DESIGN STANDARDS
FOR DESIGN, CONSTRUCTION, MAINTENANCE AND UTILITY OPERATIONS ON THE STATE HIGHWAY SYSTEM
JANUARY 2004
TOPIC NO. 625-010-003
ENGLISH UNITS
PATENTED DEVICES, MATERIALS AND PROCESSES

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### TABULATED CHANGES

The changes required below principally address functional changes in the standard drawings (intended) since publication of the 2002 booklet. The items below are keyed to what is shown on the Index sheets of this 2004 booklet. This approach is taken to diminish complexity that can arise when trying to compare the items in the tables and index of the multiple volumes of special provisions and interim indexes that were produced to update the 2002 booklet.

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Revisions
Design Standards
2004

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9 of 31 "Detailed reference deleted and "Index No. 402" reference substituted.
10 of 31 "Detailed reference deleted and "Index No. 402" reference substituted.
12 of 31 "PLAN view, notation for "Three-Beam Terminal Connector" line the Test "1/2" Mill Thread Length" inserted after word "Baria."
13 of 31 "Detailed reference deleted and "Index No. 402" reference substituted.
15 of 31 "PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS"-Table - Notation 7-test reviewed.
16 of 31 "DETAIL O" - "Street" - Added the S/1/H/B-6 Post notation.
17 of 31 "DUAL SHOULDER BUTTON HEAD BOLT"-Table, footnotes, revised. Note above table title deleted. "HEX BOLTS AND NOTES"-Test reviewed.
18 of 31 "GALVANIZED STEEL-BACK UP PLATES FOR CONNECTING SPECIAL END SHOES AND TERMINAL CONNECTORS TO CONCRETE BRIDGE TRAFFIC RAILING BARRIERS AND CONCRETE BARRIER WALLS"-Plate added.
19 of 31 "SPECIAL STEEL GUARDRAIL POSTS"-Notes: Note added for a reference to index No. 402 and Structural Index Map, THRU YTH, THRU.
21 of 31 "DETAIL O" reference deleted and "Index No. 402" reference substituted.
23 of 31 "DETAIL O" reference deleted and "Index No. 402" reference substituted.
24 of 31 "ET 2000 NOTES"-Note 6 reviewed.
27 of 31 "LET NOTES"-Note 6 reviewed.
29 of 31 FLOAT-550-Part spacing modified.

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1 of 22 "GENERAL NOTES" - Note 1 reviewed. Sectional View- No. 4 referne added in elem. "WALL FACE SAFETY SHAPES", *** notation at paragraph of notation deleted.
5 of 22 "PLAIN CONCRETE BARRIER WALL I SHOULDER" - "WALL OPTIONS" - Sectional View- No. 4 referne added in elem.
43 of 1 New "PROVINCIAL TEMPORARY CONCRETE BARRIERS".
11 of 10 Index reformatted. All sheets new or reviewed.
46 of 1 New "GENERAL NOTES" - Note 10 reviewed, "SUPPLEMENTAL GENERAL NOTES FOR THE TRITON BARRIER", Note 7 revised.
5 of 6 "GENERAL NOTES" - Note 7 revised.
6 of 6 New Sheet "YODOCK LATERAL TRAFFIC BARRIERS", added.
435 of 4 "BARRIER SELECTION GUIDELINES"-Table, last row *** solution added.
3 of 6 "ASPHALTIC CONCRETE FOUNDATION" - Plan detail deleted.
44 of 1 New Index "Crash Cushion" "TAI 102."
49 of 1 "GENERAL NOTES" - Notes 5, 6a and 15 reviewed.
49 of 2 "GENERAL NOTES" - Note 6 reviewed.
49 of 2 "GENERAL NOTES" - Note 4 added.
45 of 1 "GENERAL NOTES" - Note 7 reviewed.
50 of 2 Added detail "REINFORCED EMBANKMENT", "GEO SYNTHETIC REINFORCED FOUNDATIONS CONSTRUCTED ON SOFT SOILS", Detail reviewed.
3 of 4 Tables reviewed.
505 of 3 "FLEXIBLE PAVEMENT"-*** Notation revised, "DESIGN NOTES"-Note 1 reviewed. Note 2 added.
2 of 3 Sheet Nos. 2, 3 reversed order.
2 of 3 "MOD PAVEMENT-TREATED PERMEABLE BASE OPTION", *** Notation revised.
3 of 3 "MOD PAVEMENT-SPECIAL SELECT SOIL OPTION", *** Notation revised. "Flooded note revised.

502 of 6 "SKETCH ILLUSTRATING DEFINITIONS"-Skewline removed.
5 of 6 "LIMITS OF CLEARING & GRUBBING, STABILIZING AND BASE AT INTERSECTIONS" - Shoulder dimension notation added.
5 of 6 "LABELS" - "Edge of Pavement" changed to "Edge Of Travelled Way".
502 of 1 "GENERAL NOTES" - Note 2 reviewed.
501 of 1 Index deleted.
525 of 5 "THREE APPROACH LANES-TWO THRU LANES, DETAIL B", traffic directional arrow shown in recovery area (perpendicular to line) "NEW嵏e deleted.
4 of 5 "GENERAL NOTES" - Note 1 reviewed. Details removed.
502 of 3 "GENERAL NOTES" - Note 7 reviewed.
544 of 1 "BASIC GOOD PLANTING" - Details added. "TREE PLANTING" - Details revised.
546 of 1 - 6 of 6 New Sheets.
560 of 1 Sheet 2 thru 5 deleted, Sheet 1 reformatted.
600 of 600 Series Throughout the 600 series added "edge of pavement" with "edge of travel way" where appropriate. Updated drawing to show Type B lighted placed on traffic side of align. The 2002 Standard Signs Manual required updating to align with numbers.
2 of 10 "Travel Way" definition redlined. "TEMPORARY TRAFFIC CONTROL DEVICES" paragraph added.
3 of 10 "HIGH VISIBILITY CLOTHING", "Hand Signaling Devices", - Text "26 Inches" deleted and text "24 Inches" substitute "FLASHER STATIONS", Last sentence "shown" replaced by "shown by".
4 of 0 "SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING" - Line 8-test and "align blank" deleted. Line 8-test "shown" deleted. "SIGNING FOR DETOURS, LANE SHIFTS AND DISTURBANCE" - "NOTE-2:4" and "NOTE-3:4" text deleted and "NOTE 2-04" and "NOTE 3-04" substituted.
5 thru 7 Index 600 Sheets 5 thru 7 renumbered.
5 of 10 New Sheet "PLACEMENT OF BUSINESS ENTRANCE SIGNS AND WORK ZONE DEVICES AT BUSINESS ENTRANCE", added.
6 of 10 "PORTABLE MESSAGE SIGNS VIWKS" - Heating revised to "PORTABLE CHANGABLE (VARIABLE) MESSAGE SIGNS (PMS)" and text observations deleted. "WARRINGTON LIGHTS", last sentence revised and "FLASHING", "TYPE-B"-last sentence added. "WARRINGTON CROSSWALKS"-Test "5"-last sentence added and text "5"-eliminated.
7 thru 10 Chart "STOP/PROOF PROTECTION REQUIREMENTS"-Deleted text "591-9A" substitute text "591-9A", "STOP/PROOF NOTES"-Note 3 text "Temporary Curb" revised. "ROAD TO TRAFFIC TREATMENT FOR WILLS IN RESURFACING:
5 thru 2 and 3 revised, Dropoff detail reviewed.
8 of 10 Note 52 final sentence "text "W17" deleted text "W2" added.
8 of 10 Completely revised. Signs were removed from the index that have been deleted in the Standard Highway Sign Manual. Signs were rearranged. TFP numbers were changed and new Sign were added.
10 of 10 Sheet details, notations and notes all revised to clarify use of HWY in lieu of temporary taps or paint in work zones.
602 of 1 Notation referring to the placement of cones at the "Work Area", the text "DI"-deleted and text "DDO"-substituted.
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<td>1 of 3</td>
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<td>New sheet. Added call box behind quadrant.</td>
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<td>&quot;STEEL STRAIN POLE NOTES&quot; note 1 - ASTM numbers and grades revised.</td>
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<td>&quot;SECTION 0-0&quot; - &quot;Full Penetration Weld&quot; notation changed to &quot;Partial Penetration Weld&quot;.</td>
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<td>1994 date revised from 1974.</td>
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<td>&quot;MONOTUBE SIGNAL STRUCTURE NOTES&quot; note 1 - ASTM numbers changed. Note 11 - &quot;B&quot;&quot; in diameter changed to &quot; 1½&quot; diameter.&quot;</td>
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<td>ADA Pushbutton substituted. All Pedestrian Signal Assemblies revised.</td>
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<td>FTP numbers changed. RD-30 align added.</td>
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<td>Note 3 added. Slippery When Wet Sign (WB-5) added.</td>
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<td>&quot;FIGURE-0&quot; - Sign. 5fts, legend and border note added.</td>
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<td>Backplane Circuit modified.</td>
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<td>5 of 9</td>
<td>Axle Sensor Placement detail modified.</td>
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<tr>
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<td>Mounting height and offset note revised. Min offset revised to 13'.</td>
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<td>In detail &quot;9&quot; &quot;Six&quot; changed to &quot;Eight&quot;.</td>
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<td>In detail &quot;E&quot; - 1A and 1B corrected to 2A and 2B.</td>
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**STANDARD SYMBOLS FOR KEY MAP**

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<td>Highway Interchange</td>
<td>State Capitol</td>
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<td>Divided Highway</td>
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<td>Hard Surfaced Road</td>
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<tr>
<td>Soil, Gravel Or Shell Surfaced Road</td>
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<tr>
<td>Graded And Drained Road</td>
<td>我院ide Park Or Small Park</td>
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<tr>
<td>Unimproved Road</td>
<td>Boat Ramp</td>
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<tr>
<td>Primitive Road</td>
<td>Ferry</td>
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<td>Streets In Inset Or Delimited Areas</td>
<td>With Frontage Roads</td>
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<tr>
<td>Extension Of Local Roads Within Cities</td>
<td>Farmers Market</td>
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<td>Game Preserve</td>
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<td>Federal Aid Urban Highway</td>
<td>Game Checking Station</td>
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<tr>
<td>Federal Aid Primary Highway</td>
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<td>Federal Aid Secondary Highway</td>
<td>Fire Control Headquarters</td>
</tr>
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<td>Lookout Tower</td>
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<td>Power Plant</td>
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<td>Highway Bridge</td>
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<td>Location Of Inset Boundary Within Map</td>
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<td>Wildlife Refuge Boundary</td>
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**GENERAL NOTE**

Symbols on this Index are intended for use on all roadway, signage and marking, and lighting projects. For zone traffic control symbols refer to Index 800. When additional or similar symbols are used, legends or notations may be required for clarity.
## STANDARD SYMBOLS FOR PLAN SHEETS

### GENERAL SYMBOLS

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### UTILITY ADJUSTMENT SYMBOLS

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<tr>
<td>Buried Cable Television</td>
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### STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

See General Note Sheet 1 Of 3.
STANDARD SYMBOLS FOR PLAN SHEETS

TRAFFIC SIGNALS SYMBOLS

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<td><img src="image" alt="City Or Utility Owned Luminaires &amp; Poles" /></td>
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<td><img src="image" alt="Pendant Hung Underdeck Luminaire" /></td>
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LIGHTING SYMBOLS

W - D W
Walk - Don't Walk
FDW
Flashing Don't Walk

Existing

EXISTING PROPOSED

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<td><img src="image" alt="Signal Phase" /></td>
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SIGNING AND PAVEMENT MARKING SYMBOLS

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<td><img src="image" alt="Traffic Flow Arrow" /></td>
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See General Note, Sheet 1 of 3

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

STANDARD SYMBOLS
Temporary Earth Berm

Shoulder Line

Slope Or Median Slope
On Observeation Section

Toe Of Slope

SECTION AA

SECTION BB

SOD FLUME (SODDING OVERLAPPED)

Temporary Earth Berm

PLAN

SECTION AA

SECTION BB

TEMPORARY SLOPE DRAIN

SLOPE DRAIN APPLICATION

SOD FLUME (Sodding Overlapped)
DESIGN NOTES

1. Basins should be as deep as practical with a minimum depth of 2.0 feet.
2. In Type A, when the top of endwall is below high water, fence also will be required along the top of the endwall.
3. In Type B, the weir shall be located as far from the endwall as practicable. On steep ditch grades two or more weirs may be required. Intermediates weirs shall be constructed without slitting basins.
4. In Type B, the 6" PVC pipe shall be constructed unless shown otherwise in the plans.

GENERAL CONSTRUCTION NOTES

1. Fence material shall be aluminum or concrete only.
2. Aluminum posts shall be 3" diameter minimum. Aluminum roll braces shall be in accordance with Index 452. Concrete posts and roll braces shall be in accordance with Index 451. All posts to be set in concrete.
3. Fabric shall be installed to inlets of posts and roll braces, and tied to posts and braces of 6" centers.
4. For additional details on fencing, see Index Nos. 451 and 452.
5. All basins except as indicated herein to be constructed without slitting basins. Maintenance and clean out to be by the Contractor until acceptance of project by the Engineer.

GENERAL NOTES

1. The cost for Type A and Type B trash retainer and sediment basins shall include the cost for fences, fencing, baffles, piping and for areas and well earthwork over and above ditch excavation called for in the plans. Payment for both Type A and Type B shall be under the contract unit price for Sediment Basins, Earthwork, and Sump as shown for in the plans. The Contractor shall be paid for under the contract unit price for Sediment Basins, Earthwork, and Sump as shown for in the plans.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRASH RETAINER AND SEDIMENT BASIN

[Diagram and notes explaining the construction details for Type A and Type B trash retainers and sediment basins with various sections and views shown.]
NOTE: Spacings shown in this chart are based on having the ground line of the upstream barrier at the same elevation as the overflow of the downstream barrier as shown above. Spacings should be adjusted based on actual site performance.

CHART I

RECOMMENDED SPACING FOR BALED HAY BARRIERS AND TYPE III SILT FENCE

DITCH INSTALLATIONS AT DRAINAGE STRUCTURES
NOTES FOR BALED HAY OR STRAW BARRIERS

1. Type I and II barriers should be spaced in accordance with Chart I, Sheet 1.

2. Hay bales shall be treated 3" x 4" and anchored with 2 - 1" x 2" or 3½” dia. 1 x 4 wood spikes. Stakes of other material or shape providing equivalent strength may be used if approved by the Engineer. Stakes other than wood shall be removed upon completion of the project.

3. Risers and posts shall be 3½” x 4½” wood. Other materials providing equivalent strength may be used if approved by the Engineer.

4. Adjacent bales shall be buttered firmly together. Unavoidable gaps shall be plugged with hay or straw to prevent slit from passing.

5. Where used in conjunction with slit fence, hay bales shall be placed on the upstream side of the fence.

6. Bales to be paid for under the contract unit price for baled Hay or Straw, EA. The unit price shall include the cost of filter fabric for Type I and II barriers.

Sand bags shall be paid for under the contract unit price for Sandbags, CT. Rock bags to be paid for under the contract unit price for Rock bags, EA.
SILT FENCE APPLICATIONS

NOTES FOR SILT FENCES

1. Type III Silt Fence to be used at most locations. Where used in ditches, the spacing of Type III Silt Fence shall be in accordance with Chart 1, Sheet 1.

2. Type IV Silt Fence to be used where large sediment loads are anticipated. Suggested use is where fill slope is 1:1 or steeper and length of slope exceeds 50 feet. Avoid use where the detached water may back into travel lanes or off the right of way.

3. Do not construct silt fence across permanent flowing watercourses. Silt fences are to be of upland locations and turbidity barriers used at permanent bottom of water.

4. Where used as slope protection, Silt Fence Is to be constructed on 0% longitudinal grade to avoid deosilting runoff along the length of the fence.

5. Silt Fence to be paid for under the contract unit price for Staked Silt Fence, 1LF.
**FLOATING TURBIDITY BARRIERS**

**NOTES:**

1. Turbidity barriers are to be used in all permanent bodies of water regardless of water depth.
2. Number and spacing of anchors depend on current velocity.
3. Deployment of barrier around pile location may vary to accommodate construction operations.
4. Navigation may require segmenting barrier during construction operations.
5. For additional information, see Section 104 of the Standard Specifications.

**TURBIDITY BARRIER APPLICATIONS**

**GENERAL NOTES:**

1. Floating turbidity barriers are to be paid for under the contract unit price for Floating Turbidity Barrier, LF.
2. Staked turbidity barriers are to be paid for under the contract unit price for Staked Turbidity Barrier, LF.

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**TURBIDITY BARRIERS**

**Drawn By**

**Checked By**

**Approved By**

---

**DEPARTMENT OF TRANSPORTATION**

**TURBIDITY BARRIERS**

**Drawn By**

**Checked By**

**Approved By**
Shoulder and slope treatment for superelevated roadways

Treatments for protection from concentrated roadway runoff erosion and shoulder raveling

Criteria for paving shoulder on divided and undivided facilities

<table>
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<th>Design Speed (mph)</th>
<th>Horizontal Curve</th>
<th>Notes</th>
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<td>1° or Greater</td>
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<tr>
<td>45</td>
<td>5° or Greater</td>
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<td>50</td>
<td>6° or Greater</td>
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<tr>
<td>70</td>
<td>8° or Greater</td>
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</table>

1. Shoulder pavement is required on all curves meeting the criteria. For curves not meeting the criteria, shoulders are to be paved where erosion of the shoulder is evident or anticipated.
2. If outside shoulders are paved as designated bike lanes, the paved width within curves shall match the bike lane width.
3. All front slopes steeper than 1:3 are to be sodded.

NOTES

1. These treatments are applicable to new construction, reconstruction and resurfacing projects. Project requirements for shoulder pavement and sodding that exceed the limits of this standard take precedence.
2. For existing adjacent to ditches and at headwalls, see Index No. 281.
3. All front slopes steeper than 1:3 are to be sodded.
Existing Shoulder

Width

See

And

Gen.

Or

Pavement

Filling Voids And

Low

Areas

Shall Be

See

And Tapso

TRENCH

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Of Any Ex/sf

Coiled

New

Reworking Shoulder.

EXctNOfed

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Trenoh

I

Sod

Attln I' Drop

Edi/<

or

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Shall Be

Volume

Airb

constructed.

Be Uniformly Distributed

Drainage

and

No

slonlfloant shoulder

exist shoulder reworking. Type R-2.

Type

R-1

Editted

Apache Match Or Latex Match May Be Selected For Low Volume

Rerworking (NOT read Than RED) Or

Where Shoulder Pavement Is Coalesced.

A SIMILAR TREATMENT MAY BE USED FOR PROJECTS THAT REQUIRE SHOULDER WIDENING. DETAILS ARE TO BE SHOWN IN THE PLANS.

GENERAL NOTES

1. Special attention is to be directed to the construction of the required drop-off at edge of pavement.

2. Fertilize entire ungraded shoulder and total area to base of edge of pavement. For new development, see Kod existing shoulder for the purposes listed above. Notice to be given to the Department when new pavement is constructed.

3. Where shoulder pavement is coalesced, use Type R-2. Fill, as required.

4. Seed and mulch shall be placed in the following order:

   Type R-1: Sod, Mulch, Fertilizer
   Type R-2: Mulch, Fertilizer

5. Payment for reworking shoulders shall be paid for in separate items. Reworking Shoulder shall be paid for under the contract unit prize for Reconstructing Shoulder, ST.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

SHOULDER SODDING
AND REWORKING ON
EXISTING FACILITIES

SEEDING RATES (Lbs/Ac)

<table>
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<td>INLAND</td>
</tr>
<tr>
<td></td>
<td>COASTAL</td>
<td>INLAND</td>
</tr>
<tr>
<td>PERMANENT SEED</td>
<td></td>
<td></td>
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<td>Unsalted Seeds</td>
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<td>20</td>
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<td>Salted Seeds</td>
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<td>40</td>
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<tr>
<td>BILLS ARGENTINA OR PENSACOLA BILLS</td>
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<td>80</td>
</tr>
<tr>
<td>QUICK GROWING GRASS</td>
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<td>20</td>
</tr>
<tr>
<td>TOTAL POUNDS PER ACRE</td>
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Note: The seeding rates shown in this table apply only when area is spread by an approved mechanical spreader meeting the requirements of Section 706 of the Standard Specifications.

Widths determined by shoulder reworking are to be maintained under the seeding rates prescribed for permanent widening. Group shown by tables in Section 706.
1. A Soil Tracking Prevention Device (STPD) shall be determined at locations designated by the engineer for points of exit from unplanned areas of the project to public roads where debris tracking of real estate occurs. Traffic from unplanned areas of the construction site shall be directed to the STPD. Trash or debrispositive mowers shall be required at all times and direct vehicular aggregate across the STPD.

2. The Contractor may propose an alternative technique to minimize debris tracking of sediments. The alternative shall be reviewed and approved by the Engineer prior to use.

3. All materials spilled, dropped, or tracked onto public roads (including the STPD aggregate and construction materials) shall be removed daily, or more frequently as directed by the engineer.

4. Aggregate shall be as described in Section 901 excluding 30C-2.5. Aggregate shall be FDOT size #. If this size is not available, the next available size of aggregate may be substituted with the approval of the Engineer. Sizes containing excessive aggregate will be ejected from the project and shall be unsuitable.

5. The sediment pit shall provide a retention volume of 3600 cubic feet per acre of surface area draining to the pit. For drainage through other drainage areas, the following pit volumes will satisfy this requirement:

   - 50' x 50' = 2,500 ft³
   - 30' x 50' = 1,500 ft³

   As an option to the sediment pit, the width of the swale bottom can be increased to obtain the volume. When the sediment pit or swale volume has been reduced to one fourth, it shall be cleaned. When a swale is used, hay bale or other fence shall be placed along the length of the swale.

6. The swale ditch draining the STPD shall have a 0.2% minimum and 1.0% maximum grade along the STPD and to the sediment pit.

7. Filter pond areas are not required when the sediment pond satisfies the clear zone requirements.

8. The STPD shall be maintained in a condition that will allow it to perform its function. To prevent debris tracking, the STPD shall be cleaned daily if used to move accumulated debris downstream from the project. Additional stabilization of the vehicular route leading to the STPD may be required to prevent the debris.

9. A STPD shall be placed for under the contract unit price for Soil Tracking Prevention Device, EA. The unit price shall include full compensation for construction, maintenance, replacement of water, sediment, and restoration of the area utilized for the STPD. It shall not include any cost to construct the STPD or to remove the debris tracking device. The cost shall be paid for under the contract unit price.

10. The minimum of a standard STPD is 30C-2.5 unless otherwise specified in the plans. If the volume of entering and exiting vehicular traffic is less than 30c-2.5, the STPD may be used if approved by the Engineer. When a staked width is used, the staked quantity shall be 2 for each pole.
# STANDARD CRITERIA

<table>
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<th>APPLICATION DESCRIPTION</th>
<th>STANDARD INDEX NO.</th>
<th>PERTINENCY SEC.</th>
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<th>AVG. SED IM TENSILE STRENGTH kN/m</th>
<th>PUNCTURE kN</th>
<th>TRAPEZOIDAL TEAR MN</th>
<th>WIDE WIDTH RESISTANCE 10% ALLOWANCE MN/m</th>
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<th>COMMENTS</th>
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<td>(See D-2)</td>
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<td>0.90</td>
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<td>0.90</td>
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<td>0.90</td>
<td>50</td>
<td>500</td>
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<tr>
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<td>0.90</td>
<td>50</td>
<td>500</td>
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<td>The bedding layer may be omitted if 0&quot;-D-1 fabric is used with reinforcement.</td>
</tr>
<tr>
<td>D-5</td>
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<td>Special</td>
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<td>1.85</td>
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<td>500</td>
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<td>The bedding layer may be omitted if 0&quot;-D-1 fabric is used with reinforcement.</td>
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<tr>
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<td>0.90</td>
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<td>The bedding layer may be omitted if 0&quot;-D-1 fabric is used with reinforcement.</td>
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<td>500</td>
<td>Woven Geotextile only. No Silt Film Geotextile allowed. Provide 0&quot; thick aggregate bedding layer for reinforced sections.</td>
<td>The bedding layer may be omitted if 0&quot;-D-1 fabric is used with reinforcement.</td>
</tr>
</tbody>
</table>

## DESIGN NOTES

1. The designer shall review this criteria and adjust the values as necessary to satisfy project requirements. These adjustments shall be called for in the plans or included in the project-specific provisions.

2. Use these criteria to be consistent with the project-specific provisions. AOS values may be used to select the appropriate geotextile material.

3. These criteria apply to the reinforced sections only and are to be used for projects with reinforced sections. Provide a fabric layer for projects without reinforced sections.

4. Use the appropriate values for the project-specific provisions.
### SLAB DESIGNS - SQUARE AND RECTANGULAR STRUCTURES

**ALL SLABS 8\" THICK - REINFORCING PARALLEL TO SHORT WAY AND LONG WAY**

<table>
<thead>
<tr>
<th>SHORT-WAY</th>
<th>LONG-WAY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SLAB DEPTH</strong></td>
<td><strong>SCHEDULE</strong></td>
</tr>
<tr>
<td>2.0 x 3'</td>
<td>2.0 x 3'</td>
</tr>
<tr>
<td>2.0 x 3'</td>
<td>2.0 x 3'</td>
</tr>
<tr>
<td>2.0 x 3'</td>
<td>2.0 x 3'</td>
</tr>
</tbody>
</table>

**WALL DESIGNS - RECTANGULAR STRUCTURES**

<table>
<thead>
<tr>
<th>SHORT-WAY</th>
<th>LONG-WAY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WALL DEPTH</strong></td>
<td><strong>SCHEDULE</strong></td>
</tr>
<tr>
<td>2.0 x 3'</td>
<td>2.0 x 3'</td>
</tr>
<tr>
<td>2.0 x 3'</td>
<td>2.0 x 3'</td>
</tr>
<tr>
<td>2.0 x 3'</td>
<td>2.0 x 3'</td>
</tr>
</tbody>
</table>

### GENERAL NOTES

1. Size is the inside dimensional of a structure.
2. Slab reinforcement is appropriate for top, intermediate, and bottom slabs.
3. Slab depth is measured from finished grade to top of slab.
4. Wall design depth is measured to the top of the slabs for beams and to the top of the intermediate slab for pilasters.
5. Wall height is the distance between top of lower slab to bottom of upper slab.
6. Rebar sizes exceeding 0.5\" require an elevation design.

### REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>SCHEDULE</th>
<th>GRADE 60 STEEL (65 KSI WIRE FABRIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.25</td>
</tr>
<tr>
<td>B</td>
<td>0.25</td>
</tr>
<tr>
<td>C</td>
<td>0.25</td>
</tr>
<tr>
<td>D</td>
<td>0.25</td>
</tr>
<tr>
<td>E</td>
<td>0.25</td>
</tr>
<tr>
<td>F</td>
<td>0.25</td>
</tr>
<tr>
<td>G</td>
<td>0.25</td>
</tr>
<tr>
<td>H</td>
<td>0.25</td>
</tr>
</tbody>
</table>

---

**REMARKS**

- **Walls of Florida Department of Transportation**
- **Structure Bottoms Type J and P**

---

**Engineer**

**Drawn By**

**Checked By**

2 of 2

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*Preceding structures 3"-6" x 3"-6" maybe used with 6\" wide to depths of 75\*. See Index No. 250.
1. The standard cover is to be used for all frames Types I, II, III and IV. A 2-piece cover, and is the replacement cover for all previous frames with 6' deep seats. The cover is shown in Fig. 1.884. Non-circular frames with 6' deep seats are not permitted.

2. Use the 2'-0" cover, unless the 2-piece cover is called for in the plans. Consider using the 2-piece cover where depth exceeds 5' and manual entry may be required for cleaning.
SEPARATE RISER SEGMENTS WITH CONSTRUCTION JOINTS OTHER THAN DOWEL OPTION

When:

\[ h = \frac{0.75h_r}{(1 + e^{0.75h_r - 0.4h_r})} \]

Then (Radius):

\[ h \geq 2h_r \]

\[ h \geq 2h_r \]

\[ h \geq 0.4h_r \]

Value for \( h \)

Segments may be inverted. Minimum opening for pipe shall be the pipe OD plus 6". If it can not be achieved, then the top or bottom slab must be attached to the segment as shown below.

Walls:

\[ h + h' \leq 0.75h_r \]

\[ h + h' \leq 0.75h_r \]

\[ h + h' \leq 0.75h_r \]

MINIMUM DIMENSIONS FOR BOX AND RISER SEGMENTS

COMPARATIVE SIDE VIEWS

For square or rectangular precast drainage structures, either deformed or smooth welded wire fabric may be used provided:

1. The smooth welded wire fabric shall comply with ASTM A586, and deformed welded wire fabric shall comply with ASTM A822.

2. Min. Cover on reinforcing bars is 1".

3. Joints between wall segments and between wall segments and top or bottom slabs may be formed either by preformed plastic gasket materials using the procedure given in Section 403-7.1 or by grout.

OPTIONAL CONSTRUCTION JOINTS

The "UTILITY PIPES THRU STORM SEWER STRUCTURES" Details Have Been Moved To Index No. SM "MISCELLANEOUS UTILITY DETAILS".
NOTES FOR THIN-WALL PRECAST OPTIONS

1. The options on Sheets 4, 5, & 6 are optional for present in situ construction up to depths 0'5. These options can be used with Alt. "B" Bottom, Index No. 200. Cast-in-place construction must adhere to the criteria outlined on the referenced Indexes.

2. Only the dimensions and reinforcement changes or other modifications are indicated. For all other dimensions and details, the referenced Index drawings apply. These precast units are used in conjunction with Alt. "B" Structure Bottom, Index No. 200. The interior dimensions of an Alt. "B" Bottom can be adjusted to reflect these in situ interior dimensions.

3. Concrete meets the requirements of ASTM C496 shall be used for structural construction for these details.

4. Reinforcement may be either deformed bar reinforcement or welded wire fabric. For reinforcement other than 40 ksi may be used, however only two grades are recognized: Grades 40 and Grades 60. Welded wire fabric, including deformed welded wire fabric, will be recognized as having a design strength of 60 ksi. The area of reinforcement required may be reduced in accordance with the Equivalent Steel Area Table provided. For bars and spacings not given, the area of reinforcement required can be determined by the following equations:

   Grade 60 Steel Area = A min. = \( A_{min} \) / \( A_{min} \) x 60

   Welded Wire Fabric Area = \( A_{min} \) / \( A_{min} \) x 60

In no case will fabric with wires smaller than 0.31 or spacings greater than 6" be permitted. Bar reinforcement shall allow the minimum yield design in grade of either the number 60 or one 1/2 grade next to be acceptable at the higher value. Welded bar spacing shall not be greater than two 1/8 in the slab thickness with a maximum spacing of 0'5 or three 1/8 in the wall thickness, with a maximum spacing of 0'5.

### EQUIVALENT STEEL AREA TABLE

<table>
<thead>
<tr>
<th>Grade 40</th>
<th>Grade 60</th>
<th>Grade 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar Size &amp; Spacing</td>
<td>Steel Area</td>
<td>Bar Size &amp; Spacing</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>0.033</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>0.060</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>5/16&quot;</td>
<td>0.105</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>0.200</td>
<td>3/8&quot;</td>
</tr>
</tbody>
</table>
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTARY DETAILS FOR
MANHOLES AND INLETS

INDEX NO. 232
### General Notes

1. The minimum cover values are to be used for design to determine the thickness of the asphalt or concrete paving and the cover of the base materials in flexible pavement construction or the cover of the concrete used in rigid pavement construction.

2. The values are not to be used for other than the design of those shown in Table 2.0.4.

3. A minimum cover of 1 ft. 6 in. (18 in.) above the top of the Culvert shall be provided prior to the construction of the roadbed.

4. The minimum cover values are not to be used above certain limits of traffic for those listed in the table below.

5. The pipe construction in the table shall be used in the design of the culvert, and no combination shall be used above the limits as listed in the table below.

6. The limits for the different combinations are as follows:

<table>
<thead>
<tr>
<th>Limit</th>
<th>Pipes</th>
<th>Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 in.</td>
<td>30 ft.</td>
<td>56 mph</td>
</tr>
<tr>
<td>21 in.</td>
<td>24 ft.</td>
<td>56 mph</td>
</tr>
<tr>
<td>15 in.</td>
<td>90 ft.</td>
<td>46 mph</td>
</tr>
</tbody>
</table>

### Pipe Type/Size & Shapes

- **Concrete**
  - Pipe type: Circular
  - Size: 15" - 72" (54" - 72")

- **Steel**
  - Pipe type: Circular
  - Size: 12" - 72" (15" - 72")

- **Flexible**
  - Pipe type: Circular
  - Size: 12" - 24" (15" - 24")

### Minimum Cover for Concrete, Steel, Aluminum, Polyethylene, and Polyvinyl Chloride Pipe

<table>
<thead>
<tr>
<th>Material</th>
<th>Cover Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>6 ft.</td>
</tr>
<tr>
<td>Steel</td>
<td>3 ft.</td>
</tr>
<tr>
<td>Flexible</td>
<td>2 ft.</td>
</tr>
</tbody>
</table>

### Extra Material for Cross Culverts

- **Asphalt Concrete Base**
  - Extra material is required where the centerline of the roadway is more than the distance between the pipes.

- **Flexible Paving**
  - Extra material is required where the centerline of the roadway is more than the distance between the pipes.

- **Rigid Paving**
  - Extra material is required where the centerline of the roadway is more than the distance between the pipes.

### Appendix

- **Concrete Culvert**
  - The thickness of concrete shall be determined using the methods outlined in the applicable construction standards.

- **Steel Culvert**
  - The thickness of steel shall be determined using the methods outlined in the applicable construction standards.

- **Flexible Culvert**
  - The thickness of flexible shall be determined using the methods outlined in the applicable construction standards.

### Footnotes

- The values are recommended for design purposes only.
- The data is based on the latest information available.
- The values may be subject to change based on future research.
- The values are not to be used for construction without the approval of the relevant authorities.

---

**Checked by:**

**Drawn by:**

**Date:** 09/84
### Round Pipe Dimensions

<table>
<thead>
<tr>
<th>Nominal Dimension</th>
<th>Horiz. Wall Thickness</th>
<th>Vert. Wall Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>12</td>
<td>0.8</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>1.2</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>1.4</td>
<td>2</td>
</tr>
<tr>
<td>24</td>
<td>3.1</td>
<td>3</td>
</tr>
<tr>
<td>30</td>
<td>4.9</td>
<td>4</td>
</tr>
<tr>
<td>36</td>
<td>7.1</td>
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</tr>
<tr>
<td>42</td>
<td>9.6</td>
<td>6</td>
</tr>
<tr>
<td>48</td>
<td>12.6</td>
<td>8</td>
</tr>
<tr>
<td>54</td>
<td>15.9</td>
<td>10</td>
</tr>
<tr>
<td>60</td>
<td>19.5</td>
<td>12</td>
</tr>
<tr>
<td>66</td>
<td>23.8</td>
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<tr>
<td>72</td>
<td>28.3</td>
<td>18</td>
</tr>
<tr>
<td>78</td>
<td>33.2</td>
<td>21</td>
</tr>
<tr>
<td>84</td>
<td>38.5</td>
<td>24</td>
</tr>
<tr>
<td>90</td>
<td>44.4</td>
<td>27</td>
</tr>
<tr>
<td>96</td>
<td>50.3</td>
<td>30</td>
</tr>
<tr>
<td>102</td>
<td>56.7</td>
<td>34</td>
</tr>
<tr>
<td>108</td>
<td>63.7</td>
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<td>114</td>
<td>70.9</td>
<td>40</td>
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<tr>
<td>120</td>
<td>78.5</td>
<td>44</td>
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</table>

### Elliptical Pipe Dimensions

<table>
<thead>
<tr>
<th>Nominal Dimension</th>
<th>Horiz. Area</th>
<th>Vert. Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A Wall</td>
<td>B Wall</td>
</tr>
<tr>
<td>12&quot; - 30&quot;</td>
<td>0.8</td>
<td>1.2</td>
</tr>
<tr>
<td>36&quot; - 54&quot;</td>
<td>4.9</td>
<td>7.1</td>
</tr>
<tr>
<td>60&quot; - 78&quot;</td>
<td>7.1</td>
<td>9.6</td>
</tr>
<tr>
<td>84&quot; - 96&quot;</td>
<td>9.6</td>
<td>12.6</td>
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</table>

### Round Pipe Installations

<table>
<thead>
<tr>
<th>Pipe Class</th>
<th>Maximum Height of Fill (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class S</td>
<td>Class S</td>
</tr>
<tr>
<td>Class I</td>
<td>Class I</td>
</tr>
<tr>
<td>Class II</td>
<td>Class II</td>
</tr>
<tr>
<td>Class III</td>
<td>Class III</td>
</tr>
<tr>
<td>Class IV</td>
<td>Class IV</td>
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</tbody>
</table>

### Elliptical Pipe Installations (All Sizes)

<table>
<thead>
<tr>
<th>Installation</th>
<th>Maximum Height Of Fill (ft)</th>
<th>Pipe Class</th>
<th>Bedding Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal</td>
<td>1-6&quot;</td>
<td>HE II</td>
<td>C</td>
</tr>
<tr>
<td>Vertical</td>
<td>1-6&quot;</td>
<td>VE II</td>
<td>C</td>
</tr>
</tbody>
</table>

### Concrete Pipe Dimensions

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Height of Maximum Fill (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot; - 48&quot;</td>
<td>2</td>
</tr>
</tbody>
</table>

### Polyethylene Pipe

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Height of Maximum Fill (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot; - 48&quot;</td>
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</tr>
</tbody>
</table>

### Polyvinyl Chloride Pipe

<table>
<thead>
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<th>Diameter</th>
<th>Height of Maximum Fill (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot; - 48&quot;</td>
<td>2</td>
</tr>
</tbody>
</table>

### Maximum Cover Heights

**Note**: Height of fill (maximum cover) is measured from top of finished grade to outside top of pipe.

<table>
<thead>
<tr>
<th>State of Florida</th>
<th>Cover Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designated By</td>
<td>Drawn By</td>
</tr>
<tr>
<td>Shalal</td>
<td>...</td>
</tr>
<tr>
<td>7086</td>
<td>205</td>
</tr>
</tbody>
</table>

**Notes**: HE III and VE III pipe required for depth of cover less than 2" for 15", 18", and 24" equivalent.
### ROUND PIPE - 2" x 2" CORRUGATION

<table>
<thead>
<tr>
<th>D (in)</th>
<th>Area (in²)</th>
<th>Maximum Height of Fill (ft)</th>
<th>Min. Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>12.54</td>
<td>0.064</td>
<td>4000</td>
</tr>
<tr>
<td>2.5</td>
<td>31.76</td>
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<tr>
<td>3.0</td>
<td>82.25</td>
<td>0.21</td>
<td>4000</td>
</tr>
<tr>
<td>3.5</td>
<td>191.04</td>
<td>0.30</td>
<td>4000</td>
</tr>
<tr>
<td>4.0</td>
<td>461.93</td>
<td>0.40</td>
<td>4000</td>
</tr>
<tr>
<td>4.5</td>
<td>914.84</td>
<td>0.50</td>
<td>4000</td>
</tr>
<tr>
<td>5.0</td>
<td>1931.41</td>
<td>0.60</td>
<td>4000</td>
</tr>
</tbody>
</table>

### ROUND PIPE - 3" x 1" CORRUGATION

<table>
<thead>
<tr>
<th>D (in)</th>
<th>Area (in²)</th>
<th>Maximum Height of Fill (ft)</th>
<th>Min. Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>9.82</td>
<td>0.064</td>
<td>6000</td>
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<tr>
<td>2.5</td>
<td>24.52</td>
<td>0.13</td>
<td>6000</td>
</tr>
<tr>
<td>3.0</td>
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<td>0.21</td>
<td>6000</td>
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<tr>
<td>3.5</td>
<td>129.73</td>
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<td>4.0</td>
<td>290.59</td>
<td>0.40</td>
<td>6000</td>
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<tr>
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<td>567.01</td>
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<td>6000</td>
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<td>5.0</td>
<td>1136.02</td>
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<td>6000</td>
</tr>
</tbody>
</table>

### ROUND PIPE - 5" x 1" CORRUGATION

<table>
<thead>
<tr>
<th>D (in)</th>
<th>Area (in²)</th>
<th>Maximum Height of Fill (ft)</th>
<th>Min. Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>2.36</td>
<td>0.064</td>
<td>8000</td>
</tr>
<tr>
<td>2.5</td>
<td>6.00</td>
<td>0.13</td>
<td>8000</td>
</tr>
<tr>
<td>3.0</td>
<td>15.71</td>
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<td>8000</td>
</tr>
<tr>
<td>3.5</td>
<td>35.00</td>
<td>0.30</td>
<td>8000</td>
</tr>
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<tr>
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<td>159.37</td>
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<td>8000</td>
</tr>
<tr>
<td>5.0</td>
<td>320.63</td>
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<td>8000</td>
</tr>
</tbody>
</table>

### PIPE ARCH: SPIRAL RIB - 2" x 2" x 1/4" RIB SPACING PIPE ARCH: SPIRAL RIB - 3" x 1" x 1/4" RIB SPACING PIPE ARCH - 2" x 2" CORRUGATION

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Area (in²)</th>
<th>Minimum Sheet Thickness Required (in.)</th>
<th>Maximum Height of Fill (ft)</th>
<th>Min. Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>3.0</td>
<td>0.25</td>
<td>5950</td>
<td>5000</td>
</tr>
<tr>
<td>26</td>
<td>3.2</td>
<td>0.25</td>
<td>5950</td>
<td>5000</td>
</tr>
<tr>
<td>28</td>
<td>3.4</td>
<td>0.25</td>
<td>5950</td>
<td>5000</td>
</tr>
<tr>
<td>30</td>
<td>3.6</td>
<td>0.25</td>
<td>5950</td>
<td>5000</td>
</tr>
<tr>
<td>32</td>
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<td>5950</td>
<td>5000</td>
</tr>
<tr>
<td>34</td>
<td>4.0</td>
<td>0.25</td>
<td>5950</td>
<td>5000</td>
</tr>
<tr>
<td>36</td>
<td>4.2</td>
<td>0.25</td>
<td>5950</td>
<td>5000</td>
</tr>
</tbody>
</table>

### PIPE ARCH - 3" x 1" RIB SPACING 3" x 1" x 1/4" RIB SPACING 5" x 1" x 1/4" RIB SPACING

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Area (in²)</th>
<th>Minimum Sheet Thickness Required (in.)</th>
<th>Maximum Height of Fill (ft)</th>
<th>Min. Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2.0</td>
<td>0.25</td>
<td>7950</td>
<td>6000</td>
</tr>
<tr>
<td>14</td>
<td>2.2</td>
<td>0.25</td>
<td>7950</td>
<td>6000</td>
</tr>
<tr>
<td>16</td>
<td>2.4</td>
<td>0.25</td>
<td>7950</td>
<td>6000</td>
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<tr>
<td>18</td>
<td>2.6</td>
<td>0.25</td>
<td>7950</td>
<td>6000</td>
</tr>
<tr>
<td>20</td>
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### ROUND PIPE - SPIRAL RIB RIB SPACING (3/8" x 3/8") or (1/4" x 1/4")

<table>
<thead>
<tr>
<th>D (in)</th>
<th>Area (in²)</th>
<th>Maximum Height of Fill (ft)</th>
<th>Min. Corner Pressure Lbs/Sq.Ft.</th>
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### MAXIMUM COVER FOR CORRUGATED STEEL PIPE ROUND AND PIPE ARCH

**COVER HEIGHT**

<table>
<thead>
<tr>
<th>State of Florida Department of Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designed By</td>
</tr>
<tr>
<td>Drawn By</td>
</tr>
<tr>
<td>Checked By</td>
</tr>
<tr>
<td>Approved By</td>
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</tbody>
</table>
### ROUND PIPE - 2\(\frac{5}{8}\) x \(\frac{5}{8}\) CORRUGATION

<table>
<thead>
<tr>
<th>D (in)</th>
<th>Area Sq. Ft.</th>
<th>Thickness (in.)</th>
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<td>0.055</td>
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<tr>
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### PIPE ARCH - 2\(\frac{5}{8}\) x \(\frac{5}{8}\) CORRUGATION

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Rise (ft)</th>
<th>Equiv. Round Pipe Area Sq. Ft.</th>
<th>Min. Sheet Thickness Required (in.)</th>
<th>Min. Corner Pressure (lb/Sq Ft.)</th>
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<td>8</td>
<td>1.5</td>
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<td>0.060 (1/16)</td>
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<tr>
<td>6</td>
<td>1.5</td>
<td>3.0</td>
<td>0.060 (1/16)</td>
<td>400</td>
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**Notes:**
- NA = Not Available
- NS = Not Suitable (For highway H-120 or H-120 Loadings)

### STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**COVER HEIGHT**

<table>
<thead>
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<th>Journal No.</th>
<th>Status</th>
<th>Page No.</th>
<th>Date</th>
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<tbody>
<tr>
<td>205</td>
<td>Approved</td>
<td>5</td>
<td>04/17</td>
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</tbody>
</table>

**Pipe Type:**
- Round Pipe
- Spiral Rib

**Material:**
- Aluminum Alloy

**Design Review:**
- To be performed by the designer.
GENERAL NOTES

1. Trench drains are intended for use in gutters and driveways as shown on the typical locations on Sheet 2. Type I is intended for use in Type I, II, and III, and adjacent to traffic separator and standard barrier walls, without grate. Type II is intended for use in standard driveways and wraps. Trench drain shall not be placed in designated pedestrian paths unless ADA compliant grates are used.

2. Unless shown in the plans, outlet pipe and pre-formed channel invert shall be sloped 0.6% or shallower toward the outlet regardless of the surface slope.

3. Trench drain may be extended directly into drainage structure, or outlet pipe may be used to connect trench drains to drainage structures.

4. A cleanout shall be provided for Type I drains at the upstream end and at intervals not to exceed 50 feet. The cleanout portal shall provide an opening 6" x 6" wide (transverse to the trench drain length) and 6" to 24" deep. Cleanouts are placed adjacent to raised curb or separator, the curb or separator shall be forced around the cleanout. The cleanout shall have a removable flat cover or grate.

5. Trench drain must allow for a minimum of 6 inches of concrete to be placed under and alongside the trench drain channel system. Under plan CSP Concrete backfill shall meet the requirements of Section 54. After the end of all units, Type I or II, the concrete backfill shall extend 6" minimum past the end of the drain opening.

6. Trench drain for Type I trench drain shall be spaced 4 to 6 feet on center.

7. Whenever the work disturbs existing conditions or work already completed, restore the same to the original condition in every detail. All such repair and replacement shall meet the approval of the Engineer.

8. For pavement and channel materials see specification Section 436.

DESIGN NOTES

1. Where placed adjacent to reinforced concrete barrier wall or standard barrier wall, the designer shall detail in the plans the position of the grate relative to the wall to avoid conflicts with the L-wall and curtain wall of the barrier wall. See Index 400.

2. The designer shall identify the following in the plans:
   (a) The type of grate at each location.
   (b) The location of the outlet pipe if the trench drain is not connected directly into a drainage structure.

3. Capture efficiency for Type I trench drain may be computed using the equation for asphaltic drain in FHWA HEC 12 & 22.

4. Round pipe alternate is available in 12, 18, 24, 36 inch CSP.
WITHIN TYPE E CURB

WITHIN TYPE F CURB

WITHIN DROP CURB

WITHIN DROP CURB

ADJACENT TO STANDARD BARRIER WALL

ADJACENT TO TRAFFIC SEPARATOR

TYPICAL LOCATIONS FOR TYPE II

Grate To Be Used
On Preformed
Polyethylene Alternate
In Driveways

* As Necessary To Provide 6" Of Concrete
On This Side Of Drain

TYPICAL LOCATIONS FOR TYPE I

ROUND PIPE ALTERNATE SHOWN, BUT PREFORMED POLYETHYLENE ALTERNATE ACCEPTABLE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TRENCH DRAIN
GENERAL NOTES:

1. The finished grade and slope of the inlet top is to conform with the finished slope and grade of the finished cross slope and grade of the proposed sidewalk and/or border.

2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. All details shown. Inlet tops shall be either cast-in-place or precast concrete.

3. The rear wall portion of inlet top shall be constructed with brick. Masonry to top aide required.

4. All steel in inlet top shall have 1-l mininum concrete cover unless otherwise shown. Inlet top shall be either cast in place or precast concrete.

5. For supplemental details see Index No. 20.

6. Only round concrete support post will be acceptable.

7. These inlets are designed for use with standard curb and gutter Type E and Type F. Location to be determined after construction begins.

8. For structure bottoms see Index No. 200.

9. Inlet to be paid for under the contract unit price for inlets (Curb) (Type _). Each.

INLETS TYPES 1 AND 2

PLAN (INLET TYPE 2 SYMMETRICAL ABOUT I)

PLAN (INLET TYPE 4 SYMMETRICAL ABOUT J)

SECTION BB (INLET TYPE 2 SYMMETRICAL ABOUT I)

SECTION BB (INLET TYPE 4 SYMMETRICAL ABOUT J)

INLETS TYPES 3 AND 4

SECTION BB (INLET TYPE 4 SYMMETRICAL ABOUT J)

SLAB REINFORCING

DIMENSIONAL SECTION

DIMENSIONAL SECTION

DIMENSION & REINFORCING HALF SECTION

TRANVERSE SECTIONS FOR INLETS TYPES 1, 2, 3 & 4
GENERAL NOTES

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

2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.

3. All reinforcing steel shall have 1/2" minimum cover unless otherwise shown. Inlet tops shall be either cast-in-place or precast concrete.

4. Pressuring of this inlet top will be permitted. Precast unit sizes must conform to the dimensions shown and, in accordance with approved shop drawings, steel for the top reinforcing required shall be detailed to the State Drainage Engineer.

5. Concrete meeting the requirements of ASTM C-39/C-39M may be used. In lieu of Class II concrete for precast units, manufactured in plants which are under the standard Operating Procedures for the inspection of precast drainage products.

6. The corner iron bars for rectangular throats are necessary only when throats are to be used in conjunction with circular inlet bottoms or when used on elbows with rectangular inlet bottoms.

7. For inlet bottoms 200 or larger, bars are to be used with 3'-6" bars.

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

9. See Index No. BB-3 for supplemental details.

10. All steel used for frame and cover shall meet the requirements of ASTM A-572.

11. Either cast iron covers or cast covers may be used. Cast covers shall be Class No. 50 or 60 in accordance with ASTM A-446.

12. When Alternate No. 1 Cover is specified in plan either the cast iron covers or galvanized steel frame or the galvanized steel cover and frame must be used. Covers are to be grouted in accordance with the grouting details shown in sheet E-2, in lieu of cast welding.

13. Inlets to be paid for under the contract unit price for Inlets (Curb) Type E.

Inlet Type 5

This area was cast incorporating all No Additional Cost To The Department.

Intermediate Bar (Discontinued When Space Between Adjacent Longitudinal Cleats. More Than 8" Cleats.)

This area was cast incorporating all No Additional Cost To The Department.
This Inlet is used in Traffic Separators. Types Curb and Inlet End Of Street types A, B, C, D, E, and F are used in this example. For other applications, please consult with the manufacturer of the Inlet.

1. This Inlet is used to connect Traffic Separators. Types Curb and Inlet End Of Street types A, B, C, D, E, and F are used in this example. For other applications, please consult with the manufacturer of the Inlet.

2. Reinforcing #4 bars 12" centers unless otherwise noted. Cut or bend bars out of the way of pipe when necessary. Bars to clear pipe by 12".

3. Recommended maximum pipe sizes are 24" longitudinally and 30" transversely. For larger pipes, bars with #4 in the bars number 100 are recommended.

4. For supplementary details use Index No. 205.

5. Inlet to be paid for under the contract unit price for inlets (Curb) Type 7. Each.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
CURB INLET TYPE 7

PLAN

SECTION CC

THROAT DETAIL

REINFORCING STEEL DIAGRAM

TOP SLAB OF INLETS

GENERAL NOTES

1. Reinforcing #4 bars 12" centers unless otherwise noted. Cut or bend bars out of the way of pipe when necessary. Bars to clear pipe by 12".

2. Recommended maximum pipe sizes are 24" longitudinally and 30" transversely. For larger pipes, bars with #4 in the bars number 100 are recommended.

3. For supplementary details use Index No. 205.

4. Inlet to be paid for under the contract unit price for inlets (Curb) Type 7. Each.
1. This inlet is to be used only in Trafflc Separators, Types 2D and X1 or X2, in sewers constructed with Curbs Types A, B, C, D, and E, and sidewalk paving, which are permitted in sewer Types 1, D, E, F, or G. This inlet must not be used in any other type of sewer. The use of this inlet on the through traffic side of the separator should be avoided in medians constructed with Curb Type B or C.

2. Reinforcing #4 bars of 1/2" centers unless otherwise noted. Cut or bend bars out of way of pipe when necessary. Bows to clear pipes by 1/3.

3. Recommended maximum pipe sizes are 14" longitudinal and 18" transverse. For larger pipes, inlets with A, B, and C types, indexes Nos. 250 are recommended.

4. For additional details see Index No. 210.

5. Inlet to be paid for under the contract unit price for Inlets (Curb) Type 8. Each.
GENERAL NOTES:

1. This inlet is primarily intended for locations with light to moderate flows where right of way does not permit the use of through Curb Inlets. Types 1 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 to be located outside of curb ramp area in vertical faced curbs such as Curb and Gutter Type F. Grate shall be oriented with vanes directed toward predominate flow.

3. For structure details see Index No. 20G. For supplemental details see Index No. 20D.

4. Allressed in dual type shall have 1 1/2" minimum cover unless otherwise stated. Top slab 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 wall or clear wall.

6. When used on a structure with dimensions larger than those detailed above and plans are not applied, the top slab shall be constructed using Index No. 20D with the slab opening adjusted to 24" x 36". The "Special Top Slab" on Index No. 22D is not permitted.

7. Frame may be adjusted with one to six courses of brick.

8. Inlet and grate details shown on Figure R-1067-L. Various grates with approximately equal openings will be permitted that satisfy AASHO HS-20 loading. Inlet and grates shall be Class 30 castings in accordance with ASTM A48. Grates shall be reversible, right or left.
This curb inlet is primarily intended for locations with light flows where right of way does not permit the use of threaded Curb Inlets Types I through 6. The typical application is on curbs with fast city streets. The inlet grate is suitable for pedestrian and bicycle traffic.

This inlet is to be located outside of curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.

All steel inlets in slab tops shall be mortared to the bottom or riser walls.

When used on a structure with dimensions larger than those detailed above and risers are not applied, the top slab shall be constructed using Index No. 200 with the slab opening adjusted to 24" x 24". The "Special Top Slab" on Index No. 200 is not permitted.

Inlet and grate detail shown is Keeboon E-3065-L. Grates with approximately equal openings will be permitted that satisfy AASHTO 50-20 loading. Inlet and grate shall be Class 30 castings in accordance with ASTM A456. Grates shall be reversible, left or right.

GENERAL NOTES

1. This inlet is primarily intended for locations with light flows where right of way does not permit the use of threaded Curb Inlets Types I through 6. The typical application is on curbs with fast city streets. The inlet grate is suitable for pedestrian and bicycle traffic.

2. This inlet is to be located outside of curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.

3. For structure bottoms see Index No. 200. For supplemental details see Index No. 250.

4. Adjacent or to the side of the grate shall have 15" minimum cover unless otherwise shown. Top slab 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 or below.

6. AASHTO 50-20 loading. Inlet and grate shall be Class 30 castings in accordance with ASTM A456. Grates shall be reversible, left or right.
GENERAL NOTES
1. The finished grade and slope of the inlet top are to conform with the finished road and grade of the proposed sidewalk and/or border.
2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
3. All steel shall have minimum cover unless otherwise shown.
4. All reinforcement is ASTM A6/A61B/51M Grade 60 steel, either smooth or deformed. Equivalent area grade 40 steel or 65 gal welded wire fabric may be substituted.
5. Precasting of this inlet will be permitted. Precast units shall conform to the dimensions shown or in accordance with approved shop drawings. Request for shop drawing approval shall be directed to the State Drainage Engineer.
6. Inlets to be paid for under the contract unit price for Inlets (Closed Flume) EA.

DESIGN NOTES
1. These inlets are designed for use with Type F curb and gutter only. Locate inlet outside of curb ramp area. The Single Barrel Flume is intended for locations with light to moderate flow. Multiple Barrel Flumes must be selected to meet design heavy flows.
2. Designer must specify Flume Type, "D" dimension, number of barrels and handrail requirements in plans.
3. Designer must specify where energy dissipating bricks are required.
Slopes, Ditch Apron and Endwalls

See Plans for Handrail Requirements

Closed Flume Inlet

Handrail for Flume in Sidewalk

Single Barrel Flume Depicted

Endwall

Ditch Pavement to be Adjusted When Inlet Present

Section AA

Slopes, Ditch Apron and Endwalls

Closed Flume Inlet

Handrail for Flume in Sidewalk

Single Barrel Flume Depicted

Elevation
NOTE: See Single Barrel Flume For Base Dimensions.
Inlet Symmetrical About f For Inlet Types 2 & 4
And For Double Throat Side Of Inlet Type 5. See Tabular Description Of Inlets, General Note I.

For Inlet Types 2

For Double Throat Side Of Inlet Type 5.

Tabular Description Of Inlets, General Note I.

Concrete Barrier Wall Transition

To Be Paid Under The Contract Unit Price For Barrier Wall.

PICTORIAL VIEW (TYPE I SHOWN)

GENERAL NOTES

1. Inlet Descriptions:
   Type 1: Single throat, one side of barrier wall.
   Type 2: Double throats, one side of barrier wall.
   Type 3: Two single throats, opposite sides of barrier wall.
   Type 4: Two double throats, opposite sides of barrier wall.
   Type 5: Oblique throats, one side of barrier wall, and oblique throat other side of barrier wall.

2. For grate details see Index No. 220. The parallel bar grate shall be used unless the restrictive grate is called for in the plans. This restrictive grate shall be specified where bicycle traffic is anticipated. Not suitable for pedestrian traffic.

3. For standard concrete barrier wall dimensions, and for dimensions of concrete barrier wall incorporating light-steel decks within the wall, see Index No. 400.

4. Reinforcing steel shall be 2" zinc coated.

5. All reinforcing details are shown in 2" zinc coated.

6. All reinforcing details are shown in 2" zinc coated.

7. Inlets to be paid for under the contract unit price for Inlets (Median Barrier Type 1, E.A.) barrier wall to be paid for under the contract unit price for Concrete Barrier Wall, LF.
**Concrete Barrier Wall**

**Low Side Super Elevation**

Pavement WARP FOR SHOULDERS IN SUPER ELEVATION

**Concrete Barrier Wall**

**High Side Transition**

**Joint And Bond Breaker**

- Clear In Place Inlets
- One layer of 300 ft, full covering band whereafter between Inlet and Barrier,
  - including footings,
  - Precast Inlets
  - Joint width 3 inches. Seal with backer roll and Department approved
  - pavement joint sealant.
  - See Section BB For Other Barrier Shapes.

**Shoulder Pav't Edge Of Pavement**

**4'-11" 3'-8"**

**General Notes**

1. This Inlet is primarily intended for use adjacent to concrete barrier walls on paved shoulders. Use of the Inlet in place of other well types shall be approved by the Structures Engineer. The Inlet is suitable for single or occasional pedestrian traffic, but should not be placed in a designated pedestrian maneuver way. It is not intended for use in embankment or other areas where debris is expected to high drain effect.

2. Inlets located in embankments constructed with earth anchored retaining wall shall be designed with minimum width to reduce adverse impact on the anchorage system. None of pipe parallel to end wall shall be located where the pipe shall be subjected to erosion. Special consideration shall be exercised during the design and construction of storm water systems within anchored wall areas.

3. Inlet bottoms and/or tops may be either precast or cast in-place. Whether cast as a single unit or as multiple segments, and whether precast or cast in place, the upper 2'-3" of the Inlet shall be reinforced in accordance with anchor, CC, BD and EE.

4. Exposed welds shall be deoxidized.

5. When Alternate S grate is specified in the plans, the grate to be hot dipped galvanized after fabrication. A field application of the primer shall be made in Inlet B and shall not be permitted, thereby requiring horizontal adjustment during fabrication and/or casting, or, maintaining grate to structure prior to grouting.

6. For supplemental details see Index Nos. 200 and 210.

7. Inlets to be filed for under the contract unit for Inlets (Barrier Wall), sink.

**Section AA (Without Grate)**

**Section BB**

**Top View (Without Grate)**
1. The Inlet to be used in conjunction with Barrier Wall, Concrete (Rigid) / Curb & Gutter, Index No. 490.

2. All reinforcing steel is to be #4 bars. Reinforcing steel shall be 3" min. cover unless otherwise shown. Chart to be included in contract for concrete barrier wall.

3. Barrier wall shall be Class II concrete, finished in accordance with Index No. 490.

4. A 30" x 5" drainage slit shall be constructed at the inlet centerline when the inlet is located in a curb area. No more than one V3, one V4, and one U-bar are to be deleted for construction of the drainage slit.

5. For supplemental details see Index Nos. 212 and 490.

6. Recommended maximum pipe sizes are 13" longitudinal and 36" transverse. For larger pipes, use All. B. bottoms, Index No. 200.

7. Grates can be fabricated with reinforced base or with either cold electroformed or floor welded cross bars as detailed.

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

9. For older lines, the height of the structure shall be computed using the theoretical gutter elevation, less the flow line elevation of the lowest pipe or top of sump floor.

10. Units to be paid for under the estimated unit price for Inlets / Barrier Wall / Rigid - Curb & Gutter / Ext. Each.

11. Barrier wall to be paid for under the contract unit price for Barrier Wall, Concrete / Rigid - Curb & Gutter / Ext.
Optional Steel Grates

Cross Bar Options

- Welded
- Electroformed

Cross Bar

Plan

Section KK

Inset B

Section EE

Inset C

Main Bars 5" x 5"
Cross Bar 1.0" Extra forging or 1.0" Welded

Inset Grate with Extended Crossbar To Front Of Inlet

Cold Driven Nail

Intermediate Bars 1.0" x 1.0"

Bearing Bar 5" x 5"

Intermediate Bar (See Details)

Section 20

Bar Stub

Intermediate Bar

Main Bar Stub At Front Of Inlet

NOTE:

- Each Side Main Bar And Upper Half Cross Bar
- Tolerances

State of Florida Department of Transportation

Barrier Wall Inlet

Barrier Wall, Concrete (Rigid) (C & G)

Names: Date:

Done By:

Checked:

Approved By:

Sheet No.: 2 of 2
**Recommended Maximum Pipe Sizes**

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Inlet Inside Width</th>
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<tr>
<td>4' - 0&quot;</td>
<td>4' 8&quot;</td>
</tr>
<tr>
<td>6' - 0&quot;</td>
<td>6' 4&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>8' 0&quot;</td>
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</tbody>
</table>

*Notes: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 230. For larger pipe sizes, see Section BB. For smaller pipe sizes, see Section AA.*

---

**General Notes**

1. The Inlet is intended for use in all A steel grate on facilities subject to heavy vehicle loads. Refer to the “Transition” section below for proper installation.

2. Reinforcing steel on No. 4 bars at 12" centers shall be used. See Section BB for use in “transition” section above. For other facilities, see Section AA.

3. All exposed edges and corners shall be rounded in accordance with standard practice.

4. When alternate grate Type S is specified in plans, the grate shall be not dipped galvanized after fabrication.

5. For supplementary details see Index Nos. 200 and 230.

6. Inlets to be paid for under the contract unit prices for Inlets (Gutter Type S). Cost of concrete aprons at terminal inlets to be included in the cost of the Inlets.

---

**State of Florida Department of Transportation**

**Gutter Inlet**

**Type S**

*Designed by*

*Drawn by*

*Approved by*
Concret Apron at Terminal Inlets

Apron To Be Constructed At The Most Downstream Inlet in A Run Of Shoulder Gutter

Concrete Apron At Terminal Inlets
GENERAL NOTES

1. This inlet is suitable for concrete, asphalt, or other areas subject to heavy wheel loads, minimum debris, and bicycle traffic. This inlet may be placed in areas subject to occasional pedestrian traffic such as landscaped areas and pedestrian areas where pedestrians can walk around the inlet.

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

3. Reinforcing - #4 bars at 12" o.c., both ways. Cut or bend bars out of way of pipe to cover pipe 1/4".

4. All exposed edges and corners shall be tooled to 2" radius.

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

6. For supplementary details see Index No. 20/I.

7. Inlet to be paid for under the contract unit price for Inlet (Gutter Type V), EA.


(For Pipes 30" dia. and Larger)


PLAN

SECTION BB
Recommended Maximum Pipe Sizes:
2'-0" Wall - 36" Size
4'-0" Wall - 30" Size

SECTION AA

OPTIONAL BAR SPACING

STEEL GRATE

TWO REQUIRED PER INLET

Intermediate Bars 1/2" x 1/2"
Main Bars 5" x 1/2"
Interchange Bars 1/2" x 3/4"

Steel Grate - Manufactured by Borden Foundry Co., Dade City, FL

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

GUTTER INLET
TYPE V

Drawn By:
Checked By:
Approved By:

221
**Recommended Maximum Pipe Sizes**

<table>
<thead>
<tr>
<th>Inlet Inside Width</th>
<th>Pipe Size</th>
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<tbody>
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<td>18&quot;</td>
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<tr>
<td>3'-1&quot;</td>
<td>24&quot;</td>
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*Notes: Recommended sizes are for concrete pipes. Sizes for other types of pipes may be verified for fit in accordance with Index No. 200.*

**GENERAL NOTES**

1. This inlet is designed for ditches, medians, or other areas subject to heavy wheel loads on limited access facilities where debris may be a problem.
2. This inlet is not for use in areas subject to pedestrian or bicycle traffic.
3. Reinforcing 3" clearance to inside face. Cut or bend bars out of way if pipe is close to pipe by 2'-0".
4. Chamfer exposed edges (1" Chamfer). When alternate 3" grate is specified in plans, the grate is to be hot-dipped galvanized after fabrication.
5. Cost of ditch paving to be included in the cost of inlet. Sodding to be paid for under contract unit prices for sodding, $Y.
6. For supplemental details see Index No. 200.
7. Inlet to be paid for under the contract unit prices for inlet (Drain Type A, E).
RECOMMENDED MAXIMUM PIPE SIZES

<table>
<thead>
<tr>
<th>INLET INSIDE WIDTH</th>
<th>PIPE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5'-6&quot;</td>
<td>30'</td>
</tr>
<tr>
<td>4'-2&quot;</td>
<td>24'</td>
</tr>
</tbody>
</table>

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe may be increased in accordance with Index No. 200. For larger pipe see details on Index No. 200.

NOTE: All A Structure Bottom Only. See Index No. 200 for structure bottom details and reinforcement.

INLET WITH STRUCTURE BOTTOM

<table>
<thead>
<tr>
<th>ESTIMATED QUANTITIES</th>
<th>For Informational Purposes Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PAVEMENT</td>
</tr>
<tr>
<td></td>
<td>ST</td>
</tr>
<tr>
<td>Single Slot</td>
<td>6.2</td>
</tr>
<tr>
<td>Double Slot</td>
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CONCRETE INLET PAVEMENT AND SODDING

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

DITCH BOTTOM INLET TYPE B

SECTION BB

SECTION CC

SECTION DD

STEEL GRATE

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

DITCH BOTTOM INLET TYPE B

SECTION AA

SECTION CC

SECTION DD

STEEL GRATE

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

DITCH BOTTOM INLET TYPE B

SECTION BB

SECTION CC

SECTION DD

STEEL GRATE
GENERAL NOTES

1. The general purpose of the inlet top slot/drainage area:
   a. For岛屿, median or other areas subject to heavy wheeled loads, this inlet may be placed in areas subject to conventional pedestrian traffic such as landscaped areas and pavement areas where pedestrian can walk around the inlet.
   b. Provides full grate and horizontal slot drainage for new construction.
   c. Provides full grate and horizontal slot drainage for replacing the vertical slot taps on existing Inlet Type B and Type X that are in locations subject to conventional pedestrian traffic.

2. Box, wide and shallow reinforcing wall on 1" Grade C be at 2" center both ways with 2" tolerance to stabilize of wall and foundation. Bone to be out or bent for 1/2 minimum clearance around pipe.

3. When Alternate G grates are specified in the plane, the grates are to be half-slip galvanized and other fabrication.

4. Cost for constructing traversable taps on new Inlet boxes shall be included in the contract unit price for Inlet (Ditch Bottom / Type X). Existing Inlet boxes shall be in the contract unit price for Inlet (Ditch Bottom / Type B) (Partial), EA. Unit price and payment shall be full compensation for Inlet conversion and shall include the removal and disposal of any existing concrete Inlet pavement, removal and disposal of sufficient material from the existing Inlet box to facilitate replacement of the required Inlet conversion, benefit of construction of concrete Inlet pavement, reuse, repurposing or reusing grates or required by plane or as directed by the Engineer. Any required earthwork for ditch rectification within 10' of Inlet box and of other disturbing process.

5. Cost of Inlet boxes shall be included in the contract unit price for Slab, P.Y.

6. Sediment will be paid for under the required unit price for Slab, P.Y.

7. For supplementary details see Index No. EB.

DESIGN NOTES

1. The type of top (single or double sided) depend on the approach ditch configuration and the hydraulic requirements of the site. The designer will designate in the plans the type of top to be constructed of each individual inlet location. On existing Inlet box conversion grates shall be constructed at the original grate elevation unless other elevations are called for in the plans. When grates shall be used for the Inlet top to be constructed to support water detention, details for ditch modifications and underdrains shall be shown in the plans.

MAINTENANCE NOTES

1. Traversable Inlet tops that are constructed by maintenance contract or by maintenance forces may review the existing grates that are determined by the Maintenance Engineer to be functionally sound, and their reuse as directed by the Maintenance Engineer. Existing grates approved for reuse and new grates may be mixed, removed or replaced as directed by the Maintenance Engineer.

TRAVERSABLE TOPS FOR INLETS TYPE B AND
FOR CONVERSIONS OF EXISTING INLETS TYPE B AND TYPE X

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

DITCH BOTTOM INLETS

TYPE B

2 of 2
INLETS

CAST IRON GRATES

HALF SECTION CAST IRON GRATES

CAST IRON GRATES

STEEL GRATES

NOTICE: Steel Grates Are Required On Inlets With Traverseable Slides And On Inlets Where Eligible Traffic Is Anticipated.

GENERAL NOTES

1. These inlets are exclusive for eligible traffic and are to be used in streets, medians and other areas subject to high-grade traffic. Inlets are also to be used to areas subject to any heavy wheeled loads. This inlet may be placed in areas subject to occasional pedestrian traffics such as landscaped areas and pedestrian areas where pedestrian use is within an area.

2. Inlets subject to vehicle traffic should be constructed without steel. Where steel is a problem, inlets should be modified with a grate. Several inlets should be made within an area with metal grate for pedestrian walk and non-traversable area. The traversable and modification is not adaptable to inlets Type C, Type D may be constructed of either in both sides as shown on sheet.

3. Steel grates are to be used on all inlets where eligible traffic is anticipated. Steel grates are to be used on inlets with traversable slides. Other metal is subject to vehicle traffic is not anticipated. Steel grates may be used on all inlets with traversable slides. Steel grates are to be used after either the steel grate, but slotted provided for fasteners. The steel grate may be used, unless the plane can insert the particular type.

4. Recommended maximum size shown are for concrete pipe. Sizes for other types of pipe must be checked for fit.

5. All tapered corners and edges of concrete are to be chamfered 1/2.

6. Cones are subject to be used in inlets without砼 and inlets with non-traversable slides only when subject to in the planes, but subject to all traversable and inlets. Due to be included in contract. The price for inlets, quantity shown are for information only.

7. Traverseable slides should be fastened in existing traffic will be set for as traffic portals. For construction work and method of pavement, unstable materials, STEEL GRATES Partially FOR EXISTING INLETS.

8. Sliding to be used on inlets made in several areas and pulled for under contrast areas. Top pavement unit price for Sliding.

9. For supplementary details and Inlets No. 65, 66.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
DITCH BOTTOM INLETS TYPES C, D, E & H
TRAVERSABLE SLOTS

SECTION AA

SECTION BB

SECTION CC

PAVEMENT AND SODDING QUANTITIES FOR TRAVERSABLE SLOTS

<table>
<thead>
<tr>
<th>Inter</th>
<th>Pavement</th>
<th>Soil</th>
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<td>4.67</td>
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<tr>
<td>D</td>
<td>5.99</td>
<td>0.96</td>
</tr>
<tr>
<td>E</td>
<td>6.38</td>
<td>0.98</td>
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</tbody>
</table>

DITCH BOTTOM INLETS TYPES C, D, E, & H

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TRAVERSABLE SLOTS
DESIGN NOTES FOR TRAVERSABLE SLOTTED INLETS (PARTIAL) FOR EXISTING INLETS

1. The general purpose of these conversions is to restore the original profile of the promontory inlet top, while not creating a hazard by deepening the top too much.

2. The correction procedures depend on the approach ditch grade and hydraulic requirements of the site. The determination of the appropriate case depends on the relationship between inlet top and ditch elevation, and the vertical clearance between the ditch top and the inlet. The purpose of the Case 1 conversion is to arrive at a traversable inlet plan where top removal, if necessary, is recommended to a point within a 35-foot limit. Case 2 will normally be applicable in situations where ditch grading is required. Case 3 will normally be applicable to situations where deeper grading is required.

3. The designer shall allow for the Case 1 conversion to be constructed at each individual inlet location where the existing inlet top is above the existing inlet (Case 1) but the elevation is not suitable, or as a result of other conditions, do not prevent removal of the Inlet.

**Method of Payment for Traversable Slot Inlets (Partial) for Existing Inlets**

1. Existing Inlets converted to traversable shall be paid under (2) for each partial, each shall be included in the price when described.

2. All ditch reconditioning work shall be paid within 35 feet of each traversable slot conversion, whether required by these details or as a result of the conversion. A list of such items is included as part of the partial cost. Reconditioning work shall not include excavation and removal of surplus inlets, or removal of existing sheet, grading, reconditioning, drainage, and reconditioning of the ditch, including ditch pavement and reclaiming of the ditch under the contract price for Inlet (Detention Concept). Ditch reconditioning is required for all reconditioning within the 35 feet of the Inlet. Ditch section A shall be paid for under the contract price for Inlet (Detention Concept).

3. Complete Inlet section A shall include the complete Inlet section A, including concrete Inlet paving and replacement grade in Ditch section A, ditch reconditioning, grading and reclaiming, and shall be included in the contract price for Inlet (Detention Concept).

4. Ditch section A shall be paid for under the contract price for Inlet (Detention Concept). Ditch section A shall be paid for under the contract price for Inlet (Detention Concept).
GENERAL NOTES

1. These inlets are designed for use in ditches, roadways, pavement areas, or other areas subject to heavy wheel load, excessive debris, and aerial traffic. This inlet may be placed in areas subject to•\(\text{traffic}^2\) on landscaped or paved areas where pedestrian areas are subject to heavy traffic.

2. These inlets may be used with steel or concrete bottoms. The inlet and bottom combinations are to be selected from the design of the manufacturer.

3. For supplemental details of Type F only, see Index 2DI.

PAVEMENT AND SODDING

Notes:
1. Pavement and/or sod to be used only where called for in the plans.
2. Cost of paving to be included in cost of inlet.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

DITCH BOTTOM INLETS

TYPE F & G
**RECOMMENDED MAXIMUM PIPE SIZES**

<table>
<thead>
<tr>
<th>INLET INSIDE WIDTH</th>
<th>PIPE SIZE</th>
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<tbody>
<tr>
<td>2'-0&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>4'-0&quot;</td>
<td>30&quot;</td>
</tr>
</tbody>
</table>

**Notes:** Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 2B. For larger pipe see bottom detail right and Index No. 2D.

**GENERAL NOTES**

1. This inlet is designed for use in ditches, medians, pavement areas, or other areas subject to heavy wheel loads with minimal debris. This inlet is not for use in areas subject to heavy traffic.

2. Reinforcing - Use two 1/2" centers both ways with 2" clearance to allow for joints. Cut or bend bar out of way of pipe when necessary to clear pipe by 1".

3. When alternate grate is specified in plans the grate is to be notched to allow for additional reinforcing.

4. For supplementary details, see Index No. 2B.

5. Cost of ditch paving to be included in cost of inlet. Sodding to be paid for under contract unit price for sodding, $/sq. ft.

**STEEL GRATING**

- Two required per inlet
- Bars 5" x 1" (Notched For Crown Bar 1")
- Crown Bar 1/2" x 1" (Continuously Welded at each bar notch)

**DITCH BOTTOM INLET TYPE J**

State of Florida Department of Transportation

Section CC

Section BB

Section AA

Section DD

Detail

**NOTE:** All B Structure Bottom Only, See Index No. 2D. For structure bottom details and hole reinforcement.
This skimmer is intended for use on Type C, D, or E detention pond bottom structures, as outlet control structures.

1. The skimmer consists of two side panels, one front panel, two (2) flat bars, and accessory hardware. The front panel, side panels, and flat bars are to be hot-dipped galvanized after fabrication.

2. To minimize hydraulic losses across the skimmer, the flow area under the weir slot is to be at least three times larger than the flow area of the weir slot. The flow area under the weir slot is defined as the width of the structure sides with outside dimensions greater than 6'-4".

3. The configuration of skimmers may be subject to regulatory requirements. The designer should provide skimmer details in the plans.

4. Where this skimmer is used, the designer should reference the outlet control structure details. Where a different skimmer design is needed, the designer should provide skimmer details in the plans.

5. The designer shall evaluate if a grate is needed for safety reasons. Where a grate is not needed for safety reasons and is not desirable for hydraulic or other reasons, the designer may omit the grate by marking it in the outlet control structure details.

6. The designer shall show the configuration of the weir slots in the outlet control structure details.

GENERAL NOTES

1. Each skimmer is intended for use on Type C, D, or E detention pond bottom structures as outlet control structures.

2. The side panels are dimensionally accurate, therefore they may be used on either side of the structure.

3. Two (2) skimmers may be constructed on one structure provided they are on opposite ends.

4. The location of the reinforcing areas in these structures must conform to the applicable standards to meet the requirements of the expansion anchors used to attach the skimmer.

5. Grimes to be used on the inlet unique otherwise specified in the plans.

6. A skimmer consists of two (2) flat bars, one front panel, two (2) flat bars, and accessory hardware. The cost of installation is to be included in the cost of the inlet.
The French-Drain Skimmer is a hinged cover, mounted over an outlet in a catch-basin, that prevents oil and floating debris from exiting the basin. Use this skimmer in French-drain catch-basins and in other locations where there is a need to prevent oil,体贴 or other floating contaminants from exiting catch-basins through open pipes.

1. Place neoprene gasket material between the skimmer and the catch-basin at all points of contact. Trim the gasket neatly to extend 1 inch beyond the joint on all sides.

2. Skimmer baffles, cleannout pipe, and angles shall be primarily constructed of either galvanized steel, aluminum, polyvinyl chloride, polyethylene, fiberglass, or acrylonitrile butadiene styrene. All other components, other than aluminum, shall be hot-dip galvanized.

3. Mounting hardware, hinges, and cleannout shall be either aluminum alloy fasteners or ribbed galvanized.

4. Material used in construction of all components (baffle, cleannout pipe, and angles) shall comply with Standard Specification 943 for steel, 945 for aluminum or 946 for plastics.

5. All gaskets for furnishing and leveling a French-drain skimmer shall be included in the cost of the basin in which it is installed. Retrofit skimmers shall be paid for as 'modify existing structure'.

6. Plastic Skimmers shall contain a minimum of 1.5% by weight of carbon black for UV protection.

**SKIMMERS FOR FRENCH-DRAIN OUTLETS**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**DESIGN NOTES**

1. The contractor may submit an alternative design pre-fabricated French-Drain Skimmer for approval by the Engineer.

2. Show, in the plans, the location of the basin and identify the interior side(s) of the basin on which a skimmer will be installed.

3. The French-Drain Skimmer dimensions shall be based on the outlet pipe diameter as shown in the dimension table.

4. Type II Skimmers are to be used only with outlet pipe diameters of 3", 5", and 8".
Endwall dimensions (exclusive of multiple pipe spacing)

Normal Pipe
- Pipe Slew
- Center To Center Pipe Spacing
- Centerline To Centerline Dimension At Face Of Headwall

Skewed Pipe
- Location Reference Line (See Location Control Above)

Endwall positions for single and multiple pipe and spacing for multiple pipe

Endwall Dimensions (Exclusive of Multiple Pipe Spacing)

Endwall Positions for Single and Multiple Pipe and Spacing for Multiple Pipe

General Notes
1. Endwall dimensions, locations and positions are for round and snippet concrete pipe and for round and pipe work segmental units. Round concrete pipe shown.
2. Front edge and ditch transition shall be in accordance with Index No. 285.
3. Endwalls may be cast in place or precast concrete. Reinforcing shall be Grade #4 or #6. Additional reinforcement necessary for backing placed units shall be determined by the Contractor or the Supplier. Cost or reinforcement shall be included in the contract unit price for concrete endwall.
4. All exposed concrete and edge of concrete are to be chamfered 1/2 in.
5. Concrete meeting the requirements of ASTM C 492 (850 psi) may be used in lieu of Class I concrete to precast those manufactured in plants which are under the Standard Operating Procedures for the Inspection of prestressed concrete products.
6. On soft fill slopes with side slope flatter than 1:1, grades 10' from the endwall to the flatter side slope, right of way permitting.
7. For existing around embankment see Index No. 280
8. Payment for concrete quantities for endwalls elevated to the pipe shall be made on the following basis:
   - Endwall Slew To Pipe Use Tabulated Value
   - 0° to 5° 0°
   - 6° to 10° 5°
   - 11° to 30° 30°
   - 31° or over 45°
9. Pipe length plan quantities shall be based on the pipe and locations shown in the standard location control and view, or length based on special endwall locations satisfied for in the plans.
10. Payment for pipe in pipe culverts shall be based on plan quantities, adjusted for endwall locations determined by the Engineer.
11. Endwall to be paid for under the contract unit price for Concrete Class 2 (Endwall). Ctrl.
### 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</th>
<th>Skew Angle of Pipe</th>
<th>Span</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Single</td>
<td>Double</td>
<td>Triple</td>
<td>Quadruple</td>
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<td>Concrete</td>
<td>Concrete</td>
<td>Metal</td>
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</tr>
</tbody>
</table>

**Concrete Opening Area:**
- Opening Area of Pipe
- Skew Angle

**Pipe Dimensions:**
- D: Diameter
- X: Length

**Class I Concrete:**
- CY: Cubic Yards

**Number of Pipes:**
- SF: Square Feet

<table>
<thead>
<tr>
<th>D</th>
<th>X</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
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</tbody>
</table>

**Notes:**
- Use the guidelines of General Note No. 8 for entering tolerable quantities.
- Approved by:
  - State of Florida
  - Florida Department of Transportation

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#### Corrugated Metal Pipe Arch

<table>
<thead>
<tr>
<th>Opening Area (SF)</th>
<th>Dimensions</th>
<th>Class I Concrete (CY)</th>
<th>Span</th>
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<tbody>
<tr>
<td></td>
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</tbody>
</table>

**Span:**
- R: Rise

**Pipe Dimensions:**
- D: Diameter
- X: Length

**Class I Concrete:**
- CY: Cubic Yards

**Number of Pipes:**
- SF: Square Feet

<table>
<thead>
<tr>
<th>D</th>
<th>X</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
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**Notes:**
- Use the guidelines of General Note No. 8 for entering tolerable quantities.
- Approved by:
  - State of Florida
  - Florida Department of Transportation

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#### Concrete Elliptical Pipe

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<thead>
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<th>Class I Concrete (CY)</th>
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**Pipe Dimensions:**
- D: Diameter
- X: Length

**Class I Concrete:**
- CY: Cubic Yards

**Number of Pipes:**
- SF: Square Feet

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<tr>
<th>D</th>
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<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
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</tbody>
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**Notes:**
- Use the guidelines of General Note No. 8 for entering tolerable quantities.
- Approved by:
  - State of Florida
  - Florida Department of Transportation

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### Straight Concrete Endwalls Single and Multiple Pipe

- Dimensions
- Materials
- Specifications

---

**STATE OF FLORIDA**

**DEPARTMENT OF TRANSPORTATION**

**Contract No.**

**Drawn By**

**Approved By**
SECTION BB

SECTION AA

OPTIONAL ENTRANCE FOR CONCRETE PIPE

GENERAL NOTES

1. Straight concrete endwalls are intended for use outside the clear zone.

2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwall detail conforms to the criteria in this Index, design specifications, AASHTO 1989. Precast construction, adhering to this Index, including any additional reinforcement required for bending which shall be determined by the Engineer or manufacturer in accordance with AASHTO Specifications. For precast units, all materials and reinforcing steel shall be approved by the State Drainage Engineer prior to construction.

3. Reinforcing steel shall be either Grade 40 or 60.

4. Concrete shall be Class Z except concrete meeting the requirements of ASTM C 496 (M200 PSI) may be used in lieu of Class Z concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the Inspection of precast drainage products.

5. Chisels: All exposed edges and corners to be chiselled ½" unless otherwise shown.

6. That portion of corrugated metal pipe in direct contact with the concrete slab and extending 12" beyond shall be fiberlined prior to placing of the concrete.

7. Sodding shall be in accordance with Index No. 220 and paid for under the contract unit price for Sodding, ST.

8. Bases of pipes for either cast-in-place or precast construction shall be the authorized quantities tabulated on the Contracts. Concrete and reinforcing steel shall be paid for under the contract unit price for Concrete, Cost Estimate Sheet 1, Class B, and Reinforcing Steel, Footing, 1, LC.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 60" PIPE

BILL OF REINFORCING STEEL

<table>
<thead>
<tr>
<th>BAR</th>
<th>SIZE</th>
<th>NO. REV.</th>
<th>LENGTH</th>
<th>LOCATION</th>
<th>BENDING</th>
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</thead>
<tbody>
<tr>
<td>A</td>
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<td>25</td>
<td>4'-2&quot;</td>
<td>footing</td>
<td>straight</td>
</tr>
<tr>
<td>B</td>
<td>#3</td>
<td>23</td>
<td>3'-0&quot;</td>
<td>footing</td>
<td>straight</td>
</tr>
<tr>
<td>B</td>
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<td>1'-0&quot;</td>
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</tr>
<tr>
<td>E</td>
<td>#4</td>
<td>18</td>
<td>1'-0&quot;</td>
<td>footing</td>
<td>straight</td>
</tr>
</tbody>
</table>

BENDING DIAGRAM

NOTE: All bar dimensions are set to cut.

ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>MRC</th>
<th>CMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Class JI</td>
<td>Cc.</td>
<td>Yd.</td>
<td>3.4</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>Lb.</td>
<td>695</td>
<td>695</td>
</tr>
</tbody>
</table>
1. Straight concrete endwalls are intended for use outside the clear zone.

2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the detail on this Index, design specifications AASHTO M65. Precast construction which adheres to this Index, including any additional reinforcement required for bending which shall be determined by the Contractor or supplier, does not require additional approval. Deviation from this Index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 20 for opening and grouting details.

3. Reinforcing steel shall be either Grade 40 or 60.

4. Concrete shall be Class II except concrete meeting the requirements of ASTM C 492 (400 psi) may be used in lieu of Class II concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the Inspection of precast drainage products.

5. Chamfer all exposed edges and corners to be chamfered 45° unless otherwise shown.

6. That portion of corrugated steel pipe in direct contact with the concrete walls and extending 12" beyond shall be P
duminous coated prior to placing the concrete.

7. Sealing shall be in accordance with Index No. 28 for under the contract unit prices for Sealing, St. C-2010.

8. Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Concrete Class II (Endwalls, C-1) and Reinforcing Steel (St狵king, L-8).
BILL OF REINFORCING STEEL

<table>
<thead>
<tr>
<th>BAR C</th>
<th>RCP</th>
<th>C/I</th>
<th>LD</th>
<th>H/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4</td>
<td>1249</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/4</td>
<td>1249</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4</td>
<td>1249</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>1249</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction.
3. Pre-cast endwall should conform to the details on this Index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals.
4. For precast endwalls, see Index No. 2DI for opening and grouting details.
5. Reinforcing steel shall be either Grade 40 or 60.
6. Concrete and reinforcing steel shall be paid for under the contract unit price for Concrete Class J6 and Reinforcing Steel (Randall).}

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
SINGLE AND DOUBLE 72" PIPE

STRAIGHT CONCRETE ENDWALLS

HALF ELEVATION

BARS B, C and D in front face of wall.

