupling bands shall be included in the contract unit price for mitered end section, each. Saddles not included.
3. The reinforced concrete slab shall be constructed for all sizes of cross drain pipe and cost in place with Class I concrete.
4. Concrete pipe used in the assembly of mitered end sections shall be selected lengths to avoid excessive connections.
5. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
6. The portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing of the concrete.
7. Unless otherwise designated in the plans, concrete pipe mitered and sections may be used with any type of cross drain pipe; corrugated steel pipe mitered and sections may be used with any type of cross drain pipe except aluminum pipe and corrugated aluminum. If mitered and sections may be used with any type of cross drain pipe except steel pipe. When bituminous coated metal pipe is specified for cross drain pipe, mitered and sections shall be constructed with like pipe or concrete pipe.
8. When the mitered end section pipe is dissimilar to the cross drain pipe, a concrete jacket shall be constructed in accordance with Standard Index 860.
9. When existing multiple cross drain pipes are spaced other than the dimensions shown in the detail, or have non-parallel axes, or have non-uniform sections, the mitered ends will be constructed either separately or as single pipe mitered and sections or collectively as multiple pipe mitered and sections as directed by the Engineer. However, mitered ends will be paid for each, based on each independent pipe end.
10. Mitered end sections for pipe sizes 15" to 24" round or equivalent pipe or elliptical pipe are permitted within the clear zone. When the slope intersection permits, the mitered end section may be located with the culvert opening as close as 3B beyond the outside edge of the shoulder.
11. Slop and ditch transitions shall be used when the normal roadway slope must be flattened to place and section outside clear recovery area. See detail left.

SLOPE AND DITCH TRANSITIONS

CONCRETE PIPE CONNECTOR

ANCHOR DETAIL

ANCHOR DETAIL

CROSS DRAIN MITERED END SECTION

SPECIAL DETAILS AND NOTES

All bars, bolts, nuts and washers are to be galvanized steel.

Bolt diameters shall be 3/8" for 15" to 36" pipe and 5/8" for 42" to 72" pipe.

Two connectors required per joint, located 60° right and left of bottom center of pipe.

Bolt holes in pipe shall be to be drilled.

All bars, bolts, nuts and washers are to be galvanized steel.

Bolt diameters shall be 3/8" for 15" to 36" pipe and 5/8" for 42" to 72" pipe.

Two connectors required per joint, located 60° right and left of bottom center of pipe.

Bolt holes in pipe shall be to be drilled.

ANCHOR DETAIL

ANCHOR DETAIL

CROSS DRAIN MITERED END SECTION

SPECIAL DETAILS AND NOTES

All bars, bolts, nuts and washers are to be galvanized steel.

Bolt diameters shall be 3/8" for 15" to 36" pipe and 5/8" for 42" to 72" pipe.

Two connectors required per joint, located 60° right and left of bottom center of pipe.

Bolt holes in pipe shall be to be drilled.

ANCHOR DETAIL

ANCHOR DETAIL

CROSS DRAIN MITERED END SECTION

SPECIAL DETAILS AND NOTES

All bars, bolts, nuts and washers are to be galvanized steel.

Bolt diameters shall be 3/8" for 15" to 36" pipe and 5/8" for 42" to 72" pipe.

Two connectors required per joint, located 60° right and left of bottom center of pipe.

Bolt holes in pipe shall be to be drilled.

ANCHOR DETAIL

ANCHOR DETAIL

CROSS DRAIN MITERED END SECTION

SPECIAL DETAILS AND NOTES

All bars, bolts, nuts and washers are to be galvanized steel.

Bolt diameters shall be 3/8" for 15" to 36" pipe and 5/8" for 42" to 72" pipe.

Two connectors required per joint, located 60° right and left of bottom center of pipe.

Bolt holes in pipe shall be to be drilled.

ANCHOR DETAIL

ANCHOR DETAIL

CROSS DRAIN MITERED END SECTION

SPECIAL DETAILS AND NOTES

All bars, bolts, nuts and washers are to be galvanized steel.

Bolt diameters shall be 3/8" for 15" to 36" pipe and 5/8" for 42" to 72" pipe.

Two connectors required per joint, located 60° right and left of bottom center of pipe.

Bolt holes in pipe shall be to be drilled.
### Dimensions & Quantities

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<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<th>Triple Pipe</th>
<th>Quad Pipe</th>
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<th>Standard Weight Pipe</th>
<th>Excess Weight Pipe</th>
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<th>Sodding (Sq. Yds.)</th>
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<td>Double Pipe</td>
<td>Concrete (Cu. Yds.)</td>
<td>Sodding (Sq. Yds.)</td>
</tr>
</tbody>
</table>

- **Dimensions permitted to allow use of 8" standard pipe lengths.**
- **Concrete slab shall be designed to form bank or no-slip surface of pipe. See section below.**

---

**Note:** See Sheet 5 for details and 6 for notes.

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**SIDE DRAIN MITERED END SECTION**

**SINGLE AND MULTIPLE ROUND CONCRETE PIPE**

**SECTION**

**Footnotes:**
- **Pipe:** To be included under unit price for mitered end section.
- **Drain Pipe:** F (Pipe To Be Included Under Unit Price For Mitered End Section).
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**TOP VIEW - SINGLE PIPE**

Concrete Slab, 3" Thick, Reinforced With WWF6x6-W 4x4/W-4

**TOP VIEW - MULTIPLE PIPE**

Concrete Slab, 3" Thick, Reinforced With WWF6x6-W 4x4/W-4

**SIDE DRAIN MITERED END SECTION**

SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH

---

*Note: See Sheet 5 for details and Sheet 6 for notes.*

---

*To Span Line For Pipe Arch 28" x 20" And Smaller: 2.1 For Pipe Arch 35" x 24" And Larger*
FASTENER UNIT
FOR ALL SIZES OF SINGLE AND MULTIPLE DRAIN PIPE

Grate Detail
FOR SINGLE & MULTIPLE DRAIN PIPE

CONCRETE PIPE CONNECTOR DETAIL

ANCHOR DETAIL

SIDE DRAIN MITERED END SECTION
DETAILS FOR CONCRETE & CORRUGATED METAL PIPE
GENERAL NOTES

1. Mitered end sections shall be paid for as mitered end section, each, based on each independent pipe end.
2. The cost of all pipe, grates, fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets and coupling bonds shall be included in the contract unit price for mitered end section, each. Scheduling not included.
3. The reinforced concrete slab shall be constructed for all sizes of side drain pipe and cast in place with Class I concrete.
4. Round pipe size 30” or greater, pipe-arch size 35” x 24” or greater and elliptical pipe 19” x 30” or greater shall be grouted unless specified in the plans. Smaller sizes of pipe shall be grouted only when called for in plans. The lower grate on flat downstream ends on divided highways shall be omitted.
5. Grates are to be fabricated from steel ASTM A 53, Grade B, pipe. The lower grate on all traffic approach ends shall be Schedule 80 and all remaining grates shall be Schedule 40.
6. Concrete pipe used in the assembly of mitered and sections shall be of selective lengths to avoid excessive connections.
7. Corrugated metal pipe gaskets that is damaged during breaking and precasting for mitered and sections shall be replaced.
8. That portion of corrugated metal pipe in direct contact with the concrete slab shall be beveled coated prior to placing of the concrete.
9. Unless otherwise designated in the plans, concrete pipe mitered and sections may be used with any type of side drain pipe, corrugated steel pipe mitered and sections may be used with any type of side drain pipe except aluminum pipe; and corrugated aluminum mitered and sections may be used with any type of side drain pipe except steel pipe. When backfilled coated metal pipe is specified for side drain pipe, mitered and sections shall be constructed with side pipe or concrete pipe. When the mitered and section pipe is dissimilar to the side drain pipe, a concrete jacket shall be constructed in accordance with Index No. 280.
10. Corrugated polyethylene pipe (CPRE) for sidevane application of 15” (9”) or 24” diameter shall utilize either corrugated metal or concrete mitered sections. When used in conjunction with concrete, corrugated metal mitered and sections, concrete shall be by either a formed metal bend specifically designed to join CPRE pipe or metal pipe, or other coupling approved by the Engineer of Drainage. When used in conjunction with a concrete mitered section, section shall be by concrete jacket constructed in accordance with Index No. 280.
11. When existing multiple side drain pipes are spaced other than dimensions shown in this detail, or have non-parallel axes, or have non-uniform sections, the mitered and sections will be constructed either separately as single pipe mitered sections or collectively as multiple pipe mitered sections as directed by the Engineer; however, mitered and sections shall be paid for each, based on each independent pipe end.
12. In addition to the requirements of Section 430-4, submittal submittal shall comply with the bedding and backfill requirements shown in Index No. 280.
13. Ditch transitions shall be used on all grades in excess of 3% as directed by the Engineer.
14. The project engineer shall contact the District Drainage Engineer for possible alternate treatment prior to constructing side drain mitered sections where a minimum spacing of 30’ will not result between the two limits of the mitered sections.

DESIGN NOTES

1. In critical hydraulic locations, grates shall not be used until potential debris transport has been evaluated by the drainage engineer and appropriate adjustments made. Ditch grades in excess of 3% or pipe with less than 15% of cover and grades in excess of 1% will require such an evaluation (General Note 4).
2. The design engineer shall determine highly corrosive locations and specify in the plans when the grates shall be hot-dipped galvanized after fabrication (General Note 5).
3. The design engineer shall determine and designate in the plans which alternate types of mitered end section will not be permitted. The restriction shall be based on corrosive or structural requirements.
GENERAL NOTE

1. Details for concrete and round corrugated metal pipe, concrete pipe shown.

2. Sod slopes 2' each side and top and ditch 4' beyond toe.

3. These mitered end sections are intended for side drain installations by FDOT Maintenance forces and for side drain installations constructed under FDOT Maintenance permit.
## Sodding Quantities (SY)

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Note: These quantities are for one lane.

## Sodding Quantities (SY)

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Note: Quantity for 2:1 is for one lane with buffer.

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**STRaight ENDWall**

NOTE: All straight walls 30" over index 7.50 will require sodding as shown in this drawing. Quantities for each particular case to be determined by the designer.

---

**Ditch pavement & sodding**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

[Signature]
Provide a minimum of 0.20% grade on gutter, slightly warning the surface of the median pavement if necessary, within limits of the median curb or curb and gutter. Construct a drainage flume or flumes at the point or points of low grade. See details.

**SECTION A-A**

Provide smooth Section Match existing grade

**SECTION B-B**

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**FLUME DETAIL**

| 9' | 6' |

| 9' | 6' |

| 6' |

| 5' Wide Sod Unless Other Treatment Called For in Plans |

**MEDIAN OPENING FLUME**

**General Notes**

1. These details are to apply to projections which provide for the conversion of 2-lane sections to 4-lane divided highway sections and for super-elevated sections of new 4-lane divided highways. Layout above is illustrative only. Cost of flumes to be included in the contract unit price for Curb or Curb and gutter. Cost to be paid for under the contract unit price for Sodding, 5y.

2. Flumes to be located in low points of grades and at other points as designated in the plans. The locations may be adjusted by the Engineer during construction.
Note: Self-reflector plates on right-hand curb at bridge ends as shown. Plates to be furnished by O.O.T. and installed by the contractor. Cost of installing plates to be included in the contract unit price for concrete ditch pavement (3' thick).

SECTION AA

SECTION BB

SECTION CC

Profile of curb to match curb at end of bridge.
Depress Approach Slab

BRIDGE

APPROACH SLAB

PLAN

ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Ditch Pavement (3&quot; Thick)</td>
<td>Sq. Yd</td>
<td>10.87</td>
</tr>
</tbody>
</table>

*Quantity shown above includes pavement for 0.1% "Length of Slope". For each additional foot of slope length add 0.349 sq. yd.*
DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER

(To be used where inlets, pipes & embankments are impractical)

NOTES:
1. Spillway to be placed for as shallow gutter.
2. If gutter projects into a division in embankment, the details should be modified as necessary.
GENERAL NOTES

1. The type of pipe (metal or concrete) to be installed shall be as specified in the plans. Dissimilar types of pipe will not be permitted in a continuous run of pipe.

2. Concrete pipe shall be placed with the slots positioned on the sides.

3. Alignment joints are standard (gaskets not required).

4. The contractor may submit other methods of providing slots having equal or greater area of opening for approval by the Engineer.

5. Filter fabric shall be Subsurface Drainage type meeting the requirements of Section 285. All filter fabric joints shall be minimum of one (1) foot.

