The State of Delaware
Department of Transportation

Standard Construction Details

Design values are presented in this document in both metric and U.S. customary units and were developed independently within each system. The relationship between the metric and U.S. customary values is neither an exact (soft) conversion nor a completely rationalized (hard) conversion. The metric values are those that would have been used had this document been presented exclusively in metric units; the U.S. customary values are those that would have been used if this document had been presented exclusively in U.S. customary units. Therefore, the user is advised to work completely in one system and not attempt to convert directly between the two.
SECTION I - BARRIER (CONT'D)

B-15
- PORTABLE CONCRETE SAFETY BARRIER IF SHAPED

- CURVE SECTION DETAIL DELETED - SEE SPECIFICATIONS
- CURVE SECTION DETAIL DELETED - SEE SPECIFICATIONS
- TAPERED END SECTION DETAIL DELETED - SEE SPECIFICATIONS
- TYPICAL REINFORCEMENT DETAILS DETAIL DELETED - SEE SPECIFICATIONS
- JOINT CONNECTION DETAILS DETAIL DELETED - SEE SPECIFICATIONS

SECTION II - CURB & GUTTER

C-1 (C008) - P.C.C. CURB, P.C.C. CURB & GUTTER, AND HOT-MIX CURB

C-2 - CURB RAMPS
- TYPE 1
- TYPES 2, 3 & 4
- SECTIONS FOR TYPES 2, 3 & 4
- TYPE 5
- TYPE 6

C-3 (C008) - ENTRANCES

C-4 - CURB OPENINGS
- TYPES A, B & C
- TYPES D, E & F
- TYPES F & G

SECTION III - DRAINAGE

D-1 - 60' SAFETY END STRUCTURE
- DETAIL VIEWS
- SCHEDULES

D-2 - 90' SAFETY END STRUCTURE
- DETAIL VIEWS
- SCHEDULES

D-3 - SAFETY GRATES
- SAFETY END DETAIL & ASSEMBLY DETAIL
- PERSONNEL SAFETY GRATE FOR PIPE INLET DETAIL

D-4 (C007) - INLET BOX DETAILS

D-5 - DRAINAGE INLET DETAILS
- DRAINAGE INLET ASSEMBLY
- DRAINAGE INLET FRAME AND GRATES
- DRAINAGE INLET TOP LAMPS
- DRAINAGE INLET COVER SLAB DETAILS
- DOUBLE INLET COVER SLAB DETAILS
- 3\% x 3\% x 3\% x 3\% DRAINAGE INLET AND COVER SLAB DETAILS
- 7\% x 7\% x 7\% DRAINAGE INLET DETAILS
- 2\% x 2\% SUBDIVISION INLET DETAILS
- LAVIN INLET DETAIL
SECTION III - DRAINAGE (CONT'D)

D-6 - MANHOLE DETAILS
  D00701 - BOX MANHOLE ASSEMBLY
  D00801 - ROUND MANHOLE ASSEMBLY
  D00901 - MANHOLE FRAME AND COVER
  D01001 - BOX MANHOLE COVER SLAB

D-7 - JUNCTION BOX DETAILS
  D00701 - JUNCTION BOX ASSEMBLY
  D00901 - JUNCTION BOX COVER SLAB

D-8 - PIPE BEDDING
D-9 - PERFORATED PIPE UNDERDRAIN
D-0 - PIPE PLUGGING DETAIL

SECTION IV - EROSION

E-1 (2005) - INCREMENTAL STABILIZATION
E-2 (2006) - SILT FENCE
E-3 (2005) - DRAINAGE INLET SEDIMENT CONTROL
E-4 (2006) - CURB INLET SEDIMENT CONTROL
E-5 (2006) - STONE CHECK DAM
E-6 (2005) - SEDIMENT TRAP
E-7 (2005) - SEDIMENT TRAP, USING DRAINAGE INLET AS OUTLET
E-8 - RISER PIPE ASSEMBLY FOR SEDIMENT TRAP
  E0061 - 1 ELEVATION
  E0062 - 2 TRACK HOOD DETAILS
E-9 (2005) - EROSION CONTROL, BLANKET APPLICATIONS
E-10 (2005) - RIPRAP DITCH
E-11 (2005) - TEMPORARY SWALE
E-12 (2005) - PERIMETER Dike/SWALE
E-13 (2005) - EARTH Dike
E-14 (2005) - TEMPORARY SLOPE DRAIN
E-15 (2005) - STILLING WELLS
E-16 (2005) - SUMP PIT, TYPE 1A & 2
E-17 (2005) - DEWATERING BASIN
E-18 (2005) - GEOTEXTILE-MED CHANNEL DIVERSION
E-19 (2005) - SANDBAG DIVERSION
E-20 (2005) - SANDBAG Dike
E-21 (2005) - STABILIZED CONSTRUCTION ENTRANCE
E-22 (2006) - SKIMMER Dewatering Device
E-23 - TURBIDITY CURTAIN
  E0061 - 1 FLOATING TURBIDITY CURTAIN
  E0062 - 2 STABILIZED TURBIDITY CURTAIN
E-24 (2005) - PORTABLE SEDIMENT TANK
E-25 (2005) - TURF REINFORCEMENT MAT APPLICATIONS
E-26 (2006) - RIPRAP ENERGY DISSIPATOR DETAIL
SECTION V - LANDSCAPING

SHEET NO.  NAME
L-1  PLANTING DETAILS
   2006-1  ROADSIDE SHRUB PLANTING DETAIL
   2006-2  TREE PLANTING DETAILS
   2006-3  PERENNIAL/GROUND COVER PLANTING DETAIL

SECTION VI - MISCELLANEOUS

SHEET NO.  NAME
M-1  2006B  RIGHT-OF-WAY FENCE
M-2  2006B  CONCRETE MONUMENT
M-3  2006B  BOLLARD & SHARED-USE PATH DETAILS
M-4  2007I  BIKE RACK
M-5  2004I  WOOD RAIL FENCE
M-6  2004I  PATTERNED HOI-MIX OR CONCRETE & BRICK PAVER
M-7  2006I  CHAIN LINK FENCE DETAILS
M-8  2007I  P.C.C. PARKING BUMPER

SECTION VII - PAVEMENT

SHEET NO.  NAME
P-1  P.C.C. PAVEMENT
   2008-1  SLAB PLAN (WITH DOWEL AND TE LOCATIONS)
   2001-3  JOINT AND SEALANT DETAILS
   2001-4  # BOLT, NUT BOLT, DOWEL & TE BAR
   2001-5  DOWEL SUPPORT BASKET
   2001-6  DOWEL & TE BAR PLACEMENT TOLERANCES
P-2  P.C.C. PAVEMENT PAVING
   2008-1  FULL DEPTH PAVEMENT, PLAN VIEW
   2008-2  FULL DEPTH PAVEMENT, SECTION VIEWS
   2008-3  FULL DEPTH PAVEMENT SEALANT DETAILS, GRAB DETENTION DECK, AND DOWEL BAR
   2008-4  FULL DEPTH PAVEMENT, DOWEL BAR PLACEMENT TOLERANCES
   2008-5  PARTIAL DEPTH PAVEMENT, PLAN AND SECTION VIEWS

DELAWARE DEPARTMENT OF TRANSPORTATION
SECTION VIII - TRAFFIC

T-4 (2005) - CONDUIT JUNCTION WELL, TYPES 1, 2, AND 3
T-2 (2005) - CONDUIT JUNCTION WELL, TYPE 4
T-3 (2005) - CONDUIT JUNCTION WELL, TYPE 5
T-4 (2005) - CABINET BASES (TYPES "W" AND "P")
T-5 - POLE BASES
   (2005) - 1. ROUND BASE, SQUARE BASE
   (2005) - 3. TYPICAL SECTION BASES 5 AND 6, ANCHOR BOLT DATA CHART AND DETAILS
T-6 (2005) - SPECIAL POLE BASE
T-7 (2005) - SIGN FOUNDATION
T-8 (2005) - LOOP DETECTOR TO CONDUIT JUNCTION WELL CONNECTION
T-9 (2005) - TYPE "M" LOOP DETECTOR
T-10 (2005) - TYPE "M2" LOOP DETECTOR
T-11 - MESSENGER WIRE ATTACHMENT
   (2005) - 1. INTERMEDIATE MESSENGER WIRE ATTACHMENT ON WOOD POLES
   (2005) - 2. ANGULAR INTERMEDIATE MESSENGER WIRE ATTACHMENT
T-12 - MESSENGER WIRE ATTACHMENT
   (2005) - 1. SPAN WIRE ATTACHMENT BETWEEN POLES
   (2005) - 2. DEAD END MESSENGER WIRE ATTACHMENT
T-43 - CONDUIT JUNCTION WELLS
   (2006) - 1. TYPE 4
   (2006) - 2. TYPE 7
T-44 - EMERGENCY PREEMPTION RECEIVER
   (2006) - 1. UPRIGHT MOUNT
   (2005) - 2. INVERTED MOUNT
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>W-BEAM</td>
</tr>
<tr>
<td>2</td>
<td>W6 X 9 (W50 x 13.5) STEEL POST</td>
</tr>
<tr>
<td>3</td>
<td>WOOD OFFSET BLOCK</td>
</tr>
<tr>
<td>4</td>
<td>SPlice - REQUIRES EIGHT(8) 5/8&quot;(16) GUARDRAIL BOLTS (L=1/2&quot;(35)) WITH RECESS NUTS, AND ONE(1) 5/8&quot;(16) GUARDRAIL BOLT (L=10&quot;(255)) WITH RECESS NUT.</td>
</tr>
<tr>
<td>5</td>
<td>W-BEAM TERMINAL CONNECTOR</td>
</tr>
<tr>
<td>6</td>
<td>5/8&quot;(16) GUARDRAIL BOLT (L=1/2&quot;(35)) AND RECESS NUT</td>
</tr>
<tr>
<td>7</td>
<td>5/8&quot;(16) GUARDRAIL BOLT (L=10&quot;(255)) AND RECESS NUT</td>
</tr>
<tr>
<td>8</td>
<td>5/8&quot;(16) GUARDRAIL BOLT (L=10&quot;(255)), STEEL WASHER, AND RECESS NUT</td>
</tr>
<tr>
<td>9</td>
<td>7/8&quot;(22) HIGH STRENGTH STRUCTURAL HEX BOLT (L=VARIeS) AND HEX NUT</td>
</tr>
<tr>
<td>10</td>
<td>5/8&quot;(16) CARRiAGE BOLT (L=VARIeS), STEEL WASHER, AND HEX NUT</td>
</tr>
<tr>
<td>11</td>
<td>BEARING PLATE</td>
</tr>
</tbody>
</table>
**DELAWARE DEPARTMENT OF TRANSPORTATION**

**GUARDRAIL APPLICATIONS**

**STANDARD NO.** B-1 (2004)  **SHT.** 1  **OF** 6  **APPROVED**

**SCALE:** NTS

**DATE:** 1/10/05

---

**TYPE 1 GUARDRAIL**

**POST SPACING:** 6'-3" (1905)

**POST SPACING:** 3'-4" (952.5)

**POST SPACING:** 6'-3" (1905)

**REQUIRED CLEARANCE:**
- **4' (1200) MINIMUM**

**SEE NOTE #1**

**EDGE OF SHOULDER**

**EDGE OF TRAVEL LANE**

**NOTE:** 1. THE DISTANCE FROM THE EDGE OF THE TRAVEL LANE OR SHOULDER TO THE FACE OF GUARDRAIL SHOULD BE MAXIMIZED. THIS AREA SHALL BE GRADED 10:1 OR FLATTER.

**NOTE:** 2. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.

---

**TYPE 2 GUARDRAIL**

**POST SPACING:** 25' (7620) MIN.

**POST SPACING:** 25' (7620) MIN.

**POST SPACING:** 25' (7620) MIN.

**POST SPACING:** 6'-3" (1905)

**required clearance, 4' (1200) minimum**

**SEE NOTE #1**

**EDGE OF SHOULDER**

**EDGE OF TRAVEL LANE**

**NOTE:** 1. THE DISTANCE FROM THE EDGE OF THE TRAVEL LANE OR SHOULDER TO THE FACE OF GUARDRAIL SHOULD BE MAXIMIZED. THIS AREA SHALL BE GRADED 10:1 OR FLATTER.

**NOTE:** 2. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.

---

**TYPE 3 GUARDRAIL**

**POST SPACING:** 10' (3000) MINIMUM

**POST SPACING:** 10' (3000) MINIMUM

**POST SPACING:** 10' (3000) MINIMUM

**POST SPACING:** 6'-3" (1905)

**4' (1200) MINIMUM**

**SEE NOTE #1**

**EDGE OF TRAVEL LANE**

**NOTE:** 1. THE DISTANCE FROM THE EDGE OF THE TRAVEL LANE OR SHOULDER TO THE FACE OF GUARDRAIL SHOULD BE MAXIMIZED. THIS AREA SHALL BE GRADED 10:1 OR FLATTER.

**NOTE:** 2. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.

---

**FLARE RATES**

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>FLARE RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 MPH (110 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>60 MPH (100 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>55 MPH (90 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>50 MPH (80 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>45 MPH (70 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>40 MPH (60 km/h)</td>
<td>4d</td>
</tr>
<tr>
<td>30 MPH (50 km/h)</td>
<td>4d</td>
</tr>
</tbody>
</table>

**DESIGN SPEED**

- 70 MPH (110 km/h)
- 60 MPH (100 km/h)
- 55 MPH (90 km/h)
- 50 MPH (80 km/h)
- 45 MPH (70 km/h)
- 40 MPH (60 km/h)
- 30 MPH (50 km/h)
GUARDRAIL APPLICATIONS

B-1 (2004)

NOTE: OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.
1. Flare the end treatment at 25'/beginning 50' (15 m) from the end of the impact head, unless the construction plans or specifications specify a smaller flare.
2. This detail was solely created to show the grading required for this type of attenuator.
3. The guardrail end treatment attenuator shall be installed as per the manufacturer's and the department of transportation's specifications.
4. If curb is present, depress the curb to a maximum height of 2' (600) within the limits of the end treatment and throughout the length of the taper grading.

**DELAWARE DEPARTMENT OF TRANSPORTATION**

**GUARDRAIL APPLICATIONS**

<table>
<thead>
<tr>
<th>STANDARD NO.</th>
<th>B-1 (2007)</th>
<th>SHT.</th>
<th>4 OF 6</th>
<th>APPROVED</th>
<th>RECOMMENDED</th>
</tr>
</thead>
</table>

**SECTION A-A**

**GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE I**

**NOTES:**

- Offset to barrier (see note A)
- Edge of pavement
- Length of need
- 3'-3" (1000) Min
- Impact head
- Shoulder
- Begin post

**SCALE:** 1/10" = 1'-0"
1. Flare shall be 4' (1200) unless the construction plans or specifications specify a smaller flare. Flare may be parabolic or straight based on manufacturer's specifications.

2. This detail was solely created to show the grading required for this type of attenuator. The guardrail end treatment attenuator shall be installed as per the manufacturer's and the Department of Transportation's specifications.

3. If curb is present, depress the curb to a maximum height of 2' (50) within the limits of the end treatment and throughout the length of the taper grading.