TYPICAL SECTION THRU ENDWALL

BARS B, C and D in front face of wall.

REMARKS:

- All bar dimensions are in feet.
- Estimation quantities are tabulated in the contract unit prices for Concrete and Reinforcing Steel.
- The Contractor or supplier, does not require additional approvals.
- All exposed edges and corners to be chamfered unless otherwise shown.
**SECTION BB**

Plan showing bars in footing.

**SECTION AA**

Half Elevation showing bars in back face of wall.

Optional entrance for concrete pipe.

**BILL OF REINFORCING STEEL**

<table>
<thead>
<tr>
<th>BAR</th>
<th>SIZE</th>
<th>NO. REO</th>
<th>LENGTH</th>
<th>LOCATION</th>
<th>BENDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>85</td>
<td>4'-3&quot;</td>
<td>Footing</td>
<td>Straight</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>2</td>
<td>6'-0&quot;</td>
<td>Casting &amp; Wall</td>
<td>Straight</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>58</td>
<td>9'-5&quot;</td>
<td>Wall</td>
<td>Bending</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>23</td>
<td>8'-7&quot;</td>
<td>Wall</td>
<td>Straight</td>
</tr>
<tr>
<td>E</td>
<td>4</td>
<td>6</td>
<td>2'-9&quot;</td>
<td>Wall</td>
<td>Straight</td>
</tr>
<tr>
<td>F</td>
<td>4</td>
<td>6</td>
<td>1'-6&quot;</td>
<td>Wall</td>
<td>Straight</td>
</tr>
</tbody>
</table>

**BENDING DIAGRAM**

Diagram showing bending of bars.

**ESTIMATED QUANTITIES**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>RCP</th>
<th>CMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Exc</td>
<td>Cu. Yd.</td>
<td>1519</td>
<td>1519</td>
</tr>
<tr>
<td>Rebar</td>
<td>Lb.</td>
<td>229</td>
<td>229</td>
</tr>
</tbody>
</table>

*NOTE: All bar dimensions are cut to suit.*

*NOTE: See Sheet 1 of 2 for General Notes.*

**TYPICAL SECTION THRU ENDWALL**

Diagram showing typical section through endwall.
HALF ELEVATION
(Shewing Bends in Back Face of Wall)

GENERAL NOTES

HALF ELEVATION
(Shewing Bends in Front Face of Wall)

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this page. Precast construction shall conform to the Standard Operating Procedures for the Inspection of precast drainage products. 
3. Reinforcing steel shall be Grade 40 or 60.
4. Concrete shall be Class I except concrete meeting the requirements of ASTM C-476 (4000 PSI) may be used in lieu of Class II concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the Inspection of precast drainage products.
Shape Sand Cement Bags On Upstream End To 45° Bevel (3" At Top To 6" On Lower Sides) For Concrete And Corrugated Metal Culverts Bars

At Top To 6"

Fl Elev.

Varies (6" Min.)

To 45°

Bill Batter

Loc. Ref.

Varies (9" Min.)

Bill Batter

FL Elev.

FL Elev.

CORRUGATED METAL PIPE

CONCRETE PIPE

SECTION YY

Note: (1) For concrete and corrugated metal pipes. Concrete pipe shown.

(2) The top row of riprap bags shall be secured by pinning, using #4 reinforcing bars 12 inches in length, as follows:

(a) The end bags shall be secured using two bars per bag, one vertical and one diagonal as shown.

(b) The next to last bag on each end shall be secured with two bars vertically.

(c) Bags located over the pipe shall be secured by a bar which is driven diagonally except that for concrete pipe two bars shall be used for single bags above the pipe.

(d) Intermediate bags shall be secured with a single bar.

Bars shall be driven to one inch below the surface of the bag.

The cost of furnishing and installing the bars shall be included in the cost of the riprap.

FRONT ELEVATION

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE ENDWALL

<table>
<thead>
<tr>
<th>SIZE OF PIPE</th>
<th>H</th>
<th>T</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>F</th>
<th>X</th>
<th>ONE PIPE CULVERTS</th>
<th>TWO PIPE CULVERTS</th>
<th>THREE PIPE CULVERTS</th>
<th>FOUR PIPE CULVERTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></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>18&quot;</td>
<td>2'-3&quot;</td>
<td>1'-0&quot;</td>
<td>4'-0&quot;</td>
<td>0'-0&quot;</td>
<td>0'-0&quot;</td>
<td>1'-0&quot;</td>
<td>2'-10&quot;</td>
<td>8'-9&quot;</td>
<td>1.2</td>
<td>1.2</td>
<td>11'-7&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>2'-9&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-6&quot;</td>
<td>0'-0&quot;</td>
<td>1'-0&quot;</td>
<td>3'-5&quot;</td>
<td>10'-3&quot;</td>
<td>2.4</td>
<td>2.5</td>
<td>13'-6&quot;</td>
</tr>
<tr>
<td>30&quot;</td>
<td>3'-4&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>3'-2&quot;</td>
<td>0'-0&quot;</td>
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<td>12'-0&quot;</td>
<td>3.3</td>
<td>3.4</td>
<td>16'-3&quot;</td>
</tr>
<tr>
<td>36&quot;</td>
<td>3'-10&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>3'-8&quot;</td>
<td>0'-0&quot;</td>
<td>1'-10&quot;</td>
<td>5'-1&quot;</td>
<td>13'-6&quot;</td>
<td>4.0</td>
<td>4.2</td>
<td>18'-7&quot;</td>
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<tr>
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<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
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<td>1'-8&quot;</td>
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<td>15'-3&quot;</td>
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<td>5.7</td>
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<td>10.0</td>
</tr>
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<td>54&quot;</td>
<td>5'-6&quot;</td>
<td>3'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-6&quot;</td>
<td>3'-3&quot;</td>
<td>2'-0&quot;</td>
<td>7'-8&quot;</td>
<td>18'-6&quot;</td>
<td>9.5</td>
<td>10.1</td>
<td>26'-2&quot;</td>
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<td>2'-0&quot;</td>
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<td>4'-0&quot;</td>
<td>3'-0&quot;</td>
<td>8'-6&quot;</td>
<td>20'-6&quot;</td>
<td>11.0</td>
<td>11.7</td>
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<tr>
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<td>2'-0&quot;</td>
<td>2'-6&quot;</td>
<td>4'-8&quot;</td>
<td>2'-1&quot;</td>
<td>9'-3&quot;</td>
<td>21'-9&quot;</td>
<td>13.2</td>
<td>14.1</td>
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<tr>
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<td>7'-1&quot;</td>
<td>3'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-6&quot;</td>
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<td>10'-7&quot;</td>
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<td>16.0</td>
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<td>3'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-6&quot;</td>
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<td>25'-0&quot;</td>
<td>17.5</td>
<td>18.7</td>
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<td>84&quot;</td>
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<td>3'-0&quot;</td>
<td>2'-0&quot;</td>
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<td>6'-4&quot;</td>
<td>2'-2&quot;</td>
<td>11'-8&quot;</td>
<td>28'-6&quot;</td>
<td>19.5</td>
<td>20.9</td>
<td>38'-2&quot;</td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. Straight sand-cement endwalls are intended for use outside the clear zone.
SECTION AA

END VIEW

DIMENSIONAL DETAILS

PLAN

GENERAL NOTES

I. Baffles to be constructed only when called for in plans.

2. When steel grating is required on endwall see Sheet 3-1 for details.

3. All reinforcing No. 4 bars with 2" clearance except as noted.

4. All angles, channels and pipe shall be ASTM A36/A36M, ASTM A572/GRADE 50 steel unless designated otherwise. Alternate in the plans, galvanized in accordance with Section 962-7 of the Standard Specifications.

5. Channels C-3 x 6 may be used for C-4 x 5.4 channel.

6. Preparing of this endwall will be permitted. Preparing work will conform to the dimensions shown or in accordance with approved shop drawings. Requests for shop drawings shall be directed to the State Drainage Engineer. Use Index No. 230 for opening and grouting details.

7. Concrete meeting the requirements of ASTM C-496 (4000 psi) may be used in lieu of Class I concrete in prescast pipe manufacturers to be used under the Standard Operating Procedures for the inspection of prescast products.

8. Steeling shall be in accordance with Index No. 226, and paid for under the contract unit price for Steeling, 3-1.

9. Endwall to be paid for under the contract unit price for Class I Concrete (Endwall), CF and Reinforcing Steel - Hedley, Inc. Cast of grates to be paid for under the contract unit price for Endwall Grate, LB, plus quantity. Cast of galvanized bolts and nuts to be included in the bid price for the grate.

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
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<td>3.30</td>
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<td>4&quot;</td>
<td>3&quot; 2.4 1/&quot;</td>
<td>1.86</td>
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<td>5.00</td>
<td>5.00</td>
<td>4&quot;</td>
<td>4&quot;</td>
<td>3&quot; 2.4 1/&quot;</td>
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<td>6&quot; 4.4 1/&quot;</td>
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<td>12.00</td>
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<td>5&quot;</td>
<td>7&quot; 4.4 1/&quot;</td>
<td>3.58</td>
<td>338</td>
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<td></td>
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</table>

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

U-TYPE CONCRETE ENDWALLS

BAFFLES AND GRATE OPTIONAL

15" TO 30" PIPE

WITH BAFFLES

ENDWALLS FOR 2:1 SLOPES

WITHOUT BAFFLES

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

U-TYPE CONCRETE ENDWALLS

BAFFLES AND GRATE OPTIONAL

15" TO 30" PIPE

WITH BAFFLES

ENDWALLS FOR 2:1 SLOPES

WITHOUT BAFFLES
U-TYPE CONCRETE ENDWALLS
BAFFLES AND GRATE OPTIONAL
15° TO 30° PIPE

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

DIMENSIONS AND QUANTITIES FOR BARRIERS

<table>
<thead>
<tr>
<th>Slope</th>
<th>Pipe Size</th>
<th>Area</th>
<th>L</th>
<th>W</th>
<th>Steel Coarse</th>
<th>Concrete</th>
<th>Rebar Steel</th>
<th>Total Cost</th>
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<tbody>
<tr>
<td>1:3</td>
<td>15'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:4</td>
<td>15'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:6</td>
<td>15'</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tbody>
</table>

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL

<table>
<thead>
<tr>
<th>Slope</th>
<th>Pipe Size</th>
<th>Area</th>
<th>L</th>
<th>W</th>
<th>Steel Coarse</th>
<th>Concrete</th>
<th>Rebar Steel</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:3</td>
<td>15'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:4</td>
<td>15'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:6</td>
<td>15'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SIDE VIEWS AND BACKWALL SECTIONS
REINFORCING DETAILS

ENDWALLS WITH AND WITHOUT BAFFLES FOR 1:3, 1:4 AND 1:6 SLOPES
### Steel Grating Use Criteria

1. Grates to be used on pipe culvert underside located within the designated clear zone. Protective metal covers shall be provided of an equivalent specification. Grates shall not be used unless one or more of the following conditions exist:

   A. Grates to be used on pipe culvert underside located within the designated clear zone. Protective metal covers shall be provided of an equivalent specification. Grates shall not be used unless one or more of the following conditions exist:

   B. Runoff shall be considered to be sheet flow or in such defined channels that debris transport is not considered a major problem.

   C. Runoff shall be considered to be sheet flow or in such defined channels that debris transport is not considered a major problem.

   D. Runoff shall be considered to be sheet flow or in such defined channels that debris transport is not considered a major problem.

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

### Table of Dimensions and Quantities for One Grate

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Lbs./L.F.</th>
<th>Width</th>
<th>Length</th>
<th>Angle</th>
<th>Table</th>
<th>Total Weight Lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>15&quot; x 6&quot;</td>
<td>102</td>
<td>2.5</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>18&quot; x 6&quot;</td>
<td>102</td>
<td>2.5</td>
<td>3</td>
<td>4</td>
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<td>60</td>
</tr>
<tr>
<td>24&quot; x 6&quot;</td>
<td>102</td>
<td>2.5</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>30&quot; x 6&quot;</td>
<td>102</td>
<td>2.5</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>60</td>
</tr>
</tbody>
</table>

### Steel Grate

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**U-TYPE CONCRETE ENDMALLS BARRIERS AND GRATE OPTIONAL**

15" TO 30" PIPE
### General Notes

1. Winged concrete endwalls are intended for use outside the clear zone.
2. Chamfer all exposed edges of concrete.
3. Concrete meeting the requirements of ASTM C-496 (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.
4. Edges to be paid for under the contract unit price for Class I Concrete.
5. Sodding to be in accordance with Index No. 229, and paid for under the contract unit price for sodding.

### Table of Dimensions and Estimated Quantities

#### Plan: Pipe Culvert Endwalls with U-Type Wings

<table>
<thead>
<tr>
<th>Opening</th>
<th>Wall</th>
<th>Footing</th>
<th>Total Co. Yds. Concrete, Class</th>
<th>Concrete Endwall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>Conc Pipe</td>
<td>C.I. Pipe</td>
</tr>
<tr>
<td>4'-6&quot;</td>
<td>1.8</td>
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#### Plan: Pipe Culvert Endwalls with 45° Wings

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### Table of Dimensions and Estimated Quantities

#### Table of Dimensions and Estimated Quantities

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### Design Details

- **State of Florida**
- **Department of Transportation**
- **Winged Concrete Endwalls**
- **Single Round Pipe**
- **Approved By:** [Signature]
GENERAL NOTES

1. Flared and eccentric joints conform to the requirements of ASTM C78 with the exception that dimensional and reinforcement shall be as prescribed in the table above. Circumferential reinforcement may consist of either one or two cops of steel. Conventional strength of concrete shall be 4000 psi. Shop drawings for flared end section having dimensions other than above shall be submitted for approval to the State Drainage Engineer.

2. Connections between the flared end section and the pipe culvert may be of any of the following types unless otherwise shown on the plans:
   a. Joints meeting the requirements of Section 941-1 of the Standard Specifications for Reinforced Concrete Pipe. Flared end section joint dimensions and tolerances shall be identical or comparable to those used in the pipe culvert joint. When pipe culvert and flared end section manufacturers are different, the compatibility of joint designs shall be certified by the manufacturer of the flared end sections.
   b. Joints sealed with preformed plastic gaskets. The gasket shall meet the requirements of Section 941-2 of the Standard Specifications and the minimum sizes for gaskets shall be as specified for equivalent sizes of elliptical pipe.
   c. Reinforced concrete joints as detailed on the drawings. Reinforced concrete joint shall be included in the contract unit price for the flared end section.

3. The wall shall be constructed when shown on the plans or at locations designated by the Engineer. The wall shall be cast-in-place with Class I Concrete and paid for under the contract unit price for Class I Concrete (Weak concrete). All reinforcing steel shall be included in the wall.

4. On elevated pipe culverts the flared and eccentric joints shall be placed in line with the pipe culvert. Side slope shall be wrapped as required to fill the flared and eccentric joints.

5. Flared End Section to be paid for under the contract unit price for Flared End Section (Concrete). Each section of flared end section shall be in accordance with Index No. 281, and paid for under the contract unit price for Construction.

DESIGN NOTES

1. Flared and eccentric sections are intended for use outside the clear zone on section drain and cross drain installation, except that flared end sections for pipe Sizes 8" and 10" are permitted within the clear zone. When the slope intersection of cross drain, 12" and 15" flared and eccentric sections may be treated with the cutout opening or clear zone if the outside edge of the section.

2. Flared and eccentric sections are not intended for open drain installation.

Flared and eccentric sections are not intended for open drain installation.

3. Toe walls shall be used wherever the anticipated velocity of discharge and soil types are such that erosive action would occur. Toe walls are not required where ditch pavement is provided, except when disking would occur if the ditch pavement should fail.
**Dimensions and Quantities**

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**Concrete Slab, 3" Or 5/8" thick, See Sheet 5 For Slab Quantities**

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

---

**Concrete Slab, 3" Or 5/8" thick, See Sheet 5 For Slab Quantities**

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

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- See General Note No. 3.
- See Sheet 5 of 6 For 3" Slab Quantities.

Values shown for estimating pipe quantities and are for information only.

**Concrete Slab, 3" Or 5/8" Thk., Reinforced With W.W. Bar B-420.**

---

**Notes:**
- See Sheet 6 For Details And Notes.
- Concrete Slab, 3" Or 5/8" Thk., Reinforced With W.W. Bar B-420.

---

**Section:**

1. 1/8 Miter: To major axle for pipe 24"x38" and smaller.
2. 1/2 For Pipe 26"x40" And Larger.
3. For Pipe 29"x41" and smaller.
4. For Pipe 34"x53" and larger.

---

**State of Florida Department of Transportation**

**CROSS DRAIN**

**MITERED END SECTION**

**SINGLE AND MULTIPLE ELLIPICAL CONCRETE PIPE**

**Drawn By:**

**Approved By:**

**Scale:** 1" = 4' 0"
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GENERAL NOTES

1. Mitered end sections for pipe sizes 24", 30", and 36" round or equivalent pipe arch or elliptical pipe are permitted within the clear zone. When the arch interaction permits, the mitered end section may be located with the outside opening of pipe at B beyond the outside edge of the shoulders.

2. Slope and ditch transitions shall be used when the normal roadway slope must be flattened to place end sections outside clear zone, see detail CDF.

3. The reinforced concrete pipe shall be constructed for all sizes of cross drain pipes and cast in place with Class 2 concrete. Slabs shall be 5" thick, unless 3" thickness is called for in plans.

4. Concrete pipe used in the assembly of mitered end sections shall be selected lengths to avoid excessive connections.

5. Corrugated metal pipe galvanized that is damaged during bending and perforating for mitered end sections shall be removed.

6. That portion of corrugated metal pipe in direct contact with the concrete slab and extending 6" beyond shall be 1/8" thick galvanized prior to placing the concrete.

7. Unless otherwise designated in the plans, concrete pipe for end sections may be used with any type of cross drain pipes. Corrugated steel pipe for end sections may be used with any type of cross drain pipes, except stainless steel pipe. When corrugated steel pipe is specified for cross drain pipes, mitered end sections shall be constructed with pipe or concrete pipe.

8. When the mitered end section pipe is fabricated to the cross drain pipe, a concrete jacket shall be constructed in accordance with Standard Note 2B0.

9. When using multiple cross drain pipes, the dimensions shown in this detail, or have non-parallel areas, or have non-uniform sections, the mitered end sections will be constructed either assembling as above pipe, mitered end section, or connecting multiple pipe end sections as directed by the Engineer; however, mitered end sections will be paid for each based on each independent pipe end.

10. The cost of all pipe, joints, fasteners, reinforcing, connectors, anchors, concrete, excavations, backfill, and outside line shall be included in the cost for the mitered end section. Sodding shall be paid for separately under the contract unit price of Sodding, ST.

11. Mitered end sections shall be paid for under the contract unit price for Mitered End Section (CD). Each, based on each independent pipe end.

CONCRETE PIPE CONNECTOR

ANCHOR DETAIL

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

Note: See General Note 2.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION CROSS DRAIN
MITERED END SECTION SPECIAL DETAILS AND NOTES

CONTRACT NO.

Page 6 of 6
Dimensions & Quantities

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Dimensions permitted to allow use of 8' standard pipe lengths.

Values shown for estimating pipe quantities and are for information only.

Construction joints permitted.

Notes: See Sheets 5 and 6 for details and general notes.
DIMENSIONS & QUANTITIES

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Values shown are for estimating pipe quantities and are for information only.

Beveled Or Round Corners
Concrete Slab, 3" Thick, Reinforced
With W/Fd W-44-14-4

**TOP VIEW - SINGLE PIPE**

Concrete Pipe, 24" x 36" And Smaller.

**TOP VIEW - MULTIPLE PIPE**

Concrete Slab, 3" Thick, Reinforced
With W/Fd W-44-14-4

**NOTE:** See Sheet 5 for details and general notes.

1. For Pipelines 29" x 45" And Larger.

**SIDE DRAIN**

**MITERED END SECTION**

SINGLE AND MULTIPLE ELLIPTICAL CONCRETE PIPE

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**DESIGNER:**

**APPROVED BY:**

**DEPICTED BY:**

**DRAWN BY:**

**SIGNED BY:**

**REVISION:**

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GENERAL NOTES

1. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of side drain pipe. Corrugated steel pipe mitered end sections may be used with any type of side drain pipe except aluminum pipe, and corrugated aluminum mitered end sections may be used with any type of side drain pipe except steel pipe. When bituminous coated metal pipe is specified for side drain pipe, mitered end sections shall be constructed with steel pipe or concrete pipe. When the mitered end section pipe is diastatic to the side drain pipe, a concrete jacket shall be constructed in accordance with Index No. 280.

2. Concrete pipe used in the assembly of mitered and end sections shall be of sufficient length to avoid excessive connections.

3. Corrugated metal pipe, if damaged during laying and perforating for mitered and end sections shall be repaired.

4. That portion of corrugated metal pipe in direct contact with the concrete slab and extending 18" beyond shall be bituminous coated prior to placing the concrete.

5. Corrugated polyethylene pipe (CPE) for side drain application of 15", 18", and 24" diameter shall utilize either corrugated metal or concrete mitered end sections. When used in conjunction with corrugated metal mitered end sections, connection shall be by either a formed metal band specifically designed to join CPE pipe and metal pipe or other coupler approved by the State Drainage Engineer. When used in conjunction with a concrete mitered end section, connection shall be by a concrete jacket constructed in accordance with Index No. 280.

6. When existing multiple side drain pipes are spaced other than the dimensions shown in this detail, or have non-parallel axes, or have non-uniform sections, the mitered and end sections shall be constructed either separately as simple pipe mitered and end sections or collectively as multiple pipe sections as directed by the Engineer, however, mitered and end sections shall be paid for each, based on each independent pipe.

7. In addition to the requirements of Section 3.10-4, side drain culverts shall comply with the cover requirements shown in Index No. 225.

8. The reinforced concrete slab shall be constructed for all sizes of side drain pipe and cast in place with Class I concrete.

9. Round pipe size 30° or greater, pipe-oval size 30° x 24" or greater, and elliptical pipe 30° x 30° or greater shall be granted unless excepted in the plans. Smaller sizes of pipe shall be granted only when called for in plans. The lower grade on trailing downstream ends of divided highwage shall be specified.

10. Grates are to be fabricated from steel ASTM A43, Grade B, pipe. The lower grade on all traffic approach ends shall be Schedule 10 and all remaining grates shall be Schedule 40.

11. Grates subject to salt free and corrosive free environment may be fabricated from galvanized pipe, with base metal exposed during fabrication repaired as specified in Section 562, Standard Specifications or, fabricated from black pipe and hot-dipped galvanized after fabrication in accordance with ASTM A65.

12. Grates subject to salt water or highly corrosive environment shall be hot-dipped galvanized after fabrication in accordance with ASTM A65.

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 Drainage Superintendent for possible alternate treatment prior to constructing side drain mitered end sections where a minimum depth of 30° will not result between the toe points of the mitered end sections.

15. The cost of all pipe (i.e., grates, fasteners, reinforcing, anchors, etc.), concrete, mitered end sections, and coupling bands shall be included in the cost for the mitered end section. Sodding shall be paid for separately under the contract unit price for Sodding, 5Y.

16. Mitered and end sections shall be paid for under the contract unit price for Mitered End Section (SD), etc., based on each independent pipe end.

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.

2. The design engineer shall determine highly corrosive locations and specify in the plans when the grate shall be hot-dipped galvanized after fabrication (General Note 10).

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.
Remove Headwall, Outside Wall and Headwall (See Index No. 290). Concrete Box Culvert Extension (See Index No. 290).

- Reinforcement Steel In Top Side And Wall Return To Be Cleared, Straightened And Extended Into Culvert Extension.
- Remove Headwall And Top Side To Beginning Of Radius
- Length For Manually Estimated Or Computerized Quantifies (Coding And Printout Lengths)
- Culvert Extension (Length Tabulated On Drainage Structure And Summary Sheet For Standard Box Section Extension)

**FLARED ENDWALL**

**STRAIGHT ENDWALL**

**PLAN VIEWS**

**CONNECTION DETAILS FOR CONCRETE BOX CULVERT EXTENSIONS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

MISCELLANEOUS DRAINAGE DETAILS

CONSTRUCTION DETAILS

FOR CEMENT BOX CULVERT EXTENSIONS

NOTE: The computerized printout for reinforcing steel does not include the additional lengths needed for extension and overlaps or splicing to the horizontal reinforcement in the interior walls of double, triples and quadruple culverts. For additional reinforcement and the thickened concrete wall in the transitional area shall be included in the costs for constructing the tie-in.

Cost for removal and disposal of materials from existing headwalls, wingwalls and the top slab, and cost of clearing, straightening and extending longitudinal reinforcing steel shall be included in the cost for concrete and steel of the culvert extension. For concrete box culvert details, see Index No. 290.
Addltonal Concrete Required Only When Normal Slab Thickness Is Less Than 12".

Normal Slab Thickness

SECTION BB

2'-0" 6'-0"

3'-0" 6'-9"

6" Unless Otherwise Shown In Plan

Culvert Wall

3'-0" Long x 3" Ctrs.

Near Bottom Of Slab Across Each Corner Of Opening

5'-0" Long x 3" Ctrs.

Normal Slab Thickness

Culvert Wall

SECTION CC

2'-0"

3'-0"

6" Unless Otherwise Shown In Plan

Culvert Wall

Use Extra Base When This Dimension Is Less Than 12"

Bottom Base

FRIABLE BASE

Concrete Box Culvert

The cost of furnishing and installing extra friable base material shall be included in the cost of the Box Culvert.

ASPHALTIC CONCRETE BASE

NOTE: Extra base is required when areas box culverts are located on facilities subject to high speed traffic (>45 mph) or high traffic volume (>600 ADT) and the center is within the range specified in the notation above.

EXTRA BASE FOR CROSS BOX CULVERTS UNDER FLEXIBLE PAVEMENT
### Ditch Pavement

#### General Notes
1. Type of ditch pavement shall be shown on plans.
2. In concrete ditch pavement, contraction joints are to be spaced at 25' intervals. Expansion joints may be left as needed. No open joints shall be permitted.
3. Lip of end of ditch pavement shall normally be located downstream of the ditch into the pavement. When directed by the Engineer, the lip shall be placed at least 300' downstream of the ditch bevel.
4. Trenches are to be used with all ditch paving. A trench is not required adjacent to drainage structures.
5. When directed by the Engineer, weep hole spacing may be reduced to 15' minimum.
6. For section of ditch, weep hole spacing and lateral ditch paving shall be placed at least every 15'.
7. For ditch pavements requiring filter fabric, the fabric shall be placed downstream of the pavement across the entire width of the pavement. Filter fabric shall be placed below the aggregates to form a continuous sheet with a minimum of 1%.
8. Ditch pavement requiring reinforcement shall be detailed in the plan.
9. Cost of plastic filter fabric to be included in the contract unit for ditch pavement.

#### Pavement Type Dimensions

- **Concrete Pavement**: 6' x 0.61' x 8' (90 cu.yd./m) 15% aggregate, 8' wide
- **Concrete Pavement with Bituminous Aggregate**: 6' x 0.61' x 8' (90 cu.yd./m) 15% aggregate, 8' wide
- **Concrete Pavement with Bituminous Aggregate**: 6' x 0.61' x 8' (90 cu.yd./m) 15% aggregate, 8' wide

#### Ditch Pavement

- **Standard Pavement**: 6' wide
- **Sodded Ditch**: 6' wide
- **Paved Ditch End Treatment**: 6' wide

#### Weep Hole Arrangement

- **Roadway Side Ditch**: 6' wide
- **Shoulder**: 6' wide
- **Swaled Median (No Weep Holes)**: 6' wide

#### Plan

- **Typical Section**: 6' wide
- **Profile of Ditch Pavement at Locations Other Than with Lateral Ditch**: 6' wide

#### Ditch Paving and Sodding

- **State of Florida Department of Transportation**

---

**Notes**: All weep holes to be 3" x 4" rectangle or 4" or 5" dia. circular. For each 12' x 12' x 6" of aggregate, one filter fabric is to be used, under each level. Filter fabric is to be continuous with or underlying the pavement fabric. See Index No. 106 for fabric type and application.

**State of Florida Department of Transportation**

**Designated by**

**Survey**

**Drawn by**

**Checked by**

**Approved by**

**Scale**

**Plan Number**

**Sheet Number**

**Date**

**Sheet**

**Project**

**Plan No.**

**301 122**

**281**
### Sodding Quantities (S. Y.)

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**GEOTEXTILE PLACEMENT AT CONCRETE STRUCTURE**

- **BONDED OPTION**
- **NAILED OPTION**

Note: Either option may be used unless otherwise called for in the plans.
Provide approximately a minimum of 0.02% grade on gutter, slightly warping 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.

Provide smooth section. Watch existing grades. Projekt to be adjusted by the engineer during construction.

Runoff

Provide approximately a 0.02% grade on the gutter. The gutter and the gutter of the opposing road to be connected by flumes or flumes. See details.

Prop. Part.

Warping of the surface of the median pavement if necessary, within limits of the curb or curb and gutter. Construct a drainage flume or flumes at the point or points of low grade. See details.

Prop. Part.

Runoff

Runoff

Prop. Part.

Prop. Part.

Runoff

Prop. Part.

Prop. Part.

Runoff

Prop. Part.

Prop. Part.

Runoff

Prop. Part.

Prop. Part.

Runoff

Auxiliary Lane

Auxiliary Lane

EXIST. PAVT. OR SUPER-ELEVATED CURB.LANE (EXIST. CURB OR LANE LINES)

SECTION BB

SECTION AA

MINOR ELEVATION

SECTION CC

FLUME DETAIL

GENERAL NOTES

1. These details are to apply to projects which provide for the conversion of 2-lane roadways to 4-lane divided highways and for super-elevated sections of new 4-lane divided highways. Layout above is illustration only. Cost of flumes to be included in the contract price for curbs or curb and gutter. Seal to be paid for under the contract unit price for sodding, etc.

2. Flumes to be located in the point of noseg and at other points as designated in the plans. The locations may be adjusted by the engineer during construction.

PUBLIC RD. OR CROSSEOVER

ROADWAY OPENING FLUME

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

MEDIAN OPENING FLUME

Approved By

DRAWN By

CHECKED By

DESIGNED By

Sheet No.

Scale

Date

Revised

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1 of 1
1. Spillway to be paid for as shoulder gutter.
2. If spillway empties into a shoulder or median ditch, the detail should be modified as necessary.

DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER
(TO BE USED WHERE INLETS, PIPES & ENDWALLS ARE IMPRACTICAL)
GENERAL NOTES

1. Pipe shall be any of the optional types permitted in Section 443 of the Specification unless otherwise specified in the plans. Stabtite type of pipe will not be permitted in a continuous run of pipe.

2. Concrete pipe shall be placed with the angle positioned on end.

3. Alignment points are attended (gaskets not required).

4. The contractor may select other methods of providing angle being equal or greater area of opening, for approval by the Engineer.

5. Plastic filter fabric shall be Subsurface Drainage type meeting the requirement of Section 495.

6. The standard cross section shall be constructed unless otherwise described or detailed in the plans.

7. For supplemental details see Index No. 205.

8. The contractor shall take the necessary precautions to prevent contamination of the French drain with soil, dust, and foreign materials.

9. French drain following the typical cross section shall be paid for under the contract unit price for French drain, LT. The unit price shall include the cost of pipe, pipe plugs, pipe fittings, access aggregate and filter fabric in place, and the cost for trench excavation, backfill and compaction. The unit price shall also include the cost for disposal of surplus excavated material and cost for restoration of pavement removed or damaged by French drain construction, but shall not include payment for these paid elsewhere.

French drain with a significantly different cross section shall be paid for under the contract unit price for separate French drain as follows:

(a) Slotted or Perforated Pipe, LT. Unit price shall include cost for pipe, pipe plugs and fittings in place.

(b) Ballast Pack (French Drain Aggregate), Cv. Unit price shall include cost for aggregate in place, and cost for trench excavation, backfill and compaction. The unit price shall also include the cost for disposal of surplus excavated material and cost for restoration of pavement removed or damaged by French drain construction, but shall not include payment for these paid elsewhere.

(c) Plastic Filter Fabric (Subsurface, Cv), Unit price shall be for cost of fabric in place. Quantity shall be determined by plan net dimensions of the fabric envelope.

DESIGN NOTES

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

2. French drain with minor dimensional changes or otherwise different from the standard cross section shall be either described or detailed in the plans.

French drain with significantly different cross sections shall be detailed in the plans.
ELLiptical PIPE

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**Slot Cut Options**

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**Slotting Guidelines**

A curved cut is acceptable provided the overall dimension is maintained (Typical for Elliptical & Round Pipe).

**French Drain**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Designed By

Reviewed By

Drawn By

Sheet No.

2 of 2
GENERAL NOTES

1. The underdrain pipe shall be either 4" smooth or 5" corrugated tubing unless otherwise shown in the plans. The size to be furnished will be based on the nominal internal diameter of a pipe with a smooth interior wall. Except when prohibited by the plans, the special provision for this standard pipe with a corrugated interior wall may be provided based on the following alternate equivalent:
   - 4" smooth interior equivalent to 5" corrugated interior
   - 5" smooth interior equivalent to 6" corrugated interior
   - 6" smooth interior equivalent to 8" corrugated interior

2. Fine aggregate shall be quartz sand meeting the requirements of Section 9.2-4 of the Standard Specifications.

3. Course aggregate shall be gravel or stone meeting the requirements of Sections 9.3-2 and 9.3-3.

4. Underdrain Type II, III, and IV shall be in accordance with Section 9.4.

5. Filter fabric shall be Type 0-3 (See Index No. 199). The internal filter fabric of Type II underdrain shall have a permeability of 0.7 A/sec and an ADS of 44.0 alpse.

6. When corrugated polyethylene tubing with a slope of 30° or 35° (load) is used in conjunction with these aggregate-a filter fabric exists according to Section 9.4.2 is required.

7. See Index No. 500 for the standard location of Type II, III, and IV underdrains. The location of Type I underdrain and non-standard locations of Types II, III, and IV underdrains will be as specified in the plans.

8. All filter fabric follow shall overlap a minimum of 3". The internal filter fabric of Type II underdrain shall overlap the coarse aggregate or the fine aggregate a minimum of 3".

9. Underdrain outlet pipe shall be non-perforated and all bends shall be made using a 45° elbow. Outlet pipes shall not be more than 6" below the structure floor line. Outlet pipes discharging to grassed areas shall be covered with concrete aprons, hardware cloth, and bordering as shown in Index No. 12B for Edgewood system.

10. The filter fabric shall be based on the sizes of the smooth Interior aggregate. The contract unit price for underdrain, UF, shall include the cost of pipe, fittings, aggregate, filters, filter fabric, underdrain coating, and concrete apron.

The contract unit price for underdrain outlet pipe, UF, shall be full compensation for trench excavation, pipe and fitting, concrete apron, and filter fabric, and disposal of excess materials.

The contract unit price for Underdrain Insulation Box, EA, shall be for the number completed and accepted.
GENERAL NOTES FOR CONCRETE PAVEMENT SUBDRAINAGE

1. No trenches greater than 2' in depth will be allowed overnight. Trenches shall be backfilled at all times.

2. Concrete pavement subdrainage shall be constructed adjacent to the low side of the roadway pavement and under travel lane, auxiliary pavement and shoulders, as outlined for in the plans. When the low edge and toe between outside and inside edge of pavement the concrete pavement subdrainage shall extend 50' beyond and begin 50' before the flat asphalt (100 overlap).

3. Concrete pavement subdrainage shall be placed on the low side of ramp of crossroad terminus.

4. The Contractor shall devise a procedure for testing the filter fabric in position on the vertical face of the trench. The procedure must be approved by the Engineer prior to placement of the drainrock.

5. The upper edge of each separate run of the concrete pavement subdrainage shall be capped.

6. Outlet pipe shall be constructed of minimum of 3000 Intensity. Elbows or bends shall be used to connect the outlet pipe to the concrete pavement subdrainage pipe. The elbows or bends shall be of the same material as the outlet pipe but compatible with the pipe.

7. When directed by the Engineer, outlet pipe shall be installed into existing invert or into existing ditch pavement at an elevation 5' below the invert level or outlet bottom. Concrete apron and bordering are not required for outlet outlets, but replacement grading will be required at trench for pipes stubbed into paved ditches.

8. In line vertical crown separate outlet pipe for concrete pavement subdrainage from opposite direction shall use a single apron unless otherwise shown in the plans or otherwise directed by the Engineer.

9. Bedfill around outlet pipe shall be of cohesive soils, drainrock will not be permitted.

10. Existing paved shoulder that is removed for the construction of outlet pipe shall be replaced with Type 5 asphaltic concrete and then restored with drilled holes.

11. The contract unit price for Edgedrain outlet (10") shall be full compensation for removal of existing shoulder pavement, trench excavation, pipe and fittings, concrete apron, bordering, asphalt, and shoveling with existing thirsty and overcoated, restoration of asphalt pavement, bedfill in place, and disposal of excess materials.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

CONCRETE PAVEMENT SUBDRAINAGE

HEIGHT OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONCRETE PAVEMENT SUBDRAINAGE

DETAIL SHEET NO. 103

SIGNED BY: R. M. Wilson
Approved By: J. P. L. Young

1/27/90

Drawing No. 103

Sheet No. 103

Scale 1:40

1.1/2" Draft

Structural Engineer

Former Drafter

Assistant Engineer

Structural Engineer

Nonstructural Engineer

Contract No. 103

nivel 103

Edgedrain Outlet

4" Edgedrain Outlet

4 Hole Pattern

Hole Pattern in accordance with the Standard Specifications.

Hole Pattern Diagrammed on Top Side of Pipe.

Hole Pattern Diagrammed on Side of Pipe.

Hole Pattern Diagrammed on End of Pipe.

Hole Pattern Diagrammed on Top Side of Pipe.

Hole Pattern Diagrammed on Side of Pipe.

Hole Pattern Diagrammed on End of Pipe.

Hole Pattern Diagrammed on Top Side of Pipe.

Hole Pattern Diagrammed on Side of Pipe.

Hole Pattern Diagrammed on End of Pipe.

Hole Pattern Diagrammed on Top Side of Pipe.

Hole Pattern Diagrammed on Side of Pipe.

Hole Pattern Diagrammed on End of Pipe.

Hole Pattern Diagrammed on Top Side of Pipe.

Hole Pattern Diagrammed on Side of Pipe.

Hole Pattern Diagrammed on End of Pipe.

Hole Pattern Diagrammed on Top Side of Pipe.

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NOTES FOR DRAINCRETE PAVEMENT SUBDRAINAGE

1. The edgdrain sections for DRAINCRETE SUBDRAINAGE are applicable to pavement construction identified as RIGID PAVEMENT. Alternate Plan No. 305 and Sheet 2 of 3.

2. The contractor shall confine the construction of draincrete edgdrains to an area in which the entire operation can be carried out in five (5) work days, unless another construction period is called for in the plans, with sufficient time allowed for the draincrete to set before placement of pavement.

METHOD OF PAYMENT

NEW CONSTRUCTION:

1. The contract unit price for Edgedrain (Draincrete) LF shall be full compensation for trench excavation disposal of excess materials, filter fabric, draincrete edgdrain pipe and fittings and draincrete.

Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 3.

FOR REHABILITATION:

1. The contract unit price for Edgedrain (Draincrete) LF shall be full compensation for removal of existing shoulder pavement, trench excavation, disposal of excess materials, filter fabric, draincrete edgdrain pipe and fittings, and draincrete, necessary for edgdrain construction.

Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 3.

Shoulder pavement shall be paid for under the contract unit price for Type SP, Asphaltic Concrete.

Tack coat shall be paid for under the contract unit price for Bitum. Tack Coat L, GA.

Shoulder Joint seal shall be paid for under the contract unit price for Pavement Joint or, LF.
GENERAL NOTES FOR TREATED PERMEABLE BASE EDGEDRAIN

NEW CONSTRUCTION

1. The contractor shall confine the excavation of the subdrainage to an area in which the entire operation can be carried out in (5) work days, unless another construction period is called for the plans.

METHOD OF PAYMENT

NEW CONSTRUCTION

1. Payment shall be full compensation for trench excavation, disposal of excess materials, filter fabric, pipe and fittings, necessary for concrete pavement subdrainage construction. Payment shall be included in the cost for Asphalt Treated Permeable Base, CY or Cement Treated Permeable Base, CY.

Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 3.
The construction of Culvert Extensions and Reinforcing Bar Splice Lengths are outlined in the following details. The bar splice lengths are determined based on the specific requirements of the Culvert Design Specifications. The design must ensure that the reinforcing bars are properly connected and that the structure can withstand the applied loads.

### GENERAL NOTES

- Design for low water levels: this guide is to be used only by structural engineers, utilizing the program named "REINFORCING DESIGN SPECIFICATIONS". Designers under this guide are to be familiar with the loads and conditions of the specific Culvert Extension and Reinforcing Bar Splice Lengths that are outlined in this guide.
- The design must ensure that the reinforcing bars are properly connected and that the structure can withstand the applied loads.

### REINFORCING BAR SCHEDULES

A. For the depth to be less than or equal to 8 ft, Bar A2 shall be used in the balance of the top slab, in either case. Bar A2 shall be placed with Bar A3 separated by 8 inches on the same side of each wall.

B. Where the cover is greater than 8 ft, Bar A2 will be used in the balance of the top slab, in either case. Bar A2 shall be placed with Bar A3 separated by 8 inches on the same side of each wall.

C. The pipe is on the inside of the Culvert, as shown. Reinforcing bars into the Culvert and shall be placed in the vertical position at the joint of the Culver walls. The length of the pipe shall be approximately 5 ft longer than those shown on the end elevation of the Culvert.

### TABLE OF MINIMUM BAR SPICE LENGTHS

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<tr>
<th>Bar Size</th>
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<tr>
<td>3&quot;</td>
<td>3'-0&quot;</td>
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For further details, please refer to the "Concrete Box Culvert Design Specifications" and "Reinforcing Bar Splice Lengths".
Slope Varies Not Less Than 1' 6" 3" Ditch Pavement

Top Of Box

LONGITUDINAL SECTION

SECTION AA

Slope Varies Not Less Than 1' 6"

3" Ditch Pavement

SECTION BB

SAFETY MODIFICATION FOR INLETS IN BOX CULVERTS
GRATE DETAIL

ANCHOR BOLT DETAIL

GRATE SEAT DETAIL

GENERAL NOTES

1. Use criteria see * Steel Grating Use Criteria * Index No. 295.
2. Grates shall be ASTM A526/A526M, A527/A527M or A588/A588M, Grade 50 steel, and galvanized in accordance with Section 602.7 of the Standard Specifications.
3. Channel section C5 x 6.0 may be substituted for the C4 x 5.4 channel.
4. All reinforcing No. 4 bars with 0.75 clearance except as noted. Spacing shown are center to center. Line to be 0.25 minimum. Welded wire fabric (one coped max.) having an equivalent cross section area (0.20 sq. in.) may be substituted for bar reinforcement.
5. Drill 1" hole 8° deep with a rotary drill in existing endwall for dowel bar. Hole shall be thoroughly cleaned prior to placing dowel bar and epoxy.
6. Endwall to be paid for under the contract unit price for Class 3 Decorative (Endwall), CF and Reinforcing Steel (Randall Ltd). Cost of dowel bar and epoxy mortar to be included in the contract unit price for reinforcing steel. Cost of grate to be paid for under the contract unit price for Endwall Grate, Lb., plan quantity. Cost of galvanized nails and nuts to be included in the contract unit price for the grate.
7. Steel shingle 5 each aisle and above endwall. Siding to be paid for under the contract unit price for Siding, Str.

DIMENSIONS AND QUANTITIES PER GRATE

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DIMENSIONS AND QUANTITIES PER U-ENDWALL

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**TURN LANES**

**CURBED AND UNCURBED MEDIANS**

**URBAN CONDITIONS**

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<th>Entry Speed (mph)</th>
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<th>Total Decel. Distance L_2</th>
<th>Clearance to Stop Distance L_3</th>
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**RURAL CONDITIONS**

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<th>Design Speed (mph)</th>
<th>Entry Speed (mph)</th>
<th>Clearance to Stop Distance L_1</th>
<th>Total Decel. Distance L_2</th>
<th>Clearance to Stop Distance L_3</th>
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<td>125'</td>
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<td>260'</td>
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**GENERAL NOTES**

1. The plan views shown are for turn lane taper ellipse and dimensional purposes only, they do not represent the care of curbs and gutter, subbase or expensive specifically to either rural or urban conditions.
2. Total deceleration distances must be reduced except where Hansen values are increased by unreasonable control points.
3. Infant turn lane taper and dimension identical to left turn lane under stop control conditions.
4. These left turn configurations apply to continuous left turn lanes only where specifically called for in the plans.
5. For pavement markings see Index No. 3.46.

**DESIGN NOTES**

1. Refer for turn lane configurations to:
   - AASHTO 1992
   - AASHTO 1997
   - AASHTO 2003
   - AASHTO 2010

**STATE OF FLORIDA**

**DEPARTMENT OF TRANSPORTATION**

**TURN LANES**

**FWSH AND/OR CURBED SEPARATION**

**CURB AND GUTTER**

**RAISED SEPARATION**

**DOUBLE LEFT TURNS**

**SINGLE LEFT TURNS**

**JUNCTURE DETAILS**

For Curbed And Gutter Type, See Index No. 300
(Option 2 Separation Shown) (Refer To Index No. 302)

MEDIAN CURB AND TRAFFIC SEPARATOR

**CONJECTURAL DETAILS**
**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**TRAFFIC SEPARATORS**

**OPTION I**

**TYPE I CONCRETE TRAFFIC SEPARATOR**

1. Separators Type I and II are to be used with flexible pavement. Separators Type I and II are to be used with rigid pavement when specific option is called for in plans.

2. Either Option I or Option II may be used for Type I and II separators except when a specific option is called for in the plans.

3. For all separators provide 1"-6" expansion joint at 45' center lines. Contact joint is not to be included in the plans as specific separators and paid for under the contract unit price for Concrete Traffic Separators (Type II) - Wide Type. Contact joint other than 1"-6" shall be detailed in the plans as specific separators and paid for under the contract unit price for Concrete Traffic Separators (Special) Sr.

4. Separators having widths of 4', 6' or 8'-6" shall be paid for under the contact unit price for Concrete Traffic Separators (Type II) - Wide Type. Separators having widths other than 4', 6' or 8'-6" shall be paid for under the contact unit price for Concrete Traffic Separators (Special) Sr.
Profile grades should be established that will allow inlets to be located outside the return whenever practical. Inlets shall be located to avoid conflict with pedestrian movement. Special care must be exercised to prevent conflict with public sidewalk curb ramp for the disabled. For information on public sidewalk curb ramp refer to Index No. 304.

SHOWING LOCATION OF INLETS ON RETURN

TYPICAL RETURN PROFILES
GENERAL NOTES

1. Public sidewalk curb ramps shall be constructed in the public right of way of locations that will provide continuous undisturbed pedestrian circulation paths to pedestrian areas, alleys, and facilities in the public right of way and to accessible pedestrian crossings on adjacent streets. Curb facilities with sidewalks and those without sidewalks are to have separate curb ramps.

2. The location and orientation of curb ramps shall be as shown in the plans.

3. Curb ramp running slopes of non-steepened after shall not be steeper than 1:12 and cross slopes shall be 0.5% or flatter. Transition slopes shall not be steeper than 1:12.

4. If a curb ramp is located where pedestrians must walk across the ramp, then the walk shall have transition elevation to the ramps; the maximum slope of the transition shall be 1:12. Ramps and curb returns shall be used at locations where other requirements provide assistance away from that portion of pedestrian access to the sidewalk.

5. Curb ramp detectable warning surfaces shall extend the full width of the ramp and in the direction of travel 24" from the back of curb. Detectable warning surfaces shall be constructed by texturing a transition, typically. This configuration shall be in accordance with Section 6.26.2 of the Florida Standards for Accessible Design, A.D.A., Louisiana Guildlines, Section 4.29.2. (carver shown below) Transition slopes are not to have detectable warnings.

6. Unless otherwise noted in the plans, the curb detectable warning surface shall be colored in accordance with Section 6.26.2 of the Florida Standards for Accessible Design, A.D.A., Louisiana Guildlines. Where adjacent curb, curb, and gutter are not detected, the curb detectable warning surface shall be colored in accordance with Section 6.2 of the American Standards for Accessible Design, A.D.A., Louisiana Guildlines.

7. The color requirement in General Note 6 is to provide a damp-on-light visual contrast between the detectable warning surfaces and the sidewalk warning surfaces. Where adjacent warning surfaces are colored or are constructed with materials other than materials that provide a damp-on-light visual contrast, the plans must provide for detectable warning surfaces that contrast with those that provide the necessary contrast, either damp-on-light or light-on-dark.

DESIGN NOTES

1. The color requirement in General Note 6 is to provide a damp-on-light visual contrast between the detectable warning surfaces and the sidewalk warning surfaces. Where adjacent warning surfaces are colored or are constructed with materials other than materials that provide a damp-on-light visual contrast, the plans must provide for detectable warning surfaces that contrast with those that provide the necessary contrast, either damp-on-light or light-on-dark.

TYPICAL PLACEMENT OF PUBLIC SIDEWALK CURB RAMPS AT CURBED RETURNS

PLAN VIEW

All Sidewalk Curb Ramps Shall Have Detectable Warning Surfaces That Extend The Full Width Of The Ramp And In The Direction Of Travel 24 inches (610 mm) From The Back Of Curb.
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PUBLIC SIDEWALK CURB RAMPS

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

SECTION THROUGH RAMP RUN AND LANDINGS WITH UPPER LANDING AT NORMAL SIDEWALK ELEVATION

For BACK OF SIDEWALK CURB OR BUFFER TRANSITION And FOR RAMP AND SIDEWALK CURB OPTIONS See Sheet 4.
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS WHERE RAMP AND LANDING DEPTH ARE RESTRICTED BY RIGHT OF WAY

* For BACK OF SIDEWALK CURB OR BUFFER TRANSITION AND FOR RAMP AND SIDEWALK CURB OPTIONS SEE SHEET 4.
DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS FOR LINEAR PEDESTRIAN TRAFFIC

RAMP AND SIDEWALK CURB OPTIONS

MONOLITHIC CAST CURB

SEPARATELY CAST CURB

DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK COMBINED CORNER RAMPS UNDER CONDITIONS OF INFEASIBILITY

Construct Sidewalk Curb in Absence Of Adequate Buffer, Irretrievable Surface Changes, Abutting Structure, Or When Gravel In The Plane Or Standard

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
PUBLIC SIDEWALK CURB RAMPS

Approved By:_________________________ Date:_________________________
LANDINGS FOR RAMPS WITHIN PUBLIC RIGHT OF WAY CONSTRUCTED AT LOCATIONS WHERE FUTURE SIDEWALKS ARE PROPOSED, WHERE STABLE SURFACES OTHER THAN SIDEWALKS ARE PART OF A CONTINUOUS PASSAGE OR WHERE A CURB FALLS ALONG THE CIRCULATION PATH TO PEDESTRIAN ROUTES ON ADJACENT SITES.
### METAL OR PLASTIC CAPS FOR DOWEL BARS

Transverse joints are to be spaced at a maximum of 5'. Dowels are required at all transverse joints unless otherwise noted in plans.

#### BUTT CONSTRUCTION JOINT TO BE USED AT DISCONTINUITIES OF WORK

Note: Tie bar spacing shall not exceed 24" on either sides. This joint can then be considered a free edge for determination of tie bar spacing on other joints.

#### TRANSVERSE EXPANSION JOINT

- Plain steel dowel bar
- Metal or plastic cap
- Sheet metal bottom strip

#### TRANSVERSE CONTRACTION JOINT, VIBRO CAST METHOD

- Plain steel dowel bar
- Initial cut
- Anticipated break

#### TRANSVERSE CONTRACTION JOINT, SAWED METHOD

- Plain steel dowel bar
- Initial cut
- Anticipated break

### DOWEL BAR LAYOUT

- Sheet metal bottom strip
- Plain steel dowel bar
- Bend up against end of pavement after force are removed

### MAXIMUM TIE BAR SPACING

<table>
<thead>
<tr>
<th>Distance To Closest Free Edge</th>
<th>#4 Bars Length 30&quot;</th>
<th>#5 Bars Length 30&quot;</th>
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<tr>
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<td>18'</td>
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</table>

### CONCRETE PAVEMENT JOINTS

#### LONGITUDINAL BUTT CONSTRUCTION JOINT

- Steel tie bar
- Top of pavement
- Anticipated break

Note: Tie bar spacing shall not exceed 24' at these joints.

#### LONGITUDINAL LANE-TIE JOINT

- Steel tie bar
- Top of pavement
- Anticipated break

Note: Joints poured simultaneously. Tie bars may be inserted in the plastic concrete by means approved by the Engineer.

### STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONCRETE PAVEMENT JOINTS

Note: For joint and dimensions see Sheet 2.
Note: Dimensions or will be shown in the plans or established by the Engineer based on field conditions. Dimension to the nearest 0.01 or 0.05 value of 2.0 and a minimum value of 0.05.

For rehabilitation projects, either tape or backer rod bond breaker can be used. However, the proper joint shape must be maintained in order to achieve proper joint seal performance.

CONCRETE-CONCRETE JOINTS

CONCRETE-ASPHALT SHOULDER JOINTS

JOINT SEAL DIMENSIONS

BACKER ROD BOND BREAKER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONCRETE PAVEMENT JOINTS

CONCRETE-CONCRETE JOINTS

CONCRETE-ASPHALT SHOULDER JOINTS

JOINT SEAL DIMENSIONS
NOTE: After the concrete has set to the extent that the keyway will retain its shape, the hex bolt and plastic sleeve shall be removed. The resulting portion of the bolt assembly shall be handled immediately prior to placing of concrete in the adjacent lane.

ALTERNATE KEYWAY AND HOOK BOLT

STEEL HOOK BOLT ASSEMBLY

LONGITUDINAL JOINTS will not be required for single lane pavement 14' or less in width. For entrance and exit ramp joint details, see Sheet 4 of 4.

Arrangement of longitudinal joints is to be as directed by the Engineer.

All manholes, meter boxes and other projections into the pavement shall be boxed-in with 1" preformed expansion joint material.

J O I N T A R R A N G E M E N T

CONTRACTOR ASSEMBLY

EXPANSION ASSEMBLY

Note: Proprietary contraction and expansion assemblies may be used. Products shall be introduced to the State Construction Office in accordance with section (C) of the Product Evaluation Procedure.
Longitudinal Joint

Joint Typ. I

2-THRU LINES WITH SINGLE LANE ENTRANCE RAMP

ENTRANCE TAPER WITH AUXILIARY LANE

ENTRANCE RAMP WITH ADDED LANE

EXIT TAPER WITH AUXILIARY LANE

2-THRU LINES WITH SINGLE LANE EXIT RAMP

EXIT TAPER WITH AUXILIARY LANE

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

JOINT LAYOUT AT ENTRANCE AND EXIT RAMP TERMINALS

Notes: On single lane ramps, longitudinal joint to be sawcutted along centerline of ramp.
Expansion Joints shall be constructed parallel to the existing Transverse Pavement Joints on rehabilitation projects, and parallel to the standard Transverse Pavement Joints shown in the plans for new construction.

Pavement joints shall be constructed parallel to the centerline of the roadway pavement. Shoulder pavement joints shall be constructed parallel to the standard Transverse Pavement Joints shown in the plans for new construction.

**General Notes**

1. The designer must indicate in the plans the number of expansion joints to be constructed/reconstructed, and the location of expansion joints.

2. The quantity of expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement shall be determined.

**Design Notes**

1. For rehabilitation projects, the designer must indicate in the plans the number of expansion joints to be reconstructed/constructed, and the location of expansion joints.

2. For expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement, shoulder pavement joint included.

**General Notes**

1. The centerline of the roadway and the centerline of bridges do not necessarily coincide. Prior to the placement of the expansion joint, the centerline of the roadway pavement shall be determined.

2. For information on other types of concrete pavement joints see Index No. 305.

3. Pay quantity for expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement. Shoulder pavement joint included.

**Joint Dimensions**

**Compression Seal Detail**

**Detail Showing Sheet Metal Strip**

**Section AA**

**Expansion Joint**

**Reinforcing Steel**

**OPTIONAL SEALS**

**PLAN**

For Joint Payment See General Note No. 3.
FLEXIBLE PAVEMENT NOTES

PAVEMENT REMOVAL AND REPLACEMENT

Pavement shall be excavated as needed.

The replacement asphalt shall match the existing structural and friction courses for type and thickness.

The base material shall be of the same type and composition as the materials removed or of equal or greater structural adequacy (See Index N6, N9).

BACKFILL

COMPACTED AND STABILIZED FILL OPTION

Backfill material shall be placed in accordance with Section 105 of the Standard Specifications.

In Stage 1, construct compacted fill beneath the haunches of the pipe, using mechanical tampers available for this purpose. This compaction applique to the material placed beneath the haunches of the pipe and above any bedding.

In Stage 2, construct compacted fill along the outside of the pipe and up to the bottom of the base, with the upper 12" reaching Type B Stabilization. In lieu of Type B Stabilization, the Contractor may construct using Optimal Back Group 3.

FLOWABLE FILL OPTION

If compaction cannot be achieved, through normal mechanical methods then Flowable Fill may be used.

Flowable fill to be placed in accordance with Section 105 of the Specifications, as approved by the Engineer.

Do not allow the utility being installed to Floast. If a method is required to prevent flotation from occurring, Stages 1 and 2 can be continued, if approved by the Engineer.

In Stage 1, place Flowable Fill directly on the base of the utility. Allow to harden before placing Stage 2.

In Stage 2, place Flowable Fill to the bottom of the existing base course.

RIGID PAVEMENT NOTES

PAVEMENT REMOVAL AND REPLACEMENT

High strength cement concrete (2500 psi) meeting the requirements of Standard Specification S4H shall be used for rigid pavement replacement.

Pavement shall be excavated as needed and replaced with existing pavement joints within 24 hours (See Index No. 305).

GRANULAR BACKFILL

Any granular material that is removed shall be replaced with the same type material.

Any granular material that is damaged shall be repaired with methods approved by the Engineer.

Fill material shall be placed in accordance with the Standard Specifications. Fill material shall be placed with sides in accordance with Index No. 505.

In Stage 1, construct compacted fill beneath the haunches of the pipe, using mechanical tampers available for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.

In Stage 2, construct fill along the outside of the pipe and up to the bottom of the base course.

FLOWABLE FILL OPTION

If mechanical compaction cannot be achieved through normal mechanical methods then Flowable Fill may be used.

Flowable fill to be placed in accordance with Section 105 of the Specifications, as approved by the Engineer.

Do not allow the utility being installed to float. If a method is required to prevent flotation from occurring, Stages 1 and 2 can be continued, if approved by the Engineer.

In Stage 1, place Flowable Fill directly on the base of the utility. Allow to harden before placing Stage 2.

In Stage 2, place Flowable Fill to the bottom of the existing base course.

FLEXIBLE PAVEMENT CUT

TRENCH CUTS AND RESTORATIONS ACROSS ROADSWAYS
NOTES FOR UTILITY CONFLICT PIPE

1. These details are for construction field expedients to resolve utility conflicts that cannot be remedied by relocation. For conflicts determined during design, use the construction shop drawings for guidance details.

2. Concrete used in conflict structures shall be as specified in ASTM C496, 4000 psi may be used in lieu of Class 2 concrete.

3. Minimum opening for pipe shall be the pipe OD plus 8", mortar used to seal the pipe into the opening will be of such mix that shrinkage will not cause leakage into or out of the structure.

4. If the conflict structure is round or there are multiple inlet or outlet pipes, then the wall section should be reviewed for strength.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

MISCELLANEOUS UTILITY DETAILS

UTILITY CONFLICT PIPES THRU STORM SEWER STRUCTURES
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
MISCELLANEOUS UTILITY DETAILS

NON-TRENCH PAVEMENT CUTS FOR UNDERGROUND UTILITY STRUCTURES IN PAVEMENT

PARTIAL CUTS FOR RING AND COVER ADJUSTMENTS

Notes:
1. No irregular areas are permitted. All areas must be clean and smooth.
2. Pavement cut areas for underground utility structures in rigid pavement are the same lengthwise, but the transverse areas shall extend to the nearest existing joint.
3. See Sheet 1 for replacement pavement.
NOTES FOR CONCRETE SIDEWALK ON CURBED ROADWAYS

1. Sidewalk shall be constructed in accordance with Section 322 of the FDOT Standard Specifications except for public sidewalk curb ramp runs which shall be finished in accordance with Index No. 304.

2. Bond breaker material can be any impermeable coated or sheet membrane or preformed material having a thickness of not less than 1/16 inch nor more than 1/8 inch.

3. For public sidewalk curb ramps see Index No. 304.

4. For turnouts see Index No. 515.

5. Sidewalk shall be paid for under the contract unit price for Sidewalk Concrete (____ Thick), S.Y.

CONCRETE SIDEWALK FOR CURBED ROADWAYS
NOTES FOR CONCRETE SIDEWALKS ON UNCURBED ROADWAYS

1. Sidewalks shall be constructed in accordance with Section 522 of the DOT Standard Specifications.
2. Sidewalks adjoining driveways at right angles and right or right-out cross streets and alleys, and other areas where a detectable warning surface extends the full width of the sidewalk and in the direction of travel (5' x 1500 m) from the edge of the driveway and edge of alleys and other areas, detectable warning surfaces shall conform to the requirements described in the General Notes on Index No. 504.

For sidewalks continuous through driveways, detectable warning surfaces are not required.

3. For turnouts see Index No. 512.

4. Sidewalk shall be paid for under the contract unit price for Sidewalk Concrete.
I. The illustrations for guardrail applications are standard configurations; adjustments are to be made as required by site specific conditions to attain optimum design for function, economy and serviceability.

II. Steel guardrail shall be made in uniform widths that are associated with other transportation and joint use facilities, and the conditions in Note No. 7 below.

III. All panel lengths shall be 12'-6" elements 12'-6" in length except where 25'-0" elements are called for by these and other standards or specifically called for in the plans.

IV. Flared end guardrail shall be constructed only when restraints to flared end guardrail approach ends, Parallel end guardrail assemblies for guardrail approach end treatments will be constructed only when restraints prevent construction of flared end guardrail.

V. At above ground rigid hazards where the face of guardrail is offset from the hazard line the 4 inch minimum for standard W-beam, other guardrail configurations may be applicable; see General Note No. 10 and the minimum offset table on Sheet Tr. For guardrail with post spacing less than 6'-3" the reduced spacing should extend a minimum of one panel in advance of the hazard. When minimum offset cannot be attained safety shape concrete barrier shall be used. Unique re-shaping is approved by the Engineer of Record. See Index No. 400 for safety shape concrete barriers and typical applications, and the plans for standard barrier placement.

VI. All guardrail panels, end sections and special end shall be lapped in the direction of adjacent traffic.

VII. Flared and end anchorage assemblies providing 4 offset are the standard end treatments for single face free standing guardrail approach ends. Parallel end anchorage assemblies for guardrail approach end treatments will be constructed only when restraints prevent construction of flared end guardrail.

VIII. The guardrail to bridge connections contained in this index and the use of a steel guardrail with a semi-rigid transition panel being reset under a construction or maintenance contract shall be reset using timber or steel posts. Repair within a run of guardrail with existing concrete posts can be made with either steel, timber, sound salvaged concrete posts; replacement in kind of damaged posts is to be made when like posts.

IX. The guardrail to bridge connections contained in this index are for bridges with Test Level 4 traffic railing barriers. For guardrail to concrete barrier wall connections see index No. 410. For existing bridges receiving retrofits traffic railing barriers see index No. 492.

X. The W-beam guardrail system in this index is to be used on the State Highway System where a Test Level 3 semi-rigid barrier is required.

XI. Three beam guardrail panels shall be used in guardrail transitions to bridge guardrail railing barriers, to concrete and certain water filled safety shaped barriers, certain crash cushions and as a continuous barrier when called for in the plans. For additional instructions on rail attachment, post spacings, headed rails, location of three beam transition panels and offset block configurations see details elsewhere in this index, and Index Nos. 432, 430, 441, 435, 440, 441 and 449. The use of three beam guardrail with standard offset blocks 1 Test Level 3 semi-rigid system may be considered where one or more of the conditions listed below or similar conditions are anticipated or exist:

a. W-beam deflection is marginal,

b. W-beam with rubrail considered functionally deficient,

c. Vehicle overrunning W-beam is probable,

d. Drainage will be impeded or blocked by the use of concrete barrier wall (subject to deflection space requirements),

e. High frequency of repel to W-beam,

f. Sundries beam with low deflection needed around unreasonabable structure, and,

The modified three beam guardrail is a Test Level 4 semi-rigid system and may be used where a Test Level 4 guardrail is required.

XII. Single face median guardrail for bridges located on divided roadways shall be constructed the same as outer roadway guardrail under the following conditions:

a. Wide medians where approach end anchor is located outside of opposing roadway clear zone.

b. Medians of uniform width that are occupied by other transportation and joint use facilities.

c. Medians of uniform or variable width with independent vertical alignments not suited to normal median guardrail installations.

d. Medians of bifurcated roadways.

XIII. Straight rail sections may be used to construct rail of 15' or greater. For rail less than 15' the rail must be fabricated (length bent) to fit.

XIV. Crash cushions may be required in lieu of or in conjunction with guardrail at locations where space does not permit development of sufficient guardrail length, offset or crashworthiness at terminals. Crash cushions shall be constructed at or in lieu of Type II assemblies located in the approach clear zones.

XV. Corrugated steel sheet, with end, achoo, and end sections and back up plates shall conform to the current requirements of AASHTO M180, Class A, Type II zinc coating. All other metallic components, hardware and accessories shall be in conformance with the appropriate current AASHTO requirements.

XVI. Overlaid beams: Used Class A guardrail beams that have been refurbished to Type II galvanizing, restoration of the base metal in section and attractiveness free of warp and deformation, and, re-galvanizing to AASHTO Type II specifications. Re-galvanized beams that retain ruptured noise, galeos or leaks will not be accepted.

XVII. Steel offset blocks other than modified three-beam offset blocks are not permitted for new guardrail construction. Existing steel offset blocks may remain throughout the life of the existing guardrail. Permissible post and offset block combinations are tabulated on Sheet 15.

XVIII. Where necessary to enlarge or add holes to galvanized guardrail, the work shall be done by drilling or reaming. Damaged galvanized guardrail will be metalized in accordance with Sections 562 and 91 of the Standard Specifications. No burning of holes will be permitted.

XIX. Guardrail reflector color (white or yellow) shall conform to the color of the near lane edgeline.

XX. Any run of guardrail with existing concrete posts that is being reset under a construction or maintenance contract shall be reset using timber or steel posts. Repair within a run of guardrail with existing concrete posts can be made with either steel, timber, sound salvaged concrete posts; replacement in kind of damaged posts is to be made when like posts are on hand at time of repair.

XXI. Substitutions between three beam guardrail and concrete barrier wall are not eligible for VECR consideration.

XXII. On roadways designated for reverse ionting, all downstream ends of guardrail that are not established or that are not designated as approach end terminals shall be marked with post mounted Type 3 Object Markers. Tailing bridge ends and trailing shoulder concrete barrier end shall be marked with Type 3 Object Markers except where there is trailing end guardrail. Object markers to be installed facing reverse ionting traffic.
Clear Zone Limit Or Horizontal Clearance Limit In Accordance With The Criteria In Volume I Chapters 2, 4 And 25 Of The "Plan Preparation Manual" and Index No. 700.

Back Of Hazard

Hazard Inside Clear Zone Or Horizontal Clearance

Extended Hazard

X (Length Of Advancement) Ft.

Beginning Of Length Of Need

Hazard Free, Traversable Slopes

End Anchorage Assembly (Flare Shown)

Approach End Anchorage

Face Of Guardrail

Edge Of Traffic Lane

Point Of Departure

Design Speed

X (Length Of Advancement) Ft.

mph

< 45

= \frac{16}{0.5} (D - d)

\geq 50

= \frac{13}{0.5} (D - d)

- Length of advancement determined from the diagram and equations above establishes the location of the upstream beginning length of need for guardrail, however, the length of advancement can be no less than that required by other details of this Index.

The flared end anchorage with 4' nose offset is shown in the diagram above, however, the diagram applies to other configurations that may occur at the beginning of length of need, such as, other flare designs, upstream returns and, other upstream deflected, tangent and curvilinear conditions.

Equation Variables:

D = Distance in feet from near edge of the near approach traffic lane to either (a) the back of hazard, when the hazard is located inside the clear zone or horizontal clearance or (b) the clear zone or horizontal clearance outer limit, when the hazard extends to or goes beyond the clear zone or horizontal clearance limit. For left side hazards on two-way undivided facilities, D is measured from the inside edge of the near approach traffic lane (See Figure 2).

d' = Distance in feet from the near edge of the near approach traffic lane to the face of guardrail at its intersection with the departure line. For left side hazards on two-way undivided facilities, d is measured from the inside edge of the near approach traffic lane (See Figure 2).

LENGTH OF ADVANCEMENT - FIGURE 1
LOCATING TERMINALS ON SHOULDER GUARDRAILS - FIGURE 2

For description of the dimensions D, d and X, see Length of Advancement - Figure 1.
For additional shoulder guardrail information, see Details B and C.
GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS

DIVIDED ROADWAY - DETAIL B

GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS

UNDIVIDED ROADWAY - DETAIL C

ONE-WAY TRAFFIC - DETAIL G

GUARDRAIL APPLICATION FOR NARROW MEDIAN AND GORE HAZARDS
GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING FULL LENGTH OF APPROACH SLAB

UNDIVIDED ROADWAY - DETAIL O

DIVIDED ROADWAY - DETAIL P

With four or more lanes traveling, guardrail anchorage may be as shown in detail P. Where other anchorage is called out in the plans.

GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING FULL LENGTH OF APPROACH SLAB

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GUARDRAIL

NOTES FOR DETAIL O & P:

See General Notes Nos. 1, 2, 3, 4, 5, 6, 7, and 8. See detail P for connections to bridges.

For end anchorage assemblies are shown elsewhere in this index or the plans.

Shoulder gutter in itself does not require the installation of guardrail.
Guardrail Not Required Except Where Slope Steeper Than 1:5 Other Hazards Are Present

UNDIVIDED ROADWAY - DETAIL H

Safety Shape Traffic Railing Barrier Extending Less Than Full Approach Slab Length

No Panel(s) Required In Absence Of Other Hazards

UNDIVIDED ROADWAY - DETAIL S

DIVIDED ROADWAY - DETAIL I

Guardrail Not Required Except Where Slope Steeper Than 1:3 Or Other Hazards Are Present

DIVIDED ROADWAY - DETAIL T

GUARDRAIL APPLICATIONS FOR BRIDGES WITH LESS THAN FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

Note For Details H & I:

See General Notes Nos. 1, 2, 3, 4, 5, 6, 8, and 9. See Detail H and Index No. 402 for approach connections to bridges.

For end anchorage assemblies see sheets elsewhere in this index and in the plans. Shoulder gutter in detail does not require the installation of guardrail.

GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

Note For Details S & T:

See General Notes Nos. 1, 2, 3, 4, 5, 6, 8, and 9. See Detial K and Index No. 402 for approach connections to bridges.

For end anchorage assemblies see sheets elsewhere in this index and in the plans.
Crash Cushion Located on Guardrail Panels

MEDIANs WITH 10' BRIDGE SHOULDERS

MEDIANs WITH 6' BRIDGE SHOULDERS

SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS

GUARDRAIL LENGTHS

GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING

EXTENDING FULL APPROACH SLAB LENGTH IN NARROW MEDIANs WITH FLUSH SHOULDERS
Approach Guardrail Treatments for Bridges with Safety Shape Traffic Railing Extending Less Than Full Approach Slab Length in Narrow Medians with Flush Shoulders

State of Florida, Department of Transportation

Guardrail Panel and Length (See Table Below)

<table>
<thead>
<tr>
<th>MEDIAN Width</th>
<th>1:10 TAPER RATE</th>
<th>1:15 TAPER RATE</th>
<th>1:20 TAPER RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5'</td>
<td>9.5</td>
<td>8.5</td>
<td>7.5</td>
</tr>
<tr>
<td>6'</td>
<td>11.5</td>
<td>10.5</td>
<td>9.5</td>
</tr>
<tr>
<td>8'</td>
<td>16</td>
<td>15</td>
<td>14</td>
</tr>
</tbody>
</table>

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorages or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their size may be determined by the rockfall speed (52 ft) along the runway from the approach roadway but, when consistent speed is less than 30 mph crash cushions shall be no less in size than for 30 mph or greater speed as shown below. The number of panels may be reduced when installing a crash cushion more than 2.5' in width will be shown below.

*Numbers shown in the minimum number of panels plus a W-3X3C beam transition panel single faced guardrail must have a length of five (5) or more panels.
LEGEND

1. Edge of traffic lane for simple curve turnouts.
2. Roadway.
3. Pavement return (radius R1).
4. Flared end and anchorage to be installed except when existing guardrail on intersecting drive or side road adjoins the project.
5. Post for locating flare, proximate to PC or PT.
6. Expansion shoulder for flared end anchorage.
7. Shoulder in absence of guardrail.
8. Flared end anchorage assembly.
9. Radiate guardrail to be installed when guardrail required on the intersecting drive or side road (radius R1).
10. End anchorage Type II (radial return only).

Note: Only 25' and 40' radius panels are to be used for return guardrail on simple turnouts. On intersecting turnouts the number of panels used and their arrangement with flared ends will be as shown in the plan or as directed by the Engineer.

GUARDRAIL APPLICATIONS FOR INTERSECTING DRIVES AND SIDE ROADS ON RURAL FACILITIES
GUARDRAIL TRANSITION NOTE
When shoulder gutter is required, the 25' long offset transition shown in the "PLAN" and "PICTORIAL" above, as required. Double offset blocks are shown for guardrail transitions to shoulder gutter/dike transition. Single offset block shall be utilized in absence of shoulder gutter. Nested rolls shall not be bolted to the blocks and posts at posts (5', 7', 12', and 18'). One 1/2 galvanized steel block drives between each end post and block, and between double blocks. In order to prevent block rotation, use two NAIL for PREVENTION OF OFFSET BLOCK ROTATION, as indicated.

THREE-BEAM OFFSET BLOCKS FIELD TRIMMED FOR USE AT SECTIONS CC & DD
GUARDRAIL APPROACH TRANSITION AND CONNECTION FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIERS EXTENDING FULL LENGTH OF APPROACH SLAB

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
GUARDRAIL

GUARDRAIL APPROACH TRANSITION AND CONNECTION FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIERS EXTENDING FULL LENGTH OF APPROACH SLAB

DETAI J
SHOULDER INTERFACE BETWEEN ROADWAYS AND BRIDGES

**SKETCH NOTES**

1. These sketches are for showing shoulder interface between roadways and bridges where crossings are needed to other roadways, railroads and streams. For site specific applications and details use the plans and the FDOT Structural Design Office "Detailing Manual" and "Design Guidelines".

2. Shoulder treatments shown in these sketches are for locations with shoulder gutter. Shoulder hinge location will vary for facilities without shoulder gutter.

**STATE OF FLORIDA**
**DEPARTMENT OF TRANSPORTATION**

**GUARDRAIL**
This Standard Post Must Be Timber When Steel Post Is Used In Guardrail Ahead. See Detail L.

Curb flare shall follow guardrail flare, see elsewhere in this Index for additional guardrail flare information.

*Safety pipe rail is required when the back of steel guardrail posts are 4' or less from the near edge of a pedestrian way or bikeway and post bolt treatment Is required when the back of timber posts are 4' or less from the near edge of a pedestrian way or bikeway; see "PEDESTRIAN SAFETY TREATMENTS".

Approach Treatment for Curb and Gutter

Detail Q
Notes: For beam washer requirements on end terminals, see individual and endanchorage assembly details. Washers are to be used where necessary to prevent elongation or where the parts bolt head and/or washer head thread to pull through the rail socket. Washers inserted in guardrail, between and endanchorage, prior to July 1, 1980 may remain in place until the guardrail is relocated or until repair is required.

(RECTANGULAR PLATE WASHER) BEAM WASHER

Notes: The round washer is not intended for use under the recess nut for the beam to beam reattachment. The washer is required under the recess nut for connecting the beam to the end section, and under the post nut for connecting the beam in the timber post and offset blocks. For connecting the beam to steel plates with timber offset blocks under the hex bolt head for securing the beam under plate to the beam-end, for general guardrail connection by 1/8" hex plate end nuts. For supplemental information see BEAM ANCHOR PLATES, PERMISSIBLE POST AND OFFSET BLOCK CONSTRUCTION, individual endanchorage assembly details, SPECIAL STEEL GUARDRAIL POSTS, SPECIAL END SHOE, W-BEAM RAIL SPICE, THREE-BEAM RAIL SPICE, and THREE-BEAM TERMINAL CONNECTORS details.

1/8" STEEL WASHER

1/8" OVAL SHOULDER BUTTON HEAD BOLT

Notes: For application information see individual and endanchorage assembly details.

W-BEAM BACK-UP PLATE

Notes: The round washer is not intended for use under the recess nut for the beam to beam reattachment. The washer is required under the recess nut for connecting the beam to the end section, and under the post nut for connecting the beam in the timber post and offset blocks. For connecting the beam to steel plates with timber offset blocks under the hex bolt head for securing the beam under plate to the beam-end, for general guardrail connection by 1/8" hex plate end nuts. For supplemental information see BEAM ANCHOR PLATES, PERMISSIBLE POST AND OFFSET BLOCK CONSTRUCTION, individual endanchorage assembly details, SPECIAL STEEL GUARDRAIL POSTS, SPECIAL END SHOE, W-BEAM RAIL SPICE, THREE-BEAM RAIL SPICE, and THREE-BEAM TERMINAL CONNECTORS details.

1/8" STEEL WASHER

1/8" OVAL SHOULDER BUTTON HEAD BOLT

Notes: For application information see individual and endanchorage assembly details.

W-BEAM BACK-UP PLATE

Notes: The round washer is not intended for use under the recess nut for the beam to beam reattachment. The washer is required under the recess nut for connecting the beam to the end section, and under the post nut for connecting the beam in the timber post and offset blocks. For connecting the beam to steel plates with timber offset blocks under the hex bolt head for securing the beam under plate to the beam-end, for general guardrail connection by 1/8" hex plate end nuts. For supplemental information see BEAM ANCHOR PLATES, PERMISSIBLE POST AND OFFSET BLOCK CONSTRUCTION, individual endanchorage assembly details, SPECIAL STEEL GUARDRAIL POSTS, SPECIAL END SHOE, W-BEAM RAIL SPICE, THREE-BEAM RAIL SPICE, and THREE-BEAM TERMINAL CONNECTORS details.

1/8" STEEL WASHER

1/8" OVAL SHOULDER BUTTON HEAD BOLT

Notes: For application information see individual and endanchorage assembly details.

W-BEAM BACK-UP PLATE

Notes: The round washer is not intended for use under the recess nut for the beam to beam reattachment. The washer is required under the recess nut for connecting the beam to the end section, and under the post nut for connecting the beam in the timber post and offset blocks. For connecting the beam to steel plates with timber offset blocks under the hex bolt head for securing the beam under plate to the beam-end, for general guardrail connection by 1/8" hex plate end nuts. For supplemental information see BEAM ANCHOR PLATES, PERMISSIBLE POST AND OFFSET BLOCK CONSTRUCTION, individual endanchorage assembly details, SPECIAL STEEL GUARDRAIL POSTS, SPECIAL END SHOE, W-BEAM RAIL SPICE, THREE-BEAM RAIL SPICE, and THREE-BEAM TERMINAL CONNECTORS details.

1/8" STEEL WASHER

1/8" OVAL SHOULDER BUTTON HEAD BOLT

Notes: For application information see individual and endanchorage assembly details.
For Replacement of Existing W8 x 18 Guardrail Posts on Approach Slabs and Bridges

For Construction of Guardrail Where Culvert, Pier Footing or Other Structure Precludes Driven Post Installation

Notes (Special Steel Post)

1. See index No. 428 for quantity/value packs required for replacement and repair of guardrail components to bridge traffic running barrier retrofits on existing bridges. See Structures Index Table, Thru Table 771 for steel plates required to construct traffic running barrier retrofits on existing bridges.

2. Either anchor bolts, concrete wedge anchors or approved Adhesive-Bonded Anchors for Structural Applications may be used.

3. Plates are to be bonded using anchor bolts or adhesive anchors. Either anchor bolts or adhesive anchors are to be used with adjusting nuts as detailed. Unless the Engineer approves the use of anchor bolts, plates installed using anchor bolts are to be used with anchor washers for the adjusting nuts as detailed. Unless the Engineer approves the use of anchor bolts, plates installed using anchor bolts are to be used with anchor washers for the adjusting nuts as detailed.

4. Adhesive-Bonded Anchors for Structural Applications shall comply with Section 357 and be detailed in accordance with Section 46b. Drilled holes in anchor bolts shall be in accordance with the manufacturer's instructions.

5. Anchor holes in structural steel shall be drilled in accordance with the manufacturer's specifications. Enlarged reinforcing steel shall be drilled through holes, which are thoroughly cleaned when setting bolts and anchors or dry when setting wedge anchors.

6. Steel plate and base units shall be galvanized in accordance with ASTM A53. Any damaged galvanized areas shall be be re-galvanized in accordance with Section 10 of the Standard Specifications.
For Special Posts

Max. Variation In Location
Of One Or Two Special Posts

NUMBER OF SPECIAL POSTS

Max. Variation In Location Of One Or Two Special 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 anchorages mounted on curb inlets shall be in accordance with apportioned guardrail posts. Sheet 9, and paid for under the contract unit price for special guardrail posts, EA.
3. Variations shown for the locations of special posts mounted on inlets are apportioned from adjusted post spacing 16'-3" to clearance of adjacent posts from inlets 14" minus 1.5" for standard posts and 0.5" for expansion anchors. The number of posts and their locations may vary by reducing post spacing and adjusting the length of roll panels.
4. Special guardrail posts shall conform in position to standard timber and steel posts, and be paid for under the contract unit price for special guardrail posts, EA. Payment shall include cost of foam wrap and concrete encasement.

SPECIAL POST LOCATIONS ON CURB INLETS
CONCRETE ANCHOR BLOCK OPTION

**TYPE II NOTES**

1. Unless specified in the plan, the contractor shall supply either the cable anchor option or the concrete anchor option.

2. In general, the anchorages are to be used only for guardrails that are rated vertically. The existing anchor rod (18" or 24") shall be field cut, threaded 4" on each end, and inserted in accordance with Section 16.36 and 16.36.2 of the Standard Specifications. The cost for cutting, threading, and installing the anchor rod and the turnbuckle shall be included in the contract unit price for the Ready Guardrail, FL.

3. The payment for the items of End Anchorage Assembly Type II (Concrete Anchor Block Option) shall be full compensation for furnishing and installing either the Beam Anchor Plate, Anchor Rod, Pipe Sleeves, Anchor Block, either Flange, Round or Buffer End Section, and the necessary hardware.

END ANCHORAGE ASSEMBLY TYPE II

CABLE ANCHOR OPTION

**FRONT VIEW**

The payment for the items of End Anchorage Assembly Type II (Concrete Anchor Block Option) shall be full compensation for furnishing and installing either the Beam Anchor Plate, Anchor Rod, Pipe Sleeves, Anchor Block, either Flange, Round or Buffer End Section, and the necessary hardware.
MODIFIED ECCENTRIC LOADER TERMINAL NOTES

1. The MELT is adaptable for design speeds up to 45 mph. The MELT is intended for use as an approach end guardrail or shoulder guardrail. It is aligned in a plane from the normal guardrail alignment with an effective length of 4.8 ft. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA.

2. This standard drawing is intended for use by the Florida Department of Transportation solely for its own projects. This standard drawing is intended for use by the Florida Department of Transportation solely for its own projects. This standard drawing is intended for use by the Florida Department of Transportation solely for its own projects.

3. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA.

4. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA.

5. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA.

6. This standard drawing is intended for use by the Florida Department of Transportation solely for its own projects. This standard drawing is intended for use by the Florida Department of Transportation solely for its own projects. This standard drawing is intended for use by the Florida Department of Transportation solely for its own projects.

7. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA.

8. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA. The MELT shall be designed, fabricated, and installed in accordance with NFPA.

TOP VIEW

BUFFERED END SECTION

SHELVE ANGLE

ELEVATION

PLAN

DIAPHRAGM PLATE (2 Req'd.)

STEEL STRUT AND YOKE ASSEMBLY

END ANCHORAGE ASSEMBLY TYPE MELT

END MEASUREMENT FOR GUARDRAIL POSTAGE

DIAPHRAGM PLATE (2 Req'd.)

PLAN

FLAT PLATE LAYOUT
BEST IMPACT HEAD

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

2. This standard drawing is produced by the Florida Department of Transportation solely for the
Department's use and for information purposes. This standard drawing provides the general graphics and
information necessary to field identify component parts of the BEST and their incorporation into a whole
system.

3. This standard drawing is sufficient for final details for the BEST when installed in connection with
shoulder guardrail and provides the requirement for shop drawing details unless the plans otherwise
call for such details. The BEST shall be assembled in accordance with the manufacturer's details,drawing, procedures and specifications.

4. The BEST is intended for use as an approach end guardrail anchorage for shoulder guardrail
installed to traffic zones. The effective length of the BEST is 31'6" including a 25' standard-steel panel plus
25' standard-steel panels outside of any other standard guardrail, guardrail breakaway or other special treatments. The extension of the BEST is an extension of the normal
anchorages, except when combined with curb the extension of the BEST will be 30'2" over the
panel 25' of a rate of 1:25.

5. The BEST can not be used in medians where horizontal clearance requires the use of a breakrail.

6. Pedestrian ramp, No. 1 and 2 must be fiber concrete breakaway panels with a full-length steel tube
fitted with steel plates. The panels of location Nos. 3, 4, 5, 6 and 7 shall be CRT timber panels.

7. See the General Notes for general requirements of all other components.

8. If the post and for the BEST in a cut or gutter location, and where with other end anchorage system
is not be permitted unless approved by the Engineer. If the plane of the pin assembly
contacted at a specific location, the post must be constructed any fixed or suspended guardrail
assembly, where a fixed and extended is located for in the plane, any approved substitution with a
combination as well as will not be suitable for VCP consideration.

9. The BEST shall be provided with a total unit price for the Guardrail, End Anchorage Assembly (parallel 1)
and shall be full replacement for furnishing and installing all components in accordance with the plans,
the manufacturer's data, drawings, procedures and specifications and this note.

DESIGN NOTES

1. A specification evaluation should be considered prior to using the BEST where there is a need to
design an all steel type (both sides) of the BEST.

2. The BEST is suitable for all design speeds.

CABLE ANCHOR BOX

END ANCHORAGE ASSEMBLY TYPE BEST

SPECIAL 25' APPROACH RAIL
1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Florida Systems, Inc. and marketed under the trade name SKT-350. Any infringement on the rights of the designer will be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation solely for the Florida Department of Transportation and its agencies. This standard drawing provides the general graphics and information necessary to field identify component parts of the SKT-350 and their transportation into a whole system.

3. This standard drawing is sufficient for plan details for the SKT-350 when installed in connection with shoulder guardrail and precludes the requirement for shop drawings or submittals for each assembly. The SKT-350 shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.

4. The SKT-350 is intended for use as an approach guardrail end anchorage for shoulder guardrail located parallel to traffic lanes. The effective length of the SKT-350 is 50'. The alignment of the SKT-350 shall be an extension of the normal guardrail alignment, except when constructed near the alignment of the SKT-350 will be flared over a rate of 1 in 25.

5. The SKT-350 shall be used in medians where horizontal clearance requires the use of a breakaway.

6. Posts of location No. 1, 2, 3, 4, 5, 6, 7 and 8 shall be eligible for furnishing one installation all component parts in accordance with the plans and specifications and this Index.

7. The SKT-350 shall be used for under the contract unit price for Guardrail, End Anchorage Assembly (Footnote), EA and shall be full compensation for furnishing and handling all components. In accordance with the plans, the manufacturer's detail drawings, procedures and specifications, and this Index.

8. The SKT-350 shall be used for under the contract unit price for Guardrail, End Anchorage Assembly (Footnote), EA and shall be full compensation for furnishing and handling all components. In accordance with the plans, the manufacturer's detail drawings, procedures and specifications, and this Index.

