TABLE CWGS-1

<table>
<thead>
<tr>
<th>A</th>
<th>GUARDRAIL TRANSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 25'</td>
<td>Type WGB</td>
</tr>
<tr>
<td>≥ 25'</td>
<td>Type TGB</td>
</tr>
</tbody>
</table>

NOTES:

PUBLIC ROAD APPROACH INSTALLATION AT BRIDGE END

ININDIANA DEPARTMENT OF TRANSPORTATION
CURVED W-BEAM GUARDRAIL CONNECTOR SYSTEM
SEPTEMBER 2003
STANDARD DRAWING NO.  E 601-CWGS-01

DETAILS PLACED IN THIS FORMAT  09/04/12
/s/ Richard L. VanCleave  09/04/12
SUPERVISOR, ROADWAY STANDARDS  DATE
/s/ Mark A. Miller  09/04/12
CHIEF ENGINEER  DATE
NOTE:
2. See Standard Drawing E 601-TWGB-02 for guardrail transition type WBG details.
4. See Standard Drawing E 601-CWGS-04 and 05 for terminal end buffer details.

TABLE CWGS-2

<table>
<thead>
<tr>
<th>RADIUS</th>
<th>NO. OF CRT POSTS</th>
<th>REQUIRED AREA FREE OF FIXED OBJECTS L x W</th>
</tr>
</thead>
<tbody>
<tr>
<td>8'-6&quot;</td>
<td>5</td>
<td>25' x 15'</td>
</tr>
<tr>
<td>17'-0&quot;</td>
<td>6</td>
<td>30' x 15'</td>
</tr>
<tr>
<td>25'-6&quot;</td>
<td>8</td>
<td>40' x 20'</td>
</tr>
<tr>
<td>35'-0&quot;</td>
<td>11</td>
<td>50' x 20'</td>
</tr>
</tbody>
</table>
### GENERAL NOTES

1. This drawing shall be used in conjunction with Standard Drawings E 601-CWGS-01 through -06, and E 601-CWGT-01 and -02 where a curved W-beam guardrail system is specified.

2. The type of curved W-beam guardrail system to be used shall be as shown on the plans in accordance with Table CWGS-3.

3. Except where otherwise shown, all hardware and installation shall be the same as for the guardrail specified for the adjacent run.

4. A curved W-beam guardrail terminal system shall be used to terminate a run of guardrail only at a driveway. For a public road approach, a curved W-beam guardrail connector system shall be used.

5. A maximum of two guardrail panels may be omitted from the curved W-beam guardrail terminal system only where the bridge railing falls outside of the clear zone and the plans specifically state that panels are to be omitted. See Table CWGS-03 for the number of guardrail panels to be removed for each type of curved W-beam guardrail system.

6. For the 8'-6" radius curved W-beam guardrail terminal system, guardrail shall not be bolted to this post.

7. The embankment slope behind the curved W-beam guardrail system shall be 2:1 or flatter.

8. A minimum 4 ft width shoulder shall be used with a 15 ft minimum drive radius.

9. This dimension shall be 5 ft for the 35 ft radius curved W-beam guardrail connector system.

### TABLE CWGS-3

<table>
<thead>
<tr>
<th>TYPE</th>
<th>RADIUS</th>
<th>NUMBER OF 6'-3&quot; PANELS REMOVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERMINAL SYSTEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>8'-6&quot;</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>8'-6&quot;</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>8'-6&quot;</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>17'-0&quot;</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>17'-0&quot;</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>17'-0&quot;</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>25'-0&quot;</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>25'-0&quot;</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>25'-0&quot;</td>
<td>2</td>
</tr>
<tr>
<td>CONNECTOR SYSTEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>25'-0&quot;</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>35'-0&quot;</td>
<td>0</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. This sheet shall be used in conjunction with Standard Drawings E 601-CWGS-01, 02, 03, and 06.

2. An alternate single piece having a similar dimensional shape to the terminal end buffer and mating with the W-beam guardrail may be used.

3. The W-beam terminal connector shall be steel of 0.138 inch thickness (10 gauge).

4. If the W-beam terminal connector is lapped on the outside of the guardrail, a galvanized 1" i.d. 2" o.d., 0.134" thick, narrow plain washer shall be placed under the splice bolt heads.

5. Attach the W-beam to the steel pipe with a $\frac{3}{4}$" diameter x 1½" length button head bolt with no washer. No connection to the post is required.

6. Nuts for the anchor cable assembly shall be hand tightened, plus one complete turn at the anchor plate end. All other nuts shall be torqued to 50 ft.-lbs.

INDIANA DEPARTMENT OF TRANSPORTATION

CURVED W-BEAM GUARDRAIL SYSTEM

APRIL 1996

STANDARD DRAWING NO.E 601-CWGS-05

DETAILS PLACED IN THIS FORMAT 9-15-99

/s/ Anthony L. Ormiston 9-15-99
DESIGN STANDARDS ENGINEER

/s/ Firooz Zendi 9-15-99
CHIEF HIGHWAY ENGINEER

REVISIONS APPLIED 4-9-98
See Standard Drawing E 601-CWGS-04 for location of Post B.

The TS 2 1/2" x 2 1/2" structural tube shall be welded to Post B only.

See Standard Drawing E 601-CWGS-04 for location of Post B.
NOTES:
2. See Standard Drawing E 501-CWGT-01 for Table CWGS-1.

Concrete Bridge Barrier Rail

Required Shoulder Width

Drive width

Type 8

anchor

Drive

4-0'

CURVED W-BEAM GUARDRAIL TERMINAL SYSTEM

SEPTEMBER 2003

STANDARD DRAWING NO. E 501-CWGT-01

DRIVE INSTALLATION FOR W-BEAM GUARDRAIL AT BRIDGE END
NOTES:

1. When the face of the guardrail is offset 0'-0" or 1'-0" from the edge of the paved shoulder, the width of the drive shoulder, S, must be increased to maintain the 4'-0" minimum distance between the face of the guardrail and the edge of the drive.

2. For mainline paved shoulder widths equal to or greater than 8'-0" the drive radii should be referenced from the edge of the mainline paved shoulder rather than as shown.


<table>
<thead>
<tr>
<th>MAINLINE PAVED SHOULDER WIDTH</th>
<th>DRIVE SHOULDER WIDTH S</th>
</tr>
</thead>
<tbody>
<tr>
<td>10'</td>
<td>8'-0&quot;</td>
</tr>
<tr>
<td>9'</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>8'</td>
<td>7'-0&quot;</td>
</tr>
</tbody>
</table>

**DRIVE INSTALLATION FOR W-BEAM GUARDRAIL RUN**

**INDIANA DEPARTMENT OF TRANSPORTATION**

**CURVED W-BEAM GUARDRAIL TERMINAL SYSTEM**

**MARCH 2004**

**STANDARD DRAWING NO. E 601-CWGT-02**

[Signature]  3/10/04
[Signature]  3/10/04
ALIGNMENT OF ATTENUATOR, PAD AND ROADWAY

<table>
<thead>
<tr>
<th>Distance A</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Level 3</td>
<td>Test Level 2</td>
</tr>
<tr>
<td>148'-0</td>
<td>132'-0</td>
</tr>
</tbody>
</table>

Desirable

NOTES:
NOTES:

1. The pad and grading details shown on these drawings shall be used as applicable to the attenuator system required for either or both ends of the obstruction.

2. Contractor shall follow manufacturer's recommendations for actual pad size for a particular impact attenuator system.

3. Align the centerline of attenuator system parallel to centerline of the roadway. A maximum angle of 5°, as measured between the longitudinal centerline of the roadway and an impact attenuator system type ED is allowed for the gravel barrel array. See Standard Drawing E 601-IAED-01 for gravel barrel layout and pad size.

4. Variation in transverse slope over the length of the pad shall not exceed 2%.

5. Attenuator system including pad shall not encroach on usable shoulder of the roadway.

6. Longitudinal downward slope shall be 20:1 maximum.

7. Longitudinal transition slope shall be a maximum of 10:1 downward.

8. For a concrete pad adjacent to the outside shoulder area, a distance of 3–3 beyond the far edge of concrete pad from the travel lane shall be sloped 20:1 before gradual transition to existing slope.

9. Transition from full height barrier curb to mountable curb shall be provided where barrier curb exists or is planned.
NOTES:

1. All slopes from the edge of shoulder to the center of the median and distance A upstation and downstation of the obstruction shall be sloped at 20:1 maximum.

2. Median drainage is to be determined by field inspection. If drainage is required, a 12" min. grated box end section type II, slope 10:1, and a 12" min. type 1 pipe shall be used.

3. Concrete pad slope
LEGEND

1. Obstruction
2. Impact attenuator pad, transversely as level as conditions permit, maximum slope 20\%: Longitudinally sloping 20\%: maximum, with respect to roadway grade.
4. Transition slope 10\%: maximum transversely.
5. Slope as needed, 20\%: desirable, 10\%: maximum.
6. 20\%: desirable, 10\%: maximum.
1. See Standards Drawing E-001-GCTA-02 for Details A and B.
NOTES:
1. This configuration shall be used where W-beam guardrail is specified as the bridge-approach guardrail, and is connected to the bridge railing with guardrail transition type TGB. It shall be typical for all four corners.

2. \( L_w \) = length shown on plans of W-beam guardrail at 6'-3" post spacing, ft.
# Typical both sides of roadway

<table>
<thead>
<tr>
<th></th>
<th>W-beam guardrail @ 6'-3&quot; spa.</th>
<th>Pay length shown on plans</th>
<th>Bridge Support</th>
<th>Pay length shown on plans</th>
<th>W-beam guardrail @ 6'-3&quot; spa.</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## TWO-LANE TWO-WAY ROADWAY WITH SINGLE OVERHEAD STRUCTURE AND BRIDGE-SUPPORT DISTANCE TO E.P. > 16'

<table>
<thead>
<tr>
<th></th>
<th>W-beam guardrail @ 6'-3&quot; spa.</th>
<th>GP</th>
<th>Bridge Support</th>
<th>GP</th>
<th>W-beam guardrail @ 6'-3&quot; spa.</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## TWO-LANE TWO-WAY ROADWAY WITH SINGLE OVERHEAD STRUCTURE AND BRIDGE-SUPPORT DISTANCE TO E.P. ≤ 16'

## NOTES:

1. This configuration shall be used where W-beam guardrail is specified along a two-lane two-way roadway to shield the supports of an overhead structure.

2. Dimensions and details not shown hereon shall be as shown on the plans.

---

**INDIANA DEPARTMENT OF TRANSPORTATION**

**GUARDRAIL AT ROADSIDE BRIDGE SUPPORT**

**SEPTEMBER 2011**

**STANDARD DRAWING NO. E 601-GRBS-01**

/\ Richard L. VanCleave 09/01/11

/\ Mark A. Miller 09/01/11

DESIGN STANDARDS ENGINEER

CHIEF HIGHWAY ENGINEER
NOTES:

1. This configuration shall be used where W-beam guardrail is specified along a two-lane two-way roadway to shield the supports of twin overhead structures.

2. Dimensions and details not shown hereon shall be as shown on the plans.
DIVIDED ROADWAY WITH SINGLE OVERHEAD STRUCTURE AND OUTSIDE SHOULDER BRIDGE-SUPPORT DISTANCE TO E.P. > 16'

DIVIDED ROADWAY WITH SINGLE OVERHEAD STRUCTURE AND OUTSIDE SHOULDER BRIDGE-SUPPORT DISTANCE TO E.P. ≤ 16'

NOTES:

1. This configuration shall be used where W-beam guardrail is specified along the outside shoulder of a divided roadway to shield the supports of an overhead structure.

2. Dimensions and details not shown hereon shall be as shown on the plans.

3. Rectangular plate washers shall be installed at each post along this section. See Standard Drawing E 601-GRBS-08.
DIVIDED ROADWAY WITH TWIN OVERHEAD STRUCTURES AND OUTSIDE-SHOULDER BRIDGE-SUPPORT DISTANCE TO E.P. > 16'

DIVIDED ROADWAY WITH TWIN OVERHEAD STRUCTURES AND OUTSIDE-SHOULDER BRIDGE-SUPPORT DISTANCE TO E.P. ≤ 16'

NOTES:
1. This configuration shall be used where W-beam guardrail is specified along the outside shoulder of a divided roadway to shield the supports of twin overhead structures.
2. Dimensions and details not shown hereon shall be as shown on the plans.
3. Rectangular plate washers shall be installed at each post along this section. See Standard Drawing E 601-GRBS-08.

INDIANA DEPARTMENT OF TRANSPORTATION
GUARDRAIL AT ROADSIDE BRIDGE SUPPORTS
SEPTEMBER 2011
STANDARD DRAWING NO. E 601-GRBS-04

Signature: Richard L. VanCleave 09/01/11
Signature: Mark A. Miller 09/01/11

DESIGN STANDARDS ENGINEER
CHIEF HIGHWAY ENGINEER
NOTES:

1. This configuration shall be used where impact attenuator units are specified in conjunction with a crashwall in the median of a divided roadway to shield the support of an overhead structure.

