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.
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<thead>
<tr>
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<th>NAME</th>
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<tbody>
<tr>
<td>B-14</td>
<td>CONCRETE SAFETY BARRIER IF SHAPE</td>
</tr>
<tr>
<td>02009-1</td>
<td>32''x160'' - TYPICAL CAST-IN-PLACE OR SLIP FORM CONSTRUCTION</td>
</tr>
<tr>
<td>02009-2</td>
<td>32''x160'' - TYPICAL PRE-CAST CONSTRUCTION</td>
</tr>
<tr>
<td>02009-3</td>
<td>42''x160'' - TYPICAL CAST-IN-PLACE OR SLIP FORM CONSTRUCTION</td>
</tr>
<tr>
<td>02009-4</td>
<td>SLOTTED PLATE CONNECTION DETAILS</td>
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<table>
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<tr>
<th>B-15</th>
<th>PORTABLE CONCRETE SAFETY BARRIER IF SHAPE</th>
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<tbody>
<tr>
<td>02009-1</td>
<td>PLATE, ELEVATION, AND SECTION VIEW DETAIL DELETED - SEE SPECIFICATIONS</td>
</tr>
<tr>
<td>02009-2</td>
<td>GRATE DETAIL DELETED - SEE SPECIFICATIONS</td>
</tr>
<tr>
<td>02009-3</td>
<td>FORM DETAIL DELETED - SEE SPECIFICATIONS</td>
</tr>
<tr>
<td>02009-4</td>
<td>REINFORCEMENT DETAILS DETAIL DELETED - SEE SPECIFICATIONS</td>
</tr>
<tr>
<td>02009-5</td>
<td>JOINT CONNECTION DETAIL DELETED - SEE SPECIFICATIONS</td>
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</tr>
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<tbody>
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<td>C-1 (20009-1)</td>
<td>P.C.C. CURB, P.C.C. CURB &amp; GUTTER, AND HOT-MIX CURB</td>
</tr>
<tr>
<td>C-2</td>
<td>CURB RAMPS</td>
</tr>
<tr>
<td>02008-1</td>
<td>TYPE 1</td>
</tr>
<tr>
<td>02008-2</td>
<td>TYPES 2, 3, &amp; 4</td>
</tr>
<tr>
<td>02008-3</td>
<td>SECTIONS FOR TYPES 2, 3, &amp; 4</td>
</tr>
<tr>
<td>02008-4</td>
<td>TYPE 5</td>
</tr>
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<table>
<thead>
<tr>
<th>C-3 (20009-1)</th>
<th>ENTRANCES</th>
</tr>
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<tbody>
<tr>
<td>C-4</td>
<td>CURB OPENINGS</td>
</tr>
<tr>
<td>02001-1</td>
<td>TYPES A, B, &amp; C</td>
</tr>
<tr>
<td>02001-2</td>
<td>TYPES D &amp; E</td>
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<tr>
<td>02001-3</td>
<td>TYPES F &amp; G</td>
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<th>NAME</th>
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<td>D-1</td>
<td>BARRIER END STRUCTURE</td>
</tr>
<tr>
<td>20009-1</td>
<td>DETAIL VIEWS</td>
</tr>
<tr>
<td>20009-2</td>
<td>SCHEDULES</td>
</tr>
</tbody>
</table>

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| 20009-1 | DETAIL VIEWS |
| 20009-2 | SCHEDULES |

| D-3 | SAFETY GRATES |
| 20009-1 | SAFETY END STRUCTURE GRATE & ASSEMBLY DETAIL |
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<table>
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<tr>
<th>D-4 (20009-1)</th>
<th>INLET BOX DETAILS</th>
</tr>
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<tbody>
<tr>
<td>D-5</td>
<td>DRAINAGE INLET DETAILS</td>
</tr>
<tr>
<td>20009-1</td>
<td>DRAINAGE INLET ASSEMBLY</td>
</tr>
<tr>
<td>20009-2</td>
<td>DRAINAGE INLET FRAME AND GRATES</td>
</tr>
<tr>
<td>20009-3</td>
<td>DRAINAGE INLET TOP UNITS</td>
</tr>
<tr>
<td>20009-4</td>
<td>DRAINAGE INLET COVER SLAB DETAILS</td>
</tr>
<tr>
<td>20009-5</td>
<td>DOUBLE INLET COVER SLAB DETAILS</td>
</tr>
<tr>
<td>20009-6</td>
<td>36''x160'' x 24''x160'' DRAINAGE INLET DETAILS</td>
</tr>
<tr>
<td>20009-7</td>
<td>36''x160'' x 24''x160'' DRAINAGE INLET DETAILS</td>
</tr>
<tr>
<td>20009-8</td>
<td>DRAINAGE INLET TOP UNIT, TYPE 5</td>
</tr>
<tr>
<td>20009-9</td>
<td>36''x160''x160'' DRAINAGE INLET DETAIL</td>
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<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>W-BEAM</td>
</tr>
<tr>
<td>2</td>
<td>W6 X 9 (W150 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) 3/8&quot; (6) GUARDRAIL BOLTS (L=9/4&quot; (35)) WITH RECESS NUTS, AND ONE(1) 3/8&quot; (6) 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>3/8&quot; (6) GUARDRAIL BOLT (L=9/4&quot; (35)) AND RECESS NUT</td>
</tr>
<tr>
<td>7</td>
<td>5/8&quot; (6) GUARDRAIL BOLT (L=10&quot; (255)) AND RECESS NUT</td>
</tr>
<tr>
<td>8</td>
<td>5/8&quot; (6) GUARDRAIL BOLT (L=10&quot; (255)), STEEL WASHER, AND RECESS NUT</td>
</tr>
<tr>
<td>9</td>
<td>1/2&quot; (22) HIGH STRENGTH STRUCTURAL HEX BOLT (L=VARIES) AND HEX NUT</td>
</tr>
<tr>
<td>10</td>
<td>5/8&quot; (6) CARRIAGE BOLT (L=VARIES), STEEL WASHER, AND HEX NUT</td>
</tr>
<tr>
<td>11</td>
<td>BEARING PLATE</td>
</tr>
</tbody>
</table>
### Guardrail Applications

**Type 1 Guardrail**
- **Placement**: POST SPACING 6'-3" (1905)
- **Typical Guardrail Treatment**: WHEN 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.
- **Required Clearance**: 4' (1200) MINIMUM
- **Post Spacing**: 6'-3" (1905)

**Type 2 Guardrail**
- **Placement**: POST SPACING 3'-6" (108)
- **Typical Guardrail Treatment**: WHEN A MINIMUM OF 10' (3000) IS AVAILABLE FOR MEDIAN
- **Post Spacing**: 6'-3" (1905)

**Type 3 Guardrail**
- **Placement**: POST SPACING 3'-6" (108)
- **Typical Guardrail Treatment**: WHEN 2' (600) TO 4' (1200) OF CLEARANCE TO OBSTRUCTION IS AVAILABLE
- **Post Spacing**: 6'-3" (1905)

**FLARE RATES**

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Flare Rate</th>
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<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>9d</td>
</tr>
<tr>
<td>30 MPH (50 km/h)</td>
<td>9d</td>
</tr>
</tbody>
</table>

**NOTES:**
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.
2. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
NOTE: OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.
GUARDRAIL SECTION
(RURAL SHOULDER APPLICATION)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>POST SPACING</th>
<th>CLEAR AREA BEHIND POST</th>
<th>DESIGN SPEED</th>
<th>D</th>
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<tbody>
<tr>
<td>1</td>
<td>6' (1800)</td>
<td>4' (1200) MIN.</td>
<td>&lt; 50 MPH (80 km/h)</td>
<td>6' (1800)</td>
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<tr>
<td>2</td>
<td>3'1½ (952.5)</td>
<td>2' (600) MIN.</td>
<td>≥ 50 MPH (80 km/h)</td>
<td>6' (1800)</td>
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</table>

GUARDRAIL SECTION
(MEDIAN APPLICATION)

CURB TO BE USED ONLY WHEN INDICATED ON THE PLANS

GUARDRAIL SECTION
(URBAN SHOULDER APPLICATION)

P AVEMENT OR SIDEWALK SHALL BE USED ONLY WHEN INDICATED ON PLANS
1. Flare the end treatment at 25° (beginning 50°) 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" (50) within the limits of the end treatment and throughout the length of the taper grading.

**Section A-A**

**Grading for Guardrail End Treatment Attenuator Type 1**

**Notes:**
- Flare the end treatment at 25° (beginning 50°) from the end of the impact head, unless the construction plans or specifications specify a smaller flare.
- 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.
- 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.
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
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' (3650 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 mm) within the limits of the end treatment and throughout the length of the taper grading.
TWO SECTIONS OF W-BEAM ONE NESTED INSIDE THE OTHER

2' (600 MM) MIN. TO CULVERT TOP.

NOTES: 16. ALL W-BEAMS ARE 12"-6.5'/4000" IN LENGTH.
21. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
Plan

Three sections of W-beam, one nested inside the other

Elevation

Notes:
1. All W-beams are 12'-6" (3.81m) in length.
2. Place guardrail reflector every fifth post.

DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL OVER CULVERTS, TYPE 2

STANDARD NO. B-2 (2009)  SHT. 2 OF 3  APPROVED  RECOMMENDED

SIGNATURE ON FILE  01/10/2010  SIGNATURE ON FILE  06/30/2009

SCALE 1:100

DIRECTION OF TRAVEL

30'-6" (9145m) LIMIT OF PAYMENT

TYPE 1 GUARDRAIL OR

APPROPRIATE END TREATMENT

BEAM 1
(NESTED W-BEAM)

BEAM 2
(NESTED W-BEAM)

BEAM 3
(NESTED W-BEAM)

GROUND LINE

2'-6" (0.78m) MIN.
TO CULVERT TOP
DELAWARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL OVER CULVERT, TYPE 3

STANDARD NO. B-2 (2009)
SHT. 3 OF 3

APPROVED

SIG. ON FILE

GUIDE POSTS

1. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
2. POSTS 1-4 AND 11-14 ARE TO BE 6X6X3 OR 3X3X3 STEEL POSTS. POSTS 5-10 ARE TO BE 6X6X3, 6X3X3, OR 3X3X3 WOOD POSTS WITH 2 WOOD BLOCKS AT EACH OF THESE 6 POSTS.
3. THE SPIKES AT POSTS 5, 7, 8, & 10 ARE TO USE 3/8" X 1/2" GUARDRAIL BOLT (4-22" X 600).
**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.