**SKT-350** NOTES

1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Florida Systems, Inc. and marketed under the trade name SKT-350. Any infringement on the rights of the designer will be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation solely for the use by the Department and its agencies. This standard drawing provides the general graphics and information necessary to field identify component parts of the SKT-350 and their transportation into a whole system.

3. This standard drawing is sufficient for plan details for the SKT-350 when installed in connection with shoulder guardrail and precludes the requirement for shop drawings or submittals for each assembly. The SKT-350 shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.

4. The SKT-350 is intended for use as an approach guardrail end anchorage for shoulder guardrail located parallel to traffic lanes. The effective length of the SKT-350 is 50'. The alignment of the SKT-350 shall be an extension of the normal guardrail alignment, except when constructed near the alignment of the SKT-350 will be flared over a rate of 1 in 25.

5. The SKT-350 shall be used in medians where horizontal clearance requires the use of a breakaway.

6. Posts of location No. 1, 2, 3, 4, 5, 6, 7 and 8 shall be eligible for furnishing one installation all component parts in accordance with the plans and specifications and this Index.

7. The SKT-350 shall be used for under the contract unit price for Guardrail, End Anchorage Assembly (Footnote), EA and shall be full compensation for furnishing and handling all components. In accordance with the plans, the manufacturer's detail drawings, procedures and specifications, and this Index.

**SKT-350** NOTES

1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Florida Systems, Inc. and marketed under the trade name SKT-350. Any infringement on the rights of the designer will be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation solely for the use by the Department and its agencies. This standard drawing provides the general graphics and information necessary to field identify component parts of the SKT-350 and their transportation into a whole system.

3. This standard drawing is sufficient for plan details for the SKT-350 when installed in connection with shoulder guardrail and precludes the requirement for shop drawings or submittals for each assembly. The SKT-350 shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.

4. The SKT-350 is intended for use as an approach guardrail end anchorage for shoulder guardrail located parallel to traffic lanes. The effective length of the SKT-350 is 50'. The alignment of the SKT-350 shall be an extension of the normal guardrail alignment, except when constructed near the alignment of the SKT-350 will be flared over a rate of 1 in 25.

5. The SKT-350 shall be used in medians where horizontal clearance requires the use of a breakaway.

6. Posts of location No. 1, 2, 3, 4, 5, 6, 7 and 8 shall be eligible for furnishing one installation all component parts in accordance with the plans and specifications and this Index.

7. The SKT-350 shall be used for under the contract unit price for Guardrail, End Anchorage Assembly (Footnote), EA and shall be full compensation for furnishing and handling all components. In accordance with the plans, the manufacturer's detail drawings, procedures and specifications, and this Index.

END ANCHORAGE ASSEMBLY TYPE SKT-350

**DESIGN NOTES**

1. A special site evaluation should be considered prior to using the SKT-350 where there is less than 25' clear area on the abutment side (road side) of the SKT-350.

2. The SKT-350 is suitable for all design speeds.
1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Fleet Systems, Inc. and marketed under the trade name FLEAT-350. Any information on the rights of the designer shall be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation acting for the use by the Department and its predecessors. This standard drawing provides the general graphic and information necessary to identify component parts of the FLEAT-350 and their incorporation into a whole system.

3. This standard drawing is sufficient for plan details for the FLEAT-350 when included in connection with other guardrail and standard or special transition or other special treatments. The alignment of the FLEAT-350 is straight-line ends with an upstream offset of 3 feet and a downstream offset of 5 feet from the normal guardrail alignment.

4. The FLEAT-350 is intended for use as an approach and general guardrail for shoulder guardrail. The effectiveness length of the FLEAT-350 is 27 feet (including one 0.5-foot W-Beam panel plus the 26.5-foot W-Beam panel outside of any other standard guardrail, guardrail transitions, or other special treatments. The alignment of the FLEAT-350 is a straight-line ends with an upstream offset of 3 feet and a downstream offset of 5 feet from the normal guardrail alignment.

5. The FLEAT-350 shall be used in medicare where horizontal clearance requirements the use of a barrier.

6. Parts at location Posts Nos. 2 and 3 shall be timber breakaway piers with special length steel foundation tube without soil plates. The plates at location Posts Nos. 3, 4, 5, and 7 shall be CBR timber plates.

7. See the General Notes for general requirements of metallic components.

8. If the plan calls for the FLEAT-350 at a specific location, application of all other and anchorage assemblies will not be permissible unless approved by the Engineer. If the plan calls for end anchorage assembly labeled as at specific location, the contractor has the option to construct any FDOT approved end anchorage. Where a flared and anchorage is called for in the plans, any approved anchorage with a parallel end anchorage will not be in compliance with FDOT specifications.

9. The FLEAT-350 shall be used under the latest soil abutment class for Guardrail, End Anchorage, and Fencing.

DESIGN NOTES

1. The FLEAT-350 is suitable for all design speeds.

END ANCHORAGE ASSEMBLY TYPE FLEAT-350

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GUARDRAIL

Drawing No. 400

Approved By

Drawn By

Issued By

End锚or

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Sheet 2 of 3

29 of 31

fleet-350 notes

1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Fleet Systems, Inc. and marketed under the trade name FLEAT-350. Any information on the rights of the designer shall be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation acting for the use by the Department and its predecessors. This standard drawing provides the general graphic and information necessary to identify component parts of the FLEAT-350 and their incorporation into a whole system.

3. This standard drawing is sufficient for plan details for the FLEAT-350 when included in connection with other guardrail and standard or special transition or other special treatments. The alignment of the FLEAT-350 is straight-line ends with an upstream offset of 3 feet and a downstream offset of 5 feet from the normal guardrail alignment.

4. The FLEAT-350 is intended for use as an approach and general guardrail for shoulder guardrail. The effectiveness length of the FLEAT-350 is 27 feet (including one 0.5-foot W-Beam panel plus the 26.5-foot W-Beam panel outside of any other standard guardrail, guardrail transitions, or other special treatments. The alignment of the FLEAT-350 is a straight-line ends with an upstream offset of 3 feet and a downstream offset of 5 feet from the normal guardrail alignment.

5. The FLEAT-350 shall be used in medicare where horizontal clearance requirements the use of a barrier.

6. Parts at location Posts Nos. 2 and 3 shall be timber breakaway piers with special length steel foundation tube without soil plates. The plates at location Posts Nos. 3, 4, 5, and 7 shall be CBR timber plates.

7. See the General Notes for general requirements of metallic components.

8. If the plan calls for the FLEAT-350 at a specific location, application of all other and anchorage assemblies will not be permissible unless approved by the Engineer. If the plan calls for end anchorage assembly labeled as at specific location, the contractor has the option to construct any FDOT approved end anchorage. Where a flared and anchorage is called for in the plans, any approved anchorage with a parallel end anchorage will not be in compliance with FDOT specifications.

9. The FLEAT-350 shall be used under the latest soil abutment class for Guardrail, End Anchorage, and Fencing.
END ANCHORAGE ASSEMBLY TYPE REGENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GUARDRAIL

END MEASUREMENT FOR GUARDRAIL PAYMENT

1. The REGENT is exclusive for all design aspects. The REGENT is intended for use as an approach guardrail end, approach guardrail extension, and as a grade separation. Its alignment is as a parapet handrail from the normal guardrail alignment with an effective length of 24 feet. A handrail shall be furnished on the face of the parapet handrail in accordance with the Florida Department of Transportation standards.

2. This standard drawing is intended for use in accordance with Florida Department of Transportation standards and is not intended to be used in any other way.

3. This standard drawing is intended for use in conjunction with the Florida Department of Transportation standards and is not intended to be used in any other way.

4. The Florida Department of Transportation shall be used to fabricate any of the REGENT endcaps, endplates, or other endplates.

5. The REGENT endcaps, endplates, or other endplates shall be fabricated in accordance with the Florida Department of Transportation standards and are not intended to be used in any other way.

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The guardrail and endcap system represented in this drawing is a proprietary line of post guardrail by Trinity Industries, Inc. and manufactured by SRT/HBA Post, Inc. The design drawing is protected by the rights of the designer and the user. The state of Florida does not assume any responsibility for the design, installation, or maintenance of any guardrail system, and the user hereby waives all claims against the state of Florida, their agents, and employees, for any injuries, damages, or losses that may result from the use of this design.

This drawing is intended as a guide for the installation of the SRT/HBA 6 Post when installed in conjunction with shoulder guardrail. The user shall be responsible for all aspects of installation, including but not limited to:

1. Ensuring that all materials are properly installed and meet the manufacturer's specifications.
2. Ensuring that the design is adequate for the intended use.
3. Ensuring that the design complies with all local and state regulations.
4. Ensuring that the design is compatible with existing structures.
5. Ensuring that the design is aesthetically pleasing.
6. Ensuring that the design is cost-effective.

The SRT/HBA 6 Post shall be used with the manufacturer's detailed drawing, procedure, and specifications.

This drawing is intended to be used in conjunction with shoulder guardrail and does not replace the need for the user to review the manufacturer's detailed drawing, procedure, and specifications. The SRT/HBA 6 Post shall be installed in accordance with the manufacturer's detailed drawing, procedure, and specifications.
I. For selection of an appropriate transition scheme, see Structural Instruction Index I-790 and I-795 for instructions to the Structural and roadway engineers.

NOTES FOR GUARDRAIL TRANSITIONS CONNECTING TO TRAFFIC RAILING RETROITS ON EXISTING BRIDGES

1. For selection of an appropriate transition scheme, see Structural Instruction Index I-790 and I-795 for instructions to the Structural and roadway engineers.
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (THREE-BEAM RETROFIT)
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (THREE-BEAM RETROFIT)

SEE STRUCTURES INDEX NOS. 773 & 776 - SCHEME 1

SEE STRUCTURES INDEX NOS. 773 & 776 - SCHEME 2

EXISTING CURB
See Structures Indexes For Face Of Rail Offset

EXISTING APPROACH SLAB

EXISTING PENDENT OR ANGLED WING POST
Special Steel Post For Railing Three-Beam Transition

TRANSITION BLOCK IN ABSENCE OF CURB

EXISTING APPROACH SLAB

EXISTING BOLTS

EXISTING APPROACH SLAB

EXISTING GUTTER LINE

EXISTING APPROACH SLAB

EXISTING APPROACH SLAB

EXISTING APPROACH SLAB

EXISTING APPROACH SLAB

EXISTING APPROACH SLAB

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PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (THREE-BEAM RETROFIT)
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS
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PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS
FOR BRIDGE TRAFFIC RAILING BARRIER (THREE-BEAM RETROFIT)

SEE STRUCTURES INDEX NOs. 774 & 777 - SCHEME 5 & 6

SEE STRUCTURES INDEX NOs. 774 & 777 - SCHEME 5 & 6
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (THRIE-BEAM RETROFIT)
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (THREE-BEAM RETROFIT)
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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (THREE-BEAM RETROFIT)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

PICTORIAL VIEWS

SEE STRUCTURES INDEX NOS. 773, 774, 776 & 777 - SCHEMES 5 & 6

SEE STRUCTURES INDEX SERIES NOS. 773, 774, 776 & 777 - SCHEME 3 & 4

PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (THREE-BEAM RETROFIT)
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (THRIE-BEAM RETROFIT)
Front Face of Existing Backwell & Begin or End Existing Bridge

Existing Rolling Removed

Parallel Wing Plate Removed
Traffic Rolling Barrier (Vertical Face Retrofit) Constructed

Traffic Rolling Barrier (Vertical Face Retrofit) Constructed

Front Face of Existing Backwell & Begin or End Existing Bridge

SEE STRUCTURES INDEX NO. 782 - SCHEME 1

SEE STRUCTURES INDEX NO. 782 - SCHEME 2

SEE STRUCTURES INDEX NO. 782 - SCHEME 3

Note:
*21' x 12" x 3/8" Thick Beam Terminal Connector Plate (Back-Up Plate) and 3/8 x 1/2" Long HS Hex Bolts and Nuts (15 Req'd) with 21/2" OD Plain Round Washers Under Nuts and Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING BARRIER (VERTICAL FACE RETROFIT)
PARTIAL PLAN VIEWS OF TRAFFIC RAILING BARRIER (VERTICAL FACE RETROFIT)
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (VERTICAL FACE RETROFIT)
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (VERTICAL FACE RETROFIT)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

Drawn By: HSD/SBC 12/02

Revision Number: 12/02

Approved By: 

402
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (VERTICAL FACE RETROFIT)
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (VERTICAL FACE RETROFIT)
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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING BARRIER (VERTICAL FACE RETROFIT)
TRAILING END GUARDRAIL AND ANCHORAGE FOR BRIDGE TRAFFIC RAILING BARRIER THRIE-BEAM RETROFITS

THREE-BEAM RETROFIT NOTES

1. See Structures Indexes for bridge three-beam traffic railing barrier retrofits.

2. Trailing end guardrail to be paid for under the contract unit price for the parent roadway guardrail.

NOTES FOR TRAILING END TRAFFIC RAILING BARRIER VERTICAL FACE RETROFITS

1. Where Guardrail Extensions Are Required Beyond The Trailing End Of Bridges With Traffic Railing Barrier Vertical Face Retrofits, Guardrail Connections To The Bridge Barrier Will Be By SPECIAL END SHOE For W-Beam Guardrail Extensions And By THREE-BEAM TERMINAL CONNECTOR For Three-Beam Guardrail Extensions.

2. Install W-Beam Special End Shoe and Three-Beam Terminal Connector With Back-Up Plates, Angles, 3/8" Hex Bolts And Hole (1/2" Long) With 2" OD Plain Round Washers Under Heads And Nails (4 Required For Special End Shocks And 5 Required For Three-Beam Terminal Connectors). Back-Up Plates For Special End Shocks Are 10" x 10" x 3/8" And For Terminal Connector 12" x 12" x 3/8".

3. Payment For Connecting Trailing End Special End Shoe And Three-Beam Terminal Connector To Traffic Railing Barrier Vertical Face Retrofits Will Be Made Under The Contract Unit Price For Guardrail Bridge Anchorage Assembly, EA.
GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING FLAT SLAB, PRESTRESSED BEAM AND GIRDER BRIDGES

NOTES FOR GUARDRAIL TRANSITIONS TO SAFETY SHAPE TRAFFIC RAILING BARRIERS ON EXISTING BRIDGES

1. When the existing wing posts are replaced with a bridge traffic railing barrier in accordance with Structure Standard Drawings No. T-700 or No. T-701, the three beam guardrail connection shall be in accordance with Detail I of Index No. 400.

2. When retrofitting three beam guardrail to existing wing posts or existing bridge safety shape traffic railing, permanent construction shall be paid for under the contract unit price for Guardrail Bridge Anchorage Assembly, FLA., and shall be full compensation for bolt hole reinforcement, terminal connection, terminal caps, plastic pipes and bolts, nuts and washers.

GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR EXISTING FLAT SLAB, PRESTRESSED BEAM AND GIRDER BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH
**CONCRETE BARRIER WALL**

**DETAI II WALL TERMINAL**

**DETAI III WALL TERMINAL FOR NARROW MEDIAN**

**WALL FACE SAFETY SHAPES**

**GENERAL NOTES**

1. Class II concrete shall be used for all reinforced and plain (nonreinforced) concrete barrier walls, except, in moderately and extremely aggressive environments, Class II concrete shall be used. All reinforcing steel with end-alkali-free size shall be #4 bars. Expanded concrete wall finishes shall be Class 3. Surfaces shall be finished in accordance with Section 532 of the Standard Specifications, unless other finishes are called for in the plans. The surfaces shall have a Class 5. Applied finished coating in accordance with Section 405 only when called for in the plans.

2. Concrete barrier wall terminal ends for design speed 45 mph or less:
   - a. Terminal shall be of concrete as defined in Section 533 of the Standard Specifications, unless other finishes are called for in the plans.
   - b. Terminal shall be constructed of concrete as defined in Section 533 of the Standard Specifications, unless other finishes are called for in the plans.

3. Expansion joints shall be provided as defined in Section 533 of the Standard Specifications, unless other finishes are called for in the plans.

4. When the barrier is placed adjacent to the pavement, the top 1/2" of the aggregate shall be compacted to at least 90% of the density as defined in the AASHTO T-98 specifications.

5. Cast-in-place barriers shall not be constructed of concrete as defined in Section 533 of the Standard Specifications, unless other finishes are called for in the plans.

6. Prestressed barriers shall be constructed as defined in Section 533 of the Standard Specifications, unless other finishes are called for in the plans.

7. Cast-in-place barriers are required to be of a uniform color and texture as defined in Section 533 of the Standard Specifications, unless other finishes are called for in the plans.

8. For barrier wall limited details see Section 810 of the Standard Specifications.

**CONCRETE BARRIER WALL SECTION**

**MEDIAN BARRIER WALL FOR SUPERELEVATED SECTIONS OR VARIABLE ROADWAY PROFILE GRADES**
CONCRETE BARRIER WALL TRANSITION BETWEEN WIDE AND NARROW MEDIANS WHEN BARRIER WALL END LOCATED OUTSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE

SHOULDER TREATMENT WHEN CRASH CUSHIONS SHIELDING CONCRETE BARRIER WALL END LOCATED INSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE

DETAIL A

W-BEAM GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL TRAILING ENDS

DETAIL B

Details:
1. End of wall flush mounted connections are not applicable to two-lane two-way facilities. See Sheets 18 and 20 for trailing end connections on two-lane two-way facilities and for approach guardrail connections.

2. Trailing guardrail connections to double face safety shaped walls will be under one of the following traffic conditions and mounting methods:
   a. One-way trailing condition - flush mount with flat steel back-up plate on back-plate.
   b. One-way traffic trailing condition both sides - flush mount both sides.
   c. For trailing condition one side and approaches traffic condition opposite side - see "Median Barrier Wall" mounting, Sheet 20.

FREE END REINFORCEMENT

Notes:
- Free and reinforcement required for nonreinforced walls at all exposed ends.
- Using ends of true joints, ends with guardrail connections, ends with Guardrail System connections, and ends connecting to bridge traffic rolls or other rigid barrier walls.

PRECAST BARRIER TRANSVERSE JOINTS

DETAIL C

STRAIGHT TONGUE AND GROOVE

DETAIL D
Concrete Barrier Wall Transitions at Bridge Piers and Overhead Sign Supports

To Be Paid For
As Concrete Barrier Wall, LF
(With Knee and Transition)

Elevation

Plan

SECTION AA

SECTION BB

SECTION CC

SECTION DD

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Concrete Barrier Wall

Concrete Median Barrier Wall Transitions at Bridge Piers and Overhead Sign Supports

Standard Barrier Wall

Concrete Barrier Wall Transition (Thin Wall)

Concrete Barrier Wall Transition (Half Wall, Thin Wall)

Independent Barrier and Sign Pedestal

Elevations

Pier Foundations

SECTION BB

Combination Barrier and Sign Pedestal

Variations 1/2" Std.

Variation 4" Std.

Variation 1/4" Std.

Concrete Cap

Granular Fill In Wall cavity

Shoulder or Shoulder Pavement

Elevations

Variation 1/2" Std.

Variation 4" Std.

Variation 1/4" Std.

Concrete Cap

Granular Fill In Wall cavity

Shoulder or Shoulder Pavement

Dimensions (Ft.): (When P=6"-0")

L
M
T

39
20
15

Plan

Pier Foundation

Pier (2)

With Verticals

Pier (1)

4" Concrete Cap Over Granular Fill

End Steel Reinforcement

Overhead Sign Support Footing

Overhead Sign Support Pedestal

Top of Compaction

Concrete Cap

Concrete Cap

Concrete Cap

Concrete Cap

Concrete Cap

Concrete Cap

Concrete Cap
"6 Bars (6 Req'd.)
Bond To Obtain 3" Clearance & Barrier Wall Footing
Conduit From Pull Box

TOP VIEW

Light Pole (Non-Frangible)
Anchor Bolt
Concrete Shaft For Light Pole Base
Rodding Or Motion Shoulder Pavement
Conduit From Pull Box

SECTION CC

Light Pole
Bolt Circle Projection, Diameter & Length Per Pole Manufacturer's Specification.
Free End Reinforcement Required
Concrete Shaft For Light Pole Base
See box detail right
6" Airs, To Cover, Joint Each Side (Cast in Place Required)
Free End Reinforcement Required
Junction Box/Pull Box
 See box detail right

SECTION AA

Light Pole
Conduit For Ground Rod
1" Conduit For Ground Rod
1" Conduit For Ground Rod
2" Conduit Hub (Typ.)
2" Conduit Hub (Typ.)

SECTION BB

JUNCTION BOX

Conduit Risers
Rigid Galvanized Steel - 2" SCH
Or PVC Schedule 40

TRANSVERSE SECTION

LONGITUDINAL SECTION

INSTALLATION

JUNCTION BOX NOTES
1. Junction boxes are to be fabricated from steel conforming to ASTM A36
and be hot-dipped galvanized after fabrication. All seams shall be continuously
welded and ground smooth. A neoprene gasket shall be attached to the box
to provide a watertight cover. The cover screws shall be fully galvanized.

2. Remove excess concrete while green and hand form chamfers.

3. Junction box complete and conduit races are incidental to the construction
and deal of the barrier wall. There is to be no separate compensation for the
box, races or installation unless specifically called for in the plans.

JUNCTION BOX - ELECTRICAL

LIGHT POLE MOUNTING IN MEDIAN BARRIER WALL
**CANTILEVER WALL**

**L-WALL**

---

### Dimensions and Quantities

#### CANTILEVER WALL

<table>
<thead>
<tr>
<th>Length of Barrier Wall</th>
<th>#</th>
<th>Class II Concrete (Cy/Per Lin. Ft.)</th>
<th>Reinforcing Steel (LBS/Per Lin. Ft.)</th>
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<tbody>
<tr>
<td>4'-0&quot; to 6'-9&quot;</td>
<td>1</td>
<td>0.27</td>
<td>4</td>
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<tr>
<td>7'-6&quot; to 40'</td>
<td>2</td>
<td>0.37</td>
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#### L-WALL

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<th>#</th>
<th>Class II Concrete (Cy/Per Lin. Ft.)</th>
<th>Reinforcing Steel (LBS/Per Lin. Ft.)</th>
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<td>7'-6&quot; to 40'</td>
<td>2</td>
<td>0.37</td>
<td>8</td>
</tr>
</tbody>
</table>

---

**Note:** All longitudinal reinforcement #4 bars.

---

**Plain Concrete Barrier Wall (Shoulder)**

---

**WALL OPTIONS**

**Payment:**

- Wall to be paid for under the contract unit price for Concrete Barrier Wall (Plain Shoulder), LF.

**Design Notes:**

- Wall shall have a length of 40' or greater. A Wall of 40' or more in length may be made up of segments of 20' or more in length provided the segments are joined by a transverse joint in accordance with the details shown. See Bending Diagram Sheet 218.

---

**Reinforced Concrete Barrier Wall (Shoulder)**

---

**Reinforcing Steel Modifications at Barrier Wall Inlets (Index No. 218)
Trim When Used With Bar JOA Modified
In Reinforced Concrete Barrier Wall (Retaining)
**WITH PLAIN CONCRETE BARRIER WALL (SHOULDER)**

- Expanded Shoulder When Reinforced Concrete Barrier Wall (Shoulder) Constructed.
- Concrete Traffic Railing on Retaining Wall.
- Shoulder Gutter Transition to Suit Barrier
- Transition Section: See Sheet 2D
- Deflected Shoulder Gutter When Required for Variation in Shoulder Width
- For Shoulder Gutter Requirements See Plan.

**WITH SHOULDER GUTTER AND GUARDRAIL**

- Expanded Shoulder When Reinforced Concrete Barrier Wall (Shoulder) Constructed.
- Concrete Traffic Railing on Retaining Wall.
- Shoulder Gutter Transition to Suit Barrier
- Transition Section: See Sheet 2D
- Deflected Shoulder Gutter When Required for Variation in Shoulder Width
- Grassed Shoulder

**WITH GRASSED OR PAVED SHOULDERS AND GUARDRAIL**

- Expanded Shoulder When Reinforced Concrete Barrier Wall (Shoulder) Constructed.
- Concrete Traffic Railing on Retaining Wall.
- Shoulder Gutter Transition to Suit Barrier
- Transition Section: See Sheet 2D
- Deflected Shoulder Gutter When Required for Variation in Shoulder Width
- Grassed Shoulder

**CONCRETE BARRIER WALL**

- Either Reinforced Concrete Barrier Wall (Shoulder) or Retaining Wall with Concrete Traffic Railing.

**CONCRETE BARRIER WALLS ON APPROACHES TO BRIDGES**

- Guardrail connection to concrete traffic railing on retaining wall shall be in accordance with the Structural Design Office's standards.
- Approach guardrail connections to shoulder concrete barrier wall shall be in accordance with the details shown on Sheet 6 and 2D of the index and Index No. 400, Sheet 1.
- End measurement for guardrail segment when guardrail connected to shoulder barrier wall. See Index No. 400, Sheet 1 for end measurement when guardrail connected to concrete traffic railing constructed with approach ends or on retaining walls.
- To be deleted on trailing ends except for 2-lane 2-way facilities.

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**Approach Sidewalk (Width Same As For Bridge)**

- Shoulder 
- Bridge Traffic Roll
- Roadway Shoulder (Width Same As For Bridge)
- Approach Sidewalk

**Approach Sidewalk (Width Same As For Bridge)**

- Shoulder
- Bridge Traffic Roll
- Roadway Shoulder (Width Same As For Bridge)
- Approach Sidewalk

**Approach Sidewalk (Width Same As For Bridge)**

- Shoulder
- Bridge Traffic Roll
- Roadway Shoulder (Width Same As For Bridge)
- Approach Sidewalk

**Approach Sidewalk (Width Same As For Bridge)**

- Shoulder
- Bridge Traffic Roll
- Roadway Shoulder (Width Same As For Bridge)
- Approach Sidewalk
CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • WITH ADJACENT BICYCLE LANE

LENGTH OF ADVANCEMENT

Design Speed mph | Length Of Advancement, Ft. (X)
---|---
s45 | X = 15 (D - d)

Note: The minimum length of advancement for both near and opposing lane approaches is 40'.

Equation Variables:

D = Distance in feet from near edge of the near approach traffic lane to the face of the hazard or clear zone within which a barrier is located. For left-side hazards and clear zones on two-way undivided facilities, D is measured from the inside edge of the near approach traffic lane.

d = Distance in feet from near edge of the near approach traffic lane to the face of barrier (at offset control point). For left-side hazards on two-way undivided facilities, d is measured from the inside edge of the normal opposing traffic lane.

FOR HIGH SIDE

END OF BRIDGE RAIL OR OTHER HAZARD

Other Hazard

FOR LOW SIDE

Note: All length shown on this wall shall be in feet. Shorter lengths due to construction or excavation. Joint shall be shown in the manner described for Transition Segments on Sheet IV. Transverse expansion joints are to be constructed at the junctions of wall transitions and curb and gutter, and at intervals as required per Project

FOR HIGH SIDE

Concrete Baffle Wall

For high-side installations, use Index No. 295 (sheet extends into bicycle lane 20')

Estimated Quantities Per Linear Foot Of Wall

Concrete Baffle Wall: 0.23 C.Y.
Reinforcing Steel: 20.7 Lbs.
End Barrier Wall (Rigid / Curb & Gutter)
Sidewalk (5' Std.)
Utility Strip (Variable)
Type F Curb & Gutter (2 ½')

X (Length Of Advancement, Ft.)
Bridge
X (Length Of Advancement, Ft.)

Begin Barrier Wall (Rigid / Curb & Gutter)
Sidewalk (5' Std.)
Utility Strip (Variable)
Type F Curb & Gutter (2 ½')

TWO-WAY TRAFFIC (UNDIVIDED)

End Barrier Wall (Rigid / Curb & Gutter)
Sidewalk (5' Std.)
Utility Strip (Variable)
Type F Curb & Gutter (2 ½')

Departure 25' Unless Otherwise Called For In Plans
Bridge
X (Length Of Advancement, Ft.)

Begin Barrier Wall (Rigid / Curb & Gutter)
Sidewalk (5' Std.)
Utility Strip (Variable)
Type F Curb & Gutter (2 ½')

TWO-WAY TRAFFIC (UNDIVIDED)

End Barrier Wall (Rigid / Curb & Gutter)
Sidewalk (5' Std.)
Utility Strip (Variable)
Type F Curb & Gutter (2 ½')

Departure 25' Unless Otherwise Called For In Plans
Bridge
X (Length Of Advancement, Ft.)

Begin Barrier Wall (Rigid / Curb & Gutter)
Sidewalk (5' Std.)
Utility Strip (Variable)
Type F Curb & Gutter (2 ½')

ONE-WAY TRAFFIC

Bridge End Hazard

Sidewalk Alignment Varies To Suit Conditions Around Hazard

NOTE:
X-Length of advancement in feet for near and opposing approach lanes. See Sheet 9.
For federal without utility strip see Sheet 14.
For transition sidewalk and sectional details see Sheets 15 & 16.
The 2 ½' offsets to toe of barrier wall cannot be reduced to accommodate hazard, however, hazard located in the area of the wall may be accommodated by the details on Sheet Qa.

HAZARD 4' OR LESS FROM FACE OF CURB

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
CURB AND GUTTER WITH UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER WALL

<table>
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<th>Department</th>
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</tbody>
</table>

410
ONE-WAY TRAFFIC

TWO-WAY TRAFFIC (UNDIVIDED)

Bridge End Hazard

X (Length Of Advancement, Ft.)

End Barrier Wall
(Rigid) (Curb & Gutter)

Type F Curb & Gutter (2")

Tactile Surface

Sidewalk (6" Std.)

NOTE:

X-Length of advancement in feet for near and opposing approach lanes. See Sheet 27.

For locations with utility strips see Sheet 13.

For transition, delineator and vegetational details see Sheet 5 & 6.

The 2.5' offset to toe of barrier wall cannot be reduced to accommodate hazards. However, hazards located in the area of the wall may be demonstrated by the detail on Sheet 5.

HAZARD 4' OR LESS FROM FACE OF CURB

ONE-WAY TRAFFIC

TWO-WAY TRAFFIC (UNDIVIDED)

Bridge End Hazard

X (Length Of Advancement, Ft.)

End Barrier Wall
(Rigid) (Curb & Gutter)

Type F Curb & Gutter (2")

Tactile Surface

Sidewalk (6" Std.)

HAZARD 4' OR LESS FROM FACE OF CURB

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER WALL

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
CURB AND GUTTER WITHOUT UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE
Notes:

- Drainage slots shall be located at all line outside along the sidewalk and, unless otherwise shown in the plans, shall be spaced at intervals not exceeding 10' in fill sections and 20' in cut sections. Slots shall be located such that only one bar is not swung or displaced in front and back lines of vertical reinforcement.

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

- Transition segments shall be dowelled into the end of the barrier wall in the following manner:
  - Four 1/2" diameter hole 1/2" deep, on 12" centers shall be drilled in the end of the barrier and 8" bars 15" long set in epoxy mortar. The ends of the dowel extending into the transition segment shall be wrapped with one layer of 15 lb. Type I asphalt-saturated roofing felt with the ends crimped.
  - When construction joints are utilized for transition segment construction (i.e., dowels shall be dowelled to the footing in the following manner):
    - The dowels may be placed within six inches adjacent to the keyway.

**PLAN WITH UTILTY STRIP**

- Expansion Joint
- Sidewalk (6" Stk.)
- Utility Strip (Vert.)
- Type F Curb & Gutter (12")
- Expansion Joint

**PLAN WITHOUT UTILTY STRIP**

- Expansion Joint
- Type F Curb & Gutter (12")
- Expansion Joint

**SECTION AA**

- Concrete Joint Permitted
- 4.5"

**SECTION BB**

- Concrete Joint Permitted
- 3.25"

**SECTION CC**

- Sidewalk
- Barrier Wall
- 18" x 28" Drainage Slot

**NEAT LINE PICTORIAL VIEW**

**PICTORIAL VIEW**

**RIGHT SIDE ShOWN, LEFT SIDE OPPOSITE HAND**

ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)
**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • WITHOUT ADJACENT BICYCLE LANE**

**LENTH OF ADVANCEMENT**

- **Design Speed (mph)**
- **Length Of Advancement, Ft. (L)**
  - 45 mph: 38 ft

Note: The minimum length of advancement for both near and opposing lane approaches is 45 ft.

**Equation Variables**

- \( D \): Distance in feet from near edge of the near approach traffic lane to back of nearest or clearest zone with whomever is leader. For left side hazards and other zones on two-way undivided facilities, \( D \) is measured from the inside edge of the near approach traffic lane.
- \( G \): Distance in feet from near edge of the near approach traffic lane to the face of curb or other barrier point. For left-side hazards on two-way undivided facilities, \( G \) is measured from the inside edge of the nearest opposing traffic lane.

**LENGTH OF ADVANCEMENT FOR BOTH NEAR AND OPPOSING LANE APPROACHES**

- **Near Lane Approach**
  - End Concrete Barrier Wall (Right) (Curb & Gutter)
  - Beginning Of Barrier Wall Need
  - Face Of Barrier Wall

- **Opposing Lane Approach**
  - Beginning Of Barrier Wall Need
  - Face Of Barrier Wall

**BENDING DIAGRAM**

- **Low Side**
- **High Side**

**FOR LOW SIDE**

- **FOR HIGH SIDE**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**SECTION 00**

**CONCRETE BARRIER WALL**

**DESIGN AND DRAWN BY**

**CHECKED BY**

**APPROVED BY**

**Estimated Quantity Per Linear Foot Of Wall**

- Class C Concrete: 0.285 C.Y.
- Reinforcing Steel: 15.7 Lbs.

**Detailed Sheeting Per Linear Foot Of Wall**

- State Sheet No. 400

**Price For Concrete Barrier Wall (Rigid-Curb & Gutter) L.F.**

---

**Estimation Form**

- Sheet No. 400
- Linear Feet of Wall: 17.2'

---

**DESIGNATED MATERIALS**

- Concrete: 0.285 C.Y.
- Reinforcing Steel: 15.7 Lbs.

---

**NOTE**

- All longitudinal reinforcement bars, minimum segment length for this wall is 45'. Shorter segments due to construction or expansion joints shall be shown in the manner described for Transition Segment On Sheet 80.

---

**Junction of Wall**

- Transition to Abutment and Gutter, and at Intermediate abutment shall not exceed 38'.

---

**Purpose**

- To be used for under the contract unit price for Concrete Barrier Wall (Rigid-Curb & Gutter) L.F.
**SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS**

When guardrail offset from hazard less than 3'
1. The longitudinal dimensions and payment limits shown for median concrete barrier wall also apply to shoulder concrete barrier walls.

2. W-beam elements do not apply to these transition schemes. For barrier wall trailing end guardrail connections for one-way lanes, see Sheet 2.

3. Where nesting is necessary to fit nested beams the nested surfaces shall be metalized in accordance with Index No. 400.

4. Either steel or timber guardrail post may be used, timber posts shown.

5. The nested beams shall not be bolted to blocks and plates of post numbers 1, 13, 1, 15.

6. On the trailing side of MEDIAN BARRIER WALL, offset blocks may be omitted of post numbers 1, 2, 3, 5, 6 and 8.

7. For additional guardrail information refer to Index No. 400.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER WALL
GENERAL NOTES FOR TRAPEZOIDAL BARRIER WALL

1. Concrete trapezoidal barrier wall can be either cast or cast in place. The wall shall be designed for zero deflection and shall have a minimum plate length of 120'.

2. Where concrete trapezoidal barrier wall height changes from 42" to 48" or from 48" to 54", height change shall be uniform for each 6" of height change per 20' of wall. Steel placement shall meet the dimensional positioning requirements of 42", 48" and 54" high barriers at the respective planes along the vertical transition, with the vertical steel uniformly placed throughout.

3. Welded wire fabric (WWF) made in accordance with ASTM A182 may be used in lieu of the conventional reinforcement for present or cast in place barrier wall, with the exception that any conventional reinforcement shall be used for horizontal transition and trench wall sections. These weld can be cast in place with length, shape, and reinforcement as shown in this notes.

4. To obtain gauge length, parallel segments shall be interconnected with rebars grids placed in the prefabricated slots and grouted into place. Segment length shall be not less than 30' unless otherwise specified in the plans.

5. The concrete trapezoidal barrier wall shall be vertical except where the evanescent wave is attenuated in which case it shall be normal to the slope unless otherwise shown in the plans.

6. For rebar reinforcement requirements are "CONVENTIONAL BARRIER WALL" sections and the GENERAL NOTES, Sheet 1.

7. The concrete trapezoidal barrier wall is considered by the Federal Highway Administration to be non-reflective for precast or cast in place sections. The Engineer may be used as much on Federal AID projects.

8. The concrete trapezoidal barrier wall shall be put forth under the contract unit price for Barrier Wall Concrete (Trapezoidal). This price will include full payment for materials, labor, and all other expenses.

---

**TOP VIEW**

**SECTION AA**

**SECTION BB**

**SECTION CC**

---

**LIGHT POLE MOUNTING IN TRAPEZOIDAL SECTIONS**

---

**SYSTEM LENGTH**

---

**TRAPEZOIDAL BARRIER WALL**
GENERAL NOTES

1. The J-J Hook temporary concrete barrier wall represented on this standard drawing is a proprietary design by Easi-Set Industries. Any infringement on the rights of the designer shall be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation solely for the use by the Department and its assignees.

3. The J-J Hook barrier meets NCHRP 350 Test Level 3 criteria for length limited barrier. Use of the J-J Hook units shall be in accordance with the requirements of Index No. 45.

I. The J-J Hook temporary concrete barrier wall represented on this standard drawing is a proprietary design by Easi-Set Industries. Any infringement on the rights of the designer shall be the sole responsibility of the user.

II. This standard drawing is produced by the Florida Department of Transportation solely for the use by the Department and its assignees.

III. The J-J Hook barrier meets NCHRP 350 Test Level 3 criteria for length limited barrier. Use of the J-J Hook units shall be in accordance with the requirements of Index No. 45.
GENERAL NOTES

1. Temporary Concrete Barrier wall on roadways may be any of the following:
   a. The FOOT 415 Temporary Concrete Barrier wall unit shown on Sheet I of this Index, if manufactured prior to October 1, 2002, in good condition, and furnished in accordance with this Index. Units may be either F-Shape or New Jersey Shape. See "NOTICE" below. Units produced after October 1, 2002 cannot be used, unless otherwise noted in the plans.
   b. The Ji Hook System Index No. 43J. Units may be either F-Shape or New Jersey Shape, unless otherwise noted in the plans.
   c. The FOOT Type K Temporary Concrete Wall Unit shown on Sheet 1 of this Index. Units are included in this edition of the Design Standards.

2. For temporary concrete barrier walls on bridges see Structural Design Standard Index No. 715. F-Shape units only.

3. Temporary concrete barrier wall shall be used for work zones and other temporary operations. The units are to be placed at 20' centers in uncontrolled intersections, 200' centers on curves and 500' on tangent roadways. For additional information refer to index 800.

4. Units used for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Barrier Wall (Temporary), F-Shape unit only.

5. Alignment, length of end, anchorage, and end treatment shall be in accordance with this Index.

6. Wall units shall not be used for permanent barrier wall construction regardless of unit length, unless specifically permitted by the plans.

7. If the plans specify temporary concrete barrier wall, substitution with another barrier type is not permitted.

8. Setting-Steady-Burn Lights are to be mounted on top of temporary concrete barrier walls that are used as barriers along traveled roadway in work zones. The lights are to be spaced at 50' intervals in intersections, 200' centers on curves and 500' centers on tangent roadways. For additional information refer to index 800.

9. Wall units used for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Light, Temporary, Barrier Wall Mount (Type C, Steady-Burn 1, JD).

NOTICE

THE TEMPORARY CONCRETE BARRIER WALL UNIT SHOWN ON THIS INDEX THAT WAS PRODUCED PRIOR TO OCTOBER 1, 2002, IS IN GOOD CONDITION AND THAT IS IN GOOD CONDITION CAN BE USED IN STATE HIGHWAY PROJECTS THROUGH OCTOBER 31, 2002. TEMPORARY CONCRETE BARRIER WALL UNITS PRODUCED ON AND AFTER OCTOBER 1, 2002, FOR USE IN STATE HIGHWAY PROJECTS MUST MEET NCHRP 350 CRITERIA. FOR ADDITIONAL INFORMATION REFER TO INDEX 800.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
TEMPORARY CONCRETE BARRIER

FOOT 415 TEMPORARY CONCRETE BARRIER WALL UNIT AND GENERAL NOTES
The approach departure line location is determined by the line intersected with the back of the hazard or the area to be shielded, however the intersect offset distance is not to be beyond the clear zone limit. The trailing departure line is determined by the line intersected with the front of the downstream end of the hazard or the area to be shielded. The length of barrier end need is the distance from the approach departure line intersected with the upstream toe of the temporary concrete barrier wall to the trailing departure line intersected with the downstream toe of the temporary concrete barrier wall. Temporary concrete barrier wall end units shall be located at or outside the clear zone limit or by other structure, earth embankment or a crash cushion.

Proprietary crash cushions designed for use with temporary concrete barriers have the beginning length of need and departure lines intersected parallel to the design standard drawing for each proprietary crash cushion. Where crash cushions are located on the departure line by their length of need reference point, the wall length and unit shall be aligned with the crash cushion, and the wall end shall be marked with the anchor plates shown on Sheet 4 of this index. See Sheets 5 through 8 for configurations requiring end unit anchorage.

The wall offset from the near traffic lane, wall flare rates and wall flare length are to be In accordance with the alignment called for in the plane and the alignments called for by Department Design Standards. Unless referenced in the plans, In absence of either plan requirement, the offset shall be as determined by the Engineer, and, unless other Flare rates are approved by the Engineer, the Flare rates to be applied are 1:10 or Flatter for speeds 45 mph and 1:15 or Flatter for speeds 55 mph. See Index No. 600 for other Flare rates on engineering facilities.

**Alignment and Length of Need**
OPTIONAL END TREATMENTS FOR WALL UNITS

STEEL CONNECTING PIN

CONNECTING PIN ASSEMBLY

ASSEMBLED UNIT

INSERTING FOOT SNAKE PIN

REMOVING FOOT SNAKE PIN

TOP VIEW

END VIEW

SIDE VIEW

TOP VIEW

END VIEW

SIDE VIEW

TOP VIEW

END VIEW

SIDE VIEW

TOP VIEW

END VIEW

SIDE VIEW

TOP VIEW

END VIEW

SIDE VIEW

TOP VIEW

END VIEW

SIDE VIEW
NOTES FOR WALL END SHIELDING

1. Reflective crash cushions are the principal (standard) device to be used forislething approach ends of temporary concrete barrier walls. Except where the plans designate a particular type of reflective crash cushion for a specific location, the contractor has the option to construct either the REACT 350, Guidepost, ARCM 350, TRAC or Taillights crash cushions subject to the uses and limitations described in Index Nos. 454, 435, 436, 440 and 441 respectively. The barrier wall end unit must be anchored to a paved surface using anchor plates in accordance with "Anchor Plates Notes" and the details on this sheet.

2. Temporary reflective crash cushions shall be installed in accordance with the manufacturer’s specifications and recommendations. Temporary crash cushion can be either new or functionally sound used devices. Performance of intended function is the only condition for acceptance, whether the crash cushion is new, used, refurbished, purchased, leased, rented, or loaned between projects, or made up of mixed new and used components.

3. Reflective crash cushions are not optional systems for locations designated for reflective crash cushions by the plans, and are not eligible for VESC consideration.

4. A yellow pole mounted Type I Object Marker shall be centered 3' in front of the nose of all temporary crash cushions. Mounting hardware shall be in accordance with Index Nos. 11860 and 11865. The cast of the Object Marker shall be included in the cast of the crash cushion.

5. Optional temporary reflective crash cushions are to be paid for per location under the contract unit price for Vehicular Impact Attenuator (Temporary I Reflective Option 1).

ANCHOR PLATE NOTES

1. For temporary barrier wall end units requiring anchor plates, see sheets 5 through 8.

2. The temporary concrete barrier wall anchor plate depicted above is a proprietary design by Energy Absorption Systems, Inc. Other temporary anchorage methods can be substituted when wall rigidity is assured by any of the following:
   (a) A proven by associated crash test of reflective crash cushions, or
   (b) Instruct the manufacturer in a "Guide To Standardized Highway Barrier Hardware", or
   (c) As per the manufacturer’s engineered design, or
   (d) After shop drawings on a case by case basis.

3. The cost for anchoring the wall segment will be included in the cost for the adjoining reflective crash cushion.

ANCHOR PLATE REQUIREMENTS FOR BARRIER WALL END UNITS ABUTTING CRASH CUSHIONS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
TEMPORARY CONCRETE BARRIER

1. For temporary barrier wall end units requiring anchor plates, see sheets 5 through 8.

2. The temporary concrete barrier wall anchor plate depicted above is a proprietary design by Energy Absorption Systems, Inc. Other temporary anchorage methods can be substituted when wall rigidity is assured by any of the following:
   (a) A proven by associated crash test of reflective crash cushions, or
   (b) Instruct the manufacturer in a "Guide To Standardized Highway Barrier Hardware", or
   (c) As per the manufacturer’s engineered design, or
   (d) After shop drawings on a case by case basis.

3. The cost for anchoring the wall segment will be included in the cost for the adjoining reflective crash cushion.
MEDIAN HAZARDS WITHIN CLEAR ZONES BOTH ROADWAYS

MEDIAN HAZARDS EXTENDS TO OR BEYOND CLEAR ZONES BOTH ROADWAYS

Note: Anchor Plates Required Only On End Units Abutting Crash Cushions.

See Sheet 2
**SHOULDER BARRIER ON UNDIVIDED FACILITIES**

- Anchor Piers Required Front Side Only on Units Adapting Crash Cushion (See Sheet 4).

**SHOULDER BARRIER ON DIVIDED FACILITIES**

**INTERIOR MEDIAN BARRIER**

**CONTINUATION OF RUNS OF BARRIER WITH DISSIMILAR CONNECTORS**

Note: Schemes on this sheet based on 12' Units.
See Sheet Nos. 7 & 8 for Bridge Applications with Barrier Types K.
**LEGEND**

- □ Indicate Number Of Bolt Anchor Or Stakes

**FREE STANDING UNITS (INDEX NO. 413 & 415)**

### 45 MPH OR LESS

- Edge Of Traffic Lane
- Free Standing Units
- Crash Cushion
- Barrier Type K
- 3 Units
- 4 Units
- 5 Units Slabbed
- 

### 50 MPH OR GREATER

- Edge Of Traffic Lane
- Free Standing Units
- Crash Cushion
- Barrier Type K
- 3 Units
- 4 Units
- 5 Units Slabbed
- 6 Units

**APPRAOCH SHOULDER BARRIER ON UNDIVIDED FACILITIES**

- Free Standing Barrier K
- 6 Units
- 

**APPRAOCH SHOULDER BARRIER ON DIVIDED FACILITIES**

- Free Standing Units (Index No. 413 & 415)
- 18.75
- Barrier Type K
- 18.75
- 

**INTERIOR MEDIAN BARRIER**

**CONTINUATION OF BARRIER = INDEX NO. 413 & 415 BARRIERS TO BARRIER TYPE K**

**BARRIER TYPE K ON BRIDGES AND APPROACH SLABS**

**NOTE:**

- See Sheet No. 8 For Departure Shoulder Applications.
DEPARTURE (TRAILING) SHOULDER BARRIER ON UNDIVIDED FACILITIES

50 MPH OR GREATER

DEPARTURE (TRAILING) SHOULDER BARRIER ON DIVIDED FACILITIES

CONTINUATION OF BARRIER • FROM BARRIER TYPE K TO INDEX NOS. 413 & 415 BARRIERS

BARRIER TYPE K ON BRIDGES AND APPROACH SLABS

LEGEND

Dots Indicate Number Of Bolt Anchors Or Stakes

Note:
See Sheet No. 7 For Approach Shoulder Applications.
See Sheet No. 7 For Interior Median Applications.
SHIELDING WALL ENDS WITH REDIRECTIVE CRASH CUSHIONS (REDIRECTIVE OPTION)
(CONTINUATION ON SHEET 10)
UNIDIRECTIONAL - SEPARATED TRAFFIC

TEMPORARY BARRIER WALL - TAU II Crash Cushion

Flare Vertices:
1.10 Or Flatter For 45 mph
1.15 Or Flatter For 50-70 mph

TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED OUTSIDE OPPOSING LANE CLEAR ZONE OR ONE-WAY TRAFFIC

SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)

WALL END TREATMENT WHEN SHIELDED BY TAU II CRASH CUSHION (INDEX NO. 441)

NOTES

1. For alignment and length of need see Sheets 2 and 5 through 8.
2. Anchor plates required only on units abutting crash cushions.

SHIELING WALL ENDS WITH REDIRECTIVE CRASH CUSHIONS (REDIRECTIVE OPTION)
When the approach end of a TRITON BARRIER system is located within the clear zone and approach speeds are 45 mph or less, the TRITON BARRIER can serve as its own crashworthiness and treatment by installing water barriers from first section and by deflection the connecting pin on the exposed end. For all other speeds either fill the end section and shield or shield the system with steel frame to the clear zone.

TRITON BARRIER SYSTEM

SUPPLEMENTAL GENERAL NOTES FOR THE TRITON BARRIER

1. The system presented on this standard drawing (Index) under the label TRITON BARRIER is a proprietary design by Energy Absorption Systems, Inc. and is marketed under the tradename TRITON BARRIER.

2. This Index provides the general graph and information necessary to fabricate component parts of the TRITON BARRIER and their incorporation as a whole system for Department standard qualitative.

3. The TRITON BARRIER system can be installed as a free standing system or in conjunction with other Department temporary and permanent barrier systems, exclusive of other proprietary water filled barrier systems.

4. Connections between the TRITON BARRIER and other barrier systems shall be as shown in the TRITON BARRIER TRANSITION HARDWARE ASSEMBLIES. Variation from these connections shall be as detailed in the plans or as provided by the manufacturer.

5. The TRITON BARRIER sections or sections are not to be used as pedestrian or motor vehicle cross fuse block, whether connected, unconnected, filled or unfilled.

6. Sections shall be installed in alternating white and work zone safety orange color.

7. The TRITON BARRIER system shall be placed for under the contract unit price barrier (Temporary) with TRITON Filled, LF, and shall be full separation for furnishing and handling TRITON BARRIER. In accordance with this Index, with the plans and with the manufacturer's detailed drawings, procedures and specifications. The cost for transportation hardware detailed in this Index shall be included in the contract unit price for the barrier. TRITON module considered a part of the system crashworthiness and treatment shall be included in the price measure other components and terminals, crash cushions or other attachment required for use of the TRITON barrier will not be included in the contract unit price for the barrier.

SUPPLEMENTAL DESIGN NOTES AND GUIDELINES FOR THE TRITON BARRIER

1. The length of each system can be used for work zone speeds of 60 mph or less. Transition hardware can be used in speeds where speeds are limited to 45 mph or less.

2. Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the TRITON BARRIER, and unless otherwise are exclusive, the TRITON BARRIER need not be bid against other proprietary item.

GENERAL NOTES

1. This standard drawing (Index) presents proprietary temporary water filled barrier design and is produced by the Florida Department of Transportation acting for use by the Department and its subagents.

2. Any system presented on this Index can be used as a temporary barrier in traffic control zone and other Department permitted traffic control zones but cannot be warranted as a permanent barrier.

3. All system shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications; however, installation will be limited to the application shown on this Index, except when otherwise detailed in the plans or approved by shop drawings or approved by the Engineer.

4. Water filled barrier systems are to be used only as longitudinal systems. A longitudinal system may include cross-purposing work areas barriers within low speed intersection only where the approach longitudinal system deflection and traffic specified around the work zone deflection.

5. One type proprietary water filled barrier system is not to be used in conjunction with another type proprietary water filled barrier systems, except when specifically called for and detailed in the plans.

6. All water filled barrier systems sections shall be interconnected with manufacturer and Department approved crash荷兰 connections, i.e., no individual sections or interconnected sections of unobstructed length are to stand alone, except when specifically called for and detailed in the plans, or for specific application of interconnected systems around work area shown on this Index.

7. Water filled barrier systems are not to be used on work areas with closing speed exceeding 0.05 (speeder than 1:22), including the surfaces within the design deflection area behind the barrier.

8. Water filled barrier systems are not to be used on grades greater than 5%, nor placed over surface Irregularities that cause vertical deflection.

9. Water filled barrier systems are not permitted on bridge or approach abutments; however, they can be placed over box culverts, including those of bridge length, where design deflection area is acceptable. The system should be used on concrete piers only where the Engineer determines that the dynamic loading of pavement abutments will not cause the system to crash out of alignment.

10. Temporary water filled barrier systems are to be placed for under the contract unit price barrier (Temporary) with TRITON Filled, LF, if the plans specify Barrier (Temporary). Water Filled, installation with concrete barriers will not be permitted. For additional information see the supplemental general note for the individual barrier system.

Typo: Steady-Burn flags are to be mounted on top of all water filled barrier systems along temporary work zones. The flags are to be placed at centerline and center of temporary work zones, as defined on each section. Light shall be paid for under the contract unit price for Light (Temporary Barrier Type I) or (Type C Steady-Burn) LED

DESIGN NOTES

1. The TRITON and GUARDIAN water filled barriers are certified by the Federal Highway Administration to be innovative temporary barriers, and may be used as such toward compliance with the performance of innovative barrier required in the following barrier by Federal Highway Projects.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TEMPORARY WATER FILLED BARRIERS

Contract No. 126-90

General Notes

Contract Unit Price

Signature

Drawing No.

Drawn By

Approved By

1 of 4

416
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TEMPORARY WATER FILLED BARRIERS

TRITON BARRIER SYSTEM LENGTHS AND DEFLECTIONS

DETERMINING THE IMPACT ANGLE CURVE TO APPLY

Except where the plans call for the use of a certain impact angle curve, or where a certain impact angle is anticipated by the specific conditions, the impact angle curve to be used in determining impact severity will be selected on the following basis:

- Barrier Location
- Graph Curve
- Parallel to tangent roadway: 5°
- Parallel to and on the inside of roadway curve: 5°
- Standard line shift or drop (5° & 10°)
- Parallels to and on the outside of roadway curve: 5° (10° [20°])
- Approach Flared end ejection on inside of roadway curve: 10°
- Approach Flared end ejection on approach tangent roadway: 10°
- Approach Flared end ejection on outside of roadway curve: 10° (15° [25°])
- Max. Curvature (Mid. Radius), High Speed Facilities
- [] Max. Curvature (Mid. Radius), Low Speed Facilities

IMPACT SEVERITY DETERMINATION FOR VEHICLES

Impact Severity and Lateral Deflection Distances

TRITON BARRIER SYSTEM LENGTHS

SYSTEM LENGTHS FOR UNIDIRECTIONAL OR BIDIRECTIONAL TRAFFIC

Notes: For Departure Line requirements see Index No. 400.

When TRITON BARRIER is used as its own end treatment fill all sections with water ballast except the approach and sections 1. Do not use connecting pipe on the exposed end of the end sections.

Notes: Curves for Regions 'A' and 'B' apply to vehicles ≥ 4000 lbs.

- Critical impact severity level created by higher impact angles not included in worst zone.

SINGLE ROW TRITON BARRIER INSTALLATION DEFLECTION CURVES
TRANSITION NOTES

1. Transitions shown on this sheet are limited to speeds of 45 mph or less.
2. Transition hardware can be placed on either end of TRITON section.
3. Transition hardware can be located on left or rigid side of roadway, rigid side shown.
4. TRITON Barrier end sections must be filled with water when using transition hardware assemblies.
5. Install transition hardware in accordance with the manufacturer's recommendations and specifications.
SUPPLEMENTAL GENERAL NOTES FOR THE GUARDIAN BARRIER

1. The barrier units are proprietary designs by Safety Barrier Systems and are marketed under the trade name GUARDIAN Safety Barrier.

2. This Index provides general and information necessary to field identify the water filled polyethylene elongated barrier module and the module frame and basic connections, but does not identify the connection of the module to the frame and the method of installation. Any use of the GUARDIAN must be in accordance with the details on the plans, or by shop drawing approval or by the Engineer in accordance with plan detail.

3. The GUARDIAN modules are proprietary to Safety Barrier Systems and are marketed under the trade name GUARDIAN Barriers.

4. The GUARDIAN modules can only be used in a stand alone system, i.e., not connected to other types of barrier systems.

5. The GUARDIAN can only be used as a longitudinal barrier on the State's existing highway systems. Any longitudinal system must have a minimum of eleven (11) longitudinally connected modules in sequence of and following the length of need. In no case can the longitudinal run of barrier be less than 33 modules.

6. The approach end of the GUARDIAN must either extend to the outer limit of the clear zone, be hedged, or not connected to another barrier or abutting feature.

7. GUARDIAN barrier systems shall be paid for under the contract unit price for Barrier (Temporary) and shall be full compenation for furnishing and installing GUARDIAN barrier in accordance with this Index, with the plans and with the manufacturer's detailed drawings, procedures and specifications. Any crashworthy and terminal crash cushion or other shielding required for use of the GUARDIAN barrier shall not be included in the contract unit price for the barrier.

SUPPLEMENTAL DESIGN NOTES FOR THE GUARDIAN BARRIER

1. At time of publication of this standard no crash test data was available to provide a crashworthy and terminal design using the barrier modules. Only the requirement for eleven (11) interconnected modules providing and following the length of need, based on available crash test data.

2. Systems included in any maintenance of traffic plan will require detailed location and placement information.

3. Currently the Department does not recognize other proprietary systems as being equally suitable alternatives to the GUARDIAN barrier, and until such alternatives are available, the GUARDIAN barrier need not be bid against other proprietary systems.

GUARDIAN BARRIER WITH 350 HIGHWAY KIT

SUPPLEMENTAL GENERAL NOTES FOR THE GUARDIAN BARRIER

1. The barrier units are proprietary designs by Safety Barrier Systems and are marketed under the trade name GUARDIAN Safety Barrier.

2. This Index provides general and information necessary to field identify the water filled polyethylene elongated barrier module and the module frame and basic connections, but does not identify the connection of the module to the frame and the method of installation. Any use of the GUARDIAN must be in accordance with the details on the plans, or by shop drawing approval or by the Engineer in accordance with plan detail.

3. The GUARDIAN modules are proprietary to Safety Barrier Systems and are marketed under the trade name GUARDIAN Barriers.

4. The GUARDIAN modules can only be used in a stand alone system, i.e., not connected to other types of barrier systems.

5. The GUARDIAN can only be used as a longitudinal barrier on the State's existing highway systems. Any longitudinal system must have a minimum of eleven (11) longitudinally connected modules in sequence of and following the length of need. In no case can the longitudinal run of barrier be less than 33 modules.

6. The approach end of the GUARDIAN must either extend to the outer limit of the clear zone, be hedged, or not connected to another barrier or abutting feature.

7. GUARDIAN barrier systems shall be paid for under the contract unit price for Barrier (Temporary) and shall be full compenation for furnishing and installing GUARDIAN barrier in accordance with this Index, with the plans and with the manufacturer's detailed drawings, procedures and specifications. Any crashworthy and terminal crash cushion or other shielding required for use of the GUARDIAN barrier shall not be included in the contract unit price for the barrier.

SUPPLEMENTAL DESIGN NOTES FOR THE GUARDIAN BARRIER

1. At time of publication of this standard no crash test data was available to provide a crashworthy and terminal design using the barrier modules. Only the requirement for eleven (11) interconnected modules providing and following the length of need, based on available crash test data.

2. Systems included in any maintenance of traffic plan will require detailed location and placement information.

3. Currently the Department does not recognize other proprietary systems as being equally suitable alternatives to the GUARDIAN barrier, and until such alternatives are available, the GUARDIAN barrier need not be bid against other proprietary systems.
GENERAL NOTES FOR THE YODOCK BARRIER

1. The longitudinal traffic barrier system presented on this standard drawing Index and the label YODOCK are proprietary designs by THE YODOCK RAIL COMPANY and are marketed under the trade name YODOCK BARRIER.

2. This Index provides general schematics and information necessary to identify the water-filled polyethylene expanded barrier module (Energy Disperance Cell) and the module frame and its connections, but does not identify the components of the module and frame connected into a whole system. Any use of the YODOCK Barrier must be in accordance with the details on the plans, or by plan drawing approval by the Engineer in absence of plan detail.

3. The Model 200 barrier elements are approved for use on highways with design speeds. The Model 200 barrier is intended to be used on highways with a design speed of 45 mph or less.

4. The YODOCK longitudinal traffic barrier system shall be used only in a stand-alone system i.e., not connected to other types of barrier systems.

5. The YODOCK longitudinal traffic barrier system must be placed under the contract unit price for barrier full compensation for furnishing and installing YODOCK barrier in accordance with this Index, with the plans, and with the manufacturer's detailed drawings, procedures and specifications. Any cradling and terminals, crash cushions or other accessories required for use of the YODOCK barrier will not be included in the contract unit price for the barrier.

6. The approaches used with the YODOCK barrier will be designed to provide a sufficient distance between the edge of the module and hazards in accordance with the table below.

<table>
<thead>
<tr>
<th>Vehicle Speed (mph)</th>
<th>YODOCK 200 BARRIER</th>
<th>YODOCK BOOM BARRIER</th>
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<tr>
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7. The YODOCK longitudinal traffic barrier system shall be placed under the contract unit price for barrier (Temporary Water Filled) and shall be fully compensated for furnishing and installing YODOCK barrier in accordance with this Index, with the plans, and with the manufacturer’s detailed drawings, procedures and specifications. Any cradling and terminals, crash cushions or other accessories required for use of the YODOCK barrier will not be included in the contract unit price for the barrier.

DESIGN NOTES FOR THE YODOCK BARRIER

1. Schematics included in any maintenance of traffic plan will require detailed location and placement information.

2. Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the YODOCK barrier, and until such alternatives are available, the YODOCK barrier need not be bid against other proprietary items.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TEMPORARY WATER FILLED BARRIERS

[Diagram and schedules]
INERTIAL CRASH CUSHION ARRAYS

NOTES FOR TEMPORARY INERTIAL CRASH CUSIONS

1. The crash cushion arrays shown on this index can be used on the State highway system only for shielding temporary concrete barrier wall end segments. These arrays cannot be used for restrictive crash cushion called for in the plans, and are not eligible for VEDCP considerations.

2. Inertial crash cushion arrays are getting type crash cushions, and a clear runout area back of the array must be provided. The array shown can be used for outer roadway applications, exclusive of gore areas, and for median applications where the median width is sufficient to provide clear zone width between the back side module and the near lane of the opposing traffic.

3. Inertial crash cushion modules shall be installed in accordance with the manufacturer’s specifications and recommendations, and can be constructed of either new or functionally sound used modules.

4. Anchorage of barrier wall end segment is not required.

5. A yellow post mounted Type I Object Worker shall be centered 3' in front of the nose of all crash cushion arrays. Mounting hardware shall be in accordance with Index Nos. 11861 and 11865. The cost of the Object Worker shall be included in the cost of the module.

6. Temporary inertial crash cushions are to be paid for per module under the contract unit price for Impact Attenuator Module (Inertial) Temporary, EA.
I. The energy absorbing system represented on this standard drawing is a proprietary design by Brakemaster Systems Inc. and marketed under the trade name Brakemaster 350. Any infringement on the rights of the designer shall be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation acting for users by the Department and its subsidiaries. This standard drawing provides the general information and drawings necessary to identify component parts of the Brakemaster 350 system and their incorporation into a whole system.

3. This standard drawing is sufficient for plans details for the Brakemaster 350 system to be assembled and installed in accordance with the manufacturer’s detailed drawings, procedures and specifications.

4. The Brakemaster 350 system is suitable for speeds to 60 mph.

5. The Brakemaster 350 system shall be located on a slope of 1:20 or flatter and not closer than 100 ft to any traffic area.

6. The Brakemaster 350 system shall be located at the edge of a roadway or appurtenant right of way.

7. The "fall end" section represented on this drawing applies to connections with single or double faced "V" beam guardrail, and includes the requirement for shop drawings unless the panel otherwise calls for such detail.

8. Metallic component shall meet the golographic requirement for paint. Index No. 400.

9. A yellow Type I Object Marker shall be centered 3 ft in front of the nose of the Brakemaster 350 system. Mounting hardware shall be in accordance with Index No. 1860 and 1865. The cost of the Object Marker shall be included in the cost of the BRAKEMASTER 350.

10. The Brakemaster 350 system will be paid for under the contract unit price for Impact Attenuator Vehicular (Brakemaster 1, Florida Department of Transportation).
1. **Bidirectional System**

   - **Brakemaster 350**:
     - **Plan**
     - **Right Side Elevation**
     - **Left Side Elevation**

   - **NOTE**: Notice the bolt arrangement for strap and panel connections.

2. **Brakemaster 350 System**

   - **Limits Of Payment**
   - **Object Marker**
   - **Object Marker Of Nose And Bumper**

3. **Plan Modification For Connection To Guardrail With Timber Posts**

4. **Concrete Anchor Shown**

5. **Double Faced Guardrail Only**

6. **Brakemaster 350 SAFETY - Limits Of Payment For Attenuator**

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**BRAKEMASTER 350**

**Signed By**

- **Drawn By**: [Signature]
- **Checked By**: [Signature]
- **Approved By**: [Signature]
ANCHOR ASSEMBLY, EMBEDDED BRS

ANCHOR ASSEMBLY, FOUNDATION TUBE

DIAPHRAGM, BRS

BRAKE/CABLE REPLACEMENT

Pipe 2" B. 50 45 x 2 1/2

Foot (36x36)

Cable Replacement Required When Cable Sleeve Exposed. See "Guide Notes and Guidelines", Note No. 2. For Additional Information.
### Cylinder Requirements

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<th>Length</th>
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### GENERAL NOTES

1. The energy absorbing unit represented on this standard drawing is a proprietary design by Energy Absorber Systems, Inc. and licensed under the trade name REACT, short for ReaAble Energy Absorbing Crash Terminal. Any interpretation of the design shall be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation solely for use by the Department and its licensee. This standard drawing provides the general graphic and information necessary to install energy absorbing component parts of the REACT 350 and their incorporation into a unit.

3. This standard drawing is intended for use in a free standing unit that will not be used in a manner where pedestrian, vehicle, or vehicular activity will be present. For these reasons, the REACT 350 is designed for use in a stand-alone unit for application where an existing hazard remains.

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

5. Concrete foundations shall be constructed with 4000 psi. compressive strength concrete.

6. The REACT 350 is suitable for speeds up to 60 mph.

7. The REACT 350 shall be constructed on concrete pads 1:4:x or as needed.

8. On facilitates with speeds of up to 45 mph, the REACT 350 can be used in any location provided by the plans or by Department approval. On facilities with speeds of 45-60 mph, units shall not be used in a manner where pedestrian, vehicle, or vehicular activity will be present. For these reasons, the REACT 350 is designed for use in a stand-alone unit where an existing hazard remains.

9. Concrete foundations shall be constructed with 4000 psi. compressive strength concrete.

10. The REACT 350 is designed to withstand forces of 16,000 hp.

### DESIGN NOTES

1. The REACT 350 is designed to cushion automobile and truck hits and to redirect automobile and truck hits. The number of cylinders to be used in an individual unit will be determined by the design speed, except where the Engineer determines that fewer pads are more applicable.

2. The REACT 350 is a reusable energy absorber that is particularly suited to redirecting hazards in areas with a history of frequent automobile and truck hits. Units are designed for use in an individual unit will be determined by the design speed, except where the Engineer determines that fewer pads are more applicable.

3. The REACT 350 is a reusable energy absorber that is particularly suited to redirecting hazards in areas with a history of frequent automobile and truck hits. Units are designed for use in an individual unit will be determined by the design speed, except where the Engineer determines that fewer pads are more applicable.

4. The REACT 350 is a reusable energy absorber that is particularly suited to redirecting hazards in areas with a history of frequent automobile and truck hits. Units are designed for use in an individual unit will be determined by the design speed, except where the Engineer determines that fewer pads are more applicable.

5. The REACT 350 is a reusable energy absorber that is particularly suited to redirecting hazards in areas with a history of frequent automobile and truck hits. Units are designed for use in an individual unit will be determined by the design speed, except where the Engineer determines that fewer pads are more applicable.

6. The REACT 350 is a reusable energy absorber that is particularly suited to redirecting hazards in areas with a history of frequent automobile and truck hits. Units are designed for use in an individual unit will be determined by the design speed, except where the Engineer determines that fewer pads are more applicable.

7. The REACT 350 is a reusable energy absorber that is particularly suited to redirecting hazards in areas with a history of frequent automobile and truck hits. Units are designed for use in an individual unit will be determined by the design speed, except where the Engineer determines that fewer pads are more applicable.

8. The REACT 350 is a reusable energy absorber that is particularly suited to redirecting hazards in areas with a history of frequent automobile and truck hits. Units are designed for use in an individual unit will be determined by the design speed, except where the Engineer determines that fewer pads are more applicable.

9. The REACT 350 is a reusable energy absorber that is particularly suited to redirecting hazards in areas with a history of frequent automobile and truck hits. Units are designed for use in an individual unit will be determined by the design speed, except where the Engineer determines that fewer pads are more applicable.
GENERAL NOTES

1. The energy absorbing system represented on this standard drawing is a proprietary design by Energy Absorption Systems, Inc. and marketed under the trade name QuadGuard. Any infringement on the rights of the designer shall be the sole responsibility of the user.

2. This standard drawing is produced by the Florida Department of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphically and/or information necessary to fully identify component parts of the QuadGuard System and their incorporation into a whole system.

3. This standard drawing is offered for proposal/quotes for the QuadGuard system as a free-standing system or integrated with other fixed barrier systems, and specifies the requirement for shop drawing submittals unless the plans otherwise call for such submittals.

The QuadGuard System, when installed as the primary backup to be used on Florida Department of Transportation projects, the use of special back-up will be permitted, but must be suitably filled and detailed in the zone for the specific application. Concrete back-up may be used in accordance with the manufacturer's details and transition hardware requirements.

4. The QuadGuard system shall be assembled and fabricated in accordance with the manufacturer's detailed drawings, procedures and specifications.

5. The QuadGuard is available in 24", 30", and 36" nominal widths for use with 60", 90", and 90" nominal widths for wide lanes.

6. Only the QuadGuard Type I and Type II cartridges shall be used in bag and nose assemblies as described in the "BAY SELECTION GUIDELINES" table.

7. Cemen concrete foundations and concrete back-up wllls shall be constructed with 4000 psi min. compressive strength.

8. The QuadGuard shall be mounted on clay pipes (d 8") or flatter.

9. All metallic components shall meet the galvanizing requirements for quan<rils, Index No. 400. With the QuadGuard, area specific requirements will be included in the QuadGuard system.

10. The QuadGuard system shall be centered in front of the road shoulder to be mounted hardware shall be in accordance with Index No. 400. The use of the Object Marker shall be included in the QuadGuard system.

II DESIGN NOTES AND GUIDELINES

1. The QuadGuard System is designed to absorb automobile and/or heavy truck动能 energy and redirect automobile and/or heavy truck动能 energy. The QuadGuard is designed to absorb fixed hazards or the end of other temporary and permanent barrier systems. The number of units to be used in a specific location will be determined by the design engineer, except where the engineer determines that another system is more applicable. The unit width will be determined by the width of the object to be absorbed or by the connecting barrier system. The QuadGuard is designed as a free-standing system. The QuadGuard system is designed to absorb automobile and/or heavy truck动能 energy.

2. The QuadGuard is a restorable system that is particularly suited to absorbing low speed automobile and high volume traffic, high volume traffic, and/or traffic with a history of traffic volume and vehicle speed. The QuadGuard is particularly suited to absorbing low speed automobile and high volume traffic, and/or traffic with a history of traffic volume and vehicle speed.

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BAY SELECTION GUIDELINES

<table>
<thead>
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<th>Speed (mph)</th>
<th>No. Of Bays</th>
<th>No. Of Cartridges</th>
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<tr>
<td>75</td>
<td>1</td>
<td>1</td>
<td>0.05</td>
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</tbody>
</table>

The QuadGuard System is available in 24", 30", and 36" nominal widths for use with 60", 90", and 90" nominal widths. The QuadGuard System is available in 24", 30", and 36" nominal widths for use with 60", 90", and 90" nominal widths.

QuadGuard IS units can be substituted for conventional 9-bay units.
The foundation depicted on this sheet is applicable to QuadGuard systems for both narrow and wide hazards, 2'-6" apart shown.

For the number of bays required see Table Sheet 1.

Provision shall be made for rear fender grous to slide rearward up to 2'-6" min.

For barrier connections see "TRANSITIONS" Sheet Nos. 4 and 5.

NOTES

PERMANENT FOUNDATION FOR TENSION STRUT BACKUP ASSEMBLY
RIGID FOUNDATION NOTES

1. The reinforced portland cement concrete (RPC) foundation is designed to be the temporary QuadGuard transportable system. The RPC foundation shall be constructed of concrete with a minimum compressive strength of 4000 psi, or a minimum of 4000 psi for the concrete mix, as specified in the General Notes. The QuadGuard shall be anchored exclusively with the MP-3 anchor system supplied with the QuadGuard unit, unless otherwise specified and approved by the QuadGuard manufacturer.

2. The nonreinforced portland cement concrete (PCC) foundation shall be Class II concrete, having a minimum compressive strength of 4000 psi for the concrete mix, as specified in the General Notes. The QuadGuard shall be anchored exclusively with the MP-3 anchor system supplied with the QuadGuard unit, unless otherwise specified and approved by the QuadGuard manufacturer.

3. For additional information see the General Notes.

REINFORCED AND NONREINFORCED CONCRETE PAD SYSTEMS
CEMENT CONCRETE FOUNDATIONS

TEMPORARY FOUNDATIONS
Standard thrle-beam system is not furnished with system lap panel in direction of adjacent traffic.

Limit of pay for QuadGuard system.

The diagram shows QuadGuard transitions for connecting the QuadGuard to any guardrail system. Points of connection include:

- **QuadGuard 2'-0"/2'-6'/3'-0" to W-Beam Guardrail**
- **QuadGuard 5'-9"/7'-6" to W-Beam Guardrail**
- **QuadGuard 5'-9"/7'-6" to Three-Beam Guardrail**
- **QuadGuard 2'-0"/2'-6'/3'-0" to Three-Beam Guardrail**

**NOTES**

1. Transitions are required when connecting the QuadGuard to any guardrail system.
2. Post过渡件 are required when connecting QuadGuard to any guardrail system.
3. Post a guardrail system is required when connecting the QuadGuard to any guardrail system.
4. Post过渡件 are required when connecting the QuadGuard to any guardrail system.
5. Transition panels are required when connecting the QuadGuard to any guardrail system.

**SPECIAL STEEL POST**

- **W-Beam Transition**
  - Posts #1 and #2: Posts and offset blocks as shown below.
  - Posts #1 and #2: Posts and offset blocks as shown below.

- **Three-Beam Transition**
  - Posts #1 and #2: Posts and offset blocks as shown below.
  - Posts #1 and #2: Posts and offset blocks as shown below.

**Post And Offset Block Configurations**

- **QuadGuard TO GUARDRAIL TRANSITIONS**
- **SECTION AA (POSTS #1 AND #2)**
- **SECTION BB (POSTS #3 THRU #9)**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**Channels**

- **W-Beam Quadrant**
  - Timmer Post Special
  - Timber Post Offset Blocks

- **SINGLE BEAM**
  - ALL SYSTEM WIDTHS
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **STEEL OR TIMBER POST**
  - All Steel Widths
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **Steel or Timber Post**
  - All Steel Widths
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **Steel or Timber Post**
  - All Steel Widths
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

**Sections**

- **Transition Panel**
  - QuadGuard to W-Beam Shown

**Limit of Pay for QuadGuard System**

- For W-Beam or Three-Beam, W-beam Shown.

**PLAN**

- **ELEVATION**

**Drawn By**

- **Checked By**

**MFG/VG 09/97**

**HKH 09/97**

**NOTE:**

1. Transition panels are required when connecting the QuadGuard to any guardrail system.
2. Post-connection is required for W-beam or Three-beam, W-beam shown.
3. Post #2 is not bolted directly to transition panel(s).
4. Transition panels are required when connecting the QuadGuard to any guardrail system.
5. Transition panels are required when connecting the QuadGuard to any guardrail system.

**POSTS AND OFFSET BLOCKS FOR LOCATIONS #1 AND #2**

- **SPECIAL STEEL POST A**
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **SPECIAL STEEL POST B**
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **SPECIAL STEEL POST C**
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**Channels**

- **W-Beam Quadrant**
  - Timmer Post Special
  - Timber Post Offset Blocks

- **SINGLE BEAM**
  - ALL SYSTEM WIDTHS
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **STEEL OR TIMBER POST**
  - All Steel Widths
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **Steel or Timber Post**
  - All Steel Widths
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **Steel or Timber Post**
  - All Steel Widths
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

**Sections**

- **Transition Panel**
  - QuadGuard to W-Beam Shown

**Limit of Pay for QuadGuard System**

- For W-Beam or Three-Beam, W-beam Shown.

**PLAN**

- **ELEVATION**

**Drawn By**

- **Checked By**

**MFG/VG 09/97**

**HKH 09/97**

**NOTE:**

1. Transition panels are required when connecting the QuadGuard to any guardrail system.
2. Post-connection is required for W-beam or Three-beam, W-beam shown.
3. Post #2 is not bolted directly to transition panel(s).
4. Transition panels are required when connecting the QuadGuard to any guardrail system.
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**POSTS AND OFFSET BLOCKS FOR LOCATIONS #1 AND #2**

- **SPECIAL STEEL POST A**
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **SPECIAL STEEL POST B**
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **SPECIAL STEEL POST C**
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**Channels**

- **W-Beam Quadrant**
  - Timmer Post Special
  - Timber Post Offset Blocks

- **SINGLE BEAM**
  - ALL SYSTEM WIDTHS
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **STEEL OR TIMBER POST**
  - All Steel Widths
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **Steel or Timber Post**
  - All Steel Widths
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

- **Steel or Timber Post**
  - All Steel Widths
  - TIMBER POST
  - WITH TIMBER OFFSET BLOCKS

**Sections**

- **Transition Panel**
  - QuadGuard to W-Beam Shown

**Limit of Pay for QuadGuard System**

- For W-Beam or Three-Beam, W-beam Shown.

**PLAN**

- **ELEVATION**

**Drawn By**

- **Checked By**

**MFG/VG 09/97**

**HKH 09/97**

**NOTE:**

1. Transition panels are required when connecting the QuadGuard to any guardrail system.
2. Post-connection is required for W-beam or Three-beam, W-beam shown.
3. Post #2 is not bolted directly to transition panel(s).
4. Transition panels are required when connecting the QuadGuard to any guardrail system.
5. Transition panels are required when connecting the QuadGuard to any guardrail system.
**Concrete Baffle Wall**

**Transition Panel**
(QoquadGuard To Barrier Wall)

**Concrete Barrier Wall**

**Edges Of Barrier Face**

**Barrier Wall Width**

**BIDIRECTIONAL PLAN**

**BIDIRECTIONAL ELEVATION**

**DIMENSIONAL VALUES FOR BIDIRECTIONAL APPLICATIONS WITH CONCRETE BARRIER WALL**

<table>
<thead>
<tr>
<th>System Width</th>
<th>A</th>
<th>B</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>24'</td>
<td>42</td>
<td>48</td>
<td>56</td>
</tr>
<tr>
<td>30'</td>
<td>48</td>
<td>56</td>
<td>64</td>
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**Transition Panel**
(QoquadGuard To Barrier Wall)

**Concrete Barrier Wall**

**BIDIRECTIONAL SECTION**

**UNIDIRECTIONAL PLAN**

**UNIDIRECTIONAL ELEVATION**

**DIMENSIONAL VALUES FOR UNIDIRECTIONAL APPLICATIONS WITH CONCRETE BARRIER WALL**

<table>
<thead>
<tr>
<th>System Width</th>
<th>A</th>
</tr>
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<tbody>
<tr>
<td>24'</td>
<td>42</td>
</tr>
<tr>
<td>30'</td>
<td>48</td>
</tr>
</tbody>
</table>

**Bidirectional Plan**

**Unidirectional Plan**

**Bidirectional Section**

**Unidirectional Section**

**ALIGNMENT DETAIL**

**Bidirectional Plan**

The axis of the QuadGuard relative to concrete barriers will be established on a site-specific basis. The QuadGuard supplier shall furnish dimensional data for backfill between the barrier wall end and the system foundation, and for the alignment between the face of the barrier wall and the rear diaphragm, where dimensions other than those above apply.

**QuadGuard SYSTEM**

**5'-9" / 7'-6"**

**State of Florida Department of Transportation**

**QuadGuard TO CONCRETE BARRIER WALL TRANSITIONS**

Barrier wall free ends must be reinforced in accordance with Index No. 40 and temporary walls must be adequately anchored for proper impact performance in accordance with Index No. 45.
GUARDRAIL TRANSITION TO TEMPORARY DIVERSION OR DETOUR STRUCTURES

Note: Timber or steel posts may be used. Timber posts shown.

* Transition flare flanges
  1 x 0 Or Fuller for 45 mph
  1 x 0 Or Fuller for 50-70 mph
GENERAL NOTES

1. The energy absorbing system represented on this attended drawing is a proprietary design by SYRO Inc. and covered under the trade name ADIEU 350. Any infringement on the rights of the designer shall be the sole responsibility of the user.

2. This attended drawing is produced by the Florida Department of Transportation acting for use by the Department and the licensee. This attended drawing contains the general and informational necessary to identify component parts of the ADIEU 350 and their incorporation into a whole system.

3. This attended drawing is sufficient for pipe details for the ADIEU 350 installed in connection with permanent or temporary concrete barrier walls, and precludes the requirement for shop drawing submissions unless the plans otherwise call for such submissions.

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

5. The ADIEU 350 can be located on concrete bases, piers, or concrete. Driving of anchor pins into compacted base or self-support will be permitted while drilling will be necessary for hard or concrete piers. See schedule left for anchor pin requirements.

6. The ADIEU 350 is suitable for speeds 0-60 mph.

7. The ADIEU 350 shall be located parallel to the approach travel lane(s) or flat ground areas. Until there is further development in the application of the ADIEU 350, the system is not to be located in narrow median, grooves or locations where frequent vehicle impacts can be expected.

8. All modules are slotted in place and interlocking.

9. Due to the overall unit height of 4', which exceeds the drivers' height of eye, caution is to be exercised in locating the ADIEU 350 to avoid blockage of required sight distance.

10. Attach apertures angles (connection brackets) to ADIEU 350 base with 2 1/2" dia. x 25" long HD hex bolts. Attach apertures angle to barrier wall with 6 field drilled 1/2" dia. x 6" long hex head anchors.

11. A yellow Type 1 Object Marker shall be centered in front of the face of the ADIEU 350. Mounting hardware shall be in conformance with Index Nos. 3886 and 4885. The coat of the Object Marker shall be included in the coat of the ADIEU 350.

12. Temporary ADIEU 350 systems can be reused provided the base has the structural integrity and surface qualities of new asphalt. The modules are condition new, relubricated grease can be made up of the new and used components. New and used grease can be purchased, leased, rented, or borrowed between projects.

13. The permanent ADIEU 350 will be paid for under the contract unit price for Impact Attenuator Vehicle (ADIEU), $48 per module or $216 per set of 3 modules. The contract unit price for ADIEU 350 is $48 per set of 3 modules.

DESIGN AND MAINTENANCE NOTES AND GUIDELINES

1. The ADIEU 350 is designed to absorb automobile end-on hits and to deflect automobile sides hits within the length of roadwall allowing the end of permanent or temporary concrete barrier walls.

2. The ADIEU 350 is a retrievable system that is particularly suited to existing concrete barrier wall ends. The 40' unit is suitable for speeds 0-45 mph, the 50' unit is suitable for speeds 50-60 mph.

3. The speed of the system (1.5 to 5 modules) is a design, each module (cartridge) has a mass of 1300 lbs. Care must be exercised in locating the system where debris from the car may pass a hazard. Cartridge modules or their mechanical components must be removed to replace damaged downstream modules.

4. The ADIEU 350 will require close monitoring for damage that will open sighted access, and cost repair is essential to prevent measurable absorption into modules. Installation

5. Currently, the Department does not recognize other proprietary systems as being equally suitable alternative to the ADIEU 350, and until such time that the ADIEU 350 will be used against other proprietary systems. However, the ADIEU 350 and other approved temporary corrective crash cushion systems exceed the minimum requirements for a specific location, the approved crash cushion will be considered optional-graded and paid for as described in General Notes 5 above.

GENERAL SYSTEM FEATURES AND GUIDELINES
TYPICAL APPLICATIONS

1" INTERSECTIONS OR DEAD ENDS
PERMANENT APPLICATIONS

TEMPORARY ROADWAY CLOSURES
See Index No. 630 For Traffic Control Through Work Zones

TEMPORARY APPLICATIONS

CABLE SPLICE DETAIL

DRAGNET

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

Note: Tie down anchor bolts shall be 1/2" dia. adhesive anchors with 4" long embedment. Installed to manufacturers specifications. 8 required per tie down.
3. TRACC Systems assignment. This standard drawing provides this standard drawing is a graph and
necessary to the designer shall be to ensure that the designer
the designer shall be to ensure that the designer
be substituted for another designer. See section above.

5. When TRACC Systems are installed at the plan or elevation of permanent distortion is
be substituted for another designer. See section above.

4. TRACC Systems include pre-assembled energy dissipating modules that are available in three aluminor, larger modules can be
be substituted for another designer. See section above.

6. TRACC Systems shall be located parallel to the approach travel lane 1, on 1/2 to 3/4 to 1/2 of the
be substituted for another designer. See section above.

7. In those cases where TRACC modules are installed in (a) end-on layout of which cause the use of 54'-9" and
be substituted for another designer. See section above.

8. A yellow Type I Object Marker shall be centered 3' in front of the nose of the TRACC System. Mounting hardware shall be
be substituted for another designer. See section above.

TRACC SYSTEMS

Section AA

TRACC Module Guidelines

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Manufacturer's Model</th>
<th>Length (ft)</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>SHORTTRACC</td>
<td>20' x 2</td>
</tr>
<tr>
<td>45-60</td>
<td>TRACC</td>
<td>20' x 2</td>
</tr>
<tr>
<td>&gt;60-70</td>
<td>FASTRACC</td>
<td>20' x 2</td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. The energy dissipating system as shown in this standard drawing is a proprietary design by Trinity Industries, Inc. and
be substituted for another designer. See section above.

2. This standard drawing provides the Florida Department of Transportation policy for use by the Department and the
be substituted for another designer. See section above.

3. TRACC Systems shall be illuminated in accordance with the manufacturer's lighting, procedures and specifications, except that
be substituted for another designer. See section above.

4. TRACC Systems include pre-assembled energy dissipating modules that are available in three aluminor, larger modules can be
be substituted for another designer. See section above.

5. When TRACC Systems are installed at the plan or elevation of permanent distortion is
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TRACC SYSTEMS

Section AA

TRACC Module Guidelines

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</tr>
<tr>
<td>&gt;60-70</td>
<td>FASTRACC</td>
<td>20' x 2</td>
</tr>
</tbody>
</table>
Offset blocks that exceed standard block depth can be made up of blocks of special sizes or multiple standard block field trimmed to approximately equalize to achieve full transition widths. Offset blocks for lower W-beam that are low in depth can exceed standard block or be field trimmed standard blocks. All blocks are to be squared to join position by field gauged blocks.

Transitions are required when connecting the TRACC System to any guardrail system.

TRACC TRANSITIONS
BIDIRECTIONAL TRANSITION FOR CONNECTION TO NJ SHAPE CONCRETE BARRIER WALL
PLAN VIEW

TRACC W-Beam

TRACC Wood Block

TRACC End Frame

TRACC Wedge Anchor

5/8 x 1 1/2" Hex Bolt & Nut (2 Req'd.)

5/8 x 1 1/2" Flat Washer & Hex Nut

SECTION AA

TRAPEZOIDAL SHAPE CONCRETE BARRIER WALL

BIDIRECTIONAL TRANSITION FOR CONNECTION TO

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TRACC SYSTEMS

TRACC Wood Block

TRACC End Frame

TRACC Wedge Anchor

5/8 x 1 1/2" Hex Bolt & Nut (2 Req'd.)