2. Dimensions and details not shown hereon shall be as shown on the plans.

INDIANA DEPARTMENT OF TRANSPORTATION
GUARDRAIL AT MEDIAN-SIDE BRIDGE SUPPORT
SEPTEMBER 2011
STANDARD DRAWING NO. E 601-GRBS-05

STATE OF INDIANA
No. 9750
DESIGN STANDARDS ENGINEER
09/01/11

CHIEF HIGHWAY ENGINEER
09/01/11
NOTES:

1. This configuration shall be used where impact attenuator units are specified in conjunction with a crashwall in the median of a divided roadway to shield the supports of twin overhead structures.

2. Dimensions and details not shown hereon shall be as shown on the plans.

INDIANA DEPARTMENT OF TRANSPORTATION
GUARDRAIL AT MEDIAN-SIDE BRIDGE SUPPORTS
SEPTEMBER 2011
STANDARD DRAWING NO. E 601-GRBS-06

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE

DIVIDED ROADWAY WITH TWIN OVERHEAD STRUCTURES AND MEDIAN BRIDGE SUPPORTS
NOTES:
1. This configuration shall be used where W-beam guardrail is specified along the median-side shoulder of a divided roadway to shield the support of a tandem overhead structure.
2. Dimensions and details not shown hereon shall be as shown on the plans.
3. Rectangular plate washers shall be installed at each post along this section. See Standard Drawing E 601-GRBS-08.
GUARDRAIL-TO-PIER CLEARANCE

NOTE:

① Washers required for each post in this section shall be rectangular plate washers, as shown on Standard Drawing E 601-WBGC-02.

GUARDRAIL AT BRIDGE SUPPORT
SEPTEMBER 2011

STANDARD DRAWING NO. E 601-GRBS-08

INDIANA DEPARTMENT OF TRANSPORTATION

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER
GENERAL NOTES

1. This sheet shall be used when guardrail end treatment type I is specified.

2. The details on this sheet are for the assembly and the installation of the components of guardrail end treatment type I.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL

END TREATMENT TYPE I

APRIL 1995

STANDARD DRAWING NO.E 601-GRET-04

DETAILS PLACED IN THIS FORM 11-15-89

/s/ Anthony L. Osmanski 11-15-89
DESIGN HIGHEST ENGINEER DATE

/s/ Farouq Zadri 11-15-89
EDUCATION HIGHEST ENGINEER DATE

DESIGN STANDARDS ENGINEER ORGINALLY APPROVED 4-03-95

POST NO. 2 CONNECTION DETAIL
**GENERAL NOTES**

1. The top of rail height at this post shall match the height of the adjacent guardrail.

2. Installation of guardrail end treatment type I at the end of a run of rub-rail type guardrail shall require the relocation of the rub-rail as shown.


4. If rub-rail is not spliced at post, the channel shall be cut and repositioned behind the post flange.

5. See Standard Drawing E 608-WKB-03 for Object Marker Type 5 Details.


**CONCRETE ANCHOR DETAIL**

- 10 ga. Standard W-beam terminal connector
- 2 x 1 x 10 ga. Galvanized steel plate
- 8 x 1 1/8 slotted holes
- 1 1/4 holes for bolts, washers, & nuts

**LAP DETAIL**

- Class A concrete anchor shall be 3' x 3' deep cylinder or 3' x 3' x 3' concrete cube

**PLAN**

- Guardrail alignment
- W-beam sections
- Type 3 Object Marker
- Rub-rail

**ELEVATION**

- Post No. 1 & No. 2 length = 8'-0"
NOTES:

1. The required guardrail offset shall be 0 to 2'-0" desirable as specified in the plans. The offset used between the edge of required shoulder and the face of rail shall also be used to establish the barb width at the end of the guardrail end treatment.

2. This distance may vary from 0 to 2'-0" desirable.

3. These dimensions are based on a 2'-0" guardrail offset and must be adjusted for other offset distances to maintain a 10:1 taper.

4. Grading profiles at Section A-A for types OS and Type I guardrail end treatments are shown on Standard Drawings E 801-GRET-08, and -09.

5. Limits of compacted aggregate.

6. Length and width of OS Unit Test Level 3 (TL-3)
   Length = 50'-0"
   Width = 2'-0"
NOTES:
1. This distance may vary from 0 to 2'-0'' desirable.
2. If necessary, move existing ditch line to obtain a 4:1 slope.
3. Length and width of MS Unit Test Level 3 (TL-3) and transition rail where required:
   Length = 3'-3'' (MS unit) + 12' - 6'' (transition rail) = 45' - 9'' (type)
   Width = 2'-4''

PLAN VIEW - GRADING DETAIL FOR G.R.E.T. TYPE MS ON FLARE

PLAN VIEW
GRADING DETAIL FOR GUARDRAIL END TREATMENT TYPE MS PARALLEL TO SHOULDER
NOTES:

1. Grading cross section Option 1 is most desirable and shall be used on new construction. Option 7 is least desirable. The grading cross section to be used shall be as detailed or specified on the plans. A more desirable option may be used in lieu of the option specified.

2. The backfalls on Option 3 shall not exceed 2:1 on 3R projects.


4. See plan views on Standard Drawing E 601-GRET-08.

5. Plow or deeply scarify for existing slopes 4:1 or flatter.

6. Section A-A Options 1, 2, and 3 may be used with guardrail and treatment type 1 or 08.
Non-Recoverable Proposed Slopes (Options 4, 5, 6 and 7)

OPTION 4
4:1 slope for 20', then 3:1 slope and ditch relocated.

OPTION 5
4:1 slope for 10', then 3:1 slope and ditch relocated.

OPTION 6
4:1 or flatter desirable (2:1 max)

OPTION 7
2:1 slope and ditch relocated.

NOTES:
1. Grading cross section Option 1 is most desirable and shall be used on new construction. Option 7 is least desirable. The grading cross section to use shall be as detailed or specified on the plans. A more desirable option may be used in lieu of the option specified.
2. Options 4 through 7 may only be used on a 3R/4R partial reconstruction project with right-of-way restrictions.
NOTES:
1. All posts are 9 ft in length from where the guardrail begins away from the shoulder to the post anchor. Posts for the post anchor are 6 ft long.
2. Guardrail height may be tapered down in elevation to maintain 3:1 maximum.
3. A 4:1 or flatter slope is desirable. However, a steeper or flatter existing slope may be used.
4. Vented ditch culverts may be used to reduce erosion.
5. See Standard Drawing E 801-ORFE-41 for rail end anchor details and post anchor details.
7. Ditch cross section profile should be equal to upstream ditch cross section profile and have same or greater hydraulic capacity.
9. Poles shall be installed offset from the required ditch cross section to maintain ditch's hydraulic capacity.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL END TREATMENT
TYPE II
SEPTEMBER 2004

STANDARD DRAWING NO. E 801-ORFE-10
DESIGN STANDARDS ENGINEER
CHIEF HIGHWAY ENGINEER
DATE

STEEL PLATE DETAIL

STEEL PLATE AND WASHER DETAILS

Steel post

W-beam guardrail

Wood block

Steel post W 6 x 9
6'-0" long

Bolt plate to post with
4- 3/8" hex bolts
2" long with hex nuts

ELEVATION

POST ANCHOR DETAILS

3 - 1" # holes to be field drilled in rail and attached to steel plate with 5/8" # hex bolts 2" long with square washer.

1" # holes to be field drilled in rail and through post flange. Attach to steel plate with 5/8" # hex bolts 2" long with square washer.

FRONT VIEW

RUBRAIL ANCHOR DETAILS

GALVANIZED
NOTES:

1. Grading requirements shown are for 5'-0 or larger structures, and three-sided structures on project constructed on new alignment for design speed of 70 mph rural divided highway.

2. Grading shown above is applicable for 25'-0 span needed guardrail also.

3. Grading requirements for 5'-0 or larger structures and three-sided structures constructed on existing alignments at all design speeds are shown in standard Drawings E 821-GRET 06 through 09.
NOTES:

1. Concrete pad shall be 6" thick with welded wire fabric 6" x 6", W3/W3 or equivalent. A clearance of 2" shall be provided between all sides and top of concrete pad and welded wire fabric.

2. Appropriate impact attenuator Test Level shall be used to determine the concrete pad size and gravel barrel layout.


4. The details shown are for an impact attenuator type ED, gravel barrel array with a maximum obstruction width of 3'-0".

CONCRETE PAD PLAN IMPACT ATTENUATOR TYPE ED
GRavel BARREL ARRAY FOR TEST LEVEL 3

CONCRETE PAD PLAN IMPACT ATTENUATOR TYPE ED
GRavel BARREL ARRAY FOR TEST LEVEL 2
NOTES:


3. Typical post spacing for Thrie Beam Guardrail and Double Faced Thrie Beam Guardrail is 6'-3".

4. Only the blockout material shown may be used.
NOTES:

2. For two-lane two-way operation, use GRET type OS. For structure width > 24'-3", provide three additional spans of standard W-beam guardrail at 6'-3" each before attaching the GRET.


5. See Standard Drawings E 601-NWGGA-02, 03 and 04 for post and block assemblies details.

6. Maximum structure width shall be 24'-3" out to out of structure(s) parallel to road centerline for skewed or perpendicular structure. In this case posts are not located over portion of structure.

7. Maximum structure width shall be 61'-6" out to out of structure(s) parallel to roadway centerline for skewed or perpendicular structure. Modified posts (5 through 10) over the structure where required, see Standard Drawing E 601-NWGGA-03. The remaining wood posts shall be shown on Standard Drawing E 601-NWGGA-02.

8. Post shall clear outer structure side by 4" min.

9. This dimension is 25'-0" between posts 7 and 8. The dimension is 12'-6" or 25'-0" elsewhere.

10. For grading requirements see Standard Drawings E 601-GRET-06 through 09 and E 601-GRET-12.
GUARDRAIL ASSEMBLY FOR COVER ≥ 4’-1 1/4"
FOR ANY STRUCTURE WIDTH

NOTES:
1. This drawing shall be used for any structure width provided cover over structure ≥ 4’-1 1/4”.
2. The 6’-0” length guardrail post shall be used if 4’-1 1/4” ≤ cover ≤ 5’-1 1/4”.
3. The 7’-0” long guardrail post shall be used if cover > 5’-1 1/4”.
4. 3’-7 1/4” for 6’-0” length post and 4’-7 1/4” for 7’-0” length post.
5. A = 2’-6” for 6’-0” length post.
A = 0 (min.) for 7’-0” length post.
MULTIPLE DIVIDED ROADWAY GUARDRAIL LAYOUT FOR
GUARDRAIL FACE TO OBSTRUCTION DISTANCE = 2'-0" BUT < 8'-0"

GENERAL NOTES

1. This configuration shall be used where 4-lane guardrail at
   1'-0"-3/4" post spacing is specified on a divided lane roadway
   to shield isolated or extended obstruction.

2. Dimensions and details not shown on this drawing shall be as shown
   on the plans.

3. Rectangular plate washers shall be installed at each post along
   this section.
MULTI-LANE DIVIDED ROADWAY GUARDRAIL LAYOUT FOR
GUARDRAIL FACE TO OBSTRUCTION DISTANCE > 3' 3" BUT < 4' 3"

GENERAL NOTES

1. This configuration shall be used where W beams guardrail at 3'-1 1/2" post spacing is specified on a divided lane roadway to either an isolated or extended obstruction.

2. Dimensions and details not shown on this drawing shall be as shown on the plans.

3. Rectangular plate washers shall be installed at each post along this section.
TWO-LANE TWO-WAY ROADWAY GUARDRAIL LAYOUT FOR
GUARDRAIL FACE TO OBSTRUCTION DISTANCE \( \geq 3'-3'' \) BUT \( < 4'-3'' \)

GENERAL NOTES

1. This configuration shall be used where W-beam guardrail at 3'-1 1/2''
   post spacing is specified on a two-lane two-way roadway
   to shield an isolated or extended obstruction.

2. Dimensions and details not shown on this drawing shall be as shown
   on the plans.

LEGEND

L = Length of need

- Isolated obstruction
- Extended obstruction
TWO-LANE TWO-WAY ROADWAY GUARDRAIL LAYOUT FOR
GUARDRAIL FACE TO OBSTRUCTION DISTANCE > 2'-6" BUT < 3'-3"

GENERAL NOTES
1. This configuration shall be used where W-beam guardrail at 1'-6 3/4"
or 3'-1 1/2" post spacing is specified on a two-lane two-way
roadway to shield an isolated or extended obstruction.

2. Dimensions and details not shown on this sheet shall be as shown
on the plans.

LEGEND
L = Length of need

Isolated obstruction
Extended obstruction
THRIE BEAM RAIL SECTION

Splice bolts slots
3/4" x 1 3/8"

Post bolt slots
3/4" x 2 1/2" (typ.)

2. See Standard Drawing E 601-TTGB-03 for Thrie Beam Guardrail post and blockout details with the exception of height above shoulder surface for Posts No. 11 through 16.
GENERAL NOTES

1. This drawing shall be used where guardrail transition type GP is specified to connect W-beam guardrail to a pier or frame bent collision wall.