<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>8'-6&quot; (2600)</td>
<td>25' x 6' (7600 x 1905)</td>
</tr>
<tr>
<td>17'-0&quot; (5200)</td>
<td>30' x 6' (944 x 1905)</td>
</tr>
<tr>
<td>25'-6&quot; (7800)</td>
<td>40' x 6' (1200 x 1905)</td>
</tr>
<tr>
<td>30'-0&quot; (9000)</td>
<td>50' x 6' (15200 x 1905)</td>
</tr>
</tbody>
</table>

**SCALE:** 1/100

**DIA. WASHER & NUT:**

1. 8" (200) x 8" (200) POST & OFFSET BLOCK
2. 8" (200) x 8" (200) POST & OFFSET BLOCK

**CONCRETE ANCHOR:**

- SEE ANCHOR PLATE DETAIL, SHEET B-15, 8 OF 13
- 1/4" (32) x 7'-3" (2200) GALVANIZED ROD W/ WELDED EYE
- 6" (150) HOOK OR 5" (125) DIA WASHER & NUT.
- 1'-3" (381) x 1'-3" (381) CONCRETE ANCHOR
- SEE ANCHOR PLATE DETAIL, SHEET B-15, 8 OF 13
- 12" (300) x 6" (150) HOOK OR 5" (125) DIA WASHER & NUT.
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>60 MPH (96 km/h)</td>
<td>14d</td>
</tr>
<tr>
<td>55 MPH (90 km/h)</td>
<td>12d</td>
</tr>
<tr>
<td>50 MPH (80 km/h)</td>
<td>11c</td>
</tr>
<tr>
<td>45 MPH (70 km/h)</td>
<td>10c</td>
</tr>
<tr>
<td>40 MPH (64 km/h)</td>
<td>9c</td>
</tr>
<tr>
<td>30 MPH (48 km/h)</td>
<td>7v</td>
</tr>
</tbody>
</table>

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) THE TOP OF THE W-BEAM SHALL BE HELD CONSTANT RELATIVE TO THE ROADWAY PROFILE GRADE UNTIL IT CROSSES THE DITCH FLOW LINE. A SECOND W-BEAM RAIL IS REQUIRED WHEN THE DISTANCE BETWEEN THE GROUND AND THE BOTTOM OF THE TOP RAIL EXCEEDS 1(0.45m). THE MAXIMUM HEIGHT OF THE DOUBLE RAIL SYSTEM IS 48" (1.22m). 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, A' (1.22m) LONG POSTS ARE REQUIRED BEHIND THE DITCHLINE. POSTS MUST PROVIDE 4' (1.22m) MINIMUM EMBEDMENT (20' (5.0m) WHEN ROCK IS ENCOUNTERED). POSTS FOR THE POST ANCHOR SHALL BE A' (1.22m) LONG.
5) WHEN USING THE BURIED END SECTION, THE DESIGN MUST PROVIDE A MINIMUM OF 1' (0.3m) FROM WHERE THE GUARDRAIL CROSSES THE DITCH LINE TO THE BEGINNING OF THE HAZARD.
6) MAINTAIN THE FLARE OF THE GUARDRAIL UNTIL THE 12' (3.66m) COVER HAS BEEN ATTAINED. IF THE 12' (3.66m) COVER CANNOT BE ATTAINED BEFORE THE RAIL IS 7' (2.1m) BEHIND THE BOTTOM OF THE DITCH, THEN SLOPE THE GUARDRAIL FROM THE POINT WHERE IT CROSSES THE DITCH TO WHERE IT IS 7' (2.1m) BEHIND THE DITCH, SO THAT IT HAS 2' (0.61m) OF COVER.

DELAWARE DEPARTMENT OF TRANSPORTATION

B-6 (2002)

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

APPROVED  01/31/2002

CHADDOCK  01/31/2002

RECOMMENDED
STEEL SPACER TUBE
6" OD x 150 L, E-L, SCHEDULE 40
GALVANIZED PIPE 1" OD (22b)II

4 SPACES @ 1'-6½" x (1458)

PLAN

TYPE I GUARDRAIL OR
APPROPRIATE END TREATMENT

OVERLAP W BEAMS IN DIRECTION OF TRAVEL

DIRECTION OF TRAVEL

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

LIMIT OF PAYMENT FOR GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE I

RUB RAIL TO BARRIER CONNECTION (SEE NOTE 4)

WOOD BLOCKOUT

3½" x 10" LAG BOLT

4"-0" x 1"-0"

DRILL 3½" DIAM HOLE IN W BEAM TO INSERT STEEL SPACER TUBE & ATTACH WITH 3½" x 10" CARRIAGE BOLT (T-50-G30)

BENT PLATE RUBRAIL

POSTS NO. 1 & 2
SECTION B-B

POSTS NO. 3, 4, & 5
SECTION A-A

NOTES:
1. W BEAM IS NOT BOLTED TO POSTS AT POSTS 2 THROUGH 4.
2. RUB RAIL IS NOT BOLTED AT POSTS 2 AND 4.
3. POSTS 1 THROUGH 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER WOOD BLOCKS AND/OR RUBRAIL AND WOOD BLOCK.
4. USE APPROPRIATE EPOXY BOLT ANCHORS TO DESCRIBE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS FOR 3½" x 10" BOLT BETWEEN BOLT HEADS AND RUB RAIL.
5. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
6. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
7. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
8. POSTS 1 & 2 ARE W8x3 (2200x8.3). ALL OTHER POSTS IN TRANSITION ARE W6x3 (1500x3.3).

DELWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE I

STANDARD NO. B-7 (2004)
SHT. 1 OF 3

APPROVED
C. W. WITZ
12/5/05

RECOMMENDED
C. W. WITZ
11/5/05

08/09/2005
RUB RAIL TO BARRIER CONNECTION

1. THE RUB RAIL TO BARRIER CONNECTION END MUST BE ATTACHED FLUSH WITH THE SLOPED TOP 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" (152.4) OD X 3" (76.2) ID.

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&quot; (102.0)</td>
<td>5&quot; (127.0)</td>
</tr>
<tr>
<td>2</td>
<td>3/4&quot; (18.3)</td>
<td>4&quot; (102.0)</td>
</tr>
<tr>
<td>3</td>
<td>2&quot; (50.0)</td>
<td>4&quot; (102.0)</td>
</tr>
<tr>
<td>4</td>
<td>1&quot; (25.0)</td>
<td>2&quot; (50.0)</td>
</tr>
</tbody>
</table>

NOTES:
NOTES:
0. CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
1. POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH WOOD BLOCKS AND/OR BENT RAIL.
2. DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 5, OR 6.
3. POSTS 1 AND 2 ARE 6" x 4" x 12' 2" x 12' 3".
4. ALL OTHER POSTS IN TRANSITION ARE 6" x 3" x 8'.
5. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
6. BENT RAIL MAY BE SHIP BENT TO FACILITATE INSTALLATION OR MAY BE FIELD BENT USING HEAT.
7. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.
8. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
9. FOR INSTALLATIONS WHERE CURB EXISTS, IF THE EXISTING CURB IS 8" (200) OR HIGHER AND CANNOT BE REMOVED, THE BOTTOM RAIL CAN BE ELIMINATED.
BENT RAIL WOOD BLOCKS
1'-2" (360) x 4½" (115)

<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 ⅜" (8) CARRIAGE BOLTS. 0 VARES, SEE BENT RAIL WOOD BLOCKS TABLE.

DELAWARE DEPARTMENT OF TRANSPORTATION
GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2
STANDARD NO. B-8 (2001)  SHT. 2 OF 2  APPROVED  RECOMMENDED
04/05/2001
THREE BEAM GUARDRAIL WITH WOOD POSTS SPACED AT 6'-3" (1905):
SEE NOTE

END OF SIDEWALK

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

6'-3" (1905) MIN.

8" (200) x 8" (200) TIMBER BLOCKS

EXISTING BRIDGE PARAPET

END OF SIDEWALK

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

8" (200) x 8" (200) TIMBER BLOCKS

END OF SIDEWALK

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

8" (200) x 8" (200) TIMBER BLOCKS

EXIT END APPLICATION

SEE NOTE

ENTRY END APPLICATION

SEE NOTE

NOTE:
1. THIS INSTALLATION SHALL BE USED WHEN THE EXISTING SIDEWALK IS 6'-3" (1905) OR LESS.
2. USE A THREE BEAM EXPANSION SECTION AT BRIDGE EXPANSION JOINTS.
3. PLACE GUARDRAIL REFLCTOR IN THE UPPER VALLEY OF THE THREE BEAM EVERY FIFTH POST.
4. TIMBER BLOCK THICKNESS SHALL BE ADJUSTED TO ALLOW FACE OF THE THREE 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 ENTRY 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.
THREE BEAM GUARDRAIL WITH STEEL POSTS SPACED AT 6'-3" (1905) CENTER TO CENTER

EXISTING CURB LINE (BOTTOM OF CURB) NECESSARY TO LEVEL PLATE

NOTE: 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.

SECTION A-A

NOTE: 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

WELD ALL AROUND INCLUDING EXTERIOR FLANGE SURFACE

W6 x 15 (W150 x 22)

SIDE

PLAN

SECTION B-B

TRAFFIC FACE

B

B

DELAWARE DEPARTMENT OF TRANSPORTATION

BRIDGE RAIL RETROFIT, TYPE 2

STANDARD NO. B-11 (2001)  SHT. 2 OF 2  RECOMMENDED

APPROVED

04/25/2001
TYPE I GUARDRAIL PLACEMENT OR APPROPRIATE END TREATMENT
GUARDRAIL TO BARRIER CONNECTION
LIMIT OF PAYMENT

END OF SIDEWALK

12" (305MM) MAX.
EXISTING BRIDGE RAIL

TAPER END OF WALL TO TOP OF GUARDRAIL AT A SLOPE OF 4% OR FLATTER

CONTRACTION JOINTS
BRIDGE BARRIER

DIRECTION OF TRAVEL

PLAN

A

5' (1525MM) (TYPICAL BAR SPACING)

A

5' (1525MM) (TYPICAL BAR SPACING)

TAPER END OF WALL TO TOP OF GUARDRAIL AT A SLOPE OF 4% OR FLATTER

SECTION A-A

NOTES:
STANDARD GUARDRAIL TO BARRIER CONNECTIONS
SHALL BE CONNECTED TO THE ENDS OF THE NEW
BRIDGE BARRIER AND TRANSITIONED TO THE EXISTING
GUARDRAIL.

EXISTING RAIL - DO NOT DISTURB
(NEW)

2" (50MM) COVER
TYP.

4"

3/8" (9.5MM) CHAMFER (TYP.)

