# SECTION I - BARRIER

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1 (2000)</td>
<td>BARRIER LEGEND</td>
</tr>
<tr>
<td>02001</td>
<td>BARRIER APPLICATIONS</td>
</tr>
<tr>
<td>02001-1</td>
<td>PLANS - TYPE 1, TYPE 2, AND TYPE 3</td>
</tr>
<tr>
<td>02004</td>
<td>ELEVATIONS AND SPIKE DETAIL</td>
</tr>
<tr>
<td>02005</td>
<td>SECTION HINGE</td>
</tr>
<tr>
<td>02007</td>
<td>DRIVING FOR GUARDRAIL END TREATMENT, TYPE 1</td>
</tr>
<tr>
<td>02008</td>
<td>PLAN, ELEVATION, AND SECTIONS</td>
</tr>
<tr>
<td>B-2 (2002)</td>
<td>GUARDRAIL OVER CULVERTS, TYPE 1</td>
</tr>
<tr>
<td>B-3 (2002)</td>
<td>GUARDRAIL OVER CULVERTS, TYPE 2</td>
</tr>
<tr>
<td>B-4 (2000)</td>
<td>CURVED GUARDRAIL SECTION</td>
</tr>
<tr>
<td>B-5 (2000)</td>
<td>END ANCHORAGE</td>
</tr>
<tr>
<td>B-6</td>
<td>BURIED END SECTION</td>
</tr>
<tr>
<td>02001-1</td>
<td>BURIED END SECTION</td>
</tr>
<tr>
<td>02001-2</td>
<td>BURIED END SECTION</td>
</tr>
<tr>
<td>02001-3</td>
<td>BURIED END SECTION BURIED END PRINT</td>
</tr>
<tr>
<td>B-7</td>
<td>GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1</td>
</tr>
<tr>
<td>02001</td>
<td>PLAN, ELEVATION, AND SECTIONS</td>
</tr>
<tr>
<td>02002</td>
<td>PLAN, ELEVATION, AND SECTIONS</td>
</tr>
<tr>
<td>B-8</td>
<td>GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2</td>
</tr>
<tr>
<td>B-9 (2002)</td>
<td>GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE</td>
</tr>
<tr>
<td>B-10 (2002)</td>
<td>BRIDGE RAIL RETROFIT, TYPE 1</td>
</tr>
<tr>
<td>B-11</td>
<td>BRIDGE RAIL RETROFIT, TYPE 2</td>
</tr>
<tr>
<td>02001</td>
<td>PLAN, SECTION A-A, BASE PLATE DETAIL</td>
</tr>
<tr>
<td>02001-1</td>
<td>BASE PLATE DETAIL AND STEEL GUARDRAIL POST</td>
</tr>
<tr>
<td>B-12 (2000)</td>
<td>BRIDGE RAIL RETROFIT, TYPE 3</td>
</tr>
<tr>
<td>B-13</td>
<td>HARDWARE</td>
</tr>
<tr>
<td>02004</td>
<td>W-SEAM DETAILS</td>
</tr>
<tr>
<td>02004-1</td>
<td>W-SEAM STEEL POST AND OFFSET BLOCK</td>
</tr>
<tr>
<td>02004-2</td>
<td>W-SEAM STEEL POST AND OFFSET BLOCK</td>
</tr>
<tr>
<td>02004-3</td>
<td>W-SEAM TERMINAL CONNECTOR</td>
</tr>
<tr>
<td>02004-4</td>
<td>THRIE BEAM DETAILS</td>
</tr>
<tr>
<td>02004-5</td>
<td>THRIE BEAM STEEL POST AND OFFSET BLOCK</td>
</tr>
<tr>
<td>02004-6</td>
<td>THRIE BEAM STEEL POST AND OFFSET BLOCK</td>
</tr>
<tr>
<td>02004-7</td>
<td>WOOD BLOCK, SLOTTED PLATE, SHORT WOOD BREAKAWAY POST, STEEL TUBE LONG WOOD BREAKAWAY POST</td>
</tr>
<tr>
<td>02004-8</td>
<td>WOOD BLOCK, SLOTTED PLATE, SHORT WOOD BREAKAWAY POST, STEEL TUBE LONG WOOD BREAKAWAY POST</td>
</tr>
<tr>
<td>02004-9</td>
<td>WOOD BLOCK, SLOTTED PLATE, SHORT WOOD BREAKAWAY POST, STEEL TUBE LONG WOOD BREAKAWAY POST</td>
</tr>
<tr>
<td>02004-10</td>
<td>SLOTTED PLATE CONNECTION DETAILS</td>
</tr>
<tr>
<td>02004-11</td>
<td>CONCRETE SAFETY BARRIER &quot;F SHAPE&quot;</td>
</tr>
<tr>
<td>B-14</td>
<td>CONCRETE SAFETY BARRIER &quot;F SHAPE&quot;</td>
</tr>
<tr>
<td>02004-1</td>
<td>TYPICAL ELEVATION AND PLAN FORM DETAILS</td>
</tr>
<tr>
<td>02004-2</td>
<td>TYPICAL ELEVATION AND PLAN FORM DETAILS</td>
</tr>
<tr>
<td>02004-3</td>
<td>TYPICAL ELEVATION AND PLAN FORM DETAILS</td>
</tr>
</tbody>
</table>

DELTA DEPARTMENT OF TRANSPORTATION
SECTION I - BARRIER (CONT'D)

SECTION II - CURB & GUTTER

SECTION III - DRAINAGE
SECTION III - DRAINAGE (CONT'D)