5/8 x 1 1/2" Flat Washer & Hex Nut

5/8 x 1 1/2" Flat Washer (Top)

5/8 x 1 1/2" Washer EXP Anchor

TRAPEZOIDAL SHAPE CONCRETE BARRIER WALL

BIDIRECTIONAL TRANSITION FOR CONNECTION TO

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TRACC SYSTEMS

TRACC Wood Block

TRACC End Frame

TRACC Wedge Anchor

5/8 x 1 1/2" Hex Bolt & Nut (2 Req'd.)

5/8 x 1 1/2" Flat Washer & Hex Nut

5/8 x 1 1/2" Flat Washer (Top)

5/8 x 1 1/2" Washer EXP Anchor

TRAPEZOIDAL SHAPE CONCRETE BARRIER WALL

BIDIRECTIONAL TRANSITION FOR CONNECTION TO

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TRACC SYSTEMS

TRACC Wood Block

TRACC End Frame

TRACC Wedge Anchor

5/8 x 1 1/2" Hex Bolt & Nut (2 Req'd.)

5/8 x 1 1/2" Flat Washer & Hex Nut

5/8 x 1 1/2" Flat Washer (Top)

5/8 x 1 1/2" Washer EXP Anchor

TRAPEZOIDAL SHAPE CONCRETE BARRIER WALL

BIDIRECTIONAL TRANSITION FOR CONNECTION TO

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TRACC SYSTEMS

TRACC Wood Block

TRACC End Frame

TRACC Wedge Anchor

5/8 x 1 1/2" Hex Bolt & Nut (2 Req'd.)

5/8 x 1 1/2" Flat Washer & Hex Nut

5/8 x 1 1/2" Flat Washer (Top)

5/8 x 1 1/2" Washer EXP Anchor

TRAPEZOIDAL SHAPE CONCRETE BARRIER WALL

BIDIRECTIONAL TRANSITION FOR CONNECTION TO

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TRACC SYSTEMS

TRACC Wood Block

TRACC End Frame

TRACC Wedge Anchor

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5/8 x 1 1/2" Flat Washer & Hex Nut

5/8 x 1 1/2" Flat Washer (Top)

5/8 x 1 1/2" Washer EXP Anchor

TRAPEZOIDAL SHAPE CONCRETE BARRIER WALL

BIDIRECTIONAL TRANSITION FOR CONNECTION TO
NOTES

I. The energy absorbing system represented on this standard Is proprietary. Barrier Systems, and others, shall not infringe the rights of the designer, who shall be the sole responsibility of the user.

II. This standard is produced by the Florida Department of Transportation only for use by the Department and its employees.

III. The TAU-II is a non-telescoping crash cushion produced in two models, each model designed to shield narrow hazards. The TAU-II TL-1 (slip model) is not available on Florida highways for all-weather use. The TAU-II TL-2 (slip model) is limited to use on Florida highways with speeds of 45 mph or less.

IV. There are two types of Energy Absorbing Cartridges (EAC) used in the TAU II crash cushions. They are to be placed according to the manufacturer's specifications and in the configuration illustrated below.

V. Permanent and portable pavements, cement concrete foundations shall be constructed with 4000 psi minimum compressive strength concrete. Reinforcing steel shall be in accordance with the schedule on this index.

VI. The TAU-II system is the primary backup to be used on a Florida Department of Transportation project. Use of concrete backup shall be carried out in the phase for the specific construction contract. Concrete backup specifications shall meet the guidelines of this index and must meet the manufacturer's specifications, construction guidelines and transition requirements.

VII. The TAU-II system shall be constructed parallel to the approach travel lane and on either side (k1 or k2).

VIII. All metallic components shall meet the galvanizing requirements for-galvans, index No. 400.

IX. A yellow Type I Object Marker shall be centered in front of the nose cushion and the transverse centerline of the TAU-II system. The end of the Object Marker shall be included in the cost of the TAU-II system.

X. Quantity for segment is based on each independent location as cited for in the plan or as directed by the Engineer. The cost for manufacturer's transition barriers and subgrade preparation will be included in the cost for the TAU-II system.

XI. Permits and permits for sight line shall be obtained for under the plan or subgrade preparations. Permits shall be obtained for under the plan.

XII. For Veukuson impact attenuation (TAU II), the required work will be paid for under the approved unit price for Veukuson impact attenuation (TAU II), or when the TAU II system is used as an option in accordance with the requirements for the manufacturer's transition barriers and subgrade preparation. Permits shall be obtained for under the plan.

XIII. The TAU-II System is designed to shield hazards and the transverse centerline of the displacement limit on carriageway.

XIV. The TAU-II System is designed to shield hazards and the transverse centerline of the displacement limit on carriageway. The number of cars to be used in a specific unit will be determined by the manufacturer, except where the Engineer determines that another section is more applicable.

XV. The TAU-II System is designed to shield hazards and the transverse centerline of the displacement limit on carriageway. The number of cars to be used in a specific unit will be determined by the manufacturer, except where the Engineer determines that another section is more applicable.

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XXI. The TAU-II System is designed to shield hazards and the transverse centerline of the displacement limit on carriageway. The number of cars to be used in a specific unit will be determined by the manufacturer, except where the Engineer determines that another section is more applicable.

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XXIV. The TAU-II System is designed to shield hazards and the transverse centerline of the displacement limit on carriageway. The number of cars to be used in a specific unit will be determined by the manufacturer, except where the Engineer determines that another section is more applicable.
UNIT ELEVATION
REINFORCED CONCRETE PAD

UNIT PLAN

UNIT ELEVATION
CONCRETE ANCHOR BLOCKS

BENDING DIAGRAM

REINFORCED CONCRETE PAD OR ANCHOR BLOCKS OR CONCRETE ROADWAY PAVEMENT OR BRIDGE DECK

FOUNDATIONS
TRANSITION TO DOUBLE FACE GUARDRAIL
TRANSITION TO PERMANENT CONCRETE BARRIER WALL
Transition to Safety Shape Permanent Concrete Barrier Wall
UNIT PLAN

UNIT ELEVATION

COMPACT BACKUP, CONCRETE END SHOE TO BULBED END BARRIER

TRANSITION TO PERMANENT CONCRETE BARRIER WALL
PORTABLE REINFORCED CONCRETE PAD

UNIT PLAN

PICKUP POINT LOCATIONS

<table>
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<th>No. Of Bays</th>
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<th>Pickup Points, x</th>
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</thead>
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<td>40&quot; x 2&quot;</td>
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<tr>
<td>8</td>
<td>08'-0&quot;</td>
<td>60&quot; x 2&quot;</td>
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</table>

Notes: All reinforcement as shown.

VIEW AA

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TAU-II

Approved By: [Signature]

Designed By: [Name]

Drawn By: [Name]

Checked By: [Name]

Dimensions: [Dimensions]

NOTES:

1. Proof Coil Chain Must Meet the Requirements of ASTM A473 Grade 28.
2. Minimum Length of 15 Links And the Rod Will Be Inserted Through Both End Links As Shown.

ENLARGED VIEW BB
ELEVATION

FENCING TERMINALS AT BRIDGE ENDS

(ROADWAY)

FENCING TERMINALS AT BRIDGE ENDS

(STREAM CROSSING)

PLAN

FENCE DETAIL AT CULVERT

(For Heights Of Headwalls Greater Than 4"

FENCING TERMINALS AT BOX CULVERTS

Notes: When height of headwall is 4' or less (drainage pipe 36" or less) the fence shall not be tied to the headwall, but shall span the ditch.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

FENCE LOCATION
NOTE: LA R/W along the crossroad will extend a minimum 300' beyond the end of the acceleration or deceleration taper, with the taper end remote from the project establishing the end for both sides of the roadway. In the absence of a taper the radius point of the ramp return will be used with the slope criteria.

For interchange quadrants having no taper the LA R/W will extend along the crossroad to a point opposite the start of LA R/W established by the ramp taper or radius point as noted above.

NOTE: For interchange quadrants having no taper the LA R/W will extend along the crossroad to a point opposite the start of LA R/W established by the ramp taper or radius point as noted above.

FENCING TERMINALS AT RURAL INTERCHANGES

APPLIES TO BRIDGE OVER CROSSROAD AND CROSSROAD OVER FREEWAY (BRIDGE OVER CROSSROAD SHOWN)

FENCING TERMINALS AT URBAN INTERCHANGES

PLAN

ELEVATION

FENCING TERMINALS AT RETAINING WALLS
No. 7 Gage Galv. Metal Strop, 1/4" Wide

Length As Required

Prestressed Post

No. 7 Gage Galv. Metal Strop, 1/4" Wide

FASTENER FOR CONCRETE POST AND BRACES

FASTENER FOR TIMBER POST AND BRACE

PRESTRESSED BRACE

PRECAST POST

PRECAST BRACE

ALTERNATE CONCRETE POSTS AND BRACES

Each horizontal wire to be wrapped around corner, end and pull posts and tied to same wire. See General Notes 5 and 9. Timber post illustrated. These methods also apply to steel and concrete post installations.

SPICES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

FENCE TYPE A
OPTIONAL "C" LINE POST

STEEL

Area (in.²) 724
Weight (lb./ft.) 3.72 ±5% 0.98 ±5%
Surface Area (in²/ft.) 0.776
Tensile Strength (psi Min.) 30,000
Tensile Strength (psi Max.) 40,000

OPTIONAL H²/8 x I²/0 H-BEAM LINE POST

Steel E (ASTM A36) Galvanized or Aluminum E (Alloy 6061-T6)

BASE PLATE AND ANCHOR NOTES:
1. Base plate identical for line, pull, end and corner posts shall be considered an integral part of the respective panels for basis of payment.
2. Posts to be plumbed and slotted with grout shim under base plates.
3. Anchors (Galvanized Steel):
   - 1/2" Cast Iron, #8 U-Bolt or Cluster Frame.
   - 1/2" Galvanized Anchor, #7 Min. Embedment.
   - Adhesive anchors shall be headless and/or bolted end in drilled holes with an adhesive material system in accordance with Specification Section 46 and 93. Drilled holes shall be 1" larger in diameter than the anchor bolt. Expansion bolts not permitted.
GENERAL NOTES

1. When approved by the Engineer the Contractor may substitute any cantilever slide gates from the fencing systems on the Qualified Products List.

2. Steel gates frames shall be fabricated prior to painting, except that truss rods may be fabricated following framing. When fabricated without surfaces damaged during welding are protected in accordance with Section 24 of AASHTO M256 or fabricated from pipe components with protective coating adhering to the requirements of Index No. 452 that are tolerant of welding and that a protective coating applied to the weld and damaged pipe surfaces that is equivalent to the protective coating of the fabricated pipe ends.

3. All fabric shall be hauled top and bottom edges.

4. Concrete for bases shall be either Class G concrete as specified in Section 346 of the Standard Specifications or a packaged, dry material meeting the requirements of a concrete under ASTM C-365. Materials for Class I concrete may be proportioned by volume and/or weight.

5. Cost of all gate components shall be included in the contract unit price for Sliding Fence Gate (Cantilever) in CA.
ELEVATION OF REINFORCEMENT AND DOMELING

GENERAL NOTES

1. The opaque visual barrier is intended to function as a visual screen and is not intended to resist vehicle impact loads, nor to restrain, contain or block vehicles or cargo. The barrier is designed to withstand zone wind loading and is designed to withstand accidental attrition by vehicles or cargo, and to contain captured segments of the screen when yielding in such attrition.

2. When the opaque visual barrier is constructed on an existing barrier wall, dowel shall be 1"-8" in length, embedded 6" into the barrier wall and cast with an approved chemical grout. Embedment hole shall be 3" diameter, drilled to a depth 3' below the tip of the dowel unless greater depth is required to accept manufactured grout capsule.

When the opaque visual barrier is constructed in conjunction with project concrete barrier walls, dowel may be as described above, either the drilled or preformed dowel or placed when the barrier wall is cast. For dowels that are placed when the wall is cast, the dowel shall be 2"-2" in length and embedded to a depth of 18".

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

For single faced barrier walls that are constructed around an outer vertical structure, the opaque visual barrier shall follow the guidelines of only one of the walls and be centered atop that wall.

For dual median barrier walls that follow differential profiles, the opaque visual barrier shall be constructed atop the wall with the higher elevation, unless conditions dictate otherwise. Latrobe transitions or end panels for opaque visual barriers that alternate between both walls shall be located in the plane.

For median barrier walls that are divided when connecting to a proposed bridge, the opaque visual barrier shall be constructed atop the proposed side barrier wall, unless differential profile dictates creating the opaque visual barrier on both apertures side barrier walls.

Opaque visual barriers are to be located on capped flange above dual barrier walls shall be detailed in the plane.

4. In lieu of the reinforcement shown, the Contractor may replace welded wire fabric equal to or better than that shown, when approved by the Engineer. Details shall be submitted with request for substitution.

5. The Contractor may construct regular prestressed concrete panels in lieu of the cast-in-place concrete screen when approved by the Engineer. Panel design and method for anchorage to the barrier wall shall be detailed by shop drawings when requesting the Engineers approval.

The Contractor may construct the opaque screen using panels with the barrier wall, however, the screen design shall not be modified so as to cause the wall to be dynamically active from the screen's design considerations in Note No. 10 above.

6. Exposed concrete surface shall have a Class 3 surface finish in accordance with Section 305 of the Standard Specifications unless other finishes are called for in the plane. The exposed concrete surface shall have a Class 3 Applied Finish Coating in accordance with Section 400 only when called for in the plane.

7. Payment for opaque visual barrier shall be full compensation for concrete, reinforcement, dowel, casting, placement, striking, grouting, bolting, finishing and work incident thereto, and shall be paid for under the contract unit price for Opaque Visual Barrier (Concrete) (2'-3" Height).
IN RURAL CONSTRUCTION

IN URBAN CONSTRUCTION

REMOVAL OF ORGANIC MATERIAL

GENERAL NOTES

1. All remarks on this index for removal of organic and plastic materials apply unless otherwise shown on the plans.

2. Utilization of excavated materials shall be in accordance with index No. 505.

3. Where organic or plastic materials are utilized, backfill shall be made of suitable materials in accordance with index No. 505, unless otherwise shown on the plans.

4. The term "Plastic material" used in this index in conjunction with removal of plastic soil is defined under special specifications for Plastic P1 and High Plastic P1 on index No. 505.

5. The term "Organic material" used in this index is defined as any soil which has an average organic content greater than 5.0% or an individual organic content that results in a test value above the limit of the material without consideration of the aggregate. The definition of the filter material is the same as for the index No. 505, except for the classification of the underlying filter's material which shall not exceed 15% of the total weight of the underlying soil pipe shall not exceed 500 lbs.

6. See Index No. 506 for miscellaneous earthen work details.

REMOVAL OF ORGANIC AND PLASTIC MATERIAL

DESIGN NOTES

1. At locations where organic material or other soft soil deposits are to be removed, the construction of a geotechnical foundation over these soils should be considered. The geotechnical report should contain performance of the District Geotechnical Engineer and make a geotechnical foundation design in accordance with index No. 502 when practical.

2. The designer shall take into consideration the existing and anticipated widening of the roadway and the removal of organic and plastic materials necessary to accommodate anticipated widening.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

REMOVAL OF ORGANIC AND PLASTIC MATERIAL

NOTES

1. All remarks on this index for removal of organic and plastic materials apply unless otherwise shown on the plans.

2. Utilization of excavated materials shall be in accordance with index No. 505.

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6. See Index No. 506 for miscellaneous earthen work details.

REMOVAL OF ORGANIC AND PLASTIC MATERIAL

DESIGN NOTES

1. At locations where organic material or other soft soil deposits are to be removed, the construction of a geotechnical foundation over these soils should be considered. The geotechnical report should contain performance of the District Geotechnical Engineer and make a geotechnical foundation design in accordance with index No. 502 when practical.

2. The designer shall take into consideration the existing and anticipated widening of the roadway and the removal of organic and plastic materials necessary to accommodate anticipated widening.
HALF SECTION

NOTES: Refer to roadway cross sections to determine whether minimum or preferable removal is used.

Where frequency of median breaks dictates that it is impractical to leave plastic material in the
median, the median may have to be described to remove the material.

If during the construction it becomes apparent, due to normal required construction procedures,
that it is impractical to leave the plastic material in the median, total removal of this
material shall be approved by the Engineer.

REMOVAL OF PLASTIC MATERIAL AND LOCATION OF UNDERDRAIN IN URBAN CONSTRUCTION

REMOVAL OF PLASTIC MATERIAL

Note: For GENERAL NOTES see Sheet 1.
Staked Soil Placed Over Erosion Mat

Plastic Erosion Mat (FDOT Specification Section 507)

Plastic Erosion Mat Placed In Place In Max. 3' Staggered Pattern

Erosion Mat Anchor Trench

Intermediate Reinforcement

Geosynthetic Reinforced Soil Slopes

GENERAL NOTES

1. All designs shall meet the requirements shown on this sheet and the contract documents.
2. 3°
3. Intermediate reinforcement shall be rolled out parallel to slope face.
REINFORCED EMBANKMENT

GEOSYNTHETIC REINFORCED FOUNDATIONS CONSTRUCTED ON SOFT SOILS

- Maximum vertical spacing between reinforcement layers is 36 inches.
- Minimum vertical spacing between reinforcement layers is 6 inches.
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<th>REQUIRED TEST METHOD</th>
<th>WIRAFI HP 370</th>
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**Approved Application Usage**

1. Stemmed Shapes
2. Reinforcement of Foundations over Soft Soils
3. Reinforced Shapes & Reinforcement of Foundations over Soft Soils
4. Reinforced Embankment
5. Construction Equipment

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**APPROVED GEOSYNTHETIC PRODUCTS (WOVEN GEOTEXTILES)**

**APPLICATION AND PROPERTIES**
# Table of Woven Geotextile Values

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**Approved Geosynthetic Products (Woven Geotextiles)**

**Application and Properties**

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**STATE OF FLORIDA**

**DEPARTMENT OF TRANSPORTATION**

**Approved Geosynthetic Reinforced Soils**

**Geosynthetic Reinforced Soils**

**Application and Properties**

Approved Application Usage:
1. Steepened Slopes
2. Reinforcement of Foundations over Soft Soils
3. Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4. Reinforced Embankments
5. Construction Equipment

* Minimum 3" Overlap
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**APPROVED GEOSYNTHETIC PRODUCTS (WOVEN GEORGIDS) APPLICATION AND PROPERTIES**

<table>
<thead>
<tr>
<th>Approved Application Usage</th>
<th>1 = Steepened Slopes</th>
<th>2 = Reinforcement of Foundations over Soft Soils</th>
<th>3 = Both Steepened Slopes &amp; Reinforcement of Foundations over Soft Soils</th>
<th>4 = Reinforced Embankment</th>
<th>5 = Construction Expedient</th>
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<tr>
<td><strong>Approved Application Usage</strong></td>
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*Minimum 3" Overlap*
TABLE OF WOVEN GEOGRID VALUES

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<th>SYTENNE SF 20</th>
<th>SYTENNE SF 35</th>
<th>SYTENNE SF 40</th>
<th>SYTENNE SF 50</th>
<th>SYTENNE SF 60</th>
<th>SYTENNE SF 70</th>
<th>Reaprt 3/3</th>
<th>Reaprt 4/2</th>
<th>Reaprt 6/3</th>
<th>Reaprt 8/3</th>
<th>Reaprt 9/3</th>
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<td>ASTM D 4355</td>
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<td>3,625</td>
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<td>11,143</td>
<td>1,923</td>
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<td>4,744</td>
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<td>15,303</td>
<td>16,080</td>
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<td>18,411</td>
<td>19,188</td>
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<td>19,188</td>
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Approved Application Usage:
1 = Streambed Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Streambed Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient

* Minimum 3" Overlap
<table>
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<th>PROPERTY</th>
<th>REQUIRED TEST METHOD</th>
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### TABLE OF EXTRUDED GEOGRID VALUES

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### APPROVED GEOSYNTHETIC PRODUCTS

**EXTRUDED GEOGRID**

**APPLICATION AND PROPERTIES**

---

**STATE OF FLORIDA**

**DEPARTMENT OF TRANSPORTATION**

**APPROVED GEOGRID PRODUCTS**

**GEOSYNTHETIC REINFORCED SOILS**

---

**APPROVED APPLICATION GROUP**

1. Steepened Slopes
2. Reinforcement of Foundations over Soft Soils
3. Reinforcement of Steepened Slopes & Reinforcement of Foundations over Soft Soils
4. Reinforced Embankment
5. Construction Embankment

* Minimum 3' Overlap
DIVIDED ROADWAYS

UNDIVIDED ROADWAY

FLEXIBLE PAVEMENT

GENERAL NOTES

1. Roadway dimensions are representative. Subgrade dimensions and control lines are intended. The widths shown on this index do not necessarily define the details shown in the plans or on Index Nos. 500 or 501.

2. Plastic (P) soils may be placed above the existing water level of the construction yard within 4 feet of the proposed base, if the slope shall be filled in by the lower portion of the embankment for some distance along the project rather than full depth for short distances.

3. High Plastic (H) soils excavated within the project limits may be used in embankment construction as indicated on this index. High Plastic soils are not to be used in embankment construction when obtained from outside the project limits.

4. Select (S) soils having an average organic content of more than one and one-half percent, or having an individual value which exceeds four (4) percent, shall not be used in the subgrade portion of the roadway.

Select (S), Plastic (P), or High Plastic (H) soils having an average organic content of more than five (5) percent, or an organic content individual test result which exceeds seven (7) percent, shall not be used in the portion of embankment below the control line, unless written authorization is provided by the District Geotechnical Engineer. These soils may be used for embankment construction outside the control line, unless restricted by the plans or specifications specified in the plans. Provided they can be compacted sufficiently to sustain a drainage surface for operational vehicles as approved by the Engineer.

Average organic content shall be determined from the test results of a minimum of three randomly selected samples from adjacent soil or subgrade, or a particular material. Such samples shall be taken in accordance with AASHTO T 25 in the location of the roadway control line, unless restricted by the plans or specifications specified in the plans. Provided they can be compacted sufficiently to sustain a drainage surface for operational vehicles as approved by the Engineer.

5. Highly plastic soils, composed primarily of partially decayed organic matter, often dark brown or black in color with an odor of decay, and classified as Muck, shall be designated as such. Further, any structure or admixture of soil within a portion of highly organic material may be designated as Muck (M).

Highly organic soil shall not be used in the subgrade or embankment portion of the roadway, with the exception of soil used as a subgrade or embankment below the subgrade portion of the roadway as described in Section 162 of the FDOT Standard Specifications.

DESIGN NOTES

1. The designer shall take into consideration the existing embankment to the outside, and understand that the embankment is backfilled, except for the portion of the future embankment classified for utilization of High Plastic (H) soils and/or soils classified as organic material in the embankment.

2. The designer shall take into consideration the position of the drainage swales in the portion of the embankment where Plastic (P) soils, High Plastic (H) soils, or soils classified as organic material would be allowed. The designer shall consider the use of Plastic (P) soils, High Plastic (H) soils, and/or soils classified as organic material to determine which soils will maintain the stability of embankment from the swales.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

EMBANKMENT UTILIZATION
DIVIDED ROADWAYS

UNDIVIDED ROADWAY

SYMBOL | SOIL | CLASSIFICATION (AASHO M 451)
--- | --- | ---
S | Selected | A-1, A-3, A-2-4 **
H | high plastic | A-2-5, A-2-7, A-5 OR A-7 (ALL WITH L> 50)
M | Muck | A-8

Classification listed left to right in order of preference.

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

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the embankment when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be non-plastic and contain less than 5% passing the No. 200 U.S. standard sieve.

*** For cut sections the dimension may be reduced to 24", add Index No. 500, For either cutthroat and drain facilities this dimension may be reduced to 18".
**SYMBOL**  
**SOIL**  
**CLASSIFICATION (AASHTO M 95)**

<table>
<thead>
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<th>Symbol</th>
<th>Soil</th>
<th>Classification</th>
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<td>A-1, A-3, A-2-4 ****</td>
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<tr>
<td>S+</td>
<td>Special Select</td>
<td>A-3 **** with Minimum Average Lab Permeability of Soil 2 csec (0.04 M ft/day) as per FM 1-T205</td>
</tr>
<tr>
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<td>High Plastic</td>
<td>A-2-5, A-2-7, A-5 or A-7 (ALL WITH LL&gt; 50)</td>
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</table>

**Note:** SPECIAL SELECT SOIL OPTION may be used only when approved in writing by the District Materials Engineer and shown in the plans.

---

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**EMBANKMENT UTILIZATION**

**RIGID PAVEMENT - SPECIAL SELECT SOIL OPTION**

---

**Note:** SPECIAL SELECT SOIL OPTION may be used only when approved in writing by the District Materials Engineer and shown in the plans.
NOTES

1. All material in the shaded area is excess base to be removed.
2. The cost for removal of excess base material shall be included in the contract unit price for base.
3. Payment for base shall be calculated using normal width.

REMOVAL OF EXCESS BASE MATERIAL

NOTES

1. When the median has curb or curb and gutter, stabilize 4" back of curbs.
2. When the median has shoulder with no curb or curb and gutter, stabilize to normal shoulder width.
3. See the details above for stabilizing requirements at crossroads.
4. Stabilize entire area under all paved traffic islands.
5. Stabilize full width under all traffic separators.
6. Select material as defined on Index No. 505. For minor collectors and local facilities the depth of select material thickness may be reduced from 24" to 18".

MEDIAN STABILIZING DETAILS
HIGHWAYS AND HIGH SPEED URBAN STREETS GENERAL NOTES

1. Maximum rate of superelevation for urban highways and high speed urban streets shall be 0.05.

2. Superelevation shall be obtained by rotating the plane successively about the break points of the section until the plane has obtained a slope equal to that required by the chart. Should the rotation traverse the entire section and further superelevation be required, the remaining rotation of the plane shall be about the low edge of the travel lane.

3. When positive superelevation is required, the slope of the gutter on the high side shall be a continuation of the slope of the pavement.

4. In construction, abrupt vertical curves shall be placed at all angular profile breaks within the limits of the superelevation transition.

5. The variable superelevation transition length "L" shall have a minimum value of 50 feet for design speeds under 40 mph and 75 feet for design speeds of 40 mph or greater.

6. Roadway sections having lane arrangements different from those shown, but composed of a series of planes, shall be superelevated in a similar manner.

7. For superelevation of lower speed urban streets, see the FDOT Manual of Uniform Traffic Control Devices for Design, Construction, and Maintenance for Streets and Highways. For superelevation of curves on rural highways, urban freeways and high speed urban highways, see Issues No. 56.

---

**SUPERELEVATION RATES (\( \varepsilon \)) FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS**

\[ \varepsilon_{\text{max}} = 0.05 \]

**TABULATED VALUES**

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<th>Design Speed (mph)</th>
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<td>45° 00'</td>
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</table>

**CHARTED VALUES**

---

**GENERAL NOTES**

1. Maximum rate of superelevation for urban highways and high speed urban streets shall be 0.05.

2. Superelevation shall be obtained by rotating the plane successively about the break points of the section until the plane has obtained a slope equal to that required by the chart. Should the rotation traverse the entire section and further superelevation be required, the remaining rotation of the plane shall be about the low edge of the travel lane.

3. When positive superelevation is required, the slope of the gutter on the high side shall be a continuation of the slope of the pavement.

4. In construction, abrupt vertical curves shall be placed at all angular profile breaks within the limits of the superelevation transition.

5. The variable superelevation transition length "L" shall have a minimum value of 50 feet for design speeds under 40 mph and 75 feet for design speeds of 40 mph or greater.

6. Roadway sections having lane arrangements different from those shown, but composed of a series of planes, shall be superelevated in a similar manner.

7. For superelevation of lower speed urban streets, see the FDOT Manual of Uniform Traffic Control Devices for Design, Construction, and Maintenance for Streets and Highways. For superelevation of curves on rural highways, urban freeways and high speed urban highways, see Issues No. 56.
SUPERELEVATION TRANSITION SECTIONS
FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

SUPERELEVATION
URBAN HIGHWAYS AND STREETS

THREE TRAVEL LANES EACH DIRECTION

THREE TRAVEL LANES EACH DIRECTION WITH MEDIAN

TWO TRAVEL LANES EACH DIRECTION

TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN

TWO TRAVEL LANES EACH DIRECTION WITH AUXILIARY LANES

TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANES

UNDIVIDED FACILITIES

DIVIDED FACILITIES

SUPERELEVATION RATES OBTAINED FROM THE CHART OR TABLE ON SHEET I ARE ALSO APPLICABLE TO A PARABOLIC CROWN SECTION. WHEN THIS SECTION IS USED, SUPERELEVATION IS ESTABLISHED BY CLOSING A TANGENT ABOUT THE END OF THE PARABOLIC CROWN UNTIL THE DESIRED SLOPE IS ATTAINED (POINTS A & B ON SKETCH). THE NORMAL PARABOLIC CROWN WILL BE MELTED INSTEAD OF THE LIMITS OF THE PLANE IT IS FUSED. PARABOLIC SECTION

TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANES

Maximum Superelivated Section

Normal Crowned Section

See notation 'b' under CHARTED VALUES Sheet I.

Rotation Points (Typ. 1)

Max. Superelivated Rate (0.08)

Normal Crowned Section

See notation 'b' under CHARTED VALUES Sheet I.

Rotation Points (Typ. 1)

Max. Superelivated Rate (0.08)

Normal Crowned Section

See notation 'b' under CHARTED VALUES Sheet I.

Rotation Points (Typ. 1)

Max. Superelivated Rate (0.08)

Normal Crowned Section

See notation 'b' under CHARTED VALUES Sheet I.

Rotation Points (Typ. 1)

Max. Superelivated Rate (0.08)

Normal Crowned Section

See notation 'b' under CHARTED VALUES Sheet I.

Rotation Points (Typ. 1)

Max. Superelivated Rate (0.08)

Normal Crowned Section

See notation 'b' under CHARTED VALUES Sheet I.
TWO LANES EACH DIRECTION

TWO LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANE

Note: The sections and profiles shown are examples of superelevation transitions. Similar schemes should be used for roadways having other sections.

EXAMPLE SUPERELEVATION SECTIONS AND PROFILES
FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS
**BASE THICKNESS AND OPTION CODES**

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<th>Base Group Pay Item Number</th>
<th>Structural Number (Per. In.)</th>
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<th>Cemented Coquina, LBR 100</th>
<th>Shell Rock, LBR 100</th>
<th>Bank Run Shell, LBR 100</th>
<th>Graded Aggregate Base, LBR 100</th>
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<th>B-12.5 and/or Graded Subbase, LBR 100</th>
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</table>

**GENERAL NOTES**

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

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

3. The designer may require the use of a single base option, for instance Type B-12.5 in a high water condition. This will still be bid as Optional Base.

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**OPTIONAL BASE GROUP AND STRUCTURAL NUMBERS**

---

**GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS**

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*To be used for widening only, three feet or less.*

△ Based on minimum practical thicknesses.

□ Restricted to non-limited access shoulder base construction.
### BASE THICKNESS AND OPTION CODES

<table>
<thead>
<tr>
<th>Base Group</th>
<th>Structural Range</th>
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<th>Structural Number (Per. in.)</th>
<th>Base Options</th>
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<th>1.6 (100% Plant Mixed)</th>
<th>1.6 (100% Road Mixed)</th>
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<td>11½&quot;</td>
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<tr>
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<td>708</td>
<td>13½&quot;</td>
<td>13½&quot;</td>
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</table>

*Not Recommended For 20 Year Design when accumulated 18 kip equivalent Single Axle (ESAL) Load Greater Than 12,000,000.*

**Notes:**
- These base materials may be used on FDOT projects when approved in writing by the District Materials Engineer and shown in plans.
- Based on Minimum Practical Thickness.

---

**LIMITED USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS**

(not visible in the image)
### GENERAL NOTES

1. For definitions and descriptions of access connection "Categories" and access Classifications of highway segments, and for other detailed information on access to the State Highway System, refer to FDOT Rule Chapter 14-96, "State Highway Conveyance Permit Administrative Process and Rule" Chapter 4-96, "State Highway System Access Management Classification System and Standards.

2. For the index the term "turn" applies to that portion of driveway, road, or streets adjoining the outer roadway. For that index the term "connection" encompasses a driveway, street, and road and their approach segments, intersections, pedestrian facilities, travelway forms, drainage pipes and structures, crossings, alleys, streets, curbs, sidewalks, medians, and separation markings, required alignment, maintenance of traffic or other means of access to or from controlled-access facilities. The turn standards referred to in this index do not preclude complete intersection design, construction or maintenance requirements.

3. The location, orientation, adjustment and number of connector and roadway openings shall be in accordance with FDOT Rule Chapter 14-97.

4. On all construction projects all driveways on the plans are to be repositioned at their existing location in conformance to these standards, or, in conformity to permits issued during the construction project.

5. Driveways shall have sufficient length and sites for all vehicular parking, spouses, maneuvering, parking and passing to be carried out without stopping beyond the right edge of the roadway. Length for driveway connections that are to be served directly by urban or rural arterial roads shall be considered.

### LEGEND

- **A** Return Radius Point of Flare Point
- **B** Buffer Area
- **C** Flare Point
- **D** Flag Pole
- **E** F.B. Line
- **F** Edge of Travel Way
- **G** Boundary Line
- **H** Median
- **I** Travel Way
- **J** Turnout
- **K** Outside Radius
- **L** Inside Radius
- **M** Distance Between Connections
- **N** Median
- **O** Centerline
- **P** Flare
- **Q** Intersection Point
- **R** Intersection Point
- **S** Intersection Point
- **T** Intersection Point
- **U** Flare
- **V** Intersection Point
- **W** Intersection Point
- **X** Intersection Point
- **Y** Intersection Point
- **Z** Intersection Point

### SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS

#### NOT INTENDED FOR FULL INTERSECTION DESIGN

### SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS

#### URBAN (CURB & GUTTER)

<table>
<thead>
<tr>
<th>ELEMENT DESCRIPTION</th>
<th>I-80 Trip/Day or I-5 Trip/Hour</th>
<th>I-80-600 Trip/Day or I-60-600 Trip/Hour</th>
<th>I-80-600 Trip/Day or I-60-600 Trip/Hour</th>
<th>I-80-400 Trip/Day or I-60-400 Trip/Hour</th>
<th>I-80-400 Trip/Day or I-60-400 Trip/Hour</th>
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</thead>
<tbody>
<tr>
<td>CONNECTION LENGTH W</td>
<td>50 Min.</td>
<td>50 Min.</td>
<td>50 Min.</td>
<td>50 Min.</td>
<td>50 Min.</td>
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<tr>
<td>FLARE (Dip Curve) F</td>
<td>5' Min.</td>
<td>5' Min.</td>
<td>5' Min.</td>
<td>5' Min.</td>
<td>5' Min.</td>
</tr>
<tr>
<td>FLARE (Radius) R &amp; U</td>
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<td>N/A</td>
<td>N/A</td>
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</tr>
<tr>
<td>ANGLE OF DRIVE Y</td>
<td>60' or 90'</td>
<td>60' or 90'</td>
<td>60' or 90'</td>
<td>60' or 90'</td>
<td>60' or 90'</td>
</tr>
<tr>
<td>DIVISIONAL ISLAND</td>
<td>4'-12' Wide</td>
<td>4'-12' Wide</td>
<td>4'-12' Wide</td>
<td>4'-12' Wide</td>
<td>4'-12' Wide</td>
</tr>
<tr>
<td>SETBACK G</td>
<td>30' Min.</td>
<td>30' Min.</td>
<td>30' Min.</td>
<td>30' Min.</td>
<td>30' Min.</td>
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#### RURAL

<table>
<thead>
<tr>
<th>ELEMENT DESCRIPTION</th>
<th>I-80 Trip/Day or I-5 Trip/Hour</th>
<th>I-80-600 Trip/Day or I-60-600 Trip/Hour</th>
<th>I-80-600 Trip/Day or I-60-600 Trip/Hour</th>
<th>I-80-400 Trip/Day or I-60-400 Trip/Hour</th>
<th>I-80-400 Trip/Day or I-60-400 Trip/Hour</th>
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</thead>
<tbody>
<tr>
<td>CONNECTION LENGTH W</td>
<td>50 Min.</td>
<td>50 Min.</td>
<td>50 Min.</td>
<td>50 Min.</td>
<td>50 Min.</td>
</tr>
<tr>
<td>FLARE (Dip Curve) F</td>
<td>5' Min.</td>
<td>5' Min.</td>
<td>5' Min.</td>
<td>5' Min.</td>
<td>5' Min.</td>
</tr>
<tr>
<td>FLARE (Radius) R &amp; U</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ANGLE OF DRIVE Y</td>
<td>60' or 90'</td>
<td>60' or 90'</td>
<td>60' or 90'</td>
<td>60' or 90'</td>
<td>60' or 90'</td>
</tr>
<tr>
<td>DIVISIONAL ISLAND</td>
<td>4'-12' Wide</td>
<td>4'-12' Wide</td>
<td>4'-12' Wide</td>
<td>4'-12' Wide</td>
<td>4'-12' Wide</td>
</tr>
<tr>
<td>SETBACK G</td>
<td>30' Min.</td>
<td>30' Min.</td>
<td>30' Min.</td>
<td>30' Min.</td>
<td>30' Min.</td>
</tr>
</tbody>
</table>

---

### For Additional Information Refer to FDOT Rule Chapters 14-96 and 14-97.

---

### SKETCH ILLUSTRATING DEFINITIONS

---

### DESIGN NOTES

1. Prior to the adoption of FDOT Rule Chapters 14-96 and 14-97, connections in the State Highway System were defined and permitted by Chapters. Connections that have been classified under Rule 14-96, and the term "Class" has been applied to highways in the State Highway System as defined under Rule 14-97.
**PLAN C**

**TURNOUT WITHOUT SIDEWALK**

- Driveway Width (W)
- R/W Line
- Vertical + Z Index Between Connecting 'T', See Sketch

**Notes:**
- Distance between connecting 'T', see sketch
- Bridge Foundation and Otherwise

**Special Notes for Urban Flared Turnouts**

1. Driveway 6" concrete pavement and drop are shall meet the aesthetic and construction requirements of Standard 502 and 503 of the FDOT Standard Specifications. The driveway foundation shall meet the requirements of Standard 202.
2. For center of drop curb and public sidewalk curb ramps refer to Reference No. 202, 301, and 304 respectively.
3. Where turnouts are constructed within existing cross section, the existing curb and gutter shall be removed after the normal joint beyond the cross point or to the street that no remaining section is less than 8 ft long, and drop curb shall be reconstructed in accordance with Note 1 and 2.
4. Use for permanent joint filter shall be included in the cost for the concrete pavement/curb/strip. Refer to No. 2.
5. For turnouts with lateral extensions, the requirements under the "Standard of Geometric Requirements for Turnouts", the "General Notes", the "Newly Turned Characteristics", and the sketch of "Outline of Clearing & Grading, Stabilization and Base At Intersection".

**DESIGN NOTES FOR URBAN FLARED TURNOUTS**

1. Driveways located at "Florida Application" are those with slopes that are causing channeling for representative standard passenger vehicles under dry weathered conditions, or in those areas where the channeling to be avoided is due to the fact that traffic demands volume will be impacted. The standard passenger vehicle considered for such designs is the "Florida Application" with a length of fully-asphalted roadway.
2. Driveways located at "Typical Application" are those with slopes that are causing channeling for representative standard passenger vehicle under dry weathered conditions, or in those areas where the channeling to be avoided is due to the fact that traffic demands volume will be impacted. The standard passenger vehicle considered for such designs is the "Typical Application" with a length of fully-asphalted roadway.

**State of Florida Department of Transportation**

**TURNOUTS**

**Urbain Flared Turnouts**

Note: See sheet 1 for "GENERAL NOTES"
MODIFICATIONS OF 'ADVERSE' AND 'MARGINAL' APPLICATIONS

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

ADVERSE* SECTIONS MODIFIED TO ACHIEVE MARGINAL* APPLICATION

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

MODIFICATIONS TO ADVERSE AND MARGINAL SECTIONS

* See DESIGN NOTES FOR URBAN FLARED TURNOUTS On Sheet 2.
- Depth Less Than 3' Allowable Only Under Findings Of Infeasibility.
LIMITS OF CLEARING & GRUBBING, STABILIZING AND BASE AT INTERSECTIONS

MATERIAL TYPES AND THICKNESSES IN DRIVING AREAS FOR RURAL AND URBAN CONNECTIONS

<table>
<thead>
<tr>
<th>Course</th>
<th>Material</th>
<th>Thickness (in)</th>
<th>Connection</th>
<th>Rosin (lbs)</th>
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<tr>
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<tr>
<td>A</td>
<td></td>
<td></td>
<td>0, 0.5, 1</td>
<td></td>
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<tr>
<td>B</td>
<td></td>
<td></td>
<td>0.5, 1, 2</td>
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<tr>
<td>C</td>
<td></td>
<td></td>
<td>0, 0.5, 1</td>
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LIMITS OF CONSTRUCTION AND MAINTENANCE FOR RURAL CONNECTIONS

RURAL TURNOUT CONSTRUCTION

TABLE 515-1
Definitions:

- **G**: Grade (%)
- **A**: Algebraic Difference in Grades (%)
- **L**: Transition (See Tabulated Lengths)

**RURAL TURNOUT PROFILES**

- When restoring or reconstructing existing commercial turnout connections on new construction and reconstruction projects, the maximum 7% commercial grade may be exceeded provided this does not create any adverse roadway operational or safety impacts. This shall be approved by the District Design Engineer and be supported by documented site specific findings.

**URBAN TURNOUT PROFILES**

- **G**: Grade (%)
- **A**: Algebraic Difference in Grades (%)
- **L**: Transition (See Tabulated Lengths)

**RECOMMENDED TURNOUT PROFILE TRANSITION LENGTHS (L) (FT.)**

1. Turnouts shall neither cause water to flow on or across the roadway pavement nor cause water ponding or erosion within the State right of way. On all rural turnouts the transition (L) nearest the roadway shall be aligned or connected to direct stormwater runoff to the roadway ditch. Similar runoff control devices shall be constructed when runoff volumes are sufficient to cause erosion of the shoulder. Similar runoff control devices shall be constructed as necessary to properly direct and control the stormwater runoff on urban turnouts.

2. The Option 1 profile is intended for locations where roadway, turnout taper and auxiliary lane stormwater runoff volumes are relatively small. The Option 2 profile is intended for locations where runoff volumes are relatively small and/or where there is no roadside ditch.

**LENGTHS (L) (FT.)**

- **STRAIGHT**: Minimum
- **ROUNDED**: Maximum

**ROADWAY PAVEMENT SLOPES AND SLOPES OF ABUTTING RURAL TURNOUT SURFACES (G)**

**SUPERELEVATION SECTIONS**

- **STORMWATER RUNOFF AND PROFILE OPTION NOTES**
  1. Turnouts shall neither cause water to flow on or across the roadway pavement, nor cause water ponding or erosion within the State right of way. On all rural turnouts the transition (L) nearest the roadway shall be aligned or connected to direct stormwater runoff to the roadway ditch. Similar runoff control devices shall be constructed when runoff volumes are sufficient to cause erosion of the shoulder. Similar runoff control devices shall be constructed as necessary to properly direct and control the stormwater runoff on urban turnouts.
  2. The Option 1 profile is intended for locations where roadway, turnout taper and auxiliary lane stormwater runoff volumes are relatively small. The Option 2 profile is intended for locations where runoff volumes are relatively small and/or where there is no roadside ditch.

**DRAWN BY**

- HSD 08/82

**APPROVED BY**

- [Signature]
**TURNOUT CONSTRUCTION**

**EXISTING CONNECTIONS** To Be Paved In Accordance With Index No. 555. Existing Drainage Connections To Be Paved With A Structural Course To The Limits Specified For "Rural Turnout Construction" Index No. 555. Unless Otherwise Called For In The Plans Or Directed By Engineer.

**EXISTING DRIVE**

**FRONT/FACE COURSE** 5' Same As Structural Course

**EXISTING GRADED CONNECTIONS** To Be Paved In Accordance With Index No. 515. Existing Graded Connections Paved With Structural Course To The Limits Specified For "Rural Turnout Construction" Index No. 515. Unless Otherwise Called For In The Plans Or Directed By Engineer.

**SHOULDER SLOPE**

**LEVELING COURSE** I' Feathered Structural Course

**Turnout Structural Course** and Its thickness Increased to 5' may be used at the discretion of the Engineer.

**Payment for Feathering Friction Course** placed on the roadway. Feathered areas will not be included in measured quantities. Feathering not required for FC-5 friction courses.

**Areas for One 5' Deep Turnout (SY)**

<table>
<thead>
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<th>Drive Width (ft.)</th>
<th>Normal</th>
<th>Stewed</th>
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<td>36</td>
<td>51</td>
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<td>14</td>
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</table>

**Pavement Structure for 5' Deep Turnouts**

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<tr>
<th>Course</th>
<th>Material</th>
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</tr>
<tr>
<td>Base</td>
<td>Optional Base</td>
<td>0.5, 6.1</td>
</tr>
</tbody>
</table>

**Notes:**

1. Turnout-structural course to be the same material as roadway leveling or structural course. Structural course not required if asphalt base course and its thickness increased to match edge of roadway pavement.

2. Any Department approved pavement-structure equivalence may be used at the discretion of the Engineer.

3. Additional structural-strength may be required if heavy truck loads are anticipated.

**SECTION AA WITH WIDENING**

**SECTION AA**

**TURNOUT CONSTRUCTION**

**EXISTING CONNECTIONS**

**EXISTING DRIVE**

**FRONT/FACE COURSE** 5' Same As Structural Course

**EXISTING GRADED CONNECTIONS**

**SHOULDER SLOPE**

**LEVELING COURSE** I' Feathered Structural Course

**Payment for Feathering Friction Course** placed on the roadway. Feathered areas will not be included in measured quantities. Feathering not required for FC-5 friction courses.
1. Raised rumble strip shall be constructed on all paved shoulders approaching structures, where the structure shoulder width is less than the usable shoulder width of the approach roadway. Raised rumble strip at intersections shall be constructed only when specified in the plans.

2. Raised rumble strip are to be constructed in accordance with Section 546 of the Specifications.

3. When any portion of a curve falls within the limits of rumble strip shown in these details, additional rumble strip set spaced at 200' centers shall be constructed throughout the remainder of the approaching curve.

4. Raised rumble strip shall be paid for per set under the contract unit price for Rumble Strip Sets, PS. Such price and payment shall be full compensation for all work and materials required without adjustment due to width of pavement receiving the strip or length of strip.

** Raised rumble strips may be required for one or more legs of the intersection (case shown for excessive intersection). Rumble strips shall be constructed only on the legs identified in the plans. See General Note No. 6.

** May be decreased in urban areas with low operating speeds.

**INSET C**

Notes: Rumble strips may be required for one or more legs of the intersection (case shown for excessive intersection). Rumble strip shall be constructed only on the legs identified in the plans.

See General Note No. 6.

**GENERAL NOTES FOR RAISED RUMBLE STRIPS**

1. Raised rumble strips shall be constructed on all paved shoulders approaching structures, where the structure shoulder width is less than the usable shoulder width of the approach roadway. Raised rumble strip at intersections shall be constructed only when specified in the plans.

2. Raised rumble strip are to be constructed in accordance with Section 546 of the Specifications.

3. When any portion of a curve falls within the limits of rumble strip shown in these details, additional rumble strip set spaced at 200' centers shall be constructed throughout the remainder of the approaching curve.

4. Raised rumble strip shall be paid for per set under the contract unit price for Rumble Strip Sets, PS. Such price and payment shall be full compensation for all work and materials required without adjustment due to width of pavement receiving the strip or length of strip.

**INSET C**

Notes: Rumble strips may be required for one or more legs of the intersection (case shown for excessive intersection). Rumble strip shall be constructed only on the legs identified in the plans. See General Note No. 6.

**GENERAL NOTES FOR RAISED RUMBLE STRIPS**

1. Raised rumble strip shall be constructed on all paved shoulders approaching structures, where the structure shoulder width is less than the usable shoulder width of the approach roadway. Raised rumble strip at intersections shall be constructed only when specified in the plans.

2. Raised rumble strip are to be constructed in accordance with Section 546 of the Specifications.

3. When any portion of a curve falls within the limits of rumble strip shown in these details, additional rumble strip set spaced at 200' centers shall be constructed throughout the remainder of the approaching curve.

4. Raised rumble strip shall be paid for per set under the contract unit price for Rumble Strip Sets, PS. Such price and payment shall be full compensation for all work and materials required without adjustment due to width of pavement receiving the strip or length of strip.

**INSET C**

Notes: Rumble strips may be required for one or more legs of the intersection (case shown for excessive intersection). Rumble strip shall be constructed only on the legs identified in the plans. See General Note No. 6.

**GENERAL NOTES FOR RAISED RUMBLE STRIPS**

1. Raised rumble strip shall be constructed on all paved shoulders approaching structures, where the structure shoulder width is less than the usable shoulder width of the approach roadway. Raised rumble strip at intersections shall be constructed only when specified in the plans.

2. Raised rumble strip are to be constructed in accordance with Section 546 of the Specifications.

3. When any portion of a curve falls within the limits of rumble strip shown in these details, additional rumble strip set spaced at 200' centers shall be constructed throughout the remainder of the approaching curve.

4. Raised rumble strip shall be paid for per set under the contract unit price for Rumble Strip Sets, PS. Such price and payment shall be full compensation for all work and materials required without adjustment due to width of pavement receiving the strip or length of strip.
GENERAL NOTES FOR SHOULDER GROUND-IN RUMBLE STRIPS

1. Ground-In rumble strips shall be constructed on limited access facilities.
2. The skip array is the standard array. The continuous array shall be constructed in advance of bridge ends for a distance of 1000', or back to the gore recovery area for existing interchanges (bridges) and constructed at other specified locations as noted in the plans.
3. Ground-In rumble strips are to be constructed in accordance with Section 546 of the Specifications.
4. When friction course extends more than 6" beyond the edge of the travel lane, the extended friction course shall be located off back of the 6" line, prior to rumble strip grinding.
5. Both arrays shall be paid for under the contract unit price for Rumble Strips (Ground-in), FM. Such price and payment shall be full compensation for all work and materials required.

DESIGN NOTE

1. The rumble strips described on this sheet are intended for use on flexible pavement shoulders. When constructing ground-in rumble strips on existing rigid (concrete) shoulders, no rumble strips shall be located closer than 6' from any pavement joint. When specifying ground-in rumble strips on existing rigid shoulders, their location and spacing shall be detailed in the plans.
2. Other methods and types of applications shall not be used unless approved in writing by the State roadway design engineer. Approval will be considered only with sufficient documented justification for variance from this standard.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

RUMBLE STRIPS

SHOULDER GROUND-IN RUMBLE STRIPS
Chamfer Surface

Estimated Want/Ties for Wall Height per Linear Foot of Wall

Exposed Face Height / 6" of Wall

<table>
<thead>
<tr>
<th>Height</th>
<th>CLASS I CONCRETE (CY)</th>
<th>STEEL (LBR)</th>
</tr>
</thead>
<tbody>
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<td>2</td>
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</tr>
<tr>
<td>6'</td>
<td>0.54</td>
<td>10</td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. Gravity walls constructed as extensions of reinforced concrete retaining walls, except walls of proprietary design, shall have the same face texture and finish as the reinforced concrete retaining wall.

2. When required, for optional handrail see the plans and for optional fence see Index No. 452.

3. Cost of reinforcing steel, face texture, finish and Joint seal to be included in the contract unit price for Class I Concrete (Retaining Walls) CY.
GENERAL NOTES

1. Taper-Type exit and entrance terminals as detailed shall not be used on ramps for which a speed of 30 MPH or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of taper with lengths set according to AASHTO.

2. (a.) PCC Pavement Projects:
   - Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be extended to the adjacent roadway pavement beginning with the transverse joint nearest the point of 6' width.
   - Flexible Pavement Projects:
     - Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be extended to the adjacent roadway pavement.

3. For concrete pavement joint details and inputs at entrance and exit ramp terminals see Index No. 70.

4. Shoulder gutter applications will be determined by drainage design.
THREE THRU LANES - APPROACH AUXILIARY LANE

EXIT TERMINALS

TWO-LANE RAMPS
ACCELERATION LANE WITH SHOULDER GUTTER

DECELERATION LANE WITH SHOULDER GUTTER

SHOULDER TREATMENT
AT SPEED CHANGE LANES AT FREEWAY RAMP TERMINALS

FREEWAY RAMP TERMINALS
Do Not Use Distances From 1994 AASHTO Table X-4. 

1. Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridge is located within the merging lane.

2. Parallel cross road entrance terminals. Recommended when a bridge is located within the merging lane, turning roadway speed is less than 65% of thru roadway speed or for the combinations of horizontal alignment shown elsewhere on this sheet.

3. Standard cross road exit terminals. To be used when roadway alignment is tangent.

4. Parallel cross road exit terminals. Recommended when exit is partially hidden over the crest of vertical curve or when turning roadway speed is less than 65% of thru roadway speed, or for the combinations of horizontal alignment shown elsewhere on this sheet.

UNIVERSALIZED ENTRANCES

UNIVERSALIZED EXITS

Footnotes:
- Normal shoulder pavement width.
- Adjust for grades if greater than 2% (See Table X-5, AASHTO).

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RAMP TERMINALS
CROSSROAD TERMINALS

For median widths greater than 27', curb is to be used only as required for channelization of traffic.

See Index No. 397 for deceleration length (L.) Queue length.

Signalized or Unsignalized Left Turn Control

RAMP TERMINALS ON CURVES

NOTE: Ramp terminal on curve should be avoided when possible.
4-LANE WITH TWO-WAY LEFT-TURN LANES

4-LANE UNDIVIDED FLARED - SYMMETRICAL

INTERSECTION TURNS AND STORAGE

GENERAL NOTE
1. For pavement markings refer to Index No. 0754E.
FLARED & PAINTED LEFT TURNS FOR 2-LANE 2-WAY ROADWAYS

LEFT SIDE WIDENING

CENTERED WIDENING

RIGHT SIDE WIDENING

<table>
<thead>
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<td>380 360 335</td>
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<tr>
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<td>650 620 595</td>
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<td>80</td>
<td>720 690 665</td>
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<table>
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<tbody>
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<td>380 360 335</td>
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<td>40</td>
<td>440 420 405</td>
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<tr>
<td>60</td>
<td>500 480 465</td>
</tr>
<tr>
<td>80</td>
<td>560 540 525</td>
</tr>
</tbody>
</table>

$T_e$: See Index No. 30 for Deceleration Length (L) Queue Length

Queue Length
4-LANE DIVIDED TO 4-LANE UNDIVIDED

4-LANE DIVIDED TO 2-LANE UNDIVIDED

4-LANE UNDIVIDED TO 2-LANE UNDIVIDED

LANE DIVERGENCE AND CONVERGENCE FOR CENTERED ROADWAYS

S = Design speed (mph)
CONNECTING FLARE WITH PAVED SHOULDERS TO EXISTING ROADWAY WITHOUT PAVED SHOULDERS

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

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

CONNECTING SIMILAR WIDTH PAVEMENTS

CONNECTING DIFFERENT WIDTH PAVEMENTS

FLARED - PAVED SHOULDERS

PAVED SHOULDER TREATMENT AT TRANSITIONS AND CONNECTIONS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

ROADWAY TRANSITIONS

Approved By

Designed By

Checked By

Drawn By

Revision Sheet No.

9/89

9/89

9/98

9/98

4 of 8
1. The transition details as represented on sheets 5 thru 8 are intended as guidelines only. The transition lengths, curve data, lane radii and offsets are valid only for tangent alignment, design speeds <45 mph, the median widths and lane widths shown.

2. Approach lane departures (L=5') are suitable for design speeds up to 60 mph. Interior curves (D=5') are suitable for normal crown for design speeds up to 50 mph. Merging curves (D=5') will require superelevation.

3. The geometrics of these schemes are associated with the standard subsectional spacing for shoulders, but in any case will require modification to accommodate shoulder location, multilane and/or divided shoulders, oblique shoulders, crossover widths, storage and speed change lane requirements, and other related features.

LEFT ROADWAY CENTERED ON APPROACH ROADWAY
TWO LANE TO FOUR LANE TRANSITION
L = WS for speeds ≥ 45 mph
L = WS/2 for speeds ≤ 40 mph
Where:
W = Width of lateral transition in feet
S = Design speed.

LEFT ROADWAY CENTERED ON THRU ROADWAY
FOUR LANE TO TWO LANE TRANSITION
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
ROADWAY TRANSITIONS

RIGHT ROADWAY CENTERED ON APPROACH ROADWAY
TWO LANE TO FOUR LANE TRANSITION

L = WS for speeds ≤45 mph
L = W/2 for speeds >40 mph

Where:
W = Width of lateral transition in feet
S = Design speed.
L = WS for speeds ≥ 45 mph
L = \( \frac{WS}{2} \) for speeds ≤ 40 mph
Where:
W = Width of lateral transition in feet.
S = Design speed.
NOTE: Return configurations for each quadrant must be analyzed independently to ensure adequate return pavement for semi-trailer truck lane tracking and for maintaining clearance between trucks making opposing movements. The depicted design only applies where road and arterial intersect at 90° to the median line and have centerlines common with the opposing road or street. Swept paths are by Autoturn 4.0 for the AASHTO SU and WB-40 tractor-semitrailer.

NOTE: Return configurations for each quadrant must be analyzed independently to ensure adequate return pavement for semi-trailer truck lane tracking and for maintaining clearance between trucks making opposing movements. The depicted design only applies where road and arterial intersect at 90° to the median line and have centerlines common with the opposing road or street. Swept paths are by Autoturn 4.0 for the AASHTO SU and WB-40 tractor-semitrailer.
NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for anti-trailer inside tracking and for minimum clearance between trailer and opposing movement. The depicted design only applies where roads intersect at 90\(^\circ\) to the median and have centerlines aligned with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTO DW-50 tractor-trailer.

**RETURN NO. 1**
- Curved Type A: Swept Wing (Optional)
- Chevron (Optional)

**RETURN NO. 2**
- Curved Type A: Swept Wing (Optional)
- Chevron (Optional)

**RETURN NO. 3**
- Curved Type A: Swept Wing (Optional)
- Chevron (Optional)

**RETURN NO. 4**
- Curved Type A: Swept Wing (Optional)
- Chevron (Optional)

**QUADRANT NOS. 1 & 2 VACANT**
- Curved Type A: Swept Wing (Optional)
- Chevron (Optional)

**RETURN NO. 3**
- Curved Type A: Swept Wing (Optional)
- Chevron (Optional)

**RETURN NO. 4**
- Curved Type A: Swept Wing (Optional)
- Chevron (Optional)

**RETURN NO. 5**
- Curved Type A: Swept Wing (Optional)
- Chevron (Optional)

**NOTE:** Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for anti-trailer inside tracking. The depicted design only applies where roads intersect at 90\(^\circ\) to the median. Swept paths are by AutoTURN 4.0 for the AASHTO DW-50 tractor-trailer.

**40' MEDIAN • 4-LANE DIVIDED • PARALLEL TURN BAY • 2001 AASHTO WB-50 (WB-15)**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**DIRECTOR OF TRANSPORTATION**

**DEPUTY DIRECTOR**

**ENGINEER**

**DIVISION OF HIGHWAY ENGINEERING**

**DESIGN**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**DIRECTIONAL MEDIAN OPENINGS**

**40' MEDIAN • 4-LANE DIVIDED • PARALLEL TURN BAY • 2001 AASHTO WB-50 (WB-15)**
NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for each motor-lane facility. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centerlines common with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTO 300 SU and WB-40 tractor-semitrailer.

RETURN NO. 1
RETURN NO. 2
RETURN NO. 3
RETURN NO. 4

QUADRANT NO. 1 & 2 VACANT

NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for each motor-lane facility. The depicted design only applies where roads and streets intersect at 90° to the mainline. Swept paths are by AutoTURN 4.0 for the AASHTO 300 SU and WB-40 tractor-semitrailer.

RETURN NO. 1
RETURN NO. 2
RETURN NO. 3
RETURN NO. 4

40' MEDIAN • 4-LANE DIVIDED • TAPERED TURN BAY • 2001 AASHTO SU & WB-40 (WB-12)
The purpose of this Index is to provide the designer a reference for developing emergency vehicle access through median barriers on limited access facilities. This standard is not to be applied when developing work zone median crossings. See Index Nos. 630 and 651 for work zone crossings.

1. The purpose of this Index is to provide the designer a reference for developing emergency vehicle access through median barriers on limited access facilities. This standard is not to be applied when developing work zone median crossings. See Index Nos. 630 and 651 for work zone crossings.

2. The purpose of this Index is to provide the designer a reference for developing emergency vehicle access through median barriers on limited access facilities. This standard is not to be applied when developing work zone median crossings. See Index Nos. 630 and 651 for work zone crossings.

3. Turn radii data generated by AutoTURN 4.0. With lane turning radii shown.

4. Six lane facility with 40' median above. For other lane and median configurations, adjustments to turn radii or added pavement may be required.

5. Contact the State Roadway Design Office for OFFICIAL USE ONLY details.

LIMITED ACCESS • MEDIANS 40' OR GREATER • 2001 AASHTO SU VEHICLE
**NOTES**

Keynotes On Sheet 2.

**FLOOR**
- 6" thick, concrete slab with 4 6x6-WF x 6-L-4
- 1" x 2" gray framing at slab perimeter & interior partitions
- Harden & broom finish slab surface.

**STRUCTURE**
- Floors: 8 x 8 PT
- Beams: 4 x 6 PT
- Framing: 4 x PT As described.
- Marc Members: 1x and 2x As described.

**ROOF**
- 3" x 6" T&G Wood Decking.
- 30° Aspect Impregnated Fiberglass Pant (asphalt):
  - Standing Seam Metal Pant 194 GA Steel
  - 0.032 Alum. w/ Kynar 500 Finish.
- Structure, Decking, and Roofing shall be designed to withstand 130 mph Wind Load.

**BUILDING CODE**
- Picnic Pavilions shall be constructed according to the requirements of the appropriate sections of applicable "Standard Building Code" or "South Florida Building Code", Current, Adopted Edition.

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**
- Picnic Pavilions
- Post Base Detail

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**
- Picnic Pavilions
- Post Base Detail
Alternate Material Note:
These structures are shown with timber frames and decking. Alternate materials (i.e., aluminum, steel, etc.) may be used when submittals are aligned and sealed by a specialty engineer as per Section 5.1 of the Standard Specifications and when approved by the Engineer.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

KEYNOTES

03300-A  Class III Conic Slab
03300-B  6" x 6" x 18'-6" x 14' 6" O.C.
03300-C  6 mil Vapor Barrier
03300-D  #5 Rebar Cont. (2 Required)
03300-E  24" x 26" Drop Footing
03300-F  18" x 16" Drop Footing
03300-G  6" Min Comp Sand Fill
03300-H  5" x 6" Rebar (4 Required)

05500-A  ½ Galv. Steel Plate
05500-B  ¾ Galv. Steel Plate
05500-C  Pedal Base
05500-D  ⅞ Bolt, Washer & Nut (Typ.)
05500-E  ⅞ Bolt, Washer & Nut
For Cross Brace Holes
05500-F  ⅞ Galv. Steel Rod w/Turnbuckle

06300-A  3" x 6' T&G Wood Decking
06300-B  4" x 6' PT Wood Frame
06300-C  8" x 8' PT Wood Post
06300-D  2" x 6' PT Wood Fascia
06300-E  1" x 10' PT Wood Fascia
06300-F  ⅞ Wood Shims

07411-A  Standing Seam Metal Roof
07411-B  Felt Underlayment

PICNIC PAVILIONS

REST AREA EQUIPMENT
SPECIFICATIONS

Concrete
- Footing: 10" thick
- Concrete: ASTM A36/A795, Grade #200
- Reinforcing Bars: ASTM A615/A706, Grade 60

Steel
- Galvanized Steel Plate, Steel Plate ASTM A495 with 060 Zinc Coating
- Galvanized Steel Plate, High-Strength Bolts and Nuts, ASTM A574 with 060 Zinc Coating
- Galvanized Steel Plate, High-Strength Bolts and Nuts, ASTM A574 with 060 Zinc Coating
- High-Strength Bolts and Nuts, ASTM A325 With Zinc Coating, Complying With SSPC-Paint No. 95

Wood
- Comply With American Institute For Timber Construction, AITC 81, "Standard For Heavy Timber Construction."
- For Solid Wood Decking, Comply With AITC 81, Standard For Tongue And Groove Heavy Timber Standard.

Preservative Treatment:
- Pressure Treated Fabricated Members With Waterborne Solution For Above Ground Use, Complying With AWPA C2,
- Wood Decking, Pressure Treated At 30° Centrifuge For Lateral Spiking To Adjacent Units. Spikes To Be 256 Galvanized Common

Picnic Tables
- Plastic Table And Bench Set Be 8' x 6' with Grey Galvanized Pipe Frames And Recycled Plastic Wood Saddle And Table Tops. All Tables Shall Be Of Wood Thrush Design Suitable For Exterior Locations. Tables At Accessible Pavilions Shall Meet The Requirements Of The Americans With Disabilities Act (ADA) Accessible Guidelines.

Picnic Pavilions
- Notch 0630-C To Accommodate Steel Plates
- Similar At Roof Rake
1. The location and construction of mailboxes shall conform to the rules and regulations of the United States Postal Service as modified by this design standard.

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

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

   The Contractor shall furnish and install one mailbox in accordance with this design standard at each mail patron location on the highway throughout the contract period. The Contractor shall install boxes to each patron box in accordance with identification specifications of the Domestic Mail Manual of the U.S. Postal Service, where local street names and house numbers are authorized by the Postmaster or a postal address, the contractor shall locate the box number on the box. If the box is located on a different street from the patron residence, the contractor shall locate the street name and house number on the box. The Contractor shall coordinate the location of patrons and existing mailboxes, immediately after installing the new mailbox, the contractor must notify each "Mail Delivery Patron" that removal of the existing mailbox must be accomplished in 20 days after receipt of notice. Patron shall have the option of removing the existing mailbox or leaving the mailbox in place for removal by the contractor. The contractor shall be included in the contract unit price for Mailbox, Each. The contractor shall dispose of mailboxes and supports in areas provided by him.

   Heads of existing mailboxes by the contractor will not be a requirement under any construction projects, however, where an existing mailbox meets the design requirements of this standard and is structurally and functionally sound, the contractor at his option may elect to reuse the existing mailbox. Any use of an existing mailbox must be approved by the Engineer.

4. Mailboxes shall be metal construction only, in traditional style only, and only in sizes prescribed by the Domestic Mail Manual of the U.S. Postal Service (DMW).

   Mailbox production standards, lists of approved manufacturers and suppliers of mailboxes, design approval and guidance may be obtained by writing to the Rural Delivery Division, USPS Headquarters, Washington, DC 20260.

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

   Mailboxes on rural highways shall be set with the rightside face of the box approximately 5 feet from the edge of the traveled way, a minimum distance of the greater of the following:
   - 6 feet for a width of 10 feet or less
   - 10 feet for ADT over 10,000 vehicles per day

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

   Mailboxes on rural highways, roads, and streets shall be set with the face of the box between 6 and 12" from the face of curb. If the sidewalk deters the curb or if an unusual condition exists which makes it difficult or impractical to install or serve boxes at the curb, the contractor with the concurrence of the local postal authority may be permitted to install all mailboxes 6 feet above the sidewalk, where they can be served by the carrier from the sidewalk.

6. Mailboxes shall be set with the bottom of the box between 42" and 48" above the mail stop surface, unless the U.S. Postal Service establishes other height restrictions.

7. No more than two mailboxes may be mounted on a supporting structure unless the support structure and mailbox arrangements have been shown to be safe by crash testing in accordance with NCHRP Report 350 and listed on the Department's Qualified Products List (QPL). The mail service will approve the installation of multiple mailboxes in a single location.

   Neighborhood Delivery and Collection Box Units (NDCBU) are a specialized multiple mailbox installation that must be located outside the highway and street clear zones. The location of NDCBU is at the sole responsibility of the Postmaster for the delivery route under consideration.

8. Lightweight newspaper receptacles may be mounted below the mailbox on the side of the support post in conformance with the USPS Domestic Mail Manual. The mail patron shall be responsible for newspaper receptacle installation and maintenance.

9. Wood and steel support posts for both single and double mailboxes shall be embedded no more than 24" into the ground.

   Concrete, brick, brick, stone, or other rigid foundation structure or equipment, either above or below the shoulder groundline, will not be permitted for mailboxes on rural highways. On urban roads and streets where mailbox support posts are set within right-of-way, the support posts shall be spaced from the pavement by a minimum of 1" of expansion material.

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

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

   At intersecting roads, mailboxes shall be located 100' or more from the centerline of the intersecting road on the far side in the direction of the delivery route, with the distance increased to 200' when the route volume exceeds 400 vehicles per day.

11. Wood support posts shall be in conformance with the material and dimensional requirements of Section 952 and the treatment requirements of Section 955 of the Standard Specifications.

   Steel support posts may have an external finish equal to or better than two coats of baked, white enamel, but other colors may be used when approved by the Engineer. When galvanized steel posts are used, painting is not required.

   Mounting brackets, plates, platforms, sheels and necessary hardware surface finishes are to be suitably painted to support post finishes.

12. Mailboxes shall be paid for under the contract unit price for Mailbox, Each. Payment shall be full compensation for boxes, posts and accessory items essential for construction needs, and, for identification letters and numbers.

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

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

   There shall be no payment participation for NDCBU furnishing, assembly, installation, resetting, or relocation.
STEEL FLANGED CHANNEL SUPPORT POSTS

- For Platforms
- 1/2" For Brackets

STEEL SPACER

Steel Flanged Channel or Pipe Post Types Shown on This Index

Post Spacing

Note: See General Notes for Finish Requirements.
STEEL PIPE AND WOOD SUPPORT POSTS

- 2" x 4" Wood Post
- 2" @ Pipe Post
- 4" x 4" Wood Post
- Steel Shelf
- Steel Anti-Twist Plate
- Steel Clamp
- Steel Bracket
- Steel Platform
**GENERAL NOTES**

1. Tractor crossing shall be paid for under the contract unit price for Tractor Crossing, EA.

---

**SECTION AA**

Note: Class F Concrete to be used unless otherwise noted in plans or special provisions.

**REINFORCED CONCRETE**

**TYPE A**

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**SECTION BB**

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 placed so the tractor crossing will extend a minimum of four feet (4') beyond roadway shoulders.

**TREATED TIMBER**

**TYPE B**

---

**TRACTOR CROSSINGS**
**PLAN TIMBER PLATE**

**TIMBER PLATE**

- 6 x 6" Treated Timber
- 8 x 8" Treated Timber
- 8 x 8" Treated Timber

**STEEL PLATE**

- Steel or PVC Schedule 40 Pipe (Casing)
- Steel or PVC Schedule 40 Pipe (Casing) ½" Hex Head Bolt, Nut & Washer (Both Thread End Up)
- Iron Pipe Cap
- Iron Coupling (As Required)

**STEEL PLATE**

- Steel or PVC Schedule 40 Pipe (Casing) ½" Hex Head Bolt, Nut & Washer (Both Thread End Up)
- Iron Pipe Cap
- Iron Coupling (As Required)

**STEEL PLATE**

- Steel or PVC Schedule 40 Pipe (Casing)
- Steel or PVC Schedule 40 Pipe (Casing)
- Iron Pipe Cap
- Iron Coupling (As Required)

**INSTALLATION**

- Plate To Be Plumb
- Top Of Lift Or Top Of Full Surcharge
- Fill Within 3' Of Stem Shall Be Compacted By Hand To Required Density
- Plate To Be Seated (Level) After Clearing And Grubbling Operations And Prior To Placing Final Fill Lift

**NOTES**

1. Elevation of the top of each length of marker pipe shall be established as soon as it is installed and also immediately before the next length of marker pipe is added.

2. Settlement plate locations shall be flagged and protected from construction vehicles and equipment. If settlement plates are disturbed, they shall be replaced in kind.

3. Gasket used to construct seal should not have a mesh covering (plastic or other synthetic materials).

4. The settlement plate shall be paid for under the contract unit price for Settlement Plate Assembly, etc.
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
LANDSCAPE INSTALLATION

Plastic, Rubber Or Flexible Guying Material, Wire Not To Be Used.

5" Deep Mulch Layer.

5 Layers Of Burlap And 5" O.D. Steel Bands Or Approved Alternates

12" Water Ring (At Top Of Trees) Serve To Collect Water

Sabal Palms May Be Hurricane Cut, All Others Must Have Fronds Tied As Shown With Blackwood Straps

2"x4" Post

Sabal Palms Mats Must Have Fronds Tied As Shown With Biodegradable Strip

2"x4" Post And Rails

No SLOPES

3" Deep Mulch Layer

Water Ring Providing A Water Collecting Basin For 1/2 Gall. Of Cresol

Not To Scale

Shrub Planting

For Groups Of Trees Place Barricades Between Trees And Construction

Sabal Palms Mat

All Others /just Fronds

Sabal Palms Mat

Be Huffloane Cut.

Tree Barricade

No SLOPES

1. All trees and shrubs are to be positioned vertically regardless of the slopes of the ground on which they are planted. Water rings are to be constructed which will facilitate the purpose of retaining water on the base of the plant.

2. Tree, palm and shrub planting shall be carried out in accordance with Section 506 of the Standard Specifications.

3. For clear sight development and maintenance of intersecting highways, roads and streets see Index No. 544. For offshore travel lanes see Index No. 700.

4. The top 5% of mulch shall be above soil surface prior to each application.

Notes:

1. All trees and shrubs are to be established vertically regardless of the ground on which they are planted. Water rings are to be constructed which will facilitate the purpose of retaining water on the base of the plant.

2. Tree, palm and shrub planting shall be carried out in accordance with Section 506 of the Standard Specifications.

3. For clear sight development and maintenance of intersecting highways, roads and streets see Index No. 544. For offshore travel lanes see Index No. 700.

4. The top 5% of mulch shall be above soil surface prior to each application.
1. Details apply to both rural and urban intersections under stop sign control or flashing beacon control. For full signal controlled intersections see Design Note No 4.

2. Sight distance (ds) is measured along the major roadway from the center of the entrance lane of the minor roadway to the center of the near approach lane (right or left) of the major roadway. Distance (di) and (dr) are measured from the centerline of the entrance lane of the minor roadway to a point on the edge of the near side outer traffic lane on the major roadway. Distance (dl) is measured from the centerline of the entrance lane of the major roadway to a point on the median clear zone limit or horizontal clearance limit for the far side roadway of the major roadway.

3. The limits of clear sight define a corridor throughout which a clear sight window must be preserved. See WINDOW DETAIL Sheet 6.

b. Clear sight must be provided between vehicles at intersection stop locations, and vehicles on the major roadway within dimension "d".

c. Since observations are made in both directions along the line of sight, the reference datum between roadways is 3'-6" above respective pavements.

4. Barrier systems within intersection sight corridors, where penetration into the sight window might occur, shall be located to provide the clear sight window as required.

5. The corridor defined by the limits of clear sight is a restricted planting area.驾驶员s vehicles on the intersecting roadway and vehicles on the major roadway must be able to see each other clearly throughout the limits of "d" and "d1". In the Engineer's judgment, landscape interference with the line of sight corridor prescribed by these standards the Engineer may reorient, relocate or eliminate plantings. Plants within the restricted areas are limited to selections as follows:

Ground Cover & Trunked Plants (Separate or Combined):

Ground Cover - Plant selection of low growing vegetation which at maturity do not attain a height greater than 8" below the sight line datum.

For ground cover in combination with trees and palms, the following heights below the line datum will apply: 24" for trees and palms (≤11" dia.); and, 18" for sabal palms (≥11" dia. - within Sight Window).

Trunked Plants - Plant selection of a mature trunk diameter 4" or less measured at 6" above the ground. Canopy or high borne foliage shall never be lower than 5" above the sight line datum. These selections shall be spaced no closer than 20'.

Trees:

Trees can be used with lawn, turf, pavement, gravel, bark or wood chip beds. Trunked plants or other Department approved materials. The clear sight window must be in conformance with the WINDOW DETAIL modified to obtain the height requirements listed in Ground Cover above. Tree size and spacing shall conform to the following tabular values:

<table>
<thead>
<tr>
<th>Description</th>
<th>Speed (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Inches)</td>
<td>30</td>
</tr>
<tr>
<td>(Feet)</td>
<td>84</td>
</tr>
</tbody>
</table>

Minimum Spacing (in. of trunk):

<table>
<thead>
<tr>
<th>Size and Spacing</th>
<th>Based on the following conditions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) A straight line of trees in the median parallel but not necessarily colinear with the centerline,</td>
<td></td>
</tr>
<tr>
<td>(b) A straight approaching mainline, within skew limits as described in No. 2 above,</td>
<td></td>
</tr>
<tr>
<td>(c) A straight line of trees along a vertical 6' wide shoulder band on a vehicle entering at stop bar location when viewed by multi-line driver beginning at distance (v) see SHADOW DIAGRAM, Sheet 6.</td>
<td></td>
</tr>
<tr>
<td>(d) Trees with diameters ≤11&quot; spaced at intervals providing a 2' second full view of entering vehicle at stop bar location when viewed by multi-line driver beginning at distance (v) see PERCEPTION DIAGRAM, Sheet 6.</td>
<td></td>
</tr>
<tr>
<td>(e) Trees with diameters &gt;11&quot; spaced at intervals providing a 2' second full view of entering vehicle at stop bar location when viewed by multi-line driver beginning at distance (v) see PERCEPTION DIAGRAM, Sheet 6.</td>
<td></td>
</tr>
</tbody>
</table>

For any other conditions the tree size, spacing and location shall be detailed in the plans, see Design Note No. 5.
Pictorial

2 LANE UNDIVIDED

Limit of Clear Sight

Limit of Clear Sight

2 LANE 2 WAY • FLARED FOR OPPOSING LEFT TURN CENTERED ON ALIGNMENT

Limit of Clear Sight

Limit of Clear Sight

2 LANE 2 WAY • FLARED FOR SINGLE SIDE LEFT TURN CENTERED ON ALIGNMENT

Limit of Clear Sight

Limit of Clear Sight

LEGEND

Areas Free Of Sight Obstructions

NOTE: See Sheet 6 for intersecting roadway origin of clear sight and quadrant corner clips.
SIGHT DISTANCES \((d)\) \& \((d_v)\) AND RELATED DISTANCES \((d, d_v, d_i \& d_{vl})\) (FEET)

4 LANE DIVIDED ROADWAY

NOTES FOR 4-LANE DIVIDED ROADWAY

1. See Sheet 6 for origin of clear sight line on the minor road.
2. Values shown in the tables are the governing (controlling) sight distances calculated based on "AASHTO Case B - Intersection with Stop Control on the Minor Road."

### Vehicle Type and Length

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Length (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger (P)</td>
<td>19</td>
</tr>
<tr>
<td>Single Unit (SU)</td>
<td>30</td>
</tr>
<tr>
<td>Large School Bus</td>
<td>40</td>
</tr>
<tr>
<td>WB-40</td>
<td>45.5</td>
</tr>
<tr>
<td>WB-50</td>
<td>55</td>
</tr>
</tbody>
</table>

**PLAN PICTORIAL**

Where the median is sufficiently wide for the design vehicle to pause in the median, the clearance of sight to the right is measured from the vehicle to the right of the median. The clear sight line is measured from the vehicle to the cross road stop position, not from the cross road stop position.

**INSET A**

**INSET B**

**LEGEND**

- **INSET A** Areas Free of Sight Obstructions
- **INSET B** Areas Free of Sight Obstructions

**State of Florida Department of Transportation**

**SIGHT DISTANCE AT INTERSECTIONS**

**Drawn By:**

**Checked By:**

**Drawn on:** 10/02 4

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

**HSD 10/89**
SIGHT DISTANCES \( (d) \), \( (d_v) \) \& \( (d_v) \) AND RELATED DISTANCES \( (d_1, d_2, d_3 \& d_{v1}) \) (FEET)

**6 LANE DIVIDED**

---

**NOTES FOR 4-LANE DIVIDED ROADWAY**

1. See Sheet 6 for origin of clear sight line on the minor road.
2. Values shown in the tables are the governing (controlling) sight distances calculated based on "AASHTO Case B - Intersection with Stop Control on the Minor Road."
The traveled way is the portion of the roadway for the movement of vehicles, exclusive of shoulders and marked bicycle lanes. Lines for 'limit of clear sight' are opposite hand when major road near lane traffic moving left (e.g. one-way left).

The intent of this standard is to provide a window with vertical limits of not less than 6' above and 1'-6" below the sight line datum, and horizontal limits defined by the limits of clear sight.

The values in this table were established by the method referenced in Design Note 2 and are applicable to urban, predominantly curbed roadways with design speeds of 45 mph or less, and meeting the restricted conditions defined in Index No. 700. For horizontal clearances (HCS) of 6' feet (6'), the values for d_s may be determined by the equation: d_s = L + 1.8*W + W/2, where L and W are the length and width of the obstruction, respectively. For the left-turn situation, the d_s value should be based on the operating lane for the left-turn approach and on clear zone widths (see Index No. 700).
PREFACE

All projects and works on highways, roads and streets shall have a traffic control plan. All work shall be executed under the approved plan and standards for the preparation of traffic control plans and for the execution of traffic control in work zones, for construction and maintenance operations and utility work on highways, roads and streets.

Index No. 600 provides Department policy and standards. Changes are only to be made thru Department approved procedures. Index Nos. 600 thru 670 provide typical applications for various situations. Modification can be made to these Indexes as long as the changes comply with the MUTCD and Department Design Standards.

The signs and symbols shown on the indexes are typical of recommended practices. These distances may be increased or decreased based on field conditions, in order to avoid conflicts or to improve specific traffic controls.

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

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

ABBREVIATIONS

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

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>DTOT</td>
<td>District Traffic Operations Engineer</td>
</tr>
<tr>
<td>FDOT</td>
<td>Florida Department of Transportation</td>
</tr>
<tr>
<td>HAR</td>
<td>Highway Advisory Radio</td>
</tr>
<tr>
<td>LED</td>
<td>Law Enforcement Officer</td>
</tr>
<tr>
<td>MAS</td>
<td>Motorist Awareness System</td>
</tr>
<tr>
<td>MTC</td>
<td>Maintenance Of Traffic Committee</td>
</tr>
<tr>
<td>MUTCD</td>
<td>Manual On Uniform Traffic Control Devices For Streets And Highways</td>
</tr>
<tr>
<td>NCHRP</td>
<td>National Cooperative Highway Research Program</td>
</tr>
<tr>
<td>PCMS</td>
<td>Portable Changeable (Variable) Message Sign</td>
</tr>
<tr>
<td>PRS</td>
<td>Portable Regulatory Sign</td>
</tr>
<tr>
<td>RPW</td>
<td>Raised Retroreflective Pavement Marker</td>
</tr>
<tr>
<td>RSOU</td>
<td>Radar Speed Display Unit</td>
</tr>
<tr>
<td>S</td>
<td>Speed Of Off-Peak 85 Percentile Speed (MPH)</td>
</tr>
<tr>
<td>TCP</td>
<td>Traffic Control Plan(s)</td>
</tr>
<tr>
<td>TCZ</td>
<td>Traffic Control Zones</td>
</tr>
<tr>
<td>TMA</td>
<td>Truck Mounted Attenuator</td>
</tr>
<tr>
<td>VECP</td>
<td>Value Engineering Change Proposal</td>
</tr>
<tr>
<td>W</td>
<td>Width Of Taper Transition In Feet I.E., Lateral Offset</td>
</tr>
</tbody>
</table>

SYMBOLS

The symbols shown are found in the Traffic Control Zone Cell Library (TCPZ.Cell) on the CADD system. Symbols assigned to the 600 series Design Standards and applicable to traffic control plans, unless otherwise identified in the plans, are as follows:

- Work Area, Hazard Or Work Phase (Any pattern within a boundary)
  - Sign With 8" x 18" (Min.) Orange Flag And Type B Light
  - Type I Or Type II Barricade Or Vertical Panel Or Drum
  - Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only)
  - Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)
  - Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
  - Cone Or Tubular Marker
  - Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum
  - Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum (With Flashing Light)
  - Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum (With Steady Burning Light)
  - Type III Barricade
  - Type III Barricade (With Flashing Light)
  - Type III Barricade (With Steady Burning Light)
  - Work Zone Sign
  - Flagger
  - Traffic Signal
  - Advance Warning Arrow Panel
  - Portable Signal
  - Crash Cushion
  - Stop Bar
  - Work Vehicle With Flashing Beacon
  - Shadow (SW) Or Advance Warning (AW) Vehicle
  - With Advance Warning Arrow Panel And Warning Sign
  - Truck Mounted Attenuator (TMA)
  - Orange Flag For TCZ Signs
  - Type B Light For TCZ Signs
  - Low Enforcement Officer
  - Portable Regulatory Sign
  - Radar Speed Display Unit
  - Portable Changeable (Variable) Message Sign
RAILROADS

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

OVERHEAD WORK

No work shall be allowed over a traffic lane using a bucket truck, unless a lane closure has been set up in accordance with the appropriate index.

OVERWEIGHT/OVERSIZED VEHICLES

Restrictions to Lane Widths, Heights or Load Capacity can greatly impact the movement of over dimensioned loads. The Contractor shall notify the Engineer who in turn shall notify the State Permits Office, phone no. (305) 410-5777, at least seven calendar days in advance of implementing a maintenance of traffic plan which will impact the flow of overweight/oversized vehicles. Information provided shall include location, type of restriction (height, width or weight) and restriction time frames. When the roadway is restored to normal service the State Permit Office shall be notified immediately.

LANE WIDTHS

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

LENGTH OF LANE CLOSURES

Lane closures shall not exceed 2 miles in total length in any given direction on the interstate or on state highways with a posted speed of 55 MPH or greater.

SIGHT DISTANCE TO DELINEATION DEVICES

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

ABOVE GROUND HAZARD

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

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

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

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

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

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

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

When field conditions warrant speed reductions different from those shown in the TCP the contractor may submit to the project engineer for approval by the Department, a signed and sealed study to justify the need for further reducing the posted speed, or the engineer may request the District Traffic Operations Engineer (DTOE) to investigate the need. It will not be necessary for the DTOE to issue regulations for regulatory speeds in work zones due to the revised provisions of F.S. 366.0745(2) (b), (c). Advisory Speed plates will be used at the option of the Field Engineer for temporary use while processing a request to change the regulatory speed specified in the plans when deemed necessary. Advisory speed plates cannot be used alone but must be placed below the construction warning sign for which the advisory speed is required.

For additional information refer to the FDOT Roadway Plan Preparation Manual, Volume 1, Chapter 10.

FLAGGER CONTROL

Where flaggers are used, a FLAGGER symbol or legend sign must replace the WORKERS symbol or legend align.

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

HIGH-VISIBILITY CLOTHING

For daytime work, the flagger's vest, shirt, or jacket shall be orange, or a fluorescent version of this color. For nighttime work, similar outside garments shall be retroreflective. The retroreflective material shall be either orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and be visible a minimum distance of 1,000 ft. The retroreflective clothing shall be designed to clearly identify the wearer as a person.

HAND-SIGNALING DEVICES

STOP/SLOW paddles are the primary hand-signalizing device. The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. STOP/SLOW paddles shall be at least 24 inches wide with a reflection on at least 5 inches high and should be fabricated from light semi-rigid material. The background of the STOP face shall be red with white letters and border. The background of the SLOW face shall be orange with black letters and border. When used at nighttime, the STOP/SLOW paddle shall be retroreflective.

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

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

FLAGGER STATIONS

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

SURVEY WORK ZONES

The SURVEY CREW AHEAD symbol or legend sign shall be the principal Advance Warning Sign used for Traffic Control Through Survey Work Zones and may replace the ROAD WORK AHEAD sign when lane closures occur, at the discretion of the Party Chief. Type B Light or dual orange flags shall be used at all times to enhance the SURVEY CREW AHEAD sign, even with mesh signs.

When Traffic Control Through Work Zone is being used for survey purposes only, the END ROAD WORK sign as called for on certain 500 Series indexes should be omitted.

SURVEY BETWEEN ACTIVE TRAFFIC LANES OR SHARED LEFT TURN LANES

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

(A) A STAY IN YOUR LANE (MOT-1) sign shall be added to the Advance Warning Sign sequence as the secondmost immediate sign from the work area.

(B) Elevation Surveys-Cones may be placed at the discretion of the Party Chief to protect prism holder and flagger's l. Cones, if used, may be placed at up to 50' intervals along the break line throughout the work zone.