2"

1000 MM

NOTE: *

*6 (MB) BARS SPACED 15" (375MM) LONGITUDINALLY,
FRONT AND BACK ROWS SHALL BE STAGGERED

DRILL 1/2" (12.7MM) DIA. HOLE, FILL WITH HIGH
STRENGTH, NON-SHRINK CEMENT

DELWARE
DEPARTMENT OF TRANSPORTATION

BRIDGE RAIL RETROFIT, TYPE 3

STANDARD NO. B-12 (2001) SHT. 1 OF 1

APPROVED

RECOMMENDED
**W-Beam Elevation**

- **W-Beam Section**

**NOTES:**
- Two additional \( \frac{1}{2}'' (120) \times 2\frac{1}{2}'' (65) \) slots shall be provided at 6'-3'' (1905) spacing for beam length of 26'-1\( \frac{1}{2}'' (7940).
NOTE: WHERE CONDITIONS REQUIRE, ALTERNATE LENGTHS IN INCREMENTS OF 6" (150) MAY BE USED.

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

**HARDWARE**

- **B-13 (2004)**
- **SHT. 2 OF 13**
- **STANDARD NO.**
- **APPROVED**
- **RECOMMENDED**

**NOTE:** ALL HOLES SHALL BE 5/16" (8.0) BOLT

HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.
THREE BEAM ELEVATION

THREE BEAM SECTION

THREE BEAM EXPANSION ELEMENT

DELAWARE
DEPARTMENT OF TRANSPORTATION

HARDWARE

APPROVED

SHT. 4 OF 13
RECOMMENDED
NOTE: WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150) IN.
W-THREE BEAM TRANSITION SECTION

- 12 GAGE
- POST BOLT SLOTS
- 3'-1" (92.7) MIN.
- 4½" (111.8) MIN.
- 2" (50.8) MIN.
- 2½" (64) MIN.
- 2½" (64) MIN.

HARDWARE
- B-13 (2004)

APPROVED

DELAWARE
DEPARTMENT OF TRANSPORTATION

SHT. 6 OF 13
RECOMMENDED

DATE: 11/10/05
DRAWN: 11/10/05
CHECKED: 11/10/05
SWAGED CABLE ASSEMBLY AND RELATED HARDWARE ASSEMBLY

NOTES:
1. To ensure that the timber bearing plate remains in position.
2. - 10d galvanized steel nails shall be driven in the short timber breakaway post, and bent over bearing plate.
3. Tighten assembly until cable is taught.
4. All holes shall be drilled prior to galvanizing.

SCALE: N.I.S.

DELAWARE DEPARTMENT OF TRANSPORTATION

HARDWARE

APPROVED

STANDARD NO. B-13 2004 SHT. 8 OF 13

END PLATE

ANCHOR PLATE TO W-BEAM CONNECTION DETAIL

NOTES: 1. TO ENSURE THAT THE TIMBER BEARING PLATE REMAINS IN POSITION,
2. 10D GALVANIZED STEEL NAILS SHALL BE DRIVEN IN THE SHORT TIMBER BREAKAWAY POST, AND BENT OVER BEARING PLATE.
3. TIGHTEN ASSEMBLY UNTIL CABLE IS TIGHT.
4. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
RECESSED NUT
(FOR 5/8" (16) GUARDRAIL BOLT)

STEEL WASHER (FOR 5/8" (16) GUARDRAIL BOLT)
NOTE: DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASED ON METAL THICKNESS.

GUARDRAIL BOLT

NOTES:
1. ALL FILLETS SHALL HAVE A MINIMUM RADIUS OF 5/64".
2. IF THE BOLT EXTENDS MORE THAN 5/32" 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.

**1/8" (24) HEX NUT**

**Note:** For use with swaged cable assemblage.

**5/8" (16) CARRIAGE BOLT**
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 BURRED.
4. GUARDRAIL POSTS UPON WHICH RAIL IS TO BE INSTALLED SHALL BE SHOP DRILLED FOR THE RAIL BRACKETS DURING FABRICATION.
5. ALL RAIL SPICES WILL BE AT RAIL SUPPORT BRACKETS. THE SAME BOLT USED TO ATTACH THE RAIL TO THE BRACKET WILL BE USED TO SECURE THE SPICE 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.
SECTION

TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION

BAR OFFSETS

<table>
<thead>
<tr>
<th>NOMINAL LENGTH OF BARRIER SECTION (lb)</th>
<th>X</th>
<th>NO. REQS FOR EACH BARRIER SECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>20&quot;) (6000)</td>
<td>3&quot;</td>
<td>0' 15001</td>
</tr>
<tr>
<td>18&quot;) (4500)</td>
<td>4&quot;</td>
<td>0' 17000</td>
</tr>
<tr>
<td>16&quot;) (4000)</td>
<td>4&quot;</td>
<td>0' 18000</td>
</tr>
<tr>
<td>14&quot;) (3500)</td>
<td>3&quot;</td>
<td>0' 19000</td>
</tr>
<tr>
<td>12&quot;) (3000)</td>
<td>2&quot;</td>
<td>0' 17500</td>
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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>49</td>
<td>4</td>
<td>(5)</td>
<td>6' 15001</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>482</td>
<td>4</td>
<td>(5)</td>
<td>6' 15001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* THE LENGTH OF BAR 482 SHALL BE 6' 15001 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 ½" (12.70) MIN.
2. BARS SHALL BE CLEATED AT EVERY JOINT IF MADE USING CONTINUOUS SLIP-FORM CONSTRUCTION.

DELWARE
DEPARTMENT OF TRANSPORTATION

32" (800 CONCRETE SAFETY BARRIER (G SHAPE)

STANDARD NO. B-14 (2009) SHT. 1 OF 4

APPROVED SIGNATURE ON FILE 01/10/2010

RECOMMENDED SIGNATURE ON FILE 01/14/2010
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>48</td>
<td>4 8D</td>
<td>6</td>
<td>4'-11&quot;(4000)</td>
<td>1</td>
<td>5'10&quot;(1780)</td>
<td>36&quot;(915)</td>
<td>2'(600)</td>
</tr>
<tr>
<td>48</td>
<td>4 8D</td>
<td>**</td>
<td>4'-11&quot;(4000)</td>
<td>1</td>
<td>5'10&quot;(1780)</td>
<td>36&quot;(915)</td>
<td>2'(600)</td>
</tr>
<tr>
<td>68</td>
<td>6 8D</td>
<td>**</td>
<td>2'-9&quot;(885)</td>
<td>**</td>
<td>STR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>6 8D</td>
<td>**</td>
<td>1'-9&quot;(540)</td>
<td>**</td>
<td>STR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* THE LENGTH OF BARS 68 AND 682 SHALL BE 1'-12"(360) 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.

NOTE: THE CONCRETE CLEAR COVER FOR REINFORCING BARS SHALL BE 1'/4"(600) WALL.
SECTION

ELEVATION

BAR OFFSETS

<table>
<thead>
<tr>
<th>Nominal Length of Barrier Section (ft)</th>
<th>No. Req'd for Each Barrier Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>20' (6000)</td>
<td>13</td>
</tr>
<tr>
<td>8' (2400)</td>
<td>12</td>
</tr>
<tr>
<td>6' (1800)</td>
<td>10</td>
</tr>
<tr>
<td>4' (1200)</td>
<td>9</td>
</tr>
<tr>
<td>2' (600)</td>
<td>8</td>
</tr>
<tr>
<td>1' (300)</td>
<td>6</td>
</tr>
</tbody>
</table>

BAR LIST

<table>
<thead>
<tr>
<th>Mark</th>
<th>SME</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>4B1</td>
<td>4</td>
<td>(3)</td>
<td>7'5&quot;</td>
<td>STR</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>4B2</td>
<td>4</td>
<td>(3)</td>
<td>7'5&quot;</td>
<td>STR</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- The length of bar 4B2 shall be 7'5" 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.

TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION

NOTES: 1. Concrete clear cover for reinforcing bars shall be 1/2"-1400 min. 2. Bars shall be cut at every joint if made using continuous slip-form construction.

DELAWARE
DEPARTMENT OF TRANSPORTATION

45° (900) CONCRETE BARRIER DETAILS (F-SHAPE)

Approved
Signature on file: 01/16/2010

Recommended
Signature on file: 01/14/2010

4B-14 (2009) SHT. 3 OF 4
STEEL CONNECTOR PLATE

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

SECTION A-A

SECTION B-B
DETECTABLE WARNING TRUNCATED DOME DETAILS

NOTES:
A. THE AREA OF DETECTABLE WARNING TRUNCATED DOMES SHALL BE 24"X1600" LONG AND THE FULL WIDTH OF THE RAMP OR DEPRESSED CURB.
B. SEE SPECIFICATION FOR ADDITIONAL INFORMATION.

ELEVATION A-A

MAXIMUM DIFFERENCE IN GRADE
FOR EXAMPLE, IF THE CURB RAMP AND DEPRESSED CURB SLOPE IS 9% AND THE PAVEMENT SLOPE IS 8%, THEN TO DETERMINE THE DIFFERENCE IN GRADE, ADD X - Y TO GET 1%, WHICH IS GREATER THAN THE 0% PRESCRIBED BUT LESS THAN THE 1% MAXIMUM.

CURB RAMP, TYPE 1
PERPENDICULAR CURB RAMP

DEPARTMENT OF TRANSPORTATION

CURB RAMP, TYPE 1 AND SECTIONS

STANDARD NO. C-2 (2006)  SHT. 1 OF 4

APPROVED

RECOMMENDED

D/5/2008
SAMPLE LAYOUT OF DETECTABLE WARNING TRUNCATED DOMES ALONG A CURB RADIUS

Detectable warnings shall be placed the full width of the depressed curb.

NOTES:

1. Where a 2% maximum slope ramp will not meet the sidewalk grade within a length of 5'-6" max due to steep adjacent roadway, the ramp length may be limited to 5'-4 1/2" max, and the ramp slope allowed to exceed 6%. If any ramp and sidewalk cross slope shall be 5% or greater max.

2. Transition to existing sidewalk width over the length of the ramp.

3. Ramp and sidewalk cross slope shall be 5% or greater max.

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 "S" if the width of the fully depressed curb at the street is more than 5'-6", then the detectable warning truncated domes shall follow the radius of the curb continuously without gaps for the entire length of the depressed curb.

6. The maximum difference in grade between the sidewalk or curb and the pavement shall be 13", however, it is preferred. See Standard No. C-2, Sheet 1of 4.

7. If the width of the fully depressed curved curb at the street is 0'-8" or less, then a rectangular piece of detectable warning truncated domes may be used.

DELAWARE
DEPARTMENT OF TRANSPORTATION
CURB RAMPS, TYPES 2, 3, & 4
STANDARD NO. C-2 (2008)
SHT. 2 OF 4
APPROVED
11/16/2008
RECOMMENDED
11/16/2008
PLAN

- **Joint**
- **Expansion Material**

ELEVATION

SECTION A-A

ENTRANCE WITH SIDEWALK

NOTE: IF WIDTH OF DRIVEWAY IS 16' (4.87m) OR GREATER, THE W-FLARE CAN BE OMITTED.