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-6</td>
<td>MANHOLE DETAILS</td>
</tr>
<tr>
<td>12000</td>
<td>1  BOX MANHOLE ASSEMBLY</td>
</tr>
<tr>
<td>12002</td>
<td>2  ROUND MANHOLE ASSEMBLY</td>
</tr>
<tr>
<td>12003</td>
<td>3  MANHOLE FRAME AND COVER</td>
</tr>
<tr>
<td>12004</td>
<td>4  BOX MANHOLE COVER SLAB</td>
</tr>
<tr>
<td>D-7</td>
<td>JUNCTION BOX DETAILS</td>
</tr>
<tr>
<td>12002</td>
<td>1  JUNCTION BOX ASSEMBLY</td>
</tr>
<tr>
<td>12006</td>
<td>2  JUNCTION BOX COVER SLAB</td>
</tr>
<tr>
<td>D-8 (2000)</td>
<td>PIPE BEDDING</td>
</tr>
<tr>
<td>D-9 (2000)</td>
<td>PERFORATED PIPE UNDERDRAIN</td>
</tr>
</tbody>
</table>

SECTION IV - EROSION

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1 (2001)</td>
<td>INCREMENTAL STABILIZATION</td>
</tr>
<tr>
<td>E-2 (2001)</td>
<td>SILT FENCE</td>
</tr>
<tr>
<td>E-3 (2001)</td>
<td>DRAINAGE INLET SEDIMENT CONTROL</td>
</tr>
<tr>
<td>E-4 (2001)</td>
<td>CURB INLET SEDIMENT CONTROL</td>
</tr>
<tr>
<td>E-6 (2001)</td>
<td>STONE CHECK DAM</td>
</tr>
<tr>
<td>E-6</td>
<td>SEDIMENT TRAP</td>
</tr>
<tr>
<td>E-7 (2001)</td>
<td>SEDIMENT TRAP USING DRAINAGE INLET AS OUTLET</td>
</tr>
<tr>
<td>E-8 (2001)</td>
<td>RISER PIPE ASSEMBLY FOR SEDIMENT TRAP</td>
</tr>
<tr>
<td>12001</td>
<td>1  ELEVATION</td>
</tr>
<tr>
<td>12002</td>
<td>2  TRASH HOOD DETAILS</td>
</tr>
<tr>
<td>E-9 (2001)</td>
<td>EROSION CONTROL BLANKET APPLICATIONS</td>
</tr>
<tr>
<td>E-10 (2000)</td>
<td>RIPRAP DITCH</td>
</tr>
<tr>
<td>E-11 (2000)</td>
<td>PERIMETER SWALE</td>
</tr>
<tr>
<td>E-12 (2000)</td>
<td>EARTH Dike</td>
</tr>
<tr>
<td>E-13 (2000)</td>
<td>EARTH Dike</td>
</tr>
<tr>
<td>E-16 (2001)</td>
<td>TURBIDITY CURTAIN</td>
</tr>
<tr>
<td>E-16</td>
<td>TURBIDITY CURTAIN</td>
</tr>
<tr>
<td>E-17 (2001)</td>
<td>SUMP PIT, TYPE 1 &amp; 2</td>
</tr>
<tr>
<td>E-18 (2000)</td>
<td>DEWATERING BASIN</td>
</tr>
<tr>
<td>E-19 (2000)</td>
<td>GEO Text LINE CHANNEL DIVERSION</td>
</tr>
<tr>
<td>E-20 (2000)</td>
<td>SANDBAG DIVERSION</td>
</tr>
<tr>
<td>E-21 (2000)</td>
<td>PORTABLE SEDIMENT TANK</td>
</tr>
<tr>
<td>E-22 (2000)</td>
<td>TURF REINFORCEMENT BLANKET APPLICATIONS</td>
</tr>
<tr>
<td>E-23</td>
<td>TURBIDITY CURTAIN</td>
</tr>
<tr>
<td>E-24 (2000)</td>
<td>PORTABLE SEDIMENT TANK</td>
</tr>
<tr>
<td>E-25 (2000)</td>
<td>TURF REINFORCEMENT BLANKET APPLICATIONS</td>
</tr>
</tbody>
</table>
## SECTION V - MISCELLANEOUS

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-1 (2000)</td>
<td>RIGHT-OF-WAY FENCE</td>
</tr>
<tr>
<td>W-2 (2000)</td>
<td>CONCRETE MONUMENT</td>
</tr>
<tr>
<td>W-3 (2004)</td>
<td>REMOVABLE BOLLARD</td>
</tr>
<tr>
<td>W-4 (2004)</td>
<td>BOLLARD</td>
</tr>
<tr>
<td>W-5 (2004)</td>
<td>WOOD RAIL FENCE</td>
</tr>
<tr>
<td>W-6 (2004)</td>
<td>PATTERNED HOT-MIX OR CONCRETE &amp; BRICK PAVER</td>
</tr>
</tbody>
</table>