(C) Horizontal Control—With traffic flow in the same direction, cones shall be used to protect the backlight tripod and/or instrument. Cones shall be placed at the equipment, and up to 50' intervals for at least 200' towards the flow of traffic.

(D) Horizontal Control—With traffic flow in opposite directions, cones shall be used to protect the backlight tripod and/or instrument. Cones shall be placed at the equipment and, up to 50' intervals for at least 200' in both directions towards the flow of traffic.
SIGN PLACEMENT
Post-mounted signs installed at the side of the road shall be mounted at a height of at least 7 feet measured from the bottom of the sign to a horizontal line extended from the near edge of the pavement. Signs mounted on barriers, or other portable supports shall be no less than 1 foot above the travel way.

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

(a) For scheduled projects the engineer in responsible charge of project design will resolve anticipated work zone conflicts during the development of the project traffic control plan. This may entail revision of plans on preceding projects and coordination of plans on concurrent projects.

(b) Unanticipated conflicts arising between adjoining in progress highway construction projects will be resolved by the Resident Engineer for projects under his residency, and, by the District Construction Engineer for in progress projects under adjoining residencies.

(c) The District Maintenance Engineer will resolve anticipated and occurring conflicts within scheduled maintenance operations.

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

SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING
Existing signs that conflict with temporary work zone signing shall be removed or covered as approved by the Engineer. Traffic control signs that require covers when no work is being performed in a work area shall be fully covered with a durable opaque sheet material. Plastic film and woven fabrics including burlap will not be permitted. Covering of only the legend or symbol will not be permitted. Reflective covering will not be permitted. Hinged covers designed to cover when folded will be permitted. Covers, hinged panels and intermittent work stoppage shields and plaques are incidental to work operation signs and are not to be paid for separately.

SIGN MATERIALS
Mesh signs may be used only for Daylight Operations as noted in the standards. Type D Lights and Orange Flags are not required except for survey work zones.

Vinyl signs may be used for Day or Night Operations not to exceed 12 hours except as noted in the standards. Type D Lights and Orange Flags are not required except for survey work zones.

WORK ZONE SIGN SUPPORTS
All signs shall be mounted post 1 foot above the travel way.

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

<table>
<thead>
<tr>
<th>SUPPORTS FOR MAINTENANCE OF TRAFFIC SIGNS</th>
<th>SIGN SIZE</th>
<th>SIGN BRACKET</th>
<th>ROUND ALUMINUM</th>
<th>DEPTH IN GROUND</th>
<th>STEEL CHANNEL</th>
<th>DEPTH IN GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>24&quot; x 36&quot; 2-1</td>
<td>NPS 2.0&quot; x 3/8</td>
<td>2'-0&quot;</td>
<td>2.5 lb F/M**</td>
<td>3'-0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48&quot; x 48&quot; DIAMOND</td>
<td>NPS 3.5&quot; x 3/8</td>
<td>3'-4&quot;</td>
<td>**</td>
<td>3'-0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60&quot; x 48&quot; 3-1</td>
<td>NPS 3.5&quot; x 3/8</td>
<td>3'-4&quot;</td>
<td>**</td>
<td>3'-0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24&quot; x 30&quot; 2-1</td>
<td>NPS 2.0&quot; x 3/8</td>
<td>2'-0&quot;</td>
<td>2.5 lb F/M**</td>
<td>3'-0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48&quot; x 24&quot; 2-2</td>
<td>NPS 3.0&quot; x 3/8</td>
<td>2'-6&quot;</td>
<td>**</td>
<td>3'-0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60&quot; x 24&quot; 3-3</td>
<td>NPS 3.0&quot; x 3/8</td>
<td>2'-6&quot;</td>
<td>3.0 lb F/M**</td>
<td>3'-0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60&quot; x 36&quot; 3-3</td>
<td>NPS 3.5&quot; x 3/8</td>
<td>3'-4&quot;</td>
<td>4.0 lb F/M**</td>
<td>3'-0&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* F/M indicates Type F or Type M
** Requires two 3 lb/ft steel channel (F/M) at 2'-6" center to center. All sign brackets shall be Type 1. The total number of brackets shall be per post as tabulated, except the "Diamond" sign which shall use two Type 1 brackets per post.

The 4 lb/ft steel channel shall be installed with approved breakaway bases. Refer to Index No. I1880, Sheet 3, for round aluminum sign bracket details, and Index No. I1885, Sheet 2, for steel channel breakaway bases, and notes.

FOR DETOURS, LANE SHIFTS AND DIVERSIONS
Detours should be signed clearly over their entire length so that motorists can easily determine how to return to the original roadway. The W-4H, WOT-2-04, and WOT-3-04 warning signs should be used for the advanced warning for a lane shift. A diversion should be signed as a lane shift.

EXTENDED DISTANCE ADVANCE WARNING SIGNS
Advance Warning Signs shall be used at extended distances of one-half mile or more when limited sight distance or the nature of the obstruction may require a motorist to bring their vehicle to a stop. Extended Distance Advance Warning Signs may be required on any roadways, but particularly be considered on multi-lane divided highways where vehicle speed is generally in the higher range (45 MPH or more).

SPEEDING FINES DOUBLED WHEN WORKERS PRESENT SIGN
The SPEEDING FINES DOUBLED WHEN WORKERS PRESENT sign should be installed on all projects. The placement should be 500 feet beyond the ROAD WORK AHEAD sign or midway to the next sign whichever is less.

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

INTERSECTING ROAD SIGNING
Signs for the control of traffic entering and leaving work zones by way of intersecting highways, roads and streets shall be adequate to make drivers aware of work zone conditions. Under no condition will intersecting leg signing be less than a ROAD WORK AHEAD sign, including light and flag, for approaching vehicles.

END ROAD WORK SIGNS
The END ROAD WORK sign (G20-2A) should be erected approximately 500 feet beyond the end of a construction or maintenance project unless other distance called for in the plans. When either Construction or Maintenance Operations occur within one mile this sign should be omitted and signing coordinated in accordance with index No. 600, ADJOINING AND/OR OVERLAPPING WORK ZONE SIGNING.
1. Sign height shall be 7' minimum. Sign offset from edge of travel way should be between 6' and 10' and relatively consistent through the project phase.

2. Place one business sign for each driveway entrance affected. When several businesses share a common driveway entrance, place one sign per common driveway entrance.

3. Channelizing devices should be placed at a reduced spacing on each side of the driveway entrance.

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**TRAFFIC CONTROL THROUGH WORK ZONES**

**GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES**

**Drawn By**

**Evaluated By**

**Construction Division**

**Page 600**

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**PLACEMENT OF BUSINESS ENTRANCE SIGNS AND CHANNELIZING DEVICES AT BUSINESS ENTRANCE**
PORTABLE CHANGEABLE (VARIABLE) MESSAGE SIGNS (PCMS)

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

PCMS should be placed approx. 500 to 800 feet in advance of the work zone conflicts or 1.5 to 2 miles in advance of complex traffic control schemes which require new and/or unusual traffic maneuvers.

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

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

CHANNELIZING AND LIGHTING DEVICES

Channelizing and lighting devices for work zone traffic control shall be described in Section 6F-72 of the MUTCD, subject to supplemental revisions provided in the contract documents.

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

CHANNELIZING AND LIGHTING DEVICE CONSISTENCY

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

REMOVING PAVEMENT MARKINGS

Existing pavement markings that conflict with temporary work zone delineation shall be removed by any method approved by the Engineer, where operations exceed one daylight period. However, painting over existing pavement markings will not be permitted. Full pavement width overlays of either asphalt concrete SP 9.5 or FC-6 are a positive means to achieve obliteration.

SIGNALS

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

Maintain all existing actuated or traffic responsive mode signal operations for main and side street movements for the duration of the Contract and require restoration of any loss of detection within 12 hours. The contractor shall select only detection technology listed on the Department’s Approved Products List (APL) and approved by the Engineer to retain detection capabilities. The plans should identify the intersections where Temporary Traffic Detection is required.

WARNING LIGHTS

Warning lights shall be in accordance with Section 6F-72 of the MUTCD except for the application limitations stipulated below:

Flashing Lights Type A Low Intensity Flashing Warning Lights are to be mounted on barriozes, drums, concrete barrier walls or vertical panels and used in combination with those devices to delineate the travel way on lane closures, lane changes, divergence curves and other similar conditions. Type A flashing lights are intended to be placed in a line to delineate the traveled way and around obstructions in the transition, buffer, work and termination areas of the traffic control zone. Their intended purpose is not for warning drivers that they are approaching or proceeding in a hazardous area.

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

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

ROADSIDE BARRIERS

When connecting temporary concrete barrier wall to guardrail the connection shall be made in accordance with Index No. 410. All guardrail and anchorages to be included in the cost of Temporary Guardrail.

TRUCK MOUNTED ATTENUATORS

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

MANHOLES/CROSSWALKS

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

The apron is to be removed prior to constructing the next lift of asphalt. The cost of the temporary asphalt shall be included in the Contract Unit Price for Maintenance of Traffic, LS.
**DROP OFF CONDITION NOTES**

1. A dropoff is defined as a drop in elevation, parallel to the adjacent travel lanes, greater than 3" with slopes (A:B) steeper than 1:4. When dropoffs occur within the clear zone due to construction or maintenance activities, protection devices are required. See chart.

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

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

4. Any dropoff condition that is created and restored within the same work period will not be subject to the use of barriers, however, warning devices will be required.

5. When permanent curb heights are ≥ 6", no warning device will be required. For curb heights <6", see chart.

---

**DROP OFF PROTECTION REQUIREMENTS ALL SPEEDS NO CURB AND GUTTER**

<table>
<thead>
<tr>
<th>X (ft)</th>
<th>D (in)</th>
<th>Device Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-CZ</td>
<td>≤ 0.5</td>
<td>Sign W8-SA</td>
</tr>
<tr>
<td>0-ID</td>
<td>&gt;0.5</td>
<td>Barrier</td>
</tr>
<tr>
<td>12-CZ</td>
<td>&gt;5</td>
<td>Warning Device</td>
</tr>
</tbody>
</table>

For clear zone widths, see Index No. 600 sheet 2.

---

**DROP OFF NOTES**

1. These conditions and treatments can be applied only in work areas that fall within a properly signed work zone.

2. The following are defined as acceptable warning devices:
   - Vertical panel
   - Type I or Type II barricades
   - Drum
   - Cone (where allowed)
   - Tubular marker (where allowed)

3. Where a barrier is specified, any of the types below may be used as shown in the plans:
   - Concrete temporary barrier wall
   - Temporary guardrail and end anchorages
   - Temporary water filled barriers

4. Warning device spacing shall be as follows:
   - On Taper
     - Maximum spacing between cones and tubular markers shall be 25'.
     - Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows:
       - 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH and greater.
   - On Alignments
     - Maximum spacing between cones or tubular markers shall be 25'.
     - Maximum spacing between Type I or Type II barricades on vertical panels or drums is 50' on center for the first 250', thereafter, cones or tubular markers at 50' on center and Type I or Type II barricades, or drums or vertical panels at 100' on center.

---

**SHOULDER TREATMENT**

NOTES

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

2. Whenever there is a difference in elevation between adjacent travel lanes, the WB-11 sign with "UNEVEN LANES" is required at intervals of ½ mile maximum.

3. If D is 1/2" or less, no treatment is required.

4. Treatment allowed only when D is 3" or less.

5. If the slope is steeper than 1:4 (not to be steeper than 1:1.4), the R4-1 and WOT-1-04 signs shall be used as a supplement to the W8-11; this condition should never exceed 3 miles in length.

---

**TRAVEL LANE TREATMENT FOR MILLING OR RESURFACING**

---

**DROP OFFS IN WORK ZONES**
Warning Light 24"

Cones

Tubular marker to be used during daylight only

Tubular marker

Steel drums not permitted

Vertical panel

Type I barricade

Type II barricade

Type III barricade

CHANNELIZING AND LIGHTING DEVICE AND ADVANCE WARNING ARROW PANEL NOTES

1. Only approved traffic control devices included on the Qualified Products List (QPL) may be used.

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

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

4. Type III barricades shall have a unit length of 6'-0" only. When barricades of greater lengths are required, those lengths shall be in multiples of the 6'-0" unit. Signs used in conjunction with Type III barricades may be mounted on or above the barricade. These signs shall not cover more than 50 percent of the total area of the three rails.

5. During hours of darkness, warning lights shall be used on drums, vertical panels, Type I, Type II and Type III barricades in accordance with "Warning Lights" Sheet 3.

6. Ballast shall not be placed on top rails or any striped rails or higher than 13" above the driving surface.

7. For rails less than 3'-0" long, 4" stripes shall be used.

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

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

10. Cones shall:

   1. Be used only in work zones where workers are present.
   2. Not exceed 2 miles in length of use at any one time nor exceed a 12 hour work period.
   3. Have as a minimum, one designated person for the purpose of continuous monitoring and maintenance of cones during lane closures.
   4. Be reflectorized as per the MUTCD with Department approved reflective collars when used at night.
   5. The splicing of sheeting is not permitted on either channelizing devices or WDT signs.

IDENTIFICATIONS - CHANNELIZING AND LIGHTING DEVICES AND ADVANCE WARNING ARROW PANEL MODES
USE OF RPMS IN LIEU OF PAINT OR REMOVABLE TAPE IN WORK ZONES

1. The color of the raised marker under both day and night conditions shall conform to the color of the marking for which they serve as a positioning guide, or for which they supplement or substitute.

2. To provide contrast on concrete pavement, or light asphalt, the five (5) white RPMs shall be followed by five block RPMs. The spacing between RPMs shall be 2'-6". Black RPMs will not be required for contrast with yellow RPMs.

3. It shall be the contractors responsibility to replace damaged or missing RPMs.

4. RPMs used to supplement lane lines are to be paid for as Reflective Pavement Marker (Temporary), EA. RPMs used in lieu of paint or removable tape are to be paid for as Reflective Pavement Marker (Temporary), EA.

NOTES FOR REFLECTIVE PAVEMENT MARKERS

1. The color of the raised pavement marker under both day and night conditions shall conform to the color of the marking for which they serve as a positioning guide, or for which they supplement or substitute.

2. To provide contrast on concrete pavement, or light asphalt, the five (5) white RPMs shall be followed by five block RPMs. The spacing between RPMs shall be 2'-6". Black RPMs will not be required for contrast with yellow RPMs.

3. It shall be the contractors responsibility to replace damaged or missing RPMs.

4. RPMs used to supplement lane lines are to be paid for as Reflective Pavement Marker (Temporary), EA. RPMs used in lieu of paint or removable tape are to be paid for as Reflective Pavement Marker (Temporary), EA.
GENERAL NOTES

1. If the work operation requires that two or more work vehicles cross the 15' zone in any one hour, traffic control will be in conformance with Index No. 602.

2. No special signing is required.

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

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

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

TYPICAL APPLICATIONS

- Landscaping Work
- Utility Work
- Fencing Work
- Cleaning Drainage Structures
- Reworking Ditches

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE MORE THAN 15' FROM THE EDGE OF TRAVEL WAY.
CONES OR TUBULAR MARKERS AT 25' CENTERS FOR FIRST 250' THEREAFTER AT 50' CENTERS OR EITHER TYPE I OR TYPE II BARRIADES OR VERTICAL PANELS OR DRUMS AT 50' CENTERS FOR FIRST 250' THEREAFTER AT 100' CENTERS.

MAXIMUM SPACING BETWEEN CONES AND TUBULAR MARKERS SHALL BE 25' MAXIMUM SPACING BETWEEN TYPE I OR TYPE II BARRIADES OR VERTICAL PANELS OR DRUMS SHALL BE BASED ON THE SPEED LIMIT AS FOLLOWS:

- 15' UP TO 25 MPH;
- 30' FOR 30-40 MPH;
- 50' FOR 45 MPH AND GREATER.

GENERAL NOTES

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

2. If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.

3. When four or more work vehicles enter the through traffic lanes in a one hour period or less, the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs, see Index No. 603.

4. The first two warning signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. These signs may be used for daylight only operations. Type B lights and orange flags are not required.

5. The WORKERS legend sign may be substituted for the symbol sign.

6. All signs shall be post mounted if the work operation time exceeds 12 hours.

7. Minimum time for speed s 40 mph

   \[ t \geq \frac{2s}{W + 3s} \]

   \[ t \geq \frac{200}{W + 3s} \]

   Where:
   - W = Width of shoulder in feet, 8' minimum.
   - S = Posted speed limit (mph)

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

9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 602.

10. WORKERS sign to be removed or fully covered when no work is being performed.

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

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

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag and Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light Night Only)
- Work Zone Sign

CONDITIONS

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

\[\text{Work Area}\]
\[\text{Sign With 18'' x 18'' (Min.) Orange Flag And Type B Light}\]
\[\text{Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum}\]
\[\text{Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum}\]
\[\text{Work Zone Sign}\]
\[\text{Flagger}\]

GENERAL NOTES
1. Work operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.
2. All vehicles, equipment, workers (except flaggers), and their activities are restricted at all times to one side of the roadway.
3. If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 597.
4. Additional one-way control may be effected by the following means:
   (1) Flag-carrying vehicle
   (2) Official vehicle
   (3) Pilot vehicle
   (4) Traffic signals
   When flaggers are the sole means of one-way control the flaggers shall be in sight of each other or in direct communication at all times.
5. The first two warning signs shall have an 18'' x 18'' (min.) orange flag and a Type B light attached and operating at all times.
   Each sign may be used for (Daylight Only) operations. Type B lights and orange flags are not required.
6. The FLAGGER legend sign may be substituted for the symbol sign.
7. \[L = \text{min.} W\text{ for speeds > 45 mph}\]
   \[= \text{min.} W\text{ for speeds ≤ 40 mph}\]
   Where:
   \[W = \text{Width of lateral transition in feet}\]
   \[S = \text{Posted speed limit (mph)}\]
8. The ONE-LANE ROAD signs are to be fully covered and the FLAGGER signs either removed or fully covered when no work is being performed and the highway is open to two-way traffic.
9. Arrows denote direction of traffic only and do not reflect pavement markings.
10. Longitudinal dimensions are to be adjusted to fit field conditions. See index No. 600.
11. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
12. For general TCZ requirements and additional information, refer to index No. 600.

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

CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF TRAVEL WAY.
1. Work operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.

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

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

4. The first two warning signs shall be an 18" x 18" (min.) orange flag and a Type B light, affixed and operating at all times.

5. Wash signs may be used for Daylight Only operations. Type B lights and Orange Flags are not required.

6. The FLAGGER legend sign may be substituted for the symbol sign.

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

8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

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

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

General Notes:

- Work operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.
- All vehicles, equipment, workers (except flaggers), and their activities are restricted at all times to one side of the roadway.
- When flaggers are the sole means of one-way control, the flaggers shall be in sight of each other or in direct communication at all times.
- The first two warning signs shall be an 18" x 18" (min.) orange flag and a Type B light, affixed and operating at all times.
- Wash signs may be used for Daylight Only operations. Type B lights and Orange Flags are not required.
- The FLAGGER legend sign may be substituted for the symbol sign.
- Arrows denote direction of traffic only and do not reflect pavement markings.
- Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
- When a side road intersects the highway on which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
- For general TCZ requirements and additional information, refer to Index No. 600.

Typical Applications:

- Pavement Resurfacing
- Pavement Repair
- Utility Work
- Bridge Repair
- Guardrail Work

Conditions:

- WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF TRAVEL WAY THAT REQUIRED A LANE CLOSURE IN THE VICINITY OF A RAILROAD CROSSING.

Symbols:

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum
- Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
- Work Zone Sign
- Flagger
END ROAD WORK

50'

H

250'

500'

SPEEDING FINES DOUBLED WHEN WORKERS PRESENT

500'

END ROAD WORK

250' 250' 500' 500' 500'

SPEEDING FINES DOUBLED WHEN WORKERS PRESENT

Cones Or Tubular Workers At 25' Centers For First 250' Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250' Thereafter At 100' Centers.

Maximum Spacing Between Cones And Tubular Workers Shall Be 25' Maximum Spacing Between Type I or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows:

- 15' For speeds up to 25 mph
- 30' For speeds 26-40 mph
- 50' For speeds 41-60 mph
- 75' For speeds 61-80 mph
- 100' For speeds greater than 80 mph

SPEEDING FINES DOUBLED WHEN WORKERS PRESENT

GENERAL NOTES

SYMBOLS

1. Construction operations shall be confined to one traffic lane, leaving the opposing lane open to traffic.
2. All vehicles, equipment, workers, (except flaggers) and their activities are restricted at all times to one side of the roadway.
3. Additional one-way control may be effected by the following means:
   - 1) Flag-carrying vehicle
   - 2) Official vehicle
   - 3) Pilot vehicle
   - 4) Traffic signals.
   When flaggers are the sole means of one-way control the flaggers shall be in sight of each other or in direct communication at all times.
4. The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
5. The FLAGGER legend sign may be substituted for the symbol sign.
6. All signs shall be post mounted if the closure time exceeds 12 hours.

TYPICAL APPLICATIONS

- Pavement Repair
- Culvert Construction
- Utility Work
- Bridge Repair

CONNECTIONS

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

NOTES

7. L (min) x W S for speeds x 45 mph
   - WS for speeds 25-40 mph
   - 100
   Where:
   - W = Width of lateral transition in feet
   - S = Posted speed limit (mph)

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

1. All vehicles, equipment, workers (except flaggers), and their activities are restricted at all times to one side of the roadway.
2. If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.
3. If the work operation encroaches on the through traffic lane or when four or more work vehicles enter the through traffic lane in a one hour period flaggers shall be provided and the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs see Index No. 603.
4. The first two warning signs shall have an 18" x 18" min. orange flag and a Type B light attached and operating at all times. Where signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.
5. The WORKERS legend sign may be substituted for the symbol sign.

**SYMBOLS**

- **Work Area**
- **Sign With 18" x 18" (Min.) Orange Flag And Type B Light**
- **Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum**
- **Work Zone Sign**

**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERMITTENT OR CONTINUOUS MOVING OPERATION ON THE SHOULDER OR SHOULDER AND SLOPES.

**NOTES**

7. L (min.) = WS for speeds ≤ 45 mph
   \[ \sqrt{W} \] for speeds > 45 mph
   Where:
   - W = Width of shoulder in feet, 8' minimum.
   - S = Posted speed limit (mph).

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

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

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

11. For general TCZ requirements and additional information, refer to Index No. 600.
GENERAL NOTES

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

2. Minimum length of work area is 200'. Maximum length to be determined by the Engineer, but in no case to exceed the length of one half (1/2) days operation or 2 miles whichever is less.

3. If the work operation does not exceed 60 minutes, traffic control will be in conformance with index No. 600.

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

5. The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.

6. The FLAGGER legend sign may be substituted for the symbol sign.

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

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

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

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

11. For general TCZ requirements and additional information, refer to index No. 600.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel
- Or Cone Or Tubular Marker Or Drum
- Work Zone Sign
- Flagger

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES

TWO-LANE, TWO-WAY - RURAL

MOVING OPERATIONS - DAYLIGHT ONLY

TYPICAL APPLICATIONS

- Pavement Repair
- Pavement Resurfacing
- Utility Work
- Deli/Seller Maintenance
- Crack Sealing
- Core Boring

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERMITTENT OR CONTINUOUS MOVING OPERATION ON THE PAVERMENT WHERE THE AVERAGE SPEED OF MOVEMENT IS LESS THAN 4 MILES PER HOUR.
CONDITIONS

FOR ANY OPERATION THAT IS NOT 2' OR MORE OUTSIDE THE EDGE OF THE TRAVEL WAY FOR A PERIOD OF LESS THAN 60 MINUTES.

CONDITIONS

FOR ANY OPERATION THAT ENCROACHES IN THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF THE TRAVEL WAY FOR A PERIOD OF 15 MINUTES OR LESS.

CONDITIONS

FOR ANY OPERATION THAT ENCROACHES IN THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF THE TRAVEL WAY FOR A PERIOD IN EXCESS OF 15 MINUTES BUT LESS THAN 60 MINUTES.

GENERAL NOTES

1. The maximum length of work area to be determined by the Engineer, but in no case to exceed the length of one-half (1\2) days operation or 2 miles whichever is less.
2. All vehicles, equipment, workers (except flaggers) and their activities are restricted to one side of the roadway.
3. Additional one-way control may be effected by the following means:
   (1) Flag-carrying vehicle;
   (2) Official vehicle;
   (3) Pilot vehicles;
   (4) Traffic signals.
   When flaggers are the sole means of one-way control the flaggers shall be in sight of each other or in direct communication at all times.
4. The first two warning signs shall have an 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for Daylight Only operations. Type B Lights and Orange Flags are not required.
5. The FLAGGER legend sign may be substituted for the symbol sign.
6. Arrows denote direction of traffic only and do not reflect pavement markings.
7. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
8. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
9. For general TCZ requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Marking Patches
Field Patches
String Line
Utility Work
Cleaning Up Debris On Pavement
Pavement Coring
And Straight Edging

SYMBOLS

Work Area
Sign With 18" x 18" (Min.)
Orange Flag And Type B Light
Type I Or Type II Barricade Or Vertical Panel
Or Drum (With Steady Burning Light At Night Only).
(Standard Interface Marker Bar During Daylight Only."
(Cones May Be Used - See Index No. 600.)
Work Zone Sign
Flagger

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL TOOLS WORK ZONES
TWO-LANE TWO-WAY • RURAL
SHORTTIME
DAY OR NIGHT OPERATIONS

NAME
DESK

APPROVAL

CHECK

DRAWN

DESIGN

CHANGED

DATE

4 of 4

607
GENERAL NOTES

1. Work operations shall be confined to one traffic lane, except for haul road crossings, leaving the opposite lane open to traffic.

2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway, except for haul road crossings.

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

4. Where sight distance to the signal is limited, the signals may be mounted on span wire at the discretion of the Engineer.

5. The maximum distance between portable traffic signals shall be 0.25 mile, however, in no case shall the distance exceed the maximum distance at which the remote operator (transmitter) can positively and safely operate both portable signals.

6. Flaggers to supplement the signal operator/flagger shall be used when needed to ensure safe movement between traffic and operating equipment, as determined by the Engineer.

7. The first two warning signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.

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

9. SIGNAL AHEAD and EQUIPMENT CROSSING AHEAD signs are to be removed or fully covered when no work is being performed and the highway is open to two-way traffic. Type III Barricades shall be in place to block haul road access when the haul road is not in operation and a flagger/signal operator is not on duty, except when the haul road is an existing properly marked road.

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

11. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

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

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

14. Span wire signals are to be used only in work zones where workers present, where the contractor can monitor signal operation and maintain traffic with flaggers in the event of a power failure.

TYPICAL APPLICATION

Pavement Repair
Shoulder & Roadside Work
Bridge Work
Box Culvert Work
Drainage Work
Utility Work
Haul Road Crossing

CONDITIONS

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

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Work Zone Sign
- Traffic Signal
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only.)
- Type III Barricade
- Stop Bar
- Flogger
- Portable Signal
<table>
<thead>
<tr>
<th>Min.</th>
<th>Max.</th>
<th>CTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>500'</td>
<td>1000'</td>
<td></td>
</tr>
</tbody>
</table>

**SPEEDING FINES DOUBLED IF WORKERS PRESENT**

**RELATED PAGE:**
- **PORTABLE SIGNAL**
  - 24" White Reflectorized Preformed Mat or Pavement Marking Tape (Location to Suit Signal Position)
  - Cones or Tubular Markers At 25' Centers
  - Type I or Type II Barricades or Vertical Panels or Drums at 20' Centers
  - All Transition Barricades or Tubular Markers at 25' Centers Max.

**OTHER NOTICES:**
- **STOP**
  - Side Road
  - See General Note No. 12

**SINGLE LANE CLOSURE • ROADWAY AND BRIDGES ALL LENGTHS**
MOMENTARY ROADWAY CLOSURE • HAUL ROUTE CROSSING
Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Detour Connection To Existing Pavement To Be Constructed Under TCZ Plan Of Index No. 603 Or 804. (Same For Opposite Connection)

Required Only When Construction Zone Speed Reduces Below Existing Posted Speed Prior To Construction

1. The first two warning signs shall have an 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times.

2. For speed sign applications see Index No. 600.

3. Where the tangent distance (T) exceeds 600', spacing between cones or tubular markers may be increased to 50' or spacing between Type I or II barricades, vertical panels or drums may be increased to 100' within limits of the tangent, or post mounted delineators of 50 center may be substituted for the barricades, vertical panels or drums.

4. On the existing pavement all existing markings within the work area which conflict with the revised traffic pattern are to be removed and replaceable pavement markings used for marking a new centerline and edge lines.

5. Where the tangent distance (T) exceeds 600' and no passing or stopping distance restrictions exist, the yellow reflectorized markings used to indicate the centerline of the traveled way may be replaced with yellow reflectorized markings in a broken pattern. For raised pavement marker application see index No. 600 and Index No. 7332.

GENERAL NOTES

1. The first two warning signs shall have an 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times.

2. For speed sign applications see Index No. 600.

3. Where the tangent distance (T) exceeds 600', spacing between cones or tubular markers may be increased to 50' or spacing between Type I or II barricades, vertical panels or drums may be increased to 100' within limits of the tangent, or post mounted delineators of 50 center may be substituted for the barricades, vertical panels or drums.

4. On the existing pavement all existing markings within the work area which conflict with the revised traffic pattern are to be removed and replaceable pavement markings used for marking a new centerline and edge lines.

5. Where the tangent distance (T) exceeds 600' and no passing or stopping distance restrictions exist, the yellow reflectorized markings used to indicate the centerline of the traveled way may be replaced with yellow reflectorized markings in a broken pattern. For raised pavement marker application see index No. 600 and Index No. 7332.

TYPICAL APPLICATIONS

Bridge Construction
Subgrade Restoration
Culvert Repair Or Construction

CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF BOTH LANES AND A TEMPORARY DIVERSION IS CONSTRUCTED

1. If posted speed for Work Area is 45 mph or less use "Road Work 1/2 Mile" and space accordingly.

2. See SUPERELEVATION Index No. 600.

3. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 620.

4. When other construction or maintenance operations occur within 1 Mile, sign a) To be omitted and signing to be coordinated in accordance with Index No. 600.

5. If temporary structures are required on the diversion traffic a) To be omitted and signing to be coordinated in accordance with Index No. 650.

6. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

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

8. If temporary structures are required on the diversion traffic control will be in conformance with Index No. 650.

9. For general TCZ requirements and additional information refer to indexes Nos. 600 and 7332.

10. If posted speed for Work Area is 45 mph or less use "Road Work 1/2 Mile" and space accordingly.
GENERAL NOTES
1. If the work operation requires that two or more work vehicles cross the 15' zone in any one hour, traffic control will be in accordance with Index No. 602 undivided or Index No. 611 divided.
2. No special signing is required.
3. This index also applies when work is being performed on a multilane undivided highway.
4. This index also applies to work performed in the median more than 15' from edge of travel way, both roadways.
5. Arrows denote direction of traffic only and do not reflect pavement markings.
6. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.
7. For general TCZ requirements and additional information refer to Index No. 600.

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

CONDITIONS
WHERE ALL VEHICLES, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE MORE THAN 15' FROM THE EDGE OF TRAVEL WAY.
Maximum Spacing Between Cones And Tubular Markers Shall Be 25' Centers. Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows:

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>15' Up To 25 MPH</td>
<td>25'</td>
</tr>
<tr>
<td>30-40 MPH</td>
<td>50'</td>
</tr>
<tr>
<td>45 MPH And Greater</td>
<td>100'</td>
</tr>
</tbody>
</table>


general notes

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
2. If the work operation encroaches on the through traffic lanes or when four or more work vehicles enter the through traffic lanes in a one hour period, a flagger shall be provided and a FLAGGER sign shall be substituted for the WORKERS sign. The flagger shall be positioned at the point of vehicle entry or departure from the work area.
3. This TCZ plan also applies to work performed in the median more than 2' but less than 15' from the edge of either pavement.
4. The first two warning signs, each side, shall have a 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times. Type I or Type II Barricades, vertical panels, canes, tubular markers, or drums will not be required provided vehicles in the work area have warning lights operating.
5. The WORKERS legend sign may be substituted for the symbol sign.
6. L (min) = \( \frac{W}{2} \) for speeds \( \leq 45 \) mph
   \[ W = \text{Width of lateral transition in feet}, 8' \text{ minimum.} \]
   \[ S = \text{Posted speed limit in mph} \]
7. Arrows denote direction of traffic only and do not reflect pavement markings.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
10. WORKERS signs to be removed or fully covered when no work is being performed.
11. END ROAD WORK signs required only when work exceeds one daylight period.
12. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
13. If the work operation is less than 60 minutes, additional traffic control devices shall not be required provided vehicles in the work area have warning lights operating.
14. For general TCZ requirements and additional information refer to Index No. 600.


typical applications

1. Utility Work
2. Culvert Extensions
3. Utility Work
4. Guardrail Work
5. Landscaping Work
6. Cleaning Drainage Structures
7. Reworking Ditches
8. Sign installation and Maintenance
9. Shoulder Repair

conditions

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

state of florida department of transportation

traffic control through work zones

truck lane divided or undivided rural • day or night operations

general notes

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
2. If the work operation encroaches on the through traffic lanes or when four or more work vehicles enter the through traffic lanes in a one hour period a flagger shall be provided and a flagger sign shall be substituted for the workers sign. The flagger shall be positioned at the point of vehicle entry or departure from the work area.
3. This TCZ plan also applies to work performed in the median more than 2' but less than 15' from the edge of either pavement.
4. The first two warning signs, each side, shall have a 18" x 18" (Min.) orange flag and a type B light attached and operating at all times. Type I or Type II Barricades, vertical panels, canes, tubular markers, or drums will not be required provided vehicles in the work area have warning lights operating.
5. The WORKERS legend sign may be substituted for the symbol sign.
6. L (min) = \( \frac{W}{2} \) for speeds \( \leq 45 \) mph
   \[ W = \text{Width of lateral transition in feet}, 8' \text{ minimum.} \]
   \[ S = \text{Posted speed limit in mph} \]
7. Arrows denote direction of traffic only and do not reflect pavement markings.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
10. WORKERS signs to be removed or fully covered when no work is being performed.
11. END ROAD WORK signs required only when work exceeds one daylight period.
12. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
13. If the work operation is less than 60 minutes, additional traffic control devices shall not be required provided vehicles in the work area have warning lights operating.
14. For general TCZ requirements and additional information refer to Index No. 600.

typical applications

1. Utility Work
2. Culvert Extensions
3. Utility Work
4. Guardrail Work
5. Landscaping Work
6. Cleaning Drainage Structures
7. Reworking Ditches
8. Sign installation and Maintenance
9. Shoulder Repair

conditions

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

state of florida department of transportation

traffic control through work zones

truck lane divided or undivided rural • day or night operations
CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF TRAVEL WAY FOR A PERIOD OF 15 MINUTES OR LESS.

GENERAL NOTES
1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
2. All vehicles, equipment, workers, and their activities are restricted at all times to one side of the roadway.
3. The first two warning signs, each side, shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
4. On undivided highways the median sign as shown are to be omitted.
5. When work is performed in the median lane on divided highways the barrier cord plan is inverted and left lane closed and lane reduction signs utilized for the right lane closed and lane reduction signs.
6. The right (left) lane closed signs are to be removed or fully covered when no work is being performed and the highway is open to traffic.
7. L (min.) = Length of taper feet:
   - W5' for speeds 25 mph
   - W3' for speeds 40 mph
   - W = Width of lateral transition in feet
   - P = Posted speed limit
8. Arrows denote direction of traffic only and do not reflect pavement markings.
9. Longitudinal dimensions are to be adjusted to fit field conditions.
10. When work is being performed on a multilane undivided roadway the signs normally mounted in the median lane shall be omitted.
11. The TCZ plan does not apply when work is being performed in the middle or inside lane(s) of a six or more lane highway. See Index No. 616 and 617.
12. When a side road intersects the highway on which work is being performed in the middle or inside lane(s) of a six or more lane highway, see Index No. 66 and 617.
13. For general TCZ requirements and additional information, refer to Index No. 600.
LMedlan

Where other construction or maintenance operations occur within 1 mile, signs to be omitted and signing to be coordinated in accordance with Index No. 600.

When workers present cones or tubular markers at 25' centers for first 250', thereafter at 50' centers or either type I or type II barricades or vertical panels or drums at 50' centers. Maximum spacing between cones and tubular markers shall be 25' for first 250', thereafter at 100' centers.

Maximum spacing between type I or type II barricades or vertical panels or drums shall be based on the speed limit as follows:
- 15' for speeds < 25 mph
- 30' for speeds 25 - 40 mph
- 50' for speeds > 45 mph

TYPICAL NOTES

Pavement Rehabilitation
Pavement Repair
Utility Work
Bridge Repair
Guardrail Work

CONDITIONS

Where any vehicle, equipment, workers or their activities encroach on the lane adjacent to either shoulder and the area 2' outside the edge of travel way.

SYMBOLS

- Work Area
- Orange Flag and Type B Light
- Type I or Type II Barricade or Vertical Panel or Drum (with steady burning light at night only)
- Work Zone Sign
- Advance Warning Arrow Panel

GENERAL NOTES

1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
2. All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
3. The first two warning signs, each side, shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
4. All signs shall be post mounted if the closure time exceeds 12 hours.
5. On undivided highways the median signs as shown are to be omitted.
6. When work is performed in the median lane on divided highways the barricading plan is inverted and left lane closed and lane reduction signs.
7. Signs and traffic control devices are to be modified in accordance with intermittent work stoppage details (sheet 6 of 2) when no work is being performed and the highway is open to traffic.

TYPICAL APPLICATIONS

Pavement Rehabilitation
Pavement Repair
Utility Work
Bridge Repair
Guardrail Work

WEIGHT OF FLORIDA DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES

MULTILANE, DIVIDED AND UNDIVIDED, RURAL

NIGHT OPERATIONS OR OPERATIONS

EXCEEDING ONE DAYLIGHT PERIOD

Drawn By: [Signature] Rev.: [Signature]
Reviewed By: [Signature] Date: [Date]
Verification: [Signature] Sheet: 2 of 2

Where other construction or maintenance operations occur within 1 mile, signs to be omitted and signing to be coordinated in accordance with Index No. 600.
SPEEDING FINES DOUBLED WHEN WORKERS PRESENT

Hinged Or Overlay Shields
Signs Covered

500' 2140' 1140' 1000' 500'

END ROAD WORK

Area Temporarily Reopened To Traffic

Arrow Panel Operation Discontinued And Devices Removed Or Relocated

Temporary Pavement Markings Placed Through Work Area And Devices Relocated Laterally 2' To 4' Outside Edge Of Travel Way.

EVEN PAVEMENT

INTERMITTENT WORK STOPPAGE - RIGHT LANE REOPENED TO TRAFFIC - DAYTIME OR NIGHTTIME

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL THROUGH WORK ZONES
MULTILANE, DIVIDED AND UNDIVIDED - RURAL, NIGHT OPERATIONS OR OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD
Notes: (a) The tubular marker shall be made of a flexible material or have a flexible joint at the base such that it will not cause damage to vehicles upon impact and will return to its original shape after being struck by a 5000 lb. vehicle at a velocity of 75 feet per second.

(b) The tubular marker shall be orange with two white reflective bands.

(c) The tubular marker shall be attached by bituminous adhesive or other methods approved by the Engineer.

(d) Reflective materials shall be smooth and sealed outer surface which will display the same approximate color day and night.

(e) 12" openings for drainage will be constructed in the asphalt separator island every 25' in areas with grades of 1% or less or every 50' in areas with grades over 1% as directed by the Engineer.

GENERAL NOTES

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

2. The first warning sign, each side, shall have a 18" x 18" (min.) orange flag and a Type B light attached and operated at all times.

3. All signs shall be post-mounted.

4. TWO WAY TRAFFIC signs shall be repeated every 1/2 mile in each direction, throughout the tangent distance (T).

5. L (min.) = W for speeds = 45 mph

\[ L = \frac{W}{4.5} \] for speeds > 40 mph

Where:

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

6. Where the tangent distance (T) exceeds 250', spacing between Type I or II barriodrs or vertical panels or drums may be increased to 600' within the limits of the tangent, or post mounted delineators at 50' centers may be substituted for barriodrs, vertical panels or drums.

7. All existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for marking new edge lines.

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

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

10. When side roads, cross roads or interchanges are located within the limits for work zone traffic control additional traffic control devices shall be erected in accordance with other applicable TCCS Indexes.

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

12. The contractor has the option of using temporary asphalt traffic separator and tubular type warning devices from the qualified products list in lieu of the temporary asphalt traffic separator and tubular warning device detailed above.

13. Temporary Traffic Separators shall be paid for under the contract unit price for Maintenance of Traffic, LS, and shall include all materials and work necessary to construct, maintain, and remove the temporary traffic separator. Any damage to existing pavement caused by the removal of temporary traffic separators shall be satisfactorily repaired and the cost of such repairs are to be included in the cost of Maintenance of Traffic, LS.

APPLICATIONS

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

WHERE: Unless A Specific Scheme is Called For In The Plans, Scheme Selection Shall Be At The Contractors Option And As Approved By The Engineer

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF ONE ROADWAY AND THE OPPOSING ROADWAY IS CONVERTED TO TEMPORARY TWO-WAY TRAVEL BY WAY OF CROSSOVERS.
1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.

2. The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.

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

4. TWO-WAY TRAFFIC signs shall be repeated every 1/2 mile in each direction, through the tangent distance (T).

5. L (min.) = WS for speed ≤ 45 mph
   \[ L = 60 \times \left( \frac{\text{Width of lateral transition}}{\text{Pavement speed limit (mph)}} \right) \]
   \[ L = 60 \times \left( \frac{W}{S} \right) \]

6. Where the tangent distance (T) exceeds 125', spacing between cones or tubular markers may be increased to 100' or spacing between Type I or Type II barricades or vertical panels or drums may be increased to 100' within the limits of the tangent.

7. This index does not apply when work is being performed in the middle lane(s) of a six or more lane highway. Special maintenance of traffic details will be required.

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

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

10. Additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.

11. For general TCZ requirements and additional information refer to Index No. 600.
EXISTING POSTED SPEED | PROPOSED WORK ZONE SPEED | REMARKS
---|---|---
MPH | MPH | The proposed work zone speeds are recommended speeds for the traffic control plan detailed below; however, where the Engineer deems other speeds are appropriate, the applicable speeds are to be shown on the plans.
65 | 55 | 
55 | 45 | 
45 | 35 | 

CONDITION NOTES
1. The RIGHT LANE CLOSED and lane reduction signs are to be removed or fully covered when no work is being performed and the center lane is opened to traffic.
2. For work performed in the outside lane refer to Index No. 602 and 603. For work performed in the inside lane refer to Index No. 601.
3. When the lane closure exceeds a continuous 24 hour period all existing pavement markings within the work zone which conflict with the revised traffic pattern are to be removed and reconstructing pavement marking used for marking new edge lines and center lines.

GENERAL NOTES
1. All vehicles, equipment, workers, and their activities are restricted at all times to one side of the highway.
2. The first two warning signs on each side shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. Mesh signs may be used for Daylight Only operations. Type B Lights and Orange Flags are not required.
4. All signs shall be post mounted if closure time exceeds 12 hours.
5. L (min.) = WS for speeds < 45 mph
6. L (min.) = WS + 5 for speeds 40 - 45 mph
7. WS = 150' for speeds > 45 mph

TYPICAL APPLICATIONS
Pavement Resurfacing
Pavement Repair

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

MULTILANE DIVIDED * RURAL

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES
The proposed work zone speeds are recommended speeds for the traffic control plan detailed below, however, the Engineer shall other speeds are appropriate, the applicable speeds to be shown on the plans.

<table>
<thead>
<tr>
<th>Existing Posted Speed</th>
<th>Proposed Work Zone Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPH 65</td>
<td>MPH 55</td>
</tr>
<tr>
<td>MPH 55</td>
<td>MPH 45</td>
</tr>
<tr>
<td>MPH 45</td>
<td>MPH 35</td>
</tr>
</tbody>
</table>

**Remarks**

The proposed work zone speeds are recommended speeds for the traffic control plan detailed below, however, where the Engineer deems other speeds are appropriate, the applicable speeds are to be shown on the plans.

**Condition Notes**

1. See General Notes, Sheet I of 2.
2. Maximum spacing between devices (ft) to be equal to the speed limit (mph) but not greater than 25' for cones or tubular markers or 50' for Type I or Type II barricades or vertical panels or drums.
3. Barriers, vertical panels or drums shall be used to delineate the edge lines of the transition areas (i.e. L and 2L). Beyond the transition area, any of the above noted devices may be used to delineate the edge lines. Cones or tubular markers shall be used to delineate the center line. (Except of night use vertical panels.)
4. The RIGHT LANE CLOSED, lane reduction and reverse curve signs to be removed if fully covered when no work is being performed and the travel way is open to traffic.
5. When the lane closure exceeds a continuous 24 hour period all existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for marking new edge lines and centerlines.
6. For general TCZ requirements and additional information refer to index No. 600.

**Typical Applications**

- Pavement Resurfacing
- Pavement Repair

**Conditions**

Where any vehicle, equipment, workers or workers' activities encroach on any portion of a center lane of a multilane highway, and two driving lanes are maintained and, the outside shoulder pavement is temporarily used as a travel lane.
SPEEDING FINES DOUBLED WHEN WORKERS PRESENT

Maximum Spacing Between Cones And Tubular Markers Shall Be 25'.

Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows:

- 15' For Up To 25 MPH;
- 20' For 30-40 MPH;
- 25' For 45 MPH And Greater.

SYMBOLS

- Work Area
  - Sign With 18" x 18" (Min.) Orange Flag And Type B Light
  - Type I Or Type II Barricades Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
  - Left Lane Closed Sign
  - Advance Warning Arrow Panel

GENERAL NOTES

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.
2. The first two warning signs, each side, shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. All signs shall be post mounted if closure time exceeds 12 hours.
4. L = W S for speeds ≥ 45 mph
   \[ L = \frac{W \times S}{55} \] for speeds ≤ 40 mph
   Where:
   - W = Width of lateral transition in feet
   - S = Posted speed limit (mph).
5. The LEFT LANE CLOSED and lane reduction signs are to be removed or fully covered when no work is being performed and the inside lane is open to traffic.
6. Advance warning arrow panels are required for both day and night operation. Either the right flashing arrow or the right sequential arrow mode may be used; the caution mode shall not be used.
7. Arrows denote direction of traffic only and do not reflect pavement marking.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
10. For work performed in the outside lane refer to index No. 512 and 513. For work performed in the center lane refer to Index No. 516.
11. For general TCZ requirements and additional information refer to Index No. 600.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCROACH ON ANY PORTION OF THE INSIDE LANE OF A MULTILANE HIGHWAY.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL THROUGH WORK ZONES
MULTILANE DIVIDED • RURAL

500'

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.
2. The first two warning signs, each side, shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for daylight only operations. Type B Lights and Orange Flags are not required.
3. All signs shall be post mounted if closure time exceeds 12 hours.
4. L = W S for speeds ≥ 45 mph
   \[ L = \frac{W \times S}{55} \] for speeds ≤ 40 mph
   Where:
   - W = Width of lateral transition in feet
   - S = Posted speed limit (mph).
5. The LEFT LANE CLOSED and lane reduction signs are to be removed or fully covered when no work is being performed and the inside lane is open to traffic.
6. Advance warning arrow panels are required for both day and night operation. Either the right flashing arrow or the right sequential arrow mode may be used; the caution mode shall not be used.
7. Arrows denote direction of traffic only and do not reflect pavement marking.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
10. For work performed in the outside lane refer to index No. 512 and 513. For work performed in the center lane refer to Index No. 516.
11. For general TCZ requirements and additional information refer to Index No. 600.
GENERAL NOTES

1. When construction activities encroach on a sidewalk refer to Index No. 660.

CONDITIONS
WHERE CURB AND GUTTER EXISTS AND WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 15' (OR THE RIGHT OF WAY LINE, WHICHERVER IS CLOSER) BUT NOT CLOSER THAN 2' TO THE EDGE OF TRAVEL WAY FOR A PERIOD OF MORE THAN 60 MINUTES.

SYMBOLS

- Work Area
- Work Zone Sign
- Sign With 18" x 18" (Min.)
- Orange Flag And Type B Light

TYPICAL APPLICATIONS

UTILITY WORK

WORK OUTSIDE THE TRAVEL WAY URBAN AREAS
1. All vehicles, equipment, workers (except flaggers) and their activities are forbidden in lane and intersection areas reserved for traffic.

2. The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. Wash signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.

3. The FLAGGER legend sign may be substituted for the symbol sign.

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

5. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signal encroach on a normal pedestrian walkway, the sign shall be post mounted and located in accordance with index No. 600.

6. Flaggers shall be located where they can control more than one direction of traffic.

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

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

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

10. Temporary signal phasing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.

11. Work performed for a period of 60 minutes or less is to be conducted in accordance with Index No. 600.

12. For general TCZ requirements and additional information refer to Index No. 600.
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). "(Pavement Markings May Be Used During Daylight Only. Choose May Be Used - See Index No. 600)
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Flagger

GENERAL NOTES

1. Work operations shall be confined to one travel lane, leaving the opposing travel lane open to traffic.
2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.
3. For work operations of 60 minutes or less see Index No. 601.
4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17300.
5. If work area is confined to an outside auxiliary lane the work area shall be barricaded and the FLAGGER sign replaced by ROAD WORK AHEAD signs. Flaggers are not required.
6. Flaggers shall be in sight of each other or in direct communication at all times.
7. The ROAD CONSTRUCTION AHEAD and FLAGGER sign shall have an 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.
8. The FLAGGER legend sign may be substituted for the symbol sign.
9. All signs shall be post mounted if the closure time exceeds 12 hours.
10. The maximum spacing between devices shall be not greater than 25'.
11. Arrows denote direction of traffic only and do not reflect pavement markings.
12. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
13. For general TCZ requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

- Utility Work
- Pavement Repair
- Structure Adjustments
**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Stop Bar
- Advance Warning Arrow Panel

**GENERAL NOTES**

1. All vehicles, equipment, workers (except flaggers) and their activities are forbidden in lane and intersection areas reserved for traffic.

2. For work operations of 60 minutes or less see Index No. 607.

3. The first two warning signs shall have an 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times. Each sign may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.

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

5. The WORKERS legend sign may be substituted for the symbol sign.

6. Dual signs are required for divided roadways.

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

8. Maximum spacing between barricades, vertical panels, cones, tubular markers and drums shall be not greater than 25'.

9. Temporary signal phasing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.

10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 690.

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

**TYPICAL APPLICATIONS**

- Utility Work
- Pavement Repair
- Structure Adjustments

**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF AT LEAST ONE MEDIAN TRAFFIC LANE FOR A PERIOD OF MORE THAN 60 MINUTES.
CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCLOSE ON THE PAVEMENT REQUIRING THE CLOSURE OF THE OUTSIDE TRAVEL LANE, AND/OR ADJOINING AUXILIARY LANE, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

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

2. Work operations shall be confined to either one lane or lane combinations as follows:
   (a) outside travel lane;
   (b) outside auxiliary lane;
   (c) inside travel lane and adjoining auxiliary lane;
   (d) inside travel lane and adjoining auxiliary lane.

3. For work operations of 60 minutes or less see Index No. 612. (Continued)

4. When vehicles in a parking zone block the line of sight to TCZ sign, all vehicles, equipment, workers and their activities are restricted at all times at one side of the roadway. If the work area is confined to an auxiliary lane the work area shall be barricaded and the RIGHT (LEFT) LANE CLOSED AHEAD sign replaced by ROAD WORK AHEAD sign, and the merge symbol signs eliminated.

5. The first two warning signs shall have an 18" x 18" (min.) orange flag and Type B light attached and operating at all times. Mesh signs may be used for daylight only operations. Type B lights and orange flags are not required.

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

7. Dual signs are required for divided roadways.

GENERAL NOTES

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only). (These markers may be used during daylight only. Covers may be used to Index No. 662.)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

TYPICAL APPLICATIONS

Utility Work
Pavement Repairs
Structure Adjustments
SYMBOLS

- **Work Area**
- **Sign With 18" x 18" (Min.)**
- **Orange Flag And Type B Light**
- **Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).**
- **Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only)**
- **Type III Barricade**
- **Work Zone Sign**
- **Advance Warning Arrow Panel**

GENERAL NOTES (CONT.)

8. Within the lateral transitions, the maximum spacing between cones and tubular markers shall be 25'. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH, 30' for 30-40 MPH, 50' for 45 MPH or greater.

Spacing for devices parallel to the travel lanes shall be 25' centers for cones or tubular markers and 50' centers for Type I or Type II barricades or vertical panels or drums for 200', thereafter cones or tubular markers at 50' centers and Type I or Type II barricades or vertical panels or drums at 100' centers.

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

10. Longitudinal dimensions are to be adjusted to fit field conditions.

See Index No. 600.

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

TYPICAL APPLICATIONS

- Utility Work
- Pavement Repairs
- Structure Adjustments

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE INSIDE TRAVEL LANE AND/OR ADJOINING AUXILIARY LANE, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE INSIDE TRAVEL LANE AND/OR ADJOINING AUXILIARY LANE, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.
**TYPICAL APPLICATIONS**

Utility Work  
Pavement Repair  
Structure Adjustments

**SYMBOLS**

- **Work Area**  
- **Sign With 18" x 18" (Min.)**  
- **Orange Flag And Type B Light**  
- **Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).**  
- **Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only).**  
- **Work Zone Sign**  
- **Advance Warning Arrow Panel**  
- **Stop Bar**

**GENERAL NOTES**

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

2. Work operations shall be confined to either one lane or a combination of lanes as follows:
   - (a) Outside travel lane
   - (b) Outside auxiliary lane
   - (c) Outside travel lane and adjoining auxiliary lane
   - (d) Outside travel lane and adjoining center lane
   - (e) Outside travel lane and adjoining center lanes
   - (f) Median travel lane
   - (g) Median auxiliary lane
   - (h) Median travel lane and adjoining auxiliary lane
   - (i) Median travel lane and adjoining center lane
   - (j) Median travel lane and adjoining center lanes
   - See Sheet 2.

3. For work operations, that require only a single lane closure of 60 minutes or less see Index No. 562.

4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post-mounted and located in accordance with Index No. 600.

5. When work is performed in the median lane or the median and adjoining center lanes the barricading plans are inverted and LEFT LANE CLOSED AHEAD and merge right symbol signs shall be barricaded and the RIGHT LANE CLOSED AHEAD signs replaced by ROAD WORK AHEAD signs and the merge right symbol signs eliminated.

6. The first two warning signs, each side, shall have an 18" x 18" area (Min.) orange flag and a Type B light attached and operating at all times. Mesh sign may be used for (Daylight Only) operations Type B Lights and Orange Flags are not required.

(Continued)
conditions

where any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of either the outside and center travel lanes or the median and center travel lanes, with or without closure of adjoining auxiliary lanes, for work area less than 200' from intersection, for a period of more than 60 minutes.

where any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of either the outside and center travel lanes or the median and center travel lanes, with or without closure of adjoining auxiliary lanes, for work area 200' or more from intersection, for a period of more than 60 minutes.

general notes (cont.)

7. all signs shall be post mounted if closure time exceeds 12 hours.
8. within the lateral transitions, the maximum spacing between cones and tubular markers shall be 25'. maximum spacing between type i or type ii barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 mph, 30' for 30-40 mph, 50' for 45 mph or greater. spacing for devices parallel to the travel lanes shall be 25 centers for cones or tubular markers and 50 centers for type i or type ii barricades or vertical panels or drums for 250', thereafter, cones or tubular markers at 50 centers and type i or type ii barricades or vertical panels or drums at 100 centers.
9. arrows denote direction of traffic only and do not reflect pavement markings.
10. longitudinal dimensions are to be adjusted to fit field conditions.

state of florida department of transportation

multilane one-way or multilane divided

utility work

structure adjustments

day or night operations
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel

GENERAL NOTES

1. All vehicles, equipment, workers and their activities are prohibited at all times from the lane areas reserved for traffic.
2. Work operations shall be confined to one center travel lane, leaving the adjacent travel lanes open to traffic.
3. For work operations of 60 minutes or less, see Index No. 612.
4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 612.
5. The first two warning signs, each side, shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE CENTER LANE.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
MULTILANE ONE-WAY OR MULTILANE DIVIDED WITH NON-TRAVERSABLE MEDIAN • URBAN DAY OR NIGHT OPERATIONS

Max. spacing between cones and tubular markers shall be 25'.
Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH or greater.

1. Advance warning arrow panel is required for both day and night operations.
2. Channelizing devices are to be spaced with cones or tubular markers at 25' centers, Type I or Type II barricades or vertical panels or drums at 50' centers for the first 250', thereafter, cones or tubular markers at 50' centers and Type I or Type II barricades or vertical panels or drums at 100' centers.
3. Arrows denote direction of traffic only and do not reflect pavement markings.
4. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
5. For general TCZ requirements and additional information refer to Index No. 600.
ADVANCE WARNING ARROW PANEL MODE • CAUTION

1. Shadow and Advance Warning Vehicle shall display rotating/strobe lights.

2. The Advance Warning Vehicle (Optional) may be used at the direction of the Engineer. If an Advance Warning Vehicle is operated within the travel way, an approved Truck Mounted Attenuator will be required on the Advance Warning Vehicle but not required on the Shadow Vehicle. The Advance Warning Arrow Panel and Warning Sign are required on both the Advance Warning and Shadow Vehicles.

GENERAL NOTES

1. These illustrations are representative of general conditions.

2. The intensity of light and position of panels shall be as specified in Index 600.

3. Vehicle-mounted lights shall be mounted with the bottom of the sign at a minimum height of 48 inches above the pavement. Sign legends shall be covered or turned from view when work is not in progress.

4. If the work vehicle speed exceeds the minimum legal speed limit on limited access facilities and one half the posted speed limit on other facilities, the engineer in charge may delete requirements for shadow vehicle and attenuators. The work vehicle will be required to have an advance warning arrow panel and sign messages.

TYPICAL APPLICATIONS

- Stripping
- RPM Placement
- Vegetation Control

SYMBOLS

- Work Vehicle With Rotating/Strobe Lights
- Shadow (S) Or Advance Warning (AW) Vehicle with Advance Warning Arrow Panel and Sign Message
- Truck Mounted Attenuator (TMA)
- Lane Identification And Direction Of Traffic
When Other Construction Or Maintenance Operations Occur Within 1 Mile, Signs Are To Be Coordinated In Accordance With Index No. 600.

**GENERAL NOTES**

1. Work operations shall be confined to two way left turn lane, leaving the adjacent lanes open to traffic.

2. The first two warning signs, each side, shall have an 18" x 18" (min.) Orange Flag and a Type B light attached and operating at all times. Mesh signs may be used for daylight only operations. Type B Lights and Orange Flags are not Required.

3. Advance Warning Vehicle will have an Advanced Warning Arrow Panel in the Warning Mode.

4. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

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

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

**TYPICAL APPLICATIONS**

- Pavement Repair
- Utility Work

**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ARE BEING CONDUCTED IN THE TWO WAY LEFT TURN LANE.
With Taper Transition When This Sign
Project Advance Warning Signings

CONDITION A
WHEN THE PAVING TRAIN IS IN LANE ① THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE ② AND PROCEED IN LANE ② TO THE FRONT OF THE TRAIN

CONDITION B
WHEN THE PAVING TRAIN IS IN LANE ② THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE ①, AND PROCEED IN LANE ① TO THE FRONT OF THE PAVING TRAIN

CONDITION A & B
THE ADVANCE WARNING ARROW PANELS ARE REQUIRED. UNDER NO CIRCUMSTANCES WILL THE TRAFFIC TRANSITION BE LOCATED WITHIN THE LIMITS OF THE CROSSOVER

TRAFFIC TRANSITION AREA UPSTREAM FROM CROSSOVER

CASE I

GENERAL NOTES
1. When crossovers do not exist, the contractor will construct temporary crossovers in accordance with Index No. 63.

2. L = Length of taper in feet
   - WS for speeds 45 mph
   - WS for speeds 40 mph
   W = Width of lateral transition in feet.

3. Within the lateral transitions, the maximum spacing between cones and tubular markers shall be 25'. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 10' for 5 to 25 MPH, 15' for 30 to 40 MPH, 20' for 45 MPH or greater.
   Spacing for devices parallel to the travel lanes shall be 25' centers for cones or tubular markers and 50' for Type I or Type II barricades or vertical panels or drums.

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

5. For Case I, Condition A, when the median width is too narrow for trucks to make turns into Lane No. 2, Sign Nos. 1, 2, and the Flagger Actuated Advance Warning Arrow Panel shall be moved ahead to a crossover in advance of the paving lane taper. Project advance warning sign (not shown) shall be located in advance of the relocated Sign No. 3.

6. For Case II, Condition A & B, when the median width is too narrow for trucks to make turns into Lane No. 2, Sign Nos. 1, 2, and the Flagger Actuated Advance Warning Arrow Panel shall be moved ahead to a crossover in advance of the right lane closed mile sign. Project advance warning sign (not shown) shall be located in advance of the relocated Sign No. 3.
When This Sign Conflicts With ROAD WORK ± MILE Sign, The ROAD WORK ± MILE Sign Shall Be Temporarily Removed And The Orange Flag And Type B Light Attached To This Sign.

CONDITION A

WHEN THE PAVING TRAIN IS IN LANE ① THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE ② AND PROCEED IN LANE ② TO THE FRONT OF THE TRAIN.

CONDITION B

WHEN THE PAVING TRAIN IS IN LANE ① THE U-TURNING VEHICLE SHALL TURN INTO LANE ②, CAUTIOUSLY MERGE INTO LANE ① AND PROCEED TO THE FRONT OF THE PAVING TRAIN.

CONDITION A & B

THE ADVANCE WARNING ARROW PANEL IS REQUIRED. UNDER NO CIRCUMSTANCES WILL THE TRAFFIC TRANSITION BE LOCATED WITHIN THE LIMITS OF THE CROSSOVER.

TRAFFIC TRANSITION AREA DOWNSTREAM FROM CROSSOVER

CASE II

Note: See Sheet 1 of 2 For General Notes, Sign No. Details, And Conditions.
TEMPORARY CROSSOVER FOR MEDIAN WIDTHS ≥ 75'
TEMPORARY CROSSOVER FOR MEDIAN WIDTHS FROM 50' TO < 75'

SYMBOLS
- Work Area, Hazard Or Work Phase (Any Pattern Within A Boundary)
- Work Zone Sign
- Cone Or Tubular Marker
- Advance Warning Vehicle

NOTES
1. A lane closure analysis will be required to determine the times of day that this crossover can be in operation.
2. Arrows denote direction of traffic only and do not reflect pavement markings.

MAXIMUM SPACING BETWEEN CONES AND TUBULAR MARKERS SHALL BE 25'

LENTH OF ACCESS LANES (Ft.)

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL THROUGH WORK ZONES
TEMPORARY CROSSOVER

DESIGNED BY
DRAWN BY
CHECKED BY
REVISED SHEET

631
PHASE I

1. Maintain two-lane two-way traffic over existing pavement. Construct new roadway within the proposed 4-lane limits, excluding the friction course. Sign as shown if roadway construction area falls within 15' of existing pavement edge. When the construction area falls more than 15' from the existing pavement edge, traffic shall be controlled in accordance with Indexes Nos. 601, 602 or 604. When other construction or maintenance operations occur within 1 mile, signs shall be coordinated in accordance with Index No. 600.

2. Construct shoulder pavement to provide two-lane two-way traffic over shoulder and existing pavement during Phase II roadway construction. For lane width requirements see Index No. 600. Signing as shown, with the near 1500' zone modified in accordance with Index No. 604, to be in place prior to shoulder pavement construction.

LEGEND

- Phase I Construction
- Phase II Construction
- Phase III Construction

SYMBOLS

- Sign with 18" x 18" (Min.)
  Orange Flag and Type B Light
- Type I or Type II Barricade or Vertical Panel
  Or Drum (With Steady Burning Light at Night Only)
- Work Zone Sign

Note: See Sheet 2 for General Notes.
1. Maintain two-lane two-way traffic along existing facility. Install construction lighting.

2. Post existing pavement to facilitate temporary pavement construction. For lane width requirements see Index No. 600.

3. Construct temporary pavement of sufficient width to accommodate two-lane two-way traffic on the temporary pavement and a portion of the existing pavement during Phase I roadway construction. When two-lane two-way traffic is not accommodated during temporary pavement construction temporary lane operations shall be maintained in accordance with Index No. 620. Channelizing devices shall be in conformance with Dropoffs in Work Zones of Index No. 600.

4. Mark the pavement in accordance with the Phase I diagram. Rotate through traffic to the temporary pavement and a portion of the existing pavement. For lane width requirements see Index No. 600.

5. Construct two lanes of the proposed roadway, including the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Index No. 620, 621 and 622. Channelizing shall be in conformance with Dropoffs in Work Zones. When work extends through an intersection, temporarily reroute the cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (hachures) for two-lane two-way cross streets and one-lane access (hachures) each direction for four-lane two-way cross streets. In accordance with Index No. 620, 621 and 622.

Additional provisions:

- Whenother construction or maintenance operations occur within one mile, to be coordinated in accordance with Index No. 600.
- When other construction or maintenance operations occur within one mile, to be coordinated in accordance with Index No. 600.

**LEGEND**

- Phase I Construction
- Phase II Construction
- Phase III Construction
- Work Zone Sign
- Stop Bar

**SYMBOLS**

- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel
- Or Drum (With Steady Burning Light At Night Only)
- Type III Barricade (With Flashing Light)

**CONVERTING TWO LANES TO FOUR LANES DIVIDED • URBAN**

**TRAFFIC CONTROL THROUGH WORK ZONES**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**Drawn By**

**Checked By**

**Approved By**

**CONSTRUCTION NO.**

**Sheet No.**

1 of 2

See Sheet 2 for General Notes.
SPEEDING FINES DOUBLED WHEN WORKERS PRESENT

When workers required for present projects > 2 miles:
- Erect STOP sign and install temporary guide line.
- Install double yellow reflectorized line markings.
- When through lane reopens to traffic:
  - Double yellow reflectorized line markings.
  - Remove or cover existing stop sign and reinstall stop sign and reflectorized line markings.

PHASE III

1. Mark Phases I and II pavement in accordance with the Phase III diagram.
2. Reroute through traffic to Phase II pavement.
3. Construct new pavement in accordance with Index No. 620, 650, or 622. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one-lane one-way operations for two-way cross streets and one-lane access (minimum) for four-lane two-way cross streets.

GENERAL NOTES

1. All signing, pavement marking, barricades, and warning lights necessary for maintenance of traffic shall conform to Index No. 600.
2. The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. Lane widths for maintenance of two-way traffic should be equal to lane widths of the existing facility, but lane must not be less than 10' in width. When one lane or one-way operations are necessary, a minimum width of 12' should be maintained and traffic controlled in accordance with Index No. 620, 650, or 622.
4. At signalized intersections, signs shall be directed or relocated as required to the center of relocated lane.
5. For areas covered with overlay pavement, application see Index No. 600 and Index No. 6732.
6. Additional barricades, signing, lighting, or other traffic controls for limited work areas shall be provided in accordance with applicable TCZ Indexes as a part of construction in each phase.
7. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
8. Arrows denote direction of traffic only and do not reflect pavement markings.
9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
10. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS

- Orange Flag and Type B Light
- Type I, II, or III Barricade or Vertical Panel
- Tubular Markers May Be Used During Daylight Only.
- Work Zone Sign
- Stop Bar

LEGEND

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONVERTING TWO LANES TO FOUR LANES DIVIDED

TRAFFIC CONTROL THROUGH WORK ZONES

Drawn By
Approved By
Date
Date

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641

On 2 of 2

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PHASE I
1. Maintain two-lane two-way traffic over existing facility.
2. Construct temporary structure, approaches, guardrail and install crash cushions if center truss is constructed.
3. The signing shown in the Phase I diagram is required whenever equipment workers or their activities are within 15' of the existing pavement edge.

PHASE II (See Sheet 2 of 2)
GENERAL NOTES (See Sheet 2 of 2)

LEGEND

SYMBOLS

- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
- Type III Barricade (With Flashing Light)
- Work Zone Sign

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
PHASE III

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

GENERAL NOTES

1. All signing, pavement marking, barriers and warning lights necessary for maintenance of traffic shall conform to Index No. 600.
2. The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. For speed limit applications see Index No. 600.
4. For lane width requirements see Index No. 600. When one-way one-lane operations are necessary, a minimum width of 12' shall be maintained and traffic controlled in accordance with Index Nos. 603, 604, 606, 607 or 608. Minimum width for the diversion shoulders is 6'.
5. Method of attaching temporary guardrail to the diversion structure to be approved by the Engineer. Cost of temporary guardrail systems, including end anchorages, transitions and attachment to temporary structures, are to be included in the contract unit price for Guardrail (Temporary).
6. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
7. Only temporary crash cushions approved by the Department shall be used unless specified devices called for in the plan.
8. Arrows denote direction of traffic only and do not reflect pavement markings.
9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
10. Where the temporary structure is not required the diversion may be constructed in accordance with Index No. 509, unless otherwise stipulated in the plans.
11. For reflective raised pavement marker application see Index No. 600 and Index No. II60.2.
12. For general TCZ requirements and additional information refer to Index No. 600.
When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign(s) To Be Deleted And Signing To Be Coordinated In Accordance With Index No. 600.

**GENERAL NOTES**

1. All existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and new pavement markings used for marking edge lines and lane lines.

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

3. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

4. When side roads, cross roads or Interchanges are located within the limits for work zone traffic control apparatus, traffic control devices shall be erected in accordance with applicable TDC Index.

**SYMBOLS**

- **Work Area**
- **Sign With 18" x 18" (Min.) Orange Flag And Type B Light**
- **Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).**
- **Work Zone Sign**

**CONDITIONS**

Where any vehicle, equipment, workers or their activities require the closure of one roadway and the opposing roadway is converted to temporary two-way travel by way of crossovers.

**TYPICAL FOR 45 MPH**

**SECTION AA**

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

2. The first two warning signs, each side, shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.

3. All signs shall be past mounted.

4. Speed limit sign (mph).

5. Within the lateral transitions, the maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 26-40 MPH; 60' for 45 MPH or greater. Barricades, vertical panels, and drums shall not be intermixed in lateral transitions.

6. For speed sign applications see 'Regulatory Speed In Work Zones' Index No. 600.
When other Construction or Maintenance Operations Occur Within 500 ft. of Edge of Existing Pavement Shoulder & Travel Way - Yellow Reflectorized Pavement Markings

When Other Construction or Maintenance Operations Occur Within 1100 ft. of Edge of Existing Pavement Shoulder & Travel Way - Yellow Reflectorized Pavement Markings

When Other Construction or Maintenance Operations Occur Within 1100 ft. of EDGE OF TRAVEL WAY - Temporary Concrete Barrier Wall

* Length of barrier wall needed for protection of work area and/or other hazards to be shown in the plans. For complimentary information on barrier walls and work areas see Sheet 1. See Index No. 600 for clear zone requirements.

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<th>65 Degree</th>
<th>74 Degree</th>
<th>83 Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>160</td>
<td>144</td>
<td>128</td>
<td>112</td>
<td>96</td>
</tr>
<tr>
<td>30</td>
<td>166</td>
<td>150</td>
<td>134</td>
<td>118</td>
<td>102</td>
</tr>
<tr>
<td>40</td>
<td>172</td>
<td>156</td>
<td>140</td>
<td>124</td>
<td>108</td>
</tr>
<tr>
<td>50</td>
<td>178</td>
<td>160</td>
<td>144</td>
<td>128</td>
<td>112</td>
</tr>
<tr>
<td>60</td>
<td>184</td>
<td>168</td>
<td>152</td>
<td>136</td>
<td>120</td>
</tr>
<tr>
<td>70</td>
<td>190</td>
<td>174</td>
<td>158</td>
<td>142</td>
<td>126</td>
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<tr>
<td>80</td>
<td>196</td>
<td>180</td>
<td>164</td>
<td>148</td>
<td>132</td>
</tr>
</tbody>
</table>

Minimum Radii for Normal Cross Slopes

<table>
<thead>
<tr>
<th>Curve 1 &amp; 2</th>
<th>Curve 3 &amp; 4</th>
<th>Curve 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>22,900 (5° 5')</td>
<td>3,904 (9° 9')</td>
</tr>
<tr>
<td>65</td>
<td>22,900 (6° 6')</td>
<td>3,904 (10° 2')</td>
</tr>
<tr>
<td>60</td>
<td>22,900 (7° 0')</td>
<td>3,904 (10° 1')</td>
</tr>
<tr>
<td>55</td>
<td>4,450 (0° 50')</td>
<td>2,944 (8° 15')</td>
</tr>
<tr>
<td>50</td>
<td>4,450 (1° 2')</td>
<td>2,944 (8° 0')</td>
</tr>
<tr>
<td>45</td>
<td>1,060 (1° 12')</td>
<td>700 (8° 0')</td>
</tr>
<tr>
<td>40</td>
<td>835 (6° 54')</td>
<td>550 (10° 25')</td>
</tr>
<tr>
<td>35</td>
<td>660 (9° 41')</td>
<td>400 (13° 58')</td>
</tr>
<tr>
<td>30</td>
<td>490 (11° 44')</td>
<td>285 (18° 06')</td>
</tr>
</tbody>
</table>

NOTE: Variations with speeds of 50 mph or greater are considered high-speed facilities curvatures and superelevation criteria for open roadway conditions apply.
**Temporary Crosswalk Marking**

**SYMBOLS**

**Work Area**

- Type I Or Type II Barricade Or Vertical Panel
- Or Drum (With Steady Burning Light At Night Only)
- (Roadside Barricades May Be Used During Daylight Only. Crossing May Be Used - See Index No. 610.)

**Work Zone Sign**

- Required locations for either temporary or permanent curb ramps.

**GENERAL NOTES**

1. Arrows denote direction of traffic only and do not reflect pavement markings.
2. Only the signs controlling pedestrian flows are shown. Other work zone signs will be needed to control traffic on the streets.
3. For spacing of traffic control devices and general TCZ requirements refer to Index No. 600. Maximum spacing between barricades, vertical panels, drums or tubular markers shall not be greater than 25.
4. For nighttime closures see Type A Flashing warning lights on barricades supporting signs and closing sidewalks. Use Type C steady-burn lights on channelizing devices separating the work area from vehicular traffic.
5. Street lighting should be considered.
6. Pedestrian traffic signal display controlling closed crosswalks shall be covered or deactivated.
7. Post Mounted Signs located near or adjacent to a sidewalk shall have a 7' minimum clearance from the bottom of sign to the sidewalk.
8. When construction activities involve sidewalks on both sides of the street, efforts should be made to stage the construction so that both sidewalks are not out of service at the same time.
9. In the event that sidewalks on both sides of the street are closed, then pedestrians shall be guided around the construction zone.
10. Temporary walkways shall be a minimum of 4' wide with a maximum 0.02 cross slope and a maximum 0.05 running slope between ramps. Temporary walkways less than 5' in width shall provide for a 5' X 5' passing space at intervals not to exceed 200'. Temporary walkways shall meet the requirements for curb ramps specified in Index No. 304, General Notes 1 through 7. Temporary walkway surfaces and ramps shall be safe, free of any obstructions and hazards such as holes, debris, mud, construction equipment, stored materials, etc.
11. Temporary ramps and temporary crosswalk markings shall be removed with reopening of the sidewalk, unless otherwise noted in the plans. All work and materials associated with constructing temporary curb ramps and temporary crosswalk markings, removal and disposal of temporary curb ramps and temporary crosswalk markings, and restoration to original condition shall be paid for as Maintenance of Traffic, Lump Sum.

**TYPICAL APPLICATIONS**

- Sidewalk Repair
- Pavement Widening
- Utility Work

**CONDITIONS**

- WHERE ANY VEHICLE, EQUIPMENT WORKERS OR THEIR ACTIVITIES ENCROACH ON THE SIDEWALK FOR A PERIOD OF MORE THAN 60 MINUTES.

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**TRAFFIC CONTROL THROUGH WORK ZONES**

**PEDESTRIAN CONTROL FOR CLOSURE OF SIDEWALKS**

**DESIGNED BY**

**DRAFTED BY**

**CHECKED BY**

**APPROVED BY**

**Drawn By**

**Rev. Of**

**Specified By**

**Completion Date**

**660**
GENERAL NOTES

1. Access openings across limited access right of way and use of this Index are prohibited unless specifically permitted in the Contract Plans or Special Provisions. When permitted in the Contract Plans or Special Provisions and prior to construction of any opening, the Contractor shall submit, in writing, a request identifying specific locations for approval by the Engineer.

2. No more than two (2) access openings will be allowed on each project.

3. Access openings shall be located only in areas having adequate sight distance and shall not be located within 1,500 ft. of Interchanges nor within 2,000 ft. of acceleration-deceleration lanes at rest areas, other access openings or other highway service areas.

4. Access openings shall not be constructed directly opposite temporary median crossovers nor within 2,000 ft. of temporary median crossovers.

5. Access openings shall be within the project limits and shall not be used for transporting materials to or from any other project. The acceleration-deceleration surfaces shall be paved. RAP material is acceptable for driveway surfacing.

6. Any Motorist Aid Call Boxes affected by the temporary access opening shall be relocated outside the limits of access lane and remain in use during construction. Upon removal of access lanes, call boxes shall be returned to their previous location.

7. Access openings in the limited access fence shall have gates which are to be locked during non-work hours or periods when the access is not in active use.

8. The contractor shall take all precautions necessary to insure against entrance by livestock or unauthorized persons or vehicles.

9. The contractor shall not vary from the plan detail without approval of the Engineer.

10. Gates shall be removed and access opening locations shall be restored to pre-construction condition immediately upon completion of activities utilizing the materials being transported through the openings whether or not the project is completed.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
LIMITED ACCESS
RIGHT OF WAY TEMPORARY OPENING

SYMBOLS

D Work Zone Sign
1. Work operations shall be confined to one traffic lane, leaving the lanes open to traffic.
2. All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
3. The first two warning signs, each side, shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
4. All signs shall be past mounted if the closure time exceeds 12 hours.
5. When work is performed in the median lane on divided highways the signs shall be omitted.
6. When work is being performed on a multilane undivided roadway the signs shall be omitted.
7. Arrows denote direction of traffic only and do not reflect pavement markings.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
10. For general TCZ requirements and additional information refer to Index No. 600.

**GENERAL NOTES**

8. Highway Advisory Radios may be considered as a supplement to the Motorist Awareness System.

The following operating parameters must be adhered to when using a Highway Advisory Radio:

A. Daytime construction periods only.
B. Per CFR 90.242 (a) (5) the transmitting site of the HAR is restricted to the immediate vicinity of the following specified areas:

- Air, Train, Bus Transportation Terminals, Public Parks, Historical Sites, Bridges and Tunnels.

Any intersection of the following Federal Interstate Highway with any other Interstate, Federal, State, or Local Highways: 1-4, 1-10, 1-75, 1-275, 1-95 and 1-295.

**CONDITIONS**

1. The MAS is intended for use on rural high-speed high volume highways, which have lane closures with no more than two lanes open to traffic, and when the active work zone is less than one mile in length.

2. The MAS should be considered on projects where the likelihood of excessive speeds in the work area needs to be controlled.

**SYMBOLS**

- **Work Area**
- **Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only)**
- **Type II Barricade Or Vertical Panel Or Drum (With Flashing Light)**
- **Advance Warning Arrow Panel**
- **(1) PCMS* Portable Changeable Variable Message Sign (When Called For In Plans)**
- **(1) HAR* Highway Advisory Radio (When Called For In Plans)**
- **(2) PRS* Portable Regulatory Sign: Speed Limit When Flashing**
- **(2) RSDU* Radar Speed Display Unit**
- **(1) LEO* Law Enforcement with Flashing Lights and Radar Policed As: FHP  (Contract) (Do Not Bid)**

**PCMS Display**

Message 1: TUNE TO XXX AM

Message 2: FOR CONST INFO

**Note:**

PCMS to be used when HAR is used. See Note II.
STEP I
Obtain the design speed.

**TABLE A**

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>Travel Lane &amp; Multi-Lane Ramps</th>
<th>Auxiliary Lane &amp; Single Lane Ramps</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 45</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>45</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>50</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>55</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>&gt; 55</td>
<td>36</td>
<td>24</td>
</tr>
</tbody>
</table>

**TABLE B**

**Restricting Conditions**

1. The facility is an urban facility.
2. The facility's design speed is 45 mph or lower.
3. The facility is a large multi-lane facility.
4. The distance from the face of such the R/W line is less than the value obtained in STEP 2.

**STEP 2**
Select the minimum recoverable terrain from Table A based on the lane type and design speed.

**STEP 3**
Determine the clear zone.

**STEP 4A**
As shown in Figure 1, determine the clear zone.

**STEP 4B**
Select the horizontal clearance requirement from the restricted column of Table B based on the object, obstruction, or condition.

**STEP 5**
Select the horizontal clearance requirement from the non-restricted column of Table C based on the object, obstruction, or condition.

**PROCESS FOR DETERMINING HORIZONTAL CLEARANCE REQUIREMENTS AND CLEAR ZONES**

**Clear Zone**

- Recoverable Terrain: The relatively flat, unobstructed area that is to be provided for safe use by errant vehicles, and must be wide enough so that the sum of all the recoverable terrain widths is equal to or greater than the value obtained in STEP 2. Recoverable terrain provided beyond non-recoverable terrain shall be a minimum of 6 feet.

- Non-Recoverable Terrain: Areas beyond non-traversable and hazardous terrain cannot be used as recoverable or non-recoverable terrain.

- Roadside Terrain: Includes all surfaces along the roadway other than travel lanes, auxiliary lanes, and ramps.

- Horizontal Clearance Requirements: are shown in Table C and are the required offsets to an object from a specified point on the roadway.

**ROADSIDE TERRAIN**

**FIGURE 1**
TABLE C

<table>
<thead>
<tr>
<th>Item No.</th>
<th>OBJECTS, OBSTRUCTIONS OR CONDITIONS</th>
<th>HORIZONTAL CLEARANCE REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Redioted</td>
</tr>
<tr>
<td>GENERAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Above ground fixed hazards. All readable objects, obstructions or conditions other than those listed below that exceed 4 inches in height and pose a hazard to errant vehicles or vehicle occupants.</td>
<td>Locate as close to the Right Of Way as practicable and not less than 4 feet from face of curb.</td>
</tr>
<tr>
<td>2</td>
<td>All SIGT approved guardrail, crash cushions, permanent or temporary concrete barriers, and guardrail and terminal.</td>
<td>Locate as shown in the Design Standards.</td>
</tr>
<tr>
<td>3</td>
<td>Drop-off hazards. Any point along a roadside edge steeper than 3 degrees less than 6 feet below the hinge point. See Figure 2.</td>
<td>Locate the point that is 6 feet below the hinge point no less than 20 feet from the traveled way.</td>
</tr>
<tr>
<td>4</td>
<td>Moi/strous not shown in Design Standard 532.</td>
<td>Not to be used.</td>
</tr>
<tr>
<td>ROADWAY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Moi/strous shown in Design Standard 532.</td>
<td>Locate in accordance with Design Standard 532.</td>
</tr>
<tr>
<td>6</td>
<td>Trees expected to become greater than 4 inches in diameter measured 6 inches above the ground.</td>
<td>Outside roadway. Locate no less than 4 feet from face of curb in accordance with Design Standard 546. Walls medians. Locate no less than 6 feet from the edge of traffic lane and in accordance with Design Standard 546.</td>
</tr>
<tr>
<td>7</td>
<td>Trees not expected to become greater than 4 inches in diameter measured 6 inches above the ground.</td>
<td>Locate in accordance with Design Standard 546.</td>
</tr>
<tr>
<td>8</td>
<td>Concrete barriers</td>
<td>Locate no less than 5 feet from the back of the concrete barrier.</td>
</tr>
<tr>
<td>9</td>
<td>Concrete without guardrail.</td>
<td>Locate as close to the Right Of Way as practicable and not less than 40 feet from the traveled way.</td>
</tr>
<tr>
<td>DRAINAGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Culvert wing wall, endwall, retaining walls and flared and eccentric less than 6 feet deep.</td>
<td>Locate no less than 4 feet from face of curb.</td>
</tr>
<tr>
<td>11</td>
<td>Culvert wing wall, endwall, retaining walls and flared and eccentric 6 feet and greater in depth.</td>
<td>Treat as drop-off hazards. See Item No. 5.</td>
</tr>
<tr>
<td>12</td>
<td>Wiered and endwalls.</td>
<td>Locate as shown in Design Standards 272 and 273.</td>
</tr>
<tr>
<td>13</td>
<td>Frangible sign supports.</td>
<td>Locate no less than 4 feet from face of curb and in accordance with Design Standard 7502.</td>
</tr>
<tr>
<td>14</td>
<td>Drendout drain supports and other non-frangible sign.</td>
<td>Locate no less than 4 feet from face of curb.</td>
</tr>
<tr>
<td>15</td>
<td>Signal controller cabinets, signal poles, strain poles and mast arm.</td>
<td>Locate no less than 4 feet from face of curb and not in medians.</td>
</tr>
<tr>
<td>LIGHTING</td>
<td>Conventional lighting (frangible and non-frangible).</td>
<td>Locate no less than 4 feet from face of curb and not in medians.</td>
</tr>
<tr>
<td>16</td>
<td>Highintensity lighting.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>STRUCTURES</td>
<td>Bridge piers and abutments. Above ground vertical structures.</td>
<td>Locate no less than 16 feet from edge of travel lanes.</td>
</tr>
<tr>
<td>18</td>
<td>Fire hydrants with bases no higher than 4 inches above the ground.</td>
<td>Locate no less than 2 feet from face of curb.</td>
</tr>
<tr>
<td>UTILITIES</td>
<td>Utility (transmission) All above ground fixed objects.</td>
<td>Locate as close to the Right Of Way as practicable and not less than 4 feet from face of curb and not in medians.</td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. When alleys are present, an unobstructed clearance of at least 4 feet must be provided.

2. When all specific conditions prohibit meeting the horizontal clearance requirements in TABLE C, the object, obstruction or condition must be refigured, paved by abating. Otherwise, the Plane Preparation Manual, Volume 1, Chapter 2, 4, 5, 1 or 20, or Chapter 5 and 9 of the Utility Accommodation Manual must be referenced to determine viable alternative. The minimum requirements in those manuals can only be reduced when a Design Variation or Design Exception has been approved in accordance with Chapter 23 of the Plane Preparation Manual, Volume 1 for a utility Exception has been approved in accordance with Chapter 15 of the Utility Accommodation Manual.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

ROADSIDE OFFSETS

FIGURE 2

1. When alleys are present, unobstructed clearance of at least 4 feet must be provided.

2. When all specific conditions prohibit meeting the horizontal clearance requirements in TABLE C, the object, obstruction or condition must be refigured, paved by abating. Otherwise, the Plane Preparation Manual, Volume 1, Chapter 2, 4, 5, 19, or 20, or Chapter 5 and 9 of the Utility Accommodation Manual must be referenced to determine viable alternative. The minimum requirements in those manuals can only be reduced when a Design Variation or Design Exception has been approved in accordance with Chapter 23 of the Plane Preparation Manual, Volume 1 for a utility Exception has been approved in accordance with Chapter 15 of the Utility Accommodation Manual.
NOTES

1. Walls shall be constructed in accordance with Section 54B and the wall suppliers' instructions.

2. Retaining Walls and out-of-place appearances, i.e., coping, traffic railing barriers, etc., with asphalt or other surface, shall be paid for at the contract unit price per square foot of retaining wall area. Retaining Wall System materials, Retaining Wall System (Temporary), and permanent shall be based on plan quantities.

3. All exposed surfaces of out-of-place concrete shall receive a Class 5 Applied Finish Coating in accordance with Construction Specifications Section 45B. Refer to Typical Wall Sections and the following notes for limits of applied finishes.

4. Each wall unit shall be constructed with signs, supports, light poles, etc., that affect the walls. Provide full details of every change or relocated wall, including reinforcing bar size and spacing, anchor bolts and details of all welds.

5. Provide general plan and elevation details of traffic railing barriers and footings, including steps in the traffic railing barriers.

6. Provide general plan and elevation adjustments, including design and elevation details, showing all changes or relocated walls, including reinforcing bar size and spacing, anchor bolts and details of all welds.

7. Show all details of traffic railing barriers, including signs, supports, light poles, etc., that affect the walls. Provide full details of every change or relocated wall, including reinforcing bar size and spacing, anchor bolts and details of all welds.