ENTRANCE WITHOUT SIDEWALK

DELTAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD NO. C-3 (2006)  SHT. 1 OF 1

APPROVED  4/18/08  RECOMMENDED  5/15/08

03/10/2008
TOP VIEW

ISOMETRIC VIEW

TOP VIEW

ISOMETRIC VIEW

FRONT VIEW

SECTION F-F

FRONT VIEW

SECTION G-G

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

TYPE G
INTEGRAL P.C.C. CURB AND GUTTER, TYPE 4
PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: 6" SAFETY END STRUCTURE TO BE PRECAST

SECTION A-A

DELaware
DEPARTMENT OF TRANSPORTATION

6" SAFETY END STRUCTURE

STANDARD NO. D-1 (2001) SHT. 1 OF 2

APPROVED

RECOMMENDED

04/07/2003
### Dimensions

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot; (175)</td>
<td>9'-6&quot; (2890)</td>
<td>2'-5&quot; (755)</td>
<td>8'-4&quot; (2540)</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td>8'-9&quot; (2667)</td>
<td>2'-9&quot; (889)</td>
<td>10'-3&quot; (3135)</td>
</tr>
<tr>
<td>2&quot; (525) OR 24&quot; (6000)</td>
<td>14'-4&quot; (4370)</td>
<td>3'-2&quot; (965)</td>
<td>12'-6&quot; (3810)</td>
</tr>
</tbody>
</table>

### Approximate Quantities

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>CONCRETE FT³(m³)</th>
<th>REINFORCEMENT HEAVY SIZES (lbs)</th>
<th>NO. GRADES</th>
<th>LENGTH TO BE CUT FROM 1 GRADE</th>
<th>WEIGHT OF FULL SIZE (lbs)</th>
<th>WEIGHT OF CUT GRADE (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot; (175)</td>
<td>25 (0.709)</td>
<td>22 (0.634)</td>
<td>2</td>
<td>--</td>
<td>217.92</td>
<td>202.39</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td></td>
<td></td>
<td></td>
<td>2' - 7&quot; (1650)</td>
<td>217.92</td>
<td>202.39</td>
</tr>
<tr>
<td>2&quot; (525) OR 24&quot; (6000)</td>
<td>40.75 (1.16)</td>
<td>39.67 (1.12)</td>
<td>3</td>
<td>--</td>
<td>217.92</td>
<td>202.39</td>
</tr>
</tbody>
</table>

### Bending Diagram

- **Pipe Size:** X
  - 8" (175)
  - 8" (175)
  - 2" (525) OR 24" (6000)

- **Pipe Size:** Y
  - 8" (175)
  - 2" (525) OR 24" (6000)

### Schedule of Reinforcing Steel

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>A-BARS</th>
<th>B-BARS</th>
<th>C-BARS</th>
<th>D-BARS</th>
<th>G-BARS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SIZE</td>
<td>NO. SPA</td>
<td>LENGTH</td>
<td>SIZE</td>
<td>NO. SPA</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td>9&quot; (93)</td>
<td>2</td>
<td>8&quot; (200)</td>
<td>10&quot; (254)</td>
<td>2</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td>9&quot; (93)</td>
<td>2</td>
<td>8&quot; (200)</td>
<td>10&quot; (254)</td>
<td>4</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td>9&quot; (93)</td>
<td>2</td>
<td>8&quot; (200)</td>
<td>10&quot; (254)</td>
<td>1</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td>9&quot; (93)</td>
<td>2</td>
<td>8&quot; (200)</td>
<td>10&quot; (254)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>9&quot; (93)</td>
<td>2</td>
<td>8&quot; (200)</td>
<td>10&quot; (254)</td>
<td>4</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td>9&quot; (93)</td>
<td>2</td>
<td>8&quot; (200)</td>
<td>10&quot; (254)</td>
<td>4</td>
</tr>
</tbody>
</table>

### Delaware Department of Transportation

STANDARD NO. D-1 (2001)  SHT. 2 OF 2  APPROVED  RECOMMENDED
PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: USE SAFETY END STRUCTURE TO BE PRECAST

SECTION A-A
* REQUIRED ONLY FOR PPE SIZE OF 2" (525) OR 24" (600)

DELAWARE
DEPARTMENT OF TRANSPORTATION

1. Personnel safety grates (PSG) shall only be installed on the inlets of storm water pipes 21⁄3″ (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) ± 1⁄32″.

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.
**SECTION A-A**

**SECTION B-B**

**TOP VIEW**

**INLET BOX SCHEDULE**

<table>
<thead>
<tr>
<th>L (in)</th>
<th>F (lb)</th>
<th>Fabrication Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>17½&quot; (450)</td>
<td>66&quot; (1680)</td>
<td>+½ (25)</td>
</tr>
<tr>
<td>24&quot; (600)</td>
<td>24&quot; (600)</td>
<td>+½ (25)</td>
</tr>
<tr>
<td>34&quot; (863)</td>
<td>8½&quot; (215)</td>
<td>+½ (25)</td>
</tr>
<tr>
<td>34&quot; (863)</td>
<td>24&quot; (600)</td>
<td>-½ (25)</td>
</tr>
<tr>
<td>48&quot; (1220)</td>
<td>30½&quot; (775)</td>
<td>+½ (25)</td>
</tr>
<tr>
<td>48&quot; (1220)</td>
<td>20&quot; (500)</td>
<td>+½ (25)</td>
</tr>
<tr>
<td>66½&quot; (1683)</td>
<td>30½&quot; (775)</td>
<td>+½ (25)</td>
</tr>
<tr>
<td>66½&quot; (1683)</td>
<td>20&quot; (500)</td>
<td>+½ (25)</td>
</tr>
<tr>
<td>72½&quot; (1839)</td>
<td>24&quot; (600)</td>
<td>+½ (25)</td>
</tr>
<tr>
<td>72½&quot; (1839)</td>
<td>20&quot; (500)</td>
<td>+½ (25)</td>
</tr>
</tbody>
</table>

**WALL REINFORCEMENT SCHEDULE**

<table>
<thead>
<tr>
<th>Interior Wall</th>
<th>Area of Horizontal Reinforcement per Foot (minimum)</th>
<th>Area of Vertical Reinforcement per Foot (minimum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 4&quot; (102)</td>
<td>0.32 lb/ft²</td>
<td>0.32 lb/ft²</td>
</tr>
<tr>
<td>4½&quot; (1100) to 4½&quot; (1100)</td>
<td>0.32 lb/ft²</td>
<td>0.32 lb/ft²</td>
</tr>
<tr>
<td>4½&quot; (1100) to 5½&quot; (1400)</td>
<td>0.32 lb/ft²</td>
<td>0.32 lb/ft²</td>
</tr>
<tr>
<td>5½&quot; (1400) to 5½&quot; (1400)</td>
<td>0.32 lb/ft²</td>
<td>0.32 lb/ft²</td>
</tr>
<tr>
<td>5½&quot; (1400) to 6½&quot; (1650)</td>
<td>0.32 lb/ft²</td>
<td>0.32 lb/ft²</td>
</tr>
</tbody>
</table>

**NOTES:**

5. Inlet boxes shall be cast-in-place or cast-in-place.
6. PIPES SHALL NOT BE INSTALLED THROUGH ANY CORNER OF THE INLET BOX.
7. Riser sections may be used for deep inlet boxes.
8. PIPES MAY BE INSTALLED NEAR OR THROUGH JOINTS FOR RISER SECTIONS.
10. Concrete flow channel shall be shaped for positive drainage.
11. When inlet box is placed, pipe opening shall be between 3½" (89) and 4½" (1100) larger than outside diameter of pipe and shall not encroach on adjacent wall.
12. Reinforcement for lawn inlet boxes shall be 4½" (1100) x 4½" (1100) x 4½" (1100) x 1" (25) welded wire.

**INLET BOX DETAILS**

**APPROVED**

**RECOMMENDED**
DRAINAGE INLET FRAME AND GRATES

SECTION C-C
SECTION D-D
SECTION F-F
SECTION H-H
SECTION J-J
SECTION K-K
SECTION I-I
SECTION L-L
SECTION A-A
SECTION B-B
SECTION M-M

DRAINAGE GRATE LABELING EXAMPLE DETAIL

NOTES:
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 LABELLED "ONLY RAIN DOWN THE STORM DRAIN." DRAINAGE INLET GRATE TYPES 1 AND 4 SHALL BE LABELED WITH "WATER FLOW" AND AN ARROW INDICATING FLOW DIRECTION AS SHOWN IN THE EXAMPLE DETAIL.
3. THE DRAINAGE INLET GRATE SHALL BE LABELED IN "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.
4. THE TYPE 5 & 6 FRAME AND GRATE COMBINATIONS ARE TO BE USED IN CONJUNCTION WITH LAWN INLET BOXES ONLY. SEE SCHEDULE ON DETAIL D-4 SHEET 1 OF 1 FOR WHICH BOX SIZES ARE CONSIDERED LAWN INLET BOXES.
**DELAWARE DEPARTMENT OF TRANSPORTATION**

**DOUBLE INLET COVER SLAB DETAILS**

**STANDARD NO.** D-5 (2009)  
**SHT. 5 OF 8**  
**RECOMMENDED**

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**SECTION B-B**  
FOR TYPE B TOP UNITS

**SECTION B-B**  
FOR TYPES A, C, D, & E TOP UNITS

**NOTES:**
1. Relocate encroaching reinforcing bars when using Type B top units.
2. Cover slabs are to be precast and must be sized to fit inlet box dimensions.
3. All bars are to be 6" spaced or 6" @ 500 unless noted otherwise. Top reinforcement shall be 0.14 m^2/m (170 in^2/ft) min. horizontal reinforcement per foot in both directions.

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**S502 BENDING DIAGRAM**

S502 is not required to be one continuous bar, if more than one bar is used, there must be a 12"/300 overlap between bars.
**TYPE A**

**TYPE C**

**TYPE D**

**TYPE E**

**TOP UNIT DETAILS**

**SECTION A-A**

**SECTION B-B**

---

**NOTES**

1. REFER TO PREVIOUS SHEETS FOR REINFORCEMENT REQUIREMENTS.
2. THE HEIGHT OF THIS INLET IS LIMITED TO 4' 0" MAXIMAL, THEREFORE STEPS WILL NOT BE REQUIRED AND SHOULD NOT BE INSTALLED ON THIS INLET.
3. REFER TO DETAIL D-5, SHEET 3 OF 8 FOR AILET TOP UNIT APPLICATION.

**504 BENDING DIAGRAM**

504 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12'-1200" OVERLAP BETWEEN BARS.
ROUND MANHOLE ASSEMBLY

NOTE: ROUND MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.
NOTE: TOP UNIT IS TO BE CAST IN PLACE TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.