## SECTION VI - PAVEMENT

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1</td>
<td>P.C.C. PAVEMENT</td>
</tr>
<tr>
<td>0001-1</td>
<td>SLAB PLAN WITH DOWEL AND TIE LOCATIONS</td>
</tr>
<tr>
<td>0001-2</td>
<td>JOINT AND SEALANT DETAILS</td>
</tr>
<tr>
<td>0001-3</td>
<td>W BOLT, HOOK BOLT, DOWEL &amp; TIE BAR</td>
</tr>
<tr>
<td>0001-4</td>
<td>DOWEL SUPPORT BASES</td>
</tr>
<tr>
<td>0001-5</td>
<td>DOWEL &amp; TIE BAR PLACEMENT TOLERANCES</td>
</tr>
<tr>
<td>P-2</td>
<td>P.C.C. PAVEMENT PATCHING</td>
</tr>
<tr>
<td>0004-1</td>
<td>FULL DEPTH PATCH, PLAN VIEW</td>
</tr>
<tr>
<td>0004-2</td>
<td>FULL DEPTH PATCH, SECTION VIEWS</td>
</tr>
<tr>
<td>0004-3</td>
<td>FULL DEPTH PATCH, SEALANT DETAILS, GROUT RETENTION Disk, AND DOWEL BAR</td>
</tr>
<tr>
<td>0004-4</td>
<td>FULL DEPTH PATCH, DOWEL &amp; TIE BAR PLACEMENT TOLERANCES</td>
</tr>
<tr>
<td>0004-5</td>
<td>PARTIAL DEPTH PATCH, PLAN AND SECTION VIEWS</td>
</tr>
</tbody>
</table>

## SECTION VII - TRAFFIC

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-4 (2002)</td>
<td>CONDUIT JUNCTION WELL, TYPES 1, 2, AND 3</td>
</tr>
<tr>
<td>T-2 (2002)</td>
<td>CONDUIT JUNCTION WELL, TYPE 4</td>
</tr>
<tr>
<td>T-3 (2002)</td>
<td>CONDUIT JUNCTION WELL, TYPE 5</td>
</tr>
<tr>
<td>T-4 (2004)</td>
<td>CABINET BASES (TYPES &quot;M&quot; AND &quot;P&quot;)</td>
</tr>
<tr>
<td>T-5</td>
<td>POLE BASES</td>
</tr>
<tr>
<td>2002-1</td>
<td>ROUND BASE, SQUARE BASE</td>
</tr>
<tr>
<td>2002-2</td>
<td>TYPICAL SECTION BASES 1, 2, 3, 4, 5, 6, 7, 8, AND 9</td>
</tr>
<tr>
<td>2002-3</td>
<td>TYPICAL SECTION BASES 5 AND 6, ANCHOR BOLT DATA CHART AND DETAILS</td>
</tr>
<tr>
<td>T-6 (2002)</td>
<td>SPECIAL POLE BASE</td>
</tr>
<tr>
<td>T-7 (2002)</td>
<td>SIGN FOUNDATION</td>
</tr>
<tr>
<td>T-8 (2002)</td>
<td>LOOP DETECTOR TO CONDUIT JUNCTION WELL CONNECTION</td>
</tr>
<tr>
<td>T-9 (2004)</td>
<td>TYPE #1 LOOP DETECTOR</td>
</tr>
<tr>
<td>T-10 (2004)</td>
<td>TYPE #2 LOOP DETECTOR</td>
</tr>
</tbody>
</table>

DELAWARE
DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS (2004)

SHT. 4 OF 5
### SECTION VII - TRAFFIC (CONT'D)

<table>
<thead>
<tr>
<th>SHEET NO</th>
<th>NAME</th>
<th>INDEX OF SHEETS (2004)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>MESSENGER WIRE ATTACHMENT</td>
<td>2004-1 INTERMEDIATE MESSENGER WIRE ATTACHMENT ON WOOD POLES, 2004-2 ANGULAR INTERMEDIATE MESSENGER WIRE ATTACHMENT</td>
</tr>
<tr>
<td>T-12</td>
<td>MESSENGER WIRE ATTACHMENT</td>
<td>2004-1 SPAN WIRE ATTACHMENT BETWEEN POLES, 2004-2 DEAD END MESSENGER WIRE ATTACHMENT</td>
</tr>
<tr>
<td>T-14</td>
<td>EMERGENCY PREEMPTION RECEIVER</td>
<td>2004-1 UPRIGHT MOUNT, 2004-2 INVERTED MOUNT</td>
</tr>
</tbody>
</table>
**TYPE 1 GUARDRAIL**

Typical guardrail treatment when a minimum of 10' (3000) is available for median.

**TYPE 2 GUARDRAIL**

Typical guardrail treatment when 2' (600) to 4' (1200) of clearance to obstruction is available.

**TYPE 3 GUARDRAIL**

Typical guardrail treatment when a minimum of 4' (1200) is available for median.

---

**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 KG or flatter.

2. Place guardrail reflector every fifth post.
GUARDRAIL APPLICATIONS

B-1 (2004)  SHT. 2  OF 6

NOTE: OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.
NOTES:
1. ALL W-BEAMS ARE 18'-2½" (5550) IN LENGTH.
2. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.

SINCE NO POST OR OFFSET BLOCK IS PRESENT AT THIS LOCATION, 
3/4" (19) GUARDRAIL BOLT (L=4½") (2580) IS NOT REQUIRED.
Type 1 Guardrail or Appropriate End Treatment

Direction of Travel

Notes:
1. All W-beams are 12'-6" (3805) in length.
2. Place guardrail reflector every fifth post.
DELAWARE DEPARTMENT OF TRANSPORTATION

DEPARTMENT OF TRANSPORTATION

CURVED GUARDRAIL SECTION

STANDARD NO. B-4 (2004)  SHT. 1 OF 1

APPROVED

RECOMMENDED

SCALE: N.T.S.