2. The details on this drawing are for the assembly and installation of the deflector components for connecting guardrail transition type GP to a pier or frame bent collision wall.

3. The anchor bolt shall be anchored with a chemical anchor system shown on the Department's List of Approved Chemical Anchor Systems.

DETIAL OF NOSE DEFLECTOR – SQUARE

ATTACHMENT AT SQUARE NOSE PIER
**GENERAL NOTES**

1. This drawing shall be used where guardrail transition type GP is specified to connect W-beam guardrail to a pier or frame bent collision wall.

2. The details on this drawing are for the assembly and installation of the deflector components for connecting guardrail transition type GP to a pier or frame bent collision wall.


---

**ATTACHMENT AT ROUND NOSE PIER**

**ELEVATION**

**PLAN**

**TABLE:**

<table>
<thead>
<tr>
<th>Radius</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'-0</td>
<td>2(\frac{3}{8})</td>
<td>9(\frac{3}{8})</td>
<td>11(\frac{4}{8})</td>
<td>2(\frac{3}{8})</td>
</tr>
<tr>
<td>1'-1(\frac{1}{2})</td>
<td>2(\frac{3}{8})</td>
<td>10(\frac{3}{8})</td>
<td>9(\frac{4}{8})</td>
<td>4(\frac{3}{8})</td>
</tr>
<tr>
<td>1'-3</td>
<td>1(\frac{3}{8})</td>
<td>11(\frac{3}{8})</td>
<td>8(\frac{4}{8})</td>
<td>4(\frac{3}{8})</td>
</tr>
<tr>
<td>1'-4(\frac{1}{2})</td>
<td>1(\frac{3}{8})</td>
<td>12(\frac{3}{8})</td>
<td>7(\frac{4}{8})</td>
<td>7(\frac{3}{8})</td>
</tr>
<tr>
<td>1'-6</td>
<td>1(\frac{3}{8})</td>
<td>13(\frac{3}{8})</td>
<td>6(\frac{4}{8})</td>
<td>8(\frac{3}{8})</td>
</tr>
</tbody>
</table>

**INDIANA DEPARTMENT OF TRANSPORTATION**

**TRANSITION AT PIER**

**TYPE GP**

**SEPTEMBER 1998**

**STANDARD DRAWING NO. E 601-TPGP-02**

**DETAILS PLACED IN THIS FORMAT** 11-15-99

**NO. 15095**

**DESIGN STANDARD ENGINEER DATE**

**ORDINARILY APPROVED** 9-01-98
Concrete bridge railing transition

Thrie beam rail element

Thrie beam terminal connector

Direction of adjacent traffic

Thrie beam rail element

Concrete bridge railing transition

Thrie beam rail element

Thrie beam rail element

Thrie beam terminal connector

Direction of adjacent traffic

LAP DETAIL AT BRIDGE RAILING TRANSITION
INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE TGB

SEPTEMBER 2011

STANDARD DRAWING NO.  E 601-TTGB-03

W 6 x 9 POST DETAILS

Thrie-Beam Backup Plate (At post where Thrie-Beam splice does not occur)

INSTRUCTIONS:

1. All holes drilled or punched to 3/4" dia.
3. Hole pattern for posts numbers 8 through 10 may be drilled in back flange. See Standard drawing E 601-TTGB-04 or E 601-TTGB-05.

TS 7 x 4 x 3/16" BLOCK DETAILS
POSTS 1 THROUGH 7

/\ Richard L. VanCleave  09/01/11
DESIGN STANDARDS ENGINEER  DATE

/\ Mark A. Miller  09/01/11
CHIEF HIGHWAY ENGINEER  DATE
NOTES:
1. All holes drilled or punched to 3/4" dia.
3. Hole pattern for posts numbers 1 through 7 may be drilled in back flange. See Standard drawing E 601-TTGB-03.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE TGB

SEPTEMBER 2011

STANDARD DRAWING NO. E 601-TTGB-04

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER
IN Holes drilled or punched to 3/4" dia.
3. Hole pattern for posts numbers 1 through 7 may be drilled in back flange. See Standard drawing E 601-TTGB-03.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE TGB

SEPTEMBER 2011

STANDARD DRAWING NO. E 601-TTGB-05

/s/ Richard L. Vancleave 09/01/11
DESIGN STANDARDS ENGINEER  DATE

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER  DATE

W 6 x 9 POST DETAILS

W-Beam Backup Plate (At post where W-Beam splice does not occur)

Ground Line

TS 7 x 4 x 3/16" BLOCK DETAILS
POSTS 9 and 10
NOTE:

NOTES:

1. This drawing shall be used where guardrail transition type GP is specified to connect W-beam guardrail to a pier or frame bent collision wall.


INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION, TGT

SEPTEMBER 2011

STANDARD DRAWING NO. E 601-TTGT-01

/\ Richard L. VanClave 09/01/11
DESIGN STANDARDS ENGINEER DATE

/\ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE
**PARTIAL PLAN VIEW**

**NOTES:**
4. At post 6 on the thrie beam guardrail transition to W-Beam guardrail, the maximum post exposure above the top of the transition rail shall be limited to 1'.
NOTES:
1. If rub-rail is not spliced at post, the channel shall be cut and repositioned behind the flange.
2. If rub-rail is spliced at post, the splice material shall be removed and the channel shall be repositioned behind the flange.

ELEVATION
GUARDRAIL TRANSITION TYPE VH AT 6'-3" POST SPACING

RUB-RAIL RELOCATION DETAIL

3/4" x 2" slot in channel.
3/4" hole in flange.
Install 5/8" hex bolt with hex nut and 2 cut washers.

INDIANA DEPARTMENT OF TRANSPORTATION
GUARDRAIL TRANSITION TYPE VH
SEPTEMBER 2011
STANDARD DRAWING NO. E 601-TTVH-01

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER  DATE

/s/ Mark A. Miller  09/01/11
CHIEF HIGHWAY ENGINEER  DATE
NOTES:

1. If rub-rail is not spliced at post, the channel shall be cut and repositioned behind the flange.

2. If rub-rail is spliced at post, the splice material shall be removed and the channel shall be repositioned behind the flange.
**LAP DETAIL AT BRIDGE RAILING TRANSITION**

**GENERAL NOTES**
1. This lap shall be used where guardrail transition type WBD is specified to connect to concrete bridge railing termination WBE.

**PLAN**

**ELEVATION**

**POST & BLOCK DETAILS**
25'-0 limits of guardrail transition type WGB

3'-1 1/2

4' 1 1/2 = 25'-0

3' 3 1/2 = 9'-4 1/2

6'-3

W-beam guardrail
terminal section
or W-beam guardrail

W-beam terminal
connector

Two 12'-6 sections of W-beam rail
one set inside the other

Steel spacer tube 6" I.D. x 9" schedule 40 galvanized pipe
connected only to W-beam rail

NOTES:

1. This transition shall be used where guardrail transition type WGB is
   specified to connect W-beam guardrail to concrete bridge railing.

2. See Standard Drawing E 601-TWGB-03 for elevation and assembly details.

One 5/8" Ø x 18" std. button head bolt w/round washer and recess nut at each post through post and block only. No connection between rail sections and block at these posts.

Eight 5/8" Ø x 2" std. button head bolt w/round washers and recess nuts, through rail section and terminal connector.

One 5/8" Ø x 18" std. button head bolt w/rectangular plate washer, round washer and recess nut at each post.

Eight 5/8" Ø x 2" std. button head bolt w/round washers and recess nuts.

W-beam backup plate.

NOTE:
NOTES:
4. Slope on Thrie Beam Transition shall be reversed where thrie beam to W-beam guardrail relative orientation is opposite to that shown hereon.

LEGEND:
- W 6 x 9 Post
- W 14 x 22 Blockout
- Approved W-Beam Blockout

THRIE BEAM TO W-BEAM GUARDRAIL TRANSITION

CAP PLATE PLAN VIEW

ELEVATION VIEW
THRIE BEAM TRANSITION RAIL
TYPICAL W-BEAM INSTALLATION

TYPICAL DOUBLE FACED W-BEAM INSTALLATION

INDIANA DEPARTMENT OF TRANSPORTATION

W-BEAM GUARDRAIL ASSEMBLIES
SEPTEMBER 2011

STANDARD DRAWING NO. E 601-WBGA-01

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE
W-BEAM SPLICE CONNECTION
DETAIL AT POST

W-BEAM SPLICE CONNECTION DETAIL
AT POST FOR NON–SPLICE CONNECTIONS
NOTE:
1. All posts shall be 8'-0" length and spaced at 6'-3".

INDIANA DEPARTMENT OF TRANSPORTATION
WR-BEAM GUARDRAIL
SEPTEMBER 2011
STANDARD DRAWING NO. E 601-WBGA-06

In Indiana Department of Transportation, WR-beam guardrail, September 2011, standard drawing E 601-WBGA-06, it is noted that all posts shall be 8'-0" length and spaced at 6'-3".
GENERAL NOTES

1. This sheet shall be used when W-beam guardrail is specified. This sheet shall also be used when a W-beam guardrail system requires the use of standard W-beam guardrail components.

2. The details on the sheet are for the standard components of W-beam guardrail.
**DESIGN STANDARDS ENGINEER**

**CHIEF HIGHWAY ENGINEER**

**DATE**

---

**L** | **THREAD LENGTH**
--- | ---
1 1/2" | Full Length Thread
2 | 1 1/2" Min. Thread Length
8 1/2" | 1 3/8" Min. Thread Length
1-6 | 2 1/2" Min. Thread Length
2"-1 | 2" Min. Thread Length

---

**SIDE VIEW**

**FRONT VIEW**

**RECTANGULAR PLATE WASHER**

---

**STEEL WASHER**

**WASHER FOR 8" BOLT**

---

**INDIANA DEPARTMENT OF TRANSPORTATION**

**W-BEAM GUARDRAIL COMPONENTS**

MAY 2000

**STANDARD DRAWING NO.E 601-WBGC-02**

---

[Signature]

Anthony L. Dreyerich, 5-01-00

[Signature]

Pius Sandel, 5-01-00

---
NOTES:
1. These dimensions shall be adjusted as required to accommodate steel post flange.
2. Timber blocks shown in either Detail A or Detail B may be used.

STEEL POST DETAIL

TIMBER BLOCK DETAIL A  TIMBER BLOCK DETAIL B
GENERAL NOTES:

2. Cast-in-place or slip-formed concrete barrier shall have a joint type A at 10 ft. from each end of a median bridge pier or beam. The maximum spacing between type A joints shall be 400 ft. Type A joint shall be placed at the end of each work permit pour.
3. Each joint type H includes two inlet boxes, the connector pipe between the inlet boxes, and two type S castings.
4. Type S joint shall be located and spaced as shown.
5. See Standard Drawing E 720-OCDA-01 to E 720-OCDA-03 for casting type S details.
6. Concrete shoulder or pavement between type S casting and concrete barrier wall.
7. See Standard Drawing E 720-NG87-005 for information regarding inlet indicators.

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER

DRAIN AND JOINT PLACEMENT

MARCH 2003

STANDARD DRAWING NO. E 502-C3DB-01

IN: Richard L. VanCleave

DATE: 3-03

OUT: Richard K. Smith

DATE: 3-03
FORMED IN PLACE OR SLIP FORMED JOINTS

PRECAST JOINT

NOTES:

INDIANA DEPARTMENT OF TRANSPORTATION
CONCRETE BARRIER JOINT
MARCH 2003
STANDARD DRAWING NO. E 902-CCMS-02

DESIGNER: Richard V. VanClaw
DATE: 3-03-03

PREPARED BY: Ron F. Depacro
DATE: 3-03-03

STATE OF INDIANA
COUNTY OF WASHINGTON

[Diagram of Joint A, Joint B, Joint C, Section A-A, Section C-C, Section B-B]
PLAN VIEW AT
INTEGRAL MEDIAN FOUNDATION OR BRIDGE BENT

NOTES:

1. All integral median foundations shall be constructed as shown.

2. At a bridge pier, the faces of the concrete barrier shall be transitioned at a 3:1 taper to match configuration of the pier stem. At a median bridge bent, the face of the concrete barrier shall be transitioned at a 3:1 taper to match the configuration of the crash wall. If the height of the crash wall is less than the height of the concrete barrier, the height of the crash wall shall be increased, as detailed elsewhere on the plans, to match the height of the concrete barrier.

3. An appropriate type of impact attenuator shall be designated for the ends of the concrete barrier, when it is exposed to impacts within the roadway clear zone.

4. Use 2" for 35" height concrete barrier wall and 3" for 46" height concrete barrier wall.
**NEW PCG PAVEMENT**

**NEW HMA PAVEMENT**

**NEW HMA OVERLAY OVER EXISTING PCG PAVEMENT**

**33" HEIGHT CONCRETE BARRIER WALL**

**NOTES:**
1. ½" Preformed Joint Filler.

**CONCRETE BARRIER WITH PCG PAVEMENT**

**45" HEIGHT CONCRETE BARRIER WALL**

*Polyethylene Film (0.16 mm thick)*

*6# epoxy coated reinforcing steel 18" long spaced 12" c. to c. and staggered*
RIGHT OF WAY FENCE
Steel Chain Link Fence

GENERAL NOTES
1. For each additional 1'-0 in height increase dimensions A4 and A5 by 1'-0.
2. Dimensions as shown are for 4'-0 fence.
3. For chain link type stream crossing or depressed detail use Standard Drawing E 803-CLTF-02 for dimensions and installation.