**NOTES:**

**SECTION A-A**

**GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2**

**GUARDRAIL APPLICATIONS**

**DELAWARE DEPARTMENT OF TRANSPORTATION**

**STANDARD NO. B-1 (2007)**

**SHT. 5 OF 6**

**APPROVED**

**RECOMMENDED**

**DATE:** 10/23/07

**DESIGNER:**

**DATE:** 08/01/07
1. This detail was solely created to show the grading required for this type of attenuator.
2. 6:1 or flatter grading is allowable when the barrier is located 12' (3660 mm) or more from the outside edge of the shoulder.
3. This end treatment can also be used in ramp gores or other areas where 2 rails of W-beam come together and terminate with one end treatment.
4. When opposing roadways have equal elevations, the traffic barrier system should be placed on the opposite side of the ditch line from approaching traffic.
5. The guardrail end treatment attenuator shall be installed as per the manufacturer's and the Department of Transportation's specifications.
6. If curb is present, depress the curb to a maximum height of 2' (50) within the limits of the end treatment and throughout the length of the taper grading.
NOTE: 1. ALL W-BEAMS ARE 12'-6" (3810) IN LENGTH.
2. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
SCALE: N.T.S.

NOTE:
1. All W-beams are 18'/6" (5400) in length.
2. Use guardrail reflector every fifth post.

SINCE NO POST OR OFFSET BLOCK IS PRESENT AT THIS LOCATION, 
1/4" x (8) GUARDRAIL BOLT (L=40") (2055) IS NOT REQUIRED.

TYPE 1 GUARDRAIL OR
APPROPRIATE END TREATMENT

BEAM 1
(NESTED W-BEAM)

BEAM 2
(NESTED W-BEAM)

BEAM 3
(NESTED W-BEAM)

THREE SECTIONS OF W-BEAM, ONE NESTED INSIDE THE OTHER

NOTES:

1. 6'-3" (1905)
2. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
Scale: 1 = N.T.S.

<table>
<thead>
<tr>
<th>Radius</th>
<th>Min. Required Area Free of Fixed Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>L x W</td>
<td></td>
</tr>
<tr>
<td>6'-0&quot;(1800)</td>
<td>10' x 10' (3048 x 3048)</td>
</tr>
<tr>
<td>10'-0&quot;(3000)</td>
<td>15' x 15' (4572 x 4572)</td>
</tr>
<tr>
<td>15'-0&quot;(4500)</td>
<td>20' x 20' (6096 x 6096)</td>
</tr>
</tbody>
</table>

Notes:
1. No washers are used on the rail side of the long wood breakaway posts.
2. The curved guardrail section shall be shop bent.
3. Place guardrail reflector every fifth post.
4. If curb is used in conjunction with curved guardrail section, the curb cannot be higher than 2" (50).
5. On the 8'-6" (2600) radius system only, the rail is not to be bolted to the center post.

CURVED GUARDRAIL SECTION

PLAN

SECTION A-A

CURVED GUARDRAIL OR APPROPRIATE END TREATMENT OR GUARDRAIL TO BARBER CONNECTION

AREA BEHIND GUARDRAIL TO BE MAINTAINED FREE OF FIXED OBJECTS OR OTHER HAZARDS.

LONG WOOD BREAKAWAY POST

SLOPE = 15:1 OR FLATTER

4" (100) ROUNDING

SCALE: 1 = N.T.S.

DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD NO. B-4 (2007)

SHT. 1 OF 1

APPROVED

RECOMMENDED

08/14/2006

03/14/2007
END SECTION PLAN

END SECTION ELEVATION

NOTES:
1. ADDITIONAL HOLES FOR ANCHOR PLATE SHALL BE DRILLED PRIOR TO GALVANIZING. SEE STANDARD HARDWARE SHEET FOR HOLE SPACING INFORMATION.
2. CONTRACTOR HAS THE OPTION OF USING A 6" (150) STEEL TUBE WITHOUT A SOIL PLATE OR A 5" (125) STEEL TUBE WITH A SOIL PLATE.

END ANCHORAGE

DELTA
DEPARTMENT OF TRANSPORTATION

STANDARD NO. B-5 (2002) SH. 1 OF 1

01/31/2002

APPROVED

RECOMMENDED
**NOTES:**

1. BURIED END SECTION PAYMENT INCLUDES THE CONCRETE OR POST ANCHORAGE, EXCAVATION, BACKFILL, AND ALL APPLICABLE ITEMS INCLUDING LABOR NECESSARY TO COMPLETE END ANCHORAGE.

2. THE CONTRACTOR HAS THE OPTION OF USING EITHER A CONCRETE BLOCK ANCHOR OR A POST ANCHOR TO TERMINATE THE BURIED END SECTION.

3. WHEN PLACING GUARDRAIL ON A 10% OR FLATTER SLOPE, THE HEIGHT OF THE GUARDRAIL SHALL BE HELD CONSTANT RELATIVE TO THE GROUND DIRECTLY UNDER THE FACE OF THE GUARDRAIL.

4. ALL POSTS SHALL BE 6’ (1800) FOR SINGLE RAIL INSTALLATION.


6. MAINTAIN THE FLARE OF THE GUARDRAIL UNTIL THE 12’ (3600) COVER HAS BEEN ATTAINED. IF THE 12’ (3600) COVER CANNOT BE ATTAINED BEFORE THE RAIL IS 7’ (2130) BEHIND THE BOTTOM OF THE DITCH, THEN SLOPE THE GUARDRAIL FROM THE POINT WHERE IT CROSS THE DITCH TO WHERE IT IS 7’ (2130) BEHIND THE DITCH, SO THAT IT HAS 12’ (3600) OF COVER.

**FLARE RATES**

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>FLARE RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 MPH (112 km/h)</td>
<td>15d</td>
</tr>
<tr>
<td>60 MPH (96 km/h)</td>
<td>14d</td>
</tr>
<tr>
<td>55 MPH (88 km/h)</td>
<td>12d</td>
</tr>
<tr>
<td>50 MPH (80 km/h)</td>
<td>10d</td>
</tr>
<tr>
<td>45 MPH (72 km/h)</td>
<td>9d</td>
</tr>
<tr>
<td>40 MPH (64 km/h)</td>
<td>7d</td>
</tr>
<tr>
<td>30 MPH (48 km/h)</td>
<td>5d</td>
</tr>
</tbody>
</table>

**DELTA**

DEPARTMENT OF TRANSPORTATION

STANDARD NO. B-6 (2002)

SHT. 1 OF 3

RECOMMENDED

APPROVED

01/31/2002
**FLARE RATES**

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>FLARE RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 MPH (32 km/h)</td>
<td>15d</td>
</tr>
<tr>
<td>40 MPH (64 km/h)</td>
<td>12d</td>
</tr>
<tr>
<td>50 MPH (80 km/h)</td>
<td>10d</td>
</tr>
<tr>
<td>45 MPH (72 km/h)</td>
<td>9d</td>
</tr>
<tr>
<td>40 MPH (60 km/h)</td>
<td>8d</td>
</tr>
<tr>
<td>30 MPH (48 km/h)</td>
<td>7d</td>
</tr>
</tbody>
</table>

**NOTES:**

1. BURIED END SECTION PAYMENT INCLUDES THE CONCRETE OR POST ANCHORAGE, EXCAVATION, BACKFILL, AND ALL APPLICABLE ITEMS, INCLUDING LABOR NEEDED TO COMPLETE END ANCHORAGE.
2. THE CONTRACTOR HAS THE OPTION OF USING EITHER A CONCRETE BLOCK ANCHOR OR A POST ANCHOR TO TERMINATE THE BURIED END SECTION.
3. THE TOP OF THE "M" BEAM SHALL BE HELD CONSTANT RELATIVE TO THE ROADWAY PROFILE GRADE UNTIL IT CROSS EMBankment the DITCH FLOW LINE. A SECOND "M" BEAM RAIL IS REQUIRED WHEN THE DISTANCE BETWEEN THE GROUND AND THE BOTTOM OF THE TOP RAIL EXCEEDS 5' (1.5M). THE MAXIMUM HEIGHT OF THE DOUBLE RAIL SYSTEM IS 45° (0.78). IF NECESSARY, TAPER BOTH RAILS DOWN TO MAINTAIN MAXIMUM HEIGHT. SECOND RAIL SHALL BE PAID FOR AS ADDITIONAL LINEAR FEET LINEAR METERS OF TYPE I GUARDRAIL.
4. WHEN USING A SECOND RAIL, 8' (2400) LONG POSTS ARE REQUIRED BEHIND THE DITCHLINE. POSTS MUST PROVIDE 4' (1200) MINIMUM EMBEDMENT (11'-5"") WHEN ROCK IS ENCOUNTERED, POSTS FOR THE POST ANCHOR SHALL BE A 18'-0" LONG.
5. WHEN USING THE BURIED END SECTION, THE DESIGN MUST PROVIDE A MINIMUM OF 7'-0" (2.1M) FROM WHERE THE GUARDRAIL CROSSES THE DITCH LINE TO THE BEGINNING OF THE HAZARD.
6. MAINTAIN THE FLARE OF THE GUARDRAIL UNTIL THE 12'-0" COVER HAS BEEN ATTAINED. IF THE 12'-0" COVER CANNOT BE ATTAINED BEFORE THE RAIL IS 7'-0" BEHIND THE BOTTOM OF THE DITCH, THEN SLOPE THE GUARDRAIL FROM THE POINT WHERE IT CROSSES THE DITCH TO WHERE IT IS 2'-0" BEHIND THE DITCH, SO THAT IT Has A 2'-0" (600) OF COVER.

**BURIED END SECTION**

**DELAWARE DEPARTMENT OF TRANSPORTATION**

**STANDARD NO.** B-6 (2002)  
**SHT. 2 OF 3**

**RECOMMENDED**
**Rub Rail to Barrier Connection, Approach Type 1**

**Rub Rail Wood Blocks**

<table>
<thead>
<tr>
<th>Post No.</th>
<th>Width</th>
<th>Bolt Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 1/2&quot; (115)</td>
<td>6&quot; (152)</td>
</tr>
<tr>
<td>2</td>
<td>3 1/4&quot; (83)</td>
<td>4&quot; (102)</td>
</tr>
<tr>
<td>3</td>
<td>2&quot; (50)</td>
<td>4&quot; (102)</td>
</tr>
<tr>
<td>4</td>
<td>1&quot; (25)</td>
<td>2&quot; (50)</td>
</tr>
</tbody>
</table>

**Notes:**
1. The rub rail to barrier connection end must be attached flush with the sloped toe of the safety barrier, installation can be simplified by fabricating or shop twisting the rub rail end to be consistent with the slope of the barrier, however, field bending using heat is permitted.

2. Steel spacer tube is schedule 40 galvanized pipe, 6" (152) O.D. x 3" (76) long.

---

**Delaware Department of Transportation**

**Guardrail to Barrier Connection, Approach Type 1**

**Standard No. B-7 (2001)**

**Approved**

**Recommended**

04/05/2001
NOTES:

D. CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
E. POSTS 1, 2, 4, 6, AND 7 REQUIRE AN ADDITIONAL HOLE TO ATTACH WOOD BLOCKS AND/OR BENT RAIL.
F. DO NOT ATTACH RAILS TO POSTS 1, 2, 3, OR 4.
G. POSTS 1 AND 2 ARE 18 x 18 x 3.2 x 1200. ALL OTHER POSTS IN TRANSITION ARE 16 x 16 x 3.5 x 1200.
H. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
I. BENT RAIL MAY BE SHIP BENT TO FACILITATE INSTALLATION OR MAY BE FIELD BENT USING HEAT.

TL. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.
UL. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
VL. FOR INSTALLATIONS WHERE CURB EXISTS, IF THE EXISTING CURB IS 8" (200) OR HIGHER AND CANNOT BE REMOVED, THE BOTTOM RAIL CAN BE ELIMINATED.

DELAWARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2

STANDARD NO. B-8 (2005)    SHT. 1 OF 2

APPROVED

12/5/05

RECOMMENDED

11/6/05

10/1/2005
BENT RAIL WOOD BLOCKS

<table>
<thead>
<tr>
<th>BLOCK</th>
<th>WIDTH</th>
<th>BOLT LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5&quot; (125)</td>
<td>8&quot; (200)</td>
</tr>
<tr>
<td>2</td>
<td>4&quot; (100)</td>
<td>6&quot; (150)</td>
</tr>
<tr>
<td>3</td>
<td>3&quot; (75)</td>
<td>6&quot; (150)</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; (50)</td>
<td>4&quot; (100)</td>
</tr>
</tbody>
</table>

NOTE: BOTTOM WOOD BLOCKS LOCATED ON POSTS 1-4 ARE OFFSET DRILLED TO SIT SQUARELY ON THE POST FLANGE AND SECURED WITH ¾" (19) CARTRIDGE BOLTS. W. VARIIES, SEE BENT RAIL WOOD BLOCKS TABLE.
LIMIT OF PAYMENT FOR GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE

NOTES: 6. CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
2. GUARDRAIL SECTION AND TERMINAL CONNECTORS SHALL BE OVERLAPPED IN THE DIRECTION OF TRAVEL.
3. INSTALLATION SHOWN ABOVE WITH AN ‘F-TYPE’ BARRIER FACE. GUARDRAIL SECTION OF BARRIER CONNECTION SHALL BE ADJUSTED HORIZONTALLY IN ORDER TO MEET FLUSH AGAINST VARIOUS TYPES OF WALLS AND BARRIERS.
**NOTES:**

1. **THIS INSTALLATION SHALL BE USED WHEN THE EXISTING SIDEWALK IS 6'-6" (1980) OR LESS.**
2. **USE A THRIE BEAM EXPANSION SECTION AT BRIDGE EXPANSION JOINTS.**
3. **PLACE GUARDRAIL REFLECTOR IN THE UPPER VALLEY OF THE THRIE BEAM EVERY FIFTH POST.**
4. **TIMBER BLOCK THICKNESS SHALL BE ADJUSTED TO ALLOW FACE OF THE THRIE BEAM TO BE FLUSH WITH BOTTOM OF CURB. MINIMUM THICKNESS SHALL BE 4" (100).**
5. **THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER SITUATIONS, THE ENTRANCE END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.**
6. **SPACING OF WOOD POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.**

---

**SECTION A-A**

THRIE BEAM GUARDRAIL WITH WOOD POSTS SPACED AT 6'-3" (1905) SEE NOTE

END OF SIDEWALK

THRIE BEAM GUARDRAIL WITH WOOD POSTS SPACED AT 6'-3" (1905) SEE NOTE

EXIT END APPLICATION

SEE NOTE

PLACE GUARDRAIL REFLECTOR IN THE UPPER VALLEY OF THE THRIE BEAM EVERY FIFTH POST.

TIMBER BLOCK THICKNESS SHALL BE ADJUSTED TO ALLOW FACE OF THE THRIE BEAM TO BE FLUSH WITH BOTTOM OF CURB. MINIMUM THICKNESS SHALL BE 4" (100).

THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER SITUATIONS, THE ENTRANCE END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.

SPACING OF WOOD POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.
THREE BEAM GUARDRAIL WITH STEEL POSTS SPACED AT 6'-3" (1905) CENTER TO CENTER

EXISTING CURB LINE (BOTTOM OF CURB)

W-THREE BEAM TRANSITION SECTION

SEE NOTE

W6 x 15 (W150 x 22) STEEL GUARDRAIL POST

1/4" (25) TYP.