6. The standard cross section shall be constructed unless other section is detailed in the plans.

7. For supplemental details see Index No. 280.

8. The contractor shall take the necessary precautions to prevent contamination of the trench by sand, silt and foreign materials.

9. The 12" diameter weep holes shall be eliminated when the bottom of the inlet is below the normal water table, unless otherwise shown in the plans.

10. The cost for installation of pipe, filter fabric, and No. 4 coarse aggregate to be included in the contract and price of French Drain shall be the standard cross section unless another section is detailed in the plans. There will be no additional compensation for aggregate or filter fabric used over and above that required for section(s) as detailed in the plans. The cost for installation of the 12" diameter weep hole, filter fabric, galvanized hardware cloth and No. 4 coarse aggregate to be included in the contract unit price for weep, and pipe plugs as required to be included in the contract unit price for pipe.

DESIGN NOTES

1. Pipe invert should be at or above the water table whenever possible.

STANDARD CROSS SECTION (ENLARGED)

FRENCH DRAIN SYSTEM

LONGITUDINAL SECTION

FRENCH DRAIN
**TYPE I**
- Fine Aggregate
- Coarse Aggregate
- Underdrain Pipe
- Filter Fabric Envelope (Optional)
- Design Notes:
  1. The type of underdrain should be selected to meet design winter removal rate and soil conditions. Gravel is preferred in the use of these types of underdrains. Where special designs may be required to satisfy project conditions.
  2. Type I underdrain is intended for minimum winter removal conditions.
  3. Type II underdrain is intended for moderate winter removal conditions. Where excessive conditions may create chemical changes, the use of an inorganic material and/or evaluation of the filter fabric may be necessary.
  4. Type III underdrain is intended for maximum winter removal conditions. The flow fabric separation is required between the coarse aggregate and fine aggregate to be described in general note 5 below for reactive conditions.

**TYPE II**
- Design Notes:
  1. Type II underdrains shall be either 6" smooth or 5" corrugated tubing unless otherwise shown in the plans.
  2. Fine aggregate shall be 94% clean and meeting the requirements of Section 831-1, except no more than 8% passing the No. 200 size.
  3. Coarse aggregate shall be 94% clean and meeting the requirements of Section 831-1, except no more than 8% passing the No. 200 size.
  4. Filter fabric shall be of a non-organic or reactive material, or be described in general note 5 below for reactive conditions.

**TYPE III**
- Design Notes:
  1. Type III underdrain is intended for maximum winter removal conditions. The flow fabric separation is required between the coarse aggregate and fine aggregate to be described in general note 5 below for reactive conditions.
  2. Type IV underdrain is intended for minimum winter removal conditions. The flow fabric separation is required between the coarse aggregate and fine aggregate to be described in general note 5 below for reactive conditions.
  3. The designer should evaluate whether a filter fabric envelope is required around underdrain Types II, III, and IV. When required, filter fabric is to be specified in the plans. Fabric to be paid for separately.

**TYPE IV**
- Design Notes:
  1. Type IV underdrain is intended for maximum winter removal conditions. The flow fabric separation is required between the coarse aggregate and fine aggregate to be described in general note 5 below for reactive conditions.
  2. Type V underdrain is intended for minimum winter removal conditions. The flow fabric separation is required between the coarse aggregate and fine aggregate to be described in general note 5 below for reactive conditions.

**GENERAL NOTES**
- The underdrain pipe shall be either 6" smooth or 5" corrugated tubing unless otherwise shown in the plans.
- Fine aggregate shall be 94% clean and meeting the requirements of Section 831-1, except no more than 8% passing the No. 200 size.
- Coarse aggregate shall be 94% clean and meeting the requirements of Section 831-1, except no more than 8% passing the No. 200 size.
- Filter fabric shall be of a non-organic or reactive material, or be described in general note 5 below for reactive conditions.
- When corrugated polyethylene tubing with slits or 360° perforations is used in conjunction with fine aggregate, a filter fabric shall be required.
- For standard location details, see Index 950. Special locations require location details in the plans.
- The contract unit price for underdrain L.P. shall include the following components for each underdrain type as follows:
  - Type I: Pipe, rock, and aggregate.
  - Type II: Pipe, aggregate, and filter fabric envelope.
  - Type III: Pipe, aggregate, and filter fabric envelope.
  - Underdrain Type IV is to be paid for under the contract unit price. Corrugated Polyethylene Tubing Equidistant, 1:1, shall be included for taking rock and aggregate.
  - Filter fabric envelopes, when specified for underdrain Types II, III, and IV, shall be paid for separately under the contract unit price for Pallet Filter Fabric.
SAFETY MODIFICATION FOR INLETS IN BOX CULVERTS
**GENERAL NOTES**

1. For use criteria see "Steel Grating Use Criteria" Index No. 261.
2. Grates to be ASTM A586 weathering steel, except grates exposed to salt water shall be ASTM A572 Grade 50 steel and galvanized in accordance with Section 963-7 of the Standard Specifications, and shall be designated in the plans as Alternate D.
3. Channel section C 3.5 x 6.0 may be substituted for the C 4 x 5.4 x channel.
4. All reinforcing No. 4 bars with 2" clearance except as noted. Spacings shown are center to center. Laps to be 12" minimum. Welded wire fabric (two cages max.) having an equivalent cross sectional area (0.20 sq in.) may be substituted for bar reinforcement.
5. Drill 1/2 holes 8" deep with a rotary drill in existing endwall for dowel bars. Holes shall be thoroughly cleaned prior to placing dowel bars and epoxy.
6. Endwall to be paid for under the contract unit price for Class II Concrete Endwalls (Excluding Reinforcing Steel) L.B. Cost of dowel bars and epoxy mortar to be included in the contract unit price for reinforcing steel. Cost of grates to be paid for under the contract unit price for Endwall Grade L.B., plain quantity. Cost of galvanized bolts and nuts to be included in the contract unit price for the grate.
7. Slope slopes 5' each side and above endwall. Sodding to be paid for under the contract unit price for sodding ST.

### DIMENSIONS AND QUANTITIES PER GRATE

<table>
<thead>
<tr>
<th>Slope</th>
<th>Size</th>
<th>Channels</th>
<th>C 3.5 x 6.5</th>
<th>C 4 x 5.4</th>
<th>Clearence</th>
<th>Reinforcing Steel L.B.</th>
<th>Cost</th>
<th>Reinforcing Steel L.B.</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:1</td>
<td>1/2</td>
<td>1 1/2</td>
<td>7 1/2</td>
<td>4</td>
<td>1 1/2</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>4:1</td>
<td>1/2</td>
<td>1 1/2</td>
<td>7 1/2</td>
<td>4</td>
<td>1 1/2</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

### DIMENSIONS AND QUANTITIES PER U-ENDWALL

<table>
<thead>
<tr>
<th>Type</th>
<th>G</th>
<th>M</th>
<th>D</th>
<th>R</th>
<th>P</th>
<th>Class I Concrete</th>
<th>Reinforcing Steel L.B.</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>7</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>12</td>
<td>12</td>
<td>12</td>
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<tr>
<td>1/2</td>
<td>7</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

### SAFETY MODIFICATIONS FOR ENDWALLS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

Dr. [Signature]

Date: [Date]

Approved by: [Signature]

F.H.A. approved: [Date]
METHOD OF DETERMINING MEDIAN OPENINGS AT SKEWED SIDE STREETS

ALTERNATE I

Note: Dimensions 5 and 6 are identical except when median curb is type F or curbs and gutter type F.

ALTERNATE II

TABLE OF DIMENSIONS AND QUANTITIES FOR MEDIAN STORAGE LANES

<table>
<thead>
<tr>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V</th>
<th>W</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>a'</td>
<td>15'-6&quot;</td>
<td>0.170</td>
<td>0.015</td>
<td>0.003</td>
<td>3.64</td>
<td>1.30</td>
<td>2.91</td>
<td>1.30</td>
<td>2.91</td>
<td>2.91</td>
<td>2.91</td>
</tr>
<tr>
<td>b'</td>
<td>10'-6&quot;</td>
<td>0.050</td>
<td>0.015</td>
<td>0.003</td>
<td>3.64</td>
<td>1.30</td>
<td>2.91</td>
<td>1.30</td>
<td>2.91</td>
<td>2.91</td>
<td>2.91</td>
</tr>
<tr>
<td>c'</td>
<td>5'-6&quot;</td>
<td>0.025</td>
<td>0.015</td>
<td>0.003</td>
<td>3.64</td>
<td>1.30</td>
<td>2.91</td>
<td>1.30</td>
<td>2.91</td>
<td>2.91</td>
<td>2.91</td>
</tr>
<tr>
<td>d'</td>
<td>1'-6&quot;</td>
<td>0.010</td>
<td>0.015</td>
<td>0.003</td>
<td>3.64</td>
<td>1.30</td>
<td>2.91</td>
<td>1.30</td>
<td>2.91</td>
<td>2.91</td>
<td>2.91</td>
</tr>
</tbody>
</table>

Note: The rules above are applicable only where median storage lanes occur on tangent construction.

JUNCTION DETAILS, MEDIAN CURVES AND TRAFFIC SEPARATORS
TYPICAL RETURN PROFILES
INCLUDING DETAIL SHOWING LOCATION OF INLETS ON RETURN

NOTE:
1. On normal intersections, profiles need not be included in the plans on the above figures.
2. For major intersections, where severe grades are involved or where it is deemed necessary to include profiles in order to prevent excessive design dips, return profiles must be included on the plans.
3. Inlet locations and line points should be located, as much as possible, to be compatible with pedestrian traffic and drop curb location.
4. Grades of 0.2% or greater should be maintained on egg profiles outside the motor lanes.

STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION

CURB RETURN PROFILES

[Diagram showing various typical return profiles with notes on grading and inlet locations]
SIDEWALK RAMP

Note: For ramp on tangent curb use Utility Strip plus with 'a' equal to zero.

Deep Curb
On Tangent Curbs
Utility Strip

Curb Type B-0, Curb & Gutter Type F

Utility Strip
0.02 (Min.)
0.04 (Nom.)

Concrete Sidewalk

Median

Cross Ramp
(Concrete Sidewalk, 4")

Drop Curb
(Concrete Sidewalk, 4")

Berm

Drop Curb
(Concrete Sidewalk, 4")

Ramp Slopes Shall Intersect At Centerline Of Median
On The 0.02 Rate When The Roadway Profile Grades
Are Equal, The Slopes May Intersect Off The Centerline
For Variance Profile Grades Or To Accommodate Other
Construction In The Median; However, Slopes Shall Not
Exceed The 12:1 Rate.

Drop Verge
T.O.S. 8" (12:1 Min.)

Curb Type B-0, Curb & Gutter Type F

SECTION AA

PLAN

SIDEWALK ADJOINING CURB

P PICTORIAL VIEW

W = Width
W = Width

W = Width

W = Width

SIDEWALK BACK OF UTILITY STRIP

PLA N

Utility Strip

Curb Type B-0, Curb & Gutter Type F

C C CURB CUT RAMPS

PHYSICALLY HANDICAPPED

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
COUNTY DIVISION

DESIGNED: 

DRAWN: 

APPROVED: 10/13/83

304

1 of 2

PLAN

SECTION CC

MEDIAN CROSS RAMP
GENERAL NOTES

1. Ramps to be located in accordance with crosswalk marking details as shown in the plans.

2. Ramps shall not exceed a maximum slope of 1:12.

3. Ramps to be fine finish in accordance with subarticle 35E-7.2 as modified. Approved hand methods may be used.

4. Ramps to be constructed at all locations shown in the plans even when sidewalk is not constructed concurrently.

5. Ramps to be paid for as follows:
   - Drop curb to be paid for under the contract unit price for Conc Curb Type "B" or Conc Curb and Gutter Type "B", L/F (Existing facilities removal of curb or curb and gutter to be included in the cost of curb or curb and gutter).
   - Ramp to be paid for under the contract unit price for Concrete Sidewalk Type "A", L/F (Existing facilities removal of sidewalk to be included in the cost of concrete sidewalk).

Ramps on this sheet to be used where sidewalk is shared by pedestrian and bicyclist.
**Joint Dimensions**

<table>
<thead>
<tr>
<th>Joint Width</th>
<th>Sealed Bead Thickness</th>
<th>Backer Rod Placement Depth</th>
<th>Joint Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1 1/2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Dimension **w** will be shown in the plans or established by the Engineer based on field conditions. Dimension **d** will be constructed so that the shape factor **f** has a minimum value of 2.0 and a minimum value of 1.0.