TUBULAR POST CHART

<table>
<thead>
<tr>
<th>GROUP 1</th>
<th>GROUP 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT OF FENCE</td>
<td></td>
</tr>
<tr>
<td>Inches</td>
<td></td>
</tr>
<tr>
<td>END, CORNER, AND PULL POINTS</td>
<td>2</td>
</tr>
<tr>
<td>LINE POINTS</td>
<td>11/4&quot;</td>
</tr>
<tr>
<td>BRACE</td>
<td>11/4&quot;</td>
</tr>
</tbody>
</table>
GENERAL NOTES:

1. This installation to be made only where directed. Barb wire will not be
required at points where such installation would cause the
collecting of drift in the channel.

2. Line posts of 5-6 or longer for
crossing shall be 2" nominal tubing
or 3 x 3 x 1/4 angles and shall be
set in concrete footings.

3. Extra length posts to be used as
directed.

SECTION AT STREAM CROSSING OR DEPRESSION

INDIANA DEPARTMENT OF TRANSPORTATION

CHAIN LINK TYPE FENCE

SEPTEMBER 2004

STANDARD DRAWING NO. E 808-CLTF-02

RMT/Robert L. Veit/Rev

STATE:

DATE:

REVISION:

PREPARED BY:

CHECKED BY:

INSTRUCTIONS:

1.25 gauge 4 pt
barbed wire (points 8" o.c.)

Grade if necessary
to for wire

4'-0" min. embedment or as
directed.

9 gauge chain link fabric.
GENERAL NOTES
1. For each additional 1'-0" in height increase dimension A4 and A5 by 1'-0".
2. See Standard Drawing E 803-CLTF-01 for the tiebar post chart.
3. Dimensions as shown are for 4'-0" lanes.
4. Diameter equals 1'-0" plus the outside diameter of the post.
GENERAL NOTES

1. For farm field type gate see Standard Drawing E 803-CLTF-03 for dimensions and installation. Substitute farm field type fence for chain link type fence.

2. The placement of fence over a stream crossing or depression shall be as directed.

3. Extra length posts shall be used as directed.

4. Line posts 6'-6" or longer for crossing shall be 2" nom. dia. tubing or L 3 x 3 x 3/4" angles and shall be set in concrete footings.

SECTION AT STREAM CROSSING OR DEPRESSION

INDIANA DEPARTMENT OF TRANSPORTATION
FARM FIELD TYPE FENCE
SEPTEMBER 2004
STANDARD DRAWING NO. E 803-FTTF-03
STANDARD METHOD

DIAGONAL BRACE CONNECTION

ALTERNATE METHOD

TYPICAL CAPS FOR TUBULAR POSTS
SECTION THROUGH JOINT

1" preformed joint filler
(one piece for full depth joint)

1" expansion joint seal

1" preformed joint filler

SILICONE JOINT SEALANT

D
1. The curb ramp type includes the ramp and flared sides as indicated on the details. A level landing shall be provided at the high end of every curb ramp.

2. For details of sidewalk curb ramp types see Standard Drawings E 604-SWCR-03 to -11.

3. The curb ramps shall be placed within the marked crosswalk area.

4. Flared side of sidewalk curb ramp next to utility strip shall be sodded.

GENERAL NOTES:

1. These dimensions are based on a 6 in. curb height. They shall be proportionally adjusted for other curb heights.

2. Where site infeasibility precludes construction to the width shown, such width may be decreased to a minimum of 3'-0.

3. The bottom edge of the curb ramp shall be flush with the edge of adjacent pavement and gutter line.

4. Landing areas at the top of curb ramps shall have maximum cross slope of 50 : 1 in any direction. When site infeasibility precludes a landing slope of 50 : 1 in any direction, the slope perpendicular to the curb face shall not exceed 50 : 1.

5. If site infeasibility precludes construction to the width shown, the landing width may be decreased to 3'-0 minimum. The running slope of the curb ramp may be steepened to a maximum of 10 : 1 for a maximum 6 in. rise.

6. Drainage inlets should be located uphill from curb ramps to prevent puddles at the path of travel.

7. See Standard Drawing E 604-SMacr-12 for improved access on narrow sidewalks.

8. Algebraic difference in grade between the base of curb ramp and the gutter shall be limited to less than 1%. If it is not practical, a 2'-0 wide level strip shall be provided. See detail sketch.

9. Minimum recommended width of curb ramp is 4'-0.

CHANGE OF GRADE

TRUNCATED DOMES USED IN DETECTABLE WARNINGS

DETAIL OF RAMP GROOVES

RAMP AND BRICK SURFACE CONSTRUCTION DETAIL

ALTERNATE CURB CONSTRUCTION
NOTES:


SECTION B-B

SECTION A-A
NOTES:


10. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.

SECTION B-B

SECTION A-A
NOTES:


7. See Standard Drawing E 604-SWCR-02 for details of the detectable warning surface.


10. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.
NOTES:

10. See Standard Drawing E 604-SWCR-01 and -02 for Plan Location and General Notes respectively.
11. Street furnishing such as planter, signal base, etc.

SECTION B-B

SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION
SIDEWALK RAMP CURB
TYPE D
SEPTEMBER 2005
STANDARD DRAWING NO. E 604-SWCR-05

[Signatures and dates of approval]
NOTES:


7. See Standard Drawing E 804-SWCR-02 for details of detectable warning surface.


10. See Standard Drawing E 804-SWCR-01 and -02 for Plan Location and General Notes respectively.

11. Street furnishings such as planter, signal base, etc.
NOTES:

10. Curb or wall shall be used when necessary based on field conditions.
11. See Standard Drawings E 604-SWCR-01 and 02 for Location Plan and General Notes respectively.

SECTION A-A

SECTION C-C

SECTION B-B
NOTES:

7. See Standard Drawings E 604-SWCR-02 for details of the detectable warning surface.
10. Sidewalk across approach shall be sloped at 50:1 maximum transversely.
12. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.
13. Vertical face curb optional.
SECTION A-A

NOTES:


SECTION B-B
NOTES:


9. Match material in place or in plane for median.


11. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.

12. Ramp cross slope 50:1 desirable or match grade of roadway.

13. Detectable warnings are not required where the roadway crossing is controlled by traffic signals timed to provide full width street crossing by pedestrians.

SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION

SIDEWALK CURB RAMPS

TYPE L

SEPTEMBER 2005

STANDARD DRAWING NO. E 604-SWCR-11

SECTION B-B

RAISED MEDIAN 6'-0" MIN. 5'-3" 6'-0" MIN. RAISED MEDIAN
NOTES:

1. Additional right-of-way to widen sidewalks if applicable to improve accessibility on narrow sidewalks.

2. See Standard Drawing E 604-SWCR-02 and -03 to -11 for General Notes and typical curb ramps details respectively.
<table>
<thead>
<tr>
<th>Curb Type</th>
<th>6&quot; curb</th>
<th>Assumptions for calculation purposes (top landing not included in area)</th>
<th>8&quot; curb</th>
<th>Assumptions for calculation purposes (top landing not included in area)</th>
<th>Pay limits diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10' sidewalk</td>
<td>Area sq. yd: 7.0</td>
<td>12' sidewalk</td>
<td>Area sq. yd: 11.1</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>B</td>
<td>13' sidewalk</td>
<td>Area sq. yd: 16.4</td>
<td>15' sidewalk</td>
<td>Area sq. yd: 19.4</td>
<td>![Diagram]</td>
</tr>
<tr>
<td></td>
<td>R = 28', 18' sidewalk</td>
<td>Area sq. yd: 21.4</td>
<td>R = 26', 20' sidewalk</td>
<td>Area sq. yd: 30.6</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>C</td>
<td>6' utility strip</td>
<td>Area sq. yd: 2.7</td>
<td>8' utility strip</td>
<td>Area sq. yd: 3.5</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>D</td>
<td>8' utility strip</td>
<td>Area sq. yd: 2.7</td>
<td>8' utility strip</td>
<td>Area sq. yd: 3.5</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>E</td>
<td>10' utility strip on one side only, 10' radius</td>
<td>Area sq. yd: 10.7</td>
<td>Not possible to construct on 10' utility strip</td>
<td>Area sq. yd: n/a</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>F</td>
<td>R = 15', 4' sidewalk</td>
<td>Area sq. yd: 14.3</td>
<td>R = 15', 4' sidewalk</td>
<td>Area sq. yd: 16.1</td>
<td>![Diagram]</td>
</tr>
<tr>
<td></td>
<td>R = 25', 4' sidewalk</td>
<td>Area sq. yd: 21.6</td>
<td>R = 25', 4' sidewalk</td>
<td>Area sq. yd: 23.3</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>G</td>
<td>minimum dimensions</td>
<td>Area sq. yd: 4.9</td>
<td>minimum dimensions</td>
<td>Area sq. yd: 6.0</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>H</td>
<td>minimum dimensions</td>
<td>Area sq. yd: 6.3</td>
<td>minimum dimensions</td>
<td>Area sq. yd: 7.7</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>K</td>
<td>5' sidewalk</td>
<td>Area sq. yd: 8.9</td>
<td>5' sidewalk</td>
<td>Area sq. yd: 11.1</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>L</td>
<td>16' grass median width</td>
<td>Area sq. yd: 9.3</td>
<td>18' grass median width</td>
<td>Area sq. yd: 9.3</td>
<td>![Diagram]</td>
</tr>
</tbody>
</table>
NOTES:
1. For integral concrete curb
2. For integral concrete curb Type C
3. For integral concrete curb Type B

CONCRETE GUTTER

BENDING DIAGRAM FOR STIRRUPS
This section may be constructed as a monolithic unit or built up with an asphalt filler between two asphalt curbs.
GENERAL NOTES

1. For W greater than 4'-0' vary slope to hold 2" maximum height.

LEGEND

T = Normal pavement depth
W = Center curb width

SECTION F-F

SECTION G-G

SECTION H-H

INDIANA DEPARTMENT OF TRANSPORTATION
CONCRETE CENTER CURB
TYPE A

JANUARY 2001

STANDARD DRAWING NO.E 605-CNCC-01

/\/ Anthony L. Ursich, 1-02-01
DESIGN STANDARDS ENGINEER
DATE

/\/ Firas Bandi 1-08-01
CIVIL ENGINEER
DATE
NOTE:
1. Curb must be placed to conform to Type B curb, as shown on Standard Drawing E 808-CCS4-01.

LEGEND
T = Normal pavement depth

CONCRETE CENTER CURB
TYPE B
MARCH 2004
STANDARD DRAWING NO. E 808-CNCC-02

SECTION D-D

SECTION C-C
NOTES:
1. 6' for concrete center curb, type D and 8' for concrete center curb, type C.

LEGEND

T = Normal pavement depth

SECTION J–J

As specified

SECTION K–K

Variable, 0 to 1 1/2"

IN INDANA DEPARTMENT OF TRANSPORTATION
CONCRETE CENTER CURBS
TYPE C & D
APRIL 1995
STANDARD DRAWING NO.E 605–CNCC–03
DETAILED PLACED IN THIS FORDER 11-15-99

/0/ Anthony L. DeRienzo 11-15-99
DESIGN STANDARD ENGINEER DATE

/0/ Firouz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 4-03-95
NOTES:


NOTES:

EARM CONSTRUCTION TYPE "A"

For paved apron

LEGEND
1. Keyway joint
2. 1" preformed joint filler
3. Longitudinal construction joint
T = Thickness of pavement
LEGEND

1. Keyway joint
2. 1" preformed joint filler
3. Integral concrete curb
4. Longitudinal construction joint
5. Thickness of pavement

INDIANA DEPARTMENT OF TRANSPORTATION
EAR CONSTRUCTION
TYPE B AND C
JANUARY 1998

SECTION D-D

SECTION C-C

3 - #5 x 10'-0" spaced 6' c. to c.

#4 stirrup bar spaced 2'-0" c. to c.

Variable 0 to 5'-0"

#5 bars

Integral concrete curb

Variable Radius

5'-0"

EAR CONSTRUCTION TYPE "B"

EAR CONSTRUCTION TYPE "C"
GENERAL NOTES
1. For location of details and sections see Standard Drawing E 605-GTRC-05.