8. Show all details of out-of-place appearances, i.e., coping, traffic railing barriers, etc., with asphalt or other surface, shall be paid for at the contract unit price per square foot of retaining wall area. Retaining Wall System materials, Retaining Wall System (Temporary), and permanent shall be based on plan quantities.

9. Walls shall be constructed with signs, supports, light poles, etc., that affect the walls. Provide full details of every change or relocated wall, including reinforcing bar size and spacing, anchor bolts and details of all welds.
GENERAL NOTES

DESIGN CRITERIA

1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE REINFORCED EARTH WALLS, METHODS OF CONSTRUCTION AND QUALITY OF FABRICATED MATERIALS SHALL CONFORM TO THE CONTRACTING AGENCY'S TECHNICAL SPECIFICATIONS FOR RETAINED EARTH WALLS.

2. FACTORS OF SAFETY

   a. OVERWALL 1.0
   b. INTERNAL 1.5 (ALLOWED DEFORMATION 5.0"
   c. OVERALL STABILITY 1.5
   d. SOIL ENGAGEMENT DEWAR 1.5

3. SOIL REINFORCEMENT WITH FABRIC AT END OF DESIGN LIFE

4. SOIL CHARACTERISTICS ASSIGNED FOR DESIGN

5. SOIL PARAMETERS

   a. WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL PARAMETER FOR BACKFUL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF 0.2, 0.2 AND 0.8 SHALL BE PROVIDE IN THE SITE CONDITIONS.
   b. MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS 1.5 AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF OTHERS TO DETERMINE WHETHER THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.
   c. AN UNSTABLE FOUNDATION MATERIAL DELOW THE REINFORCED EARTH WALL, AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIALS OR SIMILARLY STABILIZED AS DIRECTED BY THE ENGINEER.

REINFORCEMENT ELEMENTS


8. WALL CONSTRUCTION

   a. SQUARE PANELS RETAINED EARTH WALLS IN CORES WILL FORM A SERIES OF SHORT CHOICES OF 5 FT EACH AT TOP IN THE DESIGNED WALL ALLOWS.
   b. PANELS RETAINED EARTH WALLS IN CORES WILL FORM A SERIES OF SHORT CHOICES OF 5 FT EACH AT TOP IN THE DESIGNED WALL ALLOWS.
   c. FOR LOCATION AND ALIGNMENT OF RETAINED EARTH WALLS SEE RETAINING WALL CONTROL PANELS.
   d. PANELS AND TOP HOLES ARE PRESENT, THEY SHALL BE CREATED AS SHOWN ON WALL ELEVATIONS.
   e. IF PANELS ARE LOCATED WITHIN REINFORCED SOIL WALL, THEY SHALL BE SPACED PRIOR TO CONSTRUCTION OF THE REINFORCING WIRES darf E3 GUIDE. WHICH IS CONSTRUCTED AT THE ENGINEER'S AND FOSTER GEOTECHNICAL COMPANY PROPOSED AND APPROVED IN WRITING.
   f. WALL MATERIAL SHALL BE COMPLIED WITH SECTION 5.4A TO A LEVEL OF 1/4" AND THE 1/8" MESH EMERGED IN THE WALLS. WALLS MESH WELDED MESH WHICH HAS BEEN FABRICATED TO THE CEILING MATERIAL WHICH HAS BEEN FABRICATED TO THE REQUIRED LEVEL.

9. WALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 5.4B.

   a. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE LOCATION OF ANY GUIDED POSTS BEHIND RETAINED EARTHS PANELS PER TO PLACEMENT OF THE TOP LINES OF REINFORCING WIRE OR WIRE MESH. FOR THE 1/8" MESH, ANY MESH IS AUTHORIZED AT THE ENGINEER'S OR TIGHTING OF SOIL, REINFORCEMENT MAY ALLOWED—from ANY SHAPED SHAPED AND APPROVED BY THE ENGINEER. ANY MESH DAMAGE TO THE REINFORCING MESH DUE TO THE INSTALLATION OF THE REINFORCING OF THE BACKFUL MATERIAL HAS PROVEN THE REQUIRED LEVEL.

10. WALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 5.4C.

   a. ANY EXISTING OR ALL MESH MATERIALS SHALL BE EMERGED IN ACCORDANCE WITH ASTM A-667. ANY MESH MATERIALS SHALL BE EMERGED IN ACCORDANCE WITH ASTM A-667.

11. WALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 5.4D.

   a. WALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 5.4A AND 5.4B.

MATERIALS BORNE

15. NOMINAL MESH LENGTHS

   a. THE REINFORCING MESH LENGTH IS SHOWN ON THE PLANS, LAYERS, FROM EACH FACE OF WALL ARE THE NOMINAL LENGTHS OF MESH. THE MESH LENGTH SHALL BE ADJUSTED TO MATCH THE REQUIRED MESH LENGTH. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT THE MESH LENGTH IS MATCHED TO THE REQUIRED MESH LENGTH.

16. REINFORCING BURNT QUANTITY

   a. THE REINFORCING BURNT QUANTITY IS DETERMINED IN MULTIPLYING THE MESH WALL MATERIAL SHOWN ON THE PLAN OF THE TRIBUTARY WALL SURFACE AND CONVERTING THE RESULT TO A HEATER CORES QUANTITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THE MESH WALL MATERIAL IS ADJUSTED TO MATCH THE REQUIRED MESH LENGTH.

17. PANEL SUMMARY

   a. THE PRECAST PANELS FOR THIS PROJECT SHALL BE A PRECAST STEEL PANEL FINISH UNLESS OTHERWISE SPECIFIED OF THE RETAINED EARTH CONTROL.

18. WALL MATERIALS SUPPLIED BY FOSTER GEOTECHNICAL

   a. PRECAST PANELS
   b. REINFORCING MESH
   c. MACHINEDアジROUS AS WELL AS SAND BOND
   d. NON-WOOL FILTER STAIN AND ADHESIVE (40" PANELS\) WOOL UNFARMED STAINED OR ANY OTHER MATERIALS NOTED IN THE CONTRACT FOR THE MESH WALL MATERIALS SPECIFICATIONS IS TO BE SUPPLIED BY THE CONTRACTOR.

19. notes TO CONTRACTORS

   a. THE FOLLOWING MATERIALS ARE SUPPLIED BY FOSTER GEOTECHNICAL
   b. PRECAST PANELS
   c. REINFORCING MESH
   d. MACHINEDアジROUS AS WELL AS SAND BOND
   e. NON-WOOL FILTER STAIN AND ADHESIVE (40" PANELS\) WOOL UNFARMED STAINED OR ANY OTHER MATERIALS NOTED IN THE CONTRACT FOR THE MESH WALL MATERIALS SPECIFICATIONS IS TO BE SUPPLIED BY THE CONTRACTOR.

20. FOSTER GEOTECHNICAL SUPPLIES PRECAST CONCRETE PANELS...
VERTICAL OBSTRUCTION NOTES

Obstruction shall be constructed before wall installation. Field cut and show mesh around obstruction as required. These areas will be cleanly indicated on the retained earth shop drawings and approved by the Engineer of Record. OBSTRUCTION SHALL BE CONSTRUCTED BEFORE WALL INSTALLATION.

CUTTING OFF SOIL REINFORCEMENT GRIDS ALLOWED UNLESS SHOWN ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER.

Partial Elevation Wall & Drainage Inlet

Obstruction higher than panel clevises.

Obstruction lower than panel clevises.

Obstruction Horizontal

15 degrees Max Bend

Obstruction Detail (Vertical)

Inlets 5'-0" (Typ)

Obstruction Detail (Horizontal)

CUT MESH GALV. SHAU. BASED ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER OF RECORD.

CUTTING OFF SOIL REINFORCEMENT GRIDS ALLOWED UNLESS SHOWN ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER.

Obstruction Higher Than Panel Clevises

Obstruction Lower Than Panel Clevises

Obstruction Notes

Partial Plan - Junction Slab Around Inlet

(Steel not supplied by Foster Geotechnical)

Square / Hex Panels

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24A  PLAN VIEW - PRECAST TRAFFIC BARRIER

24B  PARTIAL ELEVATION PRECAST BARRIER

All open joints in precast barrier shall be filled & made finished grade with 1/2 backing rod and checked with silicone sealant. Materials of Contractor.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM
FOSTER GEOENGINEERING RETAINED EARTH WALL

Approved By

Design By

Drawn By

Revise Ch: 3

5005

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**Plan View at End Bent**

- **Front Face of Precast Panel**
- **Leveling Pad**
- **Contractor shall field cut four wire mesh at center of cross bar and use two wire mesh at each connector location. Drainage grooves shall be coated with zinc rich paint.**

**Section A-A**

- **Top of Traffic Barrier**
- **Plan at Bend**
- **Top of CJP Casing**
- **Buttline**
- **Standard Barrier**
- **Bridge Slab**
- **Cheek Wall**
- **Top of Pile Cap**
- **Align Panel with Panel Below**
- **Panel beyond CJP Casing**
- **Cheek Wall**
- **CJP Casing**
- **Pile Cap**
- **Top of CJP Casing**
- **Top of Wall Panel**
- **Top of Barrier**

**Section B-B**

- **Partial Elevation CJP Barrier Over Slip Joint**
- **Square Panels**

**Typical Leveling Pad Steps**

- **Top of Slip Joint**
- **Filter Fabric**
- **Exp. Joint Material**
- **Step Joint**

**Partial Elevation CJP Barrier Over Slip Joint**

- **The Foster Geotechnical Square Panel System provides 3/4" to 7" vertical slip joints every 1'-0" to accommodate different vertical movements between individual panels.**

**State of Florida Department of Transportation**

**Foster Geotechnical Retained Earth Wall**

**Approved By**

- **Designated By**
- **Drawn By**
- **Checked By**

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM
FOSTER GEOTECHNICAL RETAINED EARTH WALL

CAST IN PLACE LIGHT POLE
FULL REBAR IF OTHERS
LIGHT POLE/BARRIER COPING

SECTION A-A
(SEE STRUCTURES STANDARD DRAWING SSD FOR ADDITIONAL DETAILS)

PARTIAL ELEVATION AT LIGHT POLE

SQUARE / HEX PANELS
C.I.P. BARRIER W/ COPING & JUNCTION SLAB STEEL

- Provide a positive bond breaker between C.I.P. concrete and precast panels.
- One inch monolithic joint to be placed every sixth panel joint.
- See Structures Standard Drawings for additional details.

C.I.P. PARAPET DETAIL W/ HANDRAIL

- 2'-0" precured expansion joint material seal top with 3/4" poured numbers.
- Concrete barrier wall

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5. **Steel for Junction Boxes** shall conform with ASTM A48. The boxes shall be hot-dipped galvanized after fabrication in lieu of steel. Boxes the Contractor may submit for approval must be boxed individually.

6. All conduit shall be made galvanized steel or schedule 80 pipe.

7. The cost of anchor bolts shall be included in the bid price for light poles.

8. Payment: All labor, concrete, and reinforcing steel required for the construction of the pilasters and all conduits, expansion fittings, junction boxes, and miscellaneous hardware required for completion of the electrical installation within the walls shown on this sheet shall be included in the Contractor's bid price for the wale walls.

---

**Notes:**

1. Additional concrete and reinforcing steel required for the construction of the pilasters shall meet the same requirements as that of the parapet walls.

2. Top of pilaster shall be finished to a true level area.

3. Light pole plaster is designed to resist working loads in any direction from the light pole applied at the top of the pilaster as follows:
   - Longitudinal Moment = 35,000 ft. pounds
   - Transverse Moment = 6,000 ft. pounds
   - Longitudinal Shear = 1,000 pounds
   - Transverse Shear = 800 pounds
   - Torsion = 3,500 ft. pounds
   - Axial = 400 pounds

4. The light pole provides loads that are in excess of those shown and the Contractor shall resist these loads with the pilaster. The Contractor's resistance shall be prepared, signed and sealed by a professional engineer registered in the state of Florida and qualified to perform the work.

5. The Contractor is responsible for providing anchor bolts that effectively transmit the light pole loads to the pilaster and that fit the reinforcing cage calculations signed and sealed by a professional engineer registered in the state of Florida. The Contractor's design shall be prepared, signed and sealed by a professional engineer registered in the state of Florida and qualified to perform the work.

6. The Contractor may submit for approval molded PVC boxes.

---

**Construction Details:**

- **Light Pole Detail:**
  - Thickened slab to 1'-6" 5'-0" on either side of light pole pilaster.
  - See drawing sheets.

- **Light Plaster Detail:**
  - Anchor bolts provided by Contractor.
  - Heads after tightening nuts.

- **Light Plaster Elevation:**
  - Pole to be plum.

---

**State of Florida Department of Transportation**

**Foster Geotechnical Retained Earth Wall**

**Foster Geotechnical**

**Approved by**

**Drawn by**

**Sealed by**

**Scale: 1" = 1'-0"**

**Sheet No:** 11 of 12

**5005**
STANDARD DETAILS
FOR 3" CONCRETE COVER
T-WALL RETAINING WALL SYSTEM

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CONSTRUCTION NOTES
1. All construction procedures shall comply with Spec Section 548 - Designing Retaining Wall Structures - provided in this manual. The Spec shall control.
2. For location and alignment of t-wall structure, see retaining wall control plans.
3. T-WALL structures on curves shall be built in chords as shown in the T-WALL Design Schedules.
4. If walls or drop walls are present, they shall be located as shown in the T-WALL Design Schedules.
5. If piles are located within the retaining wall zone, they shall be driven before construction of the T-WALL structure.
6. T-WALL units shall be placed one row at a time, and backfilled before placement of the next row.
7. If a structure exceeds 20' in height, the finish grade at the face of the wall shall be placed and compacted before backfilling the wall and the retaining wall volume.
8. The contractor is responsible for controlling storm water drainage in the vicinity of the wall during construction.
9. The system may be used in all environments.

Copyright © 2004 Oldcastle Precast. Inc. All rights reserved. This system may not be used for walls with acute interior corners in salt water environments.
OPEN JOINT ALIGNS WITH T-WALL UNIT

FINISH GRADE (REAR FACE)

PAD DOES NOT HAVE 8" MINIMUM REACH END OF PANEL

PRECAST HEADWALL PANEL FOR LARGE DIAMETER PANELS

TEMPORARY FINISH GRADE (FRONT FACE)

NOTES: ALL EXTENDED FACE TOP UNITS REQUIRE A MINIMUM OF TWO SHEAR KEYS. ALL OTHER UNITS ARE AS SHOWN BELOW:

TOP UNITS - 3 SHEAR KEYS

8' STEM - 3 SHEAR KEYS

10' STEM - 3 SHEAR KEYS

12' STEM - 3 SHEAR KEYS

14' STEM - 3 SHEAR KEYS

16' STEM - 3 SHEAR KEYS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM
THE NEEL COMPANY T-WALL
(3' COVER)

7/8/04

5/10
INTRODUCTION

1. Horizontal joint: 6" x 5'-0" prefomed elastomeric joint material.

2. Vertical joint: 3" space 12.5" wide decomposite backing centered about joint centerline.

NOTES:

1. SHEAR KEY MATERIAL
   - Minimum of one 6" x 5'-0" piece of AV/ASTRO-FOAM AF-250 per shear key.
2. SHEAR KEY ALIGNMENT
   - Shear key must fit snug in the blockout when unit is in its final position.
3. Minimum of 2 shear keys required per unit. See notes on sheet 2 of 8 for typical details 101.

SHEAR KEY DETAILS

PART ELEVATION - REAR FACE

PART SECTION A-A

PART SECTION B-B

JOINT MATERIAL DETAILS

SHEAR KEY / JOINT MATERIAL ARRANGEMENT

ELEVATION (FRONT FACE)

PRECAST HEADWALL PANEL FOR LARGE DIAMETER PIPES
BOLTED CONNECTION
OF EACH SHORT CORNER UNIT
LONG STEM UNIT
GEOCOMPOSITE BACKING (TYPE)
GEOMETRICALLY CLEATED (TYPE)
CLIP/CONCRETE TO PROVIDE
A MINIMUM OF 3" OF COVER
FOR BOLTED CONNECTIONS

PART PLAN - FIRST ROW

PART PLAN - SECOND ROW

PART ELEVATION

SECTION A-A
TYPICAL CORNER UNIT ARRANGEMENT
STANDARD UNIT AND SHORT STEM
EXPANSION ANCHORS

NOTE: CLIP/CONCRETE SHALL BE CLASS N.

#3 VERT. REBAR
#3 REBAR CHIMY AND VERTS AS REQUIRED

3/4" x 6" GALVANIZED EXPANSION BOLTS
AND WASHERS

MIN. 3" THICKNESS OF CLIP/CONCRETE

MIN. 3" THICKNESS OF C.L.P./CONCRETE

MIN. 3" OF COVER

BOLTED CONNECTION
OF EACH SHORT CORNER UNIT
LONG STEM UNIT
GEOCOMPOSITE BACKING (TYPE)

TYPICAL BOLTED CONNECTION FOR ANGLE POINTS
TYPICAL ANGLE POINT DETAIL

NO SCALE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETAINING WALL SYSTEM
THE NEEL COMPANY T-WALL
(3" COVER)

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5901 SOUTH I-10
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Design

Drawn

Approved By

Signature

Scale

Prepared By

Signature

5010

Dimensions OK

Date

Sheets 1/20

10/6/06

10/6/06

VERTICAL REBAR IN FACE OF PANEL
EXTENDED 3" TYP FOR 2 BARS EACH PANEL
AND FIELD-TRIMMED AS REQUIRED.

#4 BENT BAR AT EACH
EXTENDED PANEL REBAR
AS REQUIRED.

LONG BAR (FOLLOWS
TOP OF PANEL)

LONG BAR (FOLLOWS
SLOPE OF COPING)

LONG BAR (TYP FOR A)

LONG BAR TO FOLLOW
SLOPE OF COPING (TYP FOR A)

BENT BAR AT EXTENDED
T-WALL REBAR LOCATION.

T-WALL FACE REBAR EXTENDED
3" ABOVE TOP OF PANEL,
FIELD-TRIMMED AS REQUIRED.

#4 BENT BAR
TO BE
FIELD-TRIMMED
AS REQUIRED
TO PROVIDE
MIN. OF 3"
OF CONCRETE COVER.

C.L.P. COPING TREATMENT AT BEGINNING/END OF WALLS

#4 BENT BAR AT EXTENDED
T-WALL REBAR LOCATIONS.

#4 LONG BAR (TYP FOR A)

#4 LONG BAR (TYP FOR A)

#4 LONG BAR (TYP FOR A)

#4 BENT BAR
TO BE
FIELD-TRIMMED
AS REQUIRED
TO PROVIDE
MIN. OF 3"
OF CONCRETE COVER.

SECTION A-A
C.L.P. COPING

SECTION B-B
PRECAST COPING

PRECAST COPING - PART ELEVATION

VERTICAL REBAR IN FACE OF PANEL
EXTENDED 3" TYP FOR 2 BARS EACH PANEL,
AND FIELD-TRIMMED AS REQUIRED.

FINISHED GRADE (FRONT FACE)

C.L.P. LEVELING CONCRETE

FINISHED GRADE (FRONT FACE)

C.L.P. LEVELING CONCRETE

FINISHED GRADE (FRONT FACE)

FINISHED GRADE (FRONT FACE)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETAINING WALL SYSTEM
THE NEEL COMPANY T-WALL
(3" COVER)
30'-0" CAST-IN-PLACE GRAVITY SLAB
12" EXPANSION JOINT MATERIAL BETWEEN SLABS
6'-0" OPEN JOINT AT TOP BRICKS

PART PLAN - PRECAST BARRIER

VERTICAL REBAR IN FACE OF PANEL, EXTENDED 2'-0" FOR 2 BARS EACH PANEL, AND FIELD-TRIMMED AS REQUIRED.

PART ELEVATION - PRECAST BARRIER

VERTICAL REBAR IN FACE OF PANEL, EXTENDED 2'-0" FOR 2 BARS EACH PANEL, AND FIELD-TRIMMED AS REQUIRED.

VERTICAL REBAR IN FACE OF PANEL, EXTENDED 2'-0" FOR 2 BARS EACH PANEL, AND FIELD-TRIMMED AS REQUIRED.

PULLER LINE

ALL OPEN JOINTS IN BARRIER TO BE FILLED 6" ABOVE FINISHED GRADE WITH % W BACKING ROD AND CALLED WITH SILICONE SEALANT MATERIALS BY CONTRACTOR

GUTTER LINE

VERTICAL REBAR IN FACE OF PANEL, EXTENDED 2'-0" FOR 2 BARS EACH PANEL, AND FIELD-TRIMMED AS REQUIRED.

PRECAST BARRIER DIMENSIONS

PRECAST BARRIER REBAR

WALL UNDIRECTIONAL BARS ARE AS SHOWN.

THE NEEL COMPANY T-WALL
3" COVER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

PRECAST BARRIER REBAR

THE NEEL COMPANY

THE NEEL COMPANY

OGCASTLE PRECAST, INC.

OGCASTLE PRECAST, INC.
C.I.P. BARRIER AND C.I.P. JUNCTION SLAB DIMENSIONS

- Bend around 3/8" dia. pin (typical)

C.I.P. BARRIER AND C.I.P. JUNCTION SLAB REBAR

- #501 #8" O.C.
- #501 #10" O.C.
- #501 #12" O.C.
- #501 #14" O.C.
- Bars are #4 as shown

C.I.P. BARRIER REBAR DETAILS

- Bar SDI
- Bar SPA
- Bar SPB
- Bar 5A
- Bar 5C
- 5 1/2" (int. mat.)
C.J.P. LIGHT STANDARD BARRIER - PART PLAN WITH REBAR
(BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)

C.J.P. LIGHT STANDARD BARRIER - PART ELEVATION
(BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)

C.J.P. LIGHT STANDARD BARRIER - PART SECTION WITH REBAR

NOTES
1. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN TOP CJ.P. CONC. AND THE PRECAST PANEL.
2. ALL LONGITUDINAL BARS ARE #4 AS SHOWN.
3. GRAVITY SLAB SHALL HAVE DIMENSIONS SHOWN FOR A MINIMUM G5" DIA. (#1) OF EITHER SIDE OF BARRIER.
4. LIGHT POLE SUPPLIER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILLAR AND FIX THE REBAR CAGE.
5. SEE STRUCTURES STANDARD DRAWING 500 FOR ADDITIONAL DETAILS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETAINING WALL SYSTEM
THE NEEL COMPANY T-WALL (3" COVER)

THE NEEL COMPANY
OLDCASTLE PRECAST, INC.

DESIGNED BY: STRUCTURES DESIGN ENGINEER
DRAWN BY: CM
CHECKED BY: JLC
BARRIER
FOR
ASTM-6.
AFTER
FABRICATION.
SAME REqUIRMENTS
SUB/J/T
P.V.C. BOXES
AS THAT
THE PARAPET WALL.
PILASTER
SHALL
BE
ANCHOR
BOLTS
SHALL
BE /NCWDED IN THE BID
FOR
LIGHT
POLE
ANCHOR
BOLTS
AND SEALED
STATE OF
THE CONTRACTOR IS RESPONSIBLE
PROFESSIONAL
CONTRACTOR IS RESPONSIBLE
CONDUIT
CONDUIT HUB
CONDUIT HUB
CONDUIT HUB
THICKENED SLAB TO 1'-6"...
INTERFERENCE OF
L=7'-9"
L=6'-0"
L=5'-9"
L=5'-7"
L=5'-6"
L=4'-6"
L=3'-6"
L=3'-3"
L=2'-0"
L=0'-0"
L=5'-0"
L=5'-0"
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L=5'-0"
L=5'-0"
L=5'-0"
L=5'-0"
L=5'-0"
L=5'-0"
REINFORCING STEEL – DOUBLE TOP UNITS (I)

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 3” MIN. CONCRETE COVER

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

THE NEEL COMPANY T-WALL

5995 SOOTEL DR.
JACKSONVILLE, FL 32219

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DESIGN ENGINEER

SHEET NO.

DRAWN BY

CHECKED BY

REINFORCEMENT BARS SHALL HAVE 3” MIN. CONCRETE COVER

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 3” MIN. CONCRETE COVER
**REINFORCING STEEL**

**REINFORCING STEEL - DOUBLE TOP UNITS (I)**

**REINFORCING STEEL - DOUBLE TOP UNITS (II)**

<table>
<thead>
<tr>
<th>REBAR SCHEDULE</th>
<th>9.5 x 5.0 x 8.0 OB TOP UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>QTY</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

**NOTE:** ALL STEEL REINFORCING BARS SHALL HAVE 3" MIN. CONCRETE COVER.
STANDARD DETAILS FOR 2" CONCRETE COVER

T-WALL®
RETAILING WALL SYSTEM

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3. MATERIALS SUPPLIED OR PRECASTER
PRECAST T-WALL UNITS
PRECAST SHEET METAL
VERTICAL SLEEVE MATERIAL AND ADHESIVE
SHEAR KEY JOINT MATERIAL

DESIGN NOTES:
5. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE WALL SYSTEM IS RESPONSIBLE FOR THE CONSTRUCTION AND QUALITY OF WORKING MATERIALS. THE CONTRACTOR SHALL CONFORM TO THE WALL DESIGN DRAWINGS.

CONSTRUCTION NOTES:
1. ALL CONSTRUCTION PROCEDURES SHALL COMPLY WITH SPECIFICATION 548 AND THE "T-WALL CONSTRUCTION MANUAL" PROVIDED BY THE NEEL COMPANY OR OLDCASTLE PRECAST, INC. IN THE EVENT OF A DISCREPANCY BETWEEN THE TWO DOCUMENTS, THE SPEC SHEET CONTROLS.
2. FOR LOCATION AND ALIGNMENT OF T-WALL STRUCTURE, SEE RETAINING WALL CONSTRUCTION PLEANS.
3. T-WALL STRUCTURES ON CURVES SHALL BE BUILT IN CHORDS AS SHOWN IN THE T-WALL DESIGN DRAWINGS.
4. IF MANHOLE OR DRAIN INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN IN THE T-WALL DESIGN DRAWINGS.
5. IF FILES ARE Locator WITHIN THE RETAINING WALL VOLUME, THEY SHALL BE BUILT BEFORE CONSTRUCTION OF THE T-WALL STRUCTURE.

6. T-WALL UNITS SHALL BE PLACED ONE ROW AT A TIME AND COMPACTED BEFORE PLACEMENT.
7. IF A STRUCTURE EXCEEDS 60 IN HEIGHT, THE FILL GRADE AT THE FACE OF THE WALL SHALL BE PLANTED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS 60 IN HEIGHT.
8. THE CONTRACTOR AND THE PRECASTER IS RESPONSIBLE FOR CONTROLLED STORAGE OF SALT WATER DRAWING. A DIRECTIONAL SALT FREE ZONE SHALL BE ERECTED AWAY FROM THE WALL AND THE RETAINING WALL VOLUME.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETAILING WALL SYSTEM
THE NEEL COMPANY T-WALL
(2' COVER)

THIS SYSTEM SHALL BE USED IN MODERATE OR SLIGHTLY AGGRESSIVE ENVIRONMENTS.

5011

5/20
1st of 17

Drawn By
Approved By
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OPEN JOINT ALIGNS WITH T-WALL UNIT JOINTS

AREA ABOVE DUMMY JOINT INDICATES PORTION OF FRONT FACE THAT EXTENDS ABOVE THE STEM

FINISH (REAR FACE) TOP OF PARAPET

FINISH (FRONT FACE)

PAD DOES NOT HAVE TO BE FLUSH WITH END OF PANEL

PANEL BLOCK-OUT FOR SMALL DIAMETER PIPES

SECTION SHOWING TYPICAL DETAILS

NOT ALL DETAILS APPLY TO EACH WALL

NOTES:
- ALL EXTENDED FACE TOP UNITS REQUIRE A MINIMUM OF TWO SHEAR KEYS. ALL OTHER UNITS ARE AS SHOWN BY OLDCASTLE
- STEM - 2 SHEAR KEYS
- 4' STEM - 3 SHEAR KEYS
- 6' STEM - 4 SHEAR KEYS
- 8' STEM - 5 SHEAR KEYS
- 10' STEM - 6 SHEAR KEYS
- 12' STEM - 7 SHEAR KEYS
- 14' STEM - 8 SHEAR KEYS
- 16' STEM - 9 SHEAR KEYS

PART ELEVATION SHOWING TYPICAL DETAILS (NO SCALE)
PREFORMED ELASTOMERIC JOINT MATERIAL

OUTLINE OF GEOCOMPOSITE THREAD

FACE OF WALL

PART ELEVATION - REAR FACE

GEOCOMPOSITE OVER VERTICAL JOINT

PART SECTION A-A

NOTES:
1. HORIZONTAL JOINT: 1/2" x 4" x 2'-0" PREFORMED ELASTOMERIC JOINT MATERIAL
2. VERTICAL JOINT: 1/2" SPACE
3. USE GEOCOMPOSITE BACKING, CENTERED ABOUT JOINT CENTERLINE.

GEOCOMPOSITE OVER VERTICAL JOINT

PART SECTION B-B

NOTES:
1. SHEAR KEY JOINT MATERIAL
   - MINIMUM OF ONE 1/2" x 8" x 24" PIECE OF AV/ASTRO-FOAM AT 250 PER SHEAR KEY.
2. JOINT MATERIAL MAY BE ADDED OR REMOVED TO AID IN SHIMMING AND ALIGING. HOWEVER, SHEAR KEY MUST FIT SNUG IN THE SHEAR KEY BLOCKOUT WHEN UNIT IS IN ITS FINAL POSITION.
3. MINIMUM OF 2 SHEAR KEYS REQUIRED PER UNIT. SEE NOTES ON SHEET 2 OF 21, "TYPICAL DETAILS 1(T)."

1/4" JOINT MATERIAL
ALL AROUND SHEAR KEY

1/4" JOINT MATERIAL
 Arrangement

SHEAR KEY DETAILS

ELEVATION (FRONT FACE)
PRECAST HEADWALL PANEL FOR LARGE DIAMETER PIPES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETIWING WALL SYSTEM
THE NEEL COMPANY T-WALL (2" COVER)
BOLTED CONNECTION TO SHORT STEM FOR EACH SHORT CORNER UNIT

SHORT CORNER UNIT
LONG CORNER UNIT
STANDARD UNIT

BOLTED CONNECTION TO SHORT STEM FOR EACH SHORT CORNER UNIT

SHORT CORNER UNIT
LONG CORNER UNIT
STANDARD UNIT

BOLTED CONNECTION

LONG STEM UNIT
GEOCOMPOSITE BACKING (77FL)
VARS

SHORT STEM UNIT

PART PLAN - FIRST ROW
PART PLAN - SECOND ROW
PART ELEVATION

VIEW B-B

TYPICAL BOLTED CONNECTION FOR ANGLE POINTS > 90°
TYPICAL ANGLE POINT DETAIL

STANDARD UNIT

EXPANSION BOLT AND WASHER (STAINLESS STEEL, GR 304)

GALVANIZED BOLT AND WASHER

3/8" x 3/4" FIELD DRILLED HOLE

SHORT-STEM CORNER UNIT

SECTION A-A

TYPICAL CORNER UNIT ARRANGEMENT
STEM LENGTH VARY - SEE SPECIFIC ELEVATION FOR PROPER UNIT

NO SCALE

APPROXIMATE LOCATION OF TB-I BARS IN STEM
TWO CONNECTIONS PER SHORT STEM

5/8" x 3/4" EXPANSION ANCHOR (STAINLESS STEEL, GR 304) NUTS & WASHERS (STAINLESS STEEL, GR 304)

FIELD LOCATED AND DRILLED HOLE IN T-WALL STEM

NO SCALE

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PRECASTER
OLDCASTLE PRECAST, INC

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETAINING WALL SYSTEM
THE NEEL COMPANY T-WALL
(2" COVER)
PART PLAN

LIMIT OF STANDARD GRAVITY SLAB

VARIES (4'-6" TO 7'-6")

LIMIT OF EXTENDED GRAVITY SLAB AT DRAINAGE STRUCTURE

PART ELEVATION (FRONT FACE)

TOP OF PARAPET

FINISH GRADE (REAR FACE)

OPENING FOR PIPE CAST IN PANELS

OUTLINE OF T-WALL UNITS (SIDE)

DASHED LINE INDICATES TOP OF STEM FOR UNIT

HEIGHT AS REQUIRED BY DESIGN

STEM LENGTH AS REQUIRED BY DESIGN

PIPE RUNNING PARALLEL TO WALL SIZE VARIES

SECTION (SHOWING PIPE PARALLEL TO WALL)

HEIGHT AS REQUIRED

DESIGN

RETAINING WALL SYSTEM
THE NEEL COMPANY T-WALL
(2" COVER)

The Neel Company
Oldcastle Precast, Inc.

Prepared By
Drawn By
Checked By

State of Florida Department of Transportation
C.I.P. BARRIER AND C.I.P. JUNCTION SLAB DIMENSIONS

C.I.P. BARRIER REBAR DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETAINING WALL SYSTEM
THE NEEL COMPANY T-WALL (2" COVER)
C.I.P. Light Standard Barrier - Part Plan with Rebar (Barrier and Gravity Slab Rebar Omitted for Clarity)

1. Positive bond breaker shall be provided between the C.I.P. conc. and the precast panel.
2. All longitudinal bars are #4A2 ityp for 6'-0" or either side of the light standard barrier.
3. Gravity slab shall have dimensions shown for a wall length of 8'-0" either side of the light standard barrier.
4. Light pole supplier is responsible for providing anchor bolts that effectively transmit the light pole load to the pilaster and fit the rebar cage.
5. See Structures Drawing 5011 for additional details.

C.I.P. Light Standard Barrier - Part Details

C.I.P. Light Standard Barrier - Part Elevation (Barrier and Gravity Slab Rebar Omitted for Clarity)
5. STEEL FOR JUNCTION BOXES SHALL CONFORM WITH ASTM-A36. THE BOXES SHALL BE HDG GALVANIZED AFTER FABRICATION, IN LIEU OF STEEL BOXES THE CONTRACTOR MAY SUBMIT FOR APPROVAL WROUGHT IRON BOXES (SCHEDULE 80).

6. ALL CONDUITS SHALL BE HDG GALVANIZED OR SCHEDULE 80 PVC.

7. THE COST OF ANCHOR BOLTS SHALL BE INCLUDED IN THE BID PRICE FOR LIGHT POLES.
STEMS OFFSET AS REQUIRED TO PROVIDE CLEARANCE FOR END BENT PILES.

SECTION B-B
STEM / END BENT PILE INTERFACE

SECTION A-A
SECTION THRU PILE CAP

PART ELEVATION SHOWING
WINGWALL / END BENT INTERFACE

TOP OF PARAPET

SPECIAL WIDTH T-WALL UNITS AS REQUIRED BY DESIGN

FACE OF WINGWALL

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM
THE NEEL COMPANY T-WALL
(2" COVER)

DESIGN: THE NEEL COMPANY
PRECAST: OLDCASTLE PRECAST, INC.

PRINTED BY: OAKWOOD PRINTING

CONTRACT NO.:
PROJECT NO.:

Rev. 04 13 of 21
### Reinforcing Steel - Standard Units

**REINFORCING SCHEDULE**

<table>
<thead>
<tr>
<th>BAR</th>
<th>QTY</th>
<th>SIZE</th>
<th>TYPE</th>
<th>LENGTH</th>
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<td>V-1</td>
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<td>3/16&quot;</td>
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REINFORCING STEEL - DOUBLE TOP UNITS (I)

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 2" MIN. CONCRETE COVER.
MISCELLANEOUS NOTES:

1. DESIGNER:
THE NEEL COMPANY
8528 FURFORD LA
SPRINGFIELD, VA 22152
PH: (703) 913-7858
FX: (703) 913-7859

2. PRECASTER:
OLDCASTLE PRECAST, INC.
5995 SOUTELL DR
SPRINGFIELD, VA 22152
PH: (1904) 768-7081
FX: (1904) 768-8428

MATERIALS NOTES:

1. PRECAST CONCRETE:
- Precast SoGrid Panels - PER SPEC SECTION 54B
- Architectural finish shall be plain steel form finish
- Unless otherwise specified on the retaining wall control plans.

2. C.C.P. CONCRETE:
- C.C.P. leveling pad - PER SPEC SECTION 54B
- Other C.C.P. concrete - PER SPEC SECTION 54B

CONSTRUCTION NOTES:

1. ALL CONSTRUCTION PROCEDURES SHALL COMPLY WITH SPEC SECTION 54B-B AND THE "SOGRID CONSTRUCTION MANUAL" PROVIDED BY THE NEEL COMPANY OR OLDCASTLE PRECAST, INC. FOR LOCATION OF THE "SOGRID CONSTRUCTION MANUAL", THE SPEC SHALL CONTROL.

2. FOR LOCATION AND ALIGNMENT OF SOGRID STRUCTURE, SEE RETAINING WALL CONTROL PLANS.

3. SOGRID STRUCTURES ON CURVES SHALL BE BUILT IN CHORDS AS SHOWN IN THE SOGRID DESIGN DRAWINGS.

4. IF MANHOLES OR DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN IN THE SOGRID DESIGN DRAWINGS.

5. IF PILES ARE LOCATED WITHIN THE RETAINING WALL VOLUME, THEY SHALL BE REMOVED PRIOR TO CONSTRUCTION OF THE SOGRID STRUCTURE UNLESS A METHOD TO PROTECT THE STRUCTURE, WHICH IS ACCEPTABLE TO THE ENGINEER AND THE NEEL COMPANY, IS SUBMITTED AND APPROVED IN WRITING.

6. IF A STRUCTURE EXCEEDS 20' IN MIGHT, THE KNOWN GRADE AT THE FACE OF THE WALL SHALL BE PLANTED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS 20' IN MIGHT.

7. IF EXISTING OR FUTURE STRUCTURES, PILES, FOUNDATIONS OR GUARDRAIL POSTS ARE WITHIN THE RETAINING WALL VOLUME, INTERFERENCE WITH THE NORMAL PLACEMENT OF REINFORCING GRIDS AND SPECIFIC DIRECTION HAS NOT BEEN PROVIDED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

8. TOP PANELS ON WALLS WITH CAST-IN-PLACE COPING SHALL HAVE NO HEAR PRECASTING FROM THEIR TOP EDGE.

9. BACKFILL MATERIAL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE SPECIFICATIONS FOR MSE WALLS TO A LEVEL OF APPROXIMATELY 3' ABV THE SEWER CONSTRUCTION INSERT ARGUMENTED IN THE PANELS. INSTALLATION OF THE SOGRID REINFORCEMENT SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL.


11. THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING UPPER REINFORCING GRID DOWNWARD TO AVOID CONFLICTS WITH PAVING AND SURFACING MEASUREMENTS, THE CONTRACTOR'S ATTENTION IS DIRECTED ESPECIALLY TO SITUATIONS WHERE ROADWAY SUPERELEVATION AND/OR SOIL WASHING IS ANTICIPATED.

12. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING STORM WATER DRAINAGE IN THE VICINITY OF THE WALL DURING CONSTRUCTION, STORMWATER RUNOFF SHALL BE COLLECTED AND DISCHARGED AWAY FROM THE WALL AND THE RETAINING WALL VOLUME.
6" WIDE GEOTEXTILE ALONG REAR FACE OF DIAGONAL JOINTS

SECTION B-B

OUTLINE OF 6" x 60" GEOCOMPOSITE BACKING DETAIL

1½' JOINT MATERIAL

NOTE: FOR MATERIALS NOTES SEE SHEET 4.

SECTION A-A SHOWING TYPICAL DETAILS

LEVELING PAD

FINISH GRADE (FRONT FACE) SHOWING TYPICAL DETAILS

TOP OF WALL TREATMENT VARIES, SEE SPECIFIC WALL ELEVATIONS AND ISOGRID STANDARD DRAWINGS FOR DETAILS

PRECAST ISOGRID PANEL

FINISH GRADE (FRONT FACE)

PRECAST ISOGRID PANEL

FINISH GRADE (REAR FACE)

6" CONCRETE FOR CONCRETE AND PLASTIC PIPES, 6" FOR ALL OTHER PIPES

6" CONCRETE LEVELING PAD AND PAPER

LIMIT OF SELECT FILL
NOTE: PANEL IS HANDLED BY LIFTING DEVICE THAT ATTACHES TO CONNECTION INSERT.

TOP VIEW

NOTE: FOR PANEL REINFORCEMENT MATERIALS NOTES, SEE SHEET 2.

LONGITUDINAL WIRES TO BE WELDED TO BENT WIRE WHILE HELD IN A JIG FIXTURE PRIOR TO GALVANIZATION.

WIRE SIZE TO BE EQUAL TO SOIL REINFORCEMENT GRID WIRE SIZE.

INSIDE OF EACH BEND MUST BE WITHIN 4/6" TOL. INSIDE OF ALL OTHER BENDS TO ASSURE PROPER BEARING UPON LOCKING BAR.

SOIL REINFORCEMENT GRID WIRE SIZE TO BE EQUAL TO CONNECTION INSERT WIRE SIZE.

NOTE: FOR SOIL REINFORCEMENT MATERIALS NOTES, SEE SHEET 2.

FULL-SIZE PANEL TYPICAL DIMENSIONS

END VIEW

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
THE NEEL COMPANY ISOGGRID

PRECASTER
OLDCASTLE PRECAST, INC

DESIGN
THE NEEL COMPANY

DRAFTED BY
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
THE NEEL COMPANY ISOGGRID

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REVIEWED: 04/20/17

Plan No. 5012

04  A  OF  20

RETAINING WALL SYSTEM
THE NEEL COMPANY ISOGGRID
C.I.P. COPING TREATMENT AT BEGINNING/END OF WALLS

FINISHED GRADE (FRONT FACE)

C.I.P. LEVELING CONCRETE

TOP OF COPING

#4 BENT BAR TO FOLLOW SLOPE OF COPING (TOP FOR 40)

#4 BENT BAR AT COPING LOCATIONS

#4 DOWEL CAST INTO PANEL (3 EA PER PANEL)

#4 LONG BAR TO FOLLOW SLOPE OF COPING (TOP FOR 40)

#4 BENT BAR AS REQUIRED

#4 DOWEL AS REQUIRED

PRECAST COPING - PART ELEVATION

PRECAST COPING DIMENSIONS

PRECAST COPING REBAR

SOIL REINFORCEMENT GRID

SOIL REINFORCEMENT GRID

PRECAST COPING DIMENSIONS
CJP LIGHT STANDARD BARRIER – PART PLAN WITH REBAR (BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)

CJP LIGHT STANDARD BARRIER – PART ELEVATION (BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)

NOTES:

1. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN THE CJP, CONC., AND THE PRECAST PANEL.

2. ALL CONDITIONAL BARS ARE #4 AS SHOWN. GRAVITY SLAB SHALL HAVE DIMENSIONS SHOWN FOR A MIN. LENGTH OF 6'-0" EITHER SIDE OF THE LIGHT STANDARD BARRIER.

3. ALL CONDITIONAL BARS ARE #4 AS SHOWN AVOIDING THE BAR REBAR CASE.

4. LIGHT POLE SUPPLIER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND PILASTER CASE.

5. SEE STRUCTURES STANDARD NO 500 FOR ADDITIONAL DETAILS.
NOTES

1. ADDITIONAL CONCRETE AND REINFORCING STEEL REQUIRED FOR THE
   CONSTRUCTION OF THE PILASTER SHALL MEET THE SAME REQUIREMENTS
   AS THAT OF THE PARAPET WALL.

2. TOP OF PILASTER SHALL BE FINISHED TO A TRUE LEVEL AREA.

3. LIGHT POLE PILASTER IS DESIGNED TO RESIST WORKING LOADS IN ANY DIRECTION FROM THE LIGHT POLE APPLIED AT
   THE TOP OF THE PILASTER AS FOLLOWING:

   CONSTRUCTURAL Moment = 20000 FT-POUND
   Transverse Moment = 6000 FT-POUND
   Longitudinal Shear = 1000 POUND
   Transverse Shear = 250 POUND
   Torsion = 400 POUNDS

   IF THE LIGHT POLE APPLIES LOADS THAT ARE IN EXCESS OF THOSE SHOWN ABOVE, THE CONTRACTOR SHALL REDESIGN THE
   PILASTER AND SUBMIT HIS DESIGNS TO THE DEPARTMENT FOR REVIEW.

4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT
   EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND
   THAT FIT THE REINFORCING BAR. CALCULATIONS SIGNED AND SEALED
   BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA,
   AND QUALIFIED TO PERFORM THE WORK.

5. STEEL FOR JUNCTION BOXES SHALL CONFORM WITH ASTM-A46. THE BOXES
   SHALL BE HOT GALVANIZED AFTER FABRICATION. IN LUG OF STEEL
   BOXES THE CONTRACTOR MAY SUBMIT FOR APPROVAL MOLDED PLASTIC
   BOXES (SCHEDULE 80).

6. ALL CONDUITS SHALL BE HOT GALVANIZED STEEL OR SCHEDULE 80 PVC.

7. THE COST OF ANCHOR BOLTS SHALL BE INCLUDED IN THE BID PRICE FOR
   LIGHT POLES.

8. PAYMENT FOR THE COST OF CONCRETE AND STEEL
   CONSTRUCTION OF THE PILASTER AND ALL CONDUITS.
   EXPANSION COUPLINGS, JUNCTION BOXES AND MOLDED CONDUIT
   REQUIRED FOR COMPLETION OF THE ELECTRICAL INSTALLATION WITHIN
   THE LIMITS SHOWN ON THIS SHEET, SHALL BE INCLUDED IN THE
   CONTRACTOR'S BID PRICE FOR THE MSE WALLS.
OUTLINE OF C.I.P. BARRIER
GRAVITY SLAB (HEAD & BEHIND)
#4 TIE @ 12" O.C.

PART SECTION @ INLET TYPE I & 2
NOTED IS JIOLOCATION HARDWARE. SEE SHEET IS OF 3D FOR DETAILS

GRAVITY SLAB AT INLET TYPE I & 2
SOIL REINFORCEMENT GRID
FOR BACKWALL; QUANTITY AND SPACING AS REQUIRED BY DESIGN

OPTIONAL H/P
CONTRACT PLANS

SPECIAL CONNECTION
INSERT (5'-0" LONG)

SOILGRID PANEL

PLAN VIEW OF GRID/PILE ARRANGEMENT

SINGLE SPLIT-GRID CAN BE
REPLACED IN DOUBLE SPACES
THAT ARE PARTIALLY CONNECTED,
AT LEAST FIVE LONGITUDINAL
WIRES BETWEEN THE TWO GRIDS
MUST BE CONNECTED TO PANEL.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETAINING WALL SYSTEM
THE NEEL COMPANY ISOGRID

THE NEEL COMPANY
PRECAST CONSTRUCTION CO.

OLDCASTLE PRECAST, INC.

PRINTED BY
OLDCASTLE PRECAST, INC.

PREPARED BY

DRAWN BY

CHECKED BY

5012
04 4/0 of 20
SECTION B-B
STEM / END BENT PILE INTERFACE

SECTION A-A
SECTION THRU PILE CAP

PART ELEVATION SHOWING
WINDBALL / END BENT INTERFACE
NOTE: EXTERIOR DIMENSIONS ARE THE SAME AS SP-1.

SP-1
FULL-SIZE PANEL - ONE GRID ELEVATION (REAR FACE)

SP-2
FULL-SIZE PANEL - TWO GRIDS ELEVATION (REAR FACE)

SP-3
FULL-SIZE PANEL - THREE GRIDS ELEVATION (REAR FACE)

SP-4
FULL-SIZE PANEL - FOUR GRIDS ELEVATION (REAR FACE)

NOTE: FOR MATERIALS NOTES, SEE SHEET 2.
WELDED WIRE MESH PANEL REINFORCEMENT - X-1 PANEL
ELEVATION (REAR FACE)

WELDED WIRE MESH PANEL REINFORCEMENT - X-2 PANEL
ELEVATION (REAR FACE)

X-1
46" RISER - ONE GRID
ELEVATION (REAR FACE)

X-2
9" INSERT PANEL - ONE GRID
ELEVATION (REAR FACE)

NOTE: FOR MATERIALS NOTES, SEE SHEET 2.
WELDED WIRE MESH PANEL REINFORCEMENT - X-3 AND X-3(2) PANELS
ELEVATION (REAR FACE)
1. A PRIORI TO THE CONSTRUCTION OF THE REINFORCED EARTH WALL STRUCTURE, DIFFERENT MATTERAIS SHALL BE COMPACTED IN ACCORDANCE WITH THE ASSUMPTION OF THE REINFORCED EARTH WALLS.

2. SOIL PARAMETERS

3. THE MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE ENGINEER TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.

4. ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED EARTH WALL AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL, OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.

5. REINFORCING STRIPS FOR REINFORCED EARTH WALLS SHALL BE 119 mm WIDE AND 95 mm THICK, AND SHALL CONFORM TO THE PHYSICAL AND MECHANICAL PROPERTIES OF ASTM A-95 GRADE 60. SLAB CONSTRUCTION SHALL BE APPLIED IN ACCORDANCE WITH ASTM A-183.

6. THE MINIMUM FACTORS OF SAFETY REQUIRED FOR DESIGN

7. REINFORCED EARTH WALLS IN CURVES WILL FORM A SERIES OF SHORT CHORDS UNTIL EACH IS MACHINED TO MATCH DESIRED WALL ALIGNMENT.

8. FOR LOCATION AND ELEVATION OF REINFORCED EARTH WALLS, NOT TO BE EXAMINED OR OTHERWISE SPECIFIED IN THE RETAINING WALL M/ANUAL.

9. IF WALLS AND DROP NODES ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS.

10. IF PILES ARE LOCATED WITHIN THE REINFORCED EARTH WALL VOLUME, THEY SHALL BE GRANDE PRIOR TO CONSTRUCTION OF THE REINFORCED EARTH WALL UNLESS A METHOD TO PROTECT THE STRUCTURE, WHICH IS ACCEPTABLE TO THE ENGINEER AND THE REINFORCED EARTH COMPANY, IS PROPOSED AND APPROVED IN WRITING.

II. BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SEC 548 TO A LEVEL OF 2 IN TO ADHERE TO THE TIE STRIPS EMBEDDED IN THE PANELS. INSTALLATION OF BACKFILL STRIPS SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTATION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL.

12. IF STRUCTURES IN EXCESS OF 2D IN HEIHT OCCUR, THE FINISHED GRADE SHALL BE COMPACTED TO 95% OF THE NEEDED LEVEL.

13. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LENGTH OF ANY GUARDRAIL POSTS BEHIND THE REINFORCED EARTH PANELS PRIOR TO PLACEMENT OF THE TOP LAYER OF REINFORCING STRIPS. INDIVIDUAL STRIPS MAY BE SKEWED UP TO 15° TO AVOID CONFLICTING WITH PAVING OR OTHER INFORMATION PROVIDED BY THE MANUFACTURER. IF AUTHORIZED BY THE ENGINEER, ANY DAMAGE DONE TO THE REINFORCING STRIPS DUE TO THE INSTALLATION OF THE GUARDRAIL SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

14. IF EXISTING OR FUTURE STRUCTURES, PIPES, FOUNDATIONS OR FUTURE STRUCTURES, PIPES, FOUNDATIONS OR FUTURE STRUCTURES ARE TO BE SUPPLIED BY THE CONTRACTOR AND SHALL CONFORM TO THE SPECIFICATIONS OF THE ENGINEER. THE ENGINEER'S ATTENTION IS DIRECTED TO DETAILS SHOWN IN THE PLANS.

15. TOP PANELS BENEATH DOPING SHALL HAVE #4 D<5EELS PROTRUDING FROM THE TOP EDGE.

16. FOR OTHER INFORMATION PERTAINING TO WALL CONSTRUCTION PLEASE REFER TO THE REINFORCED EARTH CONSTRUCTION MANUAL.

17. THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING UPPER REINFORCING STRIPS DOWNWARD TO AVOID CONFLICTS WITH PAVING AND SUBGRADE PREPARATION. THE CONTRACTOR'S ATTENTION IS DIRECTED TO AVOIDING SLIPPERY CONDITIONS AND/OR SOME MIXING OF MATERIALS IS ANTICIPATED.

18. NOMINAL STRIP LENGTHS THE REINFORCING STRIP LENGTHS SHOWN ON THE PLANS, MEASURED FROM BACK Edge OF PANEL, ARE THE NOMINAL LENGTHS REQUIRED FOR CALCULATION. THE ACTUAL FABRICATED STRIP LENGTHS ARE OFTEN LARGER THAN THE ACTUAL DUE TO THE MANUFACTURING TOLERANCES. THE REQUIRED HORIZONTAL LIMIT OF GRANULAR CONTENT IS 16 P Release FACTOR # FOR SAND = 1.5 (FOR LIMESTONE) = 1.0 WALL CONSTRUCTION

19. REINFORCED EARTH WALLS IN CURVES WILL FORM A SERIES OF SHORT CHORDS UNTIL EACH IS MACHINED TO MATCH DESIRED WALL ALIGNMENT.

20. PANEL FINISH THE PRECAST PANELS FOR THIS PROJECT SHALL HAVE A PLAIN STEEL FINISH UNLESS OTHERWISE SPECIFIED IN THE RETAINING WALL M/ANUAL.

21. THE REINFORCED EARTH COMPANY SUPPLIES PRECAST CONCRETE PANELS AND ACCESSORIES TO BE USED IN CONJUNCTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS.

22. THE INFORMATION CONTAINED HEREIN IS BASED ON THE INFORMATION PROVIDED BY THE MANUFACTURER. THE CONTRACTOR SHOULD TAKE SPECIAL PRECAUTIONS TO PREVENT THE PANELS FROM SHIFTING OR FALLING DURING THE ERECTION PROCESS.

23. THESE DRAWINGS ARE CERTIFIED WITH RESPECT TO THE INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

24. THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO THE REINFORCED EARTH COMPANY, AND IS BEING FURNISHED FOR USE IN CONNECTION WITH FOOT PROJECTS ONLY, AND THE INFORMATION CONTAINED HEREIN IS NOT TO BE TRANSMITTED TO ANY OTHER ORGANIZATION WITHOUT EXPRESS PERMISSION OF THE ENGINEER OR THE REINFORCED EARTH COMPANY. THE INFORMATION CONTAINED IN THIS DRAWING IS SUBJECT TO PATENTS ISSUED TO HENRY VIDAL, AND THE REINFORCED EARTH COMPANY IS NOT TO BE CONSIDERED AS GRANTED UNDER THE VITAL PATENTS.

25. THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO THE REINFORCED EARTH COMPANY, AND IS BEING FURNISHED FOR USE IN CONNECTION WITH FOOT PROJECTS ONLY, AND THE INFORMATION CONTAINED HEREIN IS NOT TO BE TRANSMITTED TO ANY OTHER ORGANIZATION WITHOUT EXPRESS PERMISSION OF THE ENGINEER OR THE REINFORCED EARTH COMPANY. THE INFORMATION CONTAINED IN THIS DRAWING IS SUBJECT TO PATENTS ISSUED TO HENRY VIDAL, AND THE REINFORCED EARTH COMPANY IS NOT TO BE CONSIDERED AS GRANTED UNDER THE VITAL PATENTS.
BICK FICE

VERTICAL ALLOWABLE

PERPE

REINFORCEMENT

I,-

OF

CLOTH

4'-4'

TYP.

PVC PIPE

1/8" HOE OR

4" Pipe

SECTION 1-1

TYPICAL PANEL LAYOUT

PARTIAL ELEVATION - FRONT FACE

TIE STRIP

FILTER CLOTH DETAIL

PARTIAL ELEVATION - BACK FACE

LEVELING PAD

ED. PANEL JOINT

NOTES:

1. FILTER CLOTH DETAIL SHALL BE PLACED ON BACK FACE OF PANEL OVER PANEL JOINTS, FILTER CLOTH SHALL BE ADDED TO BACK FACE OF PANELS USING AN ADHESIVE SUPPLIED BY THE REINFORCED EARTH COMPANY, ADHESIVE SHALL BE APPLIED TO PANEL THEN FILTER CLOTH (Cartridge will type fx-60s OR EQUAL) SHALL BE APPLIED TO PANELS.

2. PANEL DESIGN THICKNESS IS 5/8" THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY PARTIAL ELEVATION SPECIFIED.

3. REINFORCING STRENGTH OF ALL PANEL TYPES ON THIS PROJECT IS DESIGNATED ABOVE. #4 ILLUSTRATED

4. PANEL DESIGN THICKNESS IS 5/8" THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY PARTIAL ELEVATION SPECIFIED.

5. PANEL DESIGN THICKNESS IS 5/8" THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY PARTIAL ELEVATION SPECIFIED.

6. PANEL DESIGN THICKNESS IS 5/8" THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY PARTIAL ELEVATION SPECIFIED.

7. EACH 3/8" ø DOWEL SHALL HAVE A TYP LENGTH OF 4', DOWELS MAY BE GALVANIZED STEEL OR PVC ROD, A SINGLE FULL LENGTH DOWEL MAY BE USED AT THE DISCRETION OF THE MANUFACTURER.

8. REINFORCEMENT PANEL TYPE "A" WITH #4 REINFORCEMENT FRONT VIEW

9. EACH VERTICAL JOINT OVER P/JIEL JOINTS. FILTER CLOTH SHALL BE ADHERED TO BACK FACE

10. ALL P/JIELS SHALL HAVE TWO LIFTING INSERTS OF ONE TON CAPACITY EACH.

11. PANEL DESIGN THICKNESS IS 5/8" THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY PARTIAL ELEVATION SPECIFIED.

12. PANEL DESIGN THICKNESS IS 5/8" THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY PARTIAL ELEVATION SPECIFIED.

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15. PANEL DESIGN THICKNESS IS 5/8" THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY PARTIAL ELEVATION SPECIFIED.
CORNER ELEMENT SIZE VARIES WITH ANGLES

SLIP JOINT

CHAMFER

SLIP JOINT LOCATION

TIE STRIP LOCATION

VARIABLES

HEIGHT OF CORNER ELEMENTS Varies with Panel Height.

SLOPED TOP PANELS 

NOTE: CUT WIDTH ON ELZATION

SLIP JOINT USED FOR ILLUSTRATION ONLY.

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY.

CRUCIFORM PANELS

SEE PANEL "A" WITH REINFORCEMENT ON SHEET TITLED "PANEL DETAILS" FOR TYPICAL REINFORCEMENT SPACING.
C.J.P. COPING - PARTIAL ELEVATION

NOTE:
1/2-Inch open joints in coping shall be at 6-panel intervals, and coincide approximately with % of alignment pins. Reinforcing steel shall be stopped 2' short of either side of the joints. Construction joints in between the open joints shall be provided at 2 panels intervals.

PRECAST COPING PARTIAL ELEVATION

TOP OF CONCRETE COPING

LEVELING PAD

ELEVATION

COPING ENCLOSURE DETAIL

NOTE:
Standard coping unit is 10' long with square ends.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
RETAILING WALL SYSTEM
REINFORCED EARTH WALL

CONTRACTOR TO FILL SPREAD ANCHOR RECESS WITH NON-SHRINK GROUT AFTER PLACEMENT

CONCRETE FILL AS REQUIRED

CONTRACTOR TO FILL SPREAD ANCHOR RECESS WITH NON-SHRINK GROUT AFTER PLACEMENT

This system shall be used in slightly or moderately aggressive environments only.

CRUCIFORM AND SQUARE PANELS

REINFORCED EARTH WALL

REINFORCED EARTH WALL

REINFORCED EARTH WALL

REINFORCED EARTH WALL

REINFORCED EARTH WALL
EXAMPLE ACUTE CORNER - SKewed STRIPS UNDER PILE CAP

* DIMENSION OR ANGLE VARIES; SEE WALL ELEVATION
** SLIP JOINTS ARE NOT REQUIRED FOR SQUARE PANELS

EXAMPLE ACUTE CORNER - SKewed STRIPS AT ABUTMENT LEVEL

NOTE:
- PRECAST REINFORCING STRIPS SHALL BE FIELD CUT AND PUNCHED TO FIT.
- CONNECTION SCREW IN WALL PANEL
- SEE WALL ELEVATION
- SLIP JOINTS ARE NOT REQUIRED FOR SQUARE PANELS

REINFORCING STRIP

GEOTEXTILE FABRIC

WRAPPED AS SHOWN

CRUCIFORM AND SQUARE PANELS

SUPPLIED STANDARD 3/8 IN. BOLT, NUT AND WASHER

CONNECTION DETAIL

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY
NOTE

1. IF SHORT CJP BARRIER SECTIONS ARE TO BE CONSTRUCTED ADJACENT TO PRECAST BARRIER SECTIONS, THEN THIS SECTION’S DIMENSIONS SHALL BE ADJUSTED TO CONFORM TO THE PRECAST DIMENSIONS.

GUTTER LINE ---
TOP OF TRAFFIC BARRIER

SECTION A-A

CJJP, CONC. TRAFFIC BARRIER

TYPICAL LEVELING PAD STEP DETAIL

(LEVELING PAD DIMENSIONS ARE THE SAME FOR BOTH CRUCIFORM AND SQUARE PANELS, SEE WALL ELEVATIONS FOR PANEL TYPES AT STEPS)

NOTE:
- SEE FL INDEX 700 CADG FOR BARRIER DIMENSIONS
- ALL LONGITUDINAL BARS ARE AS SHOWN
- CONCRETE COVER 2" TYP.

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY

CRUCIFORM AND SQUARE PANELS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
REINFORCED EARTH COMPANY
REINFORCED EARTH WALL

RETAINING WALL SYSTEM
PLAN

TOP OF BARRIER

SUPPORT POLE FOR ROADWAY LIGHTING

PARTIAL ELEVATION

NOTE: All longitudinal bars are as shown.

Pedestrian bicycle railing (see Structures Standard Drawing 7201)

NOTE: A.

Positive bend breakers shall be provided between CIP concrete and concrete panel.

NOTE: B.

The barrier junction slab shall have these dimensions for one precast unit. Either side of light pole barrier longitudinal bars shall be as shown above.

NOTE: C.

2 - #6 shear dowels - 3'-0" long refer to precast barrier sheet.

NOTE: D.

Light pole manufacturer is responsible for providing anchor bolts that effectively transmit loads to the pilaster and fit the reinforcing cage.

NOTE: E.

See Structures Standard Drawing 590 for additional details.

DIMENSION MAY VARY AS REQUIRED FOR LIGHT POLE BASE PLATE.

NOTE: A.

Positive bond breakers shall be provided between CIP concrete and concrete panel.

NOTE: B.

The barrier junction slab shall have these dimensions for one precast unit. Either side of light pole barrier longitudinal bars shall be as shown above.

NOTE: C.

2 - #6 shear dowels - 3'-0" long refer to precast barrier sheet.

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NOTE: C.

2 - #6 shear dowels - 3'-0" long refer to precast barrier sheet.

NOTE: D.

Light pole manufacturer is responsible for providing anchor bolts that effectively transmit loads to the pilaster and fit the reinforcing cage.

NOTE: E.

See Structures Standard Drawing 590 for additional details.
PEDESTRIAN/BICYCLE RAILING
(SEE STRUCTURES STANDARD DRAWING 72D)
VARIES DEPENDING ON SIDWALK
ELEVATION SHOWN ON WALL ELEV. VIEW

CONCRETE BARRIER WALL
DESIGN TO WITHSTAND ANY TRAFFIC
VIEWS PENETRATION OF 7' X 10'
WITH MIN. 15'-0'
SIDEWALK PAVEMENT

6'' MIN

IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE
STRIPS ARE PLACED BELOW THE PAVEMENT SECTION

CJP. PARAPET DETAIL W/ HANDRAIL

SEAL WITH Poured RUBBER

CONCRETE BARRIER WALL

1/2'' PREMIUM EXPANSION
JOINT MATERIAL, SEAL TOP
WITH 1/2'' POURED RUBBER
SEE DETAIL "A"

1/4'' PREMIUM EXPANSION
JOINT MATERIAL, SEAL TOP
WITH 1/4'' POURED RUBBER
SEE DETAIL "A"

PREFERRED SEBRAE BETWEEN PRECAST PANELS AND CJP. CONCRETE

SEND BARTON BETWEEN PANELS AND CJP. CONCRETE

SPACING, DEFLECT STRIPS DOWN AS REQUIRED.

FRONT FACE OF PANEL & HORIZ. CONTROL LINE

BOND BREAKER BETWEEN PRECAST PANELS AND CJP. CONCRETE

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR
MODERATELY AGGRESSIVE ENVIRONMENTS ONLY
CROSSFORM AND SQUARE PANELS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
REINFORCED WALL SYSTEM
REINFORCED EARTH COMPANY

Designed By

Drawn By

Checked By

Reviewed By

Approved By

Project No.

Sheet No.

Date of Rev.

Print No.

Rev. No.

5015
1. Reinforcing steel to be A615, Grade 60, deformed welded wire mesh, ASTM A976. May be substituted for other panel types based on design requirements.

2. Deformed welded wire mesh requirements for panel types shall be determined based on panel design. Minimum edge clearances shown on this sheet.

3. Panel types shall have two 1 in. anchors.

4. Panel design thickness is 5 1/2". Minimum edge clearances required between rebar and tie-strips.

5. Actual location of rebar will be adjusted to accommodate panel casting. Minimum edge clearance is required between rebar & tie-strips.

6. Panel design thickness is 5 1/2". Minimum edge clearances required between rebar & tie-strips.
DESIGN CRITERIA

1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL BEHIND THE PRECAST TECIWALL METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED MATERIALS SHALL COMFORM TO THE SPECIFICATIONS FOR TECIWALL.

2. SOIL PARAMETERS
   SITE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF A, B, C AND D SHALL BE PROVIDED IN THE SHOP DRAWINGS.

3. THE MAXIMUM APPLIED BEARING PRESSURE AT THE TIE OF THE TECIWALL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE OWNER TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.

4. ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE CAST-IN-PLACE FOOTING, AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIALS OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.

5. THE MINIMUM FACTORS OF SAFETY REQUIRED FOR DESIGN OVERTURNING = 2.0
   SLIDING = 1.5
   BEARING CAPACITY = 2.5
   OVERALL STABILITY = 1.5
   REINFORCED STEEL DESIGN SHALL BE IN ACCORDANCE WITH AASHTO SPECIFICATIONS AND LOCAL CODES employing standard specifications for highway bridges.

WALL CONSTRUCTION

6. FOR LOCATION AND ALIGNMENT OF TECIWALL SEE RETAINING WALL CONTROL PLANS.

7. TECIWALLS IN CURVES WILL FORM A SERIES OF SHORT CHORDS OF 820' EACH TO MATCH DESIGNED WALL ALIGNMENT.

8. IF MANHOLE AND DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS.

9. IF PILES ARE LOCATED WITHIN THE TECIWALL RETAINED VOLUME, THEY SHALL BE GROUNDED PRIOR TO CONSTRUCTION OF THE TECIWALL UNLESS A METHOD IS USED TO PROTECT THE STRUCTURE, WHICH IS ACCEPTABLE TO THE ENGINEER AND THE REINFORCED EARTH COMPANY, AND IS APPROVED AND PROPOSED IN WRITING.

10. BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 548 OF THE FLORIDA DOT SPECIFICATIONS.

11. IF STRUCTURES IN EXCESS OF 20' IN HEIGHT OCCUR, THE FINISHED GRADE IN FRONT OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS A HEIGHT OF 20', FINISHED GRADE BACKFILL SHALL BE COMPACTED TO 95% OF ASSTD T-3 REGULARLY DIRECTED BY THE ENGINEER.

12. TECIWALL PANELS TO BE COMPLETED WITH COPING SHALL HAVE 44 DOWELS PROTRUDING FROM THEIR TOP EDGE.

13. FOR OTHER INFORMATION PERTAINING TO WALL CONSTRUCTION PLEASE REFER TO THE REINFORCED EARTH CONSTRUCTION MANUAL FOR TECIWALL.

MATERIALS NOTES

14. IF UNDERDRAIN IS SHOWN, THE FINISH AND OUTLETS SHALL BE AS PER THE CONTRACT PLANS.

15. PANEL FINISH
   THE PRECAST PANELS FOR THIS PROJECT SHALL HAVE A PLAIN STEEL FORM FINISH UNLESS OTHERWISE SPECIFIED IN THE CONTROL PLANS.

16. ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY THE REINFORCED EARTH COMPANY:

   - PRECAST CONCRETE FACING PANELS
   - PRECAST CONCRETE FACING PANELS
   - GEOSYNTHETIC TERRADRAIN OR EQUIVALENT (FOR PANEL JOINTS ONLY)
   - LIFTING HARDWARE FOR HANDLING PRECAST PANELS (ON LOAN BASIS)
   - PANEL LEVELING BOLTS AND PLATES
   - ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR. ANY JOINT MATERIALS SHOWN AT THE INTERFACE OF PRECAST PANELS AND CAST-IN-PLACE CONCRETE STRUCTURES ARE TO BE SUPPLIED BY THE ERECTION CONTRACTOR. ALL SANDBLASTING, PAINTING, SEALERS OR OTHER SPECIAL APPLIED COATINGS ARE ALSO SUPPLIED/INSTALLED BY THE CONTRACTOR IN THE FIELD FOLLOWING PANEL ERECTION.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, SUPPLY, AND INSTALLATION OF A TEMPORARY FALSEWORK SUPPORT SYSTEM TO ACCOMMODATE THE INSTALLATION OF PRECAST PANELS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE TEMPORARY FALSEWORK SUPPORT SYSTEM IN ACCORDANCE WITH SECTION 548 OF THE FLORIDA DOT SPECIFICATIONS. PLANS FOR THE TEMPORARY FALSEWORK SUPPORT SYSTEM SHALL BE SUBMITTED TO THE REINFORCED EARTH COMPANY FOR REVIEW AND APPROVAL. ALL CONNECTIONS AND MATERIAL SPECIFICATIONS SHALL BE SUBMITTED TO THE REINFORCED EARTH COMPANY PRIOR TO WALL ERECTION. NOTWITHSTANDING ITS REVIEW OF THE TEMPORARY FALSEWORK SUPPORT SYSTEM, THE REINFORCED EARTH COMPANY SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE OR LOSS CAUSED IN ANY DEFECT IN THE DESIGN AND/OR CONSTRUCTION OF THE TEMPORARY FALSEWORK SUPPORT SYSTEM.

18. CONCRETE COVER
   - CAST-IN-PLACE
   - 4" CLEAR ON REBAR FOR CONCRETE CAST AGAINST EARTH.
   - 5" CLEAR ON REBAR FOR ALL OTHER CAST-IN-PLACE CONCRETE UNLESS NOTED OTHERWISE.
   - PRECAST CONCRETE
   - ALL REBARS IN PRECAST CONCRETE SHALL HAVE 2" MINIMUM CONCRETE COVER.

19. CONCRETE PANELS SHALL BE PROVIDED BY THE REINFORCED EARTH COMPANY'S MANUFACTURING PLANT IN ACCORDANCE WITH SECTION 548 OF THE FLORIDA DOT SPECIFICATIONS.

20. THE REINFORCED EARTH COMPANY'S MANUFACTURING PLANT IS EXCLUSIVE TO THE USE ON PROJECTS WITHIN THE STATE OF FLORIDA, AND THE REINFORCED EARTH COMPANY, REINFORCED EARTH COMPANY'S MANUFACTURING PLANT AND ALL DRAWINGS ISSUED TO THE REINFORCED EARTH COMPANY, ARE PROPRIETARY TO THE REINFORCED EARTH COMPANY, AND THE USE OF THESE DRAWINGS MUST BE AUTHORIZED IN WRITING.

21. THESE DRAWINGS ARE CERTIFIED WITH RESPECT TO THE INTERNAL STABILITY OF THE SYSTEM ONLY, EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.

22. THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO THE REINFORCED EARTH COMPANY, AND IS BEING FURNISHED FOR THE USE IN CONNECTION WITH FDOT PROJECTS ONLY, AND THE INFORMATION CONTAINED HEREIN IS NOT TO BE TRANSMITTED TO ANY OTHER ORGANIZATION UNLESS SPECIFICALLY AUTHORIZED IN WRITING BY THE REINFORCED EARTH COMPANY. THE REINFORCED EARTH COMPANY IS THE EXCLUSIVE Licensee IN THE UNITED STATES FOR THESE PATENTS. THE USE OF THIS DRAWING DOES NOT CONSTITUTE AN EXRESSED OR IMPLIED LICENSE UNDER THE VITAL PATENTS.
LEVEL OR SLOPING SURCHARGE AS PER CONTRACT DRAWINGS.

FRONT FACE OF PRECAST CONCRETE PANEL.

CONCRETE FILL 2" MINIMUM 10" MAXIMUM.

FOOTING WIDTH

5 1/2" PRECAST PANEL (TYPICAL)

1" EXPANSION JOINT MATERIAL BETWEEN PILES AND FOOTING.

NOTES:
1. THE BOTTOM EDGE OF THE ASSEMBLED PRECAST PANEL SHALL BE COVERED BY 7" MINIMUM OF CAST-IN-PLACE FOOTING CONCRETE.
2. PRECAST PANEL UNITS SHALL BE INSTALLED AT BATTER OF 1/2" PER FT, UNLESS OTHERWISE SHOWN ON CONSTRUCTION DRAWINGS.
3. FOR PANEL HEIGHTS OF 6' OR LESS, COUNTERFORTS ARE NOT REQUIRED. PANELS WITHOUT COUNTERFORTS SHALL BE 8' THICK (INOMINAL), DETAILS WILL BE SHOWN ON CASTING DRAWINGS.

TYPICAL SECTION THRU WALL.

PILE SPACING (VARIES)

4' 0" 4' 0"

LEVEL OR SLOPING SURCHARGE AS PER CONTRACT DRAWINGS

FRONT FACE OF PRECAST CONCRETE PANEL.

CONCRETE FILL 2" MINIMUM 10" MAXIMUM.

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3. FOR PANEL HEIGHTS OF 6' OR LESS, COUNTERFORTS ARE NOT REQUIRED. PANELS WITHOUT COUNTERFORTS SHALL BE 8' THICK (INOMINAL), DETAILS WILL BE SHOWN ON CASTING DRAWINGS.
- 6 Counterforts & Spread Anchors
- 1' - 0" x 1'-0" PVC Sleeve
- 2 #4's per counterfort
- Architectural terminates at this line
- 6" Varies with footing thickness
- 2 #4's in each pipe
- Front face of panel
- See control drawings for finish
- Spread anchor optional for verticality of panel erection
- Concrete panel facing (t/c) varies
- Counterforts, each (t/c) varies
- Total (t/c) varies
- Total panel Wt. (t/lb) varies
- 2" ID X 1'-0" PVC sleeve
- Spread anchors 2

**List of Materials**

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<tr>
<th>Material Description</th>
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<tr>
<td>Concrete panel facing (t/c)</td>
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<tr>
<td>Counterforts, each (t/c)</td>
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<tr>
<td>Total (t/c)</td>
<td>Varies</td>
</tr>
<tr>
<td>Total panel Wt. (t/lb)</td>
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<td>2&quot; ID X 1'-0&quot; PVC sleeve</td>
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<tr>
<td>Spread anchors</td>
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</tbody>
</table>

*This system shall be used in slightly or moderately aggressive environments only.*

_Safety and Environmental Notes:

- This system is designed to be used in slightly or moderately aggressive environments.
- It is important to conduct a thorough safety assessment before installation.*
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

REINFORCED EARTH COMPANY
TECHWALL

THE SYSTEM SHALL BE USED IN SLIGHTLY OR
MODERATELY AGGRESSIVE ENVIRONMENTS ONLY.

NOTE:
4-7" OPEN JOINTS IN COPING SHALL BE AT 4 PANEL INTERVALS
AND CONSIDERED APPROXIMATELY WITH PANEL JOINTS REINFORCING
STEEL. STEEL SHALL BE STOPPED 3" FROM EITHER SIDE OF THE JOINTS.
CONSTRUCTION JOINTS IN BETWEEN THE OPEN JOINTS SHALL BE PROVIDED
AT EVERY PANEL JOINT.

C.J.P. CONC. TRAFFIC BARRIER
PARTIAL ELEVATION

C.J.P. PARAPET DETAIL w/ HANDRAIL

ELEVATION SHOWN ON WALL ELEV.

NOTE:
(1/2") SHEAR DOWELS - 3" LONG REQUIRED AT EXP.JT. IF UNIT IS
LESS THAN SIX PANELS LONG.

1/2" PREMOLDED EXPANSION MATERIAL
SEAL TOP WITH POURED RUBBER SEE DETAIL "A"

CONCRETE BARRIER WALL
REFER TO ROADWAY AND TRAFFIC
DESIGN STANDARD INDEX NO.400

PAVEMENT

STABILIZED SUB-BASE

CONCRETE BARRIER WALL
PRECAST CONC. PANELS AND C.J.P. CONCRETE

SEAL WITH POURED RUBBER

CONCRETE BARRIER WALL

DETAIL "A"

PRECAST CONC. PAVING
SEE STRUCTURES STANDARD DRAWING 720

VARIES 15'-0" MIN. SIDEWALK

ALUMINUM HANDRAIL

PEDESTRIAN/BICYCLE RAILING
SEE STRUCTURES STANDARD DRAWING 720

VARIES 15'-0" MIN. SIDEWALK

ALUMINUM HANDRAIL

PEDESTRIAN/BICYCLE RAILING
SEE STRUCTURES STANDARD DRAWING 720

VARIES 15'-0" MIN. SIDEWALK

ALUMINUM HANDRAIL

PEDESTRIAN/BICYCLE RAILING
SEE STRUCTURES STANDARD DRAWING 720

VARIES 15'-0" MIN. SIDEWALK

ALUMINUM HANDRAIL

PEDESTRIAN/BICYCLE RAILING
SEE STRUCTURES STANDARD DRAWING 720

VARIES 15'-0" MIN. SIDEWALK

ALUMINUM HANDRAIL

PEDESTRIAN/BICYCLE RAILING
SEE STRUCTURES STANDARD DRAWING 720

VARIES 15'-0" MIN. SIDEWALK

ALUMINUM HANDRAIL

PEDESTRIAN/BICYCLE RAILING
SEE STRUCTURES STANDARD DRAWING 720

VARIES 15'-0" MIN. SIDEWALK

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PEDESTRIAN/BICYCLE RAILING
SEE STRUCTURES STANDARD DRAWING 720

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ALUMINUM HANDRAIL

PEDESTRIAN/BICYCLE RAILING
SEE STRUCTURES STANDARD DRAWING 720

VARIES 15'-0" MIN. SIDEWALK

ALUMINUM HANDRAIL

PEDESTRIAN/BICYCLE RAILING
SEE STRUCTURES STANDARD DRAWING 720
NOTES:
A. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN CEMENT IN PLACE CONCRETE AND PRECAST CONCRETE PANEL.
B. THE BARRIER JUNCTION SLAB SHALL BE MOUNTED ON TOP OF LIGHT POLE BARRIER.
C. VARIOUS SUPPORT POLES SHALL BE AS SHOWN ABOVE.
D. LIGHTPOLE SUPPLIER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSFER THE LIGHTPOLE LOADS TO THE PILASTER.
E. SEE STRUCTURES STANDARD DRAWING 500 FOR ADDITIONAL DETAILS.

BAR SCHEDULE

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETYAINING WALL SYSTEM
REINFORCED EARTH COMPANY
TECHWALL

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY.
GENERAL NOTES

1. THE ATTACHED DETAILS ARE BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE REINFORCED VOLUME, METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED COMPONENTS MEET THE GOVERNING AGENCIES SPECIFICATION FOR MECHANICALLY STABILIZED EARTH STRUCTURES.

2. MINIMUM DESIGN PARAMETERS


EXTERNAL STABILITY

- OVERTURNING
  - COEFFICIENT OF SAFETY = 1.5
- SLIDING
  - COEFFICIENT OF SAFETY = 1.5
- BEARING PRESSURE
  - COEFFICIENT OF SAFETY = 1.5
- OVERALL STABILITY
  - COEFFICIENT OF SAFETY = 1.5

3. THE MAXIMUM APPLIED BEARING PRESSURE AT THE INTERFACE OF THE FOUNDATION AND SELECT BACKFILL MATERIAL IS SHOWN ON THE DRAWINGS. THE BEARING PRESSURE SHOWN IS THE MAXIMUM FOR THE GIVEN BÈEAM/MAT LENGTH. IT IS THE RESPONSIBILITY OF OTHERS TO DETERMINE THAT THE BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.

4. ANY UNSTABLE FOUNDATION MATERIAL BELOW THE REINFORCED VOLUME AS DETERMINED BY THE ENGINEER SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL AS DIRECTED BY THE ENGINEER.

5. THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED TO OTHERS. ON THE BASIS OF THIS INFORMATION, THE CONTRACTOR IS RESPONSIBLE FOR THE INTERNAL STABILITY OF THE STRUCTURE. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.

WALL CONSTRUCTION

1. WALLS BUILT ON CURVES SHALL HAVE THEIR PANELS ORIENTED AS A SERIES OF CORDED AS DEFINED IN SHOP DRAWINGS IN ORDER TO MATCH THE REQUIRED WALL RADIUS.

2. FOR LOCATION AND ALIGNMENT OF THE MSE STRUCTURES REFER TO THE RETAINING WALL CONTROL PLANS.

3. IF MANHOLE AND DROP INLETS ARE REQUIRED, THEY SHALL BE LOCATED AS SHOWN ON THE RETAINING WALL ELEVATION DRAWINGS.

4. IF PANELS ARE LOCATED WITHIN THE REINFORCED VOLUME THEY SHALL BE LEFT IN PLACE PENDING CONSTRUCTION OF THE WALL UNLESS AN ALTERNATE METHOD IS USED TO ISOLATE THE PANELS FROM THE REINFORCED VOLUME AS APPROVED BY THE ENGINEER.

5. BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 4.9.1.4.1.2 LEVEL: 1/2' OF WALL ELEVATION ABOVE THE TOP OF THE MSE REINFORCED ELEMENTS. NO SOIL REINFORCEMENT SHALL BE ATTACHED TO ANY PANEL BEFORE THE BACKFILL IS COMPACTED AT 95% OF THE REQUIRED ELEVATION AND IS COMPACTED.

6. STRUCTURES GREATER THAN 20 FEET SHALL HAVE THE FINISHED GRADE PLACED AND COMPACTED AT THE FRONT FACE OF THE STRUCTURE BEFORE THE STRUCTURE IS CONSTRUCTED. POROUS 20 FEET, FINISH GRADE SHALL BE COMPACTED TO 3% OF ASABD-T-0010-78 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

HILFIKER RETAINING WALL SYSTEM

- PRECAST CONCRETE PANELS
  - SEALED REINFORCING GRIDS
  - CONNECTION PINS
  - 3/8 DIAMETER ALIGNMENT PINS
  - 3/8 DIAMETER SUPPORT PINS
  - SYNTHETIC INDUSTRIES' GEOTEXTILE FILTER FABRIC

- ANY OTHER MATERIAL REQUIRED TO BUILD THE MSE STRUCTURES ACCORDING TO THE GOVERNING SPECIFICATION SHALL BE SUPPLIED BY THE CONTRACTOR.

- TAB STRUCTURAL SYSTEMS INC.
  - IN THIS DRAWING MATERIAL AND FINISH ARE SHOWN AS A GUIDELINE FOR THE MANUFACTURER AND IS PROPRIETARY PROPERTY OF ALLAN HILFIKER, PRESIDENT & CEO OF HILFIKER ENGINEERING.

- STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
  - RETAINING WALL SYSTEM
  - HILFIKER SQUARE PANEL
THICKEN SLAB TO 2'-6"
5'-0" EACH SIDE OF LIGHT POLE PLASTER

FOR ADDITIONAL DETAILS REFERENCE STRUCTURES STANDARD DRAWING 120

PLAN BARRIER DETAIL @ LIGHT POLE

HORIZONTAL REINFORCING NOT SHOWN FOR CLARITY

ELEVATION BARRIER DETAIL @ LIGHT POLE

SECTION BARRIER DETAIL @ LIGHT POLE

LIGHT POLE PLASTER REINFORCING DETAIL
SLOPE WITH COPING

SECTION C.P., PARAPET COPING

10

HORIZONTAL REINFORCING NOT SHOWN FOR CLARITY

SLOPE WITH COPING

0' MIN

#4 BAR - TYPICAL 4 PLACES TO

3-1/2'DOWEL TOP OF PANEL (TRIM TO PROVIDE A 2' COVER)

TOP OF PANEL

2' CLEAR

2' MIN

#4 BAR AT 6" O.C.

FRONT FACE OF WALL

SECTION C.P., PEDESTRIAN BARRIER

REFERENCE STRUCTURES STANDARD DRAWING 720 FOR DETAILS NOT SHOWN

CONTRACTOR RESPONSIBLE FOR GRADUALLY DEFORMING SOIL REINFORCEMENT MAT DOWN IN ORDER TO PASS ROADWAY CONSTRUCTION OPERATIONS AND PAVEMENT SECTION

REFERENCE C.P., BARRIER WITH PEDESTRIAN BARRIER BAR DETAILS

SECTION C.P., BARRIER WITH PEDESTRIAN RAILING

REFERENCE STRUCTURES STANDARD DRAWING 720 FOR DETAILS NOT SHOWN
A. TYPICAL MSE ELEVATION

B. TYPICAL MSE SECTION WITH SLOPE

C. TYPICAL MSE SECTION WITH BARRIER

D. TYPICAL MSE SECTION AT ABUTMENT

E. TYPICAL MATERIAL ISOMETRIC

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETAINING WALL SYSTEM
HILFiker SQUARE PANEL

T&B STRUCTURAL SYSTEMS INC.
160 NORTH WEST 27TH STREET
MIAMI, FLORIDA 33127

Designed By

Drawn By

Engineered By

Fabricated By

Approved:

5021

13 of 13
CONSTRUCTION NOTES FOR PLACEMENT OF TENSAR GEORIDS AND BACKFILL SOILS
FOR TENSAR PRECAST CONCRETE REINFORCED WALLS
TENSAW MSE RETAINING WALL SYSTEM

1.0 MATERIALS
1.1 GeoGrid Reinforcement shall be Tensar Uniaxial and Uniaxial GeoGrids manufactured by the Tensar Corporation, Morrow, Georgia.
1.2 GeoGrid Bases shall be 45°-45° Hope Bases manufactured by the Tensar Corporation, Morrow, Georgia.
1.3 Geotextile Fabric shall be 6 oz non-woven needle punched polypropylene Geotextile with minimum puncture of 40 lb

1.4 Tensar Earth Technologies, Inc. shall provide to the Contractor the following materials only:
- Precast Concrete Facing Panels
- GeoGrid, Roll Form
- Connection Devices
- Bearing Pads
- Joint Cover Fabric

2.0 TECHNICAL REQUIREMENTS
2.1 Fill materials shall be placed from near the back face of the wall and then towards the tail of the GeoGrid to ensure tensing.
2.2 Fill shall be compacted as specified in Section 5B6 of the project specifications.

2.3 An approved set of shop drawings and contract specifications shall be on-site at all times, during construction of the Tensar Retaining Wall.

3.0 Tensar GeoGrid Placement
3.1 Tensar GeoGrids shall be placed at the locations and elevations shown on the shop drawings.
3.2 Tensar GeoGrid length shall be as shown on the construction drawings. The GeoGrid length is measured from the front face of the concrete panel, extending to the tail of the GeoGrid.
3.3 Tensar GeoGrid Reinforcement shall be continuous throughout their entire length. The bond connection shall not be utilized unless pre-approved by the Engineer prior to construction.
3.4 If pre-approved, Tensar Uniaxial GeoGrids may be spaced utilizing the bond connection detail, no more than one splice shall be allowed in any one length of reinforcement.

3.5 Prior to placing fill the GeoGrid materials shall be connected to the panels per panel connection detail. The GeoGrids shall be rolled flat and anchored to remove slack in the GeoGrids.

3.6 TRACED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE GEOGRID. A MINIMUM FILL THICKNESS OF SIX MONTHS IS REQUIRED FOR OPERATION ON MULTIPLE VEHICLES PERIODICALLY POLARIZED TO THE WALL FACE. TENSAR UNIAXIAL GEOGRID SHOULDN'T BE ROUGHED WITH THE MACHINE DIRECTION PARALLEL TO THE WALL FACE.

3.7 RUNNER-TIRED VEHICLES MAY PASS OVER THE REINFORCEMENT AT SLOW SPEEDS LESS THAN 10 MPH. SUGGESTED BRACING AND SHARP TURNING SHOULD BE AVOIDED.