**Preformed Elastomeric Compression Seal**

For Rehabilitation Projects

**Tape Bond Breaker**

**Joint Dimensions**

---

**Backer Rod Bond Breaker**

---

**Concrete Pavement Joints**

---

State of Florida Department of Transportation

---

[Signatures and approval dates]
EXPANSION ASSEMBLY
WADY INDUSTRIES, INC.

SECTION BB
EXPANSION ASSEMBLY
WADY INDUSTRIES, INC.

SECTION AA
CONTRACTION ASSEMBLY

SECTION AA
CONTRACTION ASSEMBLY

SECTION BB
EXPANSION ASSEMBLY
WADY INDUSTRIES, INC.

SECTION BB
CONTRACTION ASSEMBLY

TOP VIEW

SECTION AA
EXPANSION ASSEMBLY
WADY INDUSTRIES, INC.

SECTION AA
CONTRACTION ASSEMBLY

FLORIDA STEEL CORPORATION

DOWEL ASSEMBLIES FOR EXPANSION AND CONTRACTION JOINTS

THE DAYTON SURE GRIP AND SHORE COMPANY

SECTION BB
EXPANSION AND CONTRACTION ASSEMBLY

* Expansion assembly is illustrated. For contraction assembly omit expansion joint material, center spacer bars, filler support wires, support tie bars and dowel bar sleeves.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONCRETE PAVEMENT JOINTS

FLORIDA STEEL CORPORATION

DOWEL ASSEMBLIES FOR EXPANSION AND CONTRACTION JOINTS

THE DAYTON SURE GRIP AND SHORE COMPANY
**DETAIL SHOWING RIGID SHOULDER PAVEMENT**

**NOTE:** Rigid shoulder pavement shall be concrete or eoncrete as called for in the plans.

**DETAIL SHOWING SHEET METAL STRIP**

**NOTE:** Immediately prior to placing the seal, the joint shall be thoroughly cleaned of all foreign material. Immediately after the seal is placed, sheet metal strip shall be bent up against the pavement edge.

The sheet metal strip shall be of an aggregate of 15 to 20 mesh and shall be galvanized or coated in accordance with ASTM A 526, Coating Designation G90.

**GENERAL NOTES**

1. Per quantity of expansion joint to be calculated square footage at the centerline of the roadway pavement. Shoulder pavement joints included.
2. For additional details see Index No. 305.
3. The E of roadway and the E of bridge do not necessarily coincide. Prior to the placement of the expansion joint, the E of the roadway pavement shall be determined.

**SECTIONS A A**

**THROUGH EXPANSION JOINT**

**SECTION THRU SEALS**

Either of the three Seals shown may be used.
GENERAL NOTES

1. The illustrated applications for guardrail are standard requirements. Length of advancement shall be established by Figure 1 for all installations incorporating the Standard Flare Detail P. However, length of advancement shall not be less than 62.5 feet or other approach lengths shown by detail on this index.

2. One panel equals 125 feet. Post spacings shall be 6'-3" except that a reduced spacing of 3'-11½" shall be used for transitions to on-ramps or exit structures such as bridges (See Detail J).

3. At hazards where the face of guardrail is offset from the hazard less than the desirable 4 foot minimum, a 2 foot minimum offset may be used with reduced post spacing extending over the length of the hazard plus one panel of approach rail. For an offset less than 2 feet, a special detail should be submitted to the State Design Engineer, Roadways for approval.

4. In addition to use at conventional roadside hazards, guardrail will be required where fill slopes exceed 1:1, except that where fill heights are less than 8 feet guardrail may be omitted (regardless of fill slope) unless in the opinion of the Engineer its use is deemed necessary due to other roadside features.

5. Straight rail sections may be used for all radii of 125 feet or greater. For radii less than 125 feet the rail must be fabricated to fit.

6. For specifications of materials refer to Florida DOT Standard Specifications.

7. Design load of rail equals 80,000 pounds in tension.

8. Permissible post and offset block combinations are tabulated on sheet 10 of 13.

9. Where necessary to merge or add lanes to现有 guardrail, the work will be done by drilling or reworking. Damaged or damaged guardrail will be replaced in accordance with Sections 582 and 971 of the Standard Specifications. No cutting of holes will be permitted.

10. Guardrail reflectors shall be the same colors as the pavement striping edge lines.

11. Crash cushions may be required in lieu of or in conjunction with guardrail or at locations where space does not permit development of sufficient guardrail length, offset or crashworthiness of terminals.

12. Median guardrail for bridges located on divided roadways shall be constructed the same as outer roadway guardrail under the following conditions:
   (a) Medians of uniform width that are occupied by other transportation and joint-use facilities.
   (b) Medians of uniform or variable widths with independent vertical alignments not suited to normal median guardrail installations.
   (c) Medians of bifurcated roadways.

---

**Design Speed (mph)**

<table>
<thead>
<tr>
<th>Speed Range</th>
<th>Over 6000 V.P.D.</th>
<th>2000-6000 V.P.D.</th>
<th>8000-20000 V.P.D.</th>
<th>250-800 V.P.D.</th>
<th>Under 250 V.P.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-70</td>
<td>480</td>
<td>440</td>
<td>400</td>
<td>360</td>
<td>330</td>
</tr>
<tr>
<td>50-55</td>
<td>360</td>
<td>330</td>
<td>300</td>
<td>270</td>
<td></td>
</tr>
<tr>
<td>40-45</td>
<td>240</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 40</td>
<td>220</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**LENGTH OF ADVANCEMENT**

**Figure 1**

**GUARDRAIL**

---

**Note:** Guardrail length of need is length of advancement plus length of guardrail needed for hazard or hazardous area as shown on other details of this index.

\[ X = \frac{D - d}{2} \]

Where:

- \( D \) = Distance in feet from near edge of the near approach travel lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities, \( D \) is measured from the inside edge of the near approach travel lane.
- \( d \) = Distance in feet from the near edge of the near approach travel lane to the face of guardrail or the No. 2 roadway post. For left side hazards and clear zones on two-way undivided facilities, \( d \) is measured from the outside edge of the near approach travel lane. See Standard Flare - Detail P for additional information.
UNDIVIDED ROADWAY - DETAIL H

GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS

UNDIVIDED ROADWAY - DETAIL S

GUARDRAIL APPLICATIONS FOR EXISTING BRIDGES WITH LESS THAN FULL WIDTH SHOULDERS

DIVIDED ROADWAY - DETAIL I

GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS

DIVIDED ROADWAY - DETAIL T
MEDIANS 30° OR LESS WITH 10° BRIDGE SHOULDERS

MEDIANS 30° OR LESS WITH 6° BRIDGE SHOULDERS

GUARDRAIL
STEEL GUARDRAIL POST MOUNTING TO EXISTING APPROACH SLABS

1. Either anchor bolts or concrete wedge anchors may be used. Anchor bolts are to be installed in expanded anchor bolts are to be installed in accordance with the manufacturer's recommendation. All nicks, cuts, and other flaws shall be removed. Concrete wedge anchors shall be installed in concrete according to the manufacturer's recommendations. All nicks, cuts, and other flaws shall be removed. Anchor bolts shall be installed in concrete according to the manufacturer's recommendations. All nicks, cuts, and other flaws shall be removed.

2. Anchor holes and recesses are to be drilled. Encouraged reinforcing steel shall be driven through. Holes shall be thoroughly cleaned before setting bolts or wedge anchors and any foreign matter shall be removed. Holes shall be set in epoxy mortar.

3. Posts are to be plumbed with adjusting nuts when bolts and used and plumbed with mortar spacing when wedge anchors are used. All holes are to be plumbed with mortar finish.

4. Steel post and plate assembly to be galvanized. Any damaged galvanized parts to be replaced in accordance with Section 562 of the Standard Specifications.

STEEL GUARDRAIL POST

FOR CONSTRUCTION OF GUARDRAIL WHERE GUARDRAIL, PIER FOOTING OR OTHER STRUCTURE PRECLUDES NORMAL POST INSTALLATION

SPECIAL STEEL GUARDRAIL POSTS

6" C STEEL POST

W6 X 85 STEEL POST

TIMBER POST

STANDARD TIMBER AND STEEL GUARDRAIL POSTS
**CURB INLET TYPE 1**

**CURB INLET TYPE 2**

**CURB INLET TYPE 3**

**CURB INLET TYPE 4**

**CURB INLET TYPE 5**

**CURB INLET TYPE 6**

---

**NOTES:**

1. The locations shown for special posts mounted on inlets are to be used as guidelines for positioning the posts and for estimating the number of required posts.

2. Special posts and their anchorage mounted on curb inlets shall be in accordance with supplementary steel guardrail posts Sheet B of Exhibit 100 and paid for under the contract unit price for Special Guardrail Posts, each.

---

**LEGEND**

Variation in Location Of Special Post

- Single Offset Block (Or Adjacent Sections Posts) (No. 1)
- Expanded Location By Using Double Offset Blocks (Or Adjacent Sections Posts)

---

**ENCASED GUARDRAIL POST**

To be used principally over shallow utilities.
BARRIER WALL ON RETAINING WALL
FENCING TERMINALS AT RETAINING WALLS

FENCING TERMINALS AT BRIDGE ENDS (ROADWAY)

FENCING TERMINALS AT URBAN INTERCHANGES

Note A: The indicated distance shall be sufficient to provide adequate safety distance for the traffic from the ramp.

Note B: The indicated distance shall be consistent with the above noted dimension in practice.

FENCING TERMINALS AT BOX CULVERTS

FENCING TERMINALS AT RURAL INTERCHANGES

FENCING TERMINALS AT BRIDGE ENDS (STREAM CROSSING)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
FENCING LOCATION

FENCING DETAIL AT CULVERT

ICF Heights of Retaining Walls 4 ft BHS
In this same height of retaining wall is used. In other words, this is the height of the Kentucky but shall not be the design height.
FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS

NOTE

Barb Wire Attachment

GENERAL NOTES (CONT.)

8. Pull posts shall be used at grades in verticals of 1:5 for rods or 1:8 for circularly 350' centers, except that the maximum rods to be punched by the Engineer on curves where the degree of curvature is greater than 30°.

9. Corner posts are to be installed on all horizontal breaks in fence of 150' or more and as required at vertical breaks over 25' determined by the Engineer.

10. Line posts, crossbar wires, chain link fabric, wire, etc., including fittings and hardware, and Class I, 2, etc., if specified, are to be purchased for the contract unit price for Fencing Type B, LF.

11. Post and post assemblies shall consist of one post per post, one brace, one brace rod, and at necessary fittings and hardware as described above and shall be purchased for the contract unit price for Fencing Type B End Post Assembly (Type B Fence, LF).

Corner post assembly shall consist of one corner post, two braces, two brace rods, and at necessary fittings and hardware as described above and shall be purchased for under the contract unit price for Corner Post Assembly (Type B Fence, LF).
GENERAL NOTES

1. Gate components shall meet the material requirement specified on index No. 452.
2. Steel gate frame shall be fabricated prior to galvanizing, except that truss rods and truss rod plates may be fabricated following frame galvanizing provided surfaces damaged during welding are galvanized in accordance with Section 24 of AASHTO M86.
3. All fabric shall be knuckled top & bottom selvages.
4. Cost of oil gate components shall be included in the contract unit price for Sliding Fence Gate (Cantilever), Each.
5. The Contractor may substitute any equivalent counter slide gate approved by the Engineer.

FRONT ELEVATION

SUPPORT POST DETAIL
ROLLE R SPACER BAR
DETAIL A
DETAIL B

TYPICAL FRAME - 12'-6" & 20' Opening
TYPICAL FRAME - 24' Opening
FOUR LANE ROADWAY

GENERAL NOTES

1. All dimensions shown are standard. The details shown on this index drawing do not supersede the details shown on Index No. 500.

2. Soil containing more than five percent by weight of organic material, as determined by averaging the test results for three randomly selected samples from each stratum or strata of a particular material, shall be classified as mud. If an individual test value of three exceeds seven percent, the stratum or strata shall be classified as mud.

Soil containing more than 2.5 percent by weight of organic material, as determined by averaging the test results for three randomly selected samples from each stratum or strata of a particular material, shall not be used in construction of the subgrade portion of the roadway. If an individual test value of the three exceeds four percent, the stratum or strata shall not be suitable for construction of subgrade.

Any stratum or strata of soil which contains obvious pockets of highly organic material may be designated as mud or unsuitable for construction of subgrade.

Organic content tests shall be performed on the portion of a sample passing the No. 4 sieve in accordance with AASHTO T126.

TWO LANE ROADWAY

SYMBOL  SOIL  CLASSIFICATION (AASHTO M-145)
---  ---  -------------------------------
S  Select  A-1, A-3, A-2-4
H  High Plastic  A-2-5, A-2-7, A-5 or A-7 (All with LL > 50)
M  Muck  A-8

Symbols listed left to right in order of preference.

* Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and therefore should be used in the embankment above water level existing at time of construction.

* When otherwise shown on plans this dimension may be reduced to 24"
B-LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN
### General Notes

1. Pavement layers to be constructed as shown in table unless otherwise noted for in the plans.

<table>
<thead>
<tr>
<th>COURSE THICKNESS (Inches)</th>
<th>LAYER THICKNESS</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Type II</td>
<td>Type III</td>
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<td>8/9</td>
<td>8/9</td>
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<td>8/9</td>
</tr>
</tbody>
</table>

**FLEXIBLE PAVEMENT**

**LAYER THICKNESS FOR STRUCTURAL COURSES**

Date: 5/3
## Optional Base Groups and Structural Numbers

### Table: Base Group and Structural Range

<table>
<thead>
<tr>
<th>Base Group and Structural Range</th>
<th>Length Limit (ft)</th>
<th>Load Limit (kips)</th>
<th>Load Class Limit (kips)</th>
<th>Base Width Limit (ft)</th>
<th>Base Depth Limit (ft)</th>
<th>Base Length Limit (ft)</th>
<th>Base Height Limit (ft)</th>
<th>Base Thickness Limit (in)</th>
<th>Base Weight Limit (kips)</th>
<th>Base Mix Limit (lb/ft³)</th>
<th>Base Unit Cost Limit ($)</th>
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<tbody>
<tr>
<td>(5) 6</td>
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<td>50</td>
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<td>50</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

### Legend
- **K** Not recommended for design.
- **B** To be used for widening only.
- **A** Based on minimum structural thickness.
- **C** Generally restricted to shoulder base construction.
- **500** Series option codes indicate base options which have been revised.

### State of Florida Department of Transportation

**Optional Base Groups and Structural Numbers**

- **Base Group:**
  - **6** 10/6

- **Structural Range:**
  - **119.8/111.0**

- **Base Thickness:**
  - **11.0**

- **Base Structural Number:**
  - **11.0**

- **These Options Are Acceptable for Use On:**
  - **Widening Projects (Up To 2 Feet in Width)**
  - **Low-Volume Roads**

**Site:**

- **Date:**
  - **1/5/79**

**State:**

- **Year:**
  - **1979**

**Base Mix:**

- **Weight:**
  - **Structural Number**
  - **Base Mix**

**Base Unit Cost:**

- **Per Ton:**
  - **$1.25**

**Base Unit:**

- **Per Yd:**
  - **$2.50**

**Base Mix:**

- **Per Yd:**
  - **$1.25**

---

**Notes:**

- **A** Based on minimum structural thickness.
- **C** Generally restricted to shoulder base construction.
- **500** Series option codes indicate base options which have been revised.
For Side Drain Pipe and Metered End Section Requirements See Index 515.

**SECTION A-A WITH WIDENING**

**TURNOUT CONSTRUCTION**

- Slope to be same as shoulder slope.
- Feathered FC

**SECTION A-A**

**RESURFACING EXISTING TURNOUT**

- Feathered FC

**GENERAL NOTES**

1. Turnouts are to be constructed or resurfaced at locations as directed by the Engineer.
2. Turnout construction not required with paved shoulders.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. Contract unit price, Turnout Construction, to include excavation and base.
5. Payment for structural course to be included in resurfacing resurfacing pay item.
6. Payment for feathering friction course to be included in the unit price for Asphalcoat Concrete Friction Course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering not required for FC-2 & FC-3 friction courses.
7. For low volume two-lane facilities without a friction course the structural course is replaced by a surface course.

**QUANTITIES FOR ONE TURNOUT (Sq Yd.)**

<table>
<thead>
<tr>
<th>Course Material</th>
<th>Minimum Thickness</th>
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<tbody>
<tr>
<td>Structural</td>
<td>Base</td>
</tr>
<tr>
<td>Aesthetic Concrete</td>
<td>4&quot;</td>
</tr>
<tr>
<td>Crushed Concrete</td>
<td>4&quot;</td>
</tr>
<tr>
<td>Base Run Shell</td>
<td>4&quot;</td>
</tr>
<tr>
<td>Base Cement (Plain Mix)</td>
<td>5&quot;</td>
</tr>
<tr>
<td>Base Cement (Pest Mix)</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>

Notes:
- Turnout structural course to be the same as required by roadway resurfacing or structural course. Structural course not required if subject base course is used.
- Any department approved pavement structural equivalent may be used in the discretion of the Engineer.
- Additional structural strength may be required if high traffic loads are anticipated.
DETAIL C
ENTRANCE TERMINAL
TWO THRU LANES

GENERAL NOTES
1. The notes applying to P.C.C. Pavement are not applicable to R.B.A.C. Pavement.

2. (a) P.C.C. Pavement Projects:
Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identified to the adjacent roadway pavement beginning with the same joint over the point of 6' width.

(b) Flexible Base Projects:
Where shoulder pavement used in conjunction with shoulder gutter is less than 8' uniform width, it shall be identified to the adjacent roadway pavement.

3. Exit and Entrance terminals as detailed shall not be used on ramps for which is speed of 50 M.P.H. or greater cannot be maintained. For such ramps, parapet delineation and acceleration lanes shall be used in place of tapers with lengths set according to table J-8 B J-651972 AASHTO - Red Book.
SHOULDER TREATMENT

AT SPEED CHANGE LANES WITH SHOULDER GUTTER

SHOULDER TREATMENT

AT SPEED CHANGE LANES WITHOUT SHOULDER GUTTER
TRACTOR CROSSINGS

REINFORCED CONCRETE

TREATED TIMBER

Note: Tractor Crossing to be constructed to match pavement cross slope.

The number of mats required will vary with the pavement width. A sufficient number of mats will be used so that the overall width of the tractor crossing will be a minimum of one foot greater than the pavement width. The tractor crossing will be centered on the pavement centerline.

CLASS 1 CONCRETE IS TO BE USED UNLESS OTHERWISE NOTED IN PLANS OR SPECIAL PROVISIONS.
1. The purpose of shrubs in areas back of guardrail is to eliminate need for mowing in these areas.
2. Shrubs are to be planted approximately 6 feet from guardrail piers and hazards. Narrow plant strips are to be 3 feet wide and one row of shrubs, no exceptions to be made.
3. Shrubs are to be pruned approximately 3 feet in front or rear with 5-foot spacing.
4. Shrubs are to be offset in successive rows to create a staggered pattern between any two rows.
5. Shrubs shall be specified in the plans by Landscape Material Master Map, then Lot numbers.
6. Only one variety of shrubs shall be permitted within any given contiguous area and no shrub variety is to be repeated within a distance of one mile.
7. Where guardrail paving is constructed in conjunction with shrub planting, soil sterilization shall be in accordance with Section 359 of the Standard Specifications.
GENERAL NOTES

1. The furnishing and installation of concrete crossings, together with any necessary masticing, forming, grading, adjustments, and black surfacing at the railroad crossing, in accordance with the specifications of the Florida Department of Transportation, shall be furnished and installed by the Contractor.

2. All concrete slab and rubber pads for ties of the rubber and wood filler shall be furnished and installed by the Contractor.

3. Concrete Crossings shall be assembled on the Contractor's site by the Contractor.

4. Rubber pads shall be manufactured on concrete ties in the field using contact cement.

5. Filler blocks shall be pressure treated pine or clear heart redwood and shall be shaped prior to shipment.

6. Class 1 Concrete Slab that is specifically in accordance with the specifications of the Florida Department of Transportation for rubber and wood filler shall be furnished and installed by the Contractor.

Reinforcing for Concrete Paving between Parallel Track Crossings
(Cost of reinforcing to be included in cost of Slab)
This drawing is based on using 13/8" rail on a tangent section. 

1. This drawing is based on using 13/8" rail on a tangent section and details are fabricated in sections to fit the corresponding sections of the supporting frame. The depth of the 2 bars and channels may be varied to fit other rail sections.

2. The framework units are equipped to be fixed by 3/8" lag screws, and to Headwell by 5/8" anchor bolts. Double-steel spring washers are used with tab to compensate for vertical motion.

3. The decking is attached to the framework with 5/8" bolts. The head of the bolt is to be spot welded to the underside of the channel flanges.

4. Fargeway and underfill timbers to be rabbeded to assure close fit prior to treatment.

5. Tim. to be sawed and spaced 1 3/8" C.C. to C.

6. Crossing of the angle can be equipped with units of either 45°, 67° 30' or 90°.

7. Decking may be as shown or equal (Submit shop drawings for approval by the Engineer)
GENERAL NOTES

1. The reinforced concrete slabs are manufactured in 6'-0" sections, 5" in depth to fit all rail sections 5 u4" in height or heavier. Slabs are interchangeable and relocatable.

2. Center slabs are one-piece construction allowing for 2½" flange opening. 80 lb. rail is used to encase, armor, and reinforce slabs and is held in place with 3 tie rods per slab.

3. Slabs are installed by a "flotation" process, supported on non-shrinkable, non-metallic grout positioned on the ties. Slabs can be placed on wood ties, concrete ties, steel ties, bridge decks or any other type of track support. No re-spacing of ties is necessary.

4. Slabs are secured to "running rails" with specially designed hardware. Insulation is to be provided for crossings in signal territory.

5. Curved slabs are fabricated to fit curved track to 22 degrees (262.04' radius). Special slabs are available for Diamond Crossings, Turnouts, Multiple Tracks, Bridge Decks and Rapid Transit Systems.

6. For additional details, materials required and installation procedures refer to manufacturers specifications.

---

PLAN

SECTION B-B

SECTION A-A
STANDARD SLABS (PRECAST CONCRETE)

RAMP SLABS (PRECAST CONCRETE)

SECTION AA

SECTION BB

SECTION CC

SECTION DD

STANDARD AND RAMP SLAB SECTIONS
**TYPICAL 44' CROSSING**

**TOP VIEW**

**SIDE VIEW**

**TRANVERSE SECTION**

**ELEVATION**

**TIE SPACING**

**GENERAL NOTES**

1. Slab edges are welded NC6 bars.
2. Slab reinforcement all No. 4 bars.

**RAILROAD CROSSING TYPE T MODIFIED**
PHASE I
1. Maintain two-way two-lane traffic over existing facilities.
2. Construct temporary structure, approaches, guardrail and attenuators.
3. The signing shown in the Phase I diagram is a requirement whenever equipment, men or their activities are within 10 feet of the existing pavement edge.

PHASE II
4. Re-sign and mark as shown in Phase II, plans.
5. Relocate traffic to new alignment and maintain two-way traffic.
6. Remove all temporary construction items.

GENERAL MAINTENANCE OF TRAFFIC NOTES
1. All signs, pavement markings, guardrail and warning lights necessary for maintenance of traffic shall conform to the MUTCD.
2. The detour pavement shall be constructed of material equal to the existing pavement, but lanes shall be not less than 10 feet in width. When one-way operations are necessary, a minimum width of 22 feet shall be maintained and traffic controlled in accordance with the MUTCD.
3. Minimum width for the detour shoulders is 6 feet.
4. Existing signs and pavement markings that conflict with construction signposts and markings shall be obliterated or removed.
5. Posted speed on the existing facility shall be decreased at the rate of 10 mph per 500 feet (minimum distance) until detour design speed is reached.
6. Method of constructing temporary guardrail in the detour structure to be approved by the Engineer.
7. Provisions made by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
8. Temporary attenuators shall be the inertia type indicated in Figure 7.3 of the MUTCD.

TABLE FOR MAXIMUM RADIUS FOR NORMAL CROSS SLOPES

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>DETOUR DESIGN SPEED (MPH)</th>
<th>MINIMUM RADIUS (FT)</th>
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<tr>
<td>55</td>
<td>45</td>
<td>090</td>
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<tr>
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<tr>
<td>40</td>
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<td>090</td>
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<tr>
<td>Subsequent when slower speed used</td>
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</table>

LEGEND

Phase I
Phase II
MUTCD
Manual On Traffic Control
And Safe Practices
Denotes Direction Of
Traffic And Does Not
Reflect Pavement Markings

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY SAFETY MARKINGS
RURAL FACILITY

STRUCTURE REPLACEMENT STANDARD TRAFFIC CONTROL PLAN
NOTES:
1. When a crossover is no longer needed, all temporary construction shall be immediately removed and the area returned to its original condition.
2. Use of all construction, maintenance, security, and reservation work plan for salvage equipment shall be included in the contract and procured by the contractor.
3. Crossovers to be constructed where sight distance is inadequate in both directions as directed by the Engineer.
PHASE I
1. Maintain two-lane two-way traffic over existing pavement. Construct new roadway within the proposed 4-lane limit, excluding the friction course. Sign as shown if roadway construction area falls within 15 feet of existing pavement edge. When the construction area falls more than 15 feet from the existing pavement edge, traffic shall be controlled in accordance with Cases 1, 2, or 3 of the MTCSP.