18" (450) MIN.

CHIP OUT 1-1/2" (38) DEEP Recess FOR GROUT

Drill for 2 - 1/4"(6) BOLTS (AASHTO M640)
ADHESIVE ANCHORS 55,000 lbs (25,000 kg) ULTIMATE
ADHESIVE BOND STRENGTH, 1'-0" (300) MIN. EMBEDMENT

1/2" (12) GUARDRAIL BOLT (L=1-3/4"

SEE NOTE

SECTION A-A

NOTES:
1. THIS INSTALLATION SHALL BE USED WHEN THE EXISTING SIDEWALK IS 18" (450) OR WIDER, AND DEAD LOAD CONSIDERATIONS ARE A CONCERN WHEN USING BRIDGE RAIL RETROFIT, TYPE 3.
2. ADHESIVE ANCHORS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS AND SHALL BE GALVANIZED.
3. USE A THREE BEAM EXPANSION SECTION AT BRIDGE EXPANSION JOINTS.
4. PLACE GUARDRAIL REFLECTOR IN THE UPPER VALLEY OF THE THREE BEAM EVERY FIFTH POST.
5. THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER SITUATIONS, THE ENTRANCE END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.
6. SPACING OF STEEL POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.

DELAWARE
DEPARTMENT OF TRANSPORTATION

BRIDGE RAIL RETROFIT, TYPE 2

STANDARD NO. B-11 2004

APPROVED

DATE

RECOMMENDED

DATE

NOTES:
1. THIS INSTALLATION SHALL BE USED WHEN THE EXISTING SIDEWALK IS 18" (450) OR WIDER, AND DEAD LOAD CONSIDERATIONS ARE A CONCERN WHEN USING BRIDGE RAIL RETROFIT, TYPE 3.
2. ADHESIVE ANCHORS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS AND SHALL BE GALVANIZED.
3. USE A THREE BEAM EXPANSION SECTION AT BRIDGE EXPANSION JOINTS.
4. PLACE GUARDRAIL REFLECTOR IN THE UPPER VALLEY OF THE THREE BEAM EVERY FIFTH POST.
5. THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER SITUATIONS, THE ENTRANCE END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.
6. SPACING OF STEEL POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.
W6 x 15 (W150 x 22) STEEL GUARDRAIL POST

BASE PLATE DETAIL

POST - 10" (250)
6/" (150)
3/" (75)
1 1/" (25)
3/" (75)
5/" (125)
8/" (200)

W6 x 15 (W150 x 22)

1/" (125) DIA.
1/" (125) DIA.

W1/" (35) DIA.

WELD ALL AROUND INCLUDING EXTERIOR FLANGE SURFACE

SIDE
FRONT
SECTION B-B

PLAN

TRAFFIC FACE

DELTA BALANCE

DEPARTMENT OF TRANSPORTATION

BRIDGE RAIL RETROFIT, TYPE 2

STANDARD NO. B-11 (2001)

SHT. 2 OF 2

APPROVED

04/05/2001
**PLAN**

- **existing Bridge rail**: 12' (max)
- **contraction joints**: bridge barrier
- **direction of travel**
- **taper end of wall to top of guardrail at a slope of 4:1 or flatter**
- **5' (1.5m)** (typical bar spacing)

**section a-a**

- **existing rail - do not disturb**
- **drill (2.5) dia. hole, fill with high strenth non-slip grout**
- **#6 (9) bars spaced 15" (375mm) longitudinally. front and back rows shall be staggered**

**notes**:
- Standard guardrail to barrier connections shall be connected to the ends of the new bridge barrier and transitioned to the existing guardrail.

**bridge rail retrofit, type 3**

**delaware department of transportation**

**standard no.** B-12 (2001)  
**sht. 1 of 1**

**approved**

**recommended**

**scale**: n.t.s.

**05/2/2001**
NOTES:

1. TWO ADDITIONAL 1/2" x 2 1/2" (65) SLOTS SHALL BE PROVIDED AT 6'-3" (1905) SPACING FOR BEAM LENGTH OF 26'-3" (7920).

2. W-BEAM SECTION

3. W-BEAM ELEVATION

NOTE: WHERE CONDITIONS REQUIRE, ALTERNATE LENGTHS IN INCREMENTS OF 6" (150) MAY BE USED.

NOTE: ALL HOLES SHALL BE 3/8" (20) DBL. BOLT
HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.

W-BEAM STEEL POST AND WOOD OFFSET BLOCK
**W-BEAM TERMINAL CONNECTOR**

**HARDWARE**

- B-13 (2004)
- 3/4 x 2-1/2 x .625 SLOTS
- 1/2 x 2-1/2 x 0.5 SLOTS

**ELEVATION**

- 10 GAGE
- #12 GAL HOLES
- 1" (25) DIA. HOLES

**PLAN**

- 3/4" (19)
- 2'-6" (760)

**DELWARE DEPARTMENT OF TRANSPORTATION**

**APPROVED**

- Civil Eng. Off. 6/26/05

**RECOMMENDED**

- Civil Eng. Off. 6/26/05
NOTE: WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150)
W-THRIE BEAM TRANSITION SECTION

STANDARD W-BEAM SECTION

STANDARD THRIE BEAM SECTION

POST BOLT SLOTS

%" (20) x 1" (30)

%" (20) x 1" (30) SPLICE BOLT SLOTS

%" (20) x 1" (30) SPLICE BOLT SLOTS

HARDWARE

B-13 (2004)

DEPARTMENT OF TRANSPORTATION

DELTA WOOD W-1105

APPROVED

STANDARD NO. B-13 (2004) SHT. 6 OF 13 RECOMMENDED

DATE: N.T.S.

DATE: 11/05/05

DATE: 1/3/05

DATE: 3/24/2004
NOTES 
1. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
2. ALL WOOD SIZES ARE NomINAL DIMENSIONS.
3. POSTS SHOULD BE PLACED SO THAT BREAKAWAY HOLES ARE NO LOWER THAN GROUND LEVEL AND NO HIGHER THAN 4'-1000' ABOVE GROUND LEVEL.

WOOD BLOCK

STEEL TUBE

SHORT WOOD BREAKAWAY POST

LONG WOOD BREAKAWAY POST

15-8"X 6"X ¾"
175-203 x 62 x 4.8
GALVANIZED STEEL TUBING

DELWARE DEPARTMENT OF TRANSPORTATION
ANCHOR PLATE TO W-BEAM CONNECTION DETAIL

SWAGED CABLE ASSEMBLY AND RELATED HARDWARE ASSEMBLY

NOTES:
1. TO ENSURE THAT THE TIMBER BEARING PLATE REMAINS IN POSITION,
   SECURE BEARING PLATE TO PREVENT ROTATION WITH TWO 10d GALVANIZED NAILS.

2. TIGHTEN ASSEMBLY UNTIL CABLE IS TIGHT.

3. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

DELWARE
DEPARTMENT OF TRANSPORTATION

HARDWARE

APPROVED
Curtis With 11/10/05

RECOMMENDED
DATE: 11/10/05

SCALE: NTS
RECOMMENDED
APPROVED

STEEL WASHER (FOR 5/8" (16) GUARDRAIL BOLT)

NOTE: DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASED ON METAL THICKNESS.

GUARDRAIL BOLT

NOTES:

1. ALL FAILETS SHALL HAVE A MINIMUM RADIUS OF 1/4" (6).
2. IF THE BOLT EXTENDS MORE THAN 5/16" BEYOND THE NUT, THE BOLT SHALL BE TRIMMED BACK AS PER THE DEPARTMENT'S SPECIFICATIONS.
NOTE: DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASE METAL THICKNESS.
STEEL WASHER

NOTES:
1. FOR USE WITH SWAGED CABLE ASSEMBLAGE.
2. DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASE METAL THICKNESS.

1/2" (12.7) 3/4" (19.0) 1" (25.4) 2" (50.8) 21/2" (63.5) 3" (76.2)

1/4" (6.35) 5/32" (1.59) 1/8" (3.17) 3/32" (2.38) 1/16" (1.59) 3/64" (0.96)

5/32" (1.59) 3/32" (2.38) 1/16" (1.59) 3/64" (0.96) 1/8" (3.17) 5/64" (1.59)

5/8" (16) CARROAGE BOLT

5/8" (16) HEX NUT

NOTE: FOR USE WITH SWAGED CABLE ASSEMBLAGE.
NOTES:
1. RAIL SHALL BE MOUNTED ON GUARDRAIL ADJACENT TO A BIKEWAY OR SIDEWALK.
2. ALL COMPONENTS OF THE RAIL SHALL BE SHOP FABRICATED. ALL CUTTING AND DRILLING SHALL BE DONE IN THE SHOP.
3. ALL EXPOSED THREADED HARDWARE SHALL BE BURIED.
4. GUARDRAIL POSTS UPON WHICH RAIL IS TO BE INSTALLED SHALL BE SHOP DRILLED FOR THE RAIL BRACKETS DURING FABRICATION.
5. ALL RAIL SPACES WILL BE AT RAIL SUPPORT BRACKETS, THE SAME BOLT USED TO ATTACH THE RAIL TO THE BRACKET WILL BE USED TO SECURE THE SPlice TUBE.
6. RAILS SHALL BE INSTALLED ONLY ON STANDARD W-BEAM SECTIONS AND AT LEAST ONE POST AWAY FROM THE PAYMENT LIMITS OF THE END TREATMENT.

DELaware
DEPARTMENT OF TRANSPORTATION

GUARDRAIL MOUNTED RAIL

APPROVED

01/09/2006
TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION

* BAR SHALL BE CUT AT EVERY JOINT IF MADE
CONTINUOUS FOR SLIP-FORM CONSTRUCTION
TYPICAL PRE-CAST CONSTRUCTION

"F" SHAPE BARRIER SECTION

TYPICAL PRE-CAST REINFORCEMENT DETAILS

BAR LIST

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
<th>NUMBER IN EACH SECTION</th>
<th>LENGTH</th>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>4B</td>
<td>4</td>
<td>6</td>
<td>4'-7&quot;</td>
<td>04000</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4B</td>
<td>4</td>
<td>**</td>
<td>4'-7&quot;</td>
<td>04000</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6B</td>
<td>6</td>
<td>1</td>
<td>5'-0&quot;</td>
<td>06000</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6B</td>
<td>6</td>
<td>2</td>
<td>5'-0&quot;</td>
<td>06000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* THE LENGTH OF BARS 6B AND 6B2 SHALL BE 6'-0" STIR. SHORTER IN LENGTH THAN THE NOMINAL SIZE OF THE BARRIER IN WHICH IT IS USED.
** SEE "BAR OFFSETS" CHART ON THIS SHEET FOR MORE INFORMATION.

NOTES:
1. CONCRETE CLEAR COVER FOR REINFORCING BARS SHALL BE 3'-0" MIN.

DELAVARE
DEPARTMENT OF TRANSPORTATION

CONCRETE SAFETY BARRIER OF SHAPE

APPROVED
RECOMMENDED

STANDARD NO. B-14 (2001) SHT. 2 OF 3

04/17/2001
STEEL CONNECTOR PLATE

SECTION A-A

SECTION B-B

SLOT DIMENSIONS
CONCRETE SAFETY BARRIER, PRECAST CONSTRUCTION
9" SHAPE BARRIER SECTION

STANDARD NO. B-14 (2001) SHT. 3 OF 3 RECOMMENDED

APPROVED

04/17/2001
SISSWALK WITHOUT GRASS STRIP INSTALLATION

SIDEWALK WITH GRASS STRIP INSTALLATION

DETACTABLE WARNING TRUNCATED DOMES

24" (600MM) MIN (TYP)

DETECTABLE WARNING TRUNCATED DOMES

Curb Ramp, Type 2

Curb Ramp, Type 3

DIAGONAL CURB RAMPS

NOTES:
1. WHERE A 12% MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADING WITHIN A LENGTH OF 6'-6" DUE TO STEEP ADJACENT ROADSIDE, THE RAMP LENGTH MAY BE LIMITED TO 5'-4" (1650MM) AND THE RAMP SLOPE ALLOWED TO EXCEED 12%
2. TRANSITION TO EXISTING SIDEWALK WIDTH OVER THE LENGTH OF THE RAMP.
3. RAMP AND SIDEWALK CROSS SLOPE SHALL BE 5% (125MM)
4. IF GRADING WILL BE STEEPER THAN 6% ADJACENT TO THE CURB RAMP OR SIDEWALK, THEN A TYPE I CURB OR RETAINING WALL SHOULD BE USED TO ELIMINATE THE NEED FOR THE STEEP SLOPE.
5. FOR THE CURB RAMP TYPE 3, IF THE WIDTH OF THE FULLY DEPRESSED CURB AT THE STREET END IS MORE THAN 5'-10" (1780MM), THE DETECTABLE WARNING TRUNCATED DOMES SHALL FOLLOW THE RADIUS OF THE CURB CONTINUOUSLY WITHOUT GAPS FOR THE EntIRE LENGTH OF DEPRESSED CURB.
6. THE MAXIMUM DECREASE IN GRADE BETWEEN THE SIDEWALK OR CURB AND THE PAVEMENT SHALL BE 12%, however it is preferred. SEE STANDARD NO. C-2, SHEET 1 OF 4.
7. IF THE WIDTH OF THE FULLY DEPRESSED CURB AT THE STREET END IS 5'-10" OR LESS, THEN A RECTANGULAR PIECE OF DETECTABLE WARNING TRUNCATED DOMES MAY BE USED.

DEPARTMENT OF TRANSPORTATION

CURB RAMPS, TYPES 2, 3, & 4

STANDARD NO. C-2 (2008)

SHT. 2 OF 4

APPROVED

RECOMMENDED

DELWARE DEPARTMENT OF TRANSPORTATION
PLAN

NORMAL CURB

TRANITION

3' (900) DEPRESSED CURB

3' (900) MIN.

TRANSITION

NORMAL CURB

PLACE EXPANSION AT BACK OF CURB

ELEVATION

DEPRESSED CURB

TRANITION

SIDEWALK

6" (150) MAX.

5" (125) MIN.

PARKED SURFACE

6" (150) GABR

SECTION A-A

ENTRANCE WITH SIDEWALK

NOTE: IF WIDTH OF DRIVEWAY IS 40' (12192) OR GREATER, THE FLARE CAN BE OMITTED.

SCALE 1:25

ENTRANCE WITHOUT SIDEWALK

SECTION B-B

DEPRESSED CURB

SIDEWALK

TRANITION

2' (600) MIN.

7' (2100) MAX.

TOTAL

NORMAL CURB

TRANITION

2' (600) MIN.

10' (3000) MAX.