<table>
<thead>
<tr>
<th>RADUS</th>
<th>MIN REQUIRED AREA FREE OF FIXED OBJECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8'-6&quot; (2600)</td>
<td>25' x 15' (7600 x 4500)</td>
</tr>
<tr>
<td>17'-3&quot; (5200)</td>
<td>30' x 15' (9144 x 4500)</td>
</tr>
<tr>
<td>25'-6&quot; (7800)</td>
<td>40' x 20' (12000 x 6000)</td>
</tr>
<tr>
<td>35'-3&quot; (10700)</td>
<td>50' x 20' (15200 x 6000)</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 SHAPED BTB.
3. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
NOTE: 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 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER WOOD BLOCKS AND/OR RUBRAIL AND WOOD BLOCK.
4). USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE.
5). PLACE STEEL WASHER FOR 3/4" 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.
NOTE:
1. CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
2. POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH WOOD BLOCKS AND/OR BENT RAIL.
3. DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 5, OR 7.
4. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
5. BENT RAIL MAY BE SHOP BENT TO FACILITATE INSTALLATION OR MAY BE FIELD BENT USING HEAT.
6. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.
7. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
8. WHEN PLACED OVER CURB (MIN 8" (200) HIGH), BOTTOM RAIL CAN BE ELIMINATED.
9. POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH WOOD BLOCKS AND/OR BENT RAIL.
10. DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 5, OR 7.
11. CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.

DELTAWARE DEPARTMENT OF TRANSPORTATION
GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2
STANDARD NO. B-8 (2004) SHT. 1 OF 2
APPROVED
RECOMMENDED
**NOTES:**

1. This installation shall be used when the existing sidewalk is 8" (200) 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.
THREE BEAM GUARDRAIL WITH STEEL POSTS SPACED AT 6'-3" (1905) CENTER TO CENTER

SEE NOTE

EXISTING CURB LINE (BOTTOM OF CURB)

LIMIT OF PAYMENT

W-THEE BEAM TRANSITION SECTION

SEE NOTE

EXIT END APPLICATION

SEE NOTE

SECTION A-A

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.

NOTES:

18" (450) MIN.

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

ADHESIVE BOND STRENGTH), 1'-0" (300) MIN. EMBEDMENT

6" (150) x 6" (150) x 6'-6" (1980) TIMBER POSTS

ADHESIVE ANCHORS (55,000 lbs (25,000 kg) ULTIMATE

ADHESIVE ANCHORS (15,000 lbs (6800 kg) ULTIMATE

18" (450) MIN.

6" (150) x 6" (150) x 6'-6" (1980) TIMBER POSTS

W6 x 15 (W150 x 22) STEEL GUARDRAIL POST

3/4 (20) " GUARDRAIL BOLT (L=1'

3 31/2'" GUARDRAIL PLACEMENT OR APPROPRIATE END TREATMENT

1'-0" (300) BASE PLATE

W/2" (165) x 1' (305) x 1'-2" (350) PLATE

CHIP OUT 1/2" (165) DEEP RECESS FOR GROUT

SEE NOTE

ENTRANCE END APPLICATION

SEE NOTE

THREE BEAM GUARDRAIL WITH STEEL POSTS SPACED AT 6'-3" (1905) CENTER TO CENTER

SEE NOTE

EXISTING CURB LINE (BOTTOM OF CURB)

1/2" (165) GROUT PAD-FILL WITH WASHERS AS NECESSARY TO LEVEL PLATE

SEE NOTE

1/4" (60) MIN.

W/2" (165) x 1' (305) x 1'-2" (350) PLATE
**W-BEAM ELEVATION**

- \( \frac{1}{2}'' \times 2\frac{1}{2}'' (65) \) post bolt slot (6'-3" (1905) spacing typ.)

**W-BEAM SECTION**

- W-beam section with specific tolerances and dimensions.

**NOTES:**

- Two additional \( \frac{1}{2}'' \times 2\frac{1}{2}'' (65) \) slots shall be provided at 6'-3" (1905) spacing for beam length of 26'-6" (7980).

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**HARDWARE**

- B-13 (2004)

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**DELAWARE DEPARTMENT OF TRANSPORTATION**

**STANDARD NO.**

- B-13 (2004)

**SHT.**

- 1 OF 13

**APPROVED**

- Curtis N. Off 11/4/05

---

**SCALE:**

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

* OPTION FOR HANDLING DURING GALVANIZING

* 12" (300) FOR GUARDRAIL TO BARRIER CONNECTIONS - TYPE 1
* 11" (280) FOR GUARDRAIL TO BARRIER CONNECTIONS - TYPE 2

NOTE:
ALL HOLES SHALL BE \( \frac{5}{32} \)" (0.4 mm), BOLT
HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.

W-BEAM STEEL POST AND WOOD OFFSET BLOCK

WHERE RUB RAIL IS USED.

HARDWARE


APPROVED

DEPARTMENT OF TRANSPORTATION
W-BEAM TERMINAL CONNECTOR

HARDWARE

STANDARD NO. B-13 (2004)  SHT. 3  OF 13  RECOMMENDED

APPROVED

DATE: 11/14/05
THREE BEAM STEEL POST AND WOOD OFFSET BLOCK

NOTE: WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150)

OPTIONAL FOR HANDLING DURING GALVANIZING

NOTE: ALL HOLES SHALL BE 9/32" (2.91 mm). BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXES OF THE POST.

DELTA BEAM STEEL POST AND WOOD OFFSET BLOCK

NOTE: WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150)

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DELTA BEAM STEEL POST AND WOOD OFFSET BLOCK

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DELTA BEAM STEEL POST AND WOOD OFFSET BLOCK

NOTE: WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150)

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NOTE: ALL HOLES SHALL BE 9/32" (2.91 mm). BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXES OF THE POST.