SECTION A-A

SECTION B-B

SECTION C-C

TOP UNIT

FRAME

COVER

DELTA ADE
DEPARTMENT OF TRANSPORTATION

MANHOLE DETAILS

STANDARD NO. D-6 (2001) SHT. 3 OF 4

APPROVED

RECOMMENDED

05/2/2001
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).

- DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.
JUNCTION BOX DETAILS

NOTES:
1. COVER SLABS ARE TO BE PRE-CAST.
2. ALL BARS ARE TO BE 5/8" (#16) SPACED
   ± 1/8" UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1 1/2" (38).
   * DIMENSIONS TO MATCH OUTSIDE TO
   OUTSIDE DIMENSIONS OF BOX.

SECTION A-A

SECTION B-B

JUNCTION BOX COVER SLAB DETAILS

66" (1675) x 30" (760) JUNCTION BOX

48" (1220) x 30" (760) JUNCTION BOX

66" (1675) x 66" (1675) JUNCTION BOX

48" (1220) x 48" (1220) JUNCTION BOX

66" (1675) x 48" (1220) JUNCTION BOX

48" (1220) x 48" (1220) JUNCTION BOX

66" (1675) x 30" (760) JUNCTION BOX

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66" (1675) x 48" (1220) JUNCTION BOX

JUNCTION BOX DETAILS

NOTES:
1. COVER SLABS ARE TO BE PRE-CAST.
2. ALL BARS ARE TO BE 5/8" (#16) SPACED
   ± 1/8" UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1 1/2" (38).
   * DIMENSIONS TO MATCH OUTSIDE TO
   OUTSIDE DIMENSIONS OF BOX.

SECTION A-A

SECTION B-B

JUNCTION BOX COVER SLAB DETAILS

66" (1675) x 30" (760) JUNCTION BOX

48" (1220) x 30" (760) JUNCTION BOX

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66" (1675) x 48" (1220) JUNCTION BOX

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66" (1675) x 48" (1220) JUNCTION BOX

JUNCTION BOX DETAILS

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SECTION A-A

SECTION B-B

JUNCTION BOX COVER SLAB DETAILS

66" (1675) x 30" (760) JUNCTION BOX

48" (1220) x 30" (760) JUNCTION BOX

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66" (1675) x 48" (1220) JUNCTION BOX

JUNCTION BOX DETAILS

NOTES:
1. COVER SLABS ARE TO BE PRE-CAST.
2. ALL BARS ARE TO BE 5/8" (#16) SPACED
   ± 1/8" UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1 1/2" (38).
   * DIMENSIONS TO MATCH OUTSIDE TO
   OUTSIDE DIMENSIONS OF BOX.

SECTION A-A

SECTION B-B

JUNCTION BOX COVER SLAB DETAILS

66" (1675) x 30" (760) JUNCTION BOX

48" (1220) x 30" (760) JUNCTION BOX

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JUNCTION BOX DETAILS

NOTES:
1. COVER SLABS ARE TO BE PRE-CAST.
2. ALL BARS ARE TO BE 5/8" (#16) SPACED
   ± 1/8" UNLESS NOTED OTHERWISE.
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SECTION A-A

SECTION B-B

JUNCTION BOX COVER SLAB DETAILS

66" (1675) x 30" (760) JUNCTION BOX

48" (1220) x 30" (760) JUNCTION BOX

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JUNCTION BOX DETAILS

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SECTION A-A

SECTION B-B

JUNCTION BOX COVER SLAB DETAILS

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48" (1220) x 48" (1220) JUNCTION BOX

66" (1675) x 30" (760) JUNCTION BOX

48" (1220) x 48" (1220) JUNCTION BO
CLASS A BEDDING

CONCRETE 2000 P.S.I. 15 MPa (MIN.)

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

CLASS C BEDDING

NOTE: USE CLASS C BEDDING UNLESS OTHERWISE INDICATED

LIMIT OF PAY ITEMS 206 AND/OR 208

LIMIT OF PAY FOR EXCAVATION OF PIPE TRENCHES = O.D. + 24" (610)

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

EARTH CUSHION

6" (150) MIN. WHEN H.C 16" (406)
AND 3/4" (20) MIN. WHEN H.C 12" (305) OR LARGER OF LOOSE SAND OR TYPE C BORROW
NOTES:

0. THE PERFORATED PIPE UNDERDRAIN SHALL BE LOCATED AS SHOWN ON THE TYPICAL SECTIONS OF THE CONSTRUCTION PLANS.

1. GEOTEXTILE FILTER FABRIC SHALL BE PLACED ENTIRELY OVER THE TOP OF UNDERDRAIN TRENCH AND LAPPED AS SHOWN.

2. SLOPE OF UNDERDRAINS SHALL MATCH ROADWAY GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

3. 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.

4. RODENT SCREEN SHALL SNUGLY FIT THE PROVIDED SLOT WITH THE SCREEN UP FITTING TIGHT TO THE BOTTOM FLOW LINE.

5. A 4' (1200) FLEXIBLE DELINEATOR SHALL BE FURNISHED AND INSTALLED AT THE DIRECTION OF THE ENGINEER TO MARK THE LOCATION OF THE CONCRETE HEADWALL.

6. WHEN TWO LINES OF PIPE UNDERDRAIN DRAIN TO A LOW POINT, EACH PIPE MUST HAVE ITS OWN OUTLET.

7. 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:
PIPE PLUGGING DETAIL D-10 (2007)
NOTES:
1. EDGE BERM 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 TRIMMED 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' (3000) MEASURED ALONG THE SLOPE.
4. CROSS SLOPES SHALL BE 2% MINIMUM, 6% MAXIMUM.
REINFORCING STRIP OVER GEOTEXTILE FABRIC FOR UNREINFORCED SILT FENCE (TYP. AT EACH STAKED SEE NOTE 3).

EMBED APPROX. 2" (50MM) OF GEOTEXTILE BACKFILL TRENCH WITH SOIL AND COMPACT THOROUGHLY.

existing ground

HEADER OF GEOTEXTILE

embed approx. 2" (50mm) of geotextile backfill trench with soil and compact thoroughly.

flow

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

SECTION A-A

SECTION B-B

ELEVATION

WIRE MESH DETAIL (REINFORCED SILT FENCE ONLY)

UNREINFORCED SILT FENCE CONNECTION DETAIL

REINFORCED SILT FENCE CONNECTION DETAIL
SECTION B-B

SECTION A-A

NOTES:
1. For ditches less than 30"(750) in depth, place dam as directed by the engineer.
2. The 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'(1500) min.
   lower than the outer edges, forming a weir that water can flow across.
4. Geotextile fabric is to be installed underneath riprap on permanent check
daams only.
5. The maximum spacing between dams shall be the distance in the ditch where
   the toe of the upstream dam is at the same elevation as the top of the
downstream dam at the center of the weir.
NOTES:

1. SEDIMENT TRAPS ARE INTENDED FOR USE IN EXISTING, PROPOSED, AND TEMORARY 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 PILTS MAY BE USED, SEE APPROPRIATE STANDARD SHEET FOR ADDITIONAL INFORMATION.

4. FOR SIZE, LOCATION, ETC. OF SEDIMENT TRAP, SEE CONSTRUCTION PHASING, M.O.T., AND EROSION CONTROL PLANS.

5. ALL ALL SLOPES SHALL BE 2:1.

6. A 2L LENGTH TO WIDTH RATIO SHOULD BE ACHIEVED WHERE POSSIBLE, IF THIS IS NOT POSSIBLE, 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 SEGMENURATION 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.
ELEVATION

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 (20 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" (450) SPACING.
2. TOPSOIL UNDER EROSION CONTROL BLANKET IS TO BE TRACKED AND SEEDED.
3. WHEN OFFSITE RUNOFF OCCURS, ADDITIONAL MEASURES AS DIRECTED BY THE ENGINEER SHALL BE USED TO ENSURE STABILITY OF EMBANKMENT.

STABILIZATION 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 TRACKED AND SEEDED.

EROSION CONTROL BLANKET APPLICATIONS

DELaware DEPARTMENT OF TRANSPORTATION

STANDARD NO. E-9 (2006)  SHT. 1 OF 1

APPROVED

RECOMMENDED

08/10/2005
SECTION A-A

SECTION B-B

PLAN

NOTES:
1. Securing pins are to be placed at locations shown and at 24'-0" (7.32m) 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

DELPHI WHEAT
12/5/05

RIPRAP DITCH

STANDARD NO. E-10 (2000)
SHT. 1 OF 1

APPROVED 11/6/05

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>0.5-2.0%</td>
<td>SEED USED WITH EROSION CONTROL BLANKET</td>
</tr>
<tr>
<td>2</td>
<td>2.0-8.0%</td>
<td>R-4 RRRAP</td>
</tr>
<tr>
<td>3</td>
<td>8.0-20%</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>4' (12000 MIN.)</td>
<td>6' (18000 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 geotextile in accordance with the standard detail "geotextile-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>2.0-8.0%</td>
<td>LINED R-4 RIPRAP</td>
</tr>
<tr>
<td>A-3</td>
<td>8.0-20%</td>
<td>ENGINEERED DESIGN</td>
</tr>
</tbody>
</table>

**MAXIMUM DRAINAGE AREA:** 2 ACRES (0.8 ha)

---

**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 swale swales are to be operational for more than 30 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 30 days, they shall be stabilized with geotextile in accordance with the standard detail "geotextile-lined channel diversion."
### Chart A - Flow Channel Stabilization

<table>
<thead>
<tr>
<th>Type</th>
<th>Channel Grade</th>
<th>Type of Treatment</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5-2.0%</td>
<td>Seed and Erosion 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>
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</table>

### Chart B - Earth Dike Dimensions

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Dike A (5-10a/2-4 hct)</th>
<th>Dike B (5-10a/2-4 hct)</th>
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</thead>
<tbody>
<tr>
<td>a-Dike Height</td>
<td>18&quot; (450)</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-Floor Width</td>
<td>48&quot; (1200)</td>
<td>72&quot; (1800)</td>
</tr>
<tr>
<td>d-Floor Depth</td>
<td>4&quot; (100)</td>
<td>24&quot; (600)</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.

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**Delaware Department of Transportation**

**EARTH DIKE**

**Standard No.:** E-13 (2000)

**Sht.:** 1 of 1

**Approved:** [Signature] 10/5/05

**Recommended:** [Signature] 11/07/05

09/02/2005
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. GEOFABRIC FOR THE 36" (900MM) CMP SHALL BE REPLACED WHEN CLOGGED WITH SEDIMENT.
3. 1/4" x 1/4" x 1/8" x 3/16" 30 GAUGE G8 WIRE MESH SHALL BE PLACED AROUND THE REMOVABLE 36" (900MM) CMP BEFORE ATTACHING THE GEOFABRIC TO INCREASE FLOW THROUGH THE GEOFABRIC.
4. ALL PERFORATIONS SHALL BE 1" (25MM) IN DIAMETER AND 12" (300MM) ON CENTER IN ALL DIRECTIONS.
5. TYPE 1 SUMP PIT SHALL BE USED ONLY WHEN PUMPING IS NEEDED FOR LESS THAN 7 DAYS.