2. Construct shoulder pavement to provide two-lane two-way traffic over shoulder and existing pavement during Phase II roadway construction. Lanes to be not less than 10 feet in width. Signing as shown is to be in place prior to shoulder pavement construction.

PHASE II
1. Remove existing pavement marking, in areas of detour and re-mark as shown. Install warning devices and re-sign as shown. Traffic to be controlled in accordance with Case 2 of the MTCSP. Lanes to be not less than 10 feet in width.

2. Route through traffic to temporary and existing pavement.

3. Construct transitions, excluding friction course.

LEGEND
- Phase I
- Phase II
- MTCSP Manual On Traffic Control

CONVERTING TWO LANES TO FOUR LANES DIVIDED STANDARD TRAFFIC CONTROL PLAN RURAL FACILITY

[Diagram with construction phases and notes]
GENERAL MAINTENANCE OF TRAFFIC NOTES

1. All signing, pavement marking, barricades and warning signs necessary for maintenance of traffic shall conform to the MTCSP.

2. Lane widths the maintenance of two-way traffic should desirably be equal to lane widths at the existing facility, but lanes shall be not less than 10 feet in width. When one-way operations are necessary, a minimum width of 12 feet shall be maintained and traffic controlled in accordance with the MTCSP. Minimum width for the temporary shoulders is 6 feet.

3. Residue pavement markers shall be placed along the center of the pavement under traffic or 20 feet centers in the no traffic areas where pavement shift is 18 feet or greater.

4. Existing signs and pavement markings that conflict with construction signing and marking shall be obfuscated or removed.

5. Potted grass on the existing facility shall be decreased to the rate of 12 mph per 500 feet (minimum distance until traffic is reached)

6. Additional barricades, signing, lighting or other traffic control as required by the MTCSP shall be provided at intersections where in each phase

7. Interim auxiliary speed signs shall be erected when the length of construction exceeds one mile, as directed by the Engineer.

8. Minimum average speed for the segment shall be maintained by the speed limit or other means that the roadway is not under construction.

9. Specializing shall meet the requirements of Chart 1 of the MTCSP.

LEGEND

Phase I
Phase II
Phase III
MTCSP
Manual On Traffic Control
And Safe Practices

Denotes Direction Of
Traffic and Does Not
Reflect Pavement Marking

CONVERTING TWO LANES TO FOUR LANES DIVIDED
CONVERTING STANDARD TRAFFIC CONTROL PLAN
RURAL FACILITY
PHASE III

1. Sign and mark Phase III pavement in accordance with the Phase III diagram.
2. Maintain through traffic to Phase II pavement.
3. Construct friction course over Phase I pavement. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Cases 3 and 3X of the MTCSP. When work extends through an intersection, temporarily relocate cross traffic to other cross streets. When rerouting is not possible, provide one lane access (minimum) for two-lane two-way cross streets and one lane access (minimum) each direction for four-lane two-way cross streets.

GENERAL MAINTENANCE OF TRAFFIC NOTES

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to the MTCSP.
2. Recessed pavement markings shall be placed along the center of pavement open to traffic at 20" centers in the transition area where pavement width is 15 feet or greater.
3. For divided facility, horizontal and vertical traffic control as shown above shall be placed on the median and median of both roadways for each phase.
4. Existing signs and pavement markings that conflict with construction signages and markings shall be redacted or removed.
5. All signalized intersections, signals shall be directed or realigned as required to the center of rear cutoff areas.
6. Provisions approved by the Engineer shall be made for the removal of stone work from the roadway(s) during construction.
7. Additional barricades, signing, lighting or other traffic controls as required by the MTCSP shall be provided as conditions warrant in each phase.

LEGEND

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<thead>
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<th>Symbol</th>
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<tr>
<td></td>
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<td>Phase III</td>
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<td></td>
<td>MTCSP</td>
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Converting Two Lanes To Four Lanes Divided Standard Traffic Control Plan Urban Facility
| TYPE OF FACILITY | EMBANKMENT SLOPE | CLEAR WIDTHS FOR BRIDGES | BACKSLOPES | CLEAR RECOVERY AREA (CRA) | SIGNS | LIGHT POLES | UTILITY POLES, FARM BUILDINGS, ETC. | RAILROAD CROSSING DEVICES | MEDIAN WIDTHS | TREES
<table>
<thead>
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<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Full Hill</td>
<td>5% or less</td>
<td>6.0 ft for 10% or</td>
<td>41 ft</td>
<td>30 ft from edge of travel lane to 60 ft from edge of auxiliary lane to near edge of device. No Guardrail.</td>
<td>Not generally in median.</td>
<td>Not generally in median.</td>
<td>0.5 min. from edge of travel lane or 6 ft max. from edge of auxiliary lane to near edge of device. No Guardrail.</td>
<td>15 ft. from edge of travel lane or 6 ft from edge of auxiliary lane to near edge of device. No Guardrail.</td>
<td>5.0 min. over 60 ft.</td>
<td>Not generally in median.</td>
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# TABLE OF CONTENTS

## TRAFFIC DESIGN STANDARDS

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<tr>
<th>INDEX NO.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>17500</td>
<td>CONVENTIONAL POLE DETAILS</td>
</tr>
<tr>
<td>17501</td>
<td>GENERAL NOTES</td>
</tr>
<tr>
<td>17502</td>
<td>HIGHMAST LIGHTING DETAILS (3 SHEETS)</td>
</tr>
<tr>
<td>17503</td>
<td>ROADWAY LIGHTING DETAILS</td>
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<td>17505</td>
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</tr>
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</table>

### SIGNING AND MARKINGS

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<tr>
<th>INDEX NO.</th>
<th>DESCRIPTION</th>
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<tbody>
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<td>17351</td>
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<td>17355</td>
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<tr>
<td>17356</td>
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</tr>
</tbody>
</table>

### TRAFFIC SIGNAL AND EQUIPMENT

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<th>INDEX NO.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
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<td>CONDUIT INSTALLATION DETAILS (2 SHEETS)</td>
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<td>17727</td>
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<td>17736</td>
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<td>17870</td>
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</tr>
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<td>17881</td>
<td>ADVANCE WARNING FOR R/R CROSSING</td>
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<td>17890</td>
<td>TRAFFIC CONTROL DEVICES FOR MOVABLE SPAN BRIDGE SIGNALS (3 SHEETS)</td>
</tr>
<tr>
<td>INDEX NUMBER</td>
<td>SHEET NUMBER</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
</tbody>
</table>
| 17500        | 1 of 1       | Note added: Luminaires  
               Note revised: Concrete Pole and Metal Pole Details |
| 17501        | 1 of 1       | Notes Revised: 1, 12, 14, and 17. |
| 17502        | 1 of 3       | (a) Changed Conductor size on Riser and Supply Cable.  
               (b) Revised Notes on Surge Protector.  
               2 of 3  
               (a) Revised Notes on Lowering Specifications.  
               (b) Added Pole fabrication note.  
               Revised Conduit, Ground Rods and notes. |
| 17503        | 1 of 1       | Deleted trench detail and changed pull box |
| 17504        | 1 of 1       | Equipment notes added. |
| 17505        | 1 of 2       | Revised luminaire wattage and installation note. |
| 17502        | 1 of 1       | (a) Added note for Stop and Yield Sign placement.  
               (b) Revised Min. and Max. dimensions. |
| 17320        | 1 of 1       | Changed reference to use of arrows from signs to arrows. |
| 17344        | 1 of 6       | Changed dimensions to signs.  
               3 of 6  
               Relocated sign SL-1 on Section 6.  
               5 of 6  
               Revised note on FLASHER Unit. |
| 17345        | 1 of 4 thru 4 of 4 | (a) Changed chevron gore striping spacing.  
               from 10 feet to 20 feet.  
               (b) Added note for lane drop.  
               (c) Added dimensions to delineator Support detail. |
| 17346        | 1 of 8       | Changed sheet number from 1 of 7 to 1 of 8.  
               2 of 8  
               (a) Changed wheelchair parking from 9 feet to 12 feet.  
               (b) Wheelchair crossing from 5 feet to 6 feet.  
               (c) Changed sheet number from 2 of 7 to 2 of 8. |
<table>
<thead>
<tr>
<th>INDEX NUMBER</th>
<th>SHEET NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| 17346        | 3 of 8       | (a) Changed detail reference 6 to 7.  
(a) Changed sheet number from 3 of 7 to 3 of 8.  
(b) Changed gore chevron dimension to 20 feet.  
(b) Changed sheet number from 4 of 7 to 4 of 8.  
5 of 8        | (a) Revised speed and feet chart.  
(b) Changed sheet number from 5 of 7 to 5 of 8.  
6 of 8        | (a) Added dimensions to R/R Pavement message, added location of sign FT0-38 (railroad warning).  
(b) Changed sheet number 6 of 7 to 6 of 8.  
7 of 8        | Changed sheet number 7 of 7 to 7 of 8.  
8 of 8        | This new index added. (Bicycle Pavement messages). |
| 17350        | 1 of 1       | Changed Index No. 11671 to 13417. |
| 17352        | 1 of 2       | Changed detail of RPM's.  
Changed mono-directional to bi-directional and bi-directional to mono-directional. |
| 17355        | 1 of 4       | (a) Added county route markers and revised sign FT0-29.  
2 of 4        | (b) Added Note 3 in general notes.  
(c) Added sign details for "Golf cart xing" and two "No Train Horns".  
3 of 4        | Removed Note "Prints Available from Tallahassee". |
| 17356        | 1 of 1       | (a) Added type "D" assembly to span wire installation.  
(b) Added 3/8" nut bolt and lock washer to assemblies for drop pipe and sign brackets. |
| 17721        | 1 of 2       | Added Note 3 to figure "B". |
| 17882        | 3 of 3       | Added 20 feet between stop bars and the two "R" in Pavement messages, added location of sign FT0-38 (railroad warning). |
| 17890        | 3 of 3       | (a) Revised typical lamp placement detail.  
(b) Revised Gate arm. |
1) Ground rods shall have a resistance to ground not to exceed 25 ohms. Two or more ground rods connected in parallel shall be used. Contractor shall have necessary test equipment and current calibration certificate. Inspect to insure acceptability of grounding system. Total grounding system not to exceed 10 ohms.

2) The contractor shall be responsible for contacting all utility companies prior to any underground work. The utility company will locate and identify their facilities.

3) Contractor shall determine the service required date for the power company transformer installation at the pre-construction conference.

4) The power company reserves the right to install the riser, switch gear and weatherhead on power company poles at the expense of the contractor. Contact the power company for authorization for an alternate procedure.

5) Any damaged portions of backfilled steel poles and brush at ams shall be printed in accordance with section 562 of the standard specifications.

6) Poles, bracket arms and frangible devices shall be designed in accordance with the design criteria or indicated in the contract documents.

7) The luminaire manufacturer shall place a permanent tag on the luminaire housing which is imprinted the following information: manufacturing date, model, lamp shown on drawing, and serial number. The manufacturer shall provide in the drawings the wire voltage and power factor. The luminaire photometric submittals required.

8) Before final acceptance, the contractor shall provide 2 sets of full size as built plans to the maintaining agency.

9) Conductor and pole setback distance from edge of pavement: Any cable routing in locations where the ground is rocky shall be at least 2'-0" in front of the standard ground sheet.

10) Pole positions and conduit routing may be adjusted, as approved by the engineer, to prevent conflicts with utility and drainage structures. Do not install conduit, post conflict with underground lighting structures.

11) Where ground is constructed, the poles shall be placed a minimum of 6' using the freeboard suit:

12) Pole foundation installations shall be backfilled to the top of the foundation connected to a firm, stable condition approximately equal to that of the adjacent soil. The fill shall conform to existing grade and be fully graded.

13) The wires at the pole hanger and pull boxes shall be equipped with the pull and full boxes with sufficient length to completely remove connectors to the outside of the pole. Pulled wires shall be provided for a non-structural aluminum sheath. The cables shall be waterproofed at the foundation base with a minimum of 96" above ground in a protected enclosure, and the cables shall be encased with a metal conduit to be placed with a minimum of 96" above ground in a protected enclosure.

14) Neutral wires to have white insulation. Do not use white or green insulated wires for undergrond conductors. The neutral wire shall be protected with a minimum of 96" above ground in a protected enclosure.