EDGE OF PAVEMENT

R/W

GRASS STRIP

SIDEWALK

R/W

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK

R/W

GRASS STRIP

DEPRESSED CURB

SIDEWALK
TYPE D
INTEGRAL P.C.C. CURB AND GUTTER, TYPE 1

TYPE E
INTEGRAL P.C.C. CURB AND GUTTER, TYPE 2
TYPE F
INTEGRAL P.C.C. CURB AND GUTTER, TYPE 3

SECTION F-F

35" (875)
5' (1500)

TYPE G
INTEGRAL P.C.C. CURB AND GUTTER, TYPE 4

SECTION G-G

22'/8" (575)
49'/4" (1500)
PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: 61 SAFETY END STRUCTURE TO BE PRECAST
NOTE: SAFETY END STRUCTURE TO BE Precast
### Dimensions

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot; (125)</td>
<td>15°-6&quot; (4675)</td>
<td>2&quot;-4&quot; (1720)</td>
<td>4&quot;-7&quot; (4445)</td>
</tr>
<tr>
<td>6&quot; (145)</td>
<td>15°-6&quot; (5945)</td>
<td>2&quot;-9&quot; (8800)</td>
<td>8&quot;-7&quot; (575)</td>
</tr>
<tr>
<td>2&quot; (525) OR 24&quot; (4000)</td>
<td>24&quot;-0&quot; (1130)</td>
<td>5&quot;-2&quot; (8850)</td>
<td>22&quot;-2&quot; (16850)</td>
</tr>
</tbody>
</table>

### Approximate Quantities

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>CONCRETE FT³ (m³)</th>
<th>REINFORCING STEEL LBS. (kg)</th>
<th>NO. OF GRATES</th>
<th>LENGTH TO BE CUT FROM 1 GRATE</th>
<th>WEIGHT OF FULL SIZE GRATE LBS. (kg)</th>
<th>WEIGHT OF CUT GRAVE LBS. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot; (125)</td>
<td>41.35 (1.47)</td>
<td>41.78 (1.88)</td>
<td>4</td>
<td>2&quot;-1&quot; (635)</td>
<td>215.92 (488.41)</td>
<td>15.47 (68.45)</td>
</tr>
<tr>
<td>6&quot; (145)</td>
<td>50.61 (1.49)</td>
<td>56.68 (1.63)</td>
<td>5</td>
<td>2&quot;-1&quot; (635)</td>
<td>215.92 (488.41)</td>
<td>15.47 (68.45)</td>
</tr>
<tr>
<td>2&quot; (525) OR 24&quot; (4000)</td>
<td>168.43 (14.58)</td>
<td>170.31 (14.59)</td>
<td>6</td>
<td>2&quot;-1&quot; (635)</td>
<td>215.92 (488.41)</td>
<td>15.47 (68.45)</td>
</tr>
</tbody>
</table>

### Bending Diagram

#### PIPE SIZE
- 5" (125)
- 6" (145)
- 2" (525) OR 24" (4000)

#### BARS
- A-BARS
- B-BARS
- C-BARS
- D-BARS
- G-BARS

### Schedule of Reinforcing Steel

#### PIPE SIZE
- 5" (125)
- 6" (145)
- 2" (525) OR 24" (4000)

#### Size
- A-BARS
- B-BARS
- C-BARS
- D-BARS
- G-BARS

#### Size
- 4" (102)
- 6" (152)

#### Length
- 18" (457)
- 24" (609)

#### Notes
- VARIOUS
- APPROVED
- RECOMMENDED
1). PERSONNEL SAFETY GRATES (PSG) SHALL ONLY BE INSTALLED ON THE INLETS OF STORM WATER PIPES 12" (300) OR LARGER IN DIAMETER THAT ARE NOT STRAIGHT FROM THE INLET TO THE OPEN OUTLET, REGARDLESS OF THE LENGTH.

2). THE GRATE SHALL BE MADE TO FIT THE OUTSIDE PERIMETER OF THE FLARED END SECTION (FES) \pm \frac{1}{8} (13).

3). ALL BOLT HOLES ARE TO BE DRILLED IN THE FIELD.

4). A STIFFENER IS TO BE INSTALLED WHERE TWO OR MORE BARS ARE USED.

5). BOTTOM BAR SHALL BE 6" (150) ABOVE INVERT OF FES.

6). ALL HARDWARE ATTACHED TO CONCRETE SHALL BE ATTACHED USING APPROVED TAMPER PROOF ANCHORS.
1. Inlet boxes shall be pre-cast or cast-in-place.
2. Pipes shall not be installed through any corner of the inlet box.
3. Riser sections may be used for deep inlet boxes.
4. Pipes may be installed near or through joints for riser sections.
5. When the cover above the pipe is less than 4" (100) to the cover slab or top unit opening, the portion of box wall above the pipe may be removed as shown in the optional pipe opening detail. The area above the pipe shall then be formed and filled with high-strength, non-shrink grout mixed with coarse aggregate in a 1:1 ratio by weight.
6. Concrete flow channel shall be warped for positive drainage.
7. When inlet box is precast, pipe opening shall be between 3" (75) and 4" (100) larger than outside diameter of pipe and shall not encroach on adjacent wall.
**DELTAWARE DEPARTMENT OF TRANSPORTATION**

**DRAINAGE INLET ASSEMBLY**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SHT.</td>
<td>1 OF 9</td>
</tr>
</tbody>
</table>

**APPROVED**

**DRAWN BY:**

**CHECKED BY:**

**DRAWN DATE:** 4/16/08

**CHECKED DATE:** 5/16/08

**SCALE 1:8,750**

**TYPE 1 JOINT DETAIL**

- Dimensions will vary
- Joint sealant as per specifications
- Only between 2 precast units

**TYPE 2 JOINT DETAIL**

**TYPE 3 JOINT DETAIL**

- Cast-in-place concrete flow channel (Typ.)
- Top unit (cast in place)
- Type 1 joint (Typ.)
- Cover slab (pre-cast)
- Inlet box (pre-cast)

**PLAN**

- 2" x 3" x 4" (1000) temporary drainage opening
- Form and pour concrete to support frames

**SECTION A-A**

- Top unit (cast in place)
- Type 1 joint (Typ.)
- Cover slab (pre-cast)

**SECTION B-B**

- Type 3 joint (Typ.)
- Inlet box (pre-cast)

**DOUBLE INLET SECTION**

- Cast-in-place concrete flow channel (Typ.)
1. The Type 2 drainage inlet grate shall not be installed where bicycle traffic may be present.
2. The top of all drainage inlet grates shall be labeled "Only Rain Down the Storm Drain." Also, drainage inlet grates Type 1 and Type 4 shall be labeled with "Water Flow" and an arrow indicating flow direction as shown in the example detail.
3. The Type 1 drainage inlet grate shall be labeled with "Curbside" as shown on the example detail. All labeling on the Type 1 shall be on both top and bottom sides due to the Type 1 being reversible.
INLET TOP UNIT APPLICATIONS

<table>
<thead>
<tr>
<th>TOP UNIT</th>
<th>CURB</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE A</td>
<td>USE IN DRAINAGE SWALE</td>
</tr>
<tr>
<td>TYPE B</td>
<td>INTEGRAL PCC CURB &amp; GUTTER, TYPE 1 &amp; 5, PCC CURB TYPE 1</td>
</tr>
<tr>
<td>TYPE C</td>
<td>INTEGRAL PCC CURB &amp; GUTTER, TYPE 2, PCC CURB TYPE 2</td>
</tr>
<tr>
<td>TYPE D</td>
<td>INTEGRAL PCC CURB &amp; GUTTER, TYPE 4, PCC CURB TYPE 3</td>
</tr>
<tr>
<td>TYPE E</td>
<td>PCC CURB TYPE 2</td>
</tr>
</tbody>
</table>

SS01 BENDING DIAGRAM

SS01 is not required to be one continuous bar, if more than one bar is used, there must be a (2")x(12") overlap between bars.

DELWARE DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET TOP UNITS

STANDARD NO. D-6 (2008)
SHT. 3 OF 9

APPROVED

RECOMMENDED
**SINGLE GRADE SETUP**

- Transition from PCC curb and gutter type 2 to 8'0" PCC curb type 1 with curb opening (Typ.)
- Limits of payment H-6" (150) for double grate
- 50" (1270) for single grate
- 44" (1115) (Typ.)
- 0" (250)
- Cover slab opening
- R-18" (460) (Typ.)
- 4" (100)
- Edge of gutter
- 3/4" (19)
- Steps in front wall
- 4" (100) rebars & 3/4" (19) for single grate, 4" (100) for double grate (Typ.)

**DOUBLE GRADE SETUP**

- Transition from PCC curb and gutter type 2 to 8'0" PCC curb type 1 with curb opening (Typ.)
- Limits of payment H-4" (100) (Typ.)
- 88" (2235)
- 44" (1115) (Typ.)
- 0" (250)
- Cover slab opening
- R-18" (460) (Typ.)
- 4" (100)
- Edge of gutter
- 3/4" (19)

**SUBDIVISION TOP & CONFIGURATION**

- Standard inlet box, see standard no. D-9, 10f 1
- 24" (600)
- 6" (150)
- 5501
- Normal gutter slope
- Normal roadway cross slope
- Coverslab width

**NOTES:**

1. Minimum box size 10 be 34" (850) x 24" (600).
2. Pipe openings in the front wall shall not interfere with the steps, the pipe shall be shifted horizontally to avoid the steps.
   It may be necessary to use a larger box to avoid conflict between steps and pipe openings.
1. REINFORCEMENT SHALL BE 4" (102) X 4" (102) #4 X #4 (26 X 26)
2. INLET BOXES ARE TO BE PRE-CAST OR CAST-IN-PLACE.
ROUND MANHOLE ASSEMBLY

NOTE: ROUND MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.

DELAWARE DEPARTMENT OF TRANSPORTATION

MANHOLE DETAILS

STANDARD NO. D-6 (2001) SHT. 2 OF 4

APPROVED RECOMMENDED

06/06/2001
1. COVER SLABS SHALL BE PRE-CAST.
2. ALL BARS SHALL BE #5 (#16) SPACED AT 6" (150) UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1" (38).

NOTES:
* DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.
DELAWARE
DEPARTMENT OF TRANSPORTATION

SCALE 1: N.T.S.

DATE 09/18/2007

JUNCTION BOX DETAILS

STANDARD NO. D-7 (2007) SHT. 1 OF 2

APPROVED

RECOMMENDED

COVER SLAB (PRE-CAST)

CAST IN PLACE CONCRETE FLOW CHANNEL (TYP.)

6\'\' 150 M IN.

SECTION A-A

- SEE OPTIONAL PIPE OPENING DETAIL ON STANDARD NO. D-4, SHEET 1 OF 1

JUNCTION BOX ASSEMBLY

SECTION B-B

- SEE NOTE 6 ON DETAIL D-4, SHEET 1 OF 1

INLET BOX PRE-CAST OR CAST IN PLACE SEE STANDARD NO. D-4, SHEET 1 OF 1 FOR DETAILS

TYPE 3 JOINT DETAIL

TYPE 3 JOINT (TYP)

6\'\' 150 M IN.

6\'\' 150 M IN.
JUNCTION BOX COVER SLAB DETAILS

NOTES:
1. COVER SLABS ARE TO BE PRE-CAST.
2. ALL BARS ARE TO BE #5 (#16) SPACED @ 12" (305) ± UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1 1/4" (38).
4. DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

SECTION A-A

SECTION B-B

JUNCTION BOX DETAILS

DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD NO. D-7 (2007)  SHT. 2 OF 2

APPROVED

RECOMMENDED

DATE

08/31/2001

08/01/2007
LIMIT OF PAY FOR EXCAVATION OF PIPE TRENCHES = O.D. + 24" (600) MD

CONCRETE 2000 PSI 15 MPa (MIN)

1/4 O.D. 16" (406) MIN. IN ROCK

CLASS A BEDDING

LIMIT OF PAY ITEMS 206 AND/OR 208

0.D.

6" (150) MIN. WHEN H.C. < 6" (150)
AND 0.03 OF H WHEN H.C. > 6" (150)
OF LOOSE SAND OR TYPE C BORROW

EARTH CUSHION

CLASS C BEDDING

NOTE: USE CLASS C BEDDING UNLESS OTHERWISE INDICATED
NOTES:
1. The perforated pipe underdrain shall be located as shown on the typical sections of the construction plans.
2. Geotextile filter fabric shall be placed entirely over the top of underdrain trench and lapped as shown.
3. Slope of underdrains shall match roadway grade, unless otherwise directed by the engineer.
4. Outlet pipe configurations shall use 45 degree elbows or shall use straight pipe with a minimum radius of 3' (900) to direct underdrain pipe into side of drainage inlet or to positive grade. Pipe shall also be non-perforated and have a smooth interior.
5. Rodent screen shall snugly fit the provided slot with the screen lip fitting tight to the bottom flow line.
6. A 4" (100mm) flexible delineator shall be furnished and installed at the direction of the engineer to mark the location of the concrete headwall.
7. When two lines of pipe underdrain drain to a low point, each pipe must have its own outlet.
8. Perforated pipe underdrain shall not be placed under guardrail in order to avoid puncturing.
The contractor shall furnish material and plug abandoned drainage pipes with concrete as directed by the engineer.

NOTE:
The contractor shall furnish material and plug abandoned drainage pipes with concrete as directed by the engineer.
LIMIT OF CONSTRUCTION

EXISTING GROUND

PHASE 1 EXCAVATION

INTERMEDIATE PHASESII EXCAVATION

FINAL PHASE EXCAVATION

PERIMETER/ZONE SWALE USED AS A CLEAN WATER DIVERSION, SEE STANDARD SHEET

CUT SECTION

BREAK IN CROSS SLOPE MAY BE ELIMINATED TO DIRECT SURFACE FLOW LEFT OR RIGHT OR AS DIRECTED BY THE ENGINEER.

FINAL PHASE EMBANKMENT

INTERMEDIATE PHASESII EMBANKMENT

PHASE I EMBANKMENT

EXISTING GROUND

TEMPORARY SWALE, SEE STANDARD SHEET

FILL SECTION

EDGE BERMS TO BE PLACED AT THE END OF EACH WORK DAY AND LEFT UNTIL SLOPE IS COMPLETELY STABILIZED.

MINIMUM 6" (150MM) OFFSET FROM TOE OF SLOPE

SILT FENCE, SEE STANDARD SHEET

NOTES:
1) EDGE BERMS AND TEMPORARY SLOPE DRAINS SHALL BE CONSTRUCTED ALONG THE TOP OF ALL SLOPES TO INTERCEPT RUNOFF AND CONVEY IT DOWN THE SLOPE FACES WITHOUT CREATING GULLIES OR WASHOUTS.

2) SLOPE FACES SHALL BE TRACED WITH CLEATED EQUIPMENT SUCH THAT THE CLEAT MARKS ARE ORIENTED HORIZONTALLY.

3) ALL CUT AND FILL SLOPES OF THE HIGHWAY EMBANKMENT SHALL BE PERMANENTLY STABILIZED AS THE WORK PROGRESSES IN INCREMENTS NOT TO EXCEED 10' (3000MM) MEASURED ALONG THE SLOPE.