DELTA WICH
DEPARTMENT OF TRANSPORTATION

SUMP PIT, TYPE 1 & 2

STANDARD NO. E-16 (2006) SHT. 1 OF 1

APPROVED
RECOMMENDED

09/01/2005
1) A DEWATERING BASIN (DWB) IS USED TO REMOVE SEDIMENT FROM SEGMENT-LADEN WATER PUMPED FROM A CONSTRUCTION SITE BEFORE THE WATER RE-ENTERS THE WATERWAY. THE DWB SHALL HAVE A MINIMUM TOP WIDTH OF 0'6" (150) AND A MINIMUM DEPTH OF 3'3" (100). 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:

   US CUSTOMARY : TOP LENGTH (FEET) = 26' + .52 x Y
   METRIC : TOP LENGTH (M) = 7900 + 48000 x 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 DWB SHALL CEASE WHEN THE EFFLUENT FROM THE DWB BECOMES SEGMENT-LADEN.

3) A SUMP PIT OR STILLING WELL (SEE STANDARD SHEETS) SHALL BE USED IN CONJUNCTION WITH A DWB. THE BASIN MAY BE BYPASSED INTO THE STABILIZED OUTFALL. IF THE WATER BEING PUMPED IS NON-SEGMENT-LADEN, DIRECT DISCHARGE TO THE RECEIVING WATERS SHALL CEASE AND BE REDIRECTED TO THE DWB WHEN EFFLUENT FROM THE PUMP BECOMES SEGMENT-LADEN.

4) MAINTENANCE MUST BE PERFORMED IN ORDER FOR THE DWB TO FUNCTION PROPERLY. ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED DISPOSAL AREA WHEN THE BASIN IS FILLED TO WITHIN 0'6" (150) FROM THE CRESE.

5) 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.
OEIQUE VIEW

2" (600) OVERLAP
STONE TRENCH

FLOW

PINS

24" (6000) MAX. LONGITUDINAL SPACING
6" (150) MAX. LATERAL SPACING

SANDBAG DIKE
(SEE STANDARD SHEET)

EXISTING CHANNEL
WORK AREA

STONE TRENCHES

FLOW

STONE TRENCHES

GEOTEXTILE

TEMPORARY DIVERSION CHANNEL

PLAN

FLOW

DEL. NO. 3 STONE

3/4" (19) DIA. WASHER

8" (200)

30°

GEOTEXTILE

TRENCHING DETAIL

SECTION A-A

NOTE: SEE PLANS FOR LOCATION, DIMENSIONS, GRADES, ETC.
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 EVENT PEAK FLOW, OR 1/3 OF STREAM WIDTH, WHICHEVER IS GREATER.
4. THE SANDBAG DIVERSION HEIGHT (H) SHALL BE 1' (300) ABOVE THE PEAK ELEVATION OF THE ONE YEAR STORM.
NOTES:
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, the sandbag dike shall be installed at the upstream location first.

1. The height of the sandbag dike shall be 1-3 (3000) above the peak elevation of the one-year storm, or equal to the top of bank, whichever is less, see plans for information.

2. The spillway shall be sized to pass a 1-in-100 year storm event peak flow, see plans.

3. 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 PIPED UNDER THE ENTRANCE, IF NEEDED, A MOUNTABLE BERM WITH 5:1 SLOPES SHALL BE ALLOWED TO FACILITATE PLACEMENT OF PIPES IN SHALLOW CONDITIONS.

2. THE 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' (600) OF STONE SHALL BE REMOVED AND REPLACED WITH 2'-1500 OF CLEAN STONE WHEN Voids ARE FILLED OR AS DIRECTED BY THE ENGINEER.
NOTES:
8. ALL P.V.C. PIPES ARE TO BE 4" 000-LD., SCHEDULE 40.
21. ALL JOINTS OF THE FLOATATION SECTION SHALL
   BE SOLVENT WELDED. JOINTS OF SKIMMER SECTION
   NEED NOT BE WATER-TIGHT.
31. 4" 000-LD. FLEXIBLE STRAIN PIPE IS TO BE ATTACHED
   TO THE POND OUTLET STRUCTURE WITH WATER-TIGHT
   CONNECTIONS.
41. 90" DR. OFFICE IS TO BE SIZED ACCORDING TO STORAGE
   VOLUME AND TO SLOWLY RELEASE 1725 GALLONS FOR AT LEAST 24 HOURS.

END CAP

PLAN VIEW

SIDE VIEW

DELAWARE
DEPARTMENT OF TRANSPORTATION
SKIMMER DEWATERING DEVICE

APPROVED

STANDARD NO. E-22 (2006)
SHT. 1 OF 1

RECOMMENDED

10/02/2006
FLOATING TURBIDITY CURTAIN

NOTE: 1) AN ADDITIONAL PANEL REQUIRED FOR DEPTHS GREATER THAN 5' (15000).
2) FLOATING TURBIDITY CURTAIN SHALL REACH BOTTOM UP TO DEPTHS OF 10' (30000) BY USING TWO PANELS. DEPTHS GREATER THAN 10' (30000) SHALL REQUIRE SPECIAL DEPTH CURTAINS SPECIFICALLY CALLED FOR IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

DELAWARE DEPARTMENT OF TRANSPORTATION

TURBIDITY CURTAIN

STANDARD NO. E-23 (2006)
SHT. 1 OF 2
APPROVED

recommended
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 425 GALLONS PER MINUTE OR 266 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. SEVERAL UN-CONNECTED OR CONNECTED 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.

DELWARE DEPARTMENT OF TRANSPORTATION

PORTABLE SEDIMENT TANK

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

APPROVED  12/5/05

RECOMMENDED  11/22/05

02/09/2005
COMPACTED AND SEEDED BACKFILL

DOMINANT FLOW

STAPLES TO BE PLACED AT 2"(1300)
SPACING ACROSS DOMINANT FLOW

INITIAL TRENCH ANCHOR DETAIL
APPLIED AT THE DOWNSTREAM END OF DITCH

COMPACTED AND SEEDED BACKFILL

DOMINANT FLOW

24"(600)
6"(150)

STAPLES TO BE PLACED AT 12"(300)
SPACING ACROSS DOMINANT FLOW

TERMINAL TRENCH ANCHOR DETAIL
APPLIED AT THE UPSTREAM END OF DITCH

COMPACTED AND SEEDED BACKFILL

6"(150)
6"(150)

STAPLES TO BE PLACED AT 12"(300)
SPACING ACROSS DOMINANT FLOW

CHECK SLOT DETAIL
(AS NEEDED PER PLANS)

COMPACTED AND SEEDED BACKFILL

DOMINANT FLOW

STAPLES TO BE PLACED AT 2"(1300)
SPACING ACROSS DOMINANT FLOW

OVERLAP DETAIL

COMPACTED AND SEEDED BACKFILL

DOMINANT FLOW

STAPLES TO BE PLACED AT 6"(150)
SPACING ALONG DOMINANT FLOW

LONGITUDINAL TRENCH ANCHOR DETAIL

STAPLES (TYP.J)

OVERLAP

1"(25) TO
0"(0)

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.

TURF REINFORCEMENT MAT APPLICATIONS

SHT. 1 OF 1

APPROVED

DELAWARE
DEPARTMENT OF TRANSPORTATION

STABILIZATION OF DITCHES
SECTION A-A

TURF REINFORCEMENT MAT TO BE CENTERED ALONG FLOW LINE OF DITCH.

LONGITUDINAL TRENCH ANCHOR

STAPLES (TYP.J)

4"(100) MAX.

1"(25) TO
0"(0)

CASE CLOTH MAN

STAPLE DETAIL

10/14/05

RECOMMENDED

11/14/05

09/08/2005
NOTES:
1. RIFRAP IS TO BE PLACED PRIOR TO PLACING PIPE.
2. PLACE DELAWARE NO. 3 STONE UNDER PIPE.
3. ELEVATION (EL) SHOULD NOT BE HIGHER THAN PIPE INVERT.
4. REFER TO THE PIPE ENERGY DISSIPATOR SCHEDULE ON THE CONSTRUCTION PLANS FOR THE VALUE OF DIMENSION VARIABLES.

SEE DETAIL B
SEE NOTES 1 & 2

SEE NOTE 3
ALL DEAD, BROKEN, & CROSSING BRANCHES SHALL BE PRUNED OFF FOLLOWING INSTALLATION

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

ROOTBALL SHALL BE SET FLUSH TO GRADE OR 1'5/8 TO 2'5/8 ABOVE GRADE IF SOILS ARE SLOW TO DRAIN, DO NOT COVER THE TOP OF THE ROOTBALL WITH SOIL.

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

REMOVE BURLAP & WIRE BASKETS TO 1/2 OF THE ROOTBALL, DO NOT LEAVE BURLAP, BASKET, OR ROPE DEBRIS IN THE PIT.

ROOT BALL SHALL BE PLACED ON TAMPERED OR UNEXCAVATED SOIL.

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 MASSIVE OF NO LESS THAN 3 PLANTS, A MINIMUM OF 5'18000 WIDTH IS REQUIRED FROM THE BACK OF CURVE TO THE EDGE OF SIDEWALK FOR INSTALLATION OF SHRUBS.
3. ALL PRUNING SHALL BE DONE BY AN ISA 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 MASSSES SHALL BE MULCHED AS ONE CONTINUOUS BED.

ROADSIDE SHRUB PLANTING DETAIL

DELTA
DEPARTMENT OF TRANSPORTATION

PLANTING DETAILS
STANDARD NO. L-1 (2006) SHRT. 1 OF 3

APPROVED

RECOMMENDED

08/04/2006
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 LSA 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 LINED TO 7’ (2100) FOR PEDESTRIAN CLEARANCE.

STAKE & GUY TREES, GUY WIRE, STAKES, & RUBBER HOSE SHALL BE AS SPECIFIED IN SECTION 1ST.

SET ROOT BALL FLUSH TO GRADE OR 1/2 TO 2" (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.

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 TAMPED OR UNEXCAVATED SOIL.

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.

DELAWARE DEPARTMENT OF TRANSPORTATION

PLANTING DETAILS

STANDARD NO. L-1 (2006) SHT. 2 OF 1

APPROVED

RECOMMENDED

08/04/2006
NOTES:
1. SEE PLANT LIST FOR SPACING 0.25.

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

PLAN VIEW

SECTION VIEW

PERENNIAL/GROUNDCOVER PLANTING DETAIL
1%48 hole to accommodate survey cap.

Longitudinal Steel & Cage (4.5) Wire Spaced 3 1/2 C.C., 26 1/2 Long 1 1/2.