REINFORCED CONCRETE GUTTER TURNOUT
MARCH 2003
STANDARD DRAWING NO. E 605-GTRC-01

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

INDEiana DEPARTMENT OF TRANSPORTATION

INDIANA DEPARTMENT OF TRANSPORTATION

REINFORCED CONCRETE GUTTER TURNOUT
MARCH 2003
STANDARD DRAWING NO. E 605-GTRC-01

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

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REINFORCED CONCRETE GUTTER TURNOUT
MARCH 2003
STANDARD DRAWING NO. E 605-GTRC-01

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

INDEiana DEPARTMENT OF TRANSPORTATION

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REINFORCED CONCRETE GUTTER TURNOUT
MARCH 2003
STANDARD DRAWING NO. E 605-GTRC-01

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

INDEiana DEPARTMENT OF TRANSPORTATION

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REINFORCED CONCRETE GUTTER TURNOUT
MARCH 2003
STANDARD DRAWING NO. E 605-GTRC-01

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

INDEiana DEPARTMENT OF TRANSPORTATION

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REINFORCED CONCRETE GUTTER TURNOUT
MARCH 2003
STANDARD DRAWING NO. E 605-GTRC-01

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

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REINFORCED CONCRETE GUTTER TURNOUT
MARCH 2003
STANDARD DRAWING NO. E 605-GTRC-01

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

INDEiana DEPARTMENT OF TRANSPORTATION

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REINFORCED CONCRETE GUTTER TURNOUT
MARCH 2003
STANDARD DRAWING NO. E 605-GTRC-01

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

INDEiana DEPARTMENT OF TRANSPORTATION

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REINFORCED CONCRETE GUTTER TURNOUT
MARCH 2003
STANDARD DRAWING NO. E 605-GTRC-01

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
REINFORCING PLAN CONCRETE GUTTER TURNOUT

MK 423 bars to be threaded, galvanized, and installed as shown in Detail B on Standard Drawing E 605-GTRC-01.

INDIANA DEPARTMENT OF TRANSPORTATION
REINFORCED CONCRETE GUTTER TURNOUT
SEPTEMBER 1997
STANDARD DRAWING NO. E 605-GTRC-02

SECTION G-G

REIN. CONC. GUTTER

 CUT-OFF WALL AT END OF GUTTER

REIN. MESH FOR PAVEMENT

SECTION F-F

3 1/2''

Rein. concrete gutter

3 0''

3 0''

9''

1 0'' - 9''

2 0''

10''

REIN. MESH FOR PAVEMENT

#4 x 5'-0, spaced at 6'' c. to c. and bent as shown.

Cut-off wall

IN/Anthony J. Bentley 9-15-99
DESIGN STANDARDS ENGINEER

IN/Finou Zandi 9-15-99
CHIEF HIGHWAY ENGINEER

DATE

IN/Anthony J. Bentley 9-15-99
DESIGN STANDARDS ENGINEER

IN/Finou Zandi 9-15-99
CHIEF HIGHWAY ENGINEER

DATE
NOTES:

1. Curtain walls and #4 bars for anchor MK-23 shown in Detail A, Detail B, Section A-A, and Section B-B on Standard Drawing E 605-GTRC-01.

2. See Standard Drawing E 605-GTRC-02 for sections F-F and G-G.
TRANSITION FROM TWO LANES (Earth Shoulder Section)
TO TWO LANES (Curb Section)

Curve data variable
except tangent length = 50'-0

LEGEND
1 Longitudinal joint
2 Longitudinal construction joint
T = Nominal pavement thickness

INDIANA DEPARTMENT OF TRANSPORTATION
TRANSITION OF EARTH SHOULDER TO CURB SECTION
SEPTEMBER 1997
STANDARD DRAWING NO. E 605-TSCS-01

SECTION A-A

Omit dowel bars where pavement is in place.
46 bars
1. Continuous corrugation installation shall be used on interstates and intermittent installation shall be used on all other facilities.

2. Refer to E 806-SHCG-02 for corrugation instructions for HMA shoulders adjacent to a widened PCCP outside lane.
TYPICAL SHOULDER PANEL DETAIL

INTERRUPTED INSTALLATION DETAIL

NOTES

1. Continuous corrugations shall be required on every PCC shoulder panel on Interstates. Intermittent corrugations shall be required for all other facilities.

2. On facilities with a widened outside PCCP lane, the corrugations shall be installed on the portion of the PCCP located outside the edge of travel lane and in accordance with this sheet.
ENTRANCE RAMP

EXIT RAMP

LEGEND

- Shoulder Corrugations
- Shoulder Corrugation
- Full Shoulder Corrugation
- Shoulder
- Direction of Traffic

SHOULDER CORRUGATION LIMITS

MARCH 2003

STANDARD DRAWING NO. E 505-SHGC-03

INDIANA DEPARTMENT OF TRANSPORTATION

DESIGNER: Richard L. Varner

SIGNED: Richard L. Varner

DATE: 3-03-03
SECTION A–A

PAVED SIDE DITCH TYPE A THROUGH D

SECTION B–B

PAVED SIDE DITCH TYPE E THROUGH H

#4 x 5'-0 bars to be bent as shown on Standard Drawing E 607–PSDT–06.
GENERAL NOTES

1. 1'-0" For Type E
   2'-0" For Type F
   3'-0" For Type G
   4'-0" For Type H

2. 3'-0" For Type E & F
   4'-0" For Type G & H

3. See Standard Drawing E 607-PSDT-02 for Sections A-A and B-B.

ELEVATION VIEW

CUT-OFF WALL FOR PAVED SIDE DITCH TYPES E THROUGH H

401 x 9'-6"

ELEVATION VIEW

LUG FOR PAVED SIDE DITCH TYPES E THROUGH H
GENERAL NOTES

1. See Standard Drawing E 607-PSDT-02 for Sections A-A and B-B.


ELEVATION VIEW

CUT-OFF WALL FOR PAVED SIDE DITCH TYPES A THROUGH D

ELEVATION VIEW

LUG FOR PAVED SIDE DITCH TYPES A THROUGH D
1. The 61 sloped side shall be placed nearest the roadway.

2. Cut-off walls shall be used at the beginning and end of all paved side ditch.

3. Lugs shall be used at the following locations:
   a. 10 ft downslope from a grade change.
   b. 10 ft downslope from the intersection of different types of paved side ditch.
   c. At the downslope end of a transition between different types of paved side ditch.
   d. At the intervals as follows:
      | Interval | Grade   |
      |----------|---------|
      | 200 ft   | 3% to 5%|
      | 150 ft   | 5% to 8%|
      | 100 ft   | 8% to 10%|
      | 50 ft    | 10% & above|

4. Paved side ditch transitions shall be required at intersections with earth ditches and pipe culverts. These transitions shall be converted to equivalent lengths of the type of paved side ditch specified at these locations.

5. Transitions of 10 ft or less shall be required between two different types of paved side ditch. Such transitions shall be converted to equivalent lengths of the larger type of paved side ditch specified at these locations.


GENERAL NOTES

1. See Standard Drawing E 607-PSDT-02 for Section B-B.

STANDARD 3' BOTTOM DITCH
(LOCATED WITHIN CLEAR ZONE)

SPECIAL 3' BOTTOM DITCH
(LOCATED BEYOND CLEAR ZONE)

SODDED DITCH DETAILS

PLAN VIEW OF LUG (TYPICAL FOR ALL TYPES)

#4 x 5'-0 to be alternately bent upstream and downstream as shown.
GENERAL NOTES

1. 660#/yd HMA mixture for patching required. Width of patch to be equal to width of asphalt shoulder in place.

2. For pavement grades of 1% or steeper.

3. For pavement grades of flatter than 1%.

PLAN VIEW

- Direction of water flow
- Aggregate
- Shoulder line
- Aggregate

ELEVATION

- Original ground line
- Aggregate as required. See Plan View.
- Cut section
- 1'-0" min.
- Fill section
- Min. slope 1%
- 1'-4" min. to bottom of existing concrete pavement
- Proposed resurface (See Typical Section on plans)
- E.P.

SHOULDER DRAIN

INDIANA DEPARTMENT OF TRANSPORTATION

SHOULDER DRAIN

MAY 1998

STANDARD DRAWING NO. E 608-SHDR-01

DETAILS PLACED IN THIS FORM: 11-15-99

/s/ Anthony J. Toomey 11-15-99
DEPUTY CHIEF ENGINEER

/s/ Firas Zendi 11-15-99
CHIEF HIGHWAY ENGINEER
2. See plans for $t_v$
3. Flowable backfill if slab bridge.
4. All reinforcing bars shall be epoxy coated.
5. See Standard Drawing E 703-BRST-01 for reinforcing-bar bending details and notes.

INDIANA DEPARTMENT OF TRANSPORTATION
REINFORCED CONCRETE BRIDGE APPROACH
PAVEMENT LEDGE DETAIL
SEPTEMBER 2012

STANDARD DRAWING NO. E 609-RCBA-01

LEGEND

- Expanded polystyrene, 1/2" thickness

Concrete bridge deck
R.C. bridge approach

NOTES

2. See plans for $t_v$
3. Flowable backfill if slab bridge.
4. All reinforcing bars shall be epoxy coated.
5. See Standard Drawing E 703-BRST-01 for reinforcing-bar bending details and notes.
Concrete bridge railing limits
Concrete bridge railing transition type TFC, TPF-1, TPF-2, TPS-1, OR TPS-2 limits

SECTION F-F

32 spa. @ 6" = 16'-0" (top)
33-5901 (top), lap with #4 bars in R.C. bridge approach
5904
9-5901 (bottom), lap with #5 bars in R.C. bridge approach

SECTION E-E

1'-6"
2" cl.
R.C. bridge approach
5904 (typ.)
5901 (typ.)
16'-0"
3'-7"
5901 x 4'-2"
5904 x 16'-7"
See Standard Drawing E 706-TTFT-01 through -03 for concrete bridge railing transition type TFT details.

See Standard Drawing E 706-TTTF-01 through -04 for concrete bridge railing transition type TTF details.

See Standard Drawing E 706-TTXX-01 and -02 for concrete bridge railing transition type TTX details.

See Standard Drawing E 609-TBAE-04 for General Notes.

Concrete bridge railing transition type TFT, TTF-2, or TTX limits

Concrete bridge railing limits

Concrete bridge approach

SECTION F-F

SECTION E-E
Concrete bridge railing transition type WFC limits

EPOXY-COATED REINFORCING STEEL

<table>
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<tr>
<th>MARK OR SIZE</th>
<th>NO. OF BARS</th>
<th>LENGTH</th>
<th>WEIGHT</th>
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<tr>
<td>5900</td>
<td>11</td>
<td>5'-0&quot;</td>
<td></td>
</tr>
<tr>
<td>5901</td>
<td>35</td>
<td>4'-2&quot;</td>
<td></td>
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<tr>
<td>#5</td>
<td>2</td>
<td>3'-6&quot;</td>
<td>312 LBS</td>
</tr>
</tbody>
</table>

Total Epoxy-Coated Reinforcing Steel

312 LBS

MISCELLANEOUS

Concrete, Class C

3.4 SYS

INDIANA DEPARTMENT OF TRANSPORTATION

RCBA EXTENSION FOR
BRIDGE RAILING TRANSITION
WFC

SEPTEMBER 2012

STANDARD DRAWING NO. E 609-TBAE-03

/s/ Richard L. VanCleave 09/04/12
SUPERVISOR, ROADWAY STANDARDS

/s/ Mark A. Miller 09/04/12
CHIEF ENGINEER

NOTES

1. See Standard Drawings E 706-TWFC-01 through -03 for concrete bridge railing transition WFC details.


EPOXY-COATED REINFORCING STEEL

Concrete bridge railing transition WFC details.
GENERAL NOTES


3. This end of the reinforced concrete bridge approach extension shall match the construction at the bridge end as shown on the plans.


5. See the plans for thickness of RCBA and its extension to be used with asphalt pavement.

6. See the plans for thickness of RCBA and its extension to be used with a terminal joint and portland cement concrete pavement.
NOTES:
5. Pavement shall be PCCP for Approaches, 6 in., on subgrade treatment Type IIIA.
6. See Standard Drawing E 610-DRIV-08 for sections A-A and B-B.

LEGEND

= Width of sidewalk
= Distance between back face of curb to sidewalk.
= Distance from front face of curb to or R/W.
= Sidewalk elevation transition.
NOTES:
2. See Standard Drawings E 610-DRIV-10 for Sections A-A, B-B and C-C.
4. See Standard Drawings E 610-DRIV-09 for Section S-S.

LEGEND

□ HMA for Approaches; 165#/yd HMA Surface Type B on 385#/yd HMA Intermediate Type B on subgrade treatment Type IIIA or PCCP for Approaches, 6", subgrade treatment Type IIIA

□ The greater thickness of either the drive □ or the paved shoulder □ section.

□ Plan shoulder section.

□ For type and thickness equivalent to surface in place, see plans.
CONCRETE CURB & GUTTER CONNECTION FOR CLASS I & III DRIVES

NOTES:

1. See Standard Drawing E 610-DRIV-08 for Section A-A and Section B-B.

2. Pavement shall be PCCP for Approaches, 9 in., on subgrade treatment Type IIIA.

3. See Standard Drawings 604-SDWK-01 or 604-SDWK-02 for sidewalk elevation transition details, or Standard Drawing E 604-SWCR-09 for sidewalk curb ramp details if the drive is signalized.