4) CROSS SLOPES SHALL BE 2% MINIMUM, 6% MAXIMUM.
NOTES:

1. THIS DEVICE IS INTENDED TO CONTROL SHEET FLOW ONLY; IT SHALL NOT BE USED IN AREAS OF CONCENTRATED FLOW.
2. SILT FENCE ENDS SHALL BE TURNED UPSLOPE TO CONTAIN RUNOFF.
3. REINFORCING STRIPS IS TO BE ONE COMPLETE STRIP COVERING ALL GEOTEXTILE FABRIC AT POST.
SECTION B-B

GEOTEXTILE FABRIC
SEE NOTE 4

SECTION A-A

NOTES:
1. FOR DITCHES LESS THAN 30" (750) IN DEPTH, PLACE DAM AS DIRECTED BY THE ENGINEER.
2. CHECK DAM HEIGHT MUST NOT EXCEED 2' (600) AT THE CENTER OF THE WEIR.
3. THE CHECK DAM IS TO BE CONSTRUCTED SO THAT THE CENTER IS 6' (1800) MIN.
   LOWER THAN THE OUTER EDGES, FORMING A WEIR THAT WATER CAN FLOW ACROSS.
4. GEOTEXTILE FABRIC IS TO BE INSTALLED UNEVENLY RIPPED ON PERMANENT CHECK
   DAMS ONLY.
5. THE MAXIMUM SPACING BETWEEN DAMS SHALL BE THE DISTANCE IN THE DITCH WHERE
   THE TOP OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE TOP OF THE
   DOWNSTREAM DAM AT THE CENTER OF THE WEIR.

DELWARE
DEPARTMENT OF TRANSPORTATION

STONE CHECK DAM

SHT. 1 OF 1
APPROVED

08/14/2006
NOTES:
1. SEDIMENT TRAPS ARE INTENDED FOR USE IN EXISTING, PROPOSED, AND TEMPORARY DITCHES OF ALL TYPES WITH A MAXIMUM DRAINAGE AREA OF 16 ACRES (6.5 HECTARES), AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
2. SIDE SLOPES SHALL BE STABILIZED WITH "TEMPORARY GRASS SEEDING, DRY GROUND" AND STRAW MULCH.
3. AN OUTLET STRUCTURE IS REQUIRED, STONE CHECK DAMS, PERFORATED RISER PIPES, SEWER Dewatering DEVICES, OR DRAINAGE INLETS MAY BE USED. SEE APPROPRIATE STANDARD SHEET FOR ADDITIONAL INFORMATION.
4. FOR SIZE, LOCATION, ETC. OF SEDIMENT TRAP, SEE CONSTRUCTION PHASING, N.O.T., AND EROSION CONTROL PLANS.
5. ALL FALL SLOPES SHALL BE 2:1.
6. A 2:1 LENGTH TO WIDTH RATIO SHOULD BE ACHIEVED WHERE POSSIBLE; IF THIS IS NOT POSSIBLE, THEN THE USE OF BAFFLES OR OTHER SPECIAL DESIGNS SHOULD BE INCORPORATED TO INCREASE FLOW TIME.
NOTES:
1. THE WORK SHALL CONSIST OF THE CONSTRUCTION OF A SEDIMENT TRAP AROUND A DRAINAGE INLET TO ALLOW SEGMETATION TO OCCUR BEFORE RUNOFF ENTERS THE DRAINAGE INLET.
2. DRAINAGE INLET SEDIMENT TRAPS SHALL BE LIMITED TO A THREE (3) ACRE 0.2 HECTARE) MAXIMUM DRAINAGE AREA.
3. THE DIMENSIONS OF THE DRAINAGE INLET SEDIMENT TRAP ARE TO BE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
FOR SEDIMENT TRAP, SEE STANDARD NO. E-6 OR E-7

TRASH HOOD
5" (127) MIN. Dia. RISER PIPE

METAL BASE PLATE
1/4" (6.3) THICK

RISER PIPE DIAMETER

NOTES:
1. THIS DEVICE IS INTENDED TO BE USED AS AN OUTLET FOR SEDIMENT TRAPS.
2. THE PIPE OUTLET SHOWN SHALL ONLY BE USED WITH SEDIMENT TRAPS WITH DRAINAGE AREAS OF 5 ACRES (2.0 HECTARES) OR LESS. LARGER DRAINAGE AREAS REQUIRE AN ENGINEERED DESIGN.
3. THE HEIGHT OF THE SKIMMER DEWATERING DEVICE SHALL BE SPECIFIED BY THE ENGINEER IN THE FIELD.
STABILIZATION OF EMBANKMENTS

NOTES:
1. STAPLES TO BE STAGGERED AT 8"x450" SPACING.
2. TOPSOIL UNDER EROSION CONTROL BLANKET IS TO BE TRACED AND SEEDED.
3. WHEN OFFSITE RUNOFF OCCURS, ADDITIONAL MEASURES AS DIRECTED BY THE ENGINEER SHALL BE USED TO ENSURE STABILITY OF EMBANKMENT.

STABILITY OF DITCHES

PLAN

NOTES:
1. ADDITIONAL STAPLES NOT SHOWN ARE REQUIRED AT OVERLAPS.
2. SEE OVERLAP DETAIL FOR STAPLE PLACEMENT.
3. STAPLES ARE TO BE STAGGERED.
4. TOPSOIL UNDER EROSION CONTROL BLANKET IS TO BE TRACED AND SEEDED.
SECTION A-A

SECTION B-B

PLAN

NOTES:
1. Securing pins are to be placed at locations shown and at 24" (600) longitudinal and lateral spacing.
2. See plans for location, dimensions, grades, etc.
3. Use of R-7 riprap will require a separate professional engineering design for specific conditions.

DELAWARE DEPARTMENT OF TRANSPORTATION

RIPRAP DITCH

STANDARD NO. E-10 (2005)  SHT. 1 OF 1

APPROVED

RECOMMENDED

08/10/2005
**CHART A - STABILIZATION**

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>SWALE GRADE</th>
<th>TYPE OF TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5-2.0X</td>
<td>DRAINAGE AREA A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5 AC or less)</td>
</tr>
<tr>
<td>1</td>
<td>0.5-2.0X</td>
<td>DRAINAGE AREA B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5 AC - 10 AC)</td>
</tr>
<tr>
<td>2</td>
<td>2.0-4.0X</td>
<td>SEED USED WITH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EROSION CONTROL</td>
</tr>
<tr>
<td>2</td>
<td>2.0-4.0X</td>
<td>BLANKET</td>
</tr>
<tr>
<td>3</td>
<td>4.0-8.0X</td>
<td>R-4 RRAP</td>
</tr>
<tr>
<td>3</td>
<td>8.0-20X</td>
<td>R-4 RRAP</td>
</tr>
<tr>
<td>4</td>
<td>8.0-20X</td>
<td>ENGINEERED DESIGN</td>
</tr>
<tr>
<td>4</td>
<td>8.0-20X</td>
<td>ENGINEERED DESIGN</td>
</tr>
</tbody>
</table>

**CHART B - SWALE DIMENSIONS**

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>SWALE A</th>
<th>SWALE B</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>1' (3000 MIN)</td>
<td>1' (3000 MIN)</td>
</tr>
<tr>
<td>D</td>
<td>1' (3000 MIN)</td>
<td>1' (3000 MIN)</td>
</tr>
</tbody>
</table>

SEE SECTION A - A

**NOTES:**

1. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.

2. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.

3. IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR MORE THAN 14 DAYS, THEY SHALL BE STABILIZED IN ACCORDANCE WITH CHART A PRIOR TO BECOMING OPERATIONAL.

4. IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR LESS THAN 14 DAYS, THEY SHALL BE STABILIZED WITH GEOFABRIC IN ACCORDANCE WITH THE STANDARD DETAIL "GEOFABRIC-LINED CHANNEL DIVERSION."
CHART A - SWALE STABILIZATION

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>SWALE GRADE</th>
<th>TYPE OF TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>0.5-2.0%</td>
<td>SEED AND EROSION CONTROL BLANKET</td>
</tr>
<tr>
<td>A-2</td>
<td>2.1-4.0%</td>
<td>LINED R-4 RRAPP</td>
</tr>
<tr>
<td>A-3</td>
<td>4.1-20%</td>
<td>ENGINEERED DESIGN</td>
</tr>
</tbody>
</table>

MAXIMUM DRAINAGE AREA: 2 ACRES (0.8 ha)

SECTION A-A

OUTLET AS REQUIRED SEE NOTES 1 & 2.

NOTES:
1. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.

2. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.

3. IF PERIMETER DIKE SWALES ARE TO BE OPERATIONAL FOR MORE THAN 48 HOURS, THEY SHALL BE STABILIZED IN ACCORDANCE WITH CHART A PRIOR TO BECOMING OPERATIONAL.

4. IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR LESS THAN 48 HOURS, THEY SHALL BE STABILIZED WITH GEO TEXTILE IN ACCORDANCE WITH THE STANDARD DETAIL "GEO TEXTILE-LINED CHANNEL DIVERSION."
CHART A - FLOW CHANNEL STABILIZATION

<table>
<thead>
<tr>
<th>TYPE</th>
<th>CHANNEL GRADE</th>
<th>TYPE OF TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5-2.0%</td>
<td>SEED AND EROSION</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CONTROL BLANKET</td>
</tr>
<tr>
<td>2</td>
<td>2.1-6.0%</td>
<td>R-4 RIPRAP</td>
</tr>
<tr>
<td>3</td>
<td>8.1-20%</td>
<td>ENGINEERED DESIGN</td>
</tr>
</tbody>
</table>

CHART B - EARTH DIKE DIMENSIONS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DIKE A (5 and 12 ft or less)</th>
<th>DIKE B (5-100 ft or 2-4 hcl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>d-Dike Height</td>
<td>12&quot; (300)</td>
<td>18&quot; (450)</td>
</tr>
<tr>
<td>b-Dike Width</td>
<td>24&quot; (600)</td>
<td>24&quot; (600)</td>
</tr>
<tr>
<td>c-FLOW Width</td>
<td>48&quot; (1200)</td>
<td>72&quot; (1800)</td>
</tr>
<tr>
<td>c-FLOW Depth</td>
<td>44&quot; (1100)</td>
<td>27&quot; (680)</td>
</tr>
</tbody>
</table>

NOTES:
1. If desired, top width may be wider and side slopes may be flatter to facilitate crossing by construction traffic.
2. Field location should be adjusted as needed to insure a stabilized outfall.

DELaware DEPARTMENT OF TRANSPORTATION

EARTH DIKE

STANDARD NO. E-13 (2006) SHT. 1 OF 1

APPROVED

09/02/2005

RECOMMENDED
DISCHARGE INTO A STABILIZED DITCH - GEOTEXTILE, STONE OR GRASSED OR A SEDIMENT TRAP.

FLOW

R-4 RIFFRAP
(3 STY 3 m^3 MNL)

CORRUGATED PIPE - SEE PLANS FOR LOCATIONS OR AS DIRECTED BY THE ENGINEER.

TOE OF SLOPE

FILL SLOPE

TOPE OF FILL SLOPE AS EMBANKMENT IS CONSTRUCTED

INTERCEPTOR BERM 36" (900) MIN. HEIGHT, LENGTH AS REQUIRED TO CONTAIN SURFACE DRAINAGE AND DIRECT INTO TEMP SLOPE DRAIN.

PLAN

EDGE BERM AT TOP OF FILL SLOPE

ANTISEEP COLLAR

TEMPORARY FLOW LINE

SLOPE DRAIN PROFILE

FOR FILL SLOPES

CORRUGATED PIPE

COMPACT SOIL AROUND END OF PIPE

ANIT-SEEP COLLAR

PHASE 1 DRAIN

PHASE 1 FILL

ELEVATION

PLAN

ANTI-SEEP COLLAR

NOTES:
1. ALL TEMPORARY SLOPE DRAINS SHALL DISCHARGE INTO THE BACK OF SEDIMENT TRAPS, INTO SEDIMENT BASINS OR DITCHES DISCHARGING INTO TRAPS OR BASINS.
2. TEMPORARY SLOPE DRAINS SHALL BE USED AT THE TOP OF FILL SLOPES AS EMBANKMENT IS CONSTRUCTED, TO PREVENT EXCESSIVE EROSION UNTIL SHOULDERS ARE CONSTRUCTED AND THE SLOPES ARE SEEDED AND MULCHED.
NOTES:
1. THE WORK SHALL CONSIST OF CONSTRUCTING A STILLING WELL FOR THE PURPOSE OF PUMPING CLEAN WATER AROUND A DISTURBED CONSTRUCTION AREA TO A STABILIZED OUTFALL.

2. THE DIMENSIONS OF THE STILLING WELL SHALL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
NOTES:
1. THE WORK SHALL CONSIST OF CONSTRUCTING A SUMP PIT FOR THE PURPOSE OF FILTERING AND PUMPING WATER TO A STABILIZED OUTFALL.
2. GEOTEXTILE FOR THE 36" (900) CMP SHALL BE REPLACED WHEN CLOGGED WITH SEDIMENT.
3. 1/4" x 3/16" #4 GAGE WIRE MESH SHALL BE PLACED AROUND THE REMOVABLE 36" (900) CMP BEFORE ATTACHING THE GEOTEXTILE TO INCREASE FLOW THROUGH THE GEOTEXTILE.
4. ALL PERFORATIONS SHALL BE 1" (25) IN DIAMETER AND 12" (300) IN CENTER IN ALL DIRECTIONS.
5. TYPE I SUMP PIT SHALL BE USED ONLY WHEN PUMPING IS NEEDED FOR LESS THAN 7 DAYS.
1. A Dewatering Basin (DB) is used to remove sediment from sediment-laden water pumped from a construction site before the water re-enters the waterway. The DB shall have a minimum top width of 2.5’ (760 mm) and a minimum depth of 3.3’ (1000 mm). The minimum top length shown in the plan is used only for quantity calculations by the engineer. The actual top length in the field shall be calculated by the equation:

\[ \text{US Customary: } \text{Top Length (Feet) = } 26'' + .2X \times Y \]
\[ \text{Metric: } \text{Top Length (mm) = } 790 + 48000 \times Y \]

Where Y is the maximum capacity in gallons per minute (cubic meters per second) of the dewatering pump.

2. The outfall from the basin to the receiving waters shall be stabilized. Pumping into the DB shall cease when the effluent from the basin becomes sediment-laden.

3.1 A Sump Pit or Stilling Well (see standard sheet) shall be used in conjunction with a DB. The basin may be bypassed into the stabilized outfall. If the water being pumped is non-sediment-laden, direct discharge to the receiving waters shall cease and be redirected to the DB when effluent from the pump becomes sediment-laden.

4.1 Maintenance must be performed in order for the DB to function properly. Accumulated sediment shall be removed and disposed of in an approved disposal area when the basin is filled to within 12’ (3600 mm) from the crest.

5.1 When used in conjunction with a Cofferdam, dewatering shall begin no sooner than 12 hours after Cofferdam installation in order to allow sediment produced during installation to settle completely.
STONE TRENCHES

FLOW

FLOW

2' (600)

FLOW

2' (600)

2' (600) OVERLAP

FLOW

FLOW

STONE TRENCHES

GEOTEXTILE

TEMPORARY DIVERSION CHANNEL

EXISTING CHANNEL WORK AREA

SAND BAG Dike (see standard sheet)

OBlique View

PLAN

FASTENING DETAIL

TRENCHING DETAIL

SECTION A-A

NOTE: SEE PLANS FOR LOCATION, DIMENSIONS, GRADES, ETC.