Transverse Steel & Cage (4.5) Wire Spaced 12 C.C.

Notes:
1. Longitudinal steel shall be held in place by cradles.
2. Letters to be countersunk in top of marker 1/4.
DELAWARE DEPARTMENT OF TRANSPORTATION

BOLLARD & SHARED-USE PATH DETAILS

SHARED-USE PATH INTERSECTION

NOTES:
2. STEEL TUBE TO EXTEND 10" ABOVE GROUND WITH CONCRETE TO SLOPE AWAY FROM TUBE TO KEEP WATER AND SEWAGE FROM DRING INTO TUBE.
3. BOLLARDS ARE NOT REQUIRED FOR A SHARED-USE PATH LESS THAN 8' 14500 HOPE. THE LANDING SECTION SHALL BE A MINIMUM OF 5' 15250 IN LENGTH AND SHALL HAVE A MAXIMUM CROSS SLOPE AND RUNNING SLOPE OF 2%. THE ENTIRE LANDING SECTION MUST ALSO BE CONCRETE.
4. THE RAMP SECTION SHALLL HAVE A MAXIMUM CROSS SLOPE OF 2%. IT SHALL ALSO HAVE A MAXIMUM RUNNING SLOPE OF 2%. IF A 2% RUNNING SLOPE DOES NOT ALLOW THE RAMP TO MEET EXISTING GRADE WITHIN 15' 4200, THE RUNNING SLOPE MAY EXCEED 2%.
5. STRIPPING MATERIAL TO BE DETERMINED BY THE ENGINEER BASED ON THE MATERIAL THAT THE INSTALLATION IS BEING PLACED ON.
6. THE APPROPIATE TYPICAL OBJECT MARKER SHALL BE PLACED ON THE FRONT AND BACK OF EACH BOLLARD AS PER THIS DETAIL.

STANDARD NO. M-3 (3809) SHT. 1 OF 1 RBCOMMENDED

01/10/2010

01/10/2010

01/10/2010

01/10/2010

01/10/2010
**FRONT VIEW**

- D" (300) RADIUS
- 2" (50)
- 9" (225)

**ISOMETRIC VIEW**

- 30" (750) MIN

**ALTERNATE ANCHOR OPTION**

- 3/8" (5) x 1/2" (38) TAMPER PROOF CONCRETE ANCHOR (TYP)
- 4½" (113)

**EXISTING CONCRETE**

**SECTION VIEW**

- 12" (300)
- 18" (450)

**BIKE RACK DETAILS**

- CONCRETE OR GROUT
- EXISTING CONCRETE

**DELAWARE DEPARTMENT OF TRANSPORTATION**

**BIKE RACK DETAILS**

<table>
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<th>STANDARD NO.</th>
<th>M-4 (2007)</th>
<th>SHT.</th>
<th>1 OF 1</th>
<th>APPROVED</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>4 BIKE INSTALLATION</td>
</tr>
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**CHIEF ENGINEER**

**DESIGN ENGINEER**

**RECOMMENDED**

**APPROVED**

- DATE: 04/03/2007
- DATE: 10/23/07
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:

TYPICAL JOINT DETAIL

SECTION A-A

WATER TOP AT 3DE SLOPE

WATER TOP AT 3DE SLOPE

POSTS 8' 12.4m O.C. ON STRAIGHT RUNS, 4' 12.2m O.C. AROUND CURVES

PATH

PATH

SEE NOTE 2

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

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

1 1/4" (32) x 6" (150) (NOMINAL) TREATED RAILS (TYP.)

TYPICAL JOINT DETAIL

CLASS B CONCRETE

8" (200) MAX

6" (150) (TYP.) MAX

5 1/4" (130) (TYP.)

4" (100) x 4" (100) (NOMINAL)

TREATED POSTS (TYP.)

4" (100) x 4" (100) (NOMINAL)

TREATED RAILS (TYP.)

4" (100) x 4" (100) (NOMINAL)

TREATED POSTS (TYP.)

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.
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 there is against building or other confining feature.
DELWARE DEPARTMENT OF TRANSPORTATION

P.C.C. PARKING BUMPER

STANDARD NO. M-8 (2007) SHT. 1 OF 1

APPROVED

RECOMMENDED

08/01/2007

08/01/2007
SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)

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 SHOULD NOT BE LOCATED WITHIN PROPOSED WHEEL PATHS. THE WHEEL PATH IS GENERALLY LOCATED 2' (600 mm) INSIDE OF THE LANE EDGELINE OR CENTERLINE.
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 1/8" (3) 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 1/16", MINUS 0.010.
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 SEAL MATERIAL SHALL BE PLACED BEFORE LONGITUDINAL JOINT MATERIAL. THE TRANSVERSE JOINT SEAL 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 1/8" (6) TO 3 (16) DEEP AT THE TOP OF THE SLAB AND NEITHER SIDES OF THE TRANSVERSE SEALANT RESERVOIR.
8. THE TOP EDGES OF THE COMPRESSION SEAL SHALL BE IN FULL CONTACT WITH THE SLAB SIDES.
9. THE TOP EDGES OF THE COMPRESSION SEAL SHALL BE IN FULL CONTACT WITH THE SLAB SIDES.

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 1/8" (6) TO 3 (16) DEEP AT THE TOP OF THE SLAB AND NEITHER SIDES OF THE TRANSVERSE SEALANT RESERVOIR.
9. THE TOP EDGES OF THE COMPRESSION SEAL SHALL BE IN FULL CONTACT WITH THE SLAB SIDES.
WELD SIDE WIRE FRAME TO DOWELS ONLY ON ALTERNATE ENDS (TYP.)

INSTALLATION STAKE

LOWER SIDE WIRE
UPPER SIDE WIRE
SIDE WIRE FRAME (TYP.)

TOP OF SLAB
UPPER SIDE WIRE
SIDE WIRE FRAME (TYP.)

BOTTOM OF SLAB
LOWER SIDE WIRE

3/4" x 0.110" INSTALLATION STAKE, 24" to 600" C.C. (MAX.)

WELD AT ALL INTERSECTIONS OF THE SIDE WIRE FRAME AND THE UPPER AND LOWER SIDE WIRES (TYP.)

DELaware
DEPARTMENT OF TRANSPORTATION

P.C.C. PAVEMENT

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

APPROVED

RECOMMENDED
DOWEL & TIE BAR PLACEMENT TOLERANCES
SECTION A-A

SECTION B-B

SECTION C-C

EXIST. HOT-MIX OVER P.C.C. PAVEMENT

EXIST. P.C.C. PAVEMENT

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°F (16°C) AND 80°F (27°C). WHEN THE TEMPERATURE IS BELOW 60°F (16°C), THE SEALANT RESERVOIR SHALL BE CUT \( \frac{1}{8} (2) \) WIDER.
2. "T" REFERS TO THE EXISTING "AS-builtinSLAB THICKNESS.
3. TOLERANCE ON ALL JOINT SEALANT DETAIL DIMENSIONS SHOWN WITHOUT RANGES SHALL BE PLUS/\( \frac{1}{8} (2) \), MINUS \( \frac{1}{8} (2) \).
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.

FULL DEPTH PATCH
NOTE: CLOSED CELL POLYETHYLENE FOAM SHALL BE THE SAME WIDTH AS THE JOINT AND 2" (50MM) 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 ADJACENT TO JOINT:

PARTIAL DEPTH PATCH:

NOTE: WHEN X > 12" (300MM), THEN 1" (25MM) AND POLYETHYLENE FOAM IS NOT USED. WHEN X ≤ 12" (300MM), THEN 1" (25MM) AND POLYETHYLENE FOAM IS USED.
NOTES:
1. THE PROFILE OF THE OVERLAY PAVING SHALL BE ADJUSTED TO ASSURE A SMOOTH TRANSITION THROUGH THE BUTT JOINT.
   THE REMOVAL AND CLEANUP OF THE HOT MIX RESIDUE REMAIN LEFT FROM THE MILLING OPERATIONS ALONG Curb LINES,
   ADJACENT TO SPEED Humps, ACROSS INTERSECTING STREETS, AND AT THE BEGINNING AND ENDING POINTS OF THE BUTT
   JOINT, SHALL BE INCIDENTAL TO THE BUTT JOINT ITEM.

2u. THE LENGTH OF THE BUTT JOINT SHALL BE EQUAL TO 30'(900mm FOR EVERY 1'2") OF OVERLAY DEPTH.
NOTES:

1. TYPE 1 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE, AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" ID DIAMETER COMPLETELY THROUGH THE WALL, UNUSED 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 WALLS WILL BE A NOMINAL 4" ID DIAMETER, TYPE 3 WALL WILL BE A NOMINAL 8" ID DIAMETER.

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

5. 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.
NOTES:

1. TYPE 4 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE, AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5/8" DIAMETER COMPLETELY THROUGH THE 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.

DEL. 57 STONE

SECTION B-B

CONCRETE WALL

42" (1066.8 mm) X 64" (1625.6 mm)

FINISHED GRADE (PAVEMENT)

FINISHED GRADE (UNPAVED)

SECTION A-A

DEL. 57 STONE

42" (1066.8 mm) X 64" (1625.6 mm)

CONDUIT

1 2/5" MIN.
3 1/2" MAX.
BUSHING FLUSH

4" (100.0 mm)

GALV. CONDUIT

DEPARTMENT OF TRANSPORTATION
DEL. 57 STONE

CONDUIT JUNCTION WELL, TYPE 4

APPROVED
RECOMMENDED

STANDARD NO. T-2 (2006) SHT. 1 OF 1
DEPARTMENT OF TRANSPORTATION
CONDUIT JUNCTION WELL, TYPE 4
APPROVED
RECOMMENDED

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

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

SECTION A-A
CONCRETE CABINET BASE

PLAN VIEW

SECTION A-A

DELWARE DEPARTMENT OF TRANSPORTATION

CABINET BASES (TYPES 'M' & 'P')

STANDARD NO. T-4 (2005) SHT. 1 OF 1

APPROVED

CONSULTANTS

RECOMMENDED
UNDERGROUND CONDUIT ENDS SHALL BE CAPPED WITH A GALVANIZED THREADED CONDUIT PLUG UNLESS CONNECTED TO AN EXISTING CONDUIT.