3.8 TENSAR UNIAXIAL GEOGRID SHALL BE ROLLED OUT WITH THE LONG AXIS OF THE APERTURES (MACHINE DIRECTION) PERPENDICULAR TO THE WALL FACE. TENSAR UNIAXIAL GEOGRID SHOULDN'T BE ROLLED OUT WITH THE MACHINE DIRECTION PARALLEL TO THE WALL FACE.

3.9 CHANGES TO G/ROUD LEVEL OR PLACEMENT
4.1 No changes shall be made to the GeoGrid layout, including but not limited to length, GeoGrid type, or elevation, shall be made without the expressed prior written consent of Tensar Earth Technologies, Inc. Design Engineer.

6.0 DRAINAGE
6.1 DRAINAGE
6.1.1 AN APPROVED SET OF SHOP DRAWINGS AND CONTRACT SPECIFICATIONS SHALL BE ON-SITE AT ALL TIMES, DURING CONSTRUCTION OF THE TENSAR RETAINING WALL.
6.1.2 A MINIMUM LIQUID FLOW RATE OF 0.5 GALLONS PER MINUTE PER SQUARE FOOT (1.91 LPM/FT²) WILL BE PROVIDED TO THE ENGINEER SHOULDN'T BE RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE.
6.1.3 INTERNAL STABILITY

7.0 SOIL DESIGN
7.1 WALL ELEVATION VIEWS AND LOCATIONS AND GEOMETRY
7.2 SOIL DATA
7.3 THE CONTRACTOR SHALL VERIFY THAT THE SOIL DATA MEETS THE REQUIREMENTS OF THIS DESIGN.

8.0 SPECIAL PROVISIONS
8.1 SPECIAL PROVISIONS

9.0 CONSTRUCTION NOTES
9.1 CONSTRUCTION NOTES

10.0 FACTORS OF SAFETY
10.1 FACTORS OF SAFETY
10.2 FACTORS OF SAFETY
10.3 FACTORS OF SAFETY
10.4 FACTORS OF SAFETY

11.0 SCHEDULE OF SUBSURFACE CONDITIONS
11.1 SCHEDULE OF SUBSURFACE CONDITIONS

12.0 SPECIAL PROVISIONS
12.1 SPECIAL PROVISIONS

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS AS NOTED IN THESE PAGES

STATE OF FLORIDA, DEPARTMENT OF TRANSPORTATION
REINFORCED WALL SYSTEM
TENSAR EARTH TECHNOLOGIES, INC.
MSE RETAINING WALL
THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS INCLUDING DRAINAGE COMPOSITES AND EROSION MEDIA, WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION. SUBSTITUTION OF THE SPECIFIED PROJECTS WITH INVALIDATE THIS DESIGN.

THIS DRAWING, DESIGN NOTES AND ASSOCIATED CALCULATIONS HAVE BEEN PREPARED BY TENSAR EARTH TECHNOLOGIES INC. FOR PRELIMINARY DESIGN PURPOSES AND SHALL NOT BE USED FOR FINAL DESIGN OR CONSTRUCTION.

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETRAINING WALL SYSTEM
TENSAR EARTH TECHNOLOGIES
MSE RETAINING WALL

TYPICAL PANEL DETAILS - STANDARD A PANEL

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

TENSAR EARTH TECHNOLOGIES INC.

5883 Glenridge Drive
Suite 200
Atlanta, GA 30328
(404) 250-1290

DESIGNED BY:

DRAWN BY:

CHECKED BY:

Prepared:

04/04/2004

5025

SHEET 3 OF 6
This design is based upon specific properties of Tensar products: geosynthetic composites and erosion control, which are proprietary to the Tensar Corporation. Use of these products may necessitate consultation with Tensar prior to use.

This drawing, design notes, and associated calculations have been prepared by Tensar Earth Technologies, Inc., for preliminary design purposes and shall not be used for final design or construction.

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This system may be used in all environments.
ALL PANELS ARE SHOWN BACK FACE VIEW

- STANDARD STEEL REINFORCING STEEL REQUIREMENTS
  - HORIZONTAL: 4" O.C. 8" X 1/2" X 6" O.C., 1/2" X 6" O.C., 1/2" X 12"
  - VERTICAL: #2 BARS 6" X 6" X 6" O.C.

- STANDARD GRID LAYOUT
  - REINFORCING STEEL REQUIREMENTS
  - 4X4-WIREasted WIRE MATERIAL
  - FABRICATION PER ASTM A-495

- GEORGRID TAB LOCATION

- STANDARD T18 PANEL
- STANDARD T30 PANEL
- STANDARD T36 PANEL
- STANDARD T42 PANEL
- STANDARD T48 PANEL
- STANDARD T54 PANEL
- STANDARD T60 PANEL
- STANDARD T66 PANEL

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

RETAINING WALL SYSTEM
TENSAR EARTH TECHNOLOGIES
WSE RETAINING WALL

- Standard Steel Layout
- Reinforcing Steel Requirements
- Horizontal: 4" O.C. 8" X 1/2" X 6" O.C., 1/2" X 6" O.C., 1/2" X 12"
- Vertical: #2 BARS 6" X 6" X 6" O.C.

- Standard Grid LAYOUT
- Reinforcing Steel Requirements
- 4X4-Wireased WIRE MATERIAL
- Fabrication Per ASTM A-495

- Georgrid Tab Location

- Standard T18 Panel
- Standard T30 Panel
- Standard T36 Panel
- Standard T42 Panel
- Standard T48 Panel
- Standard T54 Panel
- Standard T60 Panel
- Standard T66 Panel

**TENSAR EARTH TECHNOLOGIES, INC.**

© 2003, TENSAR EARTH TECHNOLOGIES, INC.

ALL TOP PANELS WILL HAVE 2 #4 DOWELS CAST 6" INTO THE TOP OF EACH PANEL.

This design is based upon specific properties of Tensar products regarding drainage, compaction and erosion control, which are proprietary to the Tensar Corporation and citizens panels. Approximate substitution of the specified products will invalidate this design.

This drawing, design notes and associated calculations have been prepared by Tensar Earth Technologies, Inc. for design or construction.

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM
TENSAR EARTH TECHNOLOGIES
WSE RETAINING WALL

- Standard Steel Layout
- Reinforcing Steel Requirements
- Horizontal: 4" O.C. 8" X 1/2" X 6" O.C., 1/2" X 6" O.C., 1/2" X 12"
- Vertical: #2 BARS 6" X 6" X 6" O.C.

- Standard Grid LAYOUT
- Reinforcing Steel Requirements
- 4X4-Wireased WIRE MATERIAL
- Fabrication Per ASTM A-495

- Georgrid Tab Location

- Standard T18 Panel
- Standard T30 Panel
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- Standard T42 Panel
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Les than 75° Acute Corner - Skewed Geogrid Under Pile Cap

(See detail below for bar reinforcement)

Example Acute Corner - Skewed Geogrid At Abutment Level

Not to Scale

This design is based upon specific properties of Tensar products including Geogrids and Geotextiles which are proprietary to the Tensar Corporation and citizens patent. Abnormal use with substitution of the specified products will invalidate this design.

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REINFORCING STEEL OR WELDED WIRE Mesh
PRECAST CONCRETE PANEL

ENGAGEMENT EAR AND POSITIVE LOCKING CLIP

TENSAR ATTACHMENT SECTOR TABS GEOGRID CENTERED IN EDGE FACE OF PANEL AND CAST INTO PANEL.

UPPER TAB TURNED UPWARD AGAINST REINFORCING STEEL. LOWER TAB TURNED DOWNWARD AGAINST REINFORCING STEEL.

THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS INCLUDING DRAINAGE, COMPOSITES AND FABRICATION WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION AND CANNOT BE REPRODUCED BY OTHERS WITHOUT THE WRITTEN CONSENT OF THE MANUFACTURER.

CONNECTION DETAIL PLAN VIEW AT 15° GRID POSITION NOT TO SCALE

ATTACHMENT PLATE

TENSAR EARTH TECHNOLOGIES

REINFORCING STEEL OR WELDED WIRE MESH
PRECAST CONCRETE PANEL

ENGAGEMENT EAR AND POSITIVE LOCKING CLIP

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THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS, GEOBRIDS, DRAINABLE COMPOSITES AND EROSION BIOFILM, WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION. ANY SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN.

THIS DESIGN WAS PREPARED BY TENSAR EARTH TECHNOLOGIES, INC. FOR PRELIMINARY DESIGN PURPOSES AND SHALL NOT BE USED FOR FINAL DESIGN OR CONSTRUCTION.

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**NOTES:**

A. VAP CHAMFER ALL AROUND EACH FACE (EXPOSED SURFACES)

B. ALL longitudinal BARS SHALL BE #4 WITH A MAXIMUM SPACING OF 1'-4" O.C.

**Table:**

<table>
<thead>
<tr>
<th>BARS</th>
<th>QUANTITY</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>5A</td>
<td>6</td>
<td>3'-6&quot;</td>
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<tr>
<td>5C</td>
<td>6</td>
<td>3'-6&quot;</td>
</tr>
<tr>
<td>A</td>
<td>VAPVAP</td>
<td>WAS &amp; 6&quot;</td>
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<tr>
<td>B</td>
<td>VAPVAP</td>
<td>WAS &amp; 4&quot;</td>
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* SEE SHEET 3 OF 4 FOR PANEL THICKNESS

PRECAST BARRIER - VAPGRID REINFORCEMENT

NOT TO SCALE

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM

TENSAR EARTH TECHNOLOGIES

WSE RETAINING WALL

© 2003, TENSAR EARTH TECHNOLOGIES, INC.

THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS DESCRIBED, DRAWN, COMPUTED AND DESIGNED BY TENSAR, WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION AND OTHERS, UNLESS OTHERWISE STATED. ANY SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN AND PARTY ACCEPTING THIS DOCUMENT DOES SO WITH FULL KNOWLEDGE AND ACKNOWLEDGES THE PROPRIETARY RIGHTS OF TENSAR AND OTHERS, RESPECTIVELY.

TENSAR EARTH TECHNOLOGIES, INC.

DRAWN BY: D.J.H.
CHECKED BY: K.S.H.
APPROVED BY: D.J.H.

SHEET 2 OF 5
The diagram illustrates a retaining wall system featuring various components such as the front face of the backwall, the top of the wall cap, the expansion joint material, and the standard traffic barrier. The design notes indicate that this system may be used in all environments. The drawing is prepared by Tensar Earth Technologies, Inc., and approved by the State of Florida Department of Transportation. The drawing includes sections and plans that detail the construction and material specifications for the retaining wall system.
NOTES:
A. EXPANSION JOINT MATERIAL SHALL BE PROVIDED BETWEEN C.P. CONCRETE AND PRECAST CONCRETE PANEL.
B. ALL JOINTS SHALL BE 4" BARS WITH 6" BAR SPACING.
C. 3" W/DR. JOINTS - 4" JOINT MATERIAL AT EXPANSION JOINTS IF UNIT IS LESS THAN 3 PANELS LONG.
D. 2" MIN. CLEARANCE ON ALL BARS EXCEPT W0-W11.

C.P. CONCRETE TRAFFIC BARRIER
NOT TO SCALE

BAR BENDING DETAIL
NOT TO SCALE

C.P. TRAFFIC BARRIER
OVER SLIP JOINT PANEL
NOT TO SCALE

SLIP JOINT DETAIL
NOT TO SCALE

THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS INCLUDING ORTHOGONAL COMPOSITES AND EROSION MEDIANS, WHICH ARE PROPERTIES OF THE TENSAR CORPORATION. THE USE OF ANY SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TENSAR EARTH TECHNOLOGIES
MSE RETAINING WALL

NOTES:
1. EXPANSION JOINT MATERIAL SHALL BE PROVIDED BETWEEN C.P. CONCRETE AND PRECAST CONCRETE PANEL.
2. ALL JOINTS SHALL BE 4" BARS WITH 6" BAR SPACING.
3. 3" W/DR. JOINTS - 4" JOINT MATERIAL AT EXPANSION JOINTS IF UNIT IS LESS THAN 3 PANELS LONG.
4. 2" MIN. CLEARANCE ON ALL BARS EXCEPT W0-W11.

BAR BENDING DETAIL
NOT TO SCALE

TENSAR EARTH TECHNOLOGIES, INC.

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This drawing, design notes and associated calculations have been prepared by TENSAR EARTH TECHNOLOGIES, Inc. for preconstruction design purposes and shall not be used for final design or construction.

TENSAR EARTH TECHNOLOGIES

Atlanta, GA
(404) 250-1290

C.P. TRAFFIC BARRIER
OVER SLIP JOINT PANEL

SLIP JOINT DETAIL
NOT TO SCALE

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.
This design is based upon specific properties of Tensar products (geosynthetics, composite and weather barrier materials), which are proprietary to the Tensar Corporation and cannot be duplicated. Any substitution of the specified products will invalidate this design.

This drawing, design notes and associated calculations have been prepared by Tensar Earth Technologies, Inc., retaining wall design specialists, and shall be used for final design of construction.

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5. The design contains in these drawings is based on information provided by others. In the absence of this information, the Wall company is responsible for internal stability of the structure. 6. External stability design including foundation and slope stability is the responsibility of others.

Wall construction

8. Retained earth walls in curves will form a series of short chords of at least 5.5 to watered earth panels.

9. For location and alignment of retained earth walls see retaining wall control plans.

10. If panels and shop sheets are present, they shall be located as shown on wall elevations.

11. If piles are located within reinforced soil volume, they shall be driven prior to construction of the reinforced soil structure. When piles are located in a manner which is acceptable to the engineer and foster geotechnical company and is written and approved in writing.

12. Reinforced material can be compacted in accordance with section A-1 to a level of 6 inches above the top reinforcement. Partially culminating installations of reinforcement shall be permitted only if the top reinforcement is not disturbed. The height of the top reinforcement shall not exceed the required level.

13. Wall construction shall be in accordance with section 6.1.

14. If is the contractor’s responsibility to determine the location of all reinforcing posts. Rebar of reinforcement may be required to avoid the post location of reinforcing posts. Reinforcement shall be attached to the reinforcing post at the contractor’s expense.

15. If existing or future structures, pipes, foundations or other posts within reinforced soil volume interfere with the normal function of reinforcing reb and slope’s drainage system, the contractor shall be responsible for reinforcing these posts at the contractor’s expense to determine what course of action should be taken.

16. For other information pertaining to wall construction please refer to foster geotechnical wire face wall manual.

17. The contractor is responsible for gradually deflection of reinforcing shore to avoid conflicts with framing and scaffolding. The contractor’s attention is directed to the use of temporary diagonal bracing and / or wired super elevation major soil waves are anticipated.
TERRATREL™
A WIRE FACED MSE WALL SYSTEM

DESIGN CRITERIA

1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIALS WIRE, REINFORCEMENT AND SELECTION OF Prefabricated Wire Facing materials are the key elements that ensure the success of the wall. The Contractor shall ensure that the materials specified in this manual are used for the project. The Contractor shall be responsible for the selection of the materials and shall provide the necessary testing and quality control documentation to the Engineer when requested.

2. SOIL PARAMETERS

   a. SEE WALL DESIGN DRAWS FOR SOIL CHARACTERISTICS OF THE FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL. THE CONTRACTOR SHALL PROVIDE THE SOIL PARAMETERS FOR EACH WALL DESIGN, AS SPECIFIED IN THIS MANUAL. THE SOIL PARAMETERS OR THE ACTUAL SOIL CHARACTERISTICS IN THE SITE ARE MANDATORY FOR THE DESIGN OF THE WALL. THE DESIGNER IS RESPONSIBLE FOR THE DESIGN LEVEL.

3. THE MAXIMUM ALLOWABLE SHEAR STRENGTH AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL ELEVENTH FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE ENGINEER TO DETERMINE THAT THE MAXIMUM SHEAR STRENGTH IS ALLOWABLE FOR A SPECIFIC SITE.


5. THE MINIMUM FACTORS OF SAFETY REQUIRED FOR DESIGN

   a. OVERTURNING = 2.0
   b. SHEAR = 1.5
   c. INTERNAL擊N = 0.75
   d. STABILITY = 1.5
   e. WITHDRAWAL (AT END OF DESIGN LIFE) = 0.5
   f. WITHDRAWAL (AT ANY SECTOR OF BUILT CONNECTION) = 0.5
   g. MAXIMUM ALLOWABLE FACTOR
   h. ( = 1.0 (FOR UNWIND)
   i. ( = 1.0 (FOR UNWIND)

6. FOR LAYOUTS OF THE WALLS, SEE RETAINING WALL CONTROL PLAN.

7. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF THE STRUCTURE AS SHOWN ON THE DRAWINGS PROVIDED TO THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

8. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF THE STRUCTURE AS SHOWN ON THE DRAWINGS PROVIDED TO THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

9. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF THE STRUCTURE AS SHOWN ON THE DRAWINGS PROVIDED TO THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

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13. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF THE STRUCTURE AS SHOWN ON THE DRAWINGS PROVIDED TO THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

14. ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY THE REINFORCED EARTH COMPANY:

   a. Prefabricated Wire Facing Panels
   b. Locking Connections
   c. Fixing Devices
   d. Prefabricated Fabric

   ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR.

15. SOIL REINFORCEMENT LINES

   THE SOIL REINFORCEMENT LINES ARE TO BE PROVIDED TO THE ENHANCED FACES OF THE WALLS AND ARE LOCATED AS SHOWN ON THE WALL ELEVENTH. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

16. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

17. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

18. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

19. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

20. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

21. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

22. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

23. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

24. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.

25. THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONNECTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH WALLS. THE DESIGNER IS RESPONSIBLE FOR THE SELECTION OF THE MATERIALS TO BE USED IN THE CONSTRUCTION OF THE WALL. THE DESIGNER SHALL PROVIDE THE NECESSARY TESTING AND QUALITY CONTROL DOCUMENTATION TO THE ENGINEER WHEN REQUESTED.
GENERAL NOTES

1. THE ATTACHED DRAWINGS ARE BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE
   RETAINED VOLUME, METHODS OF CONSTRUCTION AND QUALITY OF THE REINFORCED
   COMPONENTS ARE IN ACCORDANCE WITH THE STRUCTURAL SYSTEMS SPECIFICATION FOR MECHANICALLY
   STABILIZED EARTH WALLS.

2. MESCHAN WALL DESIGN PARAMETERS

   a. THE WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.
   b. THE WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.
   c. THE WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.
   d. THE WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.
   e. THE WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.


4. ANY INTEGRAL FOUNDATION MATERIAL IS TO BE DEMOLISHED AND REPLACED WITH SUITABLE MATERIAL AS DIRECTED BY THE ENGINEER.

5. THE DESIGN CONSIDERED TWO OCTAVES IS BASED ON INFORMATION PROVIDED BY OTHERS.

6. THE DESIGN OF THIS STRUCTURE MEETS THE REQUIREMENTS FOR AN EARTH WALL, INCLUDING FOUNDATION AND WALL STABILITY.

7. THE DESIGN OF THIS STRUCTURE MEETS THE REQUIREMENTS FOR AN EARTH WALL, INCLUDING FOUNDATION AND WALL STABILITY.

8. THE DESIGN OF THIS STRUCTURE MEETS THE REQUIREMENTS FOR AN EARTH WALL, INCLUDING FOUNDATION AND WALL STABILITY.

9. THE DESIGN OF THIS STRUCTURE MEETS THE REQUIREMENTS FOR AN EARTH WALL, INCLUDING FOUNDATION AND WALL STABILITY.

10. THE WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

11. THE WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

WALL CONSTRUCTION

1. WALLS LOCATED ON CURVES SHALL HAVE THEIR PANELS DEPICTED AS A SERIES OF
   CURVED PANELS AS SHOWN IN THE CALCULATIONS. THE DESIGN PRESSURE, WHICH IS THE MAXIMUM PRESSURE FOR THE WALL, IS BASED ON THE DISTANCE BETWEEN THE WALL AND THE FOUNDATION.

2. THE WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

3. WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

4. WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

5. WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

6. WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

7. WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

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10. WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

11. WALL DESIGN IS BASED ON THE SOIL CHARACTERIZATION PROVIDED IN SECTION 2.1.2.3.

T&B Structural Systems, Inc.
637 West Hurst Blvd.
Hurst, TX 76053
888-280-9858
Note: Place filter fabric at desired location and secure with hog rings, tie as required.

**Correct**

**Incorrect**

---

Soil reinforcement connection sequence:

The next lift is slightly offset out from the lift below.

Orientation at bend:

Filter fabric placement detail:

Face panel connection sequence:

State of Florida Department of Transportation
**Erection Sequence Steps**

### Step 1 - Soil Reinforcing Placement
1. Place bottom soil reinforcing grid on prepared foundation.
2. Place backing face panel at back face of soil reinforcing grid and secure with hog rings.
3. Place filter fabric on back face of backing face panel and secure with hog rings.

### Step 2 - Backfill Placement
4. Place and compact maximum of 1'-0" of select backfill on top of soil reinforcing grid.
5. Place cap mat backing material at base of wall paying attention to facing alignment.
6. Place and compact 1'-0" of select backfill to bring backfill layer to next lift elevation.
7. Leave void at face of wall until next soil reinforcing element is placed.

### Step 3 - Next Soil Reinforcing Lift
8. Place soil reinforcing over previous face panel and soil reinforcing element and pull into contact.
9. Spaces below are in the mode of soil reinforcing and face panel above.

### Step 4 - Cap Mat
10. Place next layer of soil reinforcing grids on compacted fill and secure to face panel with hog rings.
11. Pull face into alignment.

### Notes:
1. Face panel shall be placed so it is at the center line of the soil reinforcing facing panel.
2. Face panel shall be placed at back face of soil reinforcing facing panel in manner that vertical and horizontal pattern maintains a 4" x 4" apparent opening as viewed from front face of structure.
CONSTRUCTION NOTES FOR THE PLACEMENT OF TENSAR GEORGRID AND BACKFILL SOILS FOR TENSAR WRF TEMPORARY RETAINING WALL

1.0 MATERIALS
2.0 DESIGN REINFORCEMENT SHALL BE TENSAR UNAXIAL AND BIAXIAL GEORGRID MANUFACTURED BY THE TENSAR CORPORATION, MONTREAL, QUEBEC.

2.1 GEORGRID BAGS SHALL BE 46" X 46" HOPE BAGS MANUFACTURED BY THE TENSAR CORPORATION, MONTREAL, QUEBEC.

2.2 CONNECTION RODS SHALL BE 4" X 4" X 8" C/S GALVANIZED IRON.

2.3 GEOTEXTILE FILTER FABRIC SHALL BE 20 OZ/NM 50% SD 50% MD NEEDLE-PUNCHED POLYPROPYLENE, WITH MINIMUM PERMEABILITY OF 12 ISC.

2.4 WALL FACING

2.4.1 WALL FACING SHALL BE PRE-FABRICATED BLACK STEEL WELDED WIRE FORMS LINED WITH BIAxIAL GEORGRID WRAP OR DUAL AXIAL CONNECTION SYSTEM WITHOUT BIAxIAL GEORGRID WRAP. WIRE FORM GEOMETRY SHALL BE AS DETAILLED IN THE CONSTRUCTION DRAWINGS.

2.5 TENSAR EARTH TECHNOLOGIES, INC. SHALL PROVIDE TO THE CONTRACTOR THE FOLLOWING MATERIALS ONLY:

2.5.1 WRF FACING FORMS AND STRIPS FILTER FABRIC GEORGRID CONNECTION, AS APPLICABLE

3.0 TECHNICAL REQUIREMENTS

3.1 FULL MATERIALS SHALL BE PLACED FROM THE BACK OF THE WELDED WIRE FORMS, TOWARDS THE ENDS OF THE GEORGRID TO ENSURE TENSIONING.

3.2 WELDED WIRE FACING SHALL BE MONITORED FOR DEFORMATION AND COMPLIANCE TO FDOT STANDARD SPECIFICATIONS SECTION 542 DURING FULL PLACEMENT AND COMPACTION. COMPACTIVITY EQUIPMENT AND OPERATING PROCEDURES MAY HAVE TO BE MODIFIED TO PREVENT EXCESSIVE DEFORMATION OF THE FLEXIBLE WELDED WIRE FACING.

3.3 THE WIRES OR HOE RIMS MAY BE REQUIRED IF ANY WIRE FACING OPERATIONS INVOLVE BACKFILL OPERATIONS.

3.4 TENSAR GEORGRID PLACEMENT

3.4.1 TENSAR GEORGRID SHALL BE PLACED AT THE SAME LOCATIONS AND ELEVATIONS SHOWN ON THE SHOP DRAWINGS

3.5 TENSAR GEORGRID REINFORCEMENT SHALL BE CONTINUOUS THROUGHOUT THEIR ENVIRONMENT LENGTHS. BOOK SPlice CONNECTION SHALL NOT BE UTILIZED UNLESS PRE-APPROVED BY THE ENGINEER.

3.6 TENSAR GEORGRID REINFORCEMENT SHALL BE PLACED AT THE SAME LOCATIONS AND ELEVATIONS SHOWN ON THE SHOP DRAWINGS.

4.0 CHANGES TO REINFORCEMENT LAYOUT OR PLACEMENT

4.1 NO CHANGES TO THE TENSAR GEORGRID LAYOUT, INCLUDING, BUT NOT LIMITED TO, LENGTH, GEORGRID TYPES, OR ELEVATION, SHALL BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE TENSAR EARTH TECHNOLOGIES, INC. DESIGN ENGINEER.

5.0 DRAINAGE

5.1 THE TENSAR REINFORCED WALL HAS BEEN DESIGNED BASED ON THE ASSUMPTION THAT THE REINFORCED BACKFILL MATERIAL SHALL BE FREE OF SUBSURFACE DRAINAGE OF WATER SEEPAGE.

6.0 DESIGN PARAMETERS

6.1 SOIL PARAMETERS

SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL MATERIAL UTILIZED AT THE SITE. THE VALUES OF FRICTION ANGLE, APPARENT CONSIDERATION UNIT WEIGHT SHALL BE PROVIDED IN THE SHOP DRAWINGS.

6.2 FACTORS OF SAFETY

6.2.1 INTERNAL STABILITY

MIND GEORGRID DESIGN STRENGTH = 0.25 UN

MINIMUM FACTOR OF SAFETY FOR GEORGRID PULLOUT = 1.5

MINIMUM FACTOR OF SAFETY FOR SLIDING = 1.5 AT LOWEST GEORGRID GEORGRID-GEORGRID INTERACTION COEFFICIENT = 0.8 PERCENT COVERAGE OF GEORGRID = VARIES

6.2.2 EXTERNAL STABILITY

MINIMUM FACTOR OF SAFETY FOR SLIDING = 1.5 MINIMUM FACTOR FOR SAFETY FOR OVERTURNING = 2.0 EXTERNAL STABILITY IS THE RESPONSIBILITY OF OTHERS. TENSAR EARTH TECHNOLOGIES, INC. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR EXTERNAL STABILITY. (ALSO SEE SECTION 7.5.3)

6.2.3 GLOBAL STABILITY

GLOBAL STABILITY IS THE RESPONSIBILITY OF OTHERS. TENSAR EARTH TECHNOLOGIES, INC. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR GLOBAL STABILITY. (ALSO SEE SECTION 7.5.3)

7.0 SPECIAL PROVISIONS

7.1 WALL ELEVATION VIEWS, LOCATIONS AND GEOMETRY OF EXISTING AND PROPOSED STRUCTURES MIGHT BE VERIFIED BY THE CONTRACTOR BEFORE DEVELOPING SHOP DRAWINGS.

7.2 TENSAR EARTH TECHNOLOGIES, INC. ASSUMES NO LIABILITY FOR INTERPRETATION OF SUBSURFACE CONDITIONS, SUITABILITY OF SOIL DESIGN PARAMETERS AND INTERPRETATION OF SUBSURFACE GROUNDWATER CONDITIONS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES TEMPORARY RETAINING WALL

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

© 2007, TENSAR EARTH TECHNOLOGIES, INC.

THIS DESIGN IS BASED UPON SPECIFIC PRODUCTS OF TENSAR PROJECTS GEORGRID GEORGRID DESIGN WHICH IS PROPRIETARY TO THE TENSAR CORPORATION AND CINCINNATI, OHIO. USE OR SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN.
TOP WIRE BASKET DETAIL

WALL FACE DETAIL

SUPPORT STRUT

SECTION 8-8

TOP OF WALL

SUPPORT STRUT LENGTH

BIAXIAL GEOGRID WRAP FACING

TYPICAL CROSS-SECTION

DIAXIAL GEOGRID WRAP FACING

TOP WIRE BASKET DETAIL

TYPICAL CROSS-SECTION

BIAXIAL GEOGRID WRAP FACING

TOP OF WALL

SUPPORT STRUT

SECTION 8-8

TOP WIRE BASKET DETAIL

WALL FACE DETAIL

SUPPORT STRUT

SECTION 8-8

TOP OF WALL

SUPPORT STRUT LENGTH

BIAXIAL GEOGRID WRAP FACING

TYPICAL CROSS-SECTION

DIAXIAL GEOGRID WRAP FACING
TOP OF WALL
CUT TOP WIRE FORM TO CONFORM TO FINISHED GRADE
4 GA WIRE 6 PER BASKET
BLACK STEEL WELDED WIRE FORM WALL
NOTE:
A FULL ROLL OF BASKET SHOULD BE PLACED IN ALL TOP BASKETS NOT CONTAINING PRIMARY REINFORCEMENT.

TOP OF WALL
4 GA STRUT 6 PER BASKET
BLACK STEEL WELDED WIRE FORM WALL
NOTE:
ALL FORMS AND STRUTS SHALL BE FABRICATED WITH NO.4 BLACK WIRE.
OVERLAPPING ONE PAIR OF VERTICAL BARS BETWEEN PANELS.

FILTER FABRIC
3'-0" TOP AND BOTTOM
TENSAR UNIAXIAL STRUCTURAL GEOGRID
SUPPORT STRUT
TENSAR BIAS GEOGRID (C.J.
TENSAR UNIAXIAL STRUCTURAL GEOGRID
REINFORCED P8 L
GEOGRID BEDMENT LENGTH ANGLE
WIRE FORMS IS 3'-0".
NOTE:
1. SCAFFOLDING CONSTRUCTION MECHANICAL CONNECTION SYSTEM WITH MECHANICAL CONNECTION MAY BE USED IN LIEU OF THE DETAILS FOR TENSAR GEOSIDER WRAP FACINGS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RETAINING WALL SYSTEM
TENSAR EARTH TECHNOLOGIES
TEMPORARY RETAINING WALL
DRAWN
1.2004
DRAWN BY
J.L.
REVISION
04 3 of 4 5125

NOTE:
3.5419 X 1-1/2 X 0.225
FILTER FABRIC
WELDED WIRE FABRIC
NOT TO SCALE
OPTIONAL WALL FACE DETAIL
OPTIONAL MECHANICAL CONNECTION SYSTEM WITHOUT BIAAXIAL GEOGRID WRAP
OPTIONAL WIRE FORM DETAIL
OPTIONAL TYPICAL CROSS-SECTION
NOT TO SCALE
GEOGRID ENGAGEMENT LENGTH
FILTER FABRIC
SERRASCAPE CONNECTION (TYP)
NOTES:
LESS THAN 1000 SQUARE METERS MAY ONLY BE USED WITH THE OPTIONAL NON-UNIAXIAL GEORGRID W/ MECHANICAL CONNECTION.

FOR LESS THAN 1000 SQUARE METERS PRIMARY REINFORCEMENT SHALL BE CONNECTED TO WALL FACINGS.

ALTERNATE LAYERS OF UNIAXIAL PRIMARY REINFORCEMENT SHALL BE PLACED IN STANDARD PATTERN SUCH THAT THE LAYER ABOVE IS PLACED WITH THE CENTERLINE OF THE GEORGRID IN ALIGNMENT WITH THE CENTERLINE OF THE SPACE BELOW.

TYPICAL GEORGRID COVERAGE
NOT TO SCALE

PRIMARY UNIAXIAL GEORGRID

<table>
<thead>
<tr>
<th>PERCENT</th>
<th>CONCENTRATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>75</td>
<td>1-5</td>
</tr>
<tr>
<td>56</td>
<td>3-4</td>
</tr>
</tbody>
</table>

NOTE:
BEND OR CUT BASKETS TO FIT FIELD CONDITIONS

TIE BASKETS WITH WIRE TIES OF 1/2" DIAMETER MADE OF WIRE WITH 12 GUAGE.

INSIDE CORNER DETAIL
NOT TO SCALE

OUTSIDE CORNER DETAIL
NOT TO SCALE

Rearm of soil between alternating layers of georgrid

REARMA D OF SOIL BETWEEN ALTERNATING LAYERS OF GEORGRID

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

REMOVING WALL SYSTEM
TENSAR EARTH TECHNOLOGIES
TEMPORARY RETAINING WALL

TENSAR EARTH TECHNOLOGIES, INC.
7300 Germano Dr.
Anchorage, AK 99518
(907) 561-0500

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CONSTRUCTION NOTES FOR THE PLACEMENT OF MIRAFL REINFORCEMENT AND BACKFILL SOILS FOR TEMPORARY MECHANICALLY STABILIZED EARTH WALLS

1.0 DESIGN CRITERIA

1.1 SOIL PARAMETERS

See Wall Control Drawings for soil characteristics of formation material to be used in the design of the wall system. The Contractor shall provide soil design parameters for backfill material based on the actual soil characteristics utilized at the site. The value of $C_{L}$ and $S_{L}$ shall be provided in the shop drawings.

1.2 MINIMUM FACTOR OF SAFETY

1.2.1 INTERNAL STABILITY

FACTOR OF SAFETY

1.2.2 INTERNAL STABILITY

FACTOR OF SAFETY

1.2.3 GLOBAL STABILITY

FACTOR OF SAFETY

1.2.4 UNIFORM SURCHARGE

FACTOR OF SAFETY

1.2.5 HYDROSTATIC FORCES

FACTOR OF SAFETY

1.2.6 SEISMIC FORCES

FACTOR OF SAFETY

1.3 WALL CONSTRUCTION

3.1 FOR LOCATION AND ALIGNMENT OF REINFORCED SOIL STRUCTURES, SEE RETAINING WALL CONTROL PLANS.

3.2 STEEL WIRE FORMS, REINFORCEMENT, SOIL RETENTION FABRIC, AND COMPACTED BACKFILL SHALL BE PLACED IN SUCCESSIVE LIFTS IN THE SEQUENCE SHOWN IN THE CONSTRUCTION DRAWINGS.

3.3 GEOSYNTHETIC REINFORCEMENT SHALL BE PLACED AT THE ELEVATIONS, LOCATION, TYPE, ORIENTATION, AND TO THE LEVELS SHOWN ON THE CONSTRUCTION DRAWINGS. THE REINFORCEMENT SHALL BE PLACED IN A MANNER SO AS TO AVOID SLACK OR WRINKLES. PINNING OR STAKES MAY BE REQUIRED TO MAINTAIN WRINKLE-FREE PLACEMENT DURING INSTALLATION.

3.4 AT EACH REINFORCEMENT ELEVATION, BACKFILL SOILS SHALL BE COMPACTED TO A LEVEL SURFACE BEFORE PLACING THE REINFORCEMENT. ALL REINFORCEMENT SHALL BE PLACED NORMAL TO THE FACE OF THE WALL.

3.5 ADJACENT WIRE FORMS SHALL BE CONNECTED ALONG VERTICAL AND HORIZONTAL SEAMS WITH GALVANIZED INTERLOCKING FASTENERS PLACED 8 INCHES ON CENTER.

3.6 BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH FOOT SPECIFICATIONS - SECTION 546.

3.7 TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE REINFORCEMENT. A MINIMUM FILL THICKNESS OF 6 INCHES IS REQUIRED FOR THE OPERATION OF TRACKED VEHICLES OVER THE REINFORCEMENT. TURNOVER OF TRACKED VEHICLES SHOULD BE AVOIDED TO PREVENT TRACKS FROM DISPLACING THE FILL AND THE REINFORCEMENT.

3.8 RUBBER TIRED VEHICLES MAY PASS OVER THE REINFORCEMENT AT SLOW SPEEDS, LESS THAN 10 MPH. SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.

3.9 TC MIRAFI ENGINEERING SERVICES, INC. IS RESPONSIBLE FOR THE INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY IS THE RESPONSIBILITY OF OTHERS.
FRONT FACE OF WALL

CONVEX CORNER DETAIL

NTS

PLACEMENT AROUND OBSTRUCTIONS

NTS

INSTALLATION AROUND PIPE RUNNING PARALLEL TO MACHINE (ROLL) DIRECTION OF REINFORCEMENT

NTS

CONCAVE CORNER DETAIL

NTS

PROVIDED 6" WIDE OF SOIL BETWEEN OVERLAPPING LAYERS OF REINFORCEMENT FOR MANDATORY WAGNERAGE.

FOLD REINFORCEMENT AROUND OBSTRUCTION

CUT REINFORCEMENT PARALLEL TO EDGE

SEAM

PIPE 5'-0"

TOUCH

SEAM

PIPE

NOTE:

SLIT REINFORCEMENT FROM END CLOSEST TO PIPE TO 6 FEET BEYOND.

LAY REINFORCEMENT IN AROUND PIPE.

H/4

H/4 EXTENSION ON SUBSEQUENT SPECIFIED REINFORCEMENT ELEVATIONS.

H/4 EXTENSION BEFORE WALL

ALTERNATE REINFORCEMENT

H/4 EXTENSION ON SUBSEQUENT SPECIFIED REINFORCEMENT ELEVATIONS.

H = WALL HEIGHT.

1/2 EXTENSION ON SPECIFIED REINFORCEMENT ELEVATIONS.

ALTERNATE REINFORCEMENT EXTENSION ON SPECIFIED REINFORCEMENT ELEVATIONS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM

TC MIRAFI WIRE FORM TEMPORARY

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.
CONSTRUCTION SEQUENCE

STEP 1
- Excavate for level base to a length adequate for reinforcement embedment.
- Set grading stakes at a 6-inch offset to facilitate proper wire form alignment.
- Align bottom basket 6 inches below finished grade at front face of wall or as shown on wall profile.

STEP 2
- For the first course of the wall, align baskets without spaces and attach with ring fasteners.
- Install struts at about 5-foot spacing.

STEP 3
- Place backfill soil in 6-inch maximum lifts.
- Compact soils within 6-inch wire form using light weight compaction equipment.
- Compact remaining backfill soils with standard compaction equipment to required density.
- Place backfill soil in 6-inch maximum lifts.
- Compact soils within 6-inch wire form using light weight compaction equipment.
- Compact remaining backfill soils with standard compaction equipment to required density.
- Place backfill soil in 6-inch maximum lifts.
- Compact soils within 6-inch wire form using light weight compaction equipment.
- Compact remaining backfill soils with standard compaction equipment to required density.

STEP 4
- Pull welded wire forms over compaction equipment.
- Place the next wire form against the lower form and attach with ring fasteners.
- Install struts on succeeding lift.

STEP 5
- Repeat steps 2 thru 5 until desired height of wall is reached.

STEP 6
- Pull welded wire forms over compaction equipment.
- Place the next wire form against the lower form and attach with ring fasteners.
- Install struts on succeeding lift.

CUT OR BEND THE WELDED WIRE FORM TO MATCH THE PROPOSED GRADE
**Procedure for Assembly of Base Connection:**

1. Assemble plug to stub with bolts and with one flat washer on each bolt between plates.
2. Shim as required to plumb plug (See Shims detail).
3. Tighten all bolts until the head is snug with a 7/16" to 1/2" wrench to bed and align and to clean out threads then loosen each bolt in turn and reposition in a random order to the prescribed torque (See Table 1).
4. Burr threads of junction with nut using a center punch to prevent nut in seizing.

**Foundation Detail Notes:**

- To prevent galvanic corrosion, reinforcing steel shall not be in contact with the aluminum jacket.
- All reinforcing to be Grade 60.

### Base Connection Data Table

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**Aluminum Post & base Foundation & FUSE details**

**Standard Roadside Sign Break Away Post Details**

**Notes:**

- Sections shown are for installation on right-of-way.
- For right-of-way posts all welds are opposite hand from that shown.
**BASE CONNECTION DATA**

| Section | A | B | C | D | Bolt Size | Type | Tension | P | D | F | S | T | W |
|---------|---|---|---|---|-----------|------|----------|---|---|---|---|---|---|---|
| 6x117  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 2x117  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 6x135  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 10x13  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 12x40  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |

**FUSE (HINGE) PLATE DATA**

| Section | A | B | C | D | Bolt Size | Type | Tension | P | D | F | S | T | W |
|---------|---|---|---|---|-----------|------|----------|---|---|---|---|---|---|---|
| 6x117  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 2x117  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 6x135  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 10x13  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 12x40  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |

**FOUNDATION DATA**

| Section | A | B | C | D | Bolt Size | Type | Tension | P | D | F | S | T | W |
|---------|---|---|---|---|-----------|------|----------|---|---|---|---|---|---|---|
| 6x117  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 2x117  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 6x135  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 10x13  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 12x40  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |

**SHIM**

| Section | A | B | C | D | Bolt Size | Type | Tension | P | D | F | S | T | W |
|---------|---|---|---|---|-----------|------|----------|---|---|---|---|---|---|---|
| 6x117  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 2x117  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 6x135  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 10x13  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |
| 12x40  | 4 | 3 | 6  | 5/16 | 1300 |  |  | 2-1/4 | 1-1/4 |  | 4  | 1  | 1  | 1  |

**PROCEDURE FOR ASSEMBLY OF BASE CONNECTION**

1. Assemble post to exist with base and with one flat washer on each bolt between plates.
2. Drills as required to grout post (see column details).
3. Tighten all bolts the enclosure post with 1'-0" to 3'-3" wrench to 2'-0" to 3'-0" wrench and to close bolt threads with 1'-0" to 3'-0" wrench to 2'-0" to 3'-0" wrench and to close bolt threads then loosen each bolt 1/4 to 1" and to each bolt turning in a clockwise direction to the prescribed torque (see table). Note: For bolt tensioning 2'-0" to 3'-0" wrench to 2'-0" to 3'-0" wrench.
4. Burnt threads of bolts with nut using a center punch to prevent nut loosening.

**NOTE:**

- Section shown are for indication only.
- For left shoulder plates and beams are opposite from each other.

**STANDARD ROADSIDE SIGN BREAK-AWAY POST DETAILS**

- **STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**
  - **DESIGNED BY:**
  - **DRAWN BY:**
  - **CHECKED BY:**

- **BREAK-AWAY POST DETAILS**
  - **SECTION AA**
  - **BASE PLATE**
  - **STIFFENER PLATE**
  - **FUSE PLATE**
  - **HINGE PLATE**

- **SECTION DETAILS**
  - **BASE PLATE**
  - **STIFFENER PLATE**
  - **FUSE PLATE**
  - **HINGE PLATE**

- **DETAIL B**

- **TABLE 3 of 3**

- **9535**

- **STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**
  - **DESIGNED BY:**
  - **DRAWN BY:**
  - **CHECKED BY:**

- **BREAK-AWAY POST DETAILS**
  - **SECTION AA**
  - **BASE PLATE**
  - **STIFFENER PLATE**
  - **FUSE PLATE**
  - **HINGE PLATE**

- **DETAIL B**

- **TABLE 3 of 3**

- **9535**
| SIGN | TYPE OF SIGN BRACKET | PROFILE - SIZE | SQ. FT. | WIND ZONE | TYPE OF SIGN BRACKET | PROFILE - SIZE | SQ. FT. | WIND ZONE | TYPE OF SIGN BRACKET | PROFILE - SIZE | SQ. FT. | WIND ZONE | TYPE OF SIGN BRACKET | PROFILE - SIZE | SQ. FT. | WIND ZONE |
|------|----------------------|----------------|---------|-----------|----------------------|----------------|---------|-----------|----------------------|----------------|---------|-----------|----------------------|----------------|---------|-----------|----------------------|----------------|---------|-----------|----------------------|----------------|---------|
| 1    | △                    | 24 x 30        | 22.8    | 80        | △                    | 24 x 30        | 22.8    | 80        | △                    | 24 x 30        | 22.8    | 80        | △                    | 24 x 30        | 22.8    | 80        |
| 2    | △                    | 30 x 30        | 16.5    | 80        | △                    | 30 x 30        | 16.5    | 80        | △                    | 30 x 30        | 16.5    | 80        | △                    | 30 x 30        | 16.5    | 80        |
| 3    | △                    | 36 x 36        | 30.9    | 80        | △                    | 36 x 36        | 30.9    | 80        | △                    | 36 x 36        | 30.9    | 80        | △                    | 36 x 36        | 30.9    | 80        |
| 4    | △                    | 48 x 48        | 39.8    | 80        | △                    | 48 x 48        | 39.8    | 80        | △                    | 48 x 48        | 39.8    | 80        | △                    | 48 x 48        | 39.8    | 80        |
| 5    | △                    | 90 x 60        | 2.8     | 80        | △                    | 90 x 60        | 2.8     | 80        | △                    | 90 x 60        | 2.8     | 80        | △                    | 90 x 60        | 2.8     | 80        |
| 6    | △                    | 10 x 6.5       | 0.2     | 80        | △                    | 10 x 6.5       | 0.2     | 80        | △                    | 10 x 6.5       | 0.2     | 80        | △                    | 10 x 6.5       | 0.2     | 80        |
| 7    | △                    | 12 x 12        | 12.5    | 80        | △                    | 12 x 12        | 12.5    | 80        | △                    | 12 x 12        | 12.5    | 80        | △                    | 12 x 12        | 12.5    | 80        |
| 8    | △                    | 18 x 18        | 27.6    | 80        | △                    | 18 x 18        | 27.6    | 80        | △                    | 18 x 18        | 27.6    | 80        | △                    | 18 x 18        | 27.6    | 80        |
| 9    | △                    | 24 x 24        | 56.8    | 80        | △                    | 24 x 24        | 56.8    | 80        | △                    | 24 x 24        | 56.8    | 80        | △                    | 24 x 24        | 56.8    | 80        |
| 10   | △                    | 30 x 30        | 85.0    | 80        | △                    | 30 x 30        | 85.0    | 80        | △                    | 30 x 30        | 85.0    | 80        | △                    | 30 x 30        | 85.0    | 80        |
| 11   | △                    | 36 x 36        | 121.2   | 80        | △                    | 36 x 36        | 121.2   | 80        | △                    | 36 x 36        | 121.2   | 80        | △                    | 36 x 36        | 121.2   | 80        |
| 12   | △                    | 48 x 48        | 192.8   | 80        | △                    | 48 x 48        | 192.8   | 80        | △                    | 48 x 48        | 192.8   | 80        | △                    | 48 x 48        | 192.8   | 80        |

NOTE:

1. Maximum height to bottom of sign is 6'.
2. Column size is 6" aluminum round tube with 2" wall.
3. Type II brackets required for attachment.
4. For Type II brackets see sheet for Type II attachments.
5. Top of bracket shall be 1'" 6" wall.
6. For Stiff Base Details see sheet 4 of 4.

Sign size is in inches unless otherwise specified.
GENERAL NOTES

GENERAL SPECIFICATIONS: Florida Department of Transportation Standard Specifications for Road and Bridge Construction and Supplements thereof.


AWMINU 1 Except as noted below, Aluminum Materials shall meet the requirements of Alloy 6061-T6 per ASTM B221-80, or B508.

CONCRETE: All concrete shall be Class (1) (Structural), the specified compressive strength of 28 days f'c shall be 3 ksi min.

SIGN PANELS: Sign Panels shall be 0.08 inches thick, thin Aluminum Plates with all corners rounded. See a sign layout sheet. Panels are to be degreased, etched, neutralized and treated with Alkylone 0201, in addition to the Bonding Sol or sealant. No degreasing permitted on panels.

ALUMINUM BOLTS, NUTS & LOCKWASHERS: Aluminum bolts shall meet the requirements of ASTM F461, Alloy 6061-T6.

TYPICAL SECTION: The bolts shall have an Anodized Coating of at least 0.0002 inches thick and be Öncrete secured. Lockwashers shall meet the requirements of Aluminum Association ANSI T16.1. Note: Nuts shall meet the requirements of ASTM 487, Alloy 5059-T6 or 6061-T6.

STAINLESS STEEL BOLTS, NUTS AND LOCKWASHERS: Stainless Steel Bolts, Nuts and Lockwashers conforming to ASTM F593, Alloy Group 2 Condition A, ONZ, or SMA may be provided in lieu of Aluminum Bolts, Nuts and Washers.

U-BOLTS, NUTS & LOCKWASHERS: U-Bolts, Nuts and Lockwashers shall meet the requirements of ASTM A307. Grade A nut shall be galvanized in accordance with ASTM A253.

INSTALLING FRAMING COLUMN SUPPORTS: Columns (Posts) may be installed by driving the columns in accordance with Index Nos. 186 thru 11865, or by an alternate method the contractor may use the column (frames) to the depth indicated to preferred loose ball filled with Washiball material compacted to 90% of standard bearing pressure to provide adequate conversation.

DRAWINGS: When Type C ground sign supports are furnished and fabricated in accordance with these plans, shop drawings will NOT be required for approval by the Engineer.

HOW TO USE THIS TABLE: Select the appropriate Sign Profiles and Size to determine the Sign Identification Number. If the exact Sign Size of all components is not listed, select the appropriate profile and larger component sizes. This table also gives the Quantity and Type of Sign Brackets required for each Sign for each Wind Zone. Where the Sign Size is given as a Vertical and Horizontal Dimension, the Vertical Dimension (Depth) is given first and the Horizontal Dimension (Length) is given last. For Column Sizes, Heights and Footings are the same. Where Zone or Height (A) listed: All brackets shall be furnished in one piece.

WIND SPEEDS BY COUNTY

ZONE NO. (70 M.P.H.)


ZONE NO. 2 (170 M.P.H.)


ZONE NO. 3 (80 M.P.H.)

Brevard, Charlotte, Citrus, Collier, Dade, Escambia, Gulf, Hendry, Hernando, Hillsborough, Indian River, Jackson, Lee, Manatee, Martin, Monroe, Okeechobee, Orange, Pasco, Pinellas, Polk, Saint Johns, Taylor and Volusia Counties.

ZONE NO. 4 (60 M.P.H.)

Brevard, Pasco, Polk, Indian River, Lee, Manatee, Martin, Monroe, Okeechobee, Orange, Pasco, Pinellas, Polk, Saint Johns, Taylor and Volusia Counties.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SINGLE COLUMN GROUND SIGNS

Table: Wind Speeds by County


- Brevard, Pasco, Polk, Indian River, Lee, Manatee, Martin, Monroe, Okeechobee, Orange, Pasco, Pinellas, Polk, Saint Johns, Taylor, and Volusia Counties.

CANTILEVER SIGN

- Note: All cantilever sign installations shall comply with standard Index 17502.

- The sign shall be supported by an aluminum round column with concrete footing and breakaway support. All sign brackets shall be Type 2.

- The column size shall be as indicated in the Standard except that the size shall not be another than ½" A.
**STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION**

**SINGLE COLUMN GROUND SIGNS**

---

**NOTE**
- Use type I bracket at the apex location (change).
**SLEEVE & BASE PLATE DETAILS (SINGLE BEVELED SLOT)**

For Left Shoulder, Plate Slot Bevels are opposite hand from that shown.

- **SLEEVE & BASE PLATE DETAILS (DOUBLE BEVELED SLOTS)**
  For Left Shoulder, Plate Slot Bevels are opposite hand from that shown.

**SLIP BASE NOTES**

1. The inside diameter (I.D.) of the sleeve shall be no more than \( \frac{3}{8} \) larger than the Outside Diameter (O.D.) of the column.
2. The sleeve base-plate shall be \( \frac{3}{8} \) with bevels. The base shall be galvanized steel (ASTM A-335) or American Association Alloy B-024-T4 or 400-T6 (ASTM 6-B1).
3. The base bolts, nuts and washers shall be high strength ASTM A-325 and shall have an etched/numbered zinc coating (C3). Type B, as required in accordance with ASTM A633.
4. An alternate base plate of aluminum alloy 356 and T6 aluminum in lieu of the fabricated base may be substituted for approval by the Engineer, if a cast base is used the sleeve shall be the same as the column and will be bolted to the column.
5. Assemble the slip base connection in the following manner:
   - Connect column to sleeve using two (2) \( \frac{3}{8} \) machine bolts.
   - Assemble the sleeve base plate to the base plate using high strength bolts with nines (9) hardened washers per bolt. One (1) washer per bolt and two (2) bolt keepers shall go between the base plates.
   - Use washers as required to plane the column.
   - Tighten all bolts to the maximum possible with a \( \frac{3}{8} \) to \( \frac{3}{4} \) inch wrench to test the washers and sleeves and to clear the bolt threads. (Screw each bolt and 1.1 turn and relighten the specified torque (see table).) Bolts shall be tightened with properly calibrated wrenches under the supervision of the project engineer.
   - Both nuts are to be tightened to prevent nut loosening.
6. Use galvanized steel shims to obtain a tight fit between the column face and the sleeve. Place shims in all spans between the \( \frac{3}{8} \) sleeve bolts.
7. Base plate may be either fabricated or castings and may have either single or double beveled slots.
8. Both fabricated and cast base assemblies were tested with the Texas Transportation Institute, College Station, in 1995 and both alternate assemblies were determined to be compliant with the performance recommendations of the National Cooperative Highway Research Program NCHRP Report 350.

**SLIP BASE DETAILS**

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<th>Hole Size A</th>
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</thead>
<tbody>
<tr>
<td>4 x 4</td>
<td>4 x 4</td>
<td>6</td>
<td>( \frac{3}{8} )</td>
<td>3</td>
<td>29</td>
<td>555</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 x 5</td>
<td>5 x 5</td>
<td>7</td>
<td>( \frac{3}{8} )</td>
<td>3</td>
<td>29</td>
<td>555</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 x 6</td>
<td>6 x 6</td>
<td>8</td>
<td>( \frac{3}{8} )</td>
<td>3</td>
<td>29</td>
<td>555</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 x 8</td>
<td>8 x 8</td>
<td>10</td>
<td>( \frac{3}{8} )</td>
<td>3</td>
<td>53</td>
<td>640</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*0.062" Thick A31, Strip-2 Req'd Per Base*
<table>
<thead>
<tr>
<th>COLUMN SIZE</th>
<th>COLUMN HEIGHT &amp; COLUMN FOUNDATIONS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>i. Work this Standard with Standard Index Number 5600 and 5605.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ii. To determine column (Post) size and footing requirements use the required Sign Identification Number and Sign Height (H). Designing for Height (H) lower than those listed in Standard Index Number 5600.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iii. Single Column footings are not allowed for heights (H) exceeding the maximum shown in the Table and affix profile (Sign Identification Number). Without any design tabulations, in this event, the engineer will have to be supported by multiple columns/footings using breakaway devices. See Standard Index Number 5653.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>iv. The Column (Post) material shall be Schedule 40. The size shall be given as outside diameter and wall thickness. Column (Post) larger than 3½&quot; x 5½&quot; are non-fragmentable and shall be surrounded with breakaway supports and have concrete fillings and/or beams.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>v. The foundation size is given as outside diameter and depth.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a) Freestanding: The Column (Post) shall be driven into the ground to the depth indicated or cast into preformed boxes to the specified depth with concrete fill below kept into compacted form in a trench not exceeding 5&quot;, or filled with flexible fill or battered concrete. The use of the flexible fill or battered concrete shall be included in the cost of the alignment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Breakaway Supports: For Breakaway Supports require concrete. The column support shall be cast in a concrete foundation, direct as shown in the table. The final dimension indicates the diameter and the second dimension the depth into the ground. In all cases the ground is to be considered as undisturbed earth, most material, or property compacted fill.</td>
</tr>
</tbody>
</table>

The Column Size is O.D. x Wall Thickness in inches. The Foundation Size is O.D. x Depth in feet & inches. A zero O.D. means that a concrete footing is not necessary.
### Column Size, Column Height & Column Footings

**State of Florida Department of Transportation**

**Single Column Ground Signs**

<table>
<thead>
<tr>
<th>Column Size</th>
<th>Height (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 x 1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>0 x 1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>0 x 2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>0 x 2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>0 x 3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>0 x 3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>0 x 4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>0 x 4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>0 x 5.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

### Foundation Sizes

**STANDARD**

<table>
<thead>
<tr>
<th>Foundation Size</th>
<th>Height (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 x 1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>0 x 1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>0 x 2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>0 x 2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>0 x 3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>0 x 3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>0 x 4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>0 x 4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>0 x 5.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

### Notes

1. Work this standard with standard index numbers 0000 and 0005.

2. To determine column (pier) size and footing requirements use the required sign identification number and sign height (H). Design for height (H) lower than those listed in the table are included in standard index number 0005.

3. Single Column foundations are not allowed for heights (H) exceeding the maximum height shown in the table, and for sign profiles SGN identification numbers without any designations. In this event, the sign will have to be supported by multiple columns (pier) using breakaway devices. See standard index number 0005.

4. The Column 1 (Pier) meter(s) will be aluminum. The size is given as outside diameter and wall thickness. Column 1s of pipe larger than 1¾” x 1¼” are non-frangible and shall be installed with breakaway supports and will have concrete footings and weld base.

5. The foundation size is given as outside diameter and depth.
   a) Frangible Support: The Column 1 (Pier) shall be driven into the ground to the depth indicated or set into preformed base to the specified depth with suitable backfill. Tampered into compacted layers not exceeding 6” or filled with flowable fill or capped concrete. The soil of the flowable fill or capped concrete shall be included in the depth of the sign.
   b) Breakaway Support: Foundation for Breakaway Support requires concrete. The column support shall be set in a concrete foundation, listed as shown in the table. The first dimension indicates the diameter and the second dimension the depth into the ground, in all cases the ground is to be considered as undisturbed earth, road material, or properly compacted fill.

The Column Size is O.D., wall thickness in inches.

The Foundation Size is O.D., depth in feet & inches. A zero O.D. means that a concrete foundation is not necessary.
<table>
<thead>
<tr>
<th>Height (FT)</th>
<th>Foundation Size</th>
<th>Column Size</th>
<th>Load Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0 x 4.6</td>
<td>0 x 4.6</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>0 x 6.0</td>
<td>0 x 6.0</td>
<td>0.8</td>
</tr>
<tr>
<td>4</td>
<td>0 x 7.6</td>
<td>0 x 7.6</td>
<td>1.0</td>
</tr>
<tr>
<td>5</td>
<td>0 x 9.2</td>
<td>0 x 9.2</td>
<td>1.2</td>
</tr>
<tr>
<td>6</td>
<td>0 x 10.8</td>
<td>0 x 10.8</td>
<td>1.4</td>
</tr>
<tr>
<td>7</td>
<td>0 x 12.5</td>
<td>0 x 12.5</td>
<td>1.6</td>
</tr>
<tr>
<td>8</td>
<td>0 x 14.5</td>
<td>0 x 14.5</td>
<td>1.8</td>
</tr>
<tr>
<td>9</td>
<td>0 x 16.5</td>
<td>0 x 16.5</td>
<td>2.0</td>
</tr>
<tr>
<td>10</td>
<td>0 x 18.5</td>
<td>0 x 18.5</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Notes:
1. Work this standard with standard index number 11860 & 11865.
2. To determine column (post) size and footing requirements use the required Sign Identification Number and Sign Height. Those heights in the table are included in Standard Index Number 11860.
3. Single Column footings are not allowed for heights (H) exceeding the maximum height shown in the table, and for sign profiles. Sign identification numbers are non-figured and shall be filled with breakaway supports and have concrete footing and Wilmington.
4. The Column (Post) materials shall be structural. The size is given as outside diameter and wall thickness. Columns (posts) larger than 3" in diameter and wall thickness, and for sign identification numbers requiring multiple columns (posts) using breakaway sleeves. See Standard Index Number 9535.
5. The foundation size is given as outside diameter and depth.
   a. Breakaway Supports, columns shall be set in a concrete foundation as shown. The required dimensions must be included in the design of the column.
   b. Breakaway Supports, foundations for breakaway supports require concrete. The column supports shall be set in a concrete foundation as shown. The required dimensions must be included in the design of the column.

The Column Size is O.D. x Wall Thickness in Inches
The Foundation Size is O.D. x Depth in Feet & Inches.
A zero O.D. means that a concrete foundation is not necessary.

Sign Height

<table>
<thead>
<tr>
<th>Height (FT)</th>
<th>Foundation Size</th>
<th>Column Size</th>
<th>Load Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0 x 4.6</td>
<td>0 x 4.6</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>0 x 6.0</td>
<td>0 x 6.0</td>
<td>0.8</td>
</tr>
<tr>
<td>4</td>
<td>0 x 7.6</td>
<td>0 x 7.6</td>
<td>1.0</td>
</tr>
<tr>
<td>5</td>
<td>0 x 9.2</td>
<td>0 x 9.2</td>
<td>1.2</td>
</tr>
<tr>
<td>6</td>
<td>0 x 10.8</td>
<td>0 x 10.8</td>
<td>1.4</td>
</tr>
<tr>
<td>7</td>
<td>0 x 12.5</td>
<td>0 x 12.5</td>
<td>1.6</td>
</tr>
<tr>
<td>8</td>
<td>0 x 14.5</td>
<td>0 x 14.5</td>
<td>1.8</td>
</tr>
<tr>
<td>9</td>
<td>0 x 16.5</td>
<td>0 x 16.5</td>
<td>2.0</td>
</tr>
<tr>
<td>10</td>
<td>0 x 18.5</td>
<td>0 x 18.5</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Notes:
1. Work this standard with standard index number 11860 & 11865.
2. To determine column (post) size and footing requirements use the required Sign Identification Number and Sign Height. Those heights in the table are included in Standard Index Number 11860.
3. Single Column footings are not allowed for heights (H) exceeding the maximum height shown in the table, and for sign profiles. Sign identification numbers are non-figured and shall be filled with breakaway supports and have concrete footing and Wilmington.
4. The Column (Post) materials shall be structural. The size is given as outside diameter and wall thickness. Columns (posts) larger than 3" in diameter and wall thickness, and for sign identification numbers requiring multiple columns (posts) using breakaway sleeves. See Standard Index Number 9535.
5. The foundation size is given as outside diameter and depth.
   a. Breakaway Supports, columns shall be set in a concrete foundation as shown. The required dimensions must be included in the design of the column.
   b. Breakaway Supports, foundations for breakaway supports require concrete. The column supports shall be set in a concrete foundation as shown. The required dimensions must be included in the design of the column.

The Column Size is O.D. x Wall Thickness in Inches
The Foundation Size is O.D. x Depth in Feet & Inches.
A zero O.D. means that a concrete foundation is not necessary.

Sign Height

<table>
<thead>
<tr>
<th>Height (FT)</th>
<th>Foundation Size</th>
<th>Column Size</th>
<th>Load Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0 x 4.6</td>
<td>0 x 4.6</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>0 x 6.0</td>
<td>0 x 6.0</td>
<td>0.8</td>
</tr>
<tr>
<td>4</td>
<td>0 x 7.6</td>
<td>0 x 7.6</td>
<td>1.0</td>
</tr>
<tr>
<td>5</td>
<td>0 x 9.2</td>
<td>0 x 9.2</td>
<td>1.2</td>
</tr>
<tr>
<td>6</td>
<td>0 x 10.8</td>
<td>0 x 10.8</td>
<td>1.4</td>
</tr>
<tr>
<td>7</td>
<td>0 x 12.5</td>
<td>0 x 12.5</td>
<td>1.6</td>
</tr>
<tr>
<td>8</td>
<td>0 x 14.5</td>
<td>0 x 14.5</td>
<td>1.8</td>
</tr>
<tr>
<td>9</td>
<td>0 x 16.5</td>
<td>0 x 16.5</td>
<td>2.0</td>
</tr>
<tr>
<td>10</td>
<td>0 x 18.5</td>
<td>0 x 18.5</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Notes:
1. Work this standard with standard index number 11860 & 11865.
2. To determine column (post) size and footing requirements use the required Sign Identification Number and Sign Height. Those heights in the table are included in Standard Index Number 11860.
3. Single Column footings are not allowed for heights (H) exceeding the maximum height shown in the table, and for sign profiles. Sign identification numbers are non-figured and shall be filled with breakaway supports and have concrete footing and Wilmington.
4. The Column (Post) materials shall be structural. The size is given as outside diameter and wall thickness. Columns (posts) larger than 3" in diameter and wall thickness, and for sign identification numbers requiring multiple columns (posts) using breakaway sleeves. See Standard Index Number 9535.
5. The foundation size is given as outside diameter and depth.
   a. Breakaway Supports, columns shall be set in a concrete foundation as shown. The required dimensions must be included in the design of the column.
   b. Breakaway Supports, foundations for breakaway supports require concrete. The column supports shall be set in a concrete foundation as shown. The required dimensions must be included in the design of the column.

The Column Size is O.D. x Wall Thickness in Inches
The Foundation Size is O.D. x Depth in Feet & Inches.
A zero O.D. means that a concrete foundation is not necessary.

Sign Height
<table>
<thead>
<tr>
<th>Column Size</th>
<th>Column Height</th>
<th>Column Footings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 4</td>
<td>0.4 x 6</td>
<td>0.4 x 6</td>
</tr>
<tr>
<td>2 x 6</td>
<td>0.4 x 6</td>
<td>0.4 x 6</td>
</tr>
<tr>
<td>2 x 8</td>
<td>0.4 x 6</td>
<td>0.4 x 6</td>
</tr>
<tr>
<td>2 x 10</td>
<td>0.4 x 6</td>
<td>0.4 x 6</td>
</tr>
<tr>
<td>2 x 12</td>
<td>0.4 x 6</td>
<td>0.4 x 6</td>
</tr>
<tr>
<td>2 x 14</td>
<td>0.4 x 6</td>
<td>0.4 x 6</td>
</tr>
<tr>
<td>2 x 16</td>
<td>0.4 x 6</td>
<td>0.4 x 6</td>
</tr>
<tr>
<td>2 x 18</td>
<td>0.4 x 6</td>
<td>0.4 x 6</td>
</tr>
<tr>
<td>2 x 20</td>
<td>0.4 x 6</td>
<td>0.4 x 6</td>
</tr>
</tbody>
</table>

### Notes

1. Work this Standard with Standard Index Number 19683 and 19685.
2. To determine column (pail) size and footing requirements use the required Sign identification Number and Sign Height (H). Design for Height (H) lower than those noted in the Table are included in Standard Index Number 19685.
3. Single Column footings are not allowed for heights (H) exceeding the maximum heights shown in the Table, and for sign profiles (Sign Identification Numbers) without any designations therein. In this event, the alphabet (A) will have to be supported by multiple columns (poles) using Breakaway devices. See Standard Index Number 19535.
4. The Column (Pail) material shall be aluminum. The size is given as outside diameter and wall thickness. Columns (poles) larger than 3/8" x 1/2" are non-frangible and shall be installed with breakaway supports and will have concrete footings and wall bases.
5. The foundation size is given as outside diameter and depth.
   a) Frangible Support: The Column (Pail) shall be driven into the ground to the depth indicated or cut to perform notes to the specified depth with surface base filled with compacted soil not exceeding 6", or filled with flexible fill or topped concrete. The cast of the flexible fill or topped concrete shall be included in the cost of the sign.
   b) Breakaway Supports: Foundation for Breakaway Supports require concrete. The column shall be set in a concrete foundation sized as shown in the table. The final dimension indicates the diameter and the second dimension the depth into the ground. In all cases, the ground is to be considered as undisturbed earth, root materials, or properly compacted fill.

---

The Column Size is O.D. x Wall Thickness in Inches.

The Foundation Size is O.D. x Depth in Feet & Inches.

A zero O.D. means that a concrete foundation is not necessary.
**NOTES**

1. The Standard size MSS practice tables for design and pile foundations for implementation at all windings with AASHTO L2167. The design values in the following table are:

<table>
<thead>
<tr>
<th>WEIGHT</th>
<th>DIA.</th>
<th>FABRICATED SQUARE TUBE</th>
<th>FABRICATED ROUND TUBE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>750</td>
<td>3</td>
<td>2.5</td>
<td>3</td>
</tr>
<tr>
<td>600</td>
<td>3</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>450</td>
<td>3</td>
<td>1.5</td>
<td>1.75</td>
</tr>
<tr>
<td>300</td>
<td>3</td>
<td>0.75</td>
<td>0.75</td>
</tr>
</tbody>
</table>

2. Design wind pressures or wind speeds and/or weight limitations are included in Table 1800 NRR 1864.

3. Specifications for Aluminum materials, Post Data Sheets, etc. are shown on an Addendum (NRR 1864). Additional information and data are shown on the Addendum (NRR 1864). Thereafter, refer to the Standard (NRR 1864) with Standard (NRR 1864) and/or Addenda.

4. Design wind requirements for round wind loads are shown in Table 1800 NRR 1864. If Fungus or Square Tubes are used, subject to the requirements of this section. See Addendum (NRR 1864) for design.

5. All decks shall be bolted, pinned, or stud wrenched with AASHTO L2167.

6. Steel for fabricated steel decks and tubular with AASHTO L2167. FABRICATED SQUARE TUBE shapes shall not be included in the design values.

7. Steel for fabricated steel decks and tubular with AASHTO L2167. FABRICATED ROUND TUBE shapes shall not be included in the design values.

8. Steel for fabricated steel decks and tubular with AASHTO L2167. FABRICATED ROUND TUBE shapes shall not be included in the design values.

9. Steel for fabricated steel decks and tubular with AASHTO L2167. FABRICATED ROUND TUBE shapes shall not be included in the design values.

10. Steel Post and Pile foundations shall be be reinforced with AASHTO L2167. FABRICATED ROUND TUBE shapes shall not be included in the design values.

11. All decks shall be bolted, pinned, or stud wrenched with AASHTO L2167.

12. Steel decks and tubular with AASHTO L2167. FABRICATED ROUND TUBE shapes shall not be included in the design values.

13. Steel Post and Pile foundations shall be be reinforced with AASHTO L2167. FABRICATED ROUND TUBE shapes shall not be included in the design values.

14. All decks shall be bolted, pinned, or stud wrenched with AASHTO L2167.

---

**SINGLE COLUMN GROUND SIGNS**

<table>
<thead>
<tr>
<th>HEIGHT (FT)</th>
<th>HEIGHT (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>13</td>
</tr>
</tbody>
</table>

---

**COLUMN SIZE, COLUMN HEIGHT & COLUMN FOOTINGS**

<table>
<thead>
<tr>
<th>STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION</th>
<th>SINGLE COLUMN GROUND SIGNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height: 9' Max. (All Wind Zones)</td>
<td></td>
</tr>
<tr>
<td>See Addenda No. 4</td>
<td></td>
</tr>
</tbody>
</table>

---

**DETAIL A**

- **Top of Sign & Post**
- **Sign Mounting Using Channels or Square Tubes**
- **Steel Post**
- **Top of Sign & Post**
- **Sign Mounting Using Channels or Square Tubes**
- **Steel Post**

---

**DETAIL B**

- **Top of Sign & Post**
- **Sign Mounting Using Channels or Square Tubes**
- **Steel Post**
- **Top of Sign & Post**
- **Sign Mounting Using Channels or Square Tubes**
- **Steel Post**

---

**DETAIL C**

- **Top of Sign & Post**
- **Sign Mounting Using Channels or Square Tubes**
- **Steel Post**
- **Top of Sign & Post**
- **Sign Mounting Using Channels or Square Tubes**
- **Steel Post**

---

**DETAIL D**

- **Top of Sign & Post**
- **Sign Mounting Using Channels or Square Tubes**
- **Steel Post**
- **Top of Sign & Post**
- **Sign Mounting Using Channels or Square Tubes**
- **Steel Post**
**GENERAL NOTES**


**SHEETS AND PLATES.** Material used shall meet the requirements of Aluminum Association Alloy 6061-T6 and ASTM B269. Sheets are to be degreased, etched, neutralized and treated with Alodine 1200, Banderite 721, or equal. For painting procedure on sheets:

**MATERIALS.** All aluminum material shall meet the requirements of the Aluminum Association Alloy 6061-T6 and shall conform to the following ASTM specifications for the following: Sheets and plates B269, extruded shapes B221 and standard structural shapes B160.

**ALUMINUM BOLTS, NUTS & LOCK WASHERS.** Aluminum bolts shall meet the requirements of the Aluminum Association Alloy 6061-T6 (ASTM B461). The bolts shall have an anodic coating of least 0.002" thick and be chromate sealed. Lockwashers shall meet the requirement of Aluminum Association Alloy 7075-T65 (ASTM B209). Nuts shall meet the requirements of Aluminum Association Alloy 6061-T6 (ASTM B209) or 6061-T6.

**SIGN FACE.** All sign face corners shall be rounded. See sign face layout. For mounting details refer to Index No. S537.
The typical sections shown serve as a guide for selecting the traffic control devices required under various roadside conditions. For details of sign construction and installation, refer to the appropriate standard index drawings for roadside signs.

1. The typical sections shown hereon serve as guides for selecting the traffic control devices required under various roadside conditions. For details of sign construction and installation, refer to the appropriate standard index drawings for roadside signs.

2. It shall be the CONTRACTOR's responsibility to verify the length of sign supports in the field prior to fabrication.

3. Roadside signs shall be positioned at an angle of 1 to 4 degrees away from the traffic flow. Freeway signs shall be rotated counterclockwise and median mounted signs rotated clockwise.

4. The setback for stop and yield signs may be reduced to 5 minimum from the driving lane if required for visibility in business or residential sections with no curb and no speed of 30 MPH or more.

5. The mounting heights are measured from the bottom of the sign panel to a horizontal line extended from the edge of the driving lane. If the minimum height cannot be met, the minimum height shall be reduced by 2 for expressway systems, 3 for urban sections, and 1 for rural sections.

6. Sign supports shall be placed in the bottom of ditches where erosion might affect the proper operation of the road system.

7. Sign supports shall not reduce the available right-of-way or interfere with adjacent uses as required by the Americans with Disabilities Act (ADA) Accessibility Guidelines.
"No Right Turn On Red" Sign shall be erected in accordance with Index No. IT302.

When computing pavement messages quantities do not include transverse lines.

All school signs shall be reflective.

School crosswalk width shall be 6 ft. min., without public sidewalk curb ramps or with public sidewalk curb ramps. See Index No. IT346 sheets 2 and 7.

For signalized intersections or mid-block signalized crossings where flashing hazard signs (pedestrian or vehicle) are install, the minimum distance from the speed limit sign to the stop line shall be 100'. The sign shall not block the view of the signal.

Special speed restrictions are not normally applicable to these two cases.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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

---

Approach speed ahead

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<th>Suggested distance in feet</th>
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<td>46 to 55</td>
<td>500</td>
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School crosswalk width shall be 6 ft.
5 ft. wide with public sidewalk curb required.
4 ft. wide, without public sidewalk curb required.
See Index No. 17346 sheet 9 of 13.
TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK

6. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK
   WITHOUT A SPEED REDUCTION
   (2 LANES - 2 WAY TRAFFIC)

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<th>SUGGESTED DISTANCE IN FT</th>
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<td>46 to 55</td>
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School crosswalk width shall be 6' min.,
except without public sidewalk curb ramps.
10' min., with public sidewalk curb ramps.
See Index No. 17346 sheet 9 of 13.

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)

8. TRAFFIC CONTROL DEVICES FOR SIGNALIZED MIDBLOCK
   SCHOOL CROSSWALK
9. TRAFFIC CONTROL DEVICES AT SCHOOL ENTRANCES WITH LOW VOLUMES OF WALKING STUDENTS

These signs are intended for use only at those few locations where the school entrance is not evident to the motorist, and must be approved in advance by the responsible traffic engineering authority.

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

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 be 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 limit the approach sight distance and where there is no opportunity to relocate the stop to another location with adequate visibility.

Location of Speed Limit Sign when a reduced speed limit has been approved.

SCHOOL BUS STOP

HORIZONTAL CURVE

VERTICAL CURVE
**Bolts For Mounting Sign & Clamps**

**CABLE ENTRY DETAIL**

- **Signal Head**
- **Lock Nut**
- **Drill 3/8" Hole**
- **Flexible Conduit Or 90° Angle Connector**

**MOUNTING DETAIL**

- **Alum. 2-3/8" X 2.33"**
- **Pipe Cap**
- **Wire Rope Clamp**

**REAR VIEW**

- **Signal Head**
- **Wire Rope Clamp**
- **Alum. 2-3/8" X 2.33"**
- **Messenger Wire**

**SIDE VIEW**

- **1/4" Signal Head (Yellow Lens)**
- **10" Signal Head (Yellow Lens)**
- **See Mounting Detail**

**FRONT VIEW**

- **10" Signal Head (Yellow Lens)**
- **Bulb Replacement Shall Be From The Front.**
- **Flexible Conduit Or 90° Angle Connector**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**SCHOOL SIGNS & MARKINGS**

- **Alum. 2-3/8" X 2.33**
- **Pipe Cap**
- **Flexible Conduit Or 90° Angle Connector**

**Note:**
- Bulb replacement shall be from the front.
- See mounting detail.
- Optional location of flashing beacon.
- Flexible conduit or 90° angle connector.

Flashing unit and cabinet to be placed on the strain pole supporting overhead sign assembly or on service pole. The flashing unit not to overhang private property or walkway.
1. Standard size signs should be used whenever possible. Minimum size may be used only on low volumes, low speed limits (35 m.p.h. or less). Special size should be used on expressway facilities where special emphasis is needed.

2. The value of the school zone speed limit shall be determined by the District Traffic Operations Engineer in cooperation with local school superintendents. In no case shall it be less than the 15 m.p.h. min. set by law.

3. See Index No. 17355 for sign details.

SCHOOL ZONE
00 MPH
WHEN FLASHING

OVERHEAD STANDARD
* Flashing Beacon May Be Placed Within Or Below Panel

FTP-31-04

SCHOOL ENTRANCE

FTP-33-04

END SCHOOL ZONE

FTP-32-04

SCHOOL SPEED LIMIT
00 MPH

SCHOOL DAYS
0:00-0:00
0:00-0:00

FTP-34-04

FTP-35-04

FTP-30-04

END SCHOOL ZONE

FTP-34-04

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
SCHOOL SIGNS & MARKINGS

SPEED LIMIT ASSEMBLY

Ground Mount Standard
Note:
Existing ground mount school speed limit signs utilizing a single 8" min. size beacon or two 6" min. size beacons inside the sign border are considered meeting the standard. However, replacement or upgrading of these school speed limit signs shall conform to the above standard. Numerical speed limit displayed shall be maintained by appropriate regulatory authorities.

Note:
SCHOOL ENTRANCE

FTP-33-04

SCHOOL DAYS

FTP-30-04

END SCHOOL ZONE

FTP-34-04

FTP-35-04

FTP-30-04

END SCHOOL ZONE

FTP-34-04

FTP-35-04

FTP-30-04
In advance of lane drop at exit ramp a special marking pattern may be used to distinguish the lane drop situation from a normal exiting ramp or auxiliary lane. A typical special marking for lane drop consists of 8" wide by 3' long white stripes separated by 15' gaps. If used, the special marking should begin ½ mile in advance of the theoretical gore point. Where last minute lane changes may cause conflicts, an 8" wide solid white channelizing line may be extended 300' upstream from the theoretical gore. (W.U.T.C.O. Section 36-9.)
NORMAL TAPERED ENTRANCE

For Striping See Detail "A" (Sheet 1 of 4)

Yellow-Red Reflective Markers (Every 40') Shall End at the Termination of the Yellow Edge Line

6" Skip Line Ends at Point Where Lane Width and Ramp Width are Equal (42')

White-Red Reflective Markers (Every 40') Shall Stop at End of Transition

Maintain Full Ramp Width (6" Typical)

Shoulder Line

Shoulder Pavement

Shoulder Line

Shoulder Pavement

Shoulder Line

White-Red Reflective Markers (Every 40') Shall End at The Termination of the Yellow Edge Line

Maintain Full Ramp Width (6" Typical)

6" White Edge Line

6" White Skip Line

NORMAL TAPERED ENTRANCE WITH ADDED LANE

For Striping See Detail "A" (Sheet 1 of 4)

Yellow-Red Reflective Markers (Every 40') Shall End at The Termination of The Yellow Edge Line

White-Red Reflective Pavement Markers (Every 40') Shall End at The Theoretical Gores.

Maintain Full Ramp Width (6" Typical)

6" White Edge Line

6" White Skip Line

6" White Edge Line

State of Florida Department of Transportation

Interchange Markings

Name: [Name]

Designed By: [Designated Person]

Drawn By: [Drawn By]

Checked By: [Checked By]

Approved By: [Approved By]

Revision Sheet No.: [Revision Sheet]

4 of 4

7345
**PARALLEL ACCELERATION AND DECELERATION LANE**

8' WHITE SKIP (3' by 9') WHITE-RED REFLECTIVE PAVEMENT MARKERS (24' CENTERS)

6' WHITE Edge Line

White-Red Reflective Markers (Every 40') Shall End at the Termination of the Acceleration Lane.

6" Solid White Line Shall Extend One Fourth the Length of Acceleration Lane From Gore Markings.

Shoulder Pavement

6" Yellow Edge Line

WHITE-RED REFLECTIVE PAVEMENT MARKERS (24' CENTERS)

Begin 6' White Edge Line

BEAR LANE MARKINGS

End 6' Yellow Edge Line

8' Solid White Line Shall Begin at the Termination of the Yellow Edge Line.

Yellow-Red Reflective Markers (Every 40') Shall Begin at the Termination of the Yellow Edge Line.

**TYPICAL MARKINGS AT DUAL LANE EXITS**

Note: Arrows Indicate Direction of travel and are not shown for pavement marking.

**TYPICAL LANE DROP MARKINGS AT EXIT RAMPS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

INTERCHANGE MARKINGS

Dave House, E.I.T.

Approval No: 7-73

Sheet No: A 4

Drawn By: 9-73

Sheet 3 of 4
Notes:
1. Post delineators spaced at 40' begin at the P.C. and end at the P.T. of the entrance and terminus of ramps. The spacing on the ramp section between the entrance and terminus shall be 30'. All delineators are to be extended 4' from abutment breaks. Post delineators shall not be discontinued in excavate with guardrail.
2. "For signalized interchanges, the wrong-way pavement arrows shall be deleted which would be located in an area from the stop line to 30' before the lane-use arrow. Wrong-way arrows located outside this area shall be terminated."

Wrong Way Arrows:
- Wrong Way Arrow To Be Placed At The Physical Gore Or 500' From Theoretical Gore.
- End 6" Yellow
- Single Yellow Post Mounted Delimiter (40' Spacing)
- Wrong Way Arrow Placed 500' Back From Stop Bar
- Yellow-Red Reflective Markers (Every 40') Along The Left Edge Line Of The Ramps
- Wrong Way Arrow To Be Placed At The End Of Physical Gore.
NOTE: When arrow and pavement message are used together, the arrow shall be located downstream of the pavement message by a distance of 25' (Base of the arrow to the base of the message).

DIMENSIONS ARE WITHIN ±4".

NOTE: Markings applied to median noise shall be yellow in color.

Non-Reflective Ceramic Pavement Marker Placement

Non-Reflective Ceramic Pavement Marker Placement

Basic Color Rule

White lines separate traffic in the same direction. Yellow lines separate traffic in opposite directions. Yellow dotted lines may be used in special cases.

Placemat of Edge Lines

State of Florida Department of Transportation

Special Marking Areas

Pavement Markings and Delineators for Median Cross-Over

Pavement Markings for Intersections with Major and Minor Roads

Placement of Edge Lines
SLOPE ILLUS

Use Stop Bar At
Signalized Intersection Only

300' Max Intervals Between Double Arrows
For use in congested urban areas where available storage length between intersections is limited and a permanent point of transition from the two-way turning lane to the exclusive turning lane cannot be determined.

SCHEME ONE

Max Intervals Between Double Arrows
For use in rural & suburban areas where adequate storage lane length can be specifically determined.

SCHEME TWO

(Typical Marking Guidelines)

TYPICAL CROSSWALK MARKINGS FOR CURB RAMPS

Slippery when wet sign shall be placed in advance of all movable and non-movable steel deck bridges.
See Section 2.1 of the Traffic Engineering Manual (Topic Number 750-000-005).

SPECIAL MARKING AREAS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

Drawn By
Approved By

2020

17346
2 of 13
These markings may be used for locations with restricted left turn lengths, only when called for in plans.

TYPICAL INTERSECTION 2 THRU LANES PLUS LEFT TURN LANE WITH CROSSWALK

RESTRICTED LEFT TURN MARKING

RIGHT TURN LANE DROP AND ISLAND DETAILS

LEFT TURN LANE DROP IS MIRROR IMAGE

RIGHT TURN LANE AND ISLAND DETAILS

24" White Stop Line

When specified, "stop" message shall be placed 25' back of stop line.

NOTES:

1. When public sidewalk curb ramps are present, refer to sheet 2 or 13 & 17 of this Index (17346) and Index No. 304 for crosswalk widths.

2. Double yellow longitudinal center line on all roadway approaches shall be extended back 300' for projects involving intersection improvements only.
ONE WAY signs (R6-3) are not ordinarily needed at divided highway intersections with nose widths of less than 30', and should be installed only if specifically called for in the plans.

Nose Widths Under 30'  
One-Way Signs on Divided Highway Intersections  
Nose Widths 30' and Greater

Figure 1

Nose Width

$6''$ White

Figure 2

Nose Width

$6''$ White

$24''$ Yellow

$24''$ Yellow

$24''$ White

$24''$ White

Pavement Markings for Traffic Channelization at Gore (Traffic Flows in Same Direction)

Pavement Markings for Traffic Separation (Traffic Flows in Opposing Directions)

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LEFT ROADWAY CENTERED ON EXISTING ROADWAY

**SPEED LIMIT M.P.H.**

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**POSTED (DAY) SPEED LIMIT M.P.H.**

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**LANE CENTERLINE TAPER**

**SPEED LIMIT M.P.H.**

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**White Centerline**

White Centerline Shall Be Used Throughout The Transition Where 85th Percentile Approach Speeds Are Greater Than 50 m.p.h.

**Lateral Offset**

For Widths, Not Less Than 50
cm.
GENERAL NOTES
1. For traffic and pedestrian island installation, refer to Index No. IT7 through IT8.
2. For public sidewalk curb ramp, refer to Index No. 304.
3. For pedestrianIsland and island installation, refer to Index No. 555 through 575.
4. Crosswalk minimum widths:
   - Intersection Crosswalk 0' Width Block Crosswalk 10'

PUBLIC SIDEWALK CURB RAMP

SIDEWALK

SEE NOTE 4 FOR MINIMUM WIDTHS

ALL CROSSWALK MARKINGS ARE WHITE

APPENDIX

<table>
<thead>
<tr>
<th>APPROACH SPEED MPH</th>
<th>A* SUGGESTED DISTANCE (Ft)</th>
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<tr>
<td>46 to 55</td>
<td>300</td>
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

SPECIAL MARKING AREAS

SPECIAL EMPHASIS CROSSWALK
TWO LANE NON-SIGNALED

SPECIAL EMPHASIS CROSSWALK
MID BLOCK-SIGNALED

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

SPECIAL EMPHASIS CROSSWALK
SIGNALED OR STOP SIGN CONTROLLED INTERSECTION

SPECIAL EMPHASIS CROSSWALK
### SINGLE LEFT TURNS

**Queue Length** is measured from the beginning of the driver's能看到的止步线, or when a stop bar is required, from the stop bar.

#### Design Speed (mph) | URBAN CONDITIONS | RURAL CONDITIONS
<table>
<thead>
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<tbody>
<tr>
<td></td>
<td>Clearance Distance</td>
<td>Total Decel. Distance</td>
</tr>
<tr>
<td><strong>Queue Length</strong></td>
<td>L₁</td>
<td>L₂</td>
</tr>
<tr>
<td>35</td>
<td>75'</td>
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<tr>
<td>45</td>
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<tr>
<td>55</td>
<td>105'</td>
<td>125'</td>
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<tr>
<td>60</td>
<td>115'</td>
<td>125'</td>
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<tr>
<td>85</td>
<td>190'</td>
<td>240'</td>
</tr>
</tbody>
</table>

**Notes:**

1. The "Begin Lane Line" location is based on the abundant lengths shown in Design Standard 30G. These lengths must be adjusted on a case-by-case basis for turn lanes not meeting the standard lengths.

2. Yellow left turn edge marking may be used adjacent to raised curbs or grass medians if lane use is not readily apparent to drivers approaching a left turn storage lane.