DELTA BEAM STEEL POST AND WOOD OFFSET BLOCK

NOTE: WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150)

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DELTA BEAM STEEL POST AND WOOD OFFSET BLOCK

NOTE: WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150)

OPTIONAL FOR HANDLING DURING GALVANIZING

NOTE: ALL HOLES SHALL BE 9/32" (2.91 mm). BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXES OF THE POST.
W-THREE BEAM TRANSITION SECTION

STANDARD W-BEAM SECTION

3'-6½" (92.9) 7'-3½" (223) 3'-6½" (92.9) 2'-5½" MIN.

12 GAGE

POST BOLT SLOTS

2" (52) MIN.

1'-8" (506) 4" (108) 4" (108) 4" (108)

HARDWARE

B-13 (2004)

STANDARD W-BEAM SECTION

3'-6½" (92.9) 7'-3½" (223) 3'-6½" (92.9) 2'-5½" MIN.

12 GAGE

POST BOLT SLOTS

2" (52) MIN.

1'-8" (506) 4" (108) 4" (108) 4" (108)

HARDWARE

B-13 (2004)

STANDARD W-BEAM SECTION

3'-6½" (92.9) 7'-3½" (223) 3'-6½" (92.9) 2'-5½" MIN.

12 GAGE

POST BOLT SLOTS

2" (52) MIN.

1'-8" (506) 4" (108) 4" (108) 4" (108)

HARDWARE

B-13 (2004)

STANDARD W-BEAM SECTION

3'-6½" (92.9) 7'-3½" (223) 3'-6½" (92.9) 2'-5½" MIN.

12 GAGE

POST BOLT SLOTS

2" (52) MIN.

1'-8" (506) 4" (108) 4" (108) 4" (108)

HARDWARE

B-13 (2004)
1. All holes shall be drilled prior to galvanizing.
2. All wood sizes are nominal dimensions.

SOIL PLATE

STEEL PLATE

WOOD BLOCK

STEEL TUBE

SHORT WOOD BREAKAWAY POST

LONG WOOD BREAKAWAY POST

NOTES:

- 1/4" galvanized steel plate
- 1/4" 3/16" dia. holes
- Wood sizes are nominal dimensions
- All holes shall be drilled prior to galvanizing

HARDWARE

- B-13 (2004)

DELAWARE DEPARTMENT OF TRANSPORTATION


SHT. 7 OF 13

APPROVED

[Signature]

[Date] 11/05

[Signature]

[Date] 10/05

[Signature]

[Date] 09/21/2004
ANCHOR PLATE TO W-BEAM CONNECTION DETAIL

SWAGED CABLE ASSEMBLAGE AND RELATED HARDWARE ASSEMBLY

NOTES:
1. TO ENSURE THAT THE TIMBER BEARING PLATE REMAINS IN POSITION, WELD END PLATE TO ANCHOR PLATE THREE SIDES AND BEND OVER BEARING PLATE.
2. DRILL 4 HOLES—½" (128) DIA. HEX BOLTS AND NUTS
3. DRILL 4 HOLES—½" (128) DIA. 4" (100) O.C. (LOWER BOLT L)

1. TO ENSURE THAT THE TIMBER BEARING PLATE REMAINS IN POSITION, WELD END PLATE TO ANCHOR PLATE THREE SIDES AND BEND OVER BEARING PLATE.
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NOTES:
1. TO ENSURE THAT THE TIMBER BEARING PLATE REMAINS IN POSITION, WELD END PLATE TO ANCHOR PLATE THREE SIDES AND BEND OVER BEARING PLATE.
2. DRILL 4 HOLES—½" (128) DIA. HEX BOLTS AND NUTS
3. DRILL 4 HOLES—½" (128) DIA. 4" (100) O.C. (LOWER BOLT L)
RECESSSED 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

HARDWARE

<table>
<thead>
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<tbody>
<tr>
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<td>FULL THREAD LENGTH</td>
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<tr>
<td>5/8&quot;(18)</td>
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<tr>
<td>5/8&quot;(18)</td>
<td>FULL THREAD LENGTH</td>
</tr>
<tr>
<td>5/8&quot;(18)</td>
<td>4&quot;X500 THREAD LENGTH</td>
</tr>
<tr>
<td>5/8&quot;(18)</td>
<td>4&quot;X500 THREAD LENGTH</td>
</tr>
</tbody>
</table>

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

5/8" (16) CARRIAGE BOLT

3/8" (24) HEX NUT

NOTE:
1. FOR USE WITH SWAGED CABLE ASSEMBLAGE.
1. WHEN INTEGRAL P.C.C. CURB AND GUTTER IS PLACED ADJACENT TO PORTLAND CEMENT CONCRETE PAVEMENT, CONSTRUCT THE JOINT AS PER THE LONGITUDINAL JOINT SEALANT DETAIL ON STANDARD P-2, SHEET 3 OF 5. USE APPROVED JOINT FILLER TO SEAL WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.

2. DEPRESS CURB AT DRIVEWAYS AS DETAILED.

3. DEPRESS CURB FLUSH WITH PAVEMENT AT CURB RAMPS. MAXIMUM SLOPE OF DEPRESSED CURB IS 12:1.
**DETECTABLE WARNING TRUNCATED DOME DETAILS**

**NOTES:**
1. The area of detectable warning truncated domes shall be 24" (600) long and the full width of the ramp.
2. See specification for additional information.

**SECTION B-B**

**ELEVATION A-A**

**SECTION C-C**

**CURB RAMP, TYPE I**

**PERPENDICULAR CURB RAMP**

**NOTES:**
1. Where a 12:1 maximum slope ramp will not meet the sidewalk grade within a length of 15' (4570) due to steep adjacent roadway, the ramp length may be limited to 15' (4570), and the ramp slope allowed to exceed 12:1.
2. Ramp width shall be 4' (1200) minimum, however, 5' (1525) is preferred.

