TRANSMITTAL LETTER

CHANGE #5 to PUB. 72, MARCH 1977 EDITION

DATE
JULY 16, 1980

REVISIONS TO STANDARDS FOR ROADWAY CONSTRUCTION, RC 0-100
CHANGE #5 to PUB. 72, MARCH 1977 EDITION

SUBJECT:

It is desired that the new features of these standards be incorporated immediately for the preparation of plans. However, no additional compensation will be allowed for work involved to conform to these standards and coordination with the issuance of the new Form 408/76 supplements must be checked.

All projects let after October 1, 1980 shall contain these corrected drawings.

INFORMATION AND SPECIAL INSTRUCTIONS: The attached revisions and additions should be inserted into your Standards:

CHANGE DESCRIPTION

<table>
<thead>
<tr>
<th>RCP</th>
<th>SHEET</th>
<th>CHANGE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-11</td>
<td>Sheet 1 of 2</td>
<td>Pen &amp; ink change; change date to July 16, 1980. Added notes for additional excavation. Modified detail C-C. Added Class 4 Excavation.</td>
</tr>
<tr>
<td>RC-23</td>
<td>Sheet 1 of 2</td>
<td>Notes added to include Type E, skewed joints for new construction as well as re-construction.</td>
</tr>
<tr>
<td></td>
<td>Sheet 2 of 2</td>
<td>Pen &amp; ink change; change date to July 16, 1980.</td>
</tr>
<tr>
<td>RC-24</td>
<td>Sheet 1 of 1</td>
<td>Added notes 4 and 5 concerning location of pavement relief joint. Added note 6 for joint details reference.</td>
</tr>
<tr>
<td>RC-25</td>
<td>Sheet 1 of 3</td>
<td>New drawings to include detail for 2 foot extension of pavement for flexible pavement construction. Modifications to details to reflect requirements for pavement extension, when re-constructing shoulders.</td>
</tr>
<tr>
<td></td>
<td>Sheet 2 of 3</td>
<td>Removed corrugation detail. Pavement relief joint cross-section detail added.</td>
</tr>
<tr>
<td></td>
<td>Sheet 3 of 3</td>
<td>Added note 5 concerning location of pavement relief joint. Added note 6 for joint details reference.</td>
</tr>
<tr>
<td>RC-27</td>
<td>Sheet 1 of 2</td>
<td>Add to index; drawings previously added.</td>
</tr>
<tr>
<td></td>
<td>Sheet 2 of 2</td>
<td>Added notes for additional excavation.</td>
</tr>
<tr>
<td>RC-80</td>
<td>Sheet 1 of 2</td>
<td>Eliminated Type T transformer base and anchor bolt table. Notes K and M added.</td>
</tr>
<tr>
<td></td>
<td>Sheet 2 of 2</td>
<td>High mast pole elevation detail removed. It is included on RC-83, sheet 2 of 2.</td>
</tr>
<tr>
<td>RC-81</td>
<td>Sheet 1 of 1</td>
<td>Removed JB-4 wood junction box and added drawings for Reinforced Plastic Mortar boxes.</td>
</tr>
<tr>
<td>RC-82</td>
<td>Sheet 1 of 1</td>
<td>Removed reference to red lead; changed to approved primer.</td>
</tr>
<tr>
<td></td>
<td>Sheet 1 of 2</td>
<td>Added &quot;thru&quot; bolt detail for two section shafts. Pole mounting detail was added. Notes changed to remove references to thickness dimensions.</td>
</tr>
<tr>
<td></td>
<td>Sheet 2 of 2</td>
<td>Pen &amp; ink change; date changed to July 16, 1980.</td>
</tr>
<tr>
<td>RC-83</td>
<td>Sheet 1 of 1</td>
<td>Remove luminaire drawing. Type &quot;LB&quot; conduit coding changed to allow metal or plastic. Removed Type T transformer base from detail of breakaway base.</td>
</tr>
<tr>
<td>RC-25</td>
<td>Sheet 1 of 3</td>
<td>May 31, 1979 RC-81, 1 of 1 June 1, 1976</td>
</tr>
<tr>
<td></td>
<td>Sheet 2 of 3</td>
<td>May 31, 1979 1 of 2 June 1, 1976</td>
</tr>
<tr>
<td>RI-84</td>
<td>Sheet 1 of 1</td>
<td>May 31, 1979 1 of 2 June 1, 1976</td>
</tr>
</tbody>
</table>

CANCEL AND DESTROY THE FOLLOWING:

<table>
<thead>
<tr>
<th>DRAWING INDEX SHEET</th>
<th>DATE</th>
<th>DRAWING INDEX SHEET</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-11, 1 of 1</td>
<td>Jan. 31, 1977</td>
<td>RC-81, 1 of 1</td>
<td>Dec. 1, 1976</td>
</tr>
<tr>
<td>RC-25, 1 of 2</td>
<td>May 31, 1979</td>
<td>RC-83, 1 of 2</td>
<td>May 1, 1978</td>
</tr>
<tr>
<td>2 of 2</td>
<td>May 31, 1979</td>
<td>RC-84, 1 of 1</td>
<td>June 1, 1978</td>
</tr>
<tr>
<td>RC-24, 1 of 1</td>
<td>May 31, 1979</td>
<td>RC-84, 1 of 1</td>
<td>June 1, 1978</td>
</tr>
<tr>
<td>RC-25, 1 of 3</td>
<td>May 31, 1979</td>
<td>RC-84, 1 of 1</td>
<td>June 1, 1978</td>
</tr>
<tr>
<td>1 of 2</td>
<td>May 31, 1979</td>
<td>RC-84, 1 of 1</td>
<td>June 1, 1978</td>
</tr>
</tbody>
</table>

APPROVED FOR ISSUANCE BY:
David C. Sims, P. E.
Deputy Secretary for Highway Administration
INFORMATION AND SPECIAL INSTRUCTIONS:

The attached revisions and additions should be inserted into your standards:

<table>
<thead>
<tr>
<th>Sheet</th>
<th>Change Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index Sheet</td>
<td>Revised to include the new sheets and dates.</td>
</tr>
<tr>
<td>RC-20, 1 of 2</td>
<td>Redrawn to show new joint configuration.</td>
</tr>
<tr>
<td>RC-21, 1 of 1</td>
<td>Redrawn to show new joint configuration and reinforcement.</td>
</tr>
<tr>
<td>RC-22, 1 of 4</td>
<td>Redrawn to reflect the addition of 6&quot; and 7&quot; overlay.</td>
</tr>
<tr>
<td>RC-23, 1 of 2</td>
<td>Joint type added.</td>
</tr>
<tr>
<td>RC-24, 1 of 1</td>
<td>This sheet was eliminated.</td>
</tr>
<tr>
<td>RC-25, 1 of 3</td>
<td>Changed Table 3 (Added 6&quot; &amp; 7&quot;)</td>
</tr>
<tr>
<td>RC-26, 1 of 3</td>
<td>Changed the notes and eliminated the 10&quot; section of RCC Pavement and the reference to the Pavement Relief Joint.</td>
</tr>
<tr>
<td>RC-27, 1 of 2</td>
<td>Removed the notes referring to outdated ST drawings.</td>
</tr>
<tr>
<td>RC-28, 1 of 1</td>
<td>The Pavement Relief Joint has been redesigned and designated to be used on reconstruction projects.</td>
</tr>
<tr>
<td>RC-29, 1 of 1</td>
<td>Joint type added and note change (Notes 1, 2, 3, &amp; 4).</td>
</tr>
<tr>
<td>RC-30, 1 of 1</td>
<td>This sheet was eliminated.</td>
</tr>
<tr>
<td>RC-31, 1 of 1</td>
<td>Changed Table 3 (Added 6&quot; &amp; 7&quot;)</td>
</tr>
<tr>
<td>RC-32, 1 of 1</td>
<td>Changed the notes and eliminated the 10&quot; section of RCC Pavement and the reference to the Pavement Relief Joint.</td>
</tr>
<tr>
<td>RC-33, 1 of 1</td>
<td>Changed the notes and eliminated the 10&quot; section of RCC Pavement and the reference to the Pavement Relief Joint.</td>
</tr>
<tr>
<td>RC-34, 1 of 6, 2 of 6, 3 of 6, 4 of 6, 6 of 6</td>
<td>Pen and ink change. Change the dates on these drawings to May 31, 1979.</td>
</tr>
<tr>
<td>RC-35, 1 of 6, 2 of 6, 3 of 6, 4 of 6, 6 of 6</td>
<td>Pen and ink change. Change the dates on these drawings to May 31, 1979.</td>
</tr>
<tr>
<td>RC-41, 1 of 1</td>
<td>Added Note 10.</td>
</tr>
<tr>
<td>RC-43, 1 of 1</td>
<td>Pen and ink change. Change the 6&quot; dimension on Section D-D to 6&quot;.</td>
</tr>
<tr>
<td>RC-44, 1 of 1</td>
<td>Added the detail for the plate slot.</td>
</tr>
<tr>
<td>RC-45, 1 of 1</td>
<td>Pen and ink change. Change the 6&quot; dimension for Mattress Type Gabions to 9&quot;.</td>
</tr>
<tr>
<td>RC-46, 1 of 1</td>
<td>Pen and ink change. Change the date on the drawing to May 31, 1979.</td>
</tr>
<tr>
<td>RC-55, 1 of 1</td>
<td>Changed the corrugation detail.</td>
</tr>
<tr>
<td>RC-56, 1 of 1</td>
<td>Changed the corrugation detail.</td>
</tr>
<tr>
<td>RC-57, 1 of 2</td>
<td>Added Gabions to 9&quot;.</td>
</tr>
<tr>
<td>RC-58, 1 of 2</td>
<td>Pen and ink change. Change the 6&quot; dimension for Mattress Type Gabions to 9&quot;.</td>
</tr>
<tr>
<td>RC-60, 1 of 1</td>
<td>Changed the corrugation detail.</td>
</tr>
<tr>
<td>RC-61, 1 of 1</td>
<td>Changed the corrugation detail.</td>
</tr>
<tr>
<td>RC-62, 1 of 1</td>
<td>Changed the corrugation detail.</td>
</tr>
<tr>
<td>RC-63, 1 of 1</td>
<td>Changed the corrugation detail.</td>
</tr>
<tr>
<td>RC-64, 1 of 1</td>
<td>Changed the corrugation detail.</td>
</tr>
<tr>
<td>RC-65, 1 of 1</td>
<td>Changed the corrugation detail.</td>
</tr>
<tr>
<td>RC-66, 1 of 1</td>
<td>Changed the corrugation detail.</td>
</tr>
</tbody>
</table>

It is desired that the new features of these standards be incorporated immediately in the preparation of plans. However, no additional compensation will be allowed for work involved to conform to these standards and coordination with the issuance of the new 408/76 supplements must be checked.

All projects let after October 1, 1979 shall contain these corrected drawings.

CANCEL AND DESTROY THE FOLLOWING:

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Date</th>
<th>Drawing</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-21, 1 of 1</td>
<td>Aug. 20, 1975</td>
<td>RC-27, 1 of 1</td>
<td>Jan. 31, 1977</td>
</tr>
<tr>
<td>RC-23, 1 of 1</td>
<td>Nov. 15, 1977</td>
<td>RC-29, 1 of 2</td>
<td>Jan. 31, 1977</td>
</tr>
<tr>
<td>RC-24, 1 of 1</td>
<td>Nov. 15, 1977</td>
<td>RC-30, 1 of 2</td>
<td>Jan. 31, 1977</td>
</tr>
<tr>
<td>RC-27, 1 of 1</td>
<td>Aug. 20, 1975</td>
<td>RC-33, 1 of 1</td>
<td>Jan. 31, 1977</td>
</tr>
<tr>
<td>RC-28, 1 of 2</td>
<td>Nov. 15, 1977</td>
<td>RC-34, 1 of 2</td>
<td>Jan. 31, 1977</td>
</tr>
<tr>
<td>RC-31, 1 of 1</td>
<td>Nov. 15, 1977</td>
<td>RC-37, 1 of 2</td>
<td>Jan. 31, 1977</td>
</tr>
<tr>
<td>RC-33, 1 of 1</td>
<td>Nov. 15, 1977</td>
<td>RC-39, 1 of 2</td>
<td>Jan. 31, 1977</td>
</tr>
<tr>
<td>RC-34, 1 of 2</td>
<td>Nov. 15, 1977</td>
<td>RC-40, 1 of 2</td>
<td>Jan. 31, 1977</td>
</tr>
<tr>
<td>RC-37, 1 of 1</td>
<td>Nov. 15, 1977</td>
<td>RC-43, 1 of 2</td>
<td>Jan. 31, 1977</td>
</tr>
<tr>
<td>RC-38, 1 of 2</td>
<td>Nov. 15, 1977</td>
<td>RC-44, 1 of 2</td>
<td>Jan. 31, 1977</td>
</tr>
</tbody>
</table>

APPROVED FOR ISSUANCE BY:

David C. Sims, P. E.
Chief Highway Engineer
REVISIONS TO STANDARDS FOR ROADWAY CONSTRUCTION, RC-0-100
CHANGE #3, TO MARCH 1977 EDITION

INFORMATION AND SPECIAL INSTRUCTIONS: The attached revisions and additions should be inserted into your standards:

<table>
<thead>
<tr>
<th>Sheet</th>
<th>Change Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index Sheet</td>
<td>Revised to include new dates.</td>
</tr>
<tr>
<td>RC-52 (1 of 6)</td>
<td>Changed sheet No. Also sheet references where necessary.</td>
</tr>
<tr>
<td>(2 of 6)</td>
<td>Changed sheet No.</td>
</tr>
<tr>
<td>(3 of 6)</td>
<td>Changed sheet No.</td>
</tr>
<tr>
<td>(4 of 6)</td>
<td>Changed sheet No. Revised Cable Anchorage Detail. Also revised Concrete Footing to show foundation anchor plate instead of the 6&quot; section of foundation post.</td>
</tr>
<tr>
<td>(6 of 6)</td>
<td>Re-issue of this sheet. Shortened Rub Rail. Also removed 15° position drawings and incorporated them with the existing drawings.</td>
</tr>
<tr>
<td>RC-60 (2 of 2)</td>
<td>Added a chart for Drive Anchor Blades.</td>
</tr>
<tr>
<td>RC-62 (1 of 2)</td>
<td>New sheets added to show Permanent Barricades for both aluminum and wood panels.</td>
</tr>
<tr>
<td>(2 of 2)</td>
<td></td>
</tr>
<tr>
<td>RC-64 (1 of 1)</td>
<td>Permanent Barricades - Types A and B removed from this sheet.</td>
</tr>
<tr>
<td>RC-65 (1 of 1)</td>
<td>Subbase under raised median is now indicated as incidental to subbase item. Also Joint Sealer added to Typical Divisor Area.</td>
</tr>
<tr>
<td>_RC-70 (1 of 4)</td>
<td>Rock lining is shown 3' minimum instead of 2'6&quot;, because the max. size rock in the spec. gradation is 3'.</td>
</tr>
</tbody>
</table>

The drawing dates on RC-70 (2 of 4), (3 of 4), and (4 of 4) and RC-60 (1 of 2) shall be changed to September 1, 1978, as per the ink change.

It is desired that the new features of these standards be incorporated immediately in the preparation of plans. However, no additional compensation will be allowed for work involved to conform to these standards and coordination with the issuance of the new 4/87 supplement must be checked.

All projects let after December 31, 1978, shall contain these corrected drawings.

CANCEL AND DESTROY THE FOLLOWING:

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Date</th>
<th>Drawing</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index Sheet</td>
<td></td>
<td>RC-55 (1 of 1)</td>
<td>June 1, 1976</td>
</tr>
<tr>
<td>RC-52 (1 of 6)</td>
<td>May 1, 1978</td>
<td>RC-70 (1 of 4)</td>
<td>June 1, 1976</td>
</tr>
<tr>
<td>(2 of 6)</td>
<td>May 1, 1978</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3 of 6)</td>
<td>May 1, 1978</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4 of 6)</td>
<td>May 1, 1978</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5 of 6)</td>
<td>May 1, 1978</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC-60 (2 of 2)</td>
<td>January 31, 1977</td>
<td>RC-64 (1 of 1)</td>
<td>June 1, 1976</td>
</tr>
</tbody>
</table>

APPROVED FOR ISSUANCE BY:
David C. Sims, P. E.
Deputy Secretary for Highway Administration
**TRANSMITTAL LETTER**

**Pub. 72, Change #2**

**To March 1977 Edition**

**DATE:** May 1, 1978

**SUBJECT:**

REVISIONS TO STANDARDS FOR ROADWAY CONSTRUCTION, RC-0-100

CHANGE #2, TO MARCH 1977 EDITION

**INFORMATION AND SPECIAL INSTRUCTIONS:**

The attached revisions and additions should be inserted into your standards:

<table>
<thead>
<tr>
<th>Sheet</th>
<th>Change Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index Sheet</td>
<td>- Revised to include new dates.</td>
</tr>
<tr>
<td>RC-30 (1 of 1)</td>
<td>- A note was added to allow for extra depth pavement base drain when required.</td>
</tr>
<tr>
<td>RC-50 (1 of 1)</td>
<td>- Removed Type 2 Strong Post End Treatment and replaced it with the Breakaway Cable Terminal End Treatment. Revised the minimum treatment length of guard rail from 125' to 150'. Also dimensioned the maximum placement of the first guard rail post from the edge of the sloped parapet.</td>
</tr>
<tr>
<td>RC-51 (1 of 3)</td>
<td>- On the Typical Installation, the distance from the toe of slope to rear of post was revised to 2' minimum.</td>
</tr>
<tr>
<td>(2 of 3)</td>
<td>- The distance from the toe of slope to the rear face of the post is revised from 1' minimum to 2' minimum. The distance from the edge of the shoulder to the face of the guard rail is revised from 5'9&quot; to 4'9&quot; Typical. Added &quot;30 inches max.&quot; to the TYPICAL END POST DETAIL G.</td>
</tr>
<tr>
<td>(3 of 3)</td>
<td>- Removed &quot;Min.&quot; from the 1&quot; height of Conc. footing above the existing ground.</td>
</tr>
<tr>
<td>RC-52 (1 of 5) &amp; (2 of 5)</td>
<td>- Revised 1' Min. to 2' Min. behind guard rail posts and changed post designation to W85 with the addition of note 5. Also change sheet nos. where necessary.</td>
</tr>
<tr>
<td>(3 of 5)</td>
<td>- Removed Terminal Section-Double and changed post designation in Table of Post Bolt Lengths.</td>
</tr>
<tr>
<td>(4 of 5) &amp; (5 of 5)</td>
<td>- New Breakaway Cable Terminal drawing.</td>
</tr>
<tr>
<td>RC-53 (1 of 2)</td>
<td>- On the Typical Installation, the distance from the toe of the slope to the rear face of the post was revised to 2' minimum.</td>
</tr>
<tr>
<td>(2 of 2)</td>
<td>- Revised the placement of all guard rail to 2' Min. behind the guard rail post.</td>
</tr>
<tr>
<td>RC-54 (1 of 3)</td>
<td>- Eliminated Type 2 Strong Post End Treatment and replaced with Breakaway Cable Terminal End Treatment. Also revised the placement of guard rail as previously indicated. On tables 1 and 2, the last column was revised to measure the distance from the obstruction to the back of rail.</td>
</tr>
</tbody>
</table>

**Change Description**

- Changed the 5'9" Typical placement of guard rail to 4'9".
- The end treatment for Median Treatment at Dual Structures was changed to the Breakaway Cable Terminal End Treatment.
- Revised sheet references to comply with RC-52 drawing change.
- Added a note to allow the internal splice plate to be threaded as an alternate to tack welding hex nuts.
- Revised guard rail clearances at lighting poles to comply with minimum design clearances for different types of weak and strong post guard rail. Design Manual Chapter 7 - Lighting - will be changed to comply with this criteria in a future change.
- Added a new sheet to RC-83 for standard high mast lighting poles.

**REQUEST ADDITIONAL COPIES FROM:**

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Date</th>
<th>Drawing</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index Sheet</td>
<td>-</td>
<td>RC-54 (1 of 3)...June 1, 1976</td>
<td></td>
</tr>
<tr>
<td>RC-30 (1 of 1)...Nov. 15, 1977</td>
<td>(2 of 3)</td>
<td>RC-55 (1 of 1)...June 1, 1976</td>
<td>(2 of 3)</td>
</tr>
<tr>
<td>RC-50 (1 of 1)...June 1, 1976</td>
<td>(3 of 3)</td>
<td>RC-56 (1 of 1)...June 1, 1976</td>
<td>(3 of 3)</td>
</tr>
<tr>
<td>RC-51 (1 of 3)...June 1, 1976</td>
<td>(2 of 3)</td>
<td>RC-83 (1 of 1)...March 7, 1973</td>
<td>(4 of 4)</td>
</tr>
<tr>
<td>RC-52 (1 of 4)...June 1, 1976</td>
<td>(4 of 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2 of 4)</td>
<td></td>
<td>RC-53 (1 of 2)...June 1, 1976</td>
<td>(2 of 2)</td>
</tr>
<tr>
<td>(2 of 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CANCEL AND DESTROY THE FOLLOWING:**

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index Sheet</td>
<td>-</td>
</tr>
<tr>
<td>RC-30 (1 of 1)</td>
<td>-</td>
</tr>
<tr>
<td>RC-50 (1 of 1)</td>
<td>-</td>
</tr>
<tr>
<td>RC-51 (1 of 3)</td>
<td>-</td>
</tr>
<tr>
<td>RC-52 (1 of 5) &amp; (2 of 5)</td>
<td>-</td>
</tr>
<tr>
<td>RC-53 (1 of 2)</td>
<td>-</td>
</tr>
<tr>
<td>RC-54 (1 of 3)</td>
<td>-</td>
</tr>
</tbody>
</table>

**APPROVED FOR ISSUANCE BY:**

David C. Sims, P. E.
Deputy Secretary for Administration
It is desired that the revisions to these standards be incorporated immediately in the preparation of plans. No additional compensations will be allowed for work involved to conform to these standards.

All projects let after June 30, 1978 shall contain these revised drawings.
SUBJECT: STANDARDS FOR ROADWAY CONSTRUCTION RC-0-100

INFORMATION AND SPECIAL INSTRUCTIONS:

This is a 1977 printing of the Roadway Construction Standard Drawings. This new printing includes all previous changes and revisions prior to January 1977. Also included is a new revision dated January 31, 1977 as described below:

<table>
<thead>
<tr>
<th>SHEET</th>
<th>CHANGE DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index Sheet</td>
<td>Revised to include new dates and titles.</td>
</tr>
<tr>
<td>RC-11 (1 of 2)</td>
<td>Redrawn to include 2 sheets.</td>
</tr>
<tr>
<td>(2 of 2)</td>
<td>Added Metal and Concrete Cribbing Details. Added Class 3 Excavation for Metal Plate Pipe and Metal Plate Pipe Arch Culverts with Rohlalls.</td>
</tr>
<tr>
<td>RC-23 (1 of 2)</td>
<td>Added a note for construction practice at bridge approach slabs when the highway has 3 and 4 lanes.</td>
</tr>
<tr>
<td>(2 of 2)</td>
<td>Date change only.</td>
</tr>
<tr>
<td>RC-25 (1 of 2)</td>
<td>Title and date change only.</td>
</tr>
<tr>
<td>(2 of 2)</td>
<td>A new drawing added to the standards showing Type 4, 5, 6, and 7 shoulders. This drawing shall be used to assist in the design for maintenance type contracts.</td>
</tr>
<tr>
<td>RC-26 (1 of 2) &amp; (2 of 2)</td>
<td>New drawings added to the Standard Drawings. These drawings shall be used to assist in performing the necessary maintenance operations for either slabjacking or concrete patching.</td>
</tr>
<tr>
<td>RC-35 (1 of 1)</td>
<td>A new drawing showing details for permanent drainage dikes.</td>
</tr>
<tr>
<td>RC-39 (1 of 2)</td>
<td>Date change only.</td>
</tr>
<tr>
<td>(2 of 2)</td>
<td>Added details for a structural steel manhole cover and frame. Revised the cast iron manhole cover and frame. The Type A and B Modified Manhole was revised to one Modified Manhole.</td>
</tr>
<tr>
<td>RC-40 (1 of 1)</td>
<td>Added a note for the crosswall location spacing for Cement Concrete Paving for Stream Beds.</td>
</tr>
<tr>
<td>RC-60 (1 of 2)</td>
<td>Redrawn into 2 sheets. Eliminated Type 3 Right-of-Way Fence and replaced it with Type 5. The braces on Type 2 and Type 5 Right-of-Way Fence have been repositioned and dimensioned. Also revised the ground to bottom of fence clearance.</td>
</tr>
</tbody>
</table>

Please note that the Standard Drawings will begin to introduce metric conversions for dimensions on the drawings. The metric conversions will be applied to new sheets as they are added to the Standards, or the conversions will be partial, applying only to the areas where a revision requires redrawing. All the metric measurements will be equivalent dimensions and will be located in parenthesis following the English dimension.

It is desired that the new revisions to these standards be incorporated immediately in the preparation of plans. No additional compensation will be allowed for work involved to conform to these standards.

All projects let after June 30, 1977 shall contain the revised drawings herein.

CANCEL AND DESTROY THE FOLLOWING:

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<td>Revised to include new dates and titles.</td>
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<td>RC-11 (1 of 1)</td>
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<td>RC-23 (1 of 2)</td>
<td>Added Metal and Concrete Cribbing Details. Added Class 3 Excavation for Metal Plate Pipe and Metal Plate Pipe Arch Culverts with Rohlalls.</td>
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<td>RC-25 (1 of 2)</td>
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<td>RC-26 (1 of 2) &amp; (2 of 2)</td>
<td>New drawings added to the Standard Drawings. These drawings shall be used to assist in performing the necessary maintenance operations for either slabjacking or concrete patching.</td>
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<td>RC-35 (1 of 1)</td>
<td>A new drawing showing details for permanent drainage dikes.</td>
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<tr>
<td>RC-39 (1 of 2)</td>
<td>Date change only.</td>
</tr>
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APPROVED FOR ISSUANCE BY:
David C. Sims, P. E.
Deputy Secretary for Highway Administration
### Earthwork

- **RC-10**: Nov 15, 1977 — Classification of Earthwork
- **RC-11**: (2 Sheets) July 16, 1980 — Classification of Earthwork for Structures
- **RC-12**: Jan 1, 1976 — Backfill at Structures
- **RC-13**: Nov 15, 1977 — Pay Limit of Subbase & Subgrade

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- **RC-25** (3 Sheets): July 16, 1980 — Shoulders
- **RC-26** (3 Sheets): May 31, 1979 — Concrete Pavement Maintenance

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- **RC-31**: May 31, 1979 — Endwalls
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- **RC-54** (3 Sheets): May 1, 1978 — Guard Rail & Median Barrier Placement
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### Pollution Control

- **RC-70** (4 Sheets): Sept 1, 1978 — Erosion & Sediment Control

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- **RC-84**: July 16, 1980 — Highway Lighting - Lighting & Electric Details

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RC-91 June 1, 1976 BRACING & PLANTING DETAILS
TRENCH DETAILS FOR PIPE CULVERTS

Metal Pipe Arch Culverts

EXCAVATION ADJACENT TO ROADWAY

EXCAVATION FOR PIPE BEDDING

EXCAVATION FOR REMOVAL OF EXISTING PIPE OR STRUCTURE WHERE NO REPLACEMENT IS REQUIRED

DIVERSION DITCH

EXTRA DEPTH PIPE UNDERRAINT

ROADWAY SECTION SHOWING CLASS I EXCAVATION

MAXIMUM PARABLE EXCAVATION FOR TRENCHES IN EMBANKMENT AREAS FOR PIPE CULVERTS, CORRUGATED METAL PIPE ARCH CULVERTS, METAL PLATE PIPE CULVERTS & METAL PLATE PIPE ARCH CULVERTS

CLASSIFICATION OF EARTHWORK

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CLASS 1 EXCAV.
CLASS 2 EXCAV.
CLASS 3 EXCAV.
CLASS 4 EXCAV.
COMMON BORROW EXCAV.
EITHER CLASS I
COMMON BORROW EXCAV.
MAXIMUM PAYABLE EXCAVATION FOR TRENCHES IN EMBANKMENT AREAS FOR PIPE CULVERTS, CORRUGATED METAL PIPE ARCH CULVERTS, METAL PLATE PIPE CULVERTS

For pipes with an inside diameter of less than 8 feet:

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<td>CLASS 4 EXCAV.</td>
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Maximum permissible excavation for trenches in embankment areas for pipe culverts, corrugated metal pipe arch culverts, metal plate pipe culverts & metal pipe arch culverts.

Additional depth required for pipe bedding & trench details for pipe culverts & metal pipe arch culverts.
STRUCTURES OVER STREAMS
INCLUDING METAL PLATE ARCH WITH FOOTING
*When right angle span is less than 8', all excavation is Class 3.

GRADE SEPARATION STRUCTURES

WING WALLS & RETAINING WALLS

RC BOX CULVERTS
RC TIED ARCH CULVERTS

CLASS 1 EXCAV. —
ROADWAY ITEM
(To be included in roadway quantities)

CLASS 3 EXCAV. —
STRUCTURE ITEM
(To be included in structure quantities)

NOTE: Special situations involving excavation not entirely covered by this drawing must be defined on the design drawing by sketches and/or described in the Special Provisions.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CLASSIFICATION OF EARTHWORK FOR STRUCTURES
STRUCTURES OVER STREAMS
INCLUDING METAL PLATE SPAN WITH FOOTING
* when right angle span is less than 8' all excavation is Class 3.

GRADE SEPARATION STRUCTURES

WING WALLS & RETAINING WALLS

R.C. BOX CULVERTS
R.C. TIED ARCH CULVERTS

CLASS 1 EXCAV.
ROADWAY ITEM
(To be included in Roadway quantities)

CLASS 3 EXCAV.
STRUCTURE ITEM
(To be included in Structure quantities)

NOTE: Special situations involving excavation not entirely covered by this drawing must be defined in the design, shown by sketches and/or described in the Special Provisions.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
CLASSIFICATION OF EARTHWORK
FOR STRUCTURES
The bed and trench shall be formed as specified in Section 603.3, Form 408. Excavation will be measured and paid for as Class I Excavation, except as noted in Section A-A and Section C-C.

**SECTION A-A**

Metal Plate Pipe and Metal Plate Pipe-Arch Culverts with Endwall

**SECTION B-B**

Metal Crbbing

**SECTION C-C**

Concrete Crbbing

CLASS I EXCAV.
ROADWAY ITEM
(To be included in Roadway quantities)

CLASS 3 EXCAV.
STRUCTURE ITEM
(To be included in Structure quantities)
The bed and trench shall be formed as specified in Section 603.3, Form 408. Excavation will be measured and paid for at a maximum of 8 feet G.I. for Section B-B and Section C-C.

Metal Cribbing

Excavation including the portions of endwalls above the flow line and to a maximum of 4 feet above the top of the pipe will be Class 4 Excavation. Excavation for spans less than 8 feet for metal plate pipe arch.

Concrete Cribbing

For metal plate pipe-arch with spans 8 feet greater than the excavation between the Flow Line and the lower limit of C1 Excavation shall conform to the area shown with the C3 Excavation symbol. The C3 Excavation quantity shall be measured and paid for as the excavation limits shown as A and B in Section C-C.

When deemed necessary to excavate below the bottom of the flow line, all excavation within the limits of the bottom of the excavated trench and the top of the existing ground will be paid for as C1 Excavation for spans greater than 8 feet and as C4 Excavation for spans 8 feet or less. Backfill material for the undercut area shall be placed and shaped to conform to the limits of the excavation with which it will be considered incidental to the class of excavation specified.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
CLASSIFICATION OF EARTHWORK FOR STRUCTURES

Recommended: July 30, 1975
Approved: August 5, 1975
Director, Bureau of Design: Henry L. Hensler

CLASS 1 or 4 EXCAV- ROADWAY ITEMS (To be included in roadway quantities)
CLASS 3 EXCAV- STRUCTURE ITEMS (To be included in structure quantities)
Structure backfill shall consist of material meeting the requirements of Sections 350.2 of this Standard Drawing. Rock which can be placed and compacted in layers of 12 inches or less, may be used. However, rock shall not be permitted for structure backfill at metal plate abutments. Any stone, regardless of whether it is classified as rock or not, shall not be permitted in structure backfill. Steel slag, such as that resulting from the production of steel in basic oxygen or electric arc furnaces, or by open hearth, shall not be permitted as structure backfill.

Structure backfill shall be measured and paid for as Selected Borrow Excavation - Structure Backfill.

Backfill construction at culverts where the top of the culvert is near subgrade shall be treated the same as flared abutment wingwalls.

Backfill construction at R.C. Box Culverts with the top slab or roadway grade shall be treated the same as abutments.

Backfill construction at culverts where the top of the culvert is near subgrade shall be considered on a special basis and shall be treated as shown in the structure drawings or as directed by the engineer. Structure backfill and adjoining embankment shall be placed simultaneously unless otherwise permitted by the engineer.

Structure backfill quantities are shown in the structure drawings.

Material removed beyond the specified limits of Class 1, 2, or 3 excavation, shall be replaced with Structure Backfill and no payment will be made for material removed or for structure backfill placed beyond the specified limits of Class 1, 2, or 3 excavation.

Backfill and embankment shall be placed in accordance with the Standard Drawing unless otherwise shown on the structure drawings.

It is not permitted to place or compact rock in layers of 12 inches or less for structure backfill at metal plate abutments. Any stone, regardless of whether it is classified as rock or not, shall not be permitted in structure backfill. Steel slag, such as that resulting from the production of steel in basic oxygen or electric arc furnaces, or by open hearth, shall not be permitted as structure backfill.

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Structure backfill quantities are shown in the structure drawings.

Material removed beyond the specified limits of Class 1, 2, or 3 excavation, shall be replaced with Structure Backfill and no payment will be made for material removed or for structure backfill placed beyond the specified limits of Class 1, 2, or 3 excavation.

Drawings details are not shown, see structural drawings for drainage, weep holes, etc.
The payment for this area of subbase will be considered incidental to the shoulder.
The payment for this area of subbase will be considered incidental to the shoulder.
1. This standard does not show the details for the load transfer units. Only load transfer units which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted. Any manufacturer desiring to be listed in Bulletin No. 15 for these units which submit a request to the Bureau of Design (Research and Engineering) for approval. The drawing must show all the necessary details for the load transfer units to support the dowel bars in correct horizontal and vertical position and to retain the expansion joint material in a vertical position and prevent it from being displaced or bent during construction.

2. The requirements for lubricating and bending the dowel bars do not apply to plastic coated dowel bars.

3. An approved tube shall be placed over the graphite end of all dowel bars to be used in Type E joints and shall provide a minimum of 125 mm clearance pocket assured by means of a positive spacing device.

4. Expansion joint filler material shall be cut to conform to the cross section of the pavement and shall be furnished in strips equal to the width of the pavement slab. The top of the joint seating material shall be smooth and have provided for the dowel bars to slide without loss in their relative position. Dowels shall be placed parallel to the centerline and surface of the slab. The top of the joint seating material shall not be below the level of the pavement slab.

5. Dowel bars shall be parallel to the centerline and surface of the slab. The top of the joint seating material shall not be less than \( \frac{1}{4} \) inch (6mm) below the level of the pavement slab.

6. Dowel bars for pavement depths of 10 in (254mm) or less shall be \( \frac{1}{2} \) in (32 mm) in diameter and \( \frac{1}{8} \) in (3mm) long. Dowel bars for pavement depths of greater than 10 in (254mm) shall be \( \frac{3}{4} \) in (18 mm) in diameter and \( \frac{3}{4} \) in (19mm) long.

7. Dowel bars shall be placed parallel to the centerline and surface of the slab. The top of the joint seating material shall not be less than \( \frac{1}{4} \) inch (6mm) below the level of the pavement slab.

8. Neoprene seals shall be installed to a uniform depth. The top of the neoprene seal shall not be less than \( \frac{1}{4} \) inch (6mm) nor more than \( \frac{1}{4} \) inch (6mm) below the level of the pavement surface. The top edges of the contact surfaces on both sides of the seal shall be of the same elevation.

9. The top of the joint seating material shall not be less than \( \frac{1}{2} \) inch (13mm) or more than \( \frac{1}{4} \) inch (6mm) below the surface of the pavement.

10. Dowel bars shall be parallel to the centerline and surface of the slab. The top of the joint seating material shall not be less than \( \frac{1}{4} \) inch (6mm) or more than \( \frac{1}{4} \) inch (6mm) below the level of the pavement surface. The top edges of the contact surfaces on both sides of the seal shall be of the same elevation.
Tiebolts shall be 30" (762 mm) in length and spaced at 30" (762 mm) intervals. The bar depth shall be measured from the top of pavement to the top of bar.

### Joint Sealing Material

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<td>11&quot; (127 mm)</td>
<td>± .14&quot; (65 mm)</td>
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2. The threaded sleeve nut shall be made from steel pipe or hexagonal steel bar 2" (51 mm) in diameter and 2" (51 mm) long.

3. The key former shall be securely fastened to the steel form. The contractor shall have a method, acceptable to the engineer, of temporarily securing the tiebolt to the key former or form during placement of the concrete.

4. Tiebolt hooks shall be parallel with the grade when placing 6" (152 mm) concrete shoulders.
Expansion anchor bolts 7/8" inch in diameter and 12" inches long with 90° to 180° bend, shall be placed in accordance with Table 3.6, Expansion Anchor Bolt requirements shown on RC-20.

The design and quality of the bolts and the number of lead slugs or wedging units used shall be approved by the Department.

**EXPANSION ANCHOR BOLT METHOD**

Concrete for underpinning shall be the same mix as and shall be placed integral with the new pavement.

Excavation made to greater dimension than those shown for underpinning shall be replaced with concrete, and backfilling with other materials will not be permitted.

Corner breaks shall be repaired by the underpinning method.

The underpinning method should not be used if it will interfere with subsurface drainage.

**UNDERPINNING METHOD**

- Payable width of pavement, subgrade, and excavation

Either method shall be used to join new pavement. Only the underpinning method shall be used where the depth of existing pavement or concrete base is less than 7/8" inches.

When dowel bars are broken off or were omitted from dowelled longitudinal construction joints, either an expansion anchor bolt or underpinning shall be used.

Postfilled expansion joint filler shall be cast in the cross section of the new pavement. Two sections of filler, if satisfactorily tamped or clipped together, may be used with the underpinning method.

No separate or additional payment will be allowed for materials or labor involved in joining pavement by either method.

Adequate subsurface drainage must be provided when the underpinning method is used.

- The bar "(x-x-long)" is required only in underpinning where dowel bars are broken off or omitted from longitudinal construction joints.

**JOINING OF PAVEMENTS**

**PATCHES**

1. The minimum width of patch will be a single lane width.
2. The sides of the patch adjacent to a longitudinal joint shall be dowelled or underpinned as per widening.
3. The sides of the patch in the transverse direction shall be dowelled only.
4. A new cut 6" inches deep will be made along each side of the patch that is not bound by a joint.
5. The depth of the patch will equal that of the existing concrete except the minimum will be 2 inches.
6. Reinforcement will be replaced in kind if not needed otherwise.
NOTES

1. For variable width pavement the reinforcement shall be cut as required.

2. Wire fabric reinforcement may be placed with transverse wires above or below longitudinal wires.

3. Longitudinal wires for wire fabric reinforcement shall be of the following minimum sizes:

<table>
<thead>
<tr>
<th>Pavement Depth</th>
<th>Min. Long. Wire Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot; (203mm)</td>
<td>W 5.5 or D 5</td>
</tr>
<tr>
<td>9&quot; (229mm)</td>
<td>W 5.5 or D 5</td>
</tr>
<tr>
<td>10&quot; (254mm)</td>
<td>W 6.5 or D 5.5</td>
</tr>
<tr>
<td>12&quot; (305mm)</td>
<td>W 7 or D 6.5</td>
</tr>
</tbody>
</table>

4. Hinged fabric reinforcement may be used. Hinge detail must be approved by the engineer.

5. All longitudinal and transverse laps of wire fabric reinforcement shall be laboratory field.

6. On projects where additional lanes are being added to existing cement concrete pavements and the existing joint spacing is more than 46.5' (14.2m), the longitudinal wire size shall be a minimum of W6 or D 5.5.

7. Wire fabric reinforcement may be constructed of smooth wire (designated by W) or deformed wire (designated by D) or a combination of both.

8. See RC-20 for joint details.

9. Depth for placement of wire fabric reinforcement, measured from top of pavement to top of fabric shall be a minimum of 2x7 (54mm) to a maximum of one half the pavement depth minus 1" (25mm).

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

REINFORCED CEMENT CONCRETE PAVEMENT
WIRE FABRIC REINFORCEMENT

- Transverse construction
- Connection or expansion joint
- “W” or “D” transverse wires
- Expansion joint
- Wires

EDGE OF PAVEMENT

OVERALL WIDTH OF FABRIC

OVERALL WIDTH OF FABRIC

ALTERNATE HINGED FABRIC

ALTERNATE LAPPED FABRIC

GENERAL NOTES

1. Fabric reinforcement shall be constructed in accordance with Specification Form 408.
2. For variable width pavement and for widths not shown, the reinforcement shall be cut as required.
3. Wire fabric reinforcement may be placed with transverse wires above or below longitudinal wires.
4. Depth for placement of wire fabric reinforcement, measured from top of pavement to the top of fabric shall be as follows with a tolerance of ± 1/8:
   - Pavement Depth
   - Depth of Fabric
   - W
   - H

5. Hinged fabric reinforcement may be used for 11'-0", 12'-0", and 13'-0" widths where longitudinal joints are not permitted.
6. Lapped fabric reinforcement may be used for all widths where longitudinal joints are not permitted.
7. All longitudinal and transverse laps of wire fabric reinforcement shall be securely tied.
8. For projects where additional lanes are being added to existing cement concrete pavements and the existing joint spacing is more than 46.5, the longitudinal wire size shall be W6 or D5.5.
9. Wire fabric reinforcement may be constructed of smooth wire (sizes designated by W) or deformed wire (sizes designated by D) or a combination of both.
**Longitudinal Steel**

<table>
<thead>
<tr>
<th>No. of Bars</th>
<th>Size (in.)</th>
<th>6&quot; (152mm)</th>
<th>7&quot; (178mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>17 #5</td>
<td>6/4 3/4</td>
<td>6/4 3/4</td>
</tr>
<tr>
<td>7</td>
<td>20 #6</td>
<td>7/4 3/4</td>
<td>7/4 3/4</td>
</tr>
<tr>
<td>8</td>
<td>23 #7</td>
<td>5/4 3/4</td>
<td>5/4 3/4</td>
</tr>
<tr>
<td>16</td>
<td>9 #8</td>
<td>4/4 3/4</td>
<td>4/4 3/4</td>
</tr>
<tr>
<td>9</td>
<td>25 #9</td>
<td>5 3/4 3/4</td>
<td>5 3/4 3/4</td>
</tr>
<tr>
<td>18</td>
<td>8 #10</td>
<td>5 3/4 3/4</td>
<td>5 3/4 3/4</td>
</tr>
<tr>
<td>10</td>
<td>28 #11</td>
<td>5 3/4 3/4</td>
<td>5 3/4 3/4</td>
</tr>
</tbody>
</table>

**Transverse Bars**

<table>
<thead>
<tr>
<th>No. of Bars</th>
<th>Size (in.)</th>
<th>4&quot; (102mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>17 #5</td>
<td>4&quot; (102mm)</td>
</tr>
<tr>
<td>7</td>
<td>20 #6</td>
<td>4&quot; (102mm)</td>
</tr>
<tr>
<td>8</td>
<td>23 #7</td>
<td>4&quot; (102mm)</td>
</tr>
<tr>
<td>16</td>
<td>9 #8</td>
<td>4&quot; (102mm)</td>
</tr>
<tr>
<td>9</td>
<td>25 #9</td>
<td>4&quot; (102mm)</td>
</tr>
<tr>
<td>18</td>
<td>8 #10</td>
<td>4&quot; (102mm)</td>
</tr>
<tr>
<td>10</td>
<td>28 #11</td>
<td>4&quot; (102mm)</td>
</tr>
</tbody>
</table>

**Notes**

1. All Longitudinal Bars shall have a minimum top of 18"(457mm) or 25 diameters whichever is greater.
2. Bars of high yield strength shall not be bent.
3. Other lapping patterns may be used as approved by the engineer provided that no more than one-third of the longitudinal bars are lapped within the same transverse plane.
4. For Type L Joints see Standard Drawing RC-20. For 48' (14.63m) pavement with the center joint shall be a Type L construction joint without rebars.
5. Transverse steel bars, when required by special provision, may be provided in full width lengths for 24' (7.32m) and 36' (10.97m) pavement widths, and tie bars will not be required. When transverse bars are provided in one lane widths, the bars shall be provided exclusively between the transverse bars. Transverse bars shall have a 3" (76mm) clearance from the lane edge of pavement or lane.
6. The target depth for longitudinal bar placement measured from top of pavement to the top of bar shall be as indicated below:

<table>
<thead>
<tr>
<th>Depth</th>
<th>Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; (152mm)</td>
<td>3/4 (19mm)</td>
</tr>
<tr>
<td>7&quot; (178mm)</td>
<td>3/4 (19mm)</td>
</tr>
<tr>
<td>8&quot; (203mm)</td>
<td>3/4 (19mm)</td>
</tr>
<tr>
<td>9&quot; (229mm)</td>
<td>3/4 (19mm)</td>
</tr>
</tbody>
</table>

**TYPICAL CROSS SECTION**

- Transverse bars required by special provision only.
TABLE 1

<table>
<thead>
<tr>
<th>Transverse Bars (when required)</th>
<th>Longitudinal Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>Bar Size</td>
</tr>
<tr>
<td>23</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>28</td>
<td>9</td>
</tr>
<tr>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

Notes:
1. Minimum and workmanship shall be in accordance with Specification Form 408.
2. All longitudinal bars shall be in lengths of 6' or 25 diameters, whichever is greater.
3. Beam of high yield strength shall not be used.
4. No more than one-third of the longitudinal bars shall be looped within the same transverse plane.
5. Minimum distance between bars shall be 30 inches.
6. For 36' pavement widths, longitudinal joints shall be spaced at 12-inch intervals. For 30' pavement widths in two operations, 24' and 12' widths, the center joint for the 24' width shall be a sawed longitudinal joint and the remaining joint shall be a keyed and tied construction joint.
7. Longitudinal construction joints shall be constructed in accordance with Standard Drawings RC-22, except ties are eliminated at the center joint of the 48' pavement width.
8. Transverse steel bars, when required by special provision, may be provided in full width lengths for 24' and 36' pavement widths, but the bars will not be required. When Transverse Bars are provided in one-lane widths, the 4' tie bar shall be provided and be positioned between the Transverse Bars. Transverse Bars shall have a 2'/min. increase from end of bar to edge of pavement.
9. The target depth for longitudinal bar placement measured from top of pavement to the top of bar shall be as indicated below, with a tolerance of ±3/4 3/4

The preferred location for the tie bars is in mid-depth. The tie bars shall be placed below the longitudinal steel for any method of steel placement.

TYPICAL CROSS SECTION

Notes:
10. The preferred location for the tie bars is in mid-depth. The tie bars shall be placed below the longitudinal steel for any method of steel placement.
Transverse Construction Joint as required

End Lap staggered Min. 6" each

Direction of Construction

N

Min.

L

B'

End Lap staggered Min. 6" each

Edge Lap

(See Detail)

Type L Joint

The Bars as reving (See note 9)

MIN.

Pavement Edge

Direction of Construction

TYPICAL CROSS SECTION

BAR MAT

Length of mats - 30' Min.

NOTE:

See notes for values of S,K,D

Sheet 1 of 4

PLAN

BAR MAT

Length of mats - 30' Min.

EMERGENCY CONSTRUCTION JOINT

LOOSE BARS

Direction of Construction

6' or 50 Dia. min. (Typical)

Emergency Const. A

(See note 5)

4' or 30 Dia. min. (Typical)

Emergency Const. A

(See note 5)

TYPICAL CROSS SECTION

BAR MAT

NOTE:

See notes for values of S,K,D

Sheet 1 of 4

BAR MAT

EMERGENCY CONSTRUCTION JOINT

BAR MAT

EMERGENCY CONSTRUCTION JOINT

END LAP DETAIL

BAR MAT

25 Dia Min.

ALTERNATE END LAP DETAIL - BAR MAT

Transverse Joint as required

BAR MAT

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended: 11-14-75
Approved: 12-12-75
Rev. 3-28-84

Director, Bureau of Design
Chief, ENG Div.

RG 22
Transverse Construction joint as required

End Loss staggered Min. 4" apart.

Direction of Construction

End Loss (See Detail)

Longitudinal Joint

Tie Bars as required (See note 8)

PLAN
BAR MAT
Length of mat: 30' Min.

TYPICAL CROSS SECTION
BAR MAT

NOTE 1.
Materials and workmanship shall be in accordance with Specification Form 408.

NOTE 2.
All Longitudinal Bars shall have a minimum lap of 18" or 25 Diameters whichever is greater.

NOTE 3.
Bars of high yield strength shall not be bent.

NOTE 4.
The target depth for longitudinal bar placement measured from top of pavement to the top of bar shall be as indicated below with a tolerance of ±1/4".

NOTE 5.
Transverse steel may be on the top or bottom except where directed otherwise as indicated above the joint line. The length of the top shall be double the nominal specified. (12" = 300mm min.) whichever is greater, or each splice shall be strengthened by bolting in symmetrically with the top a 3 ft length of deformed bar of the nominal size in the longitudinal reinforcement.

NOTE 6.
The Emergency Construction joint shall be strengthened by the addition of supplementary deformed bars. Splices shall be bolted on the paneled section on the longitudinal reinforcement placed symmetrically with the joint and at uniform spacing along the joint. The number of supplementary bars shall be as to increase the areas of steel through the joint by at least one third.

NOTE 7.
Bar Mats shall have a nominal width of 4", 6", or 8".

NOTE 8.
When transverse bars required by special provision, the transverse bars for bar mats shall be as indicated in Table 1 on Sheet 1 of 5.

NOTE 9.
When 0' mats are used, the tie bar shall not be used because the bar must extend through the longitudinal joint and transverse steel must be on the bottom.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended
Approved
Director, Bureau of Design
Deputy Chief Civil Eng.
TYPICAL REINFORCING PLAN
USING DEFORMED WELDED WIRE FABRIC

TYPICAL CROSS SECTION

TYPICAL REINFORCING PLAN
DEFORMED WELDED WIRE FABRIC

TYPICAL MAT PLACEMENT PATTERN
DEFORMED WELDED WIRE FABRIC

NOTES
1. Deformed wire fabric reinforcing shall not be allowed for pavement depths less than 8 inches.
2. All longitudinal wires in the fabric shall have a minimum lap of 4'45 inches or 20 diameters, whichever is greater.
3. Transverse wires in the consecutive fabric sheets shall have a minimum lap of 4'45 inches.
4. Transverse Construction Joints and Emergency Construction Joints shall be strengthened by the addition of supplementary deformed welded wire fabric (or #5 deformed bars) 5'-0" (1.524m) in length, placed symmetrically with the joint wire deformed wire fabric is utilized. The supplementary steel shall be such as to increase the area of steel through the joint by at least one half.

5. At all lap splices occurring within 8 feet beyond the Construction Joint limits in the direction of paving and 3 feet back of the Construction Joint limits, the length of lap shall be double that normally specified. (3' or 50 diameters minimum whichever is greater) or each splice shall be strengthened by splicing in symmetrically with the lap, a 6 foot length of deformed bar of the same nominal size as the longitudinal reinforcement.

6. Deformed welded wire fabric may have a nominal width of either 4'6" or 8'. A Type L Joint is required at center line of 24' pavement width. (See Note 2 on RC-22, Sheet 2 of 4.)

7. The largest depth for lap of longitudinal wire is 6 inches. The entire area of the lap wire shall be placed in the first 50 diameters measured from the top of pavement to the top of any adjacent bay. The lap wire shall consist of a minimum of two bars placed at 3 feet center to center, the largest diameter bar not to exceed 0.80".
TABLE 2

<table>
<thead>
<tr>
<th>DEFORMED WELDED WIRE FABRIC DETAILS</th>
<th>Length of Sheet</th>
<th>Transverse Steel</th>
<th>Width of Sheet</th>
<th>Area of Sheet</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1.52</td>
<td>0.392</td>
<td>0.392</td>
<td>6@D4 @12&quot;</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1.294</td>
<td>0.357</td>
<td>0.357</td>
<td>6@D4 @12&quot;</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1.440</td>
<td>0.640</td>
<td>0.640</td>
<td>6@D4 @12&quot;</td>
<td></td>
</tr>
</tbody>
</table>

NOTES

1. All Reinforcing wrought iron shall be in accordance with Specifications Form 408.

2. Deformed Tie Bars in the Longitudinal Joint shall be placed at Mid Point of the Slab and shall conform to the spacing indicated in Table 2.

3. All Longitudinal Wire in the Fabric shall have a minimum lap of 15" at 25 Dia., whichever is greater.

4. Transverse Wire in the consecutive Fabric sheets shall have a minimum lap of 15".

5. The Emergency Construction Joint shall be strengthened by the addition of supplementary Deformed Bars. 6 feet long and of the same nominal size as the longitudinal reinforcement shall be placed symmetrically with the joint at a uniform spacing along the joint.

6. The target depth for longitudinal Wire placement shall be to the top of wire shall be as indicated below with a tolerance of ± 1/4".

7. Deformed Welded Wire Fabric may have a nominal width of either 4'-6" or 5'. The sawed longitudinal Joint is required at center line of 24'-0" pavement width (See Note 9 on RC-22, Sheet 2 of 5).

8. The Emergency Construction Joint shall be strengthened by the addition of supplementary Deformed Bars. 6 feet long and of the same nominal size as the longitudinal reinforcement shall be placed symmetrically with the joint at a uniform spacing along the joint.
**DETAIL A**

Bituminous Coated or Polyethylene Bond Breaker (6 mils thick min.)


No. 4 Bars 20-4" x 4" (1/4"")

**DETAIL B**

Bituminous Coated or Polyethylene Cored Beam (6 mils thick min.)


No. 4 Bars 20-4" x 4" (1/4"")

**DETAIL C**

Bituminous Coated or Polyethylene Bond Breaker (6 mils thick min.)

RAMP CONNECTION DETAILS

Detail A

LONGITUDINAL CONSTRUCTION JOINT

Area of Deformation

R.C.C. Pav'f. *

Variable Distance

EXIT TERMINAL

RAMP CONSTRUCTION DETAILS

LONGITUDINAL CONSTRUCTION JOINT

(See Detail B)

LANE

AREA OF ACCELERATION

Detail A

R.C.C. Pav'f.

TRANVERSE CONSTRUCTION JOINT DETAILS

LIMITS OF PLANNED TRANSVERSE CONSTRUCTION JOINT

LIMITS OF PLANNED TRANSVERSE CONSTRUCTION JOINT

SECTION A-A

LOOSE BARS

Suggested alternative: the same size as longitudinal bars, sufficient to increase steel area at least 33%.

SECTION B-B

REFORMED WELDED WIRE FABRIC

Suggested alternative: deformed welded wire fabric 5'-0" in length (or 5 deformed bars 5'-0" in length) to increase steel area.

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF TRANSPORTATION

BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Director, Bureau of Design

Commonwealth of Pennsylvania

DEPARTMENT OF TRANSPORTATION

BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

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DEPARTMENT OF TRANSPORTATION

BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Director, Bureau of Design
NOTES

1. Bridge Approach Slab shall be constructed in accordance with this Standard Drawing unless otherwise modified or shown on the structure drawings.

2. The skewed Type E joint does not apply when approach slab is being constructed in conjunction with a Pavement Relief Joint, See RC-24.

3. The standard Bridge Approach Slab shall be constructed in 2 lane widths; for 3 lane construction, 2 standard Bridge Approach Slabs shall be connected to the standard Bridge Approach Slab using a tied longitudinal construction joint; for 4 lane construction, 2 standard Bridge Approach Slabs shall be connected by a tied longitudinal construction joint.

4. The end of the approach slab shall be constructed at full 16" (406mm) depth when constructed in conjunction with a Pavement Relief Joint, See RC-24.

SECTION A-A

End of Superstructure

TESTED EDGES

1. Rubberized Bonding Material

DETAIL A

Bridge Approach Slab

SECTION B-B

PLAN

DETAIL A

(SEE SHEET 2 FOR DETAILS OF APPROACH SLAB WITH P/S CONCRETE SUPERSTRUCTURE)

DETAIL A (ALTERNATE)

(SEE NOTE 2 SHEET 2)
NOTES

1. Bridge Approach Slab must be constructed in accordance with this Standard Drawing unless otherwise modified or shown on the structure drawings.

2. For reconstruction work the skewed joint does not apply when approach slab is being constructed in conjunction with a Pavement Relief Joint, See RC-24.

3. The standard Bridge Approach Slab shall be constructed in 2 lane widths; for 3 lane construction an additional single lane Bridge Approach Slab shall be connected to the standard Bridge Approach Slab using a tied longitudinal construction joint; for 4 lane construction, 2 standard Bridge Approach Slabs shall be connected by a tied longitudinal construction joint.

4. The end of the approach slab shall be constructed at

5. "Paver Limits for Bridge Approach Slab" Plan or Reinforced Cement Concrete Pavement

6. Type E Joint See RC-20

SECTION B-B

DETAIL A (See Sheet 2 for details of Approach slab with P/S Concrete Bridge Superstructure)

Tooled Edges

Rubberized Sealing Material

Joint Breaking Material

Closed cell neoprene sponge

DETAIL A

Top of Abutment

Band Breaker

DETAIL A (ALTERNATE)

(to apply only when indicated on Structure Drawings)

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BRIDGE APPROACH SLAB

Recommended: May 28, 1973
Approved: August 19, 1973

RC-23
NOTES

1. Materials, workmanship and method of payment shall be in accordance with Section 505 of Form 408.

2. Bridge Approach Slab shall be constructed in accordance with this Standard Drawing unless otherwise modified or shown on the structural drawings.

3. When the Pavement Relief Joint is not used adjacent to the bridge approach slab, replace precasted Expansion Joint filler at abutment or exit diaphragm with closed cell neoprene sponge.

4. The standard Bridge Approach Slab shall be constructed in 2 lane widths; for 3 lane construction an additional single lane Bridge Approach Slab shall be connected to the standard Bridge Approach Slab using a dowelled longitudinal construction joint; for 4 lane construction, 2 separate Bridge Approach Slabs shall be connected by a dowelled longitudinal construction joint.

SECTION A-A

PLAN

SECTION B-B

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BRIDGE APPROACH SLAB
17" DEEP ADJACENT COMPOSITE BOX BEAMS WITH 9" DEEP APPROACH SLAB NOTCH

21" TO 48" DEEP ADJACENT COMPOSITE BOX BEAMS WITH 11" DEEP APPROACH SLAB NOTCH

SPREAD BOX BEAMS WITH APPROACH SLAB NOTCH 11/2" OR DEEPER

PLAN - T-BEAMS
Notes for Construction Revisions

* When making construction changes in the field this drawing is to serve as a guide for modifying notch details shown on P/S Standard Drawings for accommodating the Standard 16" Bridge Approach Slab.

* At beam ends, burn off reinforcement protruding into approach slab notch.

* At increase in field, providing overhang, if required.

See RC-23 Sheet 1 of 2

- Tilt hook to maintain proper clearance

Bond-breaker (2-Ply bituminous paper)

Bend in field

17" DEEP ADJACENT COMPOSITE BOX BEAMS WITH 9" DEEP APPROACH SLAB NOTCH

See RC-23 Sheet 1 of 2

- Tilt hook to maintain proper clearance

Bond-breaker (2-Ply bituminous paper)

Bend in field

21" TO 48" DEEP ADJACENT COMPOSITE BOX BEAMS WITH 11" DEEP APPROACH SLAB NOTCH

See RC-23 Sheet 1 of 2

- Tilt hook to maintain proper clearance

Bond-breaker (2-Ply bituminous paper)

Bend in field

END OF BEAM

17" DEEP ADJACENT COMPOSITE BOX BEAMS WITH APPROACH SLAB NOTCH 1½" OR TENDER

END OF BEAM

11" DEEP ADJACENT COMPOSITE BOX BEAMS WITH APPROACH SLAB NOTCH 1½" OR TENDER

SPREAD BOX BEAMS WITH APPROACH SLAB NOTCH 1½" OR TENDER

PLAN - Z-BEAMS

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BRIDGE APPROACH SLAB
Notes for Construction Revisions:

1. When making construction changes in the field, this drawing is to serve as a guide for modifying notch details shown on
   AWS Standard Drawings (ST-200 Series, Approved Aug. 17, 1964)
   for accommodating the Standard 16" Bridge Approach Slab.
   At beam ends, burn off reinforcement protruding into
   approach slab notch.
   • Increase in field, providing overhang, if required.

17" deep adjacent composite box beams with 9" deep approach slab notch

See RC-23 Sheet 1 of 2

Tilt hook to maintain proper clearance

Note:

For details not shown, see Standard Drawings ST-202 & ST-203 (Approved Aug. 17, 1964)
(Prestressed Conc. Bridges)

SPREAD BOX BEAMS WITH APPROACH SLAB NOTCH 11\(\frac{1}{2}\)" OR DEEPER

See RC-23 Sheet 1 of 2

Tilt hook to maintain proper clearance

Note:

See ST-204, ST-205 (Approved Aug. 17, 1964) for additional information.

10" to 44" deep adjacent composite box beams with 11\(\frac{1}{2}\)" deep approach slab notch

See RC-23 Sheet 1 of 2

Tilt hook to maintain proper clearance

Note:

For details not shown, see Standard Drawings ST-202 & ST-203 (Approved Aug. 17, 1964)
(Prestressed Conc. Bridges)

PLAN - T-BEAMS

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BRIDGE APPROACH SLAB

Resident Engineer: G. W. Ridenour, R. E.

Chief Bridge Eng. J. W. G. Womack
GENERAL NOTES

1. Concrete in subslab to be Class B AE.

2. Portion of reinforcing bars which are outside of the indicated pay line shall be included in the price for Pavement Relief Joint.

3. When the pavement grade slopes drainage towards the bridge, a Subgrade Drain (See RC-30) shall be placed under the 6" (152 mm) portion of the subslab and will be measured and paid for as specified in Section 610 of Form 408.

4. Where bridges are located more than 1,000 ft (304.8 m) apart, no relief joint will be used between the bridges. Where bridges are located between 1,000 ft (304.8 m) and 1,500 ft (457.2 m), one relief joint shall be placed midway between the bridges. In these cases the subslab shall be 6 in (152 mm) thick and 8 ft (2.438 m) wide.

5. For joint details on new construction see RC-20. For joint details on reconstruction see RC-26.
GENERAL NOTES
1. Concrete in subslab to be Class AA (at contractor's option, subslab concrete may be H.E.S)
2. Portions of reinforcing bars which are outside of the indicated pay lines shall be included in the bid price for pavement relief joint
3. When the pavement grade causes drainage towards the bridge, Subgrade Drain (See RC-30) shall be placed under the 6" (152mm) portion of the subslab and will be measured and paid for as specified in Section 610 of Form 408.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PAVEMENT RELIEF JOINT
(RECONSTRUCTION)

Schedule of Reinforcement Steel

<table>
<thead>
<tr>
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[Diagram of pavement relief joint with annotations]
NOTE:

Material, workmanship and method of payment shall be in accordance with Section 504 of Form 408.

Concrete in subslab to be Class AA (at contractors option subslab concrete may be H.E.S.)

Portions of A1- Bars and A2- Bars which are outside of the indicated pay lines are to be included in pipe bid for complete joint.

Bituminous wearing course to be placed in lifts not to exceed 5" compacted depth.

Pavement Base Drains, (See details RC-30), shall be used for transverse drains under the subslab and will be measured and paid for as specified in Section 602 of Form 408.

When plain cement concrete base course is specified the pavement relief joint shall be shown on the construction drawings as a special design.

Pavement Relief Joint shall be placed midway between the bridges except where bridges are located less than 500 feet apart (measured from the face of nearest abutments). Where bridges are located between 500 feet and 1000 feet apart, one relief joint shall be placed midway between the bridges.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PAVEMENT RELIEF JOINT

APPROXIMATE QUANTITIES
PER FOOT OF TRANSVERSE MEASURE

<table>
<thead>
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- Calculated using (4E/π)!^2
- % Barred portion of pavement slab has been converted to equivalent design depth of main line pavement.
Pavement Slab - Subslab

SECTION B-B

Subslob crown or slope parallel to pavement crown or slope.

SCHEDULE OF REINFORCEMENT STEEL

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<th>MARK</th>
<th>SIZE</th>
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APPROXIMATE QUANTITIES

PER FOOT OF TRANSVERSE MEASURE

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# Calculated using 0.625H^2

* * *

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PAVEMENT RELIEF JOINT

** Memorial, Deputy Chief Hwy. Engr. **
** Deputy Chief Hwy. Engr. **

Project Leader: John J. Pahl

Printed: September 1976

RC-24
Type 1 Shoulder
Type 1-F Shoulder
Type 1-S Shoulder

Designated Travelway Width
Effective Shoulder Width, See Note 5

Roadway

Line Stripe
See Note 3, this sheet

Flexible Paving

Subbase Material, See Note 2, this sheet

6" (152 mm) Bit. Cones Base

6" (152 mm) Bit. Surf. Base

SHOULDER ROUNDING ON HIGH SIDE OF SUPERELEVATED CURVES

Type 3 Shoulder

Designated Travelway Width
Effective Shoulder Width, See Note 5

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SHEETS OF:
RC-251

SHOULDERS

NOTES
1. The Agg. Base shall be constructed as specified in Section 350.3,
Form 408, and shall be considered part of the shoulder.
2. This payment for the area of subbase material shall be considered
incidental to the shoulder.
3. Depth of shoulder to be the combined depth of surface and base
courses.
4. Shoulder width 6' (1.829 m) use 0.05 Ff./Ft. (.05 m/m) slope on the shoulder, beginning from
the edge of the pavement.
5. For shoulder widths > 6' (1.829 m) use 0.041/Ft. (.04 m/m) slope on the shoulder with full depth
roadway pavement. Line strips to provide required
designated travelway widths.

FOR SUPERELEVATION UNDER 0.05 Ff./Ft, ELIMINATE THE
0.05 Ff./Ft. Rounding and Use the 0.02 Ff./Ft.
(0.02 m/m) Slope on the Shoulder, Beginning From
the Edge of the Pavement.

SHOULDER Rounding is to be used only on Interstates & Other Freeways
and arterials unless otherwise shown on the typical sections.

The Agg. Base shall be constructed as specified in Section 350.3,
Form 408, and shall be considered part of the shoulder.

The payment for the area of subbase material shall be considered
incidental to the shoulder.

Depth of shoulder to be the combined depth of surface and base
courses.

If shoulder width 6' (1.829 m) use 0.05 Ff./Ft. (.05 m/m) slope on the shoulder, beginning from
the edge of the pavement.

For shoulder widths > 6' (1.829 m) use 0.041/Ft. (.04 m/m) slope on the shoulder with full depth
roadway pavement. Line strips to provide required
designated travelway widths.

FOR SUPERELEVATION UNDER 0.05 Ff./Ft, ELIMINATE THE
0.05 Ff./Ft. Rounding and Use the 0.02 Ff./Ft.
(0.02 m/m) Slope on the Shoulder, Beginning From
the Edge of the Pavement.

SHOULDER Rounding is to be used only on Interstates & Other Freeways
and arterials unless otherwise shown on the typical sections.
NOTES

1. The Sealed Surface Course shall be placed to an approximate depth of 3" (76 mm) after rolling in accordance with Form 408.

2. The Bit. Conv. Base shall have a depth of 4" (102 mm) min. after final compaction.

3. The Aggr. Base shall be constructed as specified in Section 350.3, Form 408, and shall be considered part of the shoulder.

4. The payment for this area of subbase material shall be considered incidental to the shoulder.

5. Depth of shoulder to be the combined depth of surface and base courses or depth of concrete pavement.

6. Paint the vertical edge of the roadway pavement with a coat of bituminous material Class AC-20, E-6, RC-250, or RC-850.

SHOULDER Rounding ON HIGH SIDE

OF SUPERELEVATED CURVES

NOTE: Shoulder rounding is to be used only on Class 1 & 2 highways unless otherwise shown on the typical sections.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SHOULDERs
NOTES

1. The Sealed Surface Course shall be placed to an approximate depth of 4" after rolling in accordance with Form 408.

2. The Bit. Conc. Base shall have a depth of 4" min. after final compaction.

3. The Aggr. Base Course shall be constructed as specified in Section 350.3 of Form 408, and shall be considered part of the shoulder.

4. The shoulder joint shall be sealed in accordance with Section 501.3(q.) of Form 408.

5. Depth of shoulder to be the combined depth of surface and base courses or depth of R.C.C. Pavement.

6. Variable slope as shown on typical sections.

7. Paint the vertical edge of the roadway pavement with a coat of bituminous material Class AC-2000, E-S, RC-850 or RC-600.

8. All shoulder joints shall be sealed in accordance with Section 501.3(q.) of Form 408.

9. Super elevation shall be maintained on curves where required.

10. Shoulder rounding shall be formed by using 5" depth by 3" pitch corrugations.

SHOULDERS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SHOULDER WIDTH

SEAL SURFACE COURSE

SUBBASE MATERIAL

SHOULDER WIDTH

SEAL SURFACE COURSE

SUBBASE MATERIAL

SECTION A-A

CONCRETE SHOULDERS

SHOULDER ROUNDOING ON HIGH SIDE OF SUPERELEVATED CURVES
1. For Type 4, Type 5, and Type 6 Shoulders, a properly prepared surface is one that is either shaped and/or scarified and/or compacted. Shaping includes removal of existing shoulder material and the placement of graded material from the shaping operation into the low areas. Where there is insufficient graded material from the shaping operation, the Contractor shall complete the work by adding additional aggregate base course material. This additional material is incidental to the shoulder item.

2. For Type 7 Shoulders, a properly prepared existing paved shoulder is one that is cleaned and patched.

3. The guard rail type, height, and location from shoulder may vary, but when the height from the top of the rail to the proposed surface becomes less than 24" (600mm), the guard rail shall be removed, replaced, and/or reset in accordance with current guard rail standards. Where guard rail has railway configuration, the guard rail shall be removed when the height of guard rail becomes less than 27" (685mm).

4. Remove unsuitable material as directed, excavate, and backfill with material meeting the requirements of Section 350 or 351, Form 408. Shoulder excavation and backfill will be measured and paid for in accordance with Sections 654, 655, and 656, Form 408. (Cross sections not required.)

5. Grading will be considered incidental to the shoulder pay item. Where there is insufficient graded material from the grading operation to complete the operation, material meeting the requirements of Section 350 or 351 shall be used and will be paid for as Tons of Selected Borrow Excavation.
CONCRETE SHOULDERS ADJACENT TO
R.C.C. PAVEMENT AND P.L.C.C. PAVEMENT (RAMP)

CONCRETE SHOULDERS ADJACENT TO
C.R.C. PAVEMENT

CONCRETE SHOULDERS ADJACENT TO
P.L.C.C. PAVEMENT FOR COLLECTOR & LOCAL HIGHWAYS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SHOULDERS
(CONCRETE)

NOTES
1. The Agg. Base shall be as specified in Section 360.2, Form 404, and shall be considered part of the shoulder.
2. All shoulder pavers shall be sealed in accordance with Section 300.3(a), Form 408.
3. For joint details, see RC-22.
4. See RC-23, sheet 1 of 3, for shoulder rounding detail on high sides of super-elevations.
5. All the contractors option, shoulder joints may be placed on a skew in line with the skewed joints of the roadway pavement.
6. At the contractors option, Type 1 concrete shoulders may be constructed on a skew or at the uniform 8" (203 mm) depth and/or constructed at the same depth as the pavement, at no additional expense to the Department.
7. At the contractors option, Type 2 concrete shoulders may be constructed on a skew, with a 6" (152 mm) maximum depth, or at the same depth as the pavement, at no additional expense to the Department.

TYPICAL SECTION

SECTIONS A-A

CONCRETE SHOULDER EXPANSION JOINTS

SECTION B-B
**CONCRETE SHOULDER TYPE 1**

- **Shoulder Width**: 6' (1.829 m)
- **Appr. Base**: See Note 1, this sheet
- **Concrete Shoulder**: 10' (3.048 m)
- **Rumble Corrugations**: See Note 3, this sheet

**CONCRETE SHOULDER TYPE 2**

- **Shoulder Width**: 6' (1.829 m)
- **Appr. Base**: See Note 1, this sheet
- **Concrete Shoulder**: 10' (3.048 m)
- **Rumble Corrugations**: See Note 3, this sheet

**TYPICAL SECTION**

- **Concrete Shoulder Expansion Joints**
- **C.R.C. Pavement**
- **R.C.C. or P.C.C. Pavement**

**NOTES**

1. The Aggr. Base shall be as specified in Section 350.3., Form 408, and shall be considered part of the shoulder.
2. All shoulder joints shall be sealed in accordance with Section 500.3.(d), Form 428.
3. Short rumble corrugations 2" (51 mm) from the edge of the roadway pavement. Where a curb is used, the shoulder shall be constructed at least 4" (102 mm) from the curb.
4. For joint details, see RC-02.
5. See RC-25, sheet 1 of 3, for shoulder rounding detail on high side of superstructures.
6. At the contractors option, shoulder joints may be placed at a point 5' (1.52 m) from the curb, or at a uniform depth, or at the outside edge of the shoulder or the roadway pavement.
7. At the contractors option, Type 1 concrete shoulders may be constructed as shown, or at a uniform 8" (203 mm), or at the outside edge of the shoulder, or at no additional expense to the Department.
8. At the contractors option, Type 2 concrete shoulders may be constructed on a slope, with a 8" (203 mm) depth, or at the outside edge of the shoulder, or at no additional expense to the Department.

**Commonwealth of Pennsylvania**
**DEPARTMENT OF TRANSPORTATION**
**BUREAU OF DESIGN**

**SHOULders**

- **Concrete**

**SECTION A-C**

- **Concrete Shoulder Expansion Joints**
- **C.R.C. Pavement**
- **R.C.C. or P.C.C. Pavement**

**CORRUGATION DETAIL**

- **Concrete Shoulder Type**
- **C.R.C. Pavement**
- **R.C.C. or P.C.C. Pavement**

**A1**

- **Concrete Shoulder**
- **Concrete Shoulder**
- **Concrete Shoulder**
- **Concrete Shoulder**

**SECTION A-C**

- **Concrete Shoulder Expansion Joints**
- **C.R.C. Pavement**
- **R.C.C. or P.C.C. Pavement**

**A1**

- **Concrete Shoulder**
- **Concrete Shoulder**
- **Concrete Shoulder**
- **Concrete Shoulder**
HOLE ARRANGEMENT

SLABJACKING PROCEDURE

A. Holes shall be located and drilled in accordance with the Typical Guide For Slabjacking Hole Arrangement or as directed by the engineer in the field. Cables left from drilling shall be removed before pumping.

B. A thin mix shall be developed that will be adequate for penetrating and lubricating the subgrade area. During this step, wooden plugs shall not be used and the material shall be pumped only to the extent that the thin mix is visible in other holes. It is important to prevent the thin mix from entering the holes in any great quantity, but should this occur, it is then necessary to pump the thicker mix from the hole where the thin mix was spotted to the adjacent holes.

C. Allow a short time for the thin mix to settle (approximately 1/2 hour).

D. Develop a thicker mix similar in consistency to that which is produced from a caulking gun and in accordance with Form 408, Section 681. Do not plug any hole until the mix being forced out that hole is of such a consistency that it would resemble a stiff caulking material.

E. Plug the appropriate holes one at a time when the thicker mix begins to discharge from the hole. Pumping shall be alternated between the holes generally beginning with the lowest hole in the center of the slab and working outward, or as directed by the engineer in the field.

F. Pumping shall be continued until the thin mix is no longer visible in other holes.

G. All holes shall be plugged and traffic kept off the raised slab for a minimum of three (3) hours or as directed by the engineer in the field. The wooden pegs may be broken off flush to the pavement if it is necessary to have the road opened to traffic before the required time.

H. The engineer reserves the right to modify the consistency of the mix to achieve the necessary goal of penetrating and lubricating the subgrade area, lifting the slab or filling the voids.

NOTES

1. All materials and workmanship shall be in accordance with the requirements of Section 681, Form 408.
2. Hole spacing may be varied within the indicated dimensions, but once a pattern is established, it shall be continued over the entire settled area.
3. Holes shall not be drilled on cracks. If a pattern places a hole on a crack, the hole shall be moved a distance of 1 to 2 from the crack.
4. A settling pattern does not have to be followed. The engineer reserves the right to indicate a settling pattern and for pressure relief during pumping in the absence of the settled area.
5. The contractor is responsible for damage occurring to the pavement, shoulder, guard rail, curb, structure, drainage and underground utilities due to his operation.
When the distance becomes less than 10', remove this area of pavement to the transverse joint. Use the existing dowel bars of the transverse joint by thoroughly cleaning the dowel bars of existing concrete.

PAVEMENT PATCHING BETWEEN TRANSVERSE ROADWAY JOINTS

1. The area to be patched shall be outlined normal to the center line of the road.
2. A full depth saw cut shall be made with approved equipment doing each side that is not bound by a joint. The face of the existing pavement shall be reasonably vertical for the face of the longitudinals.
3. The edge of the pavement shall be removed at the end of each working day and there shall be no broken concrete or debris left along the shoulder or in the ditches.
4. If the material beneath the existing subbase is unstable, additional excavation and subbase will be required.
5. When a single lane is to be patched, the face of the longitudinal joint that has not been disturbed shall be thoroughly cleaned before the new concrete is placed against it. The base projecting from the longitudinal joint shall be moistened. The edge of the patch shall be cleaned and the resulting groove shall be filled with joint wetting material after the patching is completed.
6. The surface of the patch shall be finished to match the existing pavement cross section, including any existing wheel path if the patch is to extend over the transverse joint. The transverse joint shall be kept at least 10' from the edge of the pavement.

PAVEMENT PATCHING AT TRANSVERSE ROADWAY JOINTS

7. If a patch extends over the full width of the pavement, a Type L expansion joint shall be used.
8. When placing new concrete the subbase shall be conditioned as specified in Section 350, Form 408. The Exp. Tiebolts shall have a minimum pull strength of 15,000 pounds (66,725N).
9. When the shoulder area adjacent to the patch is disturbed, the existing subbase shall be removed.
10. The contractor is responsible for the removal of any item obstructing his work area and restoring the area to its original condition prior to the patching operation.

GENERAL NOTES FOR PATCHING

- Reinforcement any required when existing concrete contains reinforcement.
- Expansion Tiebolts shall have a minimum pull strength of 15,000 pounds (66,725N).
- Only Expansion Tiebolts which are supplied by an approved supplier as listed in Exhibit A will be permitted. The inserted anchor portion shall accommodate a hook bolt of 5/8" (16mm) diameter. The Exp. Tiebolts shall have a minimum pull strength of 15,000 pounds (66,725N).
- The edge of the old concrete shall be moistened.
- The area to be patched shall be outlined normal to the center line of the road.
- The transverse joint shall be kept at least 10' from the edge of the pavement.
1. The area to be patched shall be cutline parallel to the centerline of the road.

2. A saw cut 1/2 to 2" minimum length shall be made with approved equipment along each side that is to be removed of the existing pavement which is to be replaced. The existing concrete shall not be removed.

3. The existing concrete shall be removed at the end of each working day and there shall be no broken concrete or other debris left along the shoulder or in the ditch.

4. If the depth of the existing subbase is unsuitable, additional excavation and subbase will be required.

5. When a single lane is to be patched, the face of the longitudinal joint that has not been disturbed shall be thoroughly cleaned before the new concrete is placed against it. The bars projecting from the existing joint may be left in place. The edge of the patch next to the longitudinal joint shall be finished with an edging tool and the resulting groove shall be sealed with joint sealing material after the patching is complete.

6. For pavement widths over 10', these dimensions shall be increased so that the new concrete does not have to be epoxyapped. The edge of the existing pavement shall be moistened.

7. The existing subbase material shall be removed or the existing subbase material meeting the requirements of Section 350, Form 408. See Note 4, this sheet.

8. Existing subbase material other than subbase material meeting the requirements of Section 350, Form 408 shall not be removed.

9. New subbase material shall be placed under the pavement and through the shoulder when required and outlined appropriately. See RC-30 for Underbase details.

10. Transverse roadway joints shall be required and outlined in accordance with the requirements of Section 350, Form 408. See Note 4, this sheet.

11. The removal of the pavement, the existing subbase and the unsuitable additional excavation will be paid for at the cost base rate.

12. The contractor is responsible for the removal of any item obstructing the work area and restoring the area to the original condition at no additional expense to the Department.

13. EW-GW guidelines for concrete patching are restricted to the replacement of conventionally reinforced and plain cement concrete pavements and do not apply to continuously reinforced concrete pavement.

14. The area to be patched shall be outlined normal to the center line of the road.
Joint Rehabilitation

When the existing joint is replaced full depth

See Note 6

Concrete Joint Spall Repair

* See Note 4

NOTES
1. The existing steel plate is either 14 Ga. with a lapped top, or a flat plate 1/8" (3mm) thick.
2. Where an existing joint contains a steel plate it shall be removed to the bottom of the new sealant reservoir.
3. If the slab is being replaced adjacent to an existing joint, the removal of the steel plate is generally necessary below the new saw cut to optimize.
4. When the existing joint spacing is less than 39", (992mm), the joint sealant reservoir shall be 1/8" (3mm) thick. When the existing joint spacing is 39" (992mm) or more, it shall be 1/2" (12mm).
5. Permits for Type 2 Repair to be midjoint between existing dowel bars which are 1/2" (127mm) apart.
6. Where the existing pavement has been installed at a transverse joint, the joint sealant reservoir shall be constructed in two stages. The first stage shall consist of sawing the initial cut to the width and depth indicated in accordance with the applicable requirements of Section 501.5. The second stage shall consist of sawing the sealant reservoir to the width and depth indicated. This second stage sawing shall be performed with the concrete pavement adjacent to the joint sealed. This concrete pavement shall not be sawed without damage by blade action to the concrete adjacent to the joint.
7. If more than 60% of a lane width requires a Type 2 Repair, the entire joint shall be replaced in accordance with RC-26 Sheet 2 of 3 and paid for as Pavement Potching.
NOTES

1. Construction joints, for P.C.C. Pavements constructed on subbase, shall be skewed and shall be either uniform depth with load transfer dowel bars or butted with thickened slabs as shown in the Terminal Slab detail. Construction joints, for P.C.C. Pavements constructed on a stabilized base, shall be butt jointed and skewed.

2. For joint details, see RC-20.

3. All transverse joints shall be constructed on a 0 to horizontal skew. On curves, the skew will be measured from a perpendicular to a tangent on the long radius side of the curve.

4. When ramp width exceeds 14' (4.267 m) a Type L joint is required at mid point.

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Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PLAIN CEMENT
CONCRETE PAVEMENT

Revised: 3/1/2013
Approved: 3/2/2013
Rev. 1 of 2

Director, Bureau of Design
Chief Way Eng.

RC-27
Notes:
Actual joint locations to be determined in the field.
The change of pavement type on ramps shall occur at the first joint beyond the shoulder gore.
For calculating quantities of coarse aggregate, deduct volume occupied by pipe.

- **H**: Height of fill over top of pipe.
- **d**: 1.0 ft. (305 mm) minimum, where practicable.
- **W**: 2.0 ft. (610 mm)
- **O.0.**: Outside diameter of pipe barrel or shell.
- **H.D.**: Hub Diameter - Outside diameter of pipe at bell or bond.
- **b**: Varies in conformance with class of bedding applicable to pipe installation.
- **I.D.**: Nominal inside diameter of pipe.

**CLASS A**
- Loose, Highly Compressible Earth or other Approved Material

**CLASS B**
- Fine Aggregate for Class B Bedding

**CLASS C**
- Coarse Aggregate for Pipe Trench Backfill

---

**COARSE AGGREGATE FOR PIPE TRENCH BACKFILL**

- **CEMENT CONCRETE**
- **SELECTED FINE COMPRESSIBLE MATERIAL or when directed COARSE AGGREGATE**

---

**_COMBINATION STORM SEWER AND UNDERDRAIN**

**PIECE UNDERDRAIN**

**SUBSURFACE DRAIN OUTLETS**

---

**SUBSURFACE DRAINS**

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

---

**EXTRA DEPTH**
PIPED BOUNDARY TRENCH BACKFILL

CLASS A For Pipe Trench Backfill
Cement Concrete

CLASS B For Pipe Class B Bedding
Selected Fine Compressible Material or when directed

COARSE AGGREGATE

<table>
<thead>
<tr>
<th>CLASS A</th>
<th>CLASS B</th>
<th>CLASS C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;-5&quot;</td>
<td>5&quot;-8&quot;</td>
<td>8&quot;-12&quot;</td>
</tr>
</tbody>
</table>

BEDDING FOR PIPE CULVERTS & METAL PIPE-ARCH CULVERTS

SUBGRADE DRAINS

PIPED UNDERDRAIN

PIPE UNDERDRAIN OUTLETS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

COMBINATION STORM SEWER & UDRAIN

EXTRA DEPTH UNDERDRAIN

STONE FOUNDATION UNDERDRAIN TYPES A & B

ALTERNATE CONSTRUCTION IN CURVED AREAS

COMBINED STORM SEWER & UNDERDRAIN

EXTRA DEPTH UNDERDRAIN

No.10 coarse aggregate used over Pipe Underdrain Types A & B is positive to Coarse Aggregate for Extra Depth Underdrain. Use aggregate over pipe (underdrain - Type) Bed II or embed pipe (underdrain - Type) Bed I in any combination of extra aggregate and underdrain material designated to be used by the Engineer, but having the same aggregate of the same type and size as the Type Bed II as defined by the Engineer.

Underdrain with 3"-6" depth and an additional width of 2'-0" must be placed in Class C Excavations.
SLOPE PIPE FITTING - TYPE A

OUTLET PIPE THROUGH EMBANKMENT SLOPE

METAL PIPE CONNECTOR

ALTERNATE METAL PIPE CONNECTOR

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SLOPE PIPE FITTINGS AND CONNECTORS

Recommended: Dec. 1, 1977
Approved: Dec. 1, 1977

Location & Design Engineer: G.D. Ezell

RC-32
NOTES FOR ALUMINUM ALLOY END SECTION

1. All pipe bodies to have IG 60 sides and IG 60 center panel. Width of center panels to be greater than 30% of the pipe diameter. An IG 60 panel body to have no recesses which may be tightly joined by 3/8" galvanized rivets or bolts.

2. Reinforcement should be provided with fabricated, flat, bottom edges for all IG 60 sides, IG 60 ends, and IG 60 center panel. The IG 60 panel body to be provided with IG 60 center panel. The IG 60 panel body to be provided with IG 60 center panel.

3. Reinforcement should be provided with fabricated, flat, bottom edges for all IG 60 sides, IG 60 ends, and IG 60 center panel. The IG 60 panel body to be provided with IG 60 center panel. The IG 60 panel body to be provided with IG 60 center panel.

4. Galvanized toe plates to be provided on all end sections.

5. The Type D connection shall be used to connect end sections to pipe which have other than standard or stock or stock-galvanized or other. Other designs will be acceptable provided no leakage results from the connection.

NOTES FOR GALVANIZED STEEL PIPE-ARCH

1. The Type D connection shall be used to connect end sections to pipe which have other than standard or stock or stock-galvanized or other. Other designs will be acceptable provided no leakage results from the connection.

2. Reinforcement should be provided with fabricated, flat, bottom edges for all IG 60 sides, IG 60 ends, and IG 60 center panel. The IG 60 panel body to be provided with IG 60 center panel. The IG 60 panel body to be provided with IG 60 center panel.

3. Reinforcement should be provided with fabricated, flat, bottom edges for all IG 60 sides, IG 60 ends, and IG 60 center panel. The IG 60 panel body to be provided with IG 60 center panel. The IG 60 panel body to be provided with IG 60 center panel.

4. Galvanized toe plates to be provided on all end sections.

5. The Type D connection shall be used to connect end sections to pipe which have other than standard or stock or stock-galvanized or other. Other designs will be acceptable provided no leakage results from the connection.

GENERAL NOTES

1. End section shall be of the same material as the pipe or pipe connecting to which it is connected and shall be secured to the pipe with bolts or rivets as specified or otherwise.

2. End sections for aluminum alloy or steel pipe, with a diameter larger than 36", may be on the end of pipe sections, shall be architecturally designed. Details of the design shall be shown on the drawings.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

END SECTIONS FOR PIPE CURVETS

Recommended by: C. J. E. Approved by: L. T. M. 8/3/1957

RO 33

[Diagram of pipe sections and connections]
TYPE C INLET

- Grade Adjustment Ring (if required)
- Inlet Box
- Type C Inlet Concrete Top Unit

Grote

TYPE M INLET

- Grade Adjustment Ring (if required)
- Inlet Box
- Type M Inlet Concrete Top Unit

Grote

NOTES:
1. This drawing is intended to depict the various components required in a complete inlet. For the details of the various items see the following sheets:
   - Sheet 2 - Concrete Top Units
   - Sheet 3 - Grates
   - Sheet 4 - Frames

2. Each type of grate shown is suited for a particular situation:
   a. Type C Inlet is to be designated for installation in non-motorable areas.
   b. Type M Inlet is designated for installation in median areas and motorable curbs.
   c. Type S Inlet is designated for installation in snow covered areas.

3. Light weight grates may be specified for installation in Type M and S inlets, providing that the grate is located more than 50 feet from the edge of the roadway. The light weight grate shall be designated with the suffix "LW" such as Type M-LW Inlet.

4. The selection of components to achieve a specified inlet type is the contractor's responsibility.

5. Pipes will be located as required.

6. Shear holes shall be installed as required by Section 401, Form 401.

7. Grade Adjustment Rings may be of necessity or optional.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
INLET ASSEMBLIES

May 31, 1979

Director, Bureau of Design

Inlet Assemblies

RC-34
NOTES:

1. This drawing is intended to depict the various components required in a complete inlet. For the details of the various items see the following sheets:
   - Sheet 2 - Concrete Top Units
   - Sheet 3 - Grates
   - Sheet 4 - Frames
   - Sheet 5 - Inlet Boxes

2. Each type of inlet shown is suited for a particular situation.
   a. Type C Inlet is designated for installation in non-mountable curbs.
   b. Type M Inlet is designated for installation in median areas and mountable curbs.
   c. Type S Inlet is designated for installation in shoulder swale areas.

3. A lightweight grate may be specified for installation in the Type M and S inlets, provided that the grate is located more than 50 feet from the edge of the roadway. The grate that will accommodate the lightweight grate shall be designated with the suffix "LW" such as Type M-LW Inlet.

4. The selection of components to achieve a specified inlet type is the contractor's responsibility.

5. Pipes will be located as required.

6. Weep holes shall be installed as required by Section 605, Form 408.

7. Grade Adjustment Rings may be of masonry or precast concrete construction.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
INLET ASSEMBLIES

Nov. 15, 1977

Revised Date: 

Director, Bureau of Design

Date: 11-15-77

RC-34
NOTES:

1. All Inlet Tops that are Cap-in-Place shall conform to the shape and dimensions as shown on the standard and, at the option of the contractor, may be monolithic with the inlet box.

2. Concrete Top Units which seat the grate directly within the unit shall utilize 6x6x6 concrete angles embedded in the concrete as a bearing area for the grate.

3. This standard depicts the shape and dimensions required for uniformity and compatibility. It is not intended to show the details required for manufacturing and handling precast units. Only those items which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted. Any manufacturer desiring to be listed in Bulletin No. 15 for these units shall submit a 22 x 36" shop drawing to the Bureau of Materials Testing & Research for approval. The shop drawings must show all details including shapes, handling reinforcement, and any manufacturing details.

4. Whenever an inlet is required within a Mountable Curb Section, a Type M Inlet will be located adjacent to the back of the curb and will be flush with the pavement surface. See RC-65 for installation details.

5. Type C Inlet Concrete Top Units shall be dowelled with 2 - 1/2" x 1/8" dowel bar and 1/2" pre-embedded expansion joint filler when connecting adjacent curb sections.

6. The placement of the Type S Inlet relative to the gutter invert is dependent on the rate of back slope. Back slopes greater than 2:1 shall have the inlet located where the back slope line intersects the back, top, outside corner of the inlet. Back slopes less than 2:1 shall have the inlet located where the back slope line intersects the edge of the inlet grate.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
CONCRETE TOP UNITS

May 8, 1979

Recommends:

Approved:

Director, Bureau of Design

Deputy Chief Hwy. Engr.

RC-34
NOTES:
1. All Inlets that are Cast-In-Place shall conform to the shape and dimensions shown on the standard end, at the option of the contractor, may be monolithic with the inlet box.
2. Concrete Top Units which seat the grate directly within the unit shall utilize 1½ x 1½ angle embedded in the concrete as a bearing area for the grate.
3. This standard depicts the shape and dimensions required for uniformity and compatibility. It is not intended to show the details required for manufacturing and handling. Only those items which are supplied by an approved manufacturer as listed in Bulletin No. 12 will be permitted.
4. Wherever an inlet is required within a Mountable Curb Section, a Type M Inlet will be located adjacent to the back edge of the curb and will be flush with the pavement surface. See RC-65 for installation details.
5. Type C Inlet Concrete Top Units shall be dowelled with 2- #6 x 1'-0" dowell bars and 1/8" premolded expansion joint filler when connecting adjacent curb sections.
6. The placement of the Type S Inlet relative to the gutter invert is dependent on the rate of back slope. Back slopes greater than 2:1 shall have the inlet located where the back slope intersects the outside corner of the inlet grate. Back slopes less than 2:1 shall have the inlet located where the back slope intersects the edge of the inlet grate.
Grates shall be ductile or malleable cast iron or structural grade steel. Grates manufactured from gray cast iron shall be submitted for approval.

All welding required for the fabricates shall be accomplished in accordance with Section 1032.21, Form 4011-Specifications.

This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the various details required for fabrication or manufacturing. Only those items, when supplied as an approved manufacturer listed in Bulletin No. 15, will be permitted. Any manufacturer desiring to be listed in Bulletin No. 15 for these units shall submit a shop drawing to the Design Bureau. The shop drawing shall show all details including dimensions, tolerances, welding symbols, etc. If approved, the manufacturer will be listed in Bulletin No. 15.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
GRATES

May 31, 1979

[Signature]
Director, Bureau of Design
[Signature]
Assistant Director, Bureau of Design
Typical Corner detail on fabricator's responsibility shall be approved.

\( \frac{1}{2} \times 1 \times \frac{3}{8} \) Spacer, see details.

\( \frac{1}{2} \times \frac{3}{8} \) Bar 2" C to C.

\( \frac{1}{2} \times \frac{3}{8} \) Slot 1" C to C.

**Grate Spacers Detail**

**LIGHT-WEIGHT GRATE**

[For use in Type M and S inlets when
interior more than 30 feet from edge of
the roadway where utilizing such grate will
be designated by the suffix-LW such as
Type M-LW or Type S-LW Inlet.)

**NOTES:**

1. Grates shall be ductile or malleable cast iron or structural steel grade steel. Grates manufactured from Gray Cast Iron shall be submitted for approval.

2. All welding required for the fabricated grates shall be accomplished by a welder certified as required in Section (OSHA), Form 409.

3. This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the various details required for fabrication or manufacturing. Only those items which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
GRATES

Approved: Deputy Chief Hwy. Eng.

RC-34
**TYPE C FRAME**

Symmetrical About Z

Ferrous Cost Material Structural Steel Fabrication

NOTE: Corner configuration details are fabricated responsibility. Shall be approved

**TYPE M FRAME**

Symmetrical About Z

Ferrous Cost Material Structural Steel Fabrication

NOTE: Frames shall be either gray, ductile or malleable cast iron or structural grade steel.

All welding required for the fabricated frame shall be accomplished by a welder certified as required in Section 1053.24, Form 403.

This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the variety of details required for fabrication or manufacturing. Only those items which are supplied by an approved manufacturer as listed in Bulletin No. (5) will be permitted. Any manufacturer desiring to be listed in Bulletin No. (5) for these units shall submit a 22" x 36" (560mm x 914mm) shop drawing to the Bureau of Materials, Testing & Research for approval. The shop drawing must show all details including dimensions, tolerances, welding symbols, etc.
Symmetrical
About C

Ferritic Cast Material - Structural Steel Fabrication

TYPE C FRAME

3" (Min.)

See Detail T-1

See Detail T-2

DETAIL T-3

DETAIL T-4

See Detail T-2

DETAIL T-5

DETAIL T-6

NOTES:
1. Frames shall be either gray, ductile or malleable cast iron or structural grade steel.
2. All welding required for the fabricated frame shall be accomplished by a welder certified as required in Section 1053.21, Form 409.
3. This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the various details required for fabrication or manufacturing. Only those items which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
FRAMES

Revised: June 1974
Approved: January 1974
Rev. 3 of 3
Director, Bureau of Design Deputy Chief Hwy. Engr.

RC-34

Director, Bureau of Design Deputy Chief Hwy. Engr.
NOTES:

1. Materials and construction shall comply with the requirements of specifications Form 406, section 6.05 for Class IV-R and Section 7.0.8 for Preplaced Cement Concrete Units.

2. Pipe or pipes shall be located as required, with the inlet bottom shaped to channel the flow toward the outlet pipe.

3. Precast Inlets that shall be used in lieu of Class-in-Place Boxes. This standard depicts the shape and dimensions desired for uniformity and consistency. It is not intended to show the details required for manufacturing and handling. If precast inlet boxes are used, only those supplied by an approved manufacturer as listed in Bulletin 15 will be permitted.

4. Inlets that exceed the maximum depth shown shall require a special design and details for the inlet walls and base.

5. Cut edges shall be rounded and be placed in 4" layers, thoroughly compacted to a density satisfactory to the engineer.

6. UNITS:

- For pipe dia. over 48", see Modified Type I
- For pipe dia. over 24", see Modified Type II

INLET BOX
MODIFIED TYPE I

SECTION A-A

INLET BOX
MODIFIED TYPE II

SECTION B-B

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLET BOXES

Recomm. Eng. Staff

Lett. Eng.

RC-34
Material and construction shall comply with the requirements of Specifications Form 408, Section 605 for Cost-in-Place, and Section 713.2 for Precast Concrete Units.

Inlets that exceed the maximum depth as shown shall require a special detail and design for the inlet walls and base.

When a situation cannot be satisfied by the inlet boxes shown, special details and design shall be provided.

For orientation of the Type C inlet with Modified Type I inlet box, the typical installation details are shown below. Any variation shall be shown on the construction drawings by special details.

5. When the top unit and either a Type I or Type II Modified Inlet Boxes are constructed monolithically (no construction joint), a minimum depth of 20" shall be measured from the top surface of the top unit to the inside top of the pipe.
NOTES

1. The drainage dike shall not be constructed to a
   height to cause flooding of the subbase.
2. Construction of the drainage dike shall be considered
   incidental to the Class I excavation.

SECTION A-A

Height = 8" for Swales, 12" for Medians,
Unless Otherwise Specified

Flow line or swale invert

SECTION B-B

SECTION C-C

MEDIAN INSTALLATION

DRAINAGE DIKE

SWALE INSTALLATION

DRAINAGE DIKE

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

DRAINAGE DIKE
For frame and cover casting details, refer to RC-39, 2 of 2.

Adjust to final grade with Precast Grade Rings or Brick and Cement Mortar.

Typical Cast Iron Section

Typical Precast Section

PRECAST

Precast Manholes shall meet the requirements of Section 715.3 of Form 408, and may be substituted for Types A or B Manholes.

Welded wire fabric shall conform to the requirements of Section 709.3 of Form 408.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD MANHOLES

For base dia. and thickness, see notes on sheet 2 of 2 RC-39.
**PLAN OF SLAB OVER PIPE**

- Plan showing pipe placement.

---

**SECTION A-A**

- Section showing cross-section details.

---

**PLAN OF SLAB OVER PIPE**

- Plan showing plan over pipe details.

---

**TABLE OF BASE SLAB DIMENSIONS**

<table>
<thead>
<tr>
<th>Measured Dim. of Pipe</th>
<th>Type of Material</th>
<th>Depth from Top to Crown of Pipe</th>
<th>Total As. ft</th>
<th>Minimum Width at Base Size</th>
<th>Minimum Width at 60&quot; Below Base Size</th>
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</thead>
<tbody>
<tr>
<td>12&quot; A</td>
<td>Min. 10'-0&quot;</td>
<td>0.65</td>
<td>6'-6&quot;</td>
<td></td>
<td>4'-6&quot;</td>
</tr>
<tr>
<td>18&quot; A</td>
<td>Min. 20'-0&quot;</td>
<td>0.65</td>
<td>6'-6&quot;</td>
<td></td>
<td>4'-6&quot;</td>
</tr>
<tr>
<td>24&quot; B</td>
<td>Min. 30'-0&quot;</td>
<td>1.05</td>
<td>6'-6&quot;</td>
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<td>4'-6&quot;</td>
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<tr>
<td>30&quot; B</td>
<td>Min. 40'-0&quot;</td>
<td>1.50</td>
<td>6'-6&quot;</td>
<td></td>
<td>4'-6&quot;</td>
</tr>
</tbody>
</table>

---

**STRUCTURAL STEEL COVER**

- Diagram showing structural steel cover details.

---

**CAST IRON COVER**

- Diagram showing cast iron cover details.

---

**STANDARD MANHOLES**

- Notes on standard manhole requirements.

---

**MODIFIED MANHOLE**

- Notes on modified manhole changes.

---

**MANHOLE STEPS**

- Notes on manhole steps requirements.

---

**CAST IRON FRAME**

- Notes on cast iron frame details.

---

**NOTES**

- Additional notes on design and construction requirements.
CEMENT CONCRETE SPILLWAYS

For use on embankment slopes

SECTION A-A

6' x 6' Rein. Mesh 10 Ga.

For use on cut slopes

SECTION B-B

6' x 6' Rein. Mesh 10 Ga.

For use on embankment slopes

SECTION C-C

6' x 6' Rein. Mesh 10 Ga.

FOR USE ON CUT SLOPES

6' x 6' Rein. Mesh 10 Ga.

FOR USE ON EMBANKMENT SLOPES

MORTARED STONE SPILLWAYS

SECTION F-F

CEMENT CONCRETE SPILLWAYS

Elevation indicated on the drawings or as directed.

Rock need not be placed by hand.

Installation detail for half-circle pipe (Class 2 Excavation)

DETAIL A - ANCHOR BOLT

NOTES

1. All items shall conform to the requirements of Form 408.
NOTE:
1. All reinforcement bars unless otherwise noted, are placed 3" from face of cem. cone.
2. All concrete to be Class A Cem. Cone.
3. Spacings of toe walls and cut off walls shall be as indicated by grid diagram on the detail drawings, or as directed.

Corresponding ends of reinforcement bars shall be fitted with an approved metal cap providing a 12 minimum clearance pocket (Typ.)

GRID DETAIL
(Stone not shown)

SECTION B-B THRU COMPLETED WALL

SECTION C-C

SECTION D-D

SECTION A-A

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SPECIAL MORTARED STONE SLOPE WALL

(Refer to Bureau of Design Sheet)

May 31, 1977
May 2, 1978

Director, Bureau of Design
Deputy Chief, Design
RC-41
All wires of the reinforcement fabric shall be spaced 6" C.C.

One-half of bar rendered bondless with graphite lubricant or Approved Bitumen.

One-half of bar rigidly encased in concrete.

Spacing of Weepholes shall not exceed 15 ft. C to C.

Approx. 1/2 C.C. of No. 28 Coarse Aggr. at each weephole (Typ.)

Approved Metal Tube

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

REINFORCED CEMENT CONCRETE SLOPE WALL

SECTION A-A

SLIP DOWEL BAR DETAIL

SECTION THRU COMPLETED WALL

SLAB DETAIL

All Exposed Edges Painted

GRID DETAIL

(Dots Not Shown)
DESIGN HIGH WATER
STREAM BED ELEVATION

CHANNEL LINING

APRON OR TOE WALL WILL BE REQUIRED WHERE THE SLOPE WALL IS USED ADJACENT TO WATER.

HARDWOOD PEGS—TYPICAL ON ALL SLOPES 1/2 TO 1 AND STEEPER.

SLOPE TOP OF GABIONS TOWARD CHANNEL.

FLOW

STREAM BED ELEVATION

GABION KEYED INTO STREAM.

BOTTOM UP TO 1/2 OF HEIGHT.

SLOPE TOP OF GABIONS TOWARD CHANNEL.

CHANNEL DEFLECTOR

* Type A Gabions shall consist of wire baskets filled by hand placement of coarse aggregate of least along the exposed faces for a uniform appearance.

* Type B Gabions shall consist of wire baskets filled completely with small power equipment or by hand.

* Corrosion Resistant Type A and B Gabions shall be the same as Type A and B Gabions except that the basket wire shall be sheathed in polyvinyl chloride plastic.

SLOPE WALLS

MATTRESS TYPE

WIRE MESH BASKETS

* 9" For Corrosion Resistant

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

Director, Bureau of Design
Deputy Chief Hwy Engr.

RC-43

GABIONS

May 31, 1979

Recommended

Revised

Sheet 1 of 1

May 31, 1979

 Gabions

 Gabions

 Gabions

 Gabions

 Gabions

 Gabions

 Gabions

 Gabions

 Gabions

 Gabions

 Gabions

 Gabions
TREATMENT 25' TRANSITION TREATMENT

Type 2-SC Special Guard Rail

Type 2-WC Guard Rail

Type 2-W Guard Rail

TREATMENT 25' TRANSITION TREATMENT

MINIMUM TREATMENT

Transition Curb block details shown on the structure design drawings.

Traffic Direction

PLAN

ELEVATION FOR TRANSITION TREATMENT

APPROACH END GUARD RAIL TRANSITION AT SLOPED CURB PARAPET

[27' Height]

MINIMUM TREATMENT

Transition Curb block details shown on the structure design drawings.

Traffic Direction

ELEVATION