3. Refer to Design Standard 30G for Roadway Details.

### DOUBLE LEFT TURNS

#### Through Lane Becomes Exclusive Left Turn

Through Lane Becomes Optional Left Turn

### DOUBLE LEFT TURN MARKINGS

- **Arrow Spacing**
  - Arrow should be evenly spaced between first and last arrow. Turn lanes longer than 200' add one arrow for each 100' additional length.

- **Notes:**
  - Not required for restricted/alternative turn lanes, single or dual, Through Lane Becomes Optional Left Turn.
  - Where the driver must exit the final lane to enter a turn lane.

---

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**SPECIAL MARKING AREAS**
1. Recommended spacing of symbols immediately after intersections and major driveways and of a maximum spacing of 600 feet for urban sections and 1320 feet for rural sections.

2. Raised pavement markings and raised barriers can cause steering difficulties and should not be used to delineate bicycle lanes. All pavement markings and pavement messages shall be white.

3. Raised pavement markings shall be placed adjacent to markings for vehicles &-WI-1 signs shall be sized and placed for vehicles.

4. NO STRIPE AT EDGE OF CURB & GUTTER OR PAVED SHOULDERS.
GENERAL NOTES (Signalized & Non-signalized)

1. For intersections to a one-way street, the downstream restriction may be reduced to 20.'
2. Parking shall not be allowed within 20' of a crosswalk.
3. All parking lane markings shall be 6' wide.
4. Parking lane lines shall be broken at driveways.
5. Refer to Chapter 365, Fl. Admin. Code, for laws governing parking access.
6. Where curb and gutter is used, the gutter pan width may be reduced but desirably the lane width should be to that of the gutter pan.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SPECIAL MARKING AREAS (PARKING)

MINIMUM PARKING RESTRICTION FOR SIGNALIZED INTERSECTIONS

MINIMUM PARKING RESTRICTION FOR NON-SIGNALIZED INTERSECTIONS

PAVEMENT MARKING FOR PUBLIC SIDEWALK CURB RAMPS IN REST AREAS

"UNIVERSAL SYMBOL OF ACCESSIBILITY"

NOTES:

1. Detailed measured longitudinally along the curb from driver location of entering vehicle to end of parking restriction.
2. Detailed applicable to intersecting street, major driveway and other driveway to the custom practices.
3. For non-signalized intersections, the values above shall be reduced with the values for signalized intersections and the maximum restrictions implemented. These restrictions apply to both accessible and non-accessible parking.

Notes:

1. Parking restrictions measured from curb return point.
2. restrictions for accessible parking are the same as those applied to non-signalized intersections.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SPECIAL MARKING AREAS (PARKING)
MAJOR INTERSECTION WITH SEPARATE RIGHT TURN LANE URBAN TYPICAL SECTION (CURB AND GUTTER)

MAJOR INTERSECTION, NO RIGHT TURN LANE PLUS BUS BAY URBAN TYPICAL SECTION (CURB AND GUTTER)

MAJOR WITH LOCAL STREET INTERSECTION, NO RIGHT TURN LANE, ON STREET PARKING URBAN TYPICAL SECTION (CURB AND GUTTER)
MAJOR INTERSECTION WITH DESIGNATED SHOULDER, AND SEPARATE RIGHT TURN LANE RURAL TYPICAL SECTION (PAVED SHOULDER)

MAJOR WITH LOCAL STREET INTERSECTION, DESIGNATED SHOULDER, AND NO RIGHT TURN LANE RURAL TYPICAL SECTION (PAVED SHOULDER)

MAJOR INTERSECTION WITH RIGHT TURN DROP LANE AND DESIGNATED OR UNDESIGNATED BIKE LANE URBAN TYPICAL SECTION (CURB AND GUTTER)

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

SPECIAL MARKING AREAS
(BICYCLE)

DRAWN BY
CHECKED BY
APPROVED BY

17346
12 of 17
CASE I

Type I Object Markers shall consist of nine yellow reflectors mounted on a yellow reflective background or panel of the same size with Type III-A, III-B or III-C yellow reflectors.

CASE II

End of Road Markers shall consist of nine red reflectors mounted on a red reflective background or panel of the same size with Type III-A, III-B or III-C red reflectors.

NOTES:

1. This index applicable to residential and minor streets only. Major streets to be evaluated on a case by case basis.

2. *T* Intersection: Two Way arrows and reflectors are optional. The need should be based on a review of each location.

3. For additional details on aluminum round post, steel flanged channel post, sign panel material and bolts, nuts and washers see Index Nos. 11860 and 11865.

4. Case I installation - The arrow panels and object markers shall be placed approximately 20° but not less than 22° from the edge of the roadway.

5. Dead end signs shall be placed a sufficient distance to permit the vehicle operator to avoid the dead end by turning off, if possible, at the nearest intersecting street.

6. For pavement marking see Index No. 17346

7. No guardrail is required unless special field conditions require the same.

CASE J

Red Reflectors

NOTES:

4. 24" x 8" Aluminum Round Post or 2.5#/Ft. Steel Flanged Channel Post.

Aluminum Post: 8 Aluminum Button Head Bolt with Nut and Lockwasher or 8 Stainless Steel Hex Head Bolt with Flat Washer under Head and Lockwasher under Nut.

Channel Posts Provide Attachment in Accordance with the "Sign Attachment Detail" on Index No. 11865.
Two assemblies are required, one for each side of the ramp, showing those services in each particular direction from the ramp terminal.

Ramp mounted signs shall be installed to avoid conflict with existing signs and in no case should they be placed within 100' of another sign.

See Detail "A" for procedure.

** Note:**

1. Only those emergency exit areas designated by the Department and approved by the State Traffic Operations Engineer for each interchange shall be shown. Symbol sign for an exit shall always appear in the following order reading from left to right and top to bottom: Gas, Food, Lodging, Phone, Hospital, Camping.

2. Symbols shall appear consecutively on the exit sign with no separate left blank or reserved for intermediate stops not currently approved for a particular interchange.

3. All motorist service signs to have white Legend and border with blue background.

4. For mounting details see Index 9535 for Type "A", 9560 for Type "B", and 11860 for Type "C" Brackets.

5. Only those services meeting or exceeding established criteria shall be shown.

General Notes:

** Symbol:**

- Shall appear on the face of the guide sign panel or existing sign panel.

- Shall not be connected to existing sign panels.

- Shall be suspended from the guide sign panel or existing sign panel.

- Shall be placed within 100' of another sign.

- Shall be placed within 800' of the ramp terminal.

** Note:**

- When approved for attachment to the advance guide signs, up to 3 symbols may be used for an exit. The symbol shall be installed in the following order: Gas, Food, Lodging, Phone, Hospital, Camping.

- The mounting height of the advance guide signs shall be increased, where necessary, to provide 8' between the center of the pavement edge and the bottom of the guide sign panel, prior to mounting the supplementary panel.
STATE OF FLORIDA
WELCOME CENTER
1 MILE

STATE OF FLORIDA
WELCOME CENTER

STATE OF FLORIDA
OFFICIAL WELCOME CENTER

WELCOME CENTER

Tourist Information Center
NEXT RIGHT

Note: Roadway not drawn to scale. Distances shown are adequate for driver communication but may be altered slightly if conditions require.

Note:
1. Sign and sign structures shall be erected in accordance with the details shown on Index 9535.

2. Sign FTP-11-04 shall be located on the Welcome Center grounds in proximity to the building and as far from the main line roadway as possible (i.e., aligned back to back).

3. Sign FTP-12-04 shall be located on limited access highways only.

4. All signage to be Service E.

5. See Index 11355 for sign details.

FOR LIMITED ACCESS HIGHWAYS
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

WELCOME CENTER SIGNING
Notes:

1. Signs and sign structures shall be erected in accordance with the details shown on Index 9625.

2. Sign FTP-15A-04 shall be located on the Welcome Center grounds in proximity to the building and as far from the Main Line Roadway as possible (2 signs back to back).

3. All legend to be Series E.

4. One sign FTP-15A-04 or FTP-15B-04 should be used depending on speed, roadside development & geometric condition.

* 900' Maximum For Rural Conditions
* 500' Minimum For Rural Conditions
1. Reflective Pavement Markers shall be spaced at 40’ on all skip lane lines and skip center lines. This spacing may be reduced to 20’ if specifically called for in the plans.

2. The spacing on solid lines and solid/skip combination lines shall be 40’.

3. All R.P.M.s shall be offset 1” from solid lines.

4. These spacings may be reduced for sharp curves if required.

5. All R.P.M.s shall be class "B".

---

**STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN
TYPICAL LOCATION OF REFLECTIVE PAVEMENT MARKERS**
NOTE

Raised pavement markers shall be set 1 foot from line.

RPM PLACEMENT FOR TRAFFIC CHANNELIZATION AT GORE
(TRAFFIC FLOWS IN SAME DIRECTION)

NOTE

Raised pavement markers (Bl-Directional White/Red) should be used in all gorges of this type.

RPM PLACEMENT FOR TRAFFIC SEPARATION
(TRAFFIC FLOWS IN OPPOSITE DIRECTION)

PLACEMENT OF RPM'S ON SHOULDER MARKINGS

For left side of roadway the line is opposite hand and marking shall be yellow.
For placement of RPM's on ramp see Index IT345.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
TYPICAL PLACEMENT OF REFLECTIVE PAVEMENT MARKERS

PLACEMENT OF RPM'S AT INTERSECTIONS
**INDEPENDENT USE OTHER THAN FREEWAY**

**GUIDE SIGN USE**

- **Notes:**
  1. Florida marker shall have Black Legend with White Background.
  2. Stroke width of State outline to be 1" for Independent use and 1/2" for Guide Sign.
  3. Numbers are entered 0.

**FLORIDA ROUTE MARKER**

**FTP-17-04**

**DIMENSIONS**

<table>
<thead>
<tr>
<th>SIGN</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>R</th>
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<td>40 x 40</td>
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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**SPECIAL SIGN DETAILS**

**FTP-18-04**

**MI-5 COUNTY ROUTE MARKER DETAIL**

**1-3 DIGITS 5" SERIES C**

**4 DIGITS 12" SERIES C**

**INDEPENDENT USE FOR FREEWAY**
SPECIAL SIGN DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

[Diagram of signs and symbols with dimensions and notes on materials and colors]
TYPICAL INSTALLATIONS FOR SIGN PANEL(S)
MOUNTED ON SPAN WIRE

1. Bottom edges of signs shall be approximately at the same elevation.
2. Span wire installations that support only signs shall be provided with a minimum panel weight of 7 PSF.
3. Type B & C attachments with one hanger shall have wind below for signs wider than 2'. The bottom edge shall extend to within 6" of the sign edge.
4. Type B & C attachments for signs 4' and wider shall have 2 hangers. Sign T and wire shall have wind below that extend to within 6" of the sign edge.
5. Type D attachments shall be for signs 3' wide or less.
6. Sign panels shall meet the requirements of Index 9535.
7. Refer to section 634 of the Standard Specifications For Road And Bridge Construction.
8. All bolts, nuts, and washers shall be passivated stainless steel, AISI 304, grade, commercial grade, type 36.

SIGN MOUNTING DETAIL

TYPICAL SPAN WIRE INSTALLATION

ADJUSTABLE HANGER FOR SIGN MOUNTING

In order to ease installation, sign face No. 2 should be installed after mounting to span wire. The overlapped connection of adjustable hanger shall use a minimum of 2 bolts with a minimum spacing between bolts of 2".


**TYPICAL INSTALLATIONS FOR SIGN PANEL(S) MOUNTED ON SPAN WIRE**

- **Adjustable Hanger**
- **Sign Face**
- **Catenary Wire**
- **Wire Rope Clamp**

**SIGN MOUNTING DETAIL**

- 3/8" Stainless steel round head bolts with nuts and lock washers. Bolts shall be spaced on 12" centers max.

**TYPICAL SPAN WIRE INSTALLATION**

- In order to ease installation, sign face No. 2 should be installed after mounting to span wire.

**ADJUSTABLE HANGER FOR SIGN MOUNTING**

- 3/8" Stainless steel round head bolts with nuts and lock washers.

**DETAILOFOPPOSING SIGNS SPAN WIRE MOUNTED**

- The overlapped connection of adjustable hangers shall use a minimum of 2 torc with a minimum spacing between torc of 24".

**TWO POINT ATTACHMENT**

- Refer to section 634 of the Standard Specifications For Road And Bridge Construction.

- All bolts, nuts, and washers shall be passivated stainless steel, AISI 300 series, commercial grade, type 308.

**Notes:**
1. Bottom edge of sign shall be approximately at the same elevation.
2. Type B & C attachments with one hanger shall have wind beam for signs wider than 32'. The beam shall extend to within 6' of the sign edge.
3. Type B & C attachments for signs 32' and wider shall have 2 hangers. Signs 7' and wider shall have wind beam that extends to within 6' of the sign edge.
4. Type D attachment shall be for sign 2' wide or less.
5. Sign panels shall meet the requirements of Index 8535.
6. Refer to section 634 of the Standard Specifications For Road And Bridge Construction.

- See Index ITZ of 2 for pole attachment.

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**SPAN WIRE MOUNTED SIGN DETAILS**

**Approved**

**Drawn By**

**Checked By**

**Revised**

**Title**

**Scale**

**Copyright**

**Sheet No.**

**Date**

**Details**

**For Reproduction Use Only**

**ITZ 356**
1. See Standard Highway Signs for sign R2-5 details.
2. Sign location No. 3 may require some field adjustment.
3. The Cross Road is the last detour to route around the restricted bridge.
4. Sign location No. 2 should be established from the Cross Road the following approximate distances: Interstate-1 1/2 Mile Non- Interstate-1 1/2 Mile.
5. See Index IT 355 for sign details.
NOTES:
1. Bridges should be marked as narrow bridges under the following conditions:
   (1) For approach roadways with paved shoulders when the bridge width
       excluding shoulders is less than the width of the approach roadway including
       paved shoulders.
   (2) For approach roadways without paved shoulders when the bridge
       shoulder width is less than 2'.
2. Roadways with two-way traffic:
   (1) No passing zone should be extended 1500' in advance of narrow bridge.
   (2) The post mounted delimiters shall be installed on both sides of the roadway
       if the bridge or the approach is on a curve.
3. Delimiters on both lanes of roadway shall face traffic approaching bridge.
4. Delimiters to be placed not less than 2' or more than 5' inside the outer edge of pavement.
5. The 54-2 & 53-5A mounting height shall be 50' above the road edge.
   The panels may be post mounted at the bridge.
6. Highways delimiters consist of a reflector, or reflective -absorbing, install units listed on the specified product contract.

I. Bridges should be marked as narrow bridges under the following conditions:
   (1) For approach roadways with paved shoulders when the bridge width
       excluding shoulders is less than the width of the approach roadway including
       paved shoulders.
   (2) For approach roadways without paved shoulders when the bridge
       shoulder width is less than 2'.

TWO - WAY TRAFFIC

ONE - WAY TRAFFIC
NOTES:
1. Use clean free draining sand< 5% passing No. 200 sieve for base.
2. Welded wire fabric shall meet the requirements of ASTM A490.
3. Concrete strength at 28 days shall be f'c=3 ksi.
4. Outside edges of slab shall be cast against formwork.
5. The pull box shown is 2'-3" x 2'-3"; others approved under Section 635 of the Standard Specifications may be used.
NOTES:
1. Use clean free draining sand < 55 passing No. 200 aisle for base (4"
2. Welded wire fabric shall meet the requirements of ASTM A959.
3. Concrete strength at 28 days shall be f'c = 3 ka.
4. Outside edges of slab shall be cast against forms.

5. The 1/2" flexible expansion joint between shaft and slab shall be sealed with a hot poured elastic joint filler.
6. Slabs to be placed around all Poles and Pull Boxes. In rural locations, in urban areas or where space is limited, slab dimensions may be adjusted as shown in the plans.
7. The pull box shown is 1'-3" x 1'-3", others approved under Section 625 of the Standard Specifications may be used.
1) All grounding system connections shall be earthmenderly welded. This includes all steel, ground electrode and ground. Do not earthmenderly bond grounding electrodes to grounding electrodes. Method of grounding and bonding of conductors as per Section 650 of the Standard Specifications.

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

3) Contractor shall determine the service required dates for the power company transformer location during the pre-construction conference.

4) The power company reserves the right to install the transformer, within power and weatherhead on power company poles of the expense of the contractor. Contact the power company for cost or for authorization of the transformer procedures.

5) Any deepened portion of buried steel pole and bracket area shall be protected in accordance with Section 560 of the Standard Specifications.

6) Poles and bracket area shall be designed in accordance with the design criteria, as indicated in the plan and index of the applicable environmentally friendly in the ASHTO Standard Specifications For Structural Supports For Highway Signs, Luminescent And Traffic Signals. The pole shall be based on the actual projected area of the luminaire of 3.0 square feet whenever greater.

7) The luminaire manufacturer shall place a permanent tag on the luminaire showing as follows: the following Information: Wattage, Ballast Type, Tab shown on design plans, label setting location of luminaire, ULS light distribution with this lamp in the position specified, input voltage and power factor. Luminaire's appearance is subject to approval.

8) Before final acceptance, contractor shall provide 2 L2S All to be installed as built prior to the distributing agency.

9) Conduit routing shall be to poles, excluding poles space distance from edge of pavement. Any designs routing in locations where ground is present shall be 2' in front of the standard groundwire.

10) Pole positions and conduit routing may be adjusted, as approved by the Engineer, to prevent conflicts with utility and drainage structures not indicated and prevent groundwire past conflicts.

11) Where groundwire is located, a pole shall be placed a minimum of 5' behind the face of the groundwire.

12) Pole foundation in locations where it is necessary to be located adjacent to a firm, adequate condition approximately equal to that of the adjacent soil. The fill shall conform to existing grade and be fully compacted.

13) All poles shall be made in pullboxes or the poles base. No pole shall be made below the conduit. The wire of pullboxes shall have sufficient length to complete the connections outside of pullboxes for changing lamps and trouble shooting the system.

14) Neutral wires to be new white insulation. Do not use white or green insulated wires for ungrounded conductors.

15) Unless otherwise specified, all pole shall be single conductor, 1/8 inch conductivity stranded copper, with ThHN or ThHN insulation.

16) All exposed or connected conduit shall be right to intersection metal. These exposed rows of conduit shall be provided with either expansion joint or flexible metal conduit/extension conductors to take care of vibrations and thermal expansions. All metal conduit shall be grounded. ThHN conduit shall not be dipped galvanized.

17) All conduit that will require expansion as above shall be bead reinforced, channel bracket and bolt end tapped. Leave the corrugated expanded conduit wire and duct plates, or situations to mark the location of the ends of the conduit.

18) Pull boxes shall be located at end of conduit running, and necessary for the completion of the project.

19) These wires represent minimum acceptance criteria. The approval for these wires represents the minimum basis of acceptance.

20) All materials, unless otherwise specified, shall be Underwriters Laboratory approved.

21) Pull boxes shall meet the requirements of Section 655 of the 'Standard Specifications For Road And Bridge Construction and Section 655 of the ASHTO Standard Specifications For Traffic Control Signals And Devices'.

22) A pull box shall be located at each pole location. Pull boxes shall be located 2 feet from pole unless otherwise designated by the project Engineer. All pull box covers shall be grounded. The General Specifications for Roads and Bridge Construction.

23) All pull boxes and pole boxes, ends of conduit shall be located in accordance with Section 650 of the Standard Specifications for Road and Bridge Construction.

24) Luminaire shall be equipped with a register type ballast mounted on a hinged door or panel. The unit shall swing open to provide access to the system wiring by release of captive screws. The electrical connector shall be a quartz vapor proofed plug. The unit shall be remotely located from the luminaire after release of the captive screws and disconnected from the mains.

25) All mounting heights are 2'-8" unless otherwise noted in plans.

26) A testhead is required in all poles. Testheads should be located opposite operating traffic with cover hallowed with Stainless Steel Rope. The testhead working shall be of head 30 square inches.

27) The luminaire and arm on JOINT USE POLES shall be grounded.

28) Concrete slabs around pole and pull boxes shall be sold for under the contract unit prices for Claus 1 Concrete (Knauss & McInnis) is the cost of reinforcing steel fabric to be included in the prices for Claus 1 Concrete (Knauss & McInnis).

BREAWEAWY FEATURE

All conventional mounting height pole shall be mounted on a flange metal base or 4 ½" of breakaway clamps. If clamps are used, one coupling shall be provided for each anchor bolt connection. The only connection made to the pole shall be provided by the coupling. The area between the top of the pole foundation and the bottom of the pole shall be bonded to a non-structural foundation earth.

If a flange metal base is used, it shall be one piece and be designed to breakaway without the aid of any clamping or aligning surface.

The design of the breakaway feature shall be in accordance with the breakaway performance requirements of the ASHTO Standard Specifications For Structural Supports For Highway Signs, Luminescent And Traffic Signals. The contractor (supplier) shall submit a drawing as evidence that the breakaway feature meets the above specifications and testing to verify the design will meet the ASHTO what testing is required in the contract plans. No pole is to be initiated prior to approval of submittal data.

Any alterations in the design of a breakaway support, when it is broken away, shall not exceed more than 4" as discussed in Section 7 of the above ASHTO specifications, and Chapter 4, Section 4.2 of the ASHTO "Rehabilitation Design Guide."

Each anchor bolts or barrier wall mounted, shall not be fugal.
Pole details

Luminaire support ring
Spring supported centering arm provided to center the luminaire ring.

Cover
Covered receptacle to power luminaire when in the lower position.

Head plate
Circuit Breaker Cable 12/3 SOOW-A

Lift cable sheave
Screwed control switch

Lock nut
Circuit Breaker Cable 12/3 SOOW-A

Luminaire
Wire mesh pole

Wrench
Circuit Breaker Cable

Winch cable (1/4" stainless steel aircraft cable)

Winch
Circuit Breaker Cable 10/3 SOOW-A

2" slip fitter
Lamp wattage and light distribution.

See legend for number of luminaire, lamp voltage and light distribution.

Pole cable & sheaves
Lift cable sheave

Supply cable connection

1.5 KVA dry type transformer mounted in N.E.A.A. 3R portable enclosure, provides 120V, grounded receptacle for electric drill & receptacle for supply cable. (see schematic)

Supply cable receptacle

Remote control switch

25' min. remote control cable

RMPS

10' heavy duty reversible drill 120 Volt (1 / 1) per project.

Portable drill

Covered receptacle to power luminaire when in the lower position.

Cover

Portable drill

Silk clutch

Circuit Breaker Cable 10/3 SOOW-A

2" hex drive 2" round shaft

Pole Cable

Circuit Breaker Cable 10/3 SOOW-A

Surge protector shall be located in pole with circuit breaker.
LUMINARIES SPECIFICATIONS

The reflector with its stainless cover shall be firmly attached to a cast ring. This ring shall have locating lugs in the upper surface each of the reflector/reflector assembly may be readily attached to, or detached from, the luminous bracket entry and lamp support assembly without removing the support from the pole.

Each luminous assembly contains the integral dyno-regulator type ballast connected for 400 volt input ± 5% and a power factor of more than 90%. The luminous baffle shall be enclosed within an aluminum housing which integrally attaches to the luminous bracket entry and lamp support assembly, it shall be readily removable without removing the luminous baffle from the bracket arm.

The luminous baffle shall be attached to the bracket arm by means of a breakaway and lamp support assembly. The assembly shall include a steel wire, etc. fitted for 10° with projection for 3°/adjustment for leveling the luminous. An enclosed baffle shall be included such that each electrical connection shall be protected from exposure to weather.

All electrical connections shall be made with waterproof or non-waterproof weather-resistant enclosure. All luminous shall be ANSI/UL Type, 1/2 class B, 150 Volts, and 3600 watts IP65, and shall have a minimum 10,000 hrs. rated life. All electrical connections shall be made with a weather-resistant connector. All luminous shall be equipped with a weather-resistant connector. A permanent fixture shall be fixed in the luminous cover which describes the sequence for lowering the luminaire and the cautious.


Shop drill two (1) 3/4" diameter holes 90 degree apart through hole thickness of base plate. Top hole to hole 3 3/4" of solid aluminum head bolt. Finished plate alone have a protective coating of hot galvanizing applied in accordance with ASTM A25.

Note: If the responsibility of the contractor to coordinate the starter ball with designation or installation.

ALTERNATE POLE

A spun high strength preformed concrete pole listed on the Qualified Products List may be substituted for a steel pole with approved base dimensions and connections. If the concrete pole is provided as a substitute for the steel pole, payment will be made under the terms for a full price for the concrete pole and associated foundation and plan quantity of these items will be the same for payment.

FOOTING

The high mast foundation shall be constructed in accordance with the details shown in the plans.

Anchor bolts per manufacturer's Specifications. Submittals shall be supplied to the engineer prior to purchase. One leveling nut, one locknut and one locking pin shall be supplied per anchor bolt. All level, etc., should be molded either by galvanizing per ASTM A53 or by the nature of the material's use in their fabrication.

POLE SPECIFICATIONS

The pole shall be bolted or single place, galvanized or high strength steel with a minimum yield strength of 50,000 psi. All material shall be single thickness steel plate with no welds. Steel shall be of that specified.

All poles shall be equipped with a reinforced horizontal crossbar approximately 200 above the base plates. The horizontal shall be 20° by 200 high minimum. Drilling through the horizontal reinforcement or the poles shall be to the extent of the horizontal cover is not allowed. A cover strip to the horizontal frame shall be provided. All poles and hardware shall be adequately secured to ensure protection to the finish during shipping and handling. Poles shall not be shipped pre-assembled.

Drawings shall be provided with the equipment which allow access assembly procedure, all parts, and recommended erection procedure. A permanent fixture or pole shall be fixed in the luminous cover which describes the sequence for lowering the luminaire and the cautious.


Foot drill two (1) 3/4" diameter holes 90 degree apart through hole thickness of base plate. Top hole to hole 3 3/4" of solid aluminum head bolt. Finished plate alone have a protective coating of hot galvanizing applied in accordance with ASTM A25.

Note: If the responsibility of the contractor to coordinate the starter ball with design specification. Alternatively, the pole shall be bolted or single place, galvanized or high strength steel with a minimum yield strength of 50,000 psi. All material shall be single thickness steel plate with no welds. Steel shall be of that specified.

The pole shall be bolted or single place, galvanized or high strength steel with a minimum yield strength of 50,000 psi. All material shall be single thickness steel plate with no welds. Steel shall be of that specified.
Schedule 80 PVC conduit with 4/0 copper ground wire.

1. 4/0 AWG insulated THW green stranded copper ground wire connecting all poles, and insulated THWN or THHN stranded copper circuit conductors to schedule 40 PVC conduit. Circuit conductors and conduit size as shown in plans. (Typical)

2. U.L. approved ground rod 1/2" diameter 15' long copper clad with approved ground connection at all poles and pull boxes. 4/0 AWG stranded copper circuit conductors in schedule 40 PVC conduit. Circuit conductors and conduit size as shown in plans. (Typical)

Notes:
1. At all pull boxes and pole bases, ends of conduit shall be sealed in accordance with Section 630 of The Standard Specifications For Road And Bridge Construction.

2. 1/2" AWG insulated THW green stranded copper ground wire connecting all poles, and insulated THWN or THHN stranded copper circuit conductors to schedule 40 PVC conduit. Circuit conductors and conduit size as shown in plans. (Typical)

3. Slabs to be placed around all poles and pull boxes.

4. For Pull Boxes, refer to Index 7500 sheet 2 of 3.
REINFORCEMENT LAYOUT

NOTES:
1. Use clean free draining sand c 5% passing No. 200 sieve for base (4"").
2. Woven wire fabric shall meet the requirements of ASTM A665.
3. Concrete strength of 28 days shall be 4,000 psi.
4. Outside edges of slab shall be coated against water.

5. The 1/4" thick expansion joint between shaft and slab shall be sealed with hot poured elastomeric joint filler.
6. Concrete slab around pole and pull box shall be held for under the approved unit price for Class F Concrete (Macadamia is the soil for reinforcing steel fabric shall be included in the price for Class F Concrete (Macadamia).
7. The pull box shown is 1/2" x 1/2", others approved under Section 6115 the Standards Specifications may be used.

SLAB DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

HIGHMAST LIGHTING

Sheet No. 4 of 4

17502
Foundations apply only to slopes of 1:4 or flatter.

2000 psi Min. Class I Concrete

Bolt Projection Diameter, And Bolt Length Per Manufacturer's Spec. (Submittal Data Required)

<table>
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<th>MAX. MOUNTING HEIGHT</th>
<th>LENGTH</th>
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<tr>
<td>30'</td>
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<tr>
<td>30'</td>
<td>3'</td>
<td>9-1/2&quot;</td>
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METAL POLE CONCRETE FOUNDATION DETAIL

All Spillows Shall Be Made In Pull Box Or Pole Base With Compression Sleeves Or Split Bolt Connectors Properly Taped And Weatherproofed.

At All Pull Boxes, And Pole Bases, End Of Conduit Shall Be Secured In Accordance With Section 630 Of The Standard Specifications For Road And Bridge Construction.

#6 AWG Bare Bond May Be Cast In Base Or Run Through PVC Elbow

12" Bed Of Pebbule Or Crushed Stone For Drainage

Approved Ground Connection

NOTE

Foundation design based upon the following conservative soil criteria which covers the great majority of soil types found in Florida:

<table>
<thead>
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<th>Classification</th>
<th>Cohesionless (Fine Sand)</th>
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<tr>
<td>Friction Angle</td>
<td>30 Degrees (30)</td>
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<tr>
<td>Unit Weight</td>
<td>50 lbs./cu. ft. (assumed saturated)</td>
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Only in cases where the Designer considers the soil type of the specific site location to be of lesser strength properties should an analysis be required. Auger borings, STP borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may be performed. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties. In any event, only the soil identification is required.
NOTE:

1. Photo electric control as required.
2. A pull box is required at each service point.
3. Pull box as required.
4. Concrete Foundation as required.
5. Concrete Foundation as required.
6. Concrete Foundation as required.
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144. Concrete Foundation as required.
SIGN LIGHTING INSTALLATION

Roadway Lighting Included

The power for the sign lighting shall be provided from the roadway lighting circuit. The sign lighting circuit shall be a pull-box circuit for connection to the sign light. The sign lighting circuit shall be provided from the pull-box for connection to the roadway contract.

The sign lighting shall be provided from the roadway circuit box. The lighting plans shall indicate the sign location and a pull-box location for connection to the sign lighting. The sign lighting shall be furnished in a pull-box and a sign location for connection to the roadway contract.

Roadway lighting not included is:

The lighting plans need to include the pull-box locations for connection to the roadway contract. The lighting plans shall indicate the location of the service point equipment and circuit runs. The sign lighting contractor shall provide all electrical equipment necessary for connection of the sign lights.

PLACEMENT OF SIGN LIGHTS

1. Luminaire shall be mounted as the lamp center is 4" in front of the sign face.
2. Luminaire shall be mounted as the back of the fixture is placed below the bottom edge of the sign face.
3. Luminaire from manufacturers who recommended the fixture be fitted shall be mounted on a break, while providing this recommended fitting.
4. Photometric data for mercury vapor luminaire is required for sign lighting.

Use 3/8 Liquid Tight Flexible Conduit from Junction Box To Sign Bracket. Conduit shall be of sufficient length to allow rotation of luminaire bracket 90° in either direction.

4" x 4" x 3" (Min.) Weatherproof Cast Aluminum Junction Box Mounted On Sign Chord.

4" x 4" x 3" Conduit To Weatherhead Height As Required By Power Company.

PLAN

OVERHEAD POWER SUPPLY

4" x 4" x 3" (Min.) Weatherproof Cast Aluminum Junction Box Mounted On Sign Chord.

U-L Approved Ground Rod 3/8" x 8' Ground Rod With Grounding Connectors Connection To Be Placed In Pull Box For Inspection Purposes.

Signs To Be Made With Corrosion Resistant Then Properly Insulated & Waterproofed.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

EXTERNAL LIGHTING FOR SIGN (MERCURY VAPOR)

Design By

Approved By

Drawing No.

Revised

Scale

1/2" = 1' 0"

Issue Date

17505

01-10-07
1 - Dimension "A" to be established by type and make of luminaire to be purchased and used on the project.

2 - The center lines of both flange plates and the luminaire support arm are to be set parallel to the roadway before the set screw is seated.

3 - Minor adjustments in the horizontal location of the luminaire support arm along the bottom chord of the truss will be allowed as long as the flange plates will clear the truss web members.

4 - All steel pipe shall meet the strength requirements of ASTM Specification A53 Grade "B". Steel plates shall meet the requirements of AISI and bolts, nuts and washers shall meet the requirements of ASTM F568 Class 4.6.

5 - All items shall be hot dip galvanized after fabrication in accordance with the requirements of ASTM A55 and/or A65.

6 - Luminaire support arm shall be free to rotate in a clockwise or counterclockwise direction. When service or maintenance is required for align face or vertical face of truss support arm shall be capable of being rotated to a position 90° from parallel to the roadway for unobstructed working clearance.

Circular 2

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
EXTERNAL LIGHTING FOR SIGNS
(MERCURY VAPOR)
NOTES
DO NOT ERECT POLE WITHOUT LUMINAIRE ATTACHED

1. Light Pole Materials shall be as follows:
   - Pole: ASTM B621 - ALLOY 6061-T6
   - Arm Tube Extrusions: ASTM B621 - ALLOY 6061-T6
   - Pole Connection Extrusions, Bars and Plates: ASTM 1010 - ALLOY 1010-T6 or ASTM B860 - ALLOY 356.11-T6
   - Aluminum Caps and Covers: ASTM B619
   - Frangible Transformer Base Casting: ASTM B481 - ALLOY 6061-T6 or ASTM B860 - ALLOY 356.11-T6
   - Weld Metal: A505
   - Anchor Bolts: ASTM F1554 Grade 55
   - Pole Base Connection Bolts: ASTM A325 Type 1
   - Nuts for Connection Bolts and Anchor Bolts: ASTM A563 Grade DH
   - Stainless Steel Fasteners and Hardware: A193 Grade B7H

2. Steel alloy 6061-T6 to be furnished in T4 condition and heat treated in accordance with ASTM 639.

3. Pole Base Connection Bolts, Anchor Bolts, Nuts and Washers shall be galvanized in accordance with ASTM A53, and Washers shall be galvanized in accordance with ASTM B860 Class 5.

4. Foundation concrete shall be Class I Special with a minimum 28-day Compressive Strength of 3,000 psi for all environmental classifications.

5. Restraining Steel shall be ASTM A578-96 Grade 6.

6. A design wind speed of 80 or 100 mph with a 301 gust factor for wind loading on the pole is insured in the design.

7. The pole shall be tapered as required to provide a top outside diameter (OD) of 6" with a base OD of 6'0". Portions of the shaft near the base and at the upper connections may be held constant at 6"0" and 6" respectively to simplify fabrication.

8. The pole shall be free of traceable welds except at the base.

9. Poles constructed out of two or more sections with overlapping splice are not permitted.

10. All welding shall conform to American Welding Society Structural Welding Code (Aluminum ASW/AWS D1.1) latest edition.


12. The pole and base shall be furnished with a 50 grit satin rubbed finish.

13. All designs to be in accordance with the AIHA/AIHE Standard Specifications for Structural Supports for Highway Signs, Luminaire and Traffic Signals.

14. All Live Loads within 5 miles of the coastline shall be equipped with a damping device. Information, details and performance data on the damping device shall be included with the Manufacturer’s Qualification Products List (GQPL) application.

15. The Manufacturer’s Quailification Product List (GQPL) application shall include test reports certifying that the Art Pole and Base Connection components, including the Grounding Transformer Base, are capable of resisting the forces, soils, shear, tension, and moment as applied and shown in the data tables for the arc and pole.

ELEVATION AND NOTES
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ALUMINUM LIGHT POLE

FINISHED PROJECT
(1) Pole Design Designation
(2) Pole Pannot Number
(3) Manufacturer’s Name
(4) Certification No.

Pole Identification Tag to be located within 2'-0" x 4'-0". Secure to Transformer Base by GUSSET Stainless Steel Rivets or screws. Fabricator to provide details for approval. Identification Tag located on inside of base visible from door opening. Tag to be stamped with the following information:

- Financial Project ID
- Pole Design Designation
- (1a) Pole Pannot Number
- Manufacturer’s Name
- Certification No.
**ALUMINUM LIGHT POLE**

**ARM CONNECTION DETAIL**

- Press on or Welded Cap At Lower Arm
- Use 3/4" x 3' Bar Welded Such That, Extruded Saddle, or other acceptable connection
- 4" min. Radius at bond

**ARM SECTION**

- See "O.D." in ARM DATA TABLE
- Vertical Axis
- Extruded saddle, or other acceptable connection
- 4" min. Radius at bond

**SECTION A-A**

- Connection at lower arm
- Fixture Arm Length = 3', 4', 5', or 6'
- See ARM SECTION above.

**ARM TUBE EXTRUSIONS NOTES**

- At the pole connections, provide arm tube extrusions with dimensions as shown in the ARM SECTION and as tabulated in the ARM DATA Tables. Confirm transition extruded extrusions to a cylindrical section of the arm connection.

- The manufacturer may substitute extruded cross sections other than those tabulated, provided the section properties about the vertical axis and the area of the section equal or exceed that of the required section, and provided the wall thickness is a minimum of 1/16" nominal and within the Aluminum Association Tolerances.

- The outside diameter at the minor axis should be held at 2 1/2" of the upper and lower arms.

**ARM DETAILS**

- STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
- DESIGNATED BY: [Signature]
- DRAWN BY: [Signature]
- CHECKED BY: [Signature]
- DATE: [Date]

- ARM CONNECTION DETAIL
- ARM SECTION
- SECTION A-A (Connection At Lower Arm Steel)

- ARM TUBE EXTRUSIONS NOTES
- ARM DETAILS

**ALUMINUM LIGHT POLE**
FOUNDATION NOTES:
The foundations for Aluminum Light Poles are pre-designed and are based upon the following conservative soil criteria which cover the great majority of soil types found in Florida:
- Classification: Cohesive (Fine Sand)
- Friction Angle: 30 degrees (SD)
- Unit Weight: 50 lbs./cu. ft. (assumed saturated)

For poles on FN3.6 feet, the soil classification and unit weight are as follows:
- Classification: Cohesive (Fine Sand)
- Friction Angle: 30 degrees (SD)
- Unit Weight: 50 lbs./cu. ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several hypotomies. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties. In any event, the soil identification is required.

Base Details:
- State of Florida Department of Transportation
- Aluminum Light Pole

Designed By: AVP
Drawn By: REB
Checked By: L!EN

Conduit with 6/0 AWG Bare Ground Wire cast in concrete or placed in conduit.

Class I (Special) Foundation Concrete may be cast-in-place or precast with "Flowable FM" grout.

Screws DO NOT THREAD.

Anchors, connection bolts, nuts, washers, and split lockwashers as required by approved brochure transformer base manufacturer.
### 8 FT. ARM DATA

<table>
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<tr>
<th>CASE - NO.</th>
<th>WIND SPEED (MPH)</th>
<th>O.D. (IN.)</th>
<th>WELD (IN.)</th>
<th>LOWER ARM</th>
<th>N ** (KIP)</th>
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<th>WELD (IN.)</th>
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### Notes

- All tables were developed assuming the following properties:
  - Arm = 1.0 ft. (includes wind drag coefficient)
  - Weight = 5 pounds

* "N" equals force normal to face of connection due to axial force in the arm - tension upper arm - compression lower arm.
### DATA FOR POLE WITH 8 FT. ARM

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### NOTES
1. Pole wall thicknesses shown in the POLE DATA TABLES are nominal and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.

2. See sheet 3 of 7 for Foundation Notes.
### Data for Pole with 8 Ft. Arm

<table>
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<th>Pole Wall Height (ft)</th>
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<th>Lower Wall Height (ft)</th>
<th>Moment (kip-ft)</th>
<th>Shear (kip)</th>
<th>Torsion (kip-ft)</th>
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### Data for Pole with 10 Ft. Arm

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### Notes
1. Pole wall thicknesses shown in the POLE DATA tables are minimum and should be within the Aluminum Association Tolerances. Thicker walls may be permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.
2. See sheet 3 of 7 for Foundation Notes.
DATA FOR POLE WITH 8 FT. ARM

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NOTES:
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2. See sheet 3 of 7 for Foundation Notes.

POLE DATA - 50 FT. MOUNTING HEIGHT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROADS DIVISION

ALUMINUM LIGHT POLE
EXISTING PAVEMENT INSTALLATION
Remove existing pavement minimum 1" depth throughout transition and maneuvering area, replace with misc asphalt.

NEW CONSTRUCTION
Hand work final shoulder pavement lift to plan dimensions.
GENERAL NOTES


3. Concrete: Concrete strength shall be Class JF (f'c=3,400 psi).

4. Reinforcing Steel: Reinforcing Steel shall conform to ASTM A615-96a, Grade 60.

5. Payment 1: Motorist Aid Call Box Concrete Pads shall be paid for under the contract unit price for Class II Concrete (Miscellaneous 1, E.g.) and shall include all labor, materials, and installation of assembled breakaway device sleeves, and miscellaneous galvanized steel for wheel chair stop and attachment.

6. Breakaway Device shall be paid for under Call Box Assembly.

WHEEL CHAIR STOP DETAIL

SECTION C-C

2" x 1" x 1/8" Galv. Angle And
3-3/8" x 5" Galvanized Steel Expansion
Anchor Bolt With 3" Wth. Embedment

SECTION A-A

MOTORIST AID CALL BOX CONCRETE PAD QUANTITIES

Concrete 3.5 cy, local
Reinforcing Steel's 245 lb, local

PLAN

OUTSIDE EDGE OF SHOULDER PAVEMENT

VIEW D-D

1-1/2" x 1" Hall
Galvanized Steel Pipe Spacer

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

MOTORIST AID CALL BOX

Names Design
Design By
Checked By
Approved By

17600

3 of 3
FOR USE IN AREAS NOT EXPOSED TO VEHICULAR TRAFFIC AND UNDER DRAINAGE

FIGURE A

May be adjusted due to field conditions upon approval of project engineer.

FOR USE IN ASPHALT ROADWAY ADJACENT TO CURB WHEN PLACEMENT OUTSIDE OF THE PAVEMENT IS NOT FEASIBLE.

FIGURE B

Note:
1. Trench not to be open more than 250' at a time when construction area is subject to vehicular or pedestrian traffic.
2. Asphalts to be removed and restored to leave near grade on both sides of the 12" pavement cut.
3. See note 3 Figure C

FOR USE IN INSTALLING CONDUIT UNDER EXISTING ASPHALT PAVEMENT NOT ADJACENT TO CURB WHEN JACKING IS NOT FEASIBLE.

FIGURE C

Note:
1. Rigid conduit must be used when jacking under existing pavement at least 12" minimum depth.
2. Asphalts to be removed at the edges of the trench.
3. The removal and replacement of the additional pavement width (6") will not be required.
4. The removal and replacement of the additional pavement width (6") will not be required when the trench can be constructed without disturbing the asphalt surface on either side.

FOR USE IN INSTALLING CONDUIT UNDER SIDEWALK

FIGURE D

Note:
1. Sidewalk patches to match existing joint.
2. Entire sidewalk cold must be replaced when specified in the plans.
3. Backfill and tamp with material from trench except at driveways.
    At driveways, backfill a length of trench within the driveway entirely with Flowable Fill.

FOR USE IN INSTALLING CONDUIT UNDER NEW ROADWAY PRIOR TO INSTALLATION OF CURBS, BASE AND PAVEMENT

FIGURE E

Note:
1. Sidewalk patches to match existing joint.
PULL BOX ENTRY OF CONDUIT UNDER SIDEWALKS

**FIGURE A**

Notes:
- Ends of conduit shall be sealed in accordance with Section 830 of the Standard Specifications for Road and Bridge Construction.

For use under railroads

**FIGURE C**

- Note: Conduit depth to be at R/R requirement but not less 4".
- After jacking, place right conduit as a sleeve extending to R/R right of way line.

FOR USE UNDER RAILROADS

**FIGURE C**

- Note: The run of conduit (between pull boxes) shall not contain more than 360° of bend including pull box bends.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONDUIT INSTALLATIONS DETAILS

Drawn by
State Traffic Engineer
Approved by

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONDUIT INSTALLATIONS DETAILS

Drawn by
State Traffic Engineer
Approved by

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONDUIT INSTALLATIONS DETAILS

Drawn by
State Traffic Engineer
Approved by
The foundations for Steel Strain Poles are pre-designed and are based upon the following conservative soil criteria which covers the majority of soil types found in Florida:

- Classification: Cohesionless (Fine Sand)
- Friction Angle = 30 Degree (30°)
- Unit Weight = 100 lbs/ft³ (assumed saturated)
- Cohesionless Sand
- Friction = 0.5 lbs/ft²
- Unit Weight = 100 lbs/ft³

Only in cases where the Designer considers the soil type to be of lesser strength properties should an analysis be required. Further, borings or CPT soundings may be used to verify the assumed soil properties. Furthermore, borings in the area that were performed for the other purposes may be used to confirm the assumed soil properties.

TABLE OF STRAIN POLE VARIABLES

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Note: Details shown on this sheet are for #21 dia. pole sections. However, sections with more than #21 dia. and round sections are permitted, provided the outside diameter and wall thickness are not reduced.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

POLE BASE

BASE DETAILS AND TABLE OF VARIABLES

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

STEEL STRAIN POLE

Note: Details shown on this sheet are for #21 dia. pole sections. However, sections with more than #21 dia. and round sections are permitted, provided the outside diameter and wall thickness are not reduced.
NOTE: A properly sized Service Head Weather Heads shall be installed and fastened securely on to the standard pipe for each pole location. At locations other than service entrance, the service head race is to be left closed to outdoor atmosphere. Service entrance installation per Index No. IT72.-

WIRE ENTRANCE DETAILS

POLE TOP CUT-AWAY (Option 'a')

POLE TOP CUT-AWAY (Option 'b')

POLE TOP NOTES:
Any combination of the above two options may be used, provided both lifting and wiring is accommodated.

CATEenary AND Messenger wire Clamps

NOTE: Clamps have been sized for Design Cable Loads shown in the Table, and a Maximum Pole Diameter at the Clamp Location of 2'-14".
**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**CONCRETE POLES**

**POLE TYPES N-III THROUGH N-VIII**

*Do not use these types in Type N-II. Consult with local authorities, ground wire locations and conduct location as shown in the plans.*

**SERVICE POLES - TYPE N-II**

*(For installations refer to Roads and Traffic Design Standard, Index No. 7804)*

**MINIMUM REQUIRED MOMENT CAPACITY**

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**SERVICE (Conduits** Design poles to carry the *minimum required moment capacity.* These moments are based on a dead load plus live load combinations, therefore the load at any one pole may vary for similar load conditions shown in Section 6 for the applicable factor. From Section 6 of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

**POLE TYPES N-III THROUGH N-VIII**

![Diagram of pole types](image_url)
Notes:

1. With the approval of the resident engineer, the service head hole for joint use poles may be drilled by the utility company at an angle of 90° but not less than 45° to the face of the pole.

2. Lagging wire should normally be used for distance of 12' or greater.

3. The overlapped connection of adjustable hangers shall use a minimum of 2 bolts with a minimum spacing of 2" between bolts.

4. Meet all grounding requirements of Section 62.0 of the Standard Specifications.
Figure A
Cable Drop and Termination Detail
Aerial Interconnect Figure 8

Cable Suspension Clamp
UL Approved Split Bolt Connector

Notes:
1. The messenger wire of the Interconnect cable shall be grounded to the copper ground wire of the pole or to the external wire extending down the pole.
2. When utilizing the external ground wire to the pole, a piece of 5" conduit shall be run up the pole externally to a point 6' above finish grade to protect the ground wire connecting the messenger wire to the ground rod.
3. Locking cable ties or lashing wire when used shall be placed no further than 12" apart except at the point of cable drop or termination where one tie shall be placed at the point where the cables separate from the messenger wire and another placed 4" from that tie. When using Figure 8 Interconnect cable only the locking cable tie shall be used.
4. If accessible the internal ground wire of the support pole may be used to ground the messenger wire.
5. Lashing wire should normally be used for distances of 12' or greater.
6. Meet all grounding requirements of Section 620 of the Standard Specifications.
NOTES:

1. The lightning arrester can be located on the side or bottom of the main disconnect enclosure at the Contractor's Option.

2. Liquidtight flexible conduit is approved for use from the electrical disconnect to the cabinet when both are installed on the same pole.

3. Bend all elements together to form an Intersection Grounding Network in accordance with Section 620 of the Department's current Standard Specifications for Road and Bridge Construction. The bond wire shall be run in conduit with the Electrical Service Wire or Signal Cable.

4. Meet all grounding requirements of Section 620 of the Standard Specifications.
INSTRUCTIONAL NOTES FOR DESIGNERS AND FABRICATORS

1. This index (IT45) is for use in preparing signextension plans when single arm and double arm mast assemblies are required. This standard establishes the requirements of mast arm components listed on the Qualification Product List (QPL). When components are on the QPL, the "Standard Mast Arm Design Table" will be the only information required in the Contract Plans, and shop drawings are not required.

2. If a mast arm configuration does not meet the requirements stated below, a special design and shop drawing submittal is required. For Special Designs, Structures Standard Drawing S-100 must be completed and included in the Contract Plans.

3. The "Standard Mast Arm Design Table" on Structures Standard Drawing S-100 is to be filled out in accordance with the following instructions and examples on Steel No. 2 of 2 and included in the Contract Plans.

4. The data for Standard Mast Arm are on index No. IT45. The arm classes are used regardless of single or double arm configurations. The poles are for either single or double arm configurations without isolators or single arm configurations with isolators.

5. The standard arm lengths and the sing separated locations are designed for the arm on the mast arm design loading tree on this sheet. If the same arrangement of signals and isolators used with one or more arms or isolators closer to the pole, the pole may be used. If the same arrangement is used with one or more signals or isolators further from the pole, or if a different arrangement of signals and isolators is used, a special design is required.

6. The arm types shall be specified in the "Standard Mast Arm Design Table". The standard arm length is used, as further entries are required under the arm columns, if necessary. A shorter arm length may be obtained by removing length from the arm tip. In this case, enter the actual arm length to nearest diameter (1/8") under the appropriate arm in the "Standard Mast Arm Design Table".

7. If a double arm structure is required, both arm types and the angle between the arms shall be entered in the "Standard Mast Arm Design Table". The angle between arms is measured from the first arm to the pole, and shall be either 90° or 270°. If the angle between the arms is not 90° or 270°, a special design is required.

8. Pole types Q thru Q8 and R thru R4 may be used with both single arm and double arm structures without isolators. Pole types Q2 thru Q24 Lum and R2 thru R24 Lum are intended for single arm structures with isolators. Use the Pole Selection Table to select the pole type to be used with any combination of arm types. The pole connection box, base plate variables and drifted shaft variables are shown in the "Pole, Connection and Shift Design Table" on index No. IT43.

9. The connection box variables are consistent with the pole type used with each pole type. If a double arm structure is used, the same connection box variables are to be used for each arm.

10. The pole type and arm mounting height (IUB) shall be specified in the "Standard Mast Arm Design Table". The arm mounting height (IUB) shall be between 18" and 22".

11. Special design is required for arm mounting heights greater than 22". Standard poles Q thru Q8 and R thru R6 are available to the 94 foot height, if the standard height is used, as further entries are required under the pole information, if necessary. A shorter pole may be obtained by removing height from the pole tip. In this case, enter the actual pole height (IUB) and the actual pole tip diameter (1/8") in the "Standard Mast Arm Design Table".

12. Pole Q2 thru Q24 Lum and R2 thru R24 Lum are designed for a hinged bracket attached to the pole. The location is 24" from the face of the pole. If the location is changed, an engineering change order (ECO) shall be provided. If the location is changed, the engineering change order (ECO) shall be provided. The location is 24" from the face of the pole.

13. Component type numbers shall be entered in the Assembly Numbers column using the following formats:

- **Single Arm**
  - Arm Type - Pole Type = Bw - We

- **Double Arm**
  - First Arm Type - Second Arm Type = Bw - Bw - We

14. **Notes:**

- Design: a 2"-0" x 2"-0" Slpl.
- Design: a 1/8"-6" x 6" Slpl.
- Design: a 1/8"-6" x 12" Slpl.
- Design: a 2"-0" x 3"-0" Slpl.
- Design: a 1/8"-6" x 6" Slpl.
- Design: a 1/8"-6" x 12" Slpl.
- Design: a 2"-0" x 3"-0" Slpl.

15. The foundations for Standard Mast Arm Assemblies are pre-designed and are based upon the following conservative soil criteria which covers the great majority of soil types found in Florida.

- **Classification:** Cohesionless (Fine Sand)
- **Froth Angle:** 30 Degree (20')
- **Unit Weight:** 50 psf (lfs, assumed saturated)

Only in cases where the Designer considers the soil type at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and if relatively uniform soil, a single boring or sounding may cover several foundations. Furthermore, soundings in the area of the structures for other purposes may be used to confirm the assumed soil properties.

16. Standard Mast Arm Assemblies may be placed on existing foundations with reference to Structures Standard Drawings S-100 or S-150 as necessary to implement installation. Anchor installation shall be carried out in accordance with Sections 464 and 937 of the Specifications and in accordance with manufacturer’s recommendations. Anchors may be offered from other sources, but must be placed such that all anchors are within the Foundation reinforcing cage. Remove existing grout pad. Cut existing Anchor Bolt flush with top of Foundation. Replace damaged or removed portions of Foundation using epoxy bonding compound as necessary, according to Section 400 of the Specifications. Replace grout pad according to Section 534 of the Specifications.
**STANDARD MAST ASSEMBLIES DESIGN TABLE**

<table>
<thead>
<tr>
<th>STRUCTURE NUMBERS</th>
<th>ASSEMBLY NUMBERS (i)</th>
<th>FIRST ARM</th>
<th>SECOND ARM</th>
<th>UF (mph)</th>
<th>POLE TYPE</th>
<th>SPECIAL DRILLED SHAFT DATA</th>
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<td>AT TYPE</td>
<td>FBA (ft)</td>
<td>FBA (ft)</td>
<td>POLE</td>
<td>DA (ft)</td>
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<td>BB</td>
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</table>

**TABLE NOTES:**

1. **Single Arm**
   - **1.** If an entry appears in columns "UAA" and "UCA", a shorter pole is required. This is obtained by removing length from the arm tip. The pole height shall be shortened from "UAA" to "UCA" and the tip diameter shall be increased from "UAA" to "UCA".

2. **Double Arm**
   - **1.** If an entry appears in columns "SAF" and "SFB", a shorter arm is required. This is obtained by removing length from the arm tip. The pole height shall be shortened from "SAF" to "SFB" and the tip diameter shall be increased from "SAF" to "SFB".
   - **2.** The foundations for Standard Mast Assemblies are pre-designed and are based on the conservative soil conditions which cover the great majority of soil types found in Florida. The mast shall be driven into solid material and the tip of the mast shall be driven into solid material. The pole tips shall be driven into solid material and the tip of the pole shall be driven into solid material. The pole tips shall be driven into solid material and the tip of the pole shall be driven into solid material.

3. **Example 2 INSTRUCTIONS**
   - **1.** Select First Arm Type
     - Designates longest arm as First Arm. For a 52' Arm, designate Arm 52 (Maximum Arm Length = 52') As in Example 1, compare attachment sizes and locations with design loading trees. In this case, all attachments are smaller than and closer to the pole than shown in the design loading trees. Select and enter Arm Type 52 under the First Arm in the "Standard Mast Assembly Design Table" on Structures Standard No. 5-100.
   - **2.** Specify Short Arm Type
     - When the full 52' Standard Arm is not required, provide the required 52' arm by entering an actual length of 28' under "FAA" for the First Arm. FAA = FA + 52'. Therefore, FAA = 52' + 28' or 80'."FBA" = FAA - 28'. Therefore, FAA = 80' - 28' or 52'. Determire actual tip diameter "FBA" for Arm shortened by 8'. FAA = FB + 52' - 28' or 74'. Therefore, FAA = 74' - 28' or 46'. Enter 46' for FAA under First Arm.
   - **3.** Select Second Arm Type
     - Choose BB.
   - **4.** Enter angle between arms as "BB" in "Standard Mast Assembly Design Table". The angle is measured counter-clockwise from the First Arm and must be either 90' or 120'.
   - **5.** Select Pole Type
     - Use Pole Selection Table Double Arm on Index No. 7743 C2 with Arm Types 52 and 19 and select Pole Type 120. Enter Pole Type "120" in the "Standard Mast Assembly Design Table".
   - **6.** Determine Arm Mounting Height "UAA" or "UCA".
     - "UAA" = 9.95' + 52' or 61.95'. Use 62'.
     - "UAA" = 18.92' (First Arm) or 18.54' (Second Arm). Use 18.92'.
   - **7.** Specify shorter pole height.
     - This procedure is similar to specifying a shorter arm. Select actual height of 22' and enter under "UAA" in the "Standard Mast Assembly Design Table". Determine actual tip diameter "UAA" for shortened Type "QJ". "UCA" = 18.92' + 22' or 40.92'.
   - Enter 40.92' under "UCA" in the "Standard Mast Assembly Design Table".
   - **8.** Enter Assembly Numbers BB - BB - D3. First Arm Type - Second Arm Type - Pole Type.
### Pole Selection Table - Single Arm - With & Without Luminaires

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<th>Pole Type</th>
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**Arm Type**
- B1
- B2
- B3
- B5
- B6
- B7

### Pole Selection Table - Double Arm - Without Luminaires

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**Arm Type**
- G1
- G2
- G3
- G4
- G5
- G6

### Arm Design Table - All Cases

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<th>ARM CONNECTION &amp; WELDS</th>
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**Arm Type**
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### Pole, Connection and Shaft Design Table - Single & Double Arm

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**Note:**
- Work this index with index No. 17745.
- Standard Wart Arm "B" Assemblies are designed to Loading Trees as Instructed in Index No. 17746 for Design Wind Speed = 60 mph with Signal Bowden Pipes.

### Luminaires and Luminaires Connection

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### Component Data for Standard Mast Arm "B" Assemblies

- **State of Florida Department of Transportation**
- **Component Data**
  - **Index No.** 17745
  - **Design Wind Speed:** 60 mph with Signal Bowden Pipes
### POLE SELECTION TABLE - SINGLE ARM - WITH & WITHOUT LUMINAIRE

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### POLE SELECTION TABLE - DOUBLE ARM - WITHOUT LUMINAIRE

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### ARM DESIGN TABLE - ALL CASES

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### LUMINAIRE AND LUMINAIRE CONNECTION

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**NOTES:**

1. Work this Index with Index No. IT74.
2. Standard Wad Arm "C" Assemblies are designed to Loading Tiers as indicated in Index No. IT74 for either Design Wind Speed = 90 mph with Signal Backsheds or Design Wind Speed = 100 mph without Signal Backsheds.
3. DND6J indicates shaft depth for District 6.
**Mast Arm Assemblies General Notes**

1. Signal Structure Waterfall shall be as follows:
   - Poles & Mast Arms: ASTM A586 Grade 50, 55, 60 or 65 and ASTM A36
   - Shear Panels: ASTM A586 Grade 50 or 55
   - Poles: ASTM A586 Grade 50 or 55
   - All nuts, bolts, washers, and threaded bars: ASTM A586 Grade C or D
   - Horizontal Shears: ASTM A586 Grade E

2. Concrete shall be Class 22-Gritted/Slushed with a minimum 28-day compressive strength of 4000 psi for all environmental classifications.

3. Drilled Steel shall be ASTM A586 Grade 60 or 65.

**Typical Elevation and Notes**

1. Refinishing shall be ASTM A586-96, Grade 60 or 65.

2. Concrete shall be Class 22-Gritted/Slushed with a minimum 28-day compressive strength of 4000 psi for all environmental classifications.

3. Drilled Steel shall be ASTM A586 Grade 60 or 65.

4. All welding shall conform to American Welding Society Structural Welding Code (Steel) AWS/NACE D1.1 (current edition).

5. All steel items shall be normalized as follows:
   - All Nuts, Bolts, Washers, and
   - Threaded Bars/Shanks (depending on size)
   - All other steel items: ASTM A36

6. Lap welds between IWFs from first arm of double arm panel or see special instructions on Mast Arm Tabulation Sheet.

7. Except for Anchor Bolts, all hole diameters shall be equal to the bolt diameter plus 0.040", prior to galvanizing. Hole diameters for Anchor Bolts shall exceed the bolt diameter plus 0.030".

8. **NOTE:** Contractor shall verify this dimension prior to fabrication of Poles.
The 'Slip Joint' splice shall be a tight fit with no change in the most arm slope due to the splice.

NOTE: Longitudinal seam welds within six inches of circumferential welds shall be complete penetration welds. Longitudinal seam welds of telescopic field splices shall be complete penetration welds for the splice length plus six inches.

Six 'FP' Dia. Connection Bolts (may vary for Special Design)

Provide Ultrasonic Testing for longitudinal testing in connection plates when 'F' exceeds it.
Adjust width of top and bottom connection plates to maintain minimum clearance shown.

Center of pole

First mast arm

Second mast arm

 onBackPressed

Center of first mast arm and 25° D.I. Con., Plate, Welding hole

Six "SP" D.I., Connection Bolts (may vary for Special Design)

Section K-K

Detail "P"

Elevation (Double Arm Connection)

NOTE
1. Details shown on this sheet are for 12 sided pole sections, however, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.

2. Mast arm and connection plates shall be match marked to ensure proper assembly.

Typical double arm connection details
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

MAST ARM ASSEMBLIES

TYPICAL LUMINAIRE ARM AND CONNECTION DETAILS
MONOTUBE SIGNAL STRUCTURE NOTES

1. Signal Structure Material shall be as follows:
   - Pole & Monotube Arm: ASTM A456 Grade 56
   - Handhole Frame: ASTM A516 Grade 60
   - Handhole Cover: ASTM A508 Grade 60
   - Steel Plates: E70XX
   - Bolts: ASTM A325 Type 1
   - Nuts: ASTM A563 Grade 55
   - Washers: ASTM F436 Type 36
   - Aluminum Nut Cover: ASTM B219

2. Reinforcing Steel shall be ASTM A615-96, Grade 60 ksi.

3. Concrete shall be Class 3C (C11) with a minimum 28-day compressive strength of 4200 psi for all environmental classifications.

4. Grout shall have a minimum 28-day compressive strength of 5000 psi and shall meet the requirements of Section 534 of the Specifications. Grout at the base of uprights shall be installed a minimum of 7 days prior to the installation of signals or sign panels.

5. All welding shall conform to American Welding Society Structural Welding Code (Steel) AWS/D1.1 (current edition).

6. All steel items shall be galvanized as follows:
   - All Nuts, Bolts and Washers: ASTM A653 Class C or D depending on site
   - All other steel items: ASTM A653
   - (Including Pole & Monotube Arm)

7. The Design Wind Speed is 100 mph with a 30 percent gust factor.

8. Alternatives Design for this Structure are not allowed.

9. Except for Anchor Bolts, all bolt hole diameters shall be equal to the bolt diameter plus 0.5", with the exception of Anchor Bolts which shall not exceed the bolt diameter plus 0.25".

10. Sign Panels and Signals attached to the Monotube shall be located as shown on the Traffic Signal Plans. Wire access holes shall not exceed 1/2" in diameter.

11. The Pole shall be installed vertically. Arm Camber shall be accounted for in the Flange Connections.

12. The Flange shall be installed horizontally from the Monotube.

13. All signals shall be installed vertically.

14. Monotube Arm & Poles shall be fabricated from round pipe.

15. If dewatering is required by the Engineer, they shall be installed within 3'-0" of the third points of the Span Length.

16. Each Standard Monotube Signal Structure has been designed for two free swinging internally illuminated street signs per pole, which are acceptable by Contractor Certification provided they meet the applicable requirements of Section 696, which exceed no more than 75 lbs. each and are no more than 12 sq. ft. in area each.

Base Plate Connection

Grilled Shaft

Grilled Shaft

Base Plate Connection

Special Design

Fabricator's Name

Manufacturer's Name

Pole Diameter (in)

Monotube Arm Diameter (in)

Concrete Mix Design

Foundation Design

Material Type

Manufacturers Name

ELEVATION VIEW

(left to scale)

Pole & Monotube Arm

Handhole Frame

Handhole Cover

Steel Plate

Bolts (except Anchor Bolts)

Anchor Bolts

Nuts for Anchor Bolts

Stainless Steel Washers

Aluminum Nut Cover

Drilled Shaft

Note: The Contractor shall verify these dimensions prior to fabrication of poles.

The Contractor shall verify that the drilled shaft locations shown on the Foundation Plans are within the RZW. shaft locations may be adjusted as required and as approved by the Engineer.

ARM SECTIONS

Base Plate Connection

Top of Grouted Pad

Top of Flanged Grade

Camber Details

Note: Fabricators with rolling camber up.

The Design Wind Speed is 100 mph with a 30 percent gust factor.

ELEVATION VIEW

(left to scale)

Pole & Monotube Arm

Handhole Frame

Handhole Cover

Steel Plate

Bolts (except Anchor Bolts)

Anchor Bolts

Nuts for Anchor Bolts

Stainless Steel Washers

Aluminum Nut Cover

Drilled Shaft

Note: The Contractor shall verify these dimensions prior to fabrication of poles.

The Contractor shall verify that the drilled shaft locations shown on the Foundation Plans are within the RZW. shaft locations may be adjusted as required and as approved by the Engineer.

ARM SECTIONS

Base Plate Connection

Top of Grouted Pad

Top of Flanged Grade

Camber Details

Note: Fabricators with rolling camber up.
INSTRUCTIONAL NOTES:

1. This Index, if used, is for use in preparing signalization plans when monotube assemblies are required. This standard establishes the requirements of monotube components listed on the Qualified Products List (QPL). When using components on the QPL, the span length of each pole will be the only information required in the Contract Plans and Shop Drawings are not required.

2. Monotube configurations do not meet the requirements stated below, a special design and shop drawing submission is required.

3. Four standard monotube configurations are provided. The standard monotube length and the signal locations used for design of the arm are shown on the monotube design loading tree on this sheet, if the same arrangement of signals is used with one or more signals closer to the nearest pole, the standard monotube may be used. If the same arrangement is used but one or more signals are farther from the nearest pole, or if a different configuration of signals is used, a special design is required. If any signal arm is to be attached to the monotube arm a special design is required.

4. Standard monotube span lengths of 18'-0", 19'-0", 20'-0", and 12'-0" are shown. For other required span lengths with the same configuration of signals in the same location closer to the poles, the standard monotube design with the next largest standard span length may be used. The difference in length shall be removed from the outer horizontal segments of the arm. If a span longer than 25'-0" is to be used, a special design is required.

5. The standard monotube is valid for an arm heights between 21'-0" and 23'-0". If an arm height of less than 18' is to be utilized with the same configuration of signals in the same location closer to the poles, the standard monotube may be used provided that minimum required clearances to the roadway are maintained.

6. The foundations for the standard monotube are pre-designed and are based upon the following assumptions of soil types which cover the majority of soil types found in Florida:

- Cohesionless (Fine Sand)
- Friction Angle = 30 degrees
- Unit Weight = 50 lbs./cu. ft. (assumed saturated)

Only in cases where the Designer recognizes the soil type of the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively infrequent times, a slope boring or sounding may cover several locations. Further, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

MONOTUBE SIGNAL STRUCTURE DESIGN INTERSECTION AND DESIGN LOAD TREE

DESIGN LOADING TREE FOR MONOTUBE SPAN SIGNAL STRUCTURE

Note: Signal placement on 4 of the 8 signals are included in the design of Standard Area.

Note: For referenced dimensions see Index IFM Sheet 4 of 4.
**FOUNDATION PLAN**

- Center of Drilled Shaft, Base Plates, and Pole
- Align Anchor Bolt with MONOTUBE Arm and Handholes
- 5/8" Tie Bars @ 1'-6"

**SECTION A-A**

- Center of Drilled Shaft, Base Plates, and Pole
- Align Anchor Bolt with MONOTUBE Arm
- 5/8" Tie Bars @ 1'-6"

**SECTION C-C**

- Note: Concrete and Reinforcement not shown.
- Anchor Bolt Group locations may be ±1/8" in the direction of the span

**SECTION B-B**

- 1/4" plate washer
- Double nuts, top nut may be 1/2" left of shaft
- Headed anchor bolts may be 1/2" right of shaft
- 1/4" plate washer

**BASE PLATE AND ANCHORAGE ELEVATION**

- Note: For referenced dimensions see index (7746 Sheet 4 of 4).
**Bolted Flange Splice**

**DETAIL A**

**SECTION A-A**

**SECTION B-B**

**SECTION E-E**

**TABLE OF MONOTUBE VARIABLES**

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**Foundation & Base Plate**

**Signal Layout**

**FLANGE SPLICE DETAILS**

**STATE OF FLORIDA**

**DEPARTMENT OF TRANSPORTATION**

**MONOTUBE SIGNAL STRUCTURE ARM CONNECTION DETAILS & TABLE OF VARIABLES**

**NOTES:**

- Handhole Cover may be omitted when Terminal Compartment is provided.
- Terminal Compartment is optional. See Monotube Tabulation for locations.

**TABLE OF MONOTUBE VARIABLES**

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**For additional variable definitions see Sheets 3 of 4.**
OPTIONS:

**OPTION 1**
(For Span Wire Assembly)

**OPTION 2**
(For Span Wire Assembly)

**OPTION 3**
(For Mast Arm Assembly and Monotube Signal Structure)

NOTES:

1. Free-swinging, internally-illuminated street signs shall be installed on signal structures only at one of the optional locations shown on this drawing, unless a special design is completed for the support structure.

2. Free-swinging, internally-illuminated street signs shall meet the requirements of Section 699 of the Standard Specifications for Road and Bridge Construction.

3. Pole attachments and cantilever arm for truss assemblies may be accepted by Contractor certification provided the signs being supported meet the weight and area limitations included in Section 699 for “Acceptance by Certification”.

4. Pole attachments and cantilever arm for truss assemblies supporting signs not meeting the weight or area limitations included in Section 699 for “Acceptance by Certification” require the submittal of structural calculations and Shop Drawings that have been prepared by and sealed by the Specialty Engineer.
As an option, the contractor will be allowed to install pedestrian signals on concrete poles and pedestals with the use of lead anchors (two bolts same size per tub). In lieu of the stranded steel bonds:

1. Holes drilled or punched in metal poles or pedestals shall be thoroughly reamed, cleaned of all dirt and rust, and covered with two coats of zinc rich paint as specified in the standard specifications for road and bridge construction. Grommets or bushings shall be installed in holes.

2. Meet all grounding requirements of Section 620 of the Standard Specifications.
GENERAL NOTES

1. If the loop lead-in is 75 or less from the edge of the loop detector or controller cabinet, continue the twisted pair to the cabinet. If the loop lead-in is greater than 75 continue the twisted pair to the specified pull box, splice to allotted lead-in wire and continue to cabinet or controller cabinet.

2. The width of all saw cuts shall be sufficient to allow unforced placement of loop wire or lead-in cables into the saw cut. The depth of all saw cuts, except across expansion joints, shall be 3" allowed with a maximum of 4".

3. On resurfacing or new roadway construction projects the loop wires, and lead-in cables may be installed in the asphalt structural course prior to the placement of the final asphalt wearing course. The loop wire and lead-in cable shall be placed in a saw cut in the structural course. The depth of the cable below the top of the finished surface shall comply with note 2.

4. A nonmetallic hold down material shall be used to secure loop wire and lead-ins to the bottom of saw cuts. Hold down material shall be placed at approximately 12" intervals around loops and 24" intervals on lead-ins.

5. The minimum distance between the twisted pairs of loop lead-in wire is 6" from the loop to 12" from the pavement edge or curb.

6. Splice Connections in pull boxes with U.L. listed, water tight, insulated enclosures. Place one enclosure over the end of each conductor and place a third enclosure over the exposed end of the allotted cable.

7. As an alternate, a larger diameter enclosure that will accommodate both the loop of the conductor and the exposed end of the allotted cable may be used.

8. The maximum area of asphalt to be disturbed shall be 6" x 6". This area shall be restored as directed by the Engineer.

TWISTED PAIR AND LOOP LEAD-IN INSTALLATION WITH CURB & GUTTER

ALTERNATIVE 1

Drill A Hole Through The Curb At The Point Where The Required Saw-Cut Depth Is Obtained. Just Prior To Cutting The Top Visible Edge Of The Curb, Slide A Section Of Flexible Conduit At Least 6" Into The Hole From The Back Side Of The Curb But Not Within 2" Of The Top Of The Hole. The Conduct Shall Be Snug Within The Drilled Hole. Fill The Top Of The Hole With Loop Sealant To The Level Of The Curb Surface. A Nonmetallic Material Should Be Used To Prevent Excessive Loop Sealant From Entering The Flexible Conduit.

ALTERNATIVE 2

Drill A Hole Of 2" To 4" Larger In Diameter Than The Rigid Conduct To Be Used Through The Roadway Appliance (Concrete) Surface And Base At An Appropriate Angle To Intercept The Trench Or Pull Box Hole. Place A Predetermined Length Of Flexible Conduct In The Hole And Drive The Conduct Into The Trench Or Hole. Install A Watertight (Nonmetallic) On The Roadway End Of The Flexible Conduct. The Top Of The Rigid Conduit Shall Be Approximately 6" Below The Roadway Surface. Fill The Hole With Loop Sealant To The Level Of The Roadway Surface. A Nonmetallic Material Should Be Used To Prevent Excessive Loop Sealant From Entering The Rigid Conduct.
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 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 on two lanes.
4. The number of individual loops in the Type G loop may vary up to a maximum of four (4).
5. Lead-In may be connected to either end of loop.
6. The leading edge of loop Types A,C,D,E,F may extend past the stop line a maximum of 24". The length of those loops may be extended to a maximum of 48". Each intersection should be individually designed and if the modifications noted above are required it must be noted or detailed in the plans.
7. Loop lead-In wires should not be installed in the same pull box with signal power cables.

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VEHICLE LOOP INSTALLATION DETAILS

PLAN

Pavement Joint

Double Width Cut

Concrete Groove Over Wire.

Soft Setting

Sealer Injected into Joint Section Of Groove Over Wire.

LOOP CORNER AND LEAD-IN DETAILS

Notes:
1. Loop conductors must follow wire-out to bottom forming edge section of joint.
Concrete Strain Pole

Metal Strain Pole

Grade

Steel Pipe

Concrete Pedestal

Cone

Pedestrian Actuated Signal Sign (See Fig. E & F)

Push Button

FIGURE A
POLE MOUNTED DETECTOR STATION

Concrete Pedestal

4½" OD Galvanized Pipe

Concrete Pedestal

Grade

Sidewalk

Concrete Pedestal

Grade

Sidewalk

FIGURE B
PEDESTAL STATION DETECTOR STATION

Concrete Pedestal

Grade

Sidewalk

Concrete Pedestal

Grade

Sidewalk

FIGURE C
WOOD POLE MOUNTED DETECTOR STATION

Notes:
1. Signs (RIO-3A & RIO-44A) shall be mounted above detectors, explaining their purpose and use.
2. The positioning of pedestrian push button should clearly indicate which crosswalk signal is actuated by each push button.
3. Push button and signs are to be mounted in accordance with Standard Specifications, section 665.
4. Meet all grounding requirements of Section 621 of the Standard Specifications.

Pedestrian Actuated Signal Sign (See Fig. E & F)

Push Button

Wood Strain Pole

6" (Rigid Galv.) Conduit

Non-Corrosive Conduit Straps

Concrete Pedestal

Grade

Sidewalk

Concrete Pedestal

Grade

Sidewalk

FIGURE D
POST DETECTOR STATION DETECTOR STATION

Concrete Pedestal

Grade

Sidewalk

Concrete Pedestal

Grade

Sidewalk

FIGURE E
PLAN

Concrete Pedestal

Grade

Sidewalk

Concrete Pedestal

Grade

Sidewalk

FIGURE F
PLAN

Concrete Pedestal

Grade

Sidewalk

Concrete Pedestal

Grade

Sidewalk
PUSH BUTTON TO CROSS
ST NAME

FTP-25-04

PUSH BUTTON TO CROSS
NAME NAME

FTP-26-04

START CROSSING
Watch For Vehicles
DON'T START
Finish Crossing
If Started
DON'T CROSS

TO CROSS
PUSH BUTTON

RIO-3b

CASE I
POLE PARALLEL TO CURBLINE
ALTERNATE TO FIGURE F

CASE II
POLE DIAGONAL TO CURBLINE

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
PEDESTRIAN DETECTOR
ASSEMBLY INSTALLATION
DETAILS

Name: Data
Approved:
Designed:
Drawn:
Checked:
Revision Sheet No.: 17784

1 of 2
When a pole mounted cabinet is specified, the 2" hole for the cabinet shall be field drilled.

Notes:
1. The number, size and orientation of conduit exits will vary depending on site condition or location. Two separate 2" PVC conduits shall be provided to all boxes. An access shall exist to the direction of the center rear of the cabinet base. This is a pull box and capped with a weather tight fitting. If obstructions prevent the access conduit from exiting to the rear, the rear of the cabinet is located at the R/W line, a side exit of the access conduit shall have to be approved by the project engineer. All access conduit novel shall be capped with a weather proof fitting.

2. Meet all grounding requirements of Section 600 of the Standard Specifications.
SIGNAL CLEARANCE TABLE

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LEGEND

0: Vehicle Movement Number
1: Protection Movement Number
2: Timing Function Number
3: Phases Number
4: Green Arrow (Left or Right)
5: Red Arrow
6: Yellow Arrow

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

STANDARD SIGNAL OPERATING PLANS

Drawn By: [Signature]     Checked By: [Signature]     Approved By: [Signature]

Date: [Date]     Scale: [Scale]     Sheet: [Sheet]     Drawing No: [Drawing No]
PASSIVE STATE
(TRAIN CIRCUIT NOT ACTIVATED)

ACTIVE STATE
(TRAIN CIRCUIT ACTIVATED)
**SIGNAL PLACEMENT AT RAILROAD CROSSING**

**2 - LANE DESIGN**

**SIGNAL PLACEMENT AT RAILROAD CROSSING**

**4 - LANE DESIGN**

---

**General Notes**

1. No guardrail is proposed for signals, however, some form of impact attenuation device may be specified in certain instances.
2. Advance Flasher to be installed when and as called for in plans or specifications.
3. Top of foundation shall be no higher than 4" above finished shoulder grade.

4. Type of traffic control device
   - Flashing signing
   - Flashing signage with cantilever
   - Flashing signage with gate
   - Flashing signage with cantilever & gate
   - Gate

5. Count of traffic control device
   - Flashing signage - one track
   - Flashing signage - multiple track
   - Flashing signage and gates - one track
   - Flashing signage and gates - multiple track

---

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES**

**Sheet No.** 560

**Drawn By** 4/76

**Checked By** 5/76

**Approved By** 5/78

**Revision Sheet** No. 4

---

**Figure 1**

Gate Length Requirements

See Note 6 Sheet 3

---

**Note:**

Two separate foundations may be required for each lane, one for gates, one for signals, depending on type of equipment used.

---

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES**

**Sheet No.** 560

**Drawn By** 4/76

**Checked By** 5/76

**Approved By** 5/78

**Revision Sheet** No. 4

---

**Note:**

Two separate foundations may be required for each lane, one for gates, one for signals, depending on type of equipment used.
**GENERAL NOTES**

1. The location of flashing signals and stop lines shall be established based on future or present condition of gates with appropriate track clearance.

2. Where plans call for railroad traffic control devices to be installed in curved sections, the minimum position width shall be 20'-0".

3. Location of railroad traffic control device is based on the clearance available between face of curb & sidewalk, 0'-0" to 6'-0" locate device outside sidewalk, Over 6'-0" locate device between face of curb and sidewalk.

4. Stop line to be perpendicular to edge of roadway, approx. 10' from nearest rail or 8' from parallel to gate when present.

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES**
RAILROAD GATE ARM LIGHT SPACING

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MEDIAN SECTION AT SIGNAL GATES

NOTE:

MEDIAN SIGNAL GATES FOR
MULTI LANE UNDIVIDED URBAN SECTIONS
(THREE OR MORE DRIVING LANES IN ONE DIRECTION, 45 mph OR LESS)
**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 85 percentile approach speed.

4. Beginning of operation of drawbridge gates shall be less than 15 seconds after already 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 flashers, with the two top signals on one circuit, and the two bottom signals on the alternately flashing circuit.

9. A Drawbridge Ahead 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 85% approach speed from having continuous view of at least one signal indication for approximately 10 seconds.

10. Requirements on gate installation are contained in Section 4E-14 through 4E-17 of the Manual on Uniform Traffic Control Devices.

11. In accordance with Traffic Engineering Manual (Topic Number 750-000-005) Section 2.1. SLIPPERY WHEN WET SIGNS shall be placed in advance of all MOVABLE and NON-MOVABLE STEEL DECK BRIDGES. See Note II.
BLACK OPAQUE LEGEND AND BORDER ON REFLECTORIZED YELLOW BACKGROUND

TO BE USED WITH TYPE I OPERATION, AS SHOWN ON PREVIOUS SHEET

MONOTUBE SUPPORT MOUNTING

EDGE OF TRAVELWAY

2½" x 2½"-6½"
2" Border-4" Radius
6" Serial "O" Letters

TYPICAL LAMP PLACEMENT

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL DEVICES FOR MOBILE SPAN BRIDGE SIGNALS

Note:
1. All flashing red lights shall be mounted on gate arm and shall operate in the flashing mode only when gate arm is in the lower position or in the process of being lowered. The number of lights shall vary according to length of the gate arm.
2. 2½" alternate diagonal fully reflectorized red and white stripes.

TYPICAL LAMP PLACEMENT

GATE & ARM DETAIL

ROADWAY

DRAWBRIDGE SIGNAL

CENTER LINE MARK

R/R & Gate Bridge Arm 4½ to 20½

Countersupports

2½" Steel Rolling

Roadway

3½" Min

3½" Min

5½" Min

5½" Min

5½" Min
Equipment Cable, 5 ft. long, furnished separately (ref. sheet no. 4)

JI receptacle with aluminum mounting bracket for lanes 1 to 4

Adjustable shelf

Speed/Classification Unit and Modem furnished separately

Veh. speed/class. unit

Modem

Cabinet cable

Surge suppressors (furnished separately)

10 in.

12 volt storage battery

Battery terminal

Solar terminal

Solar power surge protection

Loop term. strip

Loop sensor term. strip

Vehicle sensor term. strip

Inductive loop terminal strips

Vehicle sensor terminal strip

Battery terminal strip

Solar panel terminal strip

Note:
Bracket shall be fabricated of 0.090 - 0.125 inch thick aluminum.

Dimensions may vary depending on the manufacturer of the JI receptacle being furnished. The cabinet manufacturer will construct the mounting bracket to fit the receptacle.

1. Traffic monitoring site cabinet includes:
A. One adjustable shelf;
B. One backplane ass'y;
C. One JI receptacle with mounting bracket;
D. All associated wiring and wiring harnesses.

2. Basic backplane assembly consists of:
A. Two inductive loop terminal strips;
B. One vehicle sensor terminal strip;
C. One battery terminal strip;
D. One solar panel terminal strip.

CABINET LAYOUT DETAIL
(For Up To Four Lanes)
These cable ends must be fabricated to fit the Veh. speed/Class. unit.

Equipment Cable, 5 ft. long, furnished separately (ref. sheet no. 4)

Cable Arrangement For More Than Four Lanes Monitored By a Single Vehicle Speed/Classification Unit

1. Traffic monitoring site cabinet includes:
   A. One adjustable shelf;
   B. Two backplane assemblies (equipped as shown);
   C. Two Jl receptacles with mtg. brackets;
   D. All associated wiring and wiring harnesses.

2. Basic backplane assembly consists of:
   A. Two inductive loop terminal strips;
   B. One vehicle sensor terminal strip;
   C. One battery terminal strip;
   D. One solar panel terminal strip.

CABINET LAYOUT DETAIL
(For More Than Four Lanes And Up to Eight Lanes)
To J1 receptacle

Loop leads from lanes 1 & 2

Loop leads from lanes 3 & 4

Surge suppressor

Piezo sensor leads from lanes 1 - 4

Inuctive loop lead-in and vehicle sensor leads from roadway

Earth ground

8 in. x 24 in. x 0.125 in. thick aluminum backplane

Solar power input

Blk (-)

Red (+)

Solar power output

Voltage reg.

Jumper

Ref. sheet no. 1 or 2, note 2 for items to be included with backplane

All terminal strip contacts are on 9/16 inch centers (Cinch 142 Series or equal)

Use insulated fork wire terminations

State of Florida Department of Transportation

Traffic Monitoring Site

Designed By

Checked By

Review By

Drawn By

Rev. 2 3 of 9 17900
Alum. Bracket for JI Recept. (Attach to shelf mounting rail in cabinet)

JI Receptacle (Amphenol 28-12 recept. W/Male Pins and MS type clamp, or equal.)

Cabinet Cable

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NOTE:

The equipment cable can accommodate up to four lanes of inductive loop and vehicle sensor inputs. (Ref. Sheet No. 1 for cabinet layout)

For more than four lanes and up to eight lanes of inputs, the following options are available:

1. A second Vehicle Speed/Classification Unit and separate equipment cable connecting to a second JI receptacle; or

2. A single Vehicle Speed/Classification Unit capable of up to eight lanes of inputs and a single equipment cable with split ends to fit two JI receptacles. (Ref. Sheet 2 detail)

Numbers in parenthesis in the pinout chart identify lane numbers when a second backplane for lanes 5 through 8 is required.
SPEED/CLASSIFICATION LOOP ASSEMBLY WITH AXLE SENSORS PLACEMENT DETAIL

Lead-In - Sensor Cable Connection (Boot)

Sensor Cable Connection (Boot)

Axle Sensor

Loop Are 6 ft. x 6 ft. And Centered in The Lane

End Of Sensor Mounts Even With The Inside Edge Of Stripe.

Edge Stripe

Note:

Loop slots shall be 0.25 inches wide (max.) by 1.5 inches to 2 inches deep.

Four turns of #12 AWG, type XHHW stranded copper wire shall be placed in the slot. Backer rod shall be used to hold the loop wire in the bottom of the slot.

Loop leads shall be twisted at the rate of 10 to 12 twists per foot.

The twisted pair shall extend to the pull box with three feet of spare length called in the pull box.

All leads (Inductive loop & vehicle sensor) shall be identified according to the lane numbering convention shown on sheet 8 and 9.

TYPICAL UNENCAPSULATED CLASS II VEHICLE SENSOR

Roadway Surface

0.50 in.

Standoff

Sensor Element

0.75 in.

72 in. (Typical)

Top View

Bonding Agent

Plastic Standoff

Sensor Element

0.75 in.

End View

Note:

Some installations may require axle sensors to be placed in the structural course, prior to placement of the friction course.

Note:

These are typical dimensions. Actual dimensions, element cross-sections and standoffs may vary depending on manufacturer and model.
The unit must be capable of detecting up to eight lanes of traffic (in either or both directions) when mounted perpendicular to the roadway.

Coverage area of the unit is affected by the roadway geometry: distance from the travel lanes, median type and width, barrier walls, etc.

Mounting height of the unit and offset from the roadway must be determined on a site-by-site basis, in accordance with the manufacturer's recommended guidelines and existing clear zone requirements.
Vehicle sensors will be identified by, and leads marked with, the letters "VS" followed with the lane number. Example: "VS2"

**A** TWO LANE - TWO WAY

**B** FOUR LANE, DIVIDED - TWO WAY

**C** FOUR LANE, UNDIVIDED - TWO WAY

**D** FOUR LANE/CONTINUOUS LEFT TURN LANE

**E** TWO LANE - ONE WAY

**F** THREE LANE - ONE WAY

**G** SIX LANE, DIVIDED - TWO WAY

**H** EIGHT LANE, DIVIDED - TWO WAY
Vehicle sensors will be identified by, and leads marked with, the letters "VS" followed by the lane number.

Examples:

- **A** Two Lane - Two Way
- **B** Four Lane, Undivided Two Way
- **C** Four Lane, Divided - Two Way
- **D** Four Lane/Continuous Left Turn Lane
- **E** Six Lane, Divided - Two Way
- **F** Eight Lane, Divided Two Way
- **G** Ten Lane, Divided Two Way

**TWO CABINET CONFIGURATION**

**LANE NUMBERING CONVENTION DETAIL**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**TRAFFIC MONITORING SITE**