8 EQUALLY SPACED *8 (#25) REINFORCING BARS

BOLT CIRCLE DIAMETER TO BE AS DIRECTED BY THE ENGINEER

GROUND FOR POLE TO BE ATTACHED TO GROUND ROCS/4"95 X 240*160963

8 EQUALLY SPACED *8 (#25) REINFORCING BARS

EQUALLY SPACED *4 (#10) REINFORCING BARS

2½" (64) CONDUIT SWEEPS

EXISTING CONDUIT

ROUND BASE

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

BOLT CIRCLE DIAMETER TO BE AS DIRECTED BY THE ENGINEER

EQUALLY SPACED *4 (#10) REINFORCING BARS

2½" (64) CONDUIT SWEEPS

EXISTING CONDUIT

SQUARE BASE
### Typical Section (Bases 5 and 6)

**NOTE:**
See specifications and details from current purchasing contract for anchor bolt dimensions.

### Pole Base Data Chart

<table>
<thead>
<tr>
<th>Pole Base Type</th>
<th>Diameter</th>
<th>Depth</th>
<th>#4 (3-20) Horizontal Reinforcing Bars</th>
<th>#8 (7/20) Vertical Reinforcing Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36' (10)</td>
<td>7' (2180)</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>36' (10)</td>
<td>10' (3050)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>2A</td>
<td>48' (15)</td>
<td>6' (1830)</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>2B</td>
<td>60' (18)</td>
<td>7' (2133)</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>48' (15)</td>
<td>6' (1830)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>3A</td>
<td>60' (18)</td>
<td>9' (2730)</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>3B</td>
<td>72' (22)</td>
<td>7' (2133)</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>24' (7.5)</td>
<td>2' (610)</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td>5</td>
<td>36' (10)</td>
<td>4' (1220)</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td>6</td>
<td>24' (7.5)</td>
<td>6' (1830)</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>48' (15)</td>
<td>6' (1830)</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.
NOTES:
1. UNDERGROUND CONDUIT ENDS SHALL BE CAPPED WITH A GALVANIZED THREAD CONDUIT PLUG UNLESS CONNECTED TO AN EXISTING CONDUIT.

2. PLACE 2 EACH 6' (1850) x ½' (150) R.V.C., SCHEDULE 40 (TYP) VENTS IN THE GROUT AS DIRECTED IN THE FIELD BY THE ENGINEER.
1 - #3 (10) spiral bar, 504' (153,000) long at 8' (2400) pitch.

8 - #5 (16) bars, 4' (1200) long.

NOTES:
1. STUB POST TO BE SUPPLIED BY THE DEPARTMENTS TRAFFIC, ENGINEERING, AND MANAGEMENT SECTION.

SECTION A-A
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 ½" x 13/8" COUPLING CONTAINING A STEEL THREADED REDUCING BUSHING ½" x 13/8" TO 3/8" x 13/8" AND A 3/8" x 13/8" WATERPROOF 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.O.D./BACK FROM THE POINT OF THE EXTENDED CORNER.

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

3. A MAXIMUM OF TWO LOOP DETECTORS CAN BE SPLICE 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-9 (2006) SHT. 1 OF 1

APPROVED

RECOMMENDED
WIRE SLOT CONSTRUCTION

NOTES:
0. 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 1.3 (0.3m) BACK FROM THE POINT OF THE EXTENDED CORNER.
2. THE LONGITUDINAL / TRANSVERSE CUT SHALL BE STOPPED APPROXIMATELY 21.5 (0.5m) FROM THE CORNER TO PREVENT THE TRIANGULAR 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

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

APPROVED

12/5/05
11/06/06

01/19/2006
SPAN WIRE ATTACHMENT BETWEEN POLES

NOTES:
- 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".

DELTA 12 (2006)

SHT. 1 OF 2

APPROVED

RECOMMENDED

05/09/2005
WOOD POLES

- SERVICE WEDGE CLAMP
- MESSER WIRE
- MESSER CLAMP
- LASHING WIRE
- CABLE SPACER
- ELECTRICAL CABLE
- WOOD POLE

- GALVANIZED 1/4" x 3/4" x 3 1/2" WASHED WITH 1/4" OD HOLE
- GALVANIZED 1/4" x 5/8" NUTS (2 REQUIRED)
- GALVANIZED 1/4" x 5/8" EYEBOLT
- GALVANIZED 1/4" x 3/4" x 3 1/2" WASHED WITH 1/4" OD HOLE

METAL POLES

- SERVICE SLEEVE
- MESSER WIRE (1/2 WRAP AROUND POLE)
- GUY CLAMPS (2 REQUIRED)

NOTES:
- INSTALLATION METHOD SHOWN FOR DEAD END MESSER WIRE ATTACHMENT TO METAL POLES SHALL BE USED FOR SPAN WIRE ATTACHMENT BETWEEN METAL POLES.

DELAWARE DEPARTMENT OF TRANSPORTATION

DEAD END MESSER WIRE ATTACHMENT

STANDARD NO. T-12 (2005) SHT. 2 OF 2 APPROVED

09/09/2005
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 unenvolved 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' (305) square.

PLAN VIEW

SECTION A-A

DELAWARE DEPARTMENT OF TRANSPORTATION

CONDUIT JUNCTION WELL, TYPE 6

STANDARD NO. T-13 (2006) SHRT. 1 OF 3

APPROVED 12/5/05

RECOMMENDED 11/28/05
POLYMER CONCRETE WITH A 
HEAVY-WEAVE FIBERGLASS 
REINFORCEMENT

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

1/2" X 1000 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 UNEPAVED 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 5,000 LBS (4,500 kg) OVER A 2' X 2' SQUARE.

PLAN VIEW

SECTION A-A

DELAWARE 
DEPARTMENT OF TRANSPORTATION 
CONDUIT JUNCTION WELL, TYPE 7 
SHT. 2 OF 3 
APPROVED 
RECOMMENDED 
05/13/2006
DelDOT

SKID RESISTANT SURFACE

POLYMER CONCRETE WITH A HEAVY-WEAVE FIBERGLASS REINFORCEMENT

1/2" X 1/2 X 1" PULL SLOT

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

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 (5600 KG) OVER A 10" (255) SQUARE.

PLAN VIEW

FINISHED GRADE
(PAVEMENT)

FINISHED GRADE
(UNPAVED)

SECTION A-A

DELWARE
DEPARTMENT OF TRANSPORTATION

CONDUIT JUNCTION WELLS, TYPES 8 & 10

STANDARD NO. T-13 (2006)

SHT. 3 OF 3

APPROVED

RECOMMENDED

05/13/2006

DIMENSIONS

TYPE 8

TYPE 10

COVER

A

47 1/4" (1200)

35 1/4" (9050)

B

30 1/4" (765)

24 1/4" (610)

C

48 1/4" (1200)

37 1/4" (9550)

D

32 1/4" (866)

26 1/4" (660)

E

45 1/4" (1150)

33 1/4" (860)

F

28 1/4" (715)

22 1/4" (5650)

G

36" (914)

50" (1267)

H

33" (830)

21" (990)

FRAME

BASE

I

58" (1473)

46" (1168)

J

40" (1016)

34" (864)

STONE

BUSHING

E X F

G X H

I X J

SIDE WALL

HOLE SAW WITH TRADE SIZE

POLYMER CONCRETE INSTALLED DRY (TYPE -)

F (255) MIN.

3" (75) MAX.

G (255) MIN.

3" (75) MAX.

INSULATING CONCRETE

MIXTURE
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. TEFLOM 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

06/20/2006
5 WRAPS OF SCOTCH SUPER 33 TAPE

TO CONTROLLER CABLE

DRIP LOOP

LOWER POINT OF DRIP LOOP MUST BE LOWER THAN CABLE ENTRY POINT

SPAN WIRE

SPAN WIRE CLAMP

MOUNTING NUT

WIRING ACCESS DOOR WEATHER PROOF

4-CONDUCTOR #8 AWG SHIELDED LEAD-IN CABLE

METAL CAP (SEE NOTE 4)

BASE

CABLE ENTRY PORT

TUBE SHELLS

4-POSITION TERMINAL STRIP

ACCESS DOOR SCREW HOLE

TUBE ASSEMBLIES

CAP SCREW

FRONT VIEW (CABLE NOT SHOWN)

SIDE VIEW

2 1/4" WEEP HOLES

1/4" WEEP HOLE

NOTES:
0. INVERTED CONFIGURATION SHALL BE USED FOR SPAN MOUNT.
1. SPAN WIRE MOUNTING HARDWARE SHALL BE SUPPLIED BY THE DEPARTMENT.
3. TEFLOIN 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.
SQUARE POST SHALL NOT BE LESS THAN 2"x150 x 2"x150 WITH A WALL THICKNESS OF 0.030" (0.77mm)

2"x150 SQUARE TUBING

2½"x63 SQUARE TUBING

CONCRETE STONE

INSTALLED IN SOIL

INSTALLED IN CONCRETE SIDEWALK OR MEDIAN

PVC SLEEVE

BREAK-AWAY ASSEMBLY

NOTES:
1. SQUARE TUBES ARE TO BE FORMED FROM GALVANIZED SHEET STRUCTURAL (PHYSICAL QUALITY, ASTM A 446, GRADE A, COATING DESIGNATION C 90, REGULAR SPANGLE, OR HOT ROLLED CARBON SHEET STRUCTURAL (PHYSICAL QUALITY, ASTM A 57, GRADE 33.
2. NOMINAL OUTSIDE DIMENSIONS ARE AS FOLLOWS:
   - 2"x150 ± 0.008
   - 2½"x63 ± 0.008
3. ALL FOUR SIDES ARE TO HAVE EVENLY SPACED 5"(127MM) DIAMETER HOLES ON 8"(203MM) CENTERS THE ENTIRE LENGTH OF THE TUBE.
4. STANDARD CORNER RADIUS SHALL BE 3/8" (9.5MM).
5. THE FASTENERS TO BE SUPPLIED UNDER THIS SPECIFICATION SHALL BE 5/16"x8, GRADE 5 UNC CORNER BOLTS WITH CANDIUM OR ZINC PLATING. INSTALLATION OF SIGNS SHALL BE WITH 5/16"x8 x 2½"x63 BOLT WITH LOCKNUT AND WASHER.
6. THE CONTRACTOR SHALL PROVIDE AND INSTALL PVC SLEEVES 4"(100MM) INSIDE DIAMETER MINIMUM, 6"x150 INSIDE DIAMETER MAXIMUM IN PROPOSED CONCRETE SIDEWALKS, ISLANDS, AND MEDANS FOR FUTURE TRAFFIC SIGN POSTS AS DIRECTED BY THE ENGINEER. THE LOWER END OF THE SLEEVE SHALL BE SET ON TOP OF THE SOIL.

TYPICAL ASSEMBLY

NOTE: THE PIN ASSEMBLY IS TO BE USED WITH THE INSTALLATION OF BACK TO BACK STREET BLADE SIGNS WITH 6"x150 LETTERS.

DELWARE
DEPARTMENT OF TRANSPORTATION

BREAKWAY SIGN POST AND PIN ASSEMBLY DETAILS

STANDARD NO. T-15 (2009) SHT. 1 OF 1

APPROVED
SIGNATURE ON FILE 01/14/2010

RECOMMENDED
SIGNATURE ON FILE 01/14/2010