DELTAWARE

DEPARTMENT OF TRANSPORTATION

GEOTEXTILE-LINED CHANNEL DIVERSION

STANDARD NO.  E-18 (2005)

APPROVED  12/5/05

SHT.  1 OF 1

RECOMMENDED  11/6/05

09/08/2005
NOTES:
1. The work shall consist of installing flow diversions for the purpose of erosion control, when construction activities take place within the stream channel such as bank stabilization or bridge abutment construction.
2. The diversion structure shall be installed from upstream to downstream.
3. The effective channel width shall be sized to pass a one-year storm peak flow, or 1/3 of stream width, whichever is greater.
4. The sandbag diversion height (h) shall be 1' (300 mm) above the peak elevation of the one-year storm.
0. The work shall consist of installing a sandbag dike for the purpose of erosion control when construction activities take place within the stream channel such as bank stabilization or bridge abutment construction.

2. The sandbag dike shall be installed at the upstream location first.

3. The height of the sandbag dike shall be at least 3000 above the peak elevation of the one year storm or equal with the top of bank, whichever is less. See plans for information.

4. The spillway shall be sized to pass a 100 year storm event peak flow. See plans.

5. The pipe, when utilized, shall be sized to pass the stream base flow.
NOTES:
1. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPIED UNDER THE ENTRANCE, IF NEEDED. A MOUNTABLE BERM WITH 5:1 SLOPES SHALL BE ALLOWED TO FACILITATE PLACEMENT OF PIPES IN SHALLOW CONDITIONS.

2. LOCATION AND NUMBER OF STABILIZED CONSTRUCTION ENTRANCES SHALL BE AS INDICATED ON THE PLANS. ANY CHANGE IN LOCATION, ADDITION, OR ELIMINATION OF AN ENTRANCE SHALL BE APPROVED IN ADVANCE BY THE ENGINEER.

3. DRAINAGE PIPE, IF UTILIZED, SHALL BE PAID FOR SEPARATELY UNDER THE APPROPRIATE BID ITEM.

4. THE TOP 2'-15" OF STONE SHALL BE REMOVED AND REPLACED WITH 2'-15" OF CLEAN STONE WHEN Voids ARE FILLED OR AS DIRECTED BY THE ENGINEER.
NOTES:

8. ALL PVC PIPES ARE TO BE 4" 000-LD, SCHEDULE 40.

2L. ALL JOINTS OF THE FLOATATION SECTION SHALL BE SOLVENT WELDED. JOINTS OF SKIMMER SECTION NEED NOT BE WATER-TIGHT.

3L. 4" 000-LD HOPE FLEXIBLE STRAIN PIPE IS TO BE ATTACHED TO THE POND OUTLET STRUCTURE WITH WATER-TIGHT CONNECTIONS.

4L. ORIFICE IS TO BE SIZED ACCORDING TO STORAGE VOLUME AND TO SLOWLY RELEASE 70% RUNOFF FOR AT LEAST 24 HOURS.

SKIMMER DEWATERING DEVICE

DELTA DEPARTMENT OF TRANSPORTATION

STANDARD NO. E-22 (2006)

SH. 1 OF 1

APPROVED

RECOMMENDED

10/02/2006
FLOATING TURBIDITY CURTAIN

NOTE: 1. ADDITIONAL PANEL REQUIRED FOR DEPTHS GREATER THAN 5' (1500).  
2. FLOATING TURBIDITY CURTAIN SHALL REACH BOTTOM UP TO 
DEPTHS OF 10' (3000) BY USING TWO PANELS. DEPTHS GREATER 
THAN 10' (3000) SHALL REQUIRE SPECIAL DEPTH CURTAINS SPECIFICALLY 
CALLED FOR IN THE PLANS OR AS DIRECTED BY THE ENGINEER.
SECTION

FASTEN AT 4 PLACES EQUALLY SPACED
TURBID WATER
CLEAR WATER
BOTTOM LOAD LINE

ELEVATION

80'20000 MAX.

TOP LOAD LINE

TOP LOAD LINE

TURBIDITY CURTAIN
STAKE

PLAN VIEW
SHALLOW WATER/MARSH APPLICATION

STAKED TURBIDITY CURTAIN

DELWARE
DEPARTMENT OF TRANSPORTATION

TURBIDITY CURTAIN

STANDARD NO. E-23 (2006) SHT. 2 OF 2

APPROVED

09/08/2005
NOTES:
1. THE PORTABLE SEDIMENT TANK SHOWN MAY BE USED IN SITES WHERE SPACE IS LIMITED TO CONSTRUCT A Dewatering BASIN.

2. THE MAXIMUM PUMP DISCHARGE INTO THIS TYPICAL PORTABLE SEDIMENT TANK SHALL BE 426 GALLONS PER MINUTE OR 256 LITERS PER SECOND. THE FILTER FABRIC SHALL BE REPLACED WHEN THE PORTABLE SEDIMENT TANK CAN NO LONGER ALLOW THIS FLOW RATE, WHEN THERE IS A TEAR, OR WHEN DIRECTED BY THE ENGINEER.

3. A CON-SOL-EY CONNECTED OR CON-SOL-EY IN PARALLEL PORTABLE SEDIMENT TANKS MAY BE USED WHEN A HIGHER FLOW RATE IS NEEDED TO DE-WATER THE JOB.

4. OTHER DESIGNS MAY BE USED PROVIDED THE HYDRAULIC DESIGN IS SUBMITTED TO AND APPROVED BY THE STORMWATER ENGINEER.

SECTION B-B

SECTION A-A

DELTA HILL

DEPARTMENT OF TRANSPORTATION

PORTABLE SEDIMENT TANK

STANDARD NO. E-24 (2005) SHT. 1 OF 1

APPROVED

RECOMMENDED

09/08/2005
**Stabilization of Ditches**

**Plan**

**Notes:**
1. Additional staples not shown are required at overlaps, ends, check slots and edges. See appropriate details for staple placement.
2. Staples are to be staggered.
3. Topsoil under turf reinforcement mat is to be tracked and seeded.

**DELTAPE**

**Department of Transportation**

**Standard No.** E-25 (2006)  SHT. 1  OF 1  RECOMMENDED

**Turf Reinforcement Mat Applications**

**Scale:** 1:100

**Initial Trench Anchor Detail**
- Applied at the downstream end of ditch
- Staples to be placed at 12" (300) spacing across dominant flow

**Terminal Trench Anchor Detail**
- Applied at the upstream end of ditch
- Staples to be placed at 12" (300) spacing across dominant flow

**Longitudinal Trench Anchor Detail**
- Staples to be placed at 6" (150) spacing along dominant flow

**Overlap Detail**
- Staples to be placed at 6" (150) spacing along dominant flow

**Check Slot Detail**
- (As needed per plans)
- Staples to be placed at 12" (300) spacing across dominant flow

**Staple Detail**
- Longitudinal trench anchor
- Turf reinforcement mat to be centered along flow line of ditch
- Staples (typ.)

**Specification:**

- 1/2" (13) wire or heavier
- 1/2" (13) to 1/2" (15) staples

**APPROVED**

**12/15/05**

**RECOMMENDED**

**Turf Reinforcement Mat Applications**

**Standard No.** E-25 (2006)  SHT. 1  OF 1  RECOMMENDED

12/15/05

09/08/05
NOTES:
1. RIPRAP IS TO BE PLACED PRIOR TO PLACING PIPES.
2. PLACE DELAWARE NO.3 STONE UNDER PIPES.
3. ELEVATION (EL) SHOULD NOT BE HIGHER THAN PIPES INVERT.
4. REFER TO THE PIPE ENERGY DISSIPATOR SCHEDULE ON THE CONSTRUCTION PLANS FOR THE VALUE OF DIMENSION VARIABLES.

SECTION A-A

SEE DETAIL B

SEE NOTES 1 & 2

SEE NOTE 3

GEOTEXTILE

2 x Ti

Ti

L

DELAWARE
DEPARTMENT OF TRANSPORTATION

RIPRAP ENERGY DISSIPATOR DETAIL

STANDARD NO. E-26 (2006)  SHT. 1 OF 1  APPROVED  RECOMMENDED

08/04/2006
ALL DEAD, BROKEN, & CROSSING
BRANCHES SHALL BE PRUNED
OFF FOLLOWING INSTALLATION

ROOTBALL SHALL BE SET FLUSH TO GRADE
OR 1'-2" TO 2'-6" ABOVE GRADE IF SOILS
ARE SLOW TO DRAIN, DO NOT COVER THE
TOP OF THE ROOTBALL WITH SOIL.

ALL SOIL SHALL BE EXCAVATED FROM THE
PIT, MIXED WITH APPROVED AMENDMENTS
AND USED AS BACKFILL DURING INSTALLATION
OF SHRUB.

MULCH IN ACCORDANCE WITH
SPECIFICATIONS, DO NOT PLACE
MULCH AGAINST THE SHRUB STEMS.

NOTES:
1. BASE OF PLANTING PIT SHALL BE A MINIMUM WIDTH OF TWICE THE ROOT BALL SIZE AND A MAXIMUM OF
THREE TIMES THE ROOT BALL SIZE.
2. SHRUBS SHALL BE INSTALLED IN MASSES OF NO LESS THAN 3 PLANTS, A MINIMUM OF 3'-1" WOOD IS
REQUIRED FROM THE BACK OF CURB TO THE EDGE OF SIDEWALK FOR INSTALLATION OF SHRUBS.
3. ALL PRUNING SHALL BE DONE BY AN ICLA CERTIFIED ARBORIST, CERTIFIED NURSERY PROFESSIONAL, OR
UNDER THE DIRECTION THEREOF, DO NOT HEAVILY PRUNE SHRUBS AT PLANTING.
4. AUGERED HOLES SHALL BE HAND DUG TO FINAL WIDTH AND TO ELIMINATE GLAZING.
5. ALL SHRUB MASSES SHALL BE MULCHED AS ONE CONTINUOUS BED.

ROADSIDE SHRUB PLANTING DETAIL
DO NOT PRUNE THE DOMINANT LEADER OR TERMINAL BUDS OF THE CROWN.

NOTES:
1. ALL PRUNING SHALL BE DONE BY OR UNDER THE DIRECTION OF AN LU.S.A. CERTIFIED ARBORIST OR CERTIFIED NURSERY PROFESSIONAL. DO NOT HEAVILY PRUNE TREES AT PLANTING.
2. ALL DEAD, BROKEN, & CROSSING BRANCHES SHALL BE PRUNED OFF FOLLOWING INSTALLATION.
3. BASE OF PLANTING PIT SIZE SHALL BE A MINIMUM WIDTH OF TWICE THE ROOT BALL SIZE AND A MAXIMUM OF THREE TIMES THE ROOT BALL SIZE.
5. WHEN PLANTING TREES ALONG SIDEWALKS, THE TREE SHALL BE LIMITED TO 7'-0" (2100) FOR PEDESTRIAN CLEARANCE.

STAKE & GUY TREES, GUY WIRE, STAKES, & RUBBER HOSE SHALL BE AS SPECIFIED IN SECTION 131.

SET ROOT BALL FLUSH TO GRADE OR "+25" TO "+50"
ABOVE GRADE IF SOILS ARE SLOW TO DRAIN. PLANT TREES SUCH THAT THE TRUNK FLARE IS VISIBLE. ANY TREE WHERE TRUNK FLARE IS NOT VISIBLE SHALL BE REJECTED. DO NOT COVER THE TOP OF THE ROOT BALL WITH SOIL.

TAMP SOIL AROUND THE ROOT BALL BASE WITH FOOT PRESSURE SO ROOT BALL DOES NOT SHIFT.

REMOVE BURLAP AND BASKETS TO 1/2 OF THE ROOT BALL; DO NOT BURY EXCESS BURLAP, ROPE, OR REMNANTS OF BASKET IN THE PLANTING PIT.

MULCH IN ACCORDANCE WITH SPECIFICATIONS. DO NOT PLACE MULCH AGAINST THE TRUNK.

ALL SOIL SHALL BE EXCAVATED FROM THE PIT, MIXED WITH APPROVED AMENDMENTS AS PER SPECIFICATIONS AND USED AS BACKFILL. DURING INSTALLATION OF TREES, PLACE ROOT BALL ON TAMPERED OR UNEXCAVATED SOIL.

TREE PLANTING DETAIL

DELaware
DEPARTMENT OF TRANSPORTATION

PLANTING DETAILS
STANDARD NO. L-1 (2006) SHET. 2 OF 1

APPROVED

RECOMMENDED

08/04/2006
PERENNIAL/GROUND COVER PLANTING DETAIL

NOTES:
1. SEE PLANT LIST FOR SPACING.

PLAN VIEW

SECTION VIEW

- PERENNIAL/GROUND COVER
- FINISHED GRADE
- 3" (75) MULCH - NOT TO COVER LEAVES
- ROOT MASS
- 6" (150) PREPARED SOIL MIX AS PER SPECIFICATION
- SUBGRADE TILLED TO 6" (150) DEPTH
1½"-⅛ HOLE TO ACCOMMODATE SURVEY CAP

SECTION A-A

LONGITUDINAL STEEL 6 GAGE (4.5) WIRE SPACED 3"/175 C.C., 26"/1650 LONG 17'-9"

TRANSVERSE STEEL 7 GAGE (4.5) WIRE SPACED 8"/1200 C.C.

TOP DETAIL

NOTES:
1. LONGITUDINAL STEEL SHALL BE HELD IN PLACE BY CRADLES.
2. LETTERS TO BE COUNTERSUNK IN TOP OF MARKER ½"-16I.
NOTES:
1. IF THE SHARED USE PATH ENDS AT A ROADWAY OR RAILROAD CROSSING, THEN DETECTABLE WARNING TRUNCATED DOMES 24"×6000 LONG AND THE FULL WIDTH OF THE PATH SHALL BE INSTALLED. SEE DETAIL C-2.
2. STEEL TUBE TO EXTEND 12" (305) ABOVE GROUND WITH CONCRETE TO SLOPE AWAY FROM TUBE TO KEEP WATER AND SEDIMENT FROM DRAINING INTO TUBE.
3. BOLLARDS ARE NOT REQUIRED FOR A SHARED-USE PATH LESS THAN 8' (2450) WIDE.
4. HAVE THE POST AS NECESSARY SO THAT IT WILL FIT IN THE STEEL TUBE.
5. THE LANDING SECTION SHALL BE A MINIMUM OF 3' (915) IN LENGTH AND SHALL HAVE A MAXIMUM CROSS SLOPE OF 2%. THE ENTIRE LANDING SECTION MUST ALSO BE CONCRETE.
6. THE RAMP SECTION SHALL HAVE A MAXIMUM CROSS SLOPE OF 2%, IT SHALL ALSO HAVE A MAXIMUM RUNNING SLOPE OF 4%. HOWEVER, IF A 0% RUNNING SLOPE DOES NOT ALLOW THE RAMP TO MEET EXISTING GRADE WITHIN 15' (4200), THE RUNNING SLOPE MAY EXCEED 4%.
DELAWARE
DEPARTMENT OF TRANSPORTATION

BIKE RACK DETAILS

STANDARD NO.  M-4 (2007)  SHT.  1  OF  1

APPROVED

DATE  04/03/2007

SCALE  1 N.T.S.