15) Unless otherwise specified, all cable shall be single conductor, 90 percent conductivity stranded copper, with tin insulation.

16) All splices shall be made in pull boxes or pole base no splices shall be made inside the conduit.

17) All exposed or pulled mounted conduit shall be 90° or internal bending radius. The conduit will be provided with either expansion joints or flexible metal conduit releases for bending on bending. The conduit shall be not less than 8" I.D. All metal conduit shall be grounded. Steel conduit shall be not less than 3/4" in diameter.

18) All conduit that will remain empty as spares shall be marked, tested, cleaned inside and outside and capped. Leave the corrosion resistant pull cables wire and place conduit markers, or pull boxes to mark the location of the ends of the conduit.

19) Pull boxes shall be located at ends of conduit running roadways, and as necessary for the completion of the project.

20) These plans represent minimum acceptable criteria. The inspection per these drawings represent the minimum base of acceptance.

21) All material, unless otherwise specified, shall be underwritters laboratory approved.

22) Prior to any equipment order, the contractor shall submit for approval. Equipment specifications or drawings for all material proposed for the project and must include:

- Luminaires photometric performance data
- Pole strength calculations
- Pole frangibility test results
- Bolt specifications and bolt circle diameter

23) Seventy copies of shop drawings and design data for highway lighting equipment shall be submitted to the state department of transportation and to the owner. All shop drawings shall be signed by the owner's engineer and sent to the department and owner. If the shop drawings are not acceptable, the contractor shall submit an additional set of shop drawings.

24) All draw drawing shall be completed. All equipment shall be shipped to the job site.

25) Florida Department of Transportation:

- Traffic Design
- Highway Lighting General Notes

- Date: 3/2/97
- Revisions: 0
- Initial Date: 3/2/97
- Approved by: B. J. Weimer
- Checked by: W. L. Medley
- Submit to: Lester Jones

- Drawing No: 1
- Index No: 1

Tallahassee, Florida 32301
LUMINARIES SPECIFICATIONS

THE REFLECTOR WITH ITS ALUMINUM COVER SHALL BE FIRMLY ATTACHED TO A CAST RING. THE RING SHALL HAVE MOUNTING SOCKETS IN ITS UPPER SURFACE SUCH THAT THE REFLECTOR CAN BE EXTRACTED FROM THE MOUNTING SUPPORT ASSEMBLY WITHOUT COMPLETELY REMOVING THE SUPPORT BOLTS.

EACH LUMINARIES SHALL CONTAIN AN INTEGRAL AUTO-RETRACTING TYPE BALLAST CONNECTED FOR 120 VOLTS INPUT 50% AND A POWER FACTOR OF MORE THAN 90%. THE LUMINARIES BALLAST SHALL BE EMBEDDED WITHIN AN ALUMINUM HOUSING WHICH INTEGRALLY ATTACHES TO THE REFLECTOR. THE Ballast Housing shall be held in place by four bolts which are readily removable without removing the luminaries from the bracket arm.

THE LUMINARIES SHALL BE ATTACHED TO THE BRACKET ARM BY MEANS OF A MOUNTING SUPPORT ASSEMBLY. THE ASSEMBLY SHALL INCLUDE A SIDE ENTRY SWITCH DESIGNED FOR TWO 120 VOLT 60 HZ, 125/250 VOLT RATING FOR INDIVIDUAL INSTALLATION. THE LUMINARIES, AN ENCLOSURE SUPPORT BLOCK, SHALL BE BUILD IN SUCH MANNERS THAT ALL ELECTRICAL CONNECTIONS SHALL BE PROTECTED WITHOUT TRAVELING AS EXPOSED OR EXPOSED TO THE WEATHER.

ALL ELECTRICAL CONNECTIONS SHALL BE MADE WATERPROOF OR BE MADE WITH WATERPROOF CONNECTORS PROVIDING WATERPROOF CONNECTIONS. INDOOR LIGHT DISTRIBUTION AS INDICATED IN PLANS, EACH LUMINARIES SHALL BE ENCLOSURE SUPPORT BLOCK. THE LUMINARIES BALLAST, WHICH STAYS THE TYPE OF LUMINARIES INPUT POWER FACTOR BALLAST TYPE, SOCKET CONNECT, ANGLES LIGHT DISTRIBUTION, AND SUCH OTHER INFORMATION THAT A COMPLETE REPLACEMENT CAN BE READILY ORDERED.

THE CONTACTORS ATTENTION IS DIRECTED TO THOSE PLAN SHEETS DETAILING THE MOUNTING LUMINARIES AT THE POLE TOP. PARTICULAR ATTENTION IS DIRECTED TO INSTALLATION. LIGHT DISTRIBUTION. SPECIFIC ATTENTION SHALL BE GIVEN TO INSTALL THE LUMINARIES TO THE CORRECT LOCATION AS INDICATED IN THE PLANS. LUMINARIES SHALL NOT BE MOUNTED AT MOUNTING SUPPORT ASSEMBLY.

FOOTING

THE HOOK-UP FOUNDATIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DETAILS SHOWN IN THE PLANS. ANCHOR BOLT SUMMARY SHEETS SHALL BE SUBMITTED TO THE LIGHTING ENGINEER PRIOR TO PURCHASE.

SUMMARY SHEETS SHALL BE APPROVED BY THE LIGHTING ENGINEER. THE FOUNDATIONS SHALL BE SUPPLIED BY THE LIGHTING CONTRACTOR. ALL METAL FRAMES, ALUMINUM HOUSING, THE LUMINARIES AND ELECTRICAL WIRING SHALL BE SUPPLIED ECLIPES BY ALUMINUM HOUSING A-493 OR IMPORT SPECIFICATIONS.
METAL POLE CONCRETE FOUNDATION DETAIL

Screw Type Foundation Specifications

1. The foundation shaft and base plate shall be ASTM A-36 structural steel, or better.
2. The anchor bolt shall be ASTM A-325, or better.
3. All welds shall be sufficient to withstand 10,000 ft-lbs of torque, applied about the axis of the foundation.
4. The foundation shall have a handhole in the base plate at least ¾" in diameter.
5. The base plate shall be notched to indicate the orientation of the shaft cable wire.
6. Drainage shall be provided in the bottom of the foundation at least 2 inches of an opening of at least 5 square inches.
7. The foundation shall be designed for installation using a maximum allowable live load pressure of 5000 psi and not exceed 14,000 ft-lbs of bolt lugs or less than 3,500 ft-lbs.
8. The whole foundation shall be hot dip galvanized after fabrication to ASTM A-123.

Cast Iron Traffic Cover

Concrete Pull Box Detail

Florida Department of Transportation
Traffic Design
Roadway Lighting Details

Date: Revisions: Details: Dates

Drawn by: State Design Engineer-ROA
Approved by: P.Eng.

Designed by: Lester Jones
Drawing No: 1 of 1
Index No: 17503
SECTION THROUGH SIGN SUPPORT AT LUMINARIE

NOTES
1. Dimension "A" to be calculated from Type and Make of Luminaries to be Purchased and Used on the Project.
2. The Center Lines of Both Flange Holes and the "A" Flange Luminaries Support Arms to be Set Parallel to the Roadway. Before the Set Screws are Inserted in the Holes, MN and MD should then be Adjustments to the Final Location of the Luminaries Support Arms along the Bottom Chord of the Three Pipe Support Arms.
3. All Pipe and Holes must meet the Strength Requirements of ASTM A53 Grade "B" or Grade "A". Weld joints must meet the Minimum Requirements of A. 504 and B. 504. All Flanges must meet the Requirements of ASTM A350.
4. All Holes shall be the Top Diameter of the Flanges in accordance with the Requirements of ASTM A504 and for A53.
5. All Luminaries Support Arms shall be free to rotate in a clockwise or counter-clockwise direction. When, as a result of a design change, any other direction is required for Sign Flange or Flange of Luminaries Support Arm be supplied with being seated in a position 90° Shear Plane to the Roadway for Unaffected Working Capabilities.
TYPICAL SIGN FACE ELEVATION FOR 6" TRUSS

NOTE: SLOPES WILL BE USED SIMILARLY OR AT VERTICAL HANGERS SUPPORTS.

GENERAL NOTES

1. For "General Notes" Covering Specifications, Materials and Wind Loads, see Sheet 2 of 4, Index 9535.
GENERAL NOTES:
1. For "General Notes" covering Specifications and Materials, see Sheet 1 of 4 Index 9535
2. SHOP DRAWINGS: Contractor shall submit complete shop drawings before fabrication for approval
3. COLUMN LENGTHS: It shall be the Contractor's responsibility to determine the length of Column Supports
4. DETAIL OF SIGN FACE & TRUSS CONNECTION: see Drawing 1 of 4 Index No. 9535
5. Any Truss Member, Steel or Aluminum over 7/8" Thick must meet the Longitudinal CHARPY V-NOTCH TEST.

SPICE PLATE FLANGE DETAILS
Aluminum Alloy 6061-T6 or 5056-H32 or Alloy 5083-T6

SPICE PLATE FLANGE TABLE

<table>
<thead>
<tr>
<th>TUBE SIZE</th>
<th>T</th>
<th>BOLT SIZE &quot;D&quot;</th>
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<tbody>
<tr>
<td>3 1/2 x 6</td>
<td>13/16</td>
<td>1/8</td>
</tr>
<tr>
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<td>11/16</td>
<td>1/8</td>
</tr>
<tr>
<td>4 1/2 x 6</td>
<td>13/16</td>
<td>1/8</td>
</tr>
<tr>
<td>5 x 6</td>
<td>15/16</td>
<td>3/8</td>
</tr>
<tr>
<td>SIGN NO.</td>
<td>TYPE OF SIGN BRACKET</td>
<td>PROFILE - SIZE</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------</td>
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<tr>
<td>1</td>
<td>□ 2 x 24</td>
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<tr>
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<td>12</td>
<td>□ 144 x 144</td>
<td>□ 144 x 144</td>
</tr>
</tbody>
</table>

**TYPICAL SECTION**

**DESIGN NOTES**

*CONCRETE - 24 Concrete slab for each Sign. The specified compressive strength of 4000 psi must be achieved. The concrete slab must be designed to meet or exceed the requirements of AASHTO M211.*

**GENERAL NOTES**

*For Column Slats, height and dimensions per sheet.*

*Use of steel tension rods is mandatory.*

*No stop bars are provided during casting. All bars to be furnished to the Owner by the Contractor.*

*Stop Drawing Note: When Type "C" Single Column Ground Structure is specified, the Contractor is responsible for the design and installation.*
### Specifications

**Extruded Tubes:** The material used shall meet the requirements of the Aluminum Association AaS-69-83 and AaS-70-83 Specifications. The material shall be extruded aluminum alloy 6061/6063.

**Welding Rods:** The welding rods shall meet the requirements of the Aluminum Association AaS-69-83 and AaS-70-83 Specifications. The welding rods shall be of the appropriate type and shall be specified by the manufacturer.

**Aluminum Bolts, Nuts, and Lockwashers:** Aluminum Bolts shall meet the requirements of the Aluminum Association AaS-69-83 and AaS-70-83 Specifications. The bolts shall be specified by the manufacturer and shall be of the appropriate type.

**Material Strength:** All allowable stresses shall be in accordance with the Standard Specifications for Structural Members to the Aluminum Association. The stress shall be calculated using the appropriate stress values as specified by the manufacturer.

**Wind Load:** The wind load shall be calculated using the appropriate wind load factors as specified by the manufacturer.

**Shop Drawings:** All Shop Drawings shall be complete and shall be submitted to the owner for approval prior to fabrication.

### Anchor Bolt Detail

**Elevation**

**NOTE:** Thickness of sleeve shall match the dimensions shown. The sleeve shall provide for a key for the column.

### Sections

**A-A**

<table>
<thead>
<tr>
<th>Column OD</th>
<th>Plate Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.25&quot;</td>
<td>0.125&quot;</td>
</tr>
</tbody>
</table>

**NOTE:** For Column Size Tabulated use next Larger Diameter and Wall Thickness.
ELEVATION
Mounting of Exit Numbering Panels to Highway Signs

NOTE: EXIT NUMBERING PANELS SHALL BE LOCATED TO THE RIGHT SIDE FOR RIGHT EXIT
AND TO THE LEFT FOR LEFT EXIT.

SECTION A-A.

GENERAL NOTES


SHEETS AND PLATES: A.A.S.H.P., 1975 shall meet the requirements of Aluminum Association Alloy 6061-T6 and A.S.T.M. Specification B-209. Sheets are to be deoxidized, extruded, machined and finished with anodized finish (ODS, 243 d.e.