**MODIFIED CURB (FLUSH WITH PAVEMENT)**

**DETECTABLE WARNING TRUNCATED DOMES**

**BASE**

**P.C.C. SIDEWALK**

**SIDewalk**

**Pavement**

**Detectable Warning Truncated Domes**

**Taper Ramp 12:1 Max**

**REGRADE**

**FLUSH WITH CURB RAMP SURFACE**

**50% TO 65% OF BASE**

**0.2" (5)**

**1.6" (41) MIN**

**2.4" (61) MAX**

**0.65" (16) MIN**

**TYP. 50% TO 65% OF BASE**

**24" (600) MIN**

**50:1 MAX**

**60" (1525) MIN**

**50:1 MAX**

**1.4" (36) MAX**

**0.9" (23) MIN**

**1) THE AREA OF DETECTABLE WARNING TRUNCATED DOMES SHALL BE 24" (600) LONG AND THE FULL WIDTH OF THE RAMP.**

**2) SEE SPECIFICATION FOR ADDITIONAL INFORMATION.**

**NOTE:**

- **SHAPE**
- **SCALE: N.T.S.**
- **DATE:**
- **DELAWARE DEPARTMENT OF TRANSPORTATION**
- **CHIEF ENGINEER**
- **DESIGN ENGINEER**
- **RECOMMENDED**
- **APPROVED**
- **STANDARD NO. C-2 (2004)**
- **SHT. 1 OF 4**
- **RECOMMENDED**
CURB RAMPS, TYPES 2, 3, & 4

CURB RAMP, TYPE 2
PARALLEL CURB RAMP

CURB RAMP, TYPE 3
DIAGONAL CURB RAMP

NOTE: THE DIAGONAL CURB RAMP IS
NOT THE PREFERRED TREATMENT.

CURB RAMP, TYPE 4
PERPENDICULAR CURB RAMP

1). WHERE A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE
WITHIN A LENGTH OF 15' (4570) DUE TO STEEP ADJACENT ROADWAY, THE RAMP
LENGTH MAY BE LIMITED TO 15' (4570), AND THE RAMP SLOPE ALLOWED TO
EXCEED 12:1.

2). TRANSITION TO EXISTING SIDEWALK WIDTH OVER THE LENGTH OF THE RAMP.

3). RAMP WIDTH SHALL BE 4' (1200) MINIMUM, HOWEVER, 5' (1525) IS PREFERRED.

NOTES:

DETECTABLE WARNING
TRUNCATED DOMES

DETECTABLE WARNING
TRUNCATED DOMES

DETECTABLE WARNING
TRUNCATED DOMES

TAPER (TYP)

TAPER (TYP)

2:1 OR FLATTER
6:1 OR FLATTER

BRUSH FINISH

BRUSH FINISH

TAPER (TYP)

TAPER (TYP)

60" (1525) MIN.

60" (1525) MIN.

60" (1525) MIN.

60" (1525) MIN.

4' (1200) MIN
LANDING
(SEE NOTE 3)

4' (1200) MIN
LANDING
(SEE NOTE 3)

4' (1200) MIN
LANDING
(SEE NOTE 3)
**DELAWARE DEPARTMENT OF TRANSPORTATION**

**SCALE: N.T.S.**

**ELEVATION D-D**

**SECTION E-E**

**SECTION F-F**

**ELEVATION G-G**

**NOTE:** CURB RAMP WIDTH SHALL BE 4' (1200) MINIMUM, HOWEVER, 5' (1525) IS PREFERRED.

DETECTABLE WARNING TRUNCATED DOMES

 existed GROUND CURB

C-2 (2004)

APPROVED

RECOMMENDED

DELTA FRANK WITH

1/1/05

1/6/05

7/28/2004
Curb Ramp Type 5 & Sections

Section H-H

Notes:
1. A cut-through level with the street is the preferred treatment for islands, although ramps can be used where the island width is sufficient to accommodate them. Positive surface drainage must be provided for either treatment. Other treatment is acceptable.
2. Where a maximum slope ramp will not meet the sidewalk grade within a length of 6' (1800) due to steep adjacent roadway, the ramp length may be limited to 6' (1800) and the ramp slope allowed to exceed 5:1.
3. A continuous path must be provided between adjacent curb ramps in islands and medians, with a maximum running slope of 20:1.
4. Ramp width shall be a minimum of 4' (1200), however 5' (1525) is preferred. When using cut-through style ramp, with curbing on both sides of the ramp, the width shall be a minimum of 5' (1525).

Islands of insufficient width (W<21' (6400) for 8" (200) curb, W<17' (5200) for 6" (150) curb, etc.) to accommodate Type 5 ramps shall have a cut-through flush with adjoining pavement with a maximum running slope of 20:1 and maximum cross slope of 50:1 to be paid for under respective bid items.

P.C.C. Sidewalk

Section I-I

Notes:
1. A cut-through level with the street is the preferred treatment for islands, although ramps can be used where the island width is sufficient to accommodate them. Positive surface drainage must be provided for either treatment. Other treatment is acceptable.
2. Where a maximum slope ramp will not meet the sidewalk grade within a length of 6' (1800) due to steep adjacent roadway, the ramp length may be limited to 6' (1800) and the ramp slope allowed to exceed 5:1.
3. A continuous path must be provided between adjacent curb ramps in islands and medians, with a maximum running slope of 20:1.
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Islands of insufficient width (W<21' (6400) for 8" (200) curb, W<17' (5200) for 6" (150) curb, etc.) to accommodate Type 5 ramps shall have a cut-through flush with adjoining pavement with a maximum running slope of 20:1 and maximum cross slope of 50:1 to be paid for under respective bid items.