FRONT VIEW

ISOMETRIC VIEW

ALTERNATE ANCHOR OPTION

SECTION VIEW

EXISTING CONCRETE

3/4" x 5/8" BAR TAMPER PROOF CONCRETE ANCHOR (TYP)

CONCRETE OR GROUT

CONCRETE RACK DETAIL

9" (225) TYP

36" (900)

48" (1200)

12" (300) RADIUS

24" (600)

2" (50)

42" (1050)

30" (750) MIN

2" (50)

8" (200)

2" (50)

DEPARTMENT OF TRANSPORTATION

04/03/2001
WOOD RAIL FENCE DETAILS


1. ALL RAIL JOINTS SHALL BE CENTERED AT THE POSTS.
2. ALL JOINTS SHALL BE ATTACHED WITH 3 - 12d NAILS AND TWO ADJACENT RAILS SHALL NOT END ON THE SAME POST.
3. RAILS SHALL BE FLUSH TO THE POSTS AT THE END POSTS.

NOTES:

SECTION A-A

4" (100) x 4" (100) (NOMINAL) TREATED POSTS (TYP.)

ATTACH WITH 4-12d HOT DIP GALVANIZED RING NAILS (TYP.)

4" (100) x 6" (150) (NOMINAL) TREATED RAILS (TYP.)

PATH

METER TOP AT 3% SLOPE

WATER TO DRAIN

24" (150) MIN.

CLASS B CONCRETE

PATH

TYPICAL JOINT DETAIL

SEE NOTE 2

NOTES:

1.  ALL RAIL JOINTS SHALL BE CENTERED AT THE POSTS.
2.  ALL JOINTS SHALL BE ATTACHED WITH 3 - 12d NAILS AND TWO ADJACENT RAILS SHALL NOT END ON THE SAME POST.
3.  RAILS SHALL BE FLUSH TO THE POSTS AT THE END POSTS.

NOTES:

1.  ALL RAIL JOINTS SHALL BE CENTERED AT THE POSTS.
2.  ALL JOINTS SHALL BE ATTACHED WITH 3 - 12d NAILS AND TWO ADJACENT RAILS SHALL NOT END ON THE SAME POST.
3.  RAILS SHALL BE FLUSH TO THE POSTS AT THE END POSTS.
4" (100) x 8" (200) RUNNING BOND PATTERN

4" (100) x 8" (200) HERRINGBONE PATTERN

NOTES:
1. ACTUAL PATTERN TO BE USED SHALL BE SPECIFIED ON THE PLANS. COLOR IS TO BE "BRICK RED" UNLESS OTHERWISE NOTED ON THE PLANS.
2. MATERIALS AND PAVEMENT BOX VARY DEPENDING ON PLANS.
3. FOR CROSSWALK APPLICATIONS, 8" (200) WHITE LINES SHOULD BE PLACED ON BOTH SIDES.
4. THE PATTERNS ABOVE ARE THE PREFERRED PATTERNS AVAILABLE FOR SIDEWALK OR CROSSWALK APPLICATIONS.

1. ALL PAVERS ARE TO BE "BRICK RED" UNLESS OTHERWISE SPECIFIED ON THE PLANS. THE PATTERN SHALL BE SPECIFIED ON THE PLANS.
2. EXPANSION JOINT MAY BE NEEDED ON NON-CURB SIDE OF BRICK PAVER SIDEWALK IF THAT SIDE IS AGAINST BUILDING OR OTHER CONFINING FEATURE.
DELTA ELEKTRA

DEPARTMENT OF TRANSPORTATION

CHAIN LINK FENCE DETAILS

STANDARD NO. M-7 (2006)
SHT. 1 OF 1

APPROVED

RECOMMENDED

06/21/2006
SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)

DELAWARE
DEPARTMENT OF TRANSPORTATION

P.C.C. PAVEMENT

STANDARD NO. P-1 (2001) SHT. 1 OF 5

APPROVED

RECOMMENDED

NOTES:
1. TRANSVERSE JOINTS ARE PERPENDICULAR TO THE CENTERLINE OF THE PAVEMENT WHEN THE PAVEMENT IS STRAIGHT.
2. TRANSVERSE JOINTS ARE PERPENDICULAR TO A TANGENT LINE TO THE OUTSIDE ARC OF THE PAVEMENT WHEN THE PAVEMENT IS CURVED.
3. ALIGN THE TRANSVERSE JOINTS FOR ALL ADJACENT SLABS WITH EACH OTHER.
4. ABRUPT CHANGES IN PAVEMENT WIDTH MAY OCCUR ONLY AT THE TRANSVERSE JOINT LINE; LONGITUDINAL JOINTS SHALL BE CONTINUOUS WHENEVER POSSIBLE.
5. LONGITUDINAL JOINTS SHOULDN'T BE LOCATED WITHIN PROPOSED WHEEL PATHS. THE WHEEL PATH IS GENERALLY LOCATED 2'1000 INSIDE OF THE LANE EDGELINE OR CENTERLINE.

SCALE: 1:120

SLAB LENGTH
20'-0000 TYP.
(7'-0000 Min., 20'-0000 Max.)

TIE BAR OR TIE BOLT (TYP.)
30'-0000 (TYP.) FOR TIES

EDGE OF SLAB WITH TIED LONGITUDINAL JOINT WHEN ADJACENT TO CONCRETE PAVEMENT.

DOWELS AND BOWLS WHEN BUTTING TO FLEXIBLE PAVEMENT.

EDGE OF SLAB WHEN NOT ADJACENT TO CONCRETE PAVEMENT.

DIRECTION OF TRAVEL
NOTES:
1. AS DIMENSIONED, THE WIDTH OF THE TRANSVERSE SEALANT RESERVOIR IS APPLICABLE WHEN THE TEMPERATURE OF THE PAVEMENT SURFACE IS BETWEEN 60°F (16°C) AND 80°F (27°C). WHEN THE TEMPERATURE IS BELOW 60°F (16°C), THE SEALANT RESERVOIR SHALL BE CUT 1/4" (6) WIDER. WHEN THE TEMPERATURE IS ABOVE 80°F (27°C), THE SEALANT RESERVOIR SHALL BE CUT 1/4" (6) NARROWER.
2. "T" REFERS TO THE ACTUAL CONSTRUCTED SLAB THICKNESS.
3. TOLERANCE ON ALL JOINT SEALANT DETAIL DIMENSIONS SHOWN WITHOUT RANGES SHALL BE PLUS 1/4" (6), MINUS 0.
4. THE TOP EDGES OF THE CONTACT SURFACES OF THE SEALANT MATERIAL ON BOTH SIDES OF THE JOINT RESERVOIR SHALL BE AT THE SAME ELEVATION.
5. TRANSVERSE JOINT MATERIAL SHALL BE PLACED BEFORE LONGITUDINAL JOINT MATERIAL. THE TRANSVERSE JOINT MATERIAL SHALL BE CONTINUOUS FOR THE FULL WIDTH OF ALL ADJACENT P.C.C. PAVEMENT SLABS.
6. LONGITUDINAL JOINT MATERIAL SHALL BE PLACED WITHOUT GAPS WHENEVER INTERRUPTED BY THE TRANSVERSE JOINT MATERIAL.
7. TRANSVERSE JOINT SEAL TO BE RECESSED 1/4" TO 1/2" (6) TO 12.7MM BELOW THE TOP OF THE SLAB.
8. A 45° CHAMFER SHALL BE CUT 1/4" (6) TO 1/2" (12.7MM) DEEP AT THE TOP OF THE SLAB ALONG BOTH SIDES OF THE TRANSVERSE SEALANT RESERVOIR.
9. THE TOP EDGES OF THE COMPRESSION SEAL SHALL BE IN FULL CONTACT WITH THE SLAB SIDES.

JOINT AND SEALANT DETAILS
EDGE OF SLAB

SLAB WIDTH

EDGE OF SLAB

3" (75) MIN.

WELD SIDE WIRE FRAME TO DOWELS ONLY ON ALTERNATE ENDS (TYP.)

DOWEL INSTALLATION STAKE

LOWER SIDE WIRE

UPPER SIDE WIRE

SIDE WIRE FRAME (TYP.)

UPPER SIDE WIRE

LOWER SIDE WIRE

INSTALLATION STAKE

PLAN

TOP OF SLAB

UPPER SIDE WIRE

SIDE WIRE FRAME (TYP.)

LOWER SIDE WIRE

BOTTOM OF SLAB

ELEVATION

Dowel Support Basket

DELAWARE DEPARTMENT OF TRANSPORTATION

P.C.C. PAVEMENT

APPROVED

STANDARD NO. P-1 (2001) SHT. 4 OF 5 RECOMMENDED

04/18/2001
DOWEL & TIE BAR PLACEMENT TOLERANCES
PLAN

1. Proposed locations for transverse joints shall exactly match the alignment of the final existing or relocated transverse joints in all immediately adjacent lanes.

NOTES:
1. When repairing existing transverse joints, the patch shall extend a minimum of 24"/600 through the existing joint, which will relocate the joint.
2. Proposed locations for transverse joints, when not aligned with the final expected transverse joint locations in the immediately adjacent lanes, shall be offset a minimum of 2"/500 from the aforementioned joints.
3. The longitudinal joint alignment shall be straight and continuous through the repaired area.

DELaware DEPARTMENT OF TRANSPORTATION

P.C.C. PAVEMENT PATCHING

STANDARD NO. P-2 (2008) SHT. 1 OF 5

APPROVED

RECOMMENDED

1/14/2008
SECTION A-A

SECTION B-B
TRANVERSE SAW-CUT USED FOR JOINTS LOCATED WITHIN THE PATCH

SECTION C-C
TRANVERSE CONSTRUCTION JOINT USED ON JOINTS BETWEEN EXISTING PAVEMENT AND PATCH

FULL DEPTH PATCH

DELAWARE DEPARTMENT OF TRANSPORTATION

P.C.C. PAVEMENT PATCHING

STANDARD NO. P-2 (2006) SHT. 2 OF 5

APPROVED

1/14/2008
 Sealant detail - Longitudinal Joint

 Sealant detail - Transverse saw-cut joint

 Sealant detail - Transverse construction joint

**NOTES:**
1. As dimensioned, the width of the transverse sealant reservoir is applicable when the temperature of the pavement surface is between $60^\circ F$ ($16^\circ C$) and $80^\circ F$ ($27^\circ C$). When the temperature is below $60^\circ F$ ($16^\circ C$), the sealant reservoir shall be cut $\frac{1}{8}$" wider.
2. "T" refers to the existing "as-built" slab thickness.
3. Tolerance on all joint sealant detail dimensions shown without ranges shall be plus/minus $\frac{1}{32}$".
4. The top edges of the contact surfaces of the sealant material on both sides of the joint reservoir shall be at the same elevation.

**Notes:**
- **D - Dowel Diameter:** Including protecting coatings, if any
- **Grout retention disk:**
  - $\frac{3}{16}$" min.
  - $\frac{3}{8}$" max.
  - $\frac{1}{4}$" max.

**Notes:**
- **Hot poured joint sealant:**
  - Existing P.C.C.
  - Hot poured joint sealant
  - Top of slab
- **Initial saw cut:** $\frac{1}{4}$" min.
- **P.C.C. Patch:**
  - Existing, P.C.C. slab.
- **Backer rod:**
  - Uncompressed diameter = $\frac{3}{8}$" min.
  - $\frac{1}{4}$" max.
  - $\frac{3}{8}$" min.
  - $\frac{3}{16}$" max.
- **HOT-POURED JOINT SEALANT:**
  - Top of slab
- **TRANSVERSE CONSTRUCTION JOINT:**
  - $\frac{1}{4}$" min.
  - $\frac{3}{8}$" max.
  - $\frac{3}{8}$" max.
  - $\frac{3}{8}$" max.
  - $\frac{3}{8}$" max.
  - $\frac{3}{8}$" max.
  - $\frac{3}{8}$" max.
  - $\frac{3}{8}$" max.
  - $\frac{3}{8}$" max.
  - $\frac{3}{8}$" max.

**P.C.C. pavement patching:**
- Sheet: 3 of 5
- Approved: October 1, 2005
- Recommended: October 1, 2005
TRANVERSE JOINT  TOP OF SLAB

POSITION SPECIFIED
POSITION ALLOWED

VERTICAL TRANSLATION

TRANSVERSE JOINT

POSITION SPECIFIED
POSITION ALLOWED

HORIZONTAL TRANSLATION

TRANSVERSE JOINT

POSITION SPECIFIED
POSITION ALLOWED

LONGITUDINAL TRANSLATION

TRANSVERSE JOINT

POSITION SPECIFIED

HORIZONTAL ROTATION

TRANSVERSE JOINT

POSITION SPECIFIED

DOWEL & TIE BAR PLACEMENT TOLERANCES

FULL DEPTH PATCH

DELAWARE DEPARTMENT OF TRANSPORTATION

P.C.C. PAVEMENT PATCHING

STANDARD NO. P-2 (2001)  SHT. 4 OF 5

APPROVED

RECOMMENDED

04/18/2001
NOTE: CLOSED CELL POLYETHYLENE FOAM SHALL BE THE SAME WIDTH AS THE JOINT AND 2"(50) IN DEPTH. AFTER THE CONCRETE IN THE REPAIR AREA HAS ACHIEVED THE SPECIFIED STRENGTH, THE FOAM SHALL BE REMOVED AND REPLACED WITH BACKER ROD AND HOT-POUR SEALANT MEETING ALL APPLICABLE STANDARD DETAILS AND SPECIFICATIONS.

SECTION WITH SPALL NOT ADJACENT TO JOINT

NOTE: WHEN X > 12"(300), THEN 1"(25) AND POLYETHYLENE FOAM IS NOT USED. WHEN X ≤ 12"(300), THEN 1"(25) AND POLYETHYLENE FOAM IS USED.
NOTES:

II. TYPE I CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" (125) DIAMETER COMPLETELY THROUGH THE WALL. UNSEEN HOLES SHALL BE PLUGGED.

2. TYPE 2 AND TYPE 3 CONDUIT JUNCTION WELLS SHALL BE BRICK AND WILL CONFORM TO STANDARD SPECIFICATIONS FOR BRICK MASONRY. JOINTS SHALL BE CONCRETE TYPE.

3. TYPE 2 WELLS WILL BE A NOMINAL 4" (100) THICK. TYPE 3 WALL WILL BE A NOMINAL 8" (200) THICK.

3. TYPE 2 AND TYPE 3 CONDUIT JUNCTION WELLS SHALL NOT BE PLACED UNDER ANY TYPE OF PAVEMENT.

4. ALL CONDUIT JUNCTION WELLS CONSTRUCTED WITHIN PAVEMENT, SIDEWALKS, ETC. WILL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME. INSTALLATION IN UNPAVED AREAS WILL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM CONDUIT JUNCTION WELL.
CAST IRON COVERS

CAST IRON FRAME

24" x 60" 24" x 60" 48 7/8" x 60 1/8"

22" x 57 1/2" 22" x 57 1/2"

24" x 58 1/4"

1/2" C30 DIAL PICK PRY HOLE

NOTES:

1. TYPE 4 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST AND STANDARD DIAMOND GRID WILL BE OF MINIMUM DIAMETER COMPLETELY THROUGH WALL. UNUSED HOLES SHALL BE PLUGGED.