REINFORCEMENT: Design specified by architect. All materials shall be approved by contractor.

MATERIALS: All Aluminum Materials to meet the requirements of Aluminum Association Alloy 6061-T6 and also the following A.S.T.M. Specifications for the following: Sheet and Plate B-209, Extruded Shapes B-201, and Standard Structural Shapes B-104.

ALUMINUM-SILICATE LOCKNUTS: Aluminum Locknuts shall meet the requirements of Aluminum Association Alloy 2024-T4. Lubricants shall not be used.

TOLERANCES: All workmanship shall be in accordance with the Standard Specifications for Highway Structures for the State of Florida. All dimensions shown are in inches.

FOR MOUNTING DETAILS REFER TO DRAWING NO. 1 OF JUNE 1037.
ARROWS A - G For Guide Sign Use
ARROWS 1 - 30 For Destination Sign Use
FOR FREEWAY USE

WEIGH STATION
1 MILE

ALL TRUCKS ENTER WEIGH STATION

WEIGH STATION NEXT RIGHT

WEIGH STATION NEXT LEFT

NOTE:

FOR OTHER THAN FREEWAY USE

WEIGH STATION

ALL TRUCKS ENTER WEIGH STATION

WEIGH STATION 1000 FT

NOTE:

ALL SIGNS TO HAVE GREEN REFLECTORIZED BACKGROUND WITH WHITE LEGEND AND BORDER. EXCEPT SIGNS NO. FTD-8 IN FTD-6, WHICH SHALL HAVE WHITE BACKGROUND WITH BLACK LEGEND AND BORDER.

ALL DIMENSIONS SHOWN ARE IN INCHES AND EIGHTHS.

NOTE:

SIGN NO. FTD-1 TO BE USED WITH SIGNS NO. FTD-5A & B, FTD-6A & B.

SIGN NO. FTD-2 TO BE USED WITH SIGN NO. FTD-9.

REVISIONS

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS

NOTE: FTD-8

FTD-6A...RIGHT ARROW

FTD-6B, FTD-7...
LEFT ARROW

NOTE:

SIGN NO. FTD-1 TO BE USED WITH SIGNS NO. FTD-5A & B, FTD-6A & B.
NOTE

ALL SIGNS SHALL HAVE GREEN REFLECTORIZED BACKGROUND WITH WHITE LEGEND AND BORDER EXCEPT SIGNS FOR COMPOUNDS WHICH SHALL HAVE A WHITE BACKGROUND WITH BLACK LEGEND AND BORDER.

ALL DIMENSIONS SHOWN ARE IN INCHES AND EIGHTS
I. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A SIGNALIZED INTERSECTION

2. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A STOP CONTROLLED INTERSECTION
5. Traffic control devices for a reduced speed zone at a school crosswalk with overhead flashing beacon speed limit signs
(4 lanes undivided - 2 way traffic)
(MOBLOCK or on thru street at an intersection)

Distances shall be increased by adding the intersecting street with curb returns included to dimensions given in Table above.

<table>
<thead>
<tr>
<th>APPROACH SPEED, MPH</th>
<th>DISTANCE IN FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 TO 35</td>
<td>275</td>
</tr>
<tr>
<td>36 TO 45</td>
<td>350</td>
</tr>
<tr>
<td>46 TO 55</td>
<td>500</td>
</tr>
</tbody>
</table>

3. Traffic control devices with flashing beacon for reduced speed zone at a school crosswalk
(2 lanes - 2 way traffic )
(MOBLOCK or on thru street at an intersection)

4. Traffic control devices for a reduced speed zone at a school crosswalk (no flashing beacon)
(2 lanes - 2 way traffic )
(MOBLOCK or on thru street at an intersection)

Florida Department of Transportation Traffic Design

School Signs & Markings

<table>
<thead>
<tr>
<th>REVISIONS</th>
<th>INITIALS</th>
<th>DATES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

Drawing: 05
Index No.: 17348
6. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK
WITHOUT A SPEED REDUCTION
(2 LANES 2 WAY TRAFFIC)

7. TRAFFIC CONTROL DEVICES FOR A REDUCED SPEED ZONE AT A SCHOOL CROSSWALK
WITH OVERHEAD FLASHING BEACON SPEED LIMIT SIGNS
(4 LANES DIVIDED 2 WAY TRAFFIC)

<table>
<thead>
<tr>
<th>SPEED LIMIT (MPH)</th>
<th>APPROACH DISTANCE (FEET)</th>
<th>SUGGESTED DISTANCE (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 TO 35</td>
<td>275</td>
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</tr>
<tr>
<td>36 TO 45</td>
<td>350</td>
<td>65</td>
</tr>
<tr>
<td>46 TO 55</td>
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A & B DISTANCES SHALL BE INCREASED BY ADJUSTING THE INTERSECTION STREET WIDTH (CURB RETURNS INCLUDED) TO DIMENSIONS GIVEN IN TABLE.

B. TRAFFIC CONTROL DEVICES FOR SIGNALIZED MIDBLOCK SCHOOL CROSSWALK
9. TRAFFIC CONTROL DEVICES AT SCHOOL ENTRANCES WHERE THERE ARE LITTLE OR NO WALKING STUDENTS

These Signs Are Intended For Use Only At Those Few Locations Where The School Entrance Is Not Evdently To The Motorist, And Must Be Approved In Advance By The Responsible Traffic Engineering Authority.

10. TRAFFIC CONTROL DEVICES FOR A TYPICAL SCHOOL ZONE FRONTING THE SCHOOL PROPERTY

Note: The School Bus Stop AHEAD Sign is to be used in advance of locations where a school bus, when stopped to pick up or discharge passengers, is not visible for a distance of 500' in advance. It shall have a minimum size of 30" x 30". It is not intended that these signs be used whenever a school bus stops to pick up or discharge passengers. These signs are intended for use only where terrain and roadway features may obstruct visibility to the bus stop. Relocate the stop to another location with adequate visibility.
FLASHER UNIT AND CABINET TO BE PLACED ON THE STRAIN POLE SUPPORTING OVERHEAD SIGN ASSEMBLY OR ON SERVICE POLE. THE FLASHER UNIT NOT TO OVERHANG PRIVATE PROPERTY OR SIDEWALK.

NOTE: FLASHING BEACON MAY BE PLACED WITHIN OR BELOW PANEL.

OPTIONAL LOCATION OF FLASHING BEACON
MARKINGS FOR LEFT OFF-RAMP

THE LEFT EDGE LINE YELLOW WILL BE CONTINUOUS FROM THE MAIN LANE DOWN THE RAMPS TO CROSS ROAD.
THE MAIN LINE LEFT EDGE LINE YELLOW WILL START AGAIN AT THE PHYSICAL GORE WHICH IS THE END OF
0" LINE USED IN GORE DELINEATION

DETAIL A

COLORLESS-RED REFLECTIVE PAVEMENT MARKERS TO BE PLACED ON EVERY STRIP BEGINNING AT POINT

NOTE

RELECTIVE PAVEMENT MARKERS ARE INSTALLED ON THE THERMOPLASTIC EDGE LINE

NORMAL TAPERED EXIT (TWO THRU LANES)

DETAIL B

COLORLESS-RED REFLECTIVE PAVEMENT MARKERS TO BE PLACED ON EVERY STRIP BEGINNING AT POINT

NOTE

In advance of lane drops at off ramps a special marking pattern may be used to distinguish the lane drop situation from a normal exit ramp or auxiliary lane.
A special special marking for lane drops consists of 8 inch wide by 3 foot long white stripes separated by 1/2 foot gaps. If used, this special marking should begin 1/2 mile in advance of the theoretical gore point. Where last minute lane changes may cause conflicts, an 8 inch wide solid white channelizing line extend 100 feet upstream from the theoretical gore point [MUTCD Section 38-2-j].

NORMAL TAPERED EXIT ONLY (TWO THRU LANES-THREE APPROACH LANES)

DETAIL C

COLORLESS-RED REFLECTIVE PAVEMENT MARKERS EVERY 4O FT.

NOTES

ASSIGNED CAR (TIME, POSTED SPEED OR 85TH PERCENTILE (USE HIGHER VALUE)

INCHES ENCLOSURE BLOCK

INTERCHANGE MARKINGS

REVISIONS

DATE

DESCRIPTIONS

REMARKS

REMARKS

REMARKS

REMARKS

STATE DESIGNER 04-1990

1.0 OF 4 17949

STATE DEPARTMENT OF TRANSPORTATION

TRAFFIC DESIGN

INFORMATION
NORMAL TAPERED ENTRANCE

NORMAL TAPERED ENTRANCE WITH ADDED LANE

DETAIL D

COLORLESS-RED REFLECTIVE MARKERS TO BE PLACED ON EVERY 50 FT. BEGINNING AT RISE. REFLECTIVE MARKERS SHALL BE PLACED OUTSIDE OF THE STIPED P MARKET IS USED.

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN
INTERCHANGE MARKINGS
**Parallel Acceleration and Deceleration Lane**

- **Placement of Edgelines**: White thermoplastic arrow with colorless-red reflective markers.
- **Wrong Way Arrows**: White paint arrow with colorless-red reflective markers to be used only in areas with low traffic volumes.

**FLORIDA DEPARTMENT OF TRANSPORTATION**

**Interchange Markings**

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PAVEMENT MARKING FOR WHEELCHAIR RAMPS IN PARKING ZONES

NOTE:
- Yellow left turn storage marking may be used adjacent to paired turn lines on signaled or stop controlled intersections.
- Arrows should be evenly spaced between first and last arrow.
- Arrows should be evenly spaced.

CRITERIA FOR PAVEMENT MARKINGS ONLY:
- Wheelchair ramp locations for ramp criteria see Florida Design Manual, Section 304.

PAVEMENT MARKING FOR WHEELCHAIR RAMPS IN PARKING ZONES

NOTE:
- All parking and refuge lane markings shall be 4" white.
- Parking lane lines shall be broken at driveways.

TWO WAY LEFT TURN LANE
(WITH SINGLE LANE LEFT TURN CHANNELIZATION)

SPECIAL MARKING AREAS

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

REVISED: 8-9-87
CHECKED: X R 8-17-86
APPROVED: R. D. RICKER

STATE DESIGN ENCLOSED - PONTI

SPACING NO. 31

17546
TYPICAL INTERSECTION 2 THRU LANES
PLUS LEFT TURN LANE, WITH CROSSWALK

RIGHT TURN LANE DROP AND ISLAND DETAILS

STOP BARS, CROSSWALKS AND
DOUBLE CENTER LINES DETAILS.
BEGINNING OF A DIVIDED HIGHWAY

4-LANE-2-LANE TRANSITION—NO MEDIAN

PAVEMENT MARKINGS FOR TRAFFIC CHANNELIZATION AT GORE (TRAFFIC FLOWS IN THE SAME DIRECTION)

PAVEMENT MARKING FOR TRAFFIC SEPARATION (TRAFFIC FLOWS IN OPPOSITE DIRECTION)
STOP BAR PERPENDICULAR TO EDGE OF TRAVEL WAY

WHITE

NOT LESS THAN 150'

18" DIAMETER

WHEN USED ON A BIKE LANE it is important to vehicle lane markings shall be placed adjacent to markings for vehicles. The sign shall be used and passed for vehicles.

PAVEMENT MESSAGE DETAILS

ONLY LANE BIKE

PAVEMENT MESSAGE DETAILS

4" MIN. BIKE LANE

* FOR WIDER BIKE LANE, INCREASE SIZING 2"
GENERAL NOTES

1. ONLY THOSE SERVICES MEETING CRITERIA ESTABLISHED BY THE DEPARTMENT AND APPROVED BY THE STATE TRAFFIC OPERATIONS ENGINEER FOR EACH INTERCHANGE SHALL BE SHOWN. SIGNS FOR MOTORIST SERVICES SHALL ALWAYS APPEAR IN THE FOLLOWING ORDER READING FROM LEFT TO RIGHT AND TOP TO BOTTOM: GAS, FOOD, LODGING, PHONE, HOSPITAL, CAMPING.

2. THE PHONE SYMBOL SHALL NOT BE SHOWN WHENEVER ANY GAS, FOOD, LODGING OR CAMPING SYMBOL APPEARS.

3. SUPPLEMENTAL SIGNS DETAIL "A" (1-3 SYMBOLS) SHALL BE INSTALLED IN THE SPECIFIC LOCATION SHOWN. BLANK SPACES SHALL BE LEFT FOR SERVICES NOT AVAILABLE.