P.C.C. Sidewalk

DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD NO. C-2 (2000)
SHT. 4 OF 4
APPROVED
RECOMMENDED
DRAINAGE INLET TOP UNITS
NOTE: TOP UNIT IS TO BE CAST-IN-PLACE TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.

INLET TOP UNIT APPLICATIONS

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

DRAINAGE INLET TOP UNITS
NOTE: TOP UNIT IS TO BE CAST-IN-PLACE TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.
34" (865) x 24" (610) DRAINAGE INLET DETAILS

NOTE: REFER TO PREVIOUS SHEETS FOR REINFORCING REQUIREMENTS
NOTES:

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 lip 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. Cost incidental to downspout splash aprons item.

6. When two lines of pipe underdrain drain to a low point, each pipe must have its own outlet.

SLOTTED HEADWALL DETAIL

NOT TO SCALE

CONCRETE HEADWALL FOR UNDERDRAIN OUTLET

PERFORATED PIPE UNDERDRAIN DETAIL

NOT TO SCALE
SHARED USE PATH INTERSECTION

NOTES:
1. THE 4"(100) CONCRETE SHARED-USE PATH SHALL BE FINISHED TO INCLUDE A TEXTURED WARNING SURFACE BY USING A JOINT STRIPE TO PROVIDE A 1/4" (6MM) DEEP V-JOINT AT 6"(150) O.C.
PAYMENT FOR INSTALLING THE GROOVED FINISH SHALL BE INCIDENTAL TO THE SIDEWALK CONSTRUCTION.
2. FOR 8" (2450) AND 10" (3050) PATH WIDTH, THE OUTSIDE DIMENSION FROM CENTER OF BOLLARD TO EDGE OF PATH SHALL BE 2' (610) AND 3' (915) RESPECTIVELY.
4. STEEL TUBE TO EXTEND 1/4"(60) ABOVE GROUND WITH CONCRETE TO SLOPE AWAY FROM TUBE TO KEEP WATER AND SEDIMENT FROM DRAINING INTO TUBE.
BICYCLE RACK DETAILS

**BIKE RACK**

- **5 BIKES**
  - W = 36" (960)
- **7 BIKES**
  - W = 48" (1200)
- **9 BIKES**
  - W = 60" (1500)
- **11 BIKES**
  - W = 72" (1800)

**DIMENSIONS**

- **MIN.**
  - 6" (150)
  - 10" (255)
- **MAX.**
  - 3" (75)

**Materials**

- **#4 REBAR**
  - 6" (150) LONG
- **2" (50) DIA. TUBING**
- **5/8" (160) DIA. TUBING**

**Concrete**

- **MIN.**
  - 24" (610) MIN.
- **STONE**
- **CONCRETE**

**Slope To Drain**

- **2" (50) (TYP.)**

**Outer Edge of Concrete Footing**

- **To Be Flush With Surrounding Grade (TYP.)**

**Annotations**

- **2 3/8" (60) DIA. TUBING**
- **3" (75) (TYP.)**
- **4 REBAR 6" (150) LONG**
- **SLOPE TO DRAIN**
- **OUTER EDGE OF CONCRETE FOOTING TO BE FLUSH WITH SURROUNDING GRADE (TYP.)**

---

**Delaware Department of Transportation**

**BIKE RACK DETAILS**

- SHT. 1 OF 1
- APPROVED

**Recommended by**

- **[Signature]**
- **Date**

---

**Scale:** N.T.S.
WOOD RAIL FENCE DETAILS

CLASS B CONCRETE

SECTION A-A

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.

TYPICAL JOINT DETAIL

NOTES:

PATH

TREATED POSTS (TYP.)

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

SEE NOTE 2
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 this is against building or other confining feature.

BRICK PAVER SIDEWALK DETAIL

DEL A W AE R R DEPARTMENT OF TRANSPORTATION

PATTERNED HOT-MIX OR CONCRETE & BRICK PAVER DETAILS

STANDARD NO. M-6 (2004)
SHT. 1 OF 1

APPROVED

RECOMMENDED

DATE

SCALE: N.T.S.
NOTES:
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 0.0".
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 NEVERTHELESS INTERRUPTED BY THE TRANSVERSE JOINT MATERIAL.
7. TRANSVERSE JOINT SEAL TO BE RECESS 1/4" TO 1/2" BELOW THE TOP OF THE SLAB.
8. A 45° CHAMFER SHALL BE CUT 1/4" TO 1/2" 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.
10. THE TOP EDGES OF THE COMPRESSION SEAL SHALL BE IN FULL CONTACT WITH THE SLAB SIDES.
SECTION A-A

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

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

FULL DEPTH PATCH
VARIES 4" (100) - 8" (200)
TYP. 6" (150) MAX
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 0.2" (5) NARROWER.
2. "T" REFERS TO THE EXISTING "AS-BUILT" SLAB THICKNESS.
3. TOLERANCE ON ALL JOINT SEALANT DETAIL DIMENSIONS SHOWN WITHOUT HANES SHALL BE PLUS/0.25" (6.4), MINUS 0.25"
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.

DOWEL BAR

FULL DEPTH PATCH

DELWARE DEPARTMENT OF TRANSPORTATION

PCC PAVEMENT PATCHING


APPROVED

RECOMMENDED

DATE 1/11/05

DATE 1/11/05
GROUND RODS

EXPANSION BOLT (6) MIN.

GROUND RODS AND ALL CONDUIT 2" (50) MIN. - 3" (75) MAX.