2. ALL CONDUIT JUNCTION WELLS CONSTRUCTED WITHIN PAVEMENT, SIDEWALKS, ETC. WILL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME. INSTALLATION IN UNPAVED AREAS WILL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM CONDUIT JUNCTION WELL.

PLAN VIEW

SECTION A-A

SECTION B-B

4" 1000 CONCRETE WALL

24" 5500 LBL

42" 2000 LBL X 42" 2000 LBL

DEB. 57 STONE

DEL. 57 STONE

FINISHED GRADE (PAVEMENT) 7

FINISHED GRADE (UNPAVED)
NOTES: II. TYPE 5 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE, AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" (125) DIAMETER COMPLETELY THROUGH THE WALL, UNUSED HOLES SHALL BE PLUGGED.

25. ALL CONDUIT JUNCTION WELLS CONSTRUCTED WITHIN PAVEMENT, SIDEWALKS, ETC. WILL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME. INSTALLATION IN UMPIRED AREAS WILL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM CONDUIT JUNCTION WELL.
UNDERGROUND CONDUIT ENDS SHALL BE CAPPED WITH A GALVANIZED THREADED CONDUIT PLUG UNLESS CONNECTED TO AN EXISTING CONDUIT.

BOLT CIRCLE DIAMETER TO BE AS DIRECTED BY THE ENGINEER

GROUND FOR POLE TO BE ATTACHED TO GROUND ROD(S) (4" x 24" x 60963)

DIRECTION OF LOAD (MAST ARM OR SPAN)

2½" (64) CONDUIT SWEEPS

EXISTING CONDUIT

EQUALLY SPACED 
8 (M25) REINFORCING BARS

EQUALLY SPACED 
4 (M10) REINFORCING BARS

ROUND BASE

SQUARE BASE

NOTE: BASE DEPENDENT ON POLE AND EQUIPMENT TO BE ATTACHED.
**POLE BASE DATA CHART**

<table>
<thead>
<tr>
<th>POLE BASE TYPE</th>
<th>DIAMETER</th>
<th>DEPTH</th>
<th>4 1/2&quot; HORIZONTAL REINFORCING BARS</th>
<th>6 1/2&quot; VERTICAL REINFORCING BARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36&quot; (915)</td>
<td>7' (2150)</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>36&quot; (915)</td>
<td>9' (2750)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>2A</td>
<td>48&quot; (1220)</td>
<td>6' (1850)</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>2B</td>
<td>60&quot; (1525)</td>
<td>7' (2150)</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>48&quot; (1220)</td>
<td>6' (1850)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>3A</td>
<td>60&quot; (1525)</td>
<td>9' (2750)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>3B</td>
<td>72&quot; (1820)</td>
<td>7' (2150)</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>24&quot; (600)</td>
<td>2' 4&quot; (725)</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td>5</td>
<td>36&quot; (915)</td>
<td>4' (1225)</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td>6</td>
<td>24&quot; (600)</td>
<td>6' (1850)</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>48&quot; (1220)</td>
<td>7' (2150)</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

* - ADDITIONAL DEPTH FOR POLE BASE EXTENSION, IF REQUIRED, TO BE DETERMINED BY TRAFFIC ENGINEERING AND MANAGEMENT TEAM/FIELD REPRESENTATIVE.

TYPICAL SECTION (BASES 5 AND 6)

NOTE:
SEE SPECIFICATIONS AND DETAILS FROM CURRENT PURCHASING CONTRACT FOR ANCHOR BOLT DIMENSIONS.
NOTES:

1. Underground conduit ends shall be capped with a galvanized threaded conduit plug unless connected to an existing conduit.

2. Place 2 each 4" (600) x 1/2" (13) R.V.C. Schedule 40 (Typ) vents in the grout as directed in the field by the engineer.
NOTES:

1. The contractor shall be responsible for protecting the conduit against any possible damage in paving operations.

2. The weatherproof fitting shall consist of a galvanized 9/16" x 13/8" coupling containing a steel threaded reducing bushing to 3/8" x 13/8" and a 3/8" x 13/8" watertight connector for service entrance cable.

3. The lead-in wire shall be run through the rubber of the weatherproof fitting.

DETAIL A - Typical Installation Under Integral Curb and Gutter

DETAIL B - Typical Installation Under Curbing

DETAIL C - Typical Installation Without Curbing
WIRE SLOT CONSTRUCTION

NOTES:

1. SAW CUTS FOR WIRE SLOT CONSTRUCTION SHALL BE EXTENDED BEYOND THE CORNERS SO THAT THE SLOT IS FULL DEPTH AT TURN POINTS. A FORTY-FIVE (45) DEGREE ANGLE SHALL BE CUT 12" C/O D/B FROM THE POINT OF THE EXTENDED CORNER.

2. THE LONGITUDINAL / TRANSVERSE CUT SHALL BE STOPPED APPROXIMATELY 2" ISO FROM THE CORNER TO PREVENT THE TRAPEZOIDAL PORTION OF THE PAVEMENT FROM BREAKING.

3. A MAXIMUM OF TWO LOOP DETECTORS CAN BE SPICED TO ONE LEAD-IN CABLE. THE DETAIL ILLUSTRATES THE METHOD OF SPICING TWO LOOP DETECTORS LOOP #1 AND LOOP #2 TO A LEAD-IN CABLE.

4. LOOP DETECTOR SHALL BE CENTERED IN TRAVEL LANE.

SECTION A - A

SECTION B - B

DELAWARE DEPARTMENT OF TRANSPORTATION

T-9 (2006)

STANDARD NO. SHT. 1 OF 1

APPROVED

RECOMMENDED

01/09/2006
WIRE SLOT CONSTRUCTION

NOTES:
1. SAW CUTS FOR WIRE SLOT CONSTRUCTION SHALL BE EXTENDED BEYOND THE CORNERS SO THAT THE SLOT IS FULL DEPTH AT TURN POINTS. A FORTY-FIVE (45) DEGREE ANGLE SHALL BE CUT 1' (0.3m) BACK FROM THE POINT OF THE EXTENDED CORNER.
2. THE LONGITUDINAL / TRANSVERSE CUT SHALL BE STOPPED APPROXIMATELY 2' (0.6m) FROM THE CORNER TO PREVENT THE TRIANGULAR PORTION OF THE PAVEMENT FROM BREAKING.
3. A MAXIMUM OF TWO LOOP DETECTORS CAN BE SPliced TO ONE LEAD-IN CABLE. THE DETAIL ILLUSTRATES THE METHOD OF SPlicing TWO LOOP DETECTORS LOOP #1 AND LOOP #2 TO A LEAD-IN CABLE.
4. LOOP DETECTOR SHALL BE CENTERED IN TRAVEL LANE.

SECTION A - A

SECTION B - B

DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD NO. T-10 (2006) SHT. 1 OF 1

APPROVED

RECOMMENDED
SPAN WIRE ATTACHMENT BETWEEN POLES

NOTE: SPAN WIRE ATTACHMENT BETWEEN METAL POLES IS THE SAME AS SHOWN FOR WOOD POLES EXCEPT THAT THE STRAIN PLATES AND GUY HOOKS ARE NOT USED. FOR DETAIL SEE T-14 SHEET 2 - "DEAD END MESSENGER WIRE ATTACHMENT, METAL POLES".

DELAWARE DEPARTMENT OF TRANSPORTATION

SPAN WIRE ATTACHMENT BETWEEN POLES

STANDARD NO. T-12 (2000)  SHT. 1 OF 2  APPROVED 12/5/05

MATCH LINE A - A

SERVICE SLEEVE

TOP VIEW

SPAN WIRE

3/4" (18.8) X 2 1/2" (64)

MATCH LINE A - A

3/4" (18.8) X 2 1/2" (64)

STRAIN PLATE (2 REQUIRED)

GALVANIZED 3-BOLT GUY CLAMPS (2 REQUIRED)

SPAN WIRE (0 1/2 WRAPS AROUND POLE)

WOOD POLE

GUY HOOK

GALVANIZED 3/4" (18.8) BOLTS

GALVANIZED 3/4" (18.8) NUTS

30" (762)

MATCH LINE A - A

SERVICE SLEEVE

SPAN WIRE

WOOD POLE
WOOD POLES

SERVICE WEDGE CLAMP
MESSENGER WIRE
MESSENGER CLAMP
LASHING WIRE
CABLE SPACER

ELECTRICAL CABLE

WOOD POLE

GALVANIZED 3/16" X 3" (75 X 3" (75) WASHERS WITH 3/8" (2) HOLE
GALVANIZED 3/16" X 3" (75 X 3" (75) NUTS (2 REQUIRED)
GALVANIZED 3/16" X 3" (75 X 3" (75) EYEBOLT

METAL POLES

SERVICE SLEEVE

GALVANIZED 3/16" X 3" (75 X 3" (75) WASHERS (2 REQUIRED)
GALVANIZED 3/16" X 3" (75 X 3" (75) NUTS (2 REQUIRED)
GALVANIZED 3/16" X 3" (75 X 3" (75) EYEBOLT

MESSENGER WIRE 1/2 WRAPS AROUND POLE

NOTES: 1. INSTALLATION METHOD SHOWN FOR DEAD END MESSENGER WIRE ATTACHMENT TO METAL POLES SHALL BE USED FOR SPAN WIRE ATTACHMENT BETWEEN METAL POLES.
NOTES:
1. TYPE 6 CONDUIT JUNCTION WELL SHALL BE PRECAST POLYMER CONCRETE.
2. ALL CONDUIT JUNCTION WELLS CONSTRUCTED WITHIN PAVEMENT, SIDEWALKS, ETC. WILL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME. INSTALLATION IN UNPAVED AREAS WILL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM THE CONDUIT JUNCTION WELL.
3. POLYMER CONCRETE COVERS SHALL BE THE HEAVY-DUTY TYPE WITH A DESIGN LOAD OF 15,000 LBS (6800 kg) OVER A 10' (2450) SQUARE.
POLYMER CONCRETE WITH A HEAVY-WEAVE FIBERGLASS REINFORCEMENT

3/8" (9) - 16 UNC HEX BOLT W/ WASHERS TO BE SECURED INTO THE WELL FRAME

1/2" (13) x 4" (100)
PULL SLOT

NOTES:

1. TYPE T CONDUIT JUNCTION WELL SHALL BE PRECAST POLYMER CONCRETE.

2. ALL CONDUIT JUNCTION WELLS CONSTRUCTED WITHIN PAVEMENT, SIDEWALKS, ETC. WILL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME INSTALLATION IN UNPAVED AREAS WILL BE CONSTRUCTED ABOVE GRADING AND GRADED TO DRAIN AWAY FROM THE CONDUIT JUNCTION WELL.

3. POLYMER CONCRETE COVERS SHALL BE THE HEAVY DUTY TYPE WITH A DESIGN LOAD OF 15,000 LBS (6800 KG) OVER A 0" (25) SQUARE.

PLAN VIEW

FINISHED GRADE (PAVEMENT)

3" (75) MIN.

POLYMER TONGS AND GROOVE

3/4" (19)

60" (1524) X 36" (914)

HAND GRIPS (20)

60" (1524) X 64" (1624)

2" (51) MIN.

3" (75) MAX.

3" (75) MIN.

3" (75) MAX.

HAND GRIPS (20)

5/8" (16)

POLYMER CONCRETE

BUSHING

STONE

FABRICATED CONDUIT

SECTION A-A
**NOTES:**

1. TYPES 8 & 10 CONDUIT JUNCTION WELLS SHALL BE PRECAST POLYMER CONCRETE.
2. ALL CONDUIT JUNCTION WELLS CONSTRUCTED WITHIN PAVEMENT, SIDEWALKS, ETC. WILL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME. INSTALLATION IN UNPAVED AREAS WILL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM THE CONDUIT JUNCTION WELL.
3. POLYMER CONCRETE COVERS SHALL BE THE HEAVY-DUTY TYPE WITH A DESIGN LOAD OF 8,000 LBS (6000 kN) OVER A 10" (250) SQUARE.

---

**DIMENSIONS**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Type 8</th>
<th>Type 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>47 3/8&quot;(120)</td>
<td>35 3/8&quot;(90)</td>
</tr>
<tr>
<td>B</td>
<td>30 4/8&quot;(765)</td>
<td>24&quot;(600)</td>
</tr>
<tr>
<td>C</td>
<td>48 3/8&quot;(120)</td>
<td>37 3/8&quot;(95)</td>
</tr>
<tr>
<td>D</td>
<td>32 3/8&quot;(860)</td>
<td>26&quot;(650)</td>
</tr>
<tr>
<td>E</td>
<td>45 3/8&quot;(115)</td>
<td>33 3/8&quot;(850)</td>
</tr>
<tr>
<td>F</td>
<td>28 3/8&quot;(720)</td>
<td>22 3/8&quot;(560)</td>
</tr>
<tr>
<td>G</td>
<td>36&quot;(96)</td>
<td>59&quot;(149)</td>
</tr>
<tr>
<td>H</td>
<td>33&quot;(830)</td>
<td>21&quot;(530)</td>
</tr>
<tr>
<td>I</td>
<td>58&quot;(1470)</td>
<td>46&quot;(1160)</td>
</tr>
<tr>
<td>J</td>
<td>40&quot;(1016)</td>
<td>54&quot;(1371)</td>
</tr>
</tbody>
</table>

---

**DELTA FILE**

DEPARTMENT OF TRANSPORTATION

CONDUIT JUNCTION WELLS, TYPES 8 & 10


APPROVED

RECOMMENDED

05/13/2006
CABLE CONNECTIONS TO TERMINAL STRIP

ACCESS DOOR SCREW HOLE

FRONT VIEW
(CABLE NOT SHOWN)

BLACK WHITE GREEN RED

4-POSITION TERMINAL STRIP

SIDE VIEW

1/4" WEEP HOLE
(AT THE BOTTOM OF THE BASE)

TO MAST ARM

NOTES:
1. UPRIGHT CONFIGURATION SHALL BE USED FOR MOUNTING ON MAST ARMS, SIGNAL HEAD FRAMEWORKS AND PEDESTALS.
2. UPRIGHT MOUNTING HARDWARE SHALL BE SUPPLIED BY THE DEPARTMENT.
3. TEFCON TAPE SHALL BE APPLIED TO THREADS BEFORE MOUNTING.

DELAWARE
DEPARTMENT OF TRANSPORTATION

EMERGENCY PREEMPTION RECEIVER, UPRIGHT MOUNT

STANDARD NO. T-14 (2006) SHT. 1 OF 2

APPROVED  RECOMMENDED

06/21/2006
NOTES:

1. INVERTED CONFIGURATION SHALL BE USED FOR SPAN MOUNT.
2. SPAN WIRE MOUNTING HARDWARE SHALL BE SUPPLIED BY THE DEPARTMENT.
3. T-FLO TAP TAPE SHALL BE APPLIED TO THREADS BEFORE MOUNTING.
4. ROUTE THE LEAD-IN CABLE THROUGH THE METAL CAP AND THE RUBBER PLUG.
   REPLACE THE METAL CAP, SEALING THE CABLE ENTRY PORT. TIGHTEN THE METAL CAP SO THE CABLE WILL NOT SLIDE THROUGH THE RUBBER PLUG.