4. WHEN GAS AND DIESEL ARE BOTH AVAILABLE, ONLY THE DIESEL PANEL WILL BE USED.

5. FOR MOUNTING DETAILS SEE INDEX 9938 FOR TYPE 'A' BREAKAWAY OR INDEX 11600 FOR TYPE 'C' FRAMABLE.

REVISIONS

SIGNING FOR MOTORIST SERVICES

DETAIL "A" (1 TO 3 SYMBOLS ON SEPARATE PANELS)
DETAIL "B" (4 TO 6 SYMBOLS)
DETAIL "C" (4 SYMBOLS)
DETAIL "D" (EACH SYMBOL ON SEPARATE PANEL)

NOTE: WHEN APPROVED FOR ATTACHMENT TO THE ADVANCE GUIDE SIGN, UP TO 3 SERVICES MAY BE SHOWN. THE SYMBOLS SHALL BE SHOWN FROM THE GUIDE SIGN PANEL OR EXISTING WINO BEAMS. SIGNS ARE NOT TO BE CONNECTED TO EXISTING SIGN POSTS.


APPROXIMATE POSITION OF SECOND MOTORIST SERVICE SIGN DETAIL "D" FOR INTERCHANGES WITH TWO EXIT RAMPS.

NOTE: THE MOUNTED SIGNS SHALL BE INSTALLED TO PROTECT AGAINST CONFLICT WITH EXISTING SIGNS.
STATE OF FLORIDA
WELCOME CENTER
1 MILE

SIGNAL NO FTO-22A
4" x 6" x 4" x 6"
2" BGR-9" RAD
BLUE REFL BACKGROUND
WHITE REFL LEGEND B BORDER

1/2 MILE

SIGNAL NO FTO-22B
6" x 6" x 6" x 6"
2" BGR-9" RAD

SIGNAL NO FTO-24
5" x 6" x 12" x 6"
2" BGR-9" RAD

NOTE
ROADWAY NOT DRAWN TO SCALE

SIGNAL NO FTO-19
4" x 6" x 12" x 6"
2" BGR-9" RAD
BLUE REFL BACKGROUND
WHITE REFL. LEGEND B BORDER
ORANGE REFL STATE SILHOUETTE
(SIGN NO FTO-19 TO BE PAID FOR WITH FUNDS
OTHER THAN D.O.T.)

NOTES
1) SIGN AND SIGHT STRUCTURES SHALL BE ERECTED IN ACCORDANCE
2) SIGN FTO-19 SHALL BE LOCATED ON THE WELCOME CENTER (GROUNDS
WITH THE DETAILS SHOWN IN INDEX 9235)
IN PROXIMITY TO THE BUILDING AND AS FAR FROM THE MAIN LINE
2) SIGN BACK TO BACK
ROADWAYS AS POSSIBLE (2 SIGNS BACK TO BACK)
10) DETAIL OF OLD SYMBOL IS AVAILABLE ON REQUEST FROM TRAFFIC
OPERATIONS OFFICE OF D.O.T.

REVISIONS

DATE
07-01-75
DESCRIPTION
FOR PRIMARY HIGHWAY
INITIAL
W.B.
R.
CHECKED BY
STATE DESIGN ENGINEER, ROWDY
DRAWN BY
STATE

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN
WELCOME CENTER SIGNING
FOR PRIMARY HIGHWAY
DIRECTION OF TRAVEL WITH STATIONING

NOTES
1. FOR LANE LINES SEPARATING ONE-WAY TRAFFIC, RAISED REFLECTIVE MARKERS SHALL BE MONO-DIRECTIONAL (COLORLESS).
2. FOR LANE LINES SEPARATING TWO-WAY TRAFFIC, RAISED REFLECTIVE MARKERS SHALL BE BI-DIRECTIONAL (AMBER R AMBER), EXCEPT WHERE PASSING IS RESTRICTED IN ONE DIRECTION ONLY.
3. RAISED REFLECTIVE MARKERS SHALL BE PLACED 40 Concerted ON ALL PROJECTS; HOWEVER, ON SHORT CURVES LESS THAN 40 MAY BE USED, IF SPECIFIED BY THE PLANS.
4. ALL MARKERS SHALL BE APPLIED BEFORE RAISED MARKERS ARE INSTALLED.

PAINTED TRAFFIC LINES
SPEED LIMIT BREAKDOWN

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NOTE
In compliance with Senate Bill 366 all speed limit signs shall be installed with the corresponding size speed limit sign mounted below. Both sign panels shall be installed on the same support. The 24", 36" and 48" signs shall be installed with the corresponding size speed limit sign.

COLORS
Black non reflective legend and border, red reflective circle and white reflective background.

DIMENSIONS (INCHES)

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60 MPH WIND ZONE

- STANDARD
- EXPRESSWAY
- FREeway

50 MPH WIND ZONE

- STANDARD
- EXPRESSWAY
- FREeway

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

SPECIAL SIGN DETAILS

Mark this sheet with the "Single Column Ground Sign" standards, index 1980 through 1984.

See table for column size.

See table for footing type.

See table for column size.

See table for footing type.

See table for column size.

See table for footing type.
1. As an option, the contractor will be allowed to install pedestrian signals on concrete poles and pedestals with the use of lead anchors in lieu of the standard steel bases.

2. Holes drilled or punched in metal poles or pedestals shall be thoroughly cleaned, cleaned of all burrs and covered with two coats of zinc-rich paint as specified in the standard specifications for roads and bridges. Conduits, ground rods, or bushings shall be installed in holes.

3. Grounding to be in accordance with Section 620 of the standard specifications.

FIGURE A

FIGURE B

FIGURE C

FIGURE D

FIGURE E
CONCRETE PAVEMENT EXPANSION JOINTS

NOTES:
1. The "NUMBER OF TURNS" indicated at the specified point on the loop refers to the number of passes of loop wires which are placed in the saw cut in forming the complete loop.
2. Loop types or details not drawn to scale.
3. Loop types are centered in a single lane except type E which is centered in two lanes.
4. The number of individual loops in the type
5. Loop may vary up to a maximum of four (4).

LOOP CORNER AND LEAD-IN DETAILS
FIGURE A
POLE MOUNTED DETECTOR STATION

FIGURE B
PEDESTAL STATION DETECTOR STATION

FIGURE C
WOOD POLE MOUNTED DETECTOR STATION

FIGURE D
POST DETECTOR STATION DETECTOR STATION

FIGURE E

FIGURE F

NOTES
1. SIGNS NO. 3-8 & NO. 40-41 SHALL BE MOUNTED ABOVE DETECTORS, EXPLAINING THEIR PURPOSE AND USE.

2. THE POSITIONING OF PEDESTRIAN PUSH BUTTON SHOULD CLEARLY INDICATE WHICH CROSSWALK SIGNAL IS ACTIVATED BY EACH PUSH BUTTON.

3. PUSH BUTTONS AND SIGNS ARE TO BE MOUNTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS.

4. SIGNS NO. 3-8 & NO. 40-41 SHALL BE MOUNTED ABOVE DETECTORS, EXPLAINING THEIR PURPOSE AND USE.

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DEPARTMENT
PEDESTRIAN DETECTOR INSTALLATION DETAILS

REVISIONS

INITIALS

DATES

DESCRIPTION

DRAWN By

CHECKED BY

STATE DESIGN ENGINEER REEVY

17794
SIGNAL PLACEMENT AT RAILROAD CROSSING
(2-LANE DESIGN)

TYPE I

TYPE II

TYPE III

NOTE: TYPICAL LOCATION PLAN FOR TYPE III SIGNALING DEVICES AT END OF TRACKS.

SIGNAL PLACEMENT AT RAILROAD CROSSING
(4-LANE DESIGN)

TYPE IV

NOTE: TYPICAL LOCATION PLAN FOR TYPE IV SIGNALING DEVICES AT END OF TRACKS.

GENERAL NOTES
1. NO GUARDRAIL IS PROPOSED FOR SIGNALS; HOWEVER, SOME FORM OF IMPACT ATTENUATION DEVICE MAY BE SPECIFIED FOR CERTAIN LOCATIONS.
2. ADVANCE FLASHERS TO BE INSTALLED WHEN AND IF CALLED FOR IN PLANS OR SPECIFICATIONS.
3. TOP OF FOUNDATION SHALL BE NO GREATER THAN 4" ABOVE FINISHED SHOULDER GRADE.
4. TYPE OF TRAFFIC CONTROL DEVICES
   I. FLASHING SIGNALS
   II. FLASHING SIGNALS WITH CANTILEVER
   III. FLASHING SIGNALS WITH GATE
   IV. FLASHING SIGNALS WITH CANTILEVER & GATE
5. CLAS OF TRAFFIC CONTROL DEVICES
   I. FLASHING SIGNALS ONE TRACK
   II. FLASHING SIGNALS MULTIPLE TRACKS
   III. FLASHING SIGNALS AND GATES ON ONE TRACK
   IV. FLASHING SIGNALS AND GATES ON MULTIPLE TRACKS
6. 2-LANE GRADE CROSSINGS ARE SPECIAL CONDITIONS, PLACEMENT OF RAILROAD TRAFFIC CONTROL DEVICES ARE NOT COVERED UNDER THIS INDEX.

FLORIDA DEPARTMENT OF TRANSPORTATION

RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES

REVISIONS

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FLORIDA DEPARTMENT OF TRANSPORTATION
ACUTE ANGLE (AND RIGHT ANGLE)

SIGNAL PLACEMENT AT RAILROAD CROSSING
(2 LANES, CURB & GUTTER)

OBUSE ANGLE

SIGNAL PLACEMENT AT RAILROAD CROSSING
(2 LANES, CURB & GUTTER)

GENERAL NOTES

7. The location of flashing signals and stop lines shall be established based on future installation of gates with appropriate track clearances.

8. Where plans call for railroad traffic control devices to be installed in intermediate areas, the minimum median width shall be 10 feet.

9. Location of railroad traffic control devices is based on the distance available between face of curb & sidewalk.

- 5 ft. to 10 ft. - Locate device outside sidewalk.
- Over 10 ft. - Locate device between face of curb and sidewalk.

10. Stop line to be perpendicular to edge of roadway, determined by clearance, or not more than 3 ft. from and parallel to gate when present.

TYPE I

TYPE II

TYPE III

TYPE IV

TYPE V

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN
RAILROAD CROSSING TRAFFIC CONTROL DEVICES

REVISED

DATE INITIALS DESCRIPTION

DATE INITIALS DESCRIPTION

DATE INITIALS DESCRIPTION

DATE INITIALS DESCRIPTION

DATE INITIALS DESCRIPTION
Typical Bridge Mounts

SEQUENCE CHART

NOTES:
1. A Bypass Switch shall be installed to override each Timing Interval in case of a malfunction.
2. "STOP HERE ON RED" is omitted in Type I operation and "TRAFFIC SIGNALS" are omitted in Type II operation.
3. The time between beginning of flashing yellow on "Drawbridge Ahead" sign and the clearance of traffic signal to red, or beginning of flashing red, should not be less than the travel time of a passenger car, from the sign location to the stop line, traveling at the 95 percentile approach speed.
4. Beginning of operation of drawbridge gates shall not be less than 15 seconds after steady red or 20 seconds after flashing red (Actual time may be determined by the bridge tender).
5. Time of gate lowering and raising is dependent upon gate type.
6. Time of bridge opening is determined by the bridge tender.
7. Each gate shall be operated by a separate switch.
8. On each approach (Type II), all four red signals shall be on the same two circuit flasher, with the two top signals on one circuit, and the two bottom signals on the alternately flashing circuit.
9. A drawbridge check sign is required for both types of signal operation. However, a flashing beacon shall be added to the sign when physical conditions prevent a driver traveling at the 95 percentile speed from having a continuous view of at least one signal indication for approximately 10 sec.
DRAWBRIDGE SIGNAL

2" x 6" x 1-1/2"
2" BORDER 4" RADIUS
6" SERIES "O" LETTERS
BLACK OPAQUE LEGEND AND BORDER ON REFLORICIZED YELLOW BACKGROUND

TO BE USED WITH TYPE 1 OPERATION, AS SHOWN ON PREVIOUS SHEET
MONOTUBE SUPPORT MOUNTING

TYPICAL LAMP PLACEMENT

NOTE:
2. 16" Alternate Dotted Fully Reflectorized Red And White Stripes

FLORIDA DEPARTMENT OF TRANSPORTATION
HIGHWAY ENGINEERING
HIGHWAY SIGNAL DEVICES FOR MOVABLE SPAN BRIDGE SIGNALS

REVISIONS

DRAWING NO INDEX NO
3 17890