CONCRETE CABINET BASE

PLAN VIEW

CONCRETE CABINET BASE

SECTION A-A

PLAN SYMBOL

DELWARE
DEPARTMENT OF TRANSPORTATION

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

STANDARD NO. T-4 (2004) SHT. 1 OF 1

APPROVED

RECOMMENDED

DATE

DATE

DELAWARE
DEPARTMENT OF TRANSPORTATION
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 2" (500) back from the point of the extended corner.

2. The diagonal cut shall be stopped approximately 2" (50) 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.
**Wire Slot Construction**

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 diagonal cut shall be stopped approximately 2" (50) 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.

**Notes:**

<table>
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<tr>
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<th>Diagram</th>
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<td><img src="image1.png" alt="Diagram A - A" /></td>
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<tr>
<td>B - B</td>
<td><img src="image2.png" alt="Diagram B - B" /></td>
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DELAWARE DEPARTMENT OF TRANSPORTATION

ANGULAR INTERMEDIATE MESSENGER WIRE ATTACHMENT


APPROVED: Caudill With 1/14/05

RECOMMENDED: Caudill With 1/14/05

TOP VIEW

- Service Wedge Clamp
- Galvanized 3/4" x 12" Everbolt
- Galvanized 3/4" x 12" Nuts
- Wood Pole
- Galvanized 1/4" x 6" x 3" (75 x 3" x 175) washer with 5/6" x 2" hole
- Coordination Cable
- Messenger Wire
- Lashing Wire
- Cable Spacers
- Messenger Clamp

PLAN SYMBOL

C C C
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".

PLAN SYMBOL

X ○
WOOD POLES

GALVANIZED 1/4" x 1/4" x 3" (75) WASHED WITH 1/4" x 20 HOLE

SERVICE WEDGE CLAMP

MESSAGER WIRE

MESSAGER CLAMP

LASHING WIRE

CABLE SPACER

ELECTRICAL CABLE

WOOD POLE

METAL POLE

GALVANIZED 1/4" x 1/4" x 3" (75) WASHED WITH 1/4" x 20 HOLE

GALVANIZED 1/4" x 1/4" x 3" (75) EYESBOLT

GALVANIZED 1/4" x 1/4" x 3" (75) WASHED WITH 1/4" x 20 HOLE

GALVANIZED 1/4" x 1/4" x 3" (75) NUTS (2 REQUIRED)

MATERIALS:

WOOD POLE

METAL POLE

NOTES:

1. INSTALLATION METHOD SHOWN FOR DEAD END MESSAGER WIRE ATTACHMENT TO METAL POLES SHALL BE USED FOR SPAN WIRE ATTACHMENT BETWEEN METAL POLES.

PLA SYMBOL

X Ⓔ

DELWARE DEPARTMENT OF TRANSPORTATION

DEAD END MESSAGER WIRE ATTACHMENT

APPROVED

1/10/05

STANDARD NO. T-12 (2004) SHT. 2 OF 2 RECOMMENDED

PLAN SYMBOL

1/10/05

NOTES:

1. INSTALLATION METHOD SHOWN FOR DEAD END MESSAGER 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 6,000 LBS (6800 KG) OVER A 10" (250) SQUARE.
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 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 20,000 LBS (9000 kg) OVER A 10"X10" SQUARE.
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 (3600 kg) over a 10" (255) square.

PLAN SYMBOL

SECTION A-A

PLAN VIEW

NOTES:

Del DOT

POLYMER CONCRETE WITH A HEAVY-WEAVE FIBERGLASS REINFORCEMENT

\( \frac{3}{8} \times 4 \times 4 \) BLACK BUSHING W/ WASHERS TO BE SECURED INTO THE WELL FRAME

FINISHED GRADE
(PAVEMENT)

FINISHED GRADE
(UNPAVED)

GLY. CONDUIT
BUSHING

STONE

GALV. CONDUIT
BUSHING

SILICONE SEALER
INSTALL DRY (TYP) - HOLE SAW WITH TRADE SIZE

DIMENSIONS

<table>
<thead>
<tr>
<th>COVER</th>
<th>TYPE 8</th>
<th>TYPE 10</th>
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<tbody>
<tr>
<td>A</td>
<td>47 7/16&quot; (120)</td>
<td>35 7/16&quot; (90)</td>
</tr>
<tr>
<td>B</td>
<td>30 7/16&quot; (76)</td>
<td>24&quot; (60)</td>
</tr>
<tr>
<td>C</td>
<td>49 7/16&quot; (120)</td>
<td>37 7/16&quot; (90)</td>
</tr>
<tr>
<td>D</td>
<td>32 7/16&quot; (81)</td>
<td>26&quot; (60)</td>
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<tr>
<td>E</td>
<td>45 7/16&quot; (110)</td>
<td>33 7/16&quot; (83)</td>
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<td>F</td>
<td>28 7/16&quot; (72)</td>
<td>22 7/16&quot; (57)</td>
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<td>G</td>
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<td>I</td>
<td>58&quot; (147)</td>
<td>46&quot; (116)</td>
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<tr>
<td>J</td>
<td>40&quot; (101)</td>
<td>34&quot; (86)</td>
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CONDUIT JUNCTION WELLS, TYPES 8 & 10

DELAWARE DEPARTMENT OF TRANSPORTATION


APPROVED

RECOMMENDED
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.


CABLE CONNECTIONS
TO TERMINAL STRIP

FRONT VIEW
(SCALE IS NOT SHOWN)

SIDE VIEW

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.

1. Inverted configuration shall be used for span mount.
2. Span wire mounting hardware shall be supplied by the department.
3. Teflon 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.
5. Route the cable connections to terminal strip.