---

LEGEND

- Width of sidewalk
- Driveway width
- Distance between back face of curb and sidewalk
- Distance from front face of curb to R or R/W
- Sidewalk elevation transition

---

PLAN VIEW - CLASS III DRIVE

---

CONCRETE CURB & GUTTER CONNECTION FOR CLASS I & III DRIVES

---

 Indy Department of Transportation

CLASS III DRIVE

SEPTEMBER 2012

STANDARD DRAWING NO. E 610-DRIV-03

/s/ Richard L. VanCleave 09/04/12

/s/ Mark A. Miller 09/04/12

Chief Engineer  Date

No. 9750  State of

Professional Engineer

RICHARD L. VANCLEAVE

SUPERVISOR, ROADWAY STANDARDS
NOTES:
2. See Standard Drawings E 610-DRIV-10 for Sections A-A, B-B and C-C.
3. See Standard Drawings E 610-DRIV-09 for Section P-P.

LEGEND

- HMA for Approaches:
  1650#/yd HMA Surface Type B on
  2750#/yd HMA Intermediate Type B on
  8800#/yd HMA base, Type B on
  subgrade treatment Type IIIA
  or
  PCCP for Approaches, 9", on
  subgrade treatment Type IIIA

- The greater thickness of either the drive or the paved shoulder section.

- Plan shoulder section.

- For type and thickness equivalent to surface in place, see plans.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS IV DRIVE

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-04

/s/ Richard L. VanCleave 09/01/10
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER DATE

PLAN VIEW
(PAVED SHOULDER 8'-0" FEET OR GREATER IN WIDTH)

PLAN VIEW
(PAVED SHOULDER LESS THAN 8'-0" IN WIDTH OR UNPAVED SHOULDER)
Notes:
2. See Standard Drawing E 610-DRIV-10 for Section A-A, B-B and C-C.

Where the shoulder is earth or aggregate or the paved width is less than 8'-0", the drive radii shall be tangent to the edge of the travel lane. Where the paved shoulder width is 8'-0" or more, the drive radii shall be tangent to the edge of the paved shoulder.
PLAN VIEW

NOTES:
3. Class VI Drive accommodates a WB-65 (IDV) design vehicle with a 45'-0" turning radius.

LEGEND
- HMA for Approaches:
  165#/yd HMA Surface Type B on 775#/yd HMA Intermediate Type B on 880#/yd HMA base, Type B on subgrade treatment Type IIIA or PCCP for Approaches, 9", on subgrade treatment Type IIIA

- The greater thickness of either the drive or the paved shoulder section.

- For type and thickness equivalent to surface in place, see plans.
NOTES:
2. See Standard Drawing E 610-DRIV-12 for sections A-A, B-B and C-C.
3. Joint Placement Detail should be used with Class I, III and VII drives.
5. See Standard Drawing E 610-DRIV-16 for details and corners.

LEGEND
- HMA for Approaches: 165#/yd HMA Surface Type B on subgrade treatment Type IIIA or PCCP for Approaches, 9 in., on subgrade treatment Type IIIA
- Sidewalk elevation transition
- For type and thickness equivalent to surface in place, see plans.

Indiana Department of Transportation
Class VII Drive and Joint Placement Detail
September 2012

Standard Drawing No. E 610-DRIV-07

RICHARD L. VANCLEAVE
Supervisor, Roadway Standards

MARK A. MILLER
Chief Engineer
NOTES:

2. The limits for X are based on a 6" curb height. For other curb heights, the limits for X shall be adjusted.


LEGEND

\( W \) = Width of sidewalk

\( X \) = Distance between back face of curb to sidewalk.

\( Y \) = Distance from front face of curb to R or R/W.

- Sidewalk elevation transition section view.

PCCP = PCCP

INFORMATION DEPARTMENT OF TRANSPORTATION
CLASS I AND CLASS III DRIVE
GRADE PROFILES
SEPTEMBER 2010
STANDARD DRAWING NO. E 610-DRIV-08

Richard L. VanCleave 09/01/10
DESIGN STANDARDS ENGINEER

Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER
1. See Standard Drawing E 610-DRIV-02 for Class II Drive details.
2. See Standard Drawing E 610-DRIV-04 for Class IV Drive details.

SECTION P-P - CLASS IV DRIVES

SECTION S-S - CLASS II DRIVES
SECTION B-B
(APPROACH GRADE FOR CUT OR FILL TO BE USED WITH EARTH SHOULDERS)

SECTION C-C
(APPROACH GRADE FOR CUT OR FILL TO BE USED WITH PAVED SHOULDER 8'-0" OR WIDER)

SECTION A-A
(APPROACH GRADE FOR CUT OR FILL TO BE USED WITH LESS THAN 8'-0" WIDTH PAVED OR COMPACTED AGGREGATE SHOULDERS)

Notes:
1. See Standard Drawing E 610-DRIV-02, -04 and -05 for location of Sections A-A, B-B and C-C.
2. Where physical restrictions limit the space available for the construction of a drive from a roadway, an embankment section the downgrade breakpoint of the drive may begin at the edge of the shoulder without a crest vertical curve if the algebraic difference in grades meets the criteria in Note 7 on Standard Drawing E 610-DRIV-13.
1. See Standard Drawing E 610-DRIV-06 for plan and sections of Class VI Drive.

1. See Standard Drawing E 610-DRIV-07 for plan of Class VII Drive.
3. See Standard Drawing E 610-DRIV-16 for keyway joint shown in Detail A and for joint placement and corner reinforcement.
GENERAL NOTES

1. These notes apply to Standard Drawings E 610-DRIV-01 through 12.
2. If a PCPP approach is Class III or Class IV, the ramp shall be constructed using ear
   construction Type C as detailed on Standard Drawing E 605-ERCN-02.
3. When the maximum approach grade of ±10% does not meet the grade of the existing drive before
   the R/W line, the approach grade of ±10% shall extend beyond the R/W to the point of intersection with
   the existing driveway grade. Construction beyond the R/W line shall be done in temporary R/W.
4. The appropriate pipe end treatment should be provided for pipes located either inside the clear zone
   or outside the clear zone.
5. The maximum allowable difference in grades shall not exceed 8% for crest grade and 12% for sagged
   grades for Types I and III drives, nor 11% for crest grade and 14% for sagged grades for Types II,
   IV, and V drives.
6. The minimum driveway pavement sections for Class III, IV, VI and VII Drives have been designed for
   400 trucks per day. If the truck traffic count is greater than 400 per day, the required pavement section
   shall be as shown elsewhere on the plans.
7. See Standard Drawing E 610-DRIV-14 for shoulder treatment at driveways.

Curb Ramp Type E, as shown on Standard Drawing E 604-SWCR-09, when the approach is signalized,
   or sidewalk elevation transition as shown on Standard Drawing E 604-SDWK-02 shall be used when
   sidewalk is adjacent to curb.
8. When X is equal to or greater than 2 ft but less than 6 ft, either a Curb Ramp Type G as shown on
   Standard Drawing E 604-SWCR-09, when the approach is signalized, or sidewalk elevation transition
   as shown on Standard Drawing E 604-SDWK-01 shall be used.
9. When X is equal to or greater than 6 ft, no curb ramp or sidewalk elevation transition is required unless
   the curb height is in excess of 6 inches.
10. Embankment slopes within the mainline clear zone for new construction/reconstruction projects
    or within the obstruction-free zone for 3R projects should be as shown in the table on Standard
    Drawing E 610-PRAP-04. Outside the clear zone or the obstruction-free zone, the embankment
    slopes should ideally be 4:1 but not steeper than 3:1.
11. Hc = earth cover over culvert shall be 1 foot or greater.

LEGEND

- 1/2 in. preformed joint filler
- Monolithic curb for PCPP Approaches or concrete curb and gutter for HMA for
  Approaches
- Longitudinal joint
- Concrete sidewalk
- For type and thickness equivalent to surface in place, see plans.
- Keyway construction joint
- = Distance between back face of curb and sidewalk.
- Width of sidewalk
- PCPP
- Curb ramp, if signalized, or typically, sidewalk elevation transition.
- Curb ramp or sidewalk elevation transition section view.

INDIANA DEPARTMENT OF TRANSPORTATION

DRIVES

GENERAL NOTES AND LEGEND

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-13

/\ Richard L. VanCleave 09/01/10
STATE OF
No. 9750
DESIGN STANDARDS ENGINEER

/\ Mark A. Miller 09/01/10
DESIGN STANDARDS ENGINEER

CHIEF HIGHWAY ENGINEER

DATE
Two-lane two-way or lane-line on multi-lane roadway

HMA mainline

HMA Shoulder  HMA  HMA Shoulder

PCCP drive

PCCP mainline

PCCP or HMA Shoulder  PCCP  PCCP or HMA Shoulder

PCCP drive

LEGEND

☑ Greater thickness of drive or shoulder section

* Mainline pavement section

** Greater thickness of PCCP drive or PCCP shoulder

*** Same section as mainline shoulder

TEMPORARY EDGE OF HMA SHOULDER (TREATMENT WHERE PCCP DRIVE IS TO BE CONSTRUCTED)
MONOLITHIC CURB

DETAIL A

INDIANA DEPARTMENT OF TRANSPORTATION
CLASS VII DRIVE
JOINT PLACEMENT AND CORNERS
SEPTEMBER 2010

NOTES
3. See Standard Drawing E 610-DRIV-07 for keyway joint shown in Detail A and for joint placement and corner reinforcement.
4. See Standard Drawing E 605-ERCN-01 for ear construction Type A. See Standard Drawing E 605-ERCN-02 for ear construction Type B.
PRIVATE DRIVE CROSSOVER PLAN FOR $W = 8'-0"$ to less than $30'-0"

PRIVATE DRIVE CROSSOVER PLAN FOR $W = 30'-0"$ to over $40'-0"

Notes:

1. Thickened edge

2. See Standard Drawings:
   E 605-ERCN-01 for TYPE "A" Ear Construction
   E 605-ERCN-02 for TYPE "B" Ear Construction
   E 610-DRIV-18 for sections A-A and B-B

3. Contraction Joint Type D-1, see Standard Drawing E 503-CCPJ-01 for details.


5. 1" Preformed Joint Filler.

6. Private drive crossovers shall be constructed of HMA or PCCP as shown on the plans section unless otherwise directed.

7. Integral Concrete Curb, see Standard Drawing E 605-CCIN-01 for details.
NOTES:

1. Private drive crossover shall be constructed of HMA or PCCP as shown on the plans, unless otherwise specified.
2. Thicken edge to be same thickness as mainline pavement.
3. For location of cross sections see Standard Drawing E 610-DRIV-12.

SECTION A-A
TO BE USED WITH CROWN PAVEMENTS.

SECTION B-B
TO BE USED WITH 3 IN. TILTED PAVEMENTS.
APPROACH GRADE FOR CUT OR FILL
TO BE USED WITH PAVED SHOULDER
Notes

1. 3 ft. or wider as necessary to feather to existing grade
2. Pavement wedge to be contained on centerline of drive.

PRIVATE OR COMMERCIAL DRIVE

Drive area to be treated with HMA for Approaches
COMBINATION MAILBOX APPROACH & DRIVE

MAILBOX APPROACHES
HIGH SPEED ROADWAY

SEPTEMBER 2011

NOTES:
1. S = Normal width of paved shoulder as shown on plans.
2. See plans for W
3. Mailbox approach pavement section shall be the same as the shoulder material.

INo. 9750
STATE OF
INDIANA DEPARTMENT OF TRANSPORTATION
MAILBOX APPROACHES
HIGH SPEED ROADWAY
SEPTEMBER 2011
STANDARD DRAWING NO. E 610-MBAP-01

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE
Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE
COMBINATION MAILBOX APPROACH & DRIVE
(Mailbox located beyond drive)

TYPICAL MAILBOX APPROACH

COMBINATION MAILBOX APPROACH & DRIVE
(Mailbox located in advance of drive)
GENERAL NOTES
These notes are for Standard Drawings E 610-PRAP-02, -03, and -05.

1. Embankment slopes on either side of an approach or drive within the median clear zone for new construction/reconstruction projects or the obstruction free zone on 3K projects should conform to the following table:

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<th>DESIGN YEAR</th>
<th>High, ≥ 50 mph</th>
<th>Low, ≤ 45 mph</th>
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<td>Design Year AADT</td>
<td>≥ 5000</td>
<td>&lt; 5000</td>
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<tr>
<td>Multi-Lane Divided, All Functional Class</td>
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<tr>
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<td>4:1</td>
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<tr>
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Outside the clear zone or the obstruction free zone, the embankment slopes should ideally be 4:1 but not steeper than 3:1.

2. Cross culverts under the public road approach which cannot be located outside the median clear zone will require appropriate and treatments.

4. The cross hatched shoulder area indicates the limits where the shoulder is the same on the approach pavement.

5. If the approach is to be constructed of PCCP, the details shall be as shown elsewhere in the plans for thickness, joint type, and location.

6. Both shoulder shall be used with the Type A public road approach. The Type B public road approach shall have 6 in. compacted aggregate and full approach pavement section shoulders as shown on the Type A approach detail.

7. If the AET for the public road is greater than 1000, the required pavement section shall be as shown elsewhere in the plans.

INDIANA DEPARTMENT OF TRANSPORTATION
PUBLIC ROAD APPROACH
TYPE A & B - GENERAL NOTES
SEPTEMBER 2007
STANDARD DRAWING NO. E 610-PRAP-04

[Signature]
Chief Highway Engineer
DATE

[Signature]
Design Standards Director
DATE
### DESIGN STANDARDS ENGINEER

**CHIEF HIGHWAY ENGINEER**

**DATE**

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### LEGEND

\[ \alpha = \text{ANGLE OF TURN} \]

The angle through which a vehicle travels on the public road approaches toward making a right hand turn. It is measured from the extension of the tangent on which a vehicle approaches the intersecting road to the corresponding tangent on the intersecting road to which the vehicle turns.

### INTERSECTION CONTROL ANGLE

\[ \beta = 180^\circ - \alpha \]

### NOTES:

1. See Standard Drawing E 610-PRAP-02 for public road approach type A.
2. See Standard Drawing E 610-PRAP-03 for public road approach type B.
EXAMPLE FOR TYPE C, W = 24 R
Intersection control angle θ = 100°
L = 81.25'
θ = 44.25°
U = 81.75'
X = 35.62'
Y = 50.32'  Total area = 421.50 sq ft

NOTES:
1. See Standard Drawing E-610-PRAV-08 for tables with computed values.
2. See Standard Drawing E-610-PRAV-11 for Table A.

PUBLIC ROAD APPROACH TYPE C
MARCH 2005
STANDARD DRAWING NO. E-610-PRAV-08

SECTION A-A: MINIMUM PAVEMENT SECTION
For ADT < 1000
6066 foot HMA Surface Type A on
2288 foot HMA Intermediate Type A on
3 percent compacted aggregate base #6G

0 in. compacted aggregate shoulder

SECTION B-B: APPROACH PAVEMENT SECTION
0-3
4% Type 3
2% Slope
Type 2

PUBLIC ROAD APPROACH
TYPE C
INDIANA DEPARTMENT OF TRANSPORTATION

SECTION B-B: APPROACH PAVEMENT SECTION
a < 100', HMA or PCCP for Approaches

a > 100', 401 or 402 HMA or 501 or 502 PCCP

HMA or PCCP for Approaches

b < 100', HMA or PCCP for Approaches

b > 100', 401 or 402 HMA or 501 or 502 PCCP

NOTES:

1. The pay limits shown hereon generally apply to Types A, B, C, and D Public Road Approaches as shown on Standard Drawings E 810-PRAP-02, -03, -08, and -10 respectively.
GENERAL NOTES
These notes are for Standard Drawings E 610-PRAP-04 and E 610-PRAP-08.

1. See Table on Standard Drawing E 610-PRAP-04 for embankment slopes to be built on either side of the approach.

2. Cross culverts under the public road approach which cannot be located outside the mainline clear area will require appropriate embankment treatments at each end as shown on the plans.

3. If the approach is to be constructed of concrete, the details shall be as shown elsewhere in the plans for pavement thickness, joint type, and location.

4. The cross hatched shaded area indicates the limits where the shoulder is the same section as the approach pavement.

5. The pavement section for the auxiliary lane shall be as detailed elsewhere in the plans.

6. If the ADT for the public road is greater than 1000, the required pavement section shall be as shown elsewhere in the plans.


PAY LIMITS.
### Table of Values

| \( \alpha \) | Angle of Turn | It is the angle which a vehicle travels on the public road approach toward making a right hand turn. It is measured from the extension of the tangent on which a vehicle approaches the intersecting road to the corresponding tangent on the intersecting road to which the vehicle turns. |
| \( \beta \) | Intersection Control Angle | \( \beta = 180^\circ - \alpha \) |

### Notes:

1. See Standard Drawing E 610-PRAP-06 for public road approach type C.
2. See Standard Drawing E 610-PRAP-08 for General Notes.

---

### Indiana Department of Transportation

**Public Road Approach**

**Type C – Table of Values**

**September 2001**

**Standard Drawing No. E 610-PRAP-09**
GENERAL NOTES

These notes are for Standard Drawings E 610-PRAP-10 and E 610-PRAP-12.

1. Standard Drawings E 610-PRAP-10 and -12 are for intersection control
   angles of 70° to 110°.
   If intersection control angle is less than 70° or greater than 110°
   a special design will be required.

2. See table on Standard Drawing E 610-PRAP-04 for embankment slopes
   to be built on either side of the approach.

3. Cross culverts under the public road approach which cannot be
   located outside the right-of-way clear zone shall require an appropriate
   width of fill at each end.

4. If the culverted pavement is asphalt the transition
   area shall be the same section as the approach and will be
   included in the pay limits for HMA for Approaches.

5. The cross hatched area indicates the limits
   where the shoulder is the same as the approach pavement.

6. If the approach is to be constructed of RCC, the
   details shall be as shown elsewhere in the plans for
   pavement thickness, joint type, and location.

7. If the Class V or above truck count for the public road
   approach is greater than 50 per day, the required pavement
   section shall be as provided elsewhere in the plans.

8. The pavement section for the turn lane shall be as shown
   elsewhere in the plans.

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INDIANA DEPARTMENT OF TRANSPORTATION
PUBLIC ROAD APPROACH TYPE D
GENERAL NOTES AND TABLE A

SEPTEMBER 2007

STANDARD DRAWING NO. E 610-PRAP-11

[Signatures and dates]
### Table of Values

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**Legend**

- **β** = Angle of Turn
  - The angle which a vehicle turns on the public road approach toward making a tight hand turn. It is measured from the intersection of the alignment tangent on which a vehicle approaches the intersecting road to the corresponding tangent on the intersecting road to which the vehicle turns.

- **β** = Intersection Control Angle
  - **β = 90°** for General Notes.

**Notes**

1. See Standard Drawing E 910-PRAP-12 for Public Road Approach Type D.
GENERAL NOTES
1. Radii of 25’ at minor cross streets shall be provided on new construction and on reconstruction where space permits.
2. Radii of 30’ or more at major cross streets shall be provided where feasible so that a truck may turn without encroachment.
3. Radii of 40’ or more at major cross streets shall be provided where trucks and buses repeatedly turn.
4. Ear construction type B permitted as shown on Standard Drawing E 605-ERCN-02.

LEGEND
A PCCP
5 Longitudinal joint
7 Keyway joint
9 1” preformed joint filler
10 ½” preformed joint filler
14 Integral concrete curb
15 Combined curb and gutter
20 Contraction joint

INDIANA DEPARTMENT OF TRANSPORTATION
STREET or ALLEY APPROACH
HMA MAINLINE PAVEMENT
JANUARY 2000
STANDARD DRAWING NO.E 610-PRAP-13

Date: 1-03-00
/Anthony L. Urosevich
Design Standards Engineer

Date: 1-03-00
/Firaz Sfriend
Design Standards Engineer
GENERAL NOTES

1. Provide radius of 30° or more at major cross streets where WB-15 trucks and or buses turn repeatedly.

2. Provide radius of 60° or more at the intersection of two State or U.S. highways and streets servicing heavy industrial areas requiring repeated turns by the Indiana Single Unit Vehicle.

3. Ear construction Type B as shown on Standard Drawing E 605-ERCH-02 will be permitted.


LEGEND

A PCCP
K HMA pavement
6 Longitudinal joint
7 Keyway joint
9 1" Preformed joint filler
10 3/8" Preformed joint filler
14 Integral concrete curb
15 Combined curb and gutter
20 Contraction joint

INDIANA DEPARTMENT OF TRANSPORTATION
STREET APPROACH WITH PCCP OR HMA MAINLINE PAVEMENT
SEPTEMBER 2002
STANDARD DRAWING NO. E 810-PRAP-14
CROSSOVER PLAN FOR MEDIAN WIDTH OF
35 ft OR GREATER BUT LESS THAN 60 ft

NOTES:
1. For median width W of 60' or greater, R = 30'.
2. For median width W of less than 8', L = 100' min.
4. Use construction joint in place of keyway joint if W is 32' or more.

CROSSOVER PLAN FOR MEDIAN WIDTH OF
15 ft OR GREATER BUT LESS THAN 35 ft

CROSSOVER PLAN FOR MEDIAN WIDTH OF
8 ft OR GREATER BUT LESS THAN 15 ft
L = 65'

Type K  $20' \leq W < 25'$

Type L  $25' \leq W < 30'$

NOTES:

1. See Standard Drawing E 610–PRCO–01 for Legend and Section A–A.
PLAN

NOTES:

1. See Standard Drawing E 610–PRCO–01 for Legend and Section A–A.
PLAN

NOTES:
1. See Standard Drawing E 610-PRCO-01 for Legend and Section A-A.
NOTES:

1. See Standard Drawing E 610–PRCO–01 for Legend and Section A–A.
NOTES:

1. See Standard Drawing E 610-PRCO-01 for Legend and Section A-A.

PLAN
NOTES:

1. Plan dimensions for HMA pavement crossover shall be as shown for PCCP on Standard Drawings E 610–PRCO–01A through –07.

2. See Standard Drawing E 610–PRCO–01 for Legend and Section A–A.
U-TURN MEDIAN OPENING

SECTION A-A

GRADE OF U-TURN MEDIAN OPENING
WITH WOOD POST

WITH PIPE POST
WITH WOOD POST

Details above platform same as shown above with wood post.

WITH PIPE POST

Nominal 2" and galv pipe (2 3/4" O.D.) Anti-rattle plate

2 Req'd
SECTION A-A

NOTES

1. If the existing section corner monument is 0 to 1 ft below surface, it shall be removed and replaced as shown in Detail A.

2. If the existing section corner monument is over 1 ft to 3 ft below surface, the county surveyor shall determine whether it shall remain in place or be replaced. If the monument is to be replaced, the installation shall be as shown in Detail A. If the existing monument is to remain in place, it shall be extended as shown in Detail A.

INDIANA DEPARTMENT OF TRANSPORTATION

SECTION CORNER MONUMENTS

APRIL 1995

STANDARD DRAWING NO. E 615-SCMN-01

DETAILS PLACED IN THIS FORMAT 8-15-89

/\ Anthony L. Farmsen 8-15-89
DESIGN STANDARDS ENGINEER

/\ Nirou Zandi 8-15-99
CHECKED BY ENGINEER OF RECORD

ORIGINALLY APPROVED 1-15-99
Bench mark tablet furnished by the Department and set in cement grout.

Ground line

4 - #5 x 5'-0 set 2' from face

Class A concrete

Class A concrete

INoDIA DEPARTMENT OF TRANSPORTATION

BENCH MARK POST

SEPTEMBER 1997

STANDARD DRAWING NO. E 615-SLBM-01

BENCH MARK POST

DETAILS PLACED IN THIS FORMAT 1-15-95

/s/ Anthony L. Urnauer 1-15-95
DESIGN STANDARDS ENGINEER  DATE

/s/ Firooz Zendi 1-15-95
CHIEF HIGHWAY ENGINEER  DATE

DRAWN STANDARDS ENGINEER

ORIGINALLY APPROVED 9-1-87
GENERAL NOTES
1. Sign shall be white background with black copy.
2. One steel type A or 4" x 4" wood post required.
3. Letter height shall be as follows:
   Border: ½" series D
   Line 1: 1" series B
   Line 2: 1" series B
   Line 3: 1" series B
4. 1½ x 5' steel rod

INSTALLATION FOR VITRIFIED BRICK OR BITUMINOUS SURFACE ON CONCRETE BASE (TYPE A)

SURVEY LINE MONUMENT RING & COVER

INSTALLATION FOR CONCRETE PAVEMENT (TYPE D)

OPTIONAL INSTALLATION FOR TYPE C MONUMENT

WHERE MONUMENT IS REQUIRED INSIDE OF SURFACED AREA IT SHALL BE SET WITH THE TOP BELOW METAL.

12"Ø OR 10" X 10" SQUARE HOLE POURLED IN PLACE.

FORM TOP 10" OF MONUMENT 8" X 8" SQUARE

GROUNCHED LINE

4" CHAMFER

INDOT

SURVEY MONUMENT

DO NOT DISTURB

DO NOT DISTURB

INDIANA DEPARTMENT OF TRANSPORTATION

SURVEY LINE MONUMENTS

SEPTEMBER 1997

STANDARD DRAWING NO. E 615-SLMN-01

DETAILS PLACED IN THIS FORMAT 11-15-89

NO. 18095

DESIGN STANDARDS ENGINEER

DATE

DESIGN STANDARDS ENGINEER

DATE

P/Anthony L. Oremko

DATE

P/Fireo Zandieh

DATE
NOTES:

1. See Standard Drawing E 616-SWCO-03 for Sections A-A, B-B, and C-C.

2. When paved slopewall abuts or surrounds columns, piers or other structures, use 1/2" bituminous expansion joint material between slopewall and structure.

3. If slopewall is specified, 1'-0" hand-laid riprap or precast concrete riprap type A may be used.

4. This dimension shall be increased to 5'-0" where no curb is used on the bridge.
NOTES:

1. These configurations to be used with precast or hand-laid riprap.
2. See Standard Drawing E 616-SWR-01 for Sections D-D, E-E, and F-F.
3. This dimension shall be increased to 5'-0" where no curb is used on the bridge.
**NOTES:**

1. See Section F-F on Standard Drawing E 616-SWCO-03 for Section C-C.

2. Where hand-laid riprap is used under a structure, a drainage configuration similar to that shown for precast concrete riprap shall be used. See Standard Drawing E 616-SWRR-02 for such configuration.

3. Toewall is not required adjacent to a pier or bent.

**INDIANA DEPARTMENT OF TRANSPORTATION**

**CONCRETE AND RIPRAPP**

**SLOPEWALL DETAILS**

**SEPTEMBER 2011**

**STANDARD DRAWING NO.** E 616-SWCO-04

**/s/ Richard L. VanCleave** 09/01/11

**DESIGN STANDARDS ENGINEER**

**/s/ Mark A. Miller** 09/01/11

**CHIEF HIGHWAY ENGINEER**

**DATE**
NOTES:


2. See General Plan for stations and locations of Inlets and pipe.

PLAN
(to be used on structures without berms)

* Dimension varies according to roadway width and type of drain used
SECTION A-A
TYPICAL ELEVATION THRU SLOPEWALL

SECTION B-B
DETAIL OF CONCRETE INLET TYPE U

SECTION C-C
DETAIL OF CONCRETE INLET TYPE U

SECTION D-D
DETAIL OF CONCRETE INLET TYPE W

SECTION E-E
DETAIL OF CONCRETE INLET TYPE W

#5 x 3'-0' (1'-0' o.c.)
Preset in and bille with cap
6' dia. deck drain pipe
(See superstructure details on plans)

8' concrete toewall to be constructed at ends of rranp
(1 ft of toewall equivalent to 0.37 sys of rranp)
Welded Wire Reinforcement

Concrete toewall
(1 ft of toewall equivalent to 0.64 sys of toewall)

Welded Wire Reinforcement

INDIANA DEPARTMENT OF TRANSPORTATION
SLOPEWALL AND DRAINAGE DETAILS
SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWCO-06

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER
NOTES:
1. Precast concrete riprap may be used as an alternate to concrete slopewall only on a structure having a berm adjacent to a cap.

For appropriate casting, see Standard Drawing E 720-CDSC-01.

For additional details of type D inlet, see Standard Drawing E 720-INST-03.

4. WWR shall be placed within the middle third of slopewall thickness and shall extend through all construction joints.

5. WWR 6" x 6", W2.9 x W2.9 at 42 lb/100 sq. ft., or equivalent.

INDIANA DEPARTMENT OF TRANSPORTATION
SLOPEWALL AND DRAINAGE DETAILS
SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWCO-07

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER
SECTION D-D

1'-0" 1'-0"

Berm elev.

Welded Wire Reinforcement
Paved ditch

SECTION F-F

1'-4"

6'-0"

Conc. Curb
Constr. joint

Slope earth from top of curb to natural ground

Riprap

#4 @ 2'-0" c-c

#4 x 3'-0" spa. @ 1'-0"
c-c (preset in cap)

SECTION E-E

Where riprap terminates
2'-0" outside of coping line

SECTION E-E

Where riprap terminates
more than 2'-0" outside of coping line
SECTION THROUGH PRECAST RIPRAP

Concrete curb (at ends of riprap)
(1 ft equivalent to 0.09 yd² of riprap)

Top of riprap elev.

3'-0"

2'-0"

Sodding

This area of riprap to be considered toe wall (1 ft.
equivalent to 0.64 yd² of riprap)

8" conc. toe wall to be constructed
at ends of riprap (1 ft. of toe wall
equivalent to 0.37 yd² of riprap)

11.6 units req'd per yd²

NOTES:
1. See Standard Drawing E 616-SWRR-01 for Section F-F.
2. If riprap is specified, 1'-0" hand-laid riprap or precast
concrete riprap type A may be used.
3. Precast concrete riprap:
   Type A: H = 7 5/8" (8" nom.)
   Type B: H = 3 5/8" (4" nom.)

PLAN - PRECAST CONCRETE RIPRAP
(Type A shown)

SECTION THROUGH PAVED DITCH AT TOE OF SLOPE
(See layout on plans for location of paved ditch)

INDIANA DEPARTMENT OF TRANSPORTATION

RIPRAP SLOPEWALL DETAILS
SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWRR-02

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE
GENERAL NOTES:

1. See Standard Drawing MS for inlet type N-12 details.
2. Contours and top of weir elevation shown in Section A–A are in feet relative to the ditch grade.
3. The type N-12 inlet may be placed at the cross pipe structure to eliminate the longitudinal pipe which connects the inlet to the cross pipe.

SECTION A–A

PLAN
1½ in./ft MEDIAN SLOPE

PLAN
2 in./ft MEDIAN SLOPE

Source Sheet: MSI
GENERAL NOTES

See Standard Drawing MS for inlet type N-12 details.

USE WITH MEDIAN SLOPE OF 2 in./ft

USE WITH MEDIAN SLOPE OF 1 1/2 in./ft
GENERAL NOTES:

1. See Standard Drawing MS for inlet type P-12 details.

2. Contours and top of weir elevation shown in Section B-B are in feet relative to the ditch grade.

SECTION B-B

INDIANA DEPARTMENT OF TRANSPORTATION
CENTER DITCH INLET
PERPENDICULAR TO C. ROADWAY
MAY 1998

STANDARD DRAWING NO.E 617-CDIN-03

All dimensions are in mm unless otherwise specified.

IN/Anthony L. Ormanich 5-09-98
DESIGN STANDARDS ENGINEER

IN/James F. Furrer 5-09-98
CHIEF HIGHWAY ENGINEER

Source Sheet: MS1
GENERAL NOTES

1. See Standard drawing MS for inlet type P-12 details.

USE WITH MEDIAN SLOPE OF 2 in./ft

USE WITH MEDIAN SLOPE OF 1 1/2 in./ft

All dimensions are in mm unless otherwise specified.

INDIANA DEPARTMENT OF TRANSPORTATION
CENTER DITCH INLET
PERPENDICULAR TO C ROADWAY
MAY 1998

STANDARD DRAWING NO. E 617-CDIN-04

Source Sheet: MSI
1. Caulk shall be placed on the painted surface at the painted/unpainted interface and is intended to function as a drip bead.

LEGEND:

- Area to be painted
- Caulk Bead

SECTION A-A

SECTION B-B

CAULK BEAD DETAIL

BEAM OR GIRDER AT INTERIOR SUPPORT

ELEVATION VIEW
(Bridge Deck not shown for clarity)

BEAM OR GIRDER AT END-BENT SUPPORT

ELEVATION VIEW
(Bridge Deck, Mudwall, and Concrete Encasement not shown for clarity)
GENERAL NOTES

1. Tie wire securement points on tree shall be above the first or second main branch.

2. See Standard Drawing E 622-LSPL-04 for Rubber Hose Detail.

Detail applies to trees less than 1 1/2" caliper.
1. This detail applies to Pine Trees (48" and over) with exception that screen wire protection shall not be required.

2. Plastic coil-type protective wrapping is an acceptable alternative to screen wire and reinforcement rod method of tree protection.

GENERAL NOTES

1. This detail applies to trees over 72".

2. See Standard Drawing E 622-LSPL-04 for Rubber Hose Detail.
RUBBER HOSE DETAIL

Approved rubber hose

2" Max.

14 Ga. min. galvanized tie wire

2" od.

3/4" id. (max.)

8"

Length of stakes varies

6' Min.

6'-0" (max.)

4" Min.

5'-0" (max.)

Two 2' x 2' wooden stakes

Wrap rodent protection screenwire around stakes, reinforcement rod not required.

Existing grade

Mulch

Root stock

Backfill material

INDIANA DEPARTMENT OF TRANSPORTATION
PLANTING BARE ROOT TREE
APRIL 1995
STANDARD DRAWING NO.E 622-LSPL-04
DETAILS PLACED IN THIS FORMAT: 1-15-99
/s/ Anthony J. DeRosa 3-15-99
DESIGN STANDARDS ENGINEER DATE
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE
/s/オリジナル Approved 4-0-86
GENERAL NOTES

1. This detail to be followed in the planting of grafted bare root stock.

Diagram:
- Budded scion
- Point of union
- Mulch
- Existing ground
- Backfill material
- Root system

3" Min.
2" Min.
6" Min.
GENERAL NOTES

1. Prostrate shrub planted at right angle to slope.
GENERAL NOTES

1. Take specified mulch depth to edge of bed over 3'-0" distance from center of outer plant.

2. See Standard Drawing E 622-LSPL-10 for typical plan of shrub bed.
Seedling Variety on Level Land

Seedling Variety on Slope

3" Min. mulch

Existing grade

Root stock

Backfill

10" Min.

INDIANA DEPARTMENT OF TRANSPORTATION
PLANTING SEEDLING VARIETIES
APRIL 1995

STANDARD DRAWING NO.E 622-LSPL-09
DETAILS PLACED IN THIS FORM 11-15-95

/s/ Anthony L. Dearnley 11-15-95
DESIGNING ENGINEER

/s/ Firooz Zandi 11-15-95
DESIGN ENGINEER

ORIGINAL APPROVED 4-01-95
1. Specific variations on shrub bed configurations and layout will be shown on plans. Plans will show exceptions to 10 ft minimum distance from ditch to center of outer plants.

Staggered shrub planting of same species.

Mulch

3'-0 Min. distance from center of outer plant to edge of much bed.

2'-0 Zone, beyond mulch bed, of weed and mowing control.

Min. distance of 10'-0 from edge of ditch to outer plant.

Mulch bed & tilled area

Total minimum extent of weed and mowing control

Right-of-Way Fence
GENERAL NOTES

1. See master plant list for specific dimensions applied to individual plants.

2. 2 ft minimum distance for weed and mowing control applies to zone beyond stakes or mulch bed.
   
   \[ A = \text{Diameter of ball} \]
   \[ B = \text{Depth of ball} \]
   \[ C = \text{Diameter of pit} \]
   \[ D = \text{Depth of pit} \]
   \[ E = \text{Diameter of mulch bed} \]
   \[ F = \text{Depth of mulch bed} \]


INDIANA DEPARTMENT OF TRANSPORTATION

COMMONLY USED DIMENSIONS

APRIL 1995

STANDARD DRAWING NO. E 622-LSPL-11

DETAILS PLACED IN THIS FORMAT 11-15-95

/s/ Anthony L. Drevnick 11-15-95
DESIGN STANDARDS ENGINEER DATE

/s/ Firouz Zandt 11-15-95
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-03-95
GENERAL NOTES

1. Pruning cuts shall be made as close as possible to remaining branch and in direction of symbol for cuts ( ).

2. Cut back secondary branching to reduce foliage by a minimum of 1/3 to a maximum of 1/2.
GENERAL NOTES

1. Pruning cuts shall be made as close as possible to remaining branch and in direction of symbol for cuts ( ).

2. Cut back secondary branching to reduce foliage by a minimum of 1/3 to a maximum of 1/2.

Possible damage due to rubbing of branches may occur. Prune to alleviate problem.
GENERAL NOTES

1. Pruning cuts shall be made as close as possible to remaining branch and in direction of symbol for cuts (■).

2. Cut back secondary branching to reduce foliage by a minimum of 1/3 to a maximum of 1/2.
GENERAL NOTES

1. Pruning operations for balled & burlapped stock shall maintain the natural shape and characteristic branching pattern.

2. Cut back secondary branching to reduce foliage by a minimum of 1/3 to a maximum of 1/2.

3. Budding variations and different growth characteristic of the various shrub species may alter pruning procedures. See suggested procedure on Standard Drawing E 622-LSPR-05 which applies to most shrub species.
GENERAL NOTES


Guy wire securement point shall be located above a lower branch. Larger trees may require a slightly higher securement point.

#4 reinforcement rods
(Method #1)

Existing Grade

Guy wire securement points

#4 reinforcement rod
(Method #1)

Rubber hose

Hog ring for securing wire screen to rods

Plastic tree protector
(Method #2)

6" Min.

DETAIL APPLIES TO TREES 1 1/4" CALIPER AND GREATER
GENERAL NOTES

1. Cut at bud starts opposite the base of bud and slants up toward top of bud.

2. Cut at secondary branch shall be parallel to remaining branch.

Improper Cut
Pruning cut too slanting (too much heartwood is exposed). Die-back will occur.

Improper Cut
Pruning cut too far beyond bud. Die-back will occur.

Improper Cut
Pruning cut too close to bud (will interfere with bud growth).

Suggested Cuts

- Cut at secondary branch
- Base of bud
- Bud
- Remaining branch
- Pruning cut
GENERAL NOTES

1. This is a suggested method for pruning heavier limbs. If these limbs are not properly cut, damage to adjacent portions of the tree may occur.
DO NOT DISTURB

DO NOT SPRAY

DO NOT MOW OR SPRAY

X = Approximate distance from edge of paved shoulder to edge of area not to be mowed, sprayed, or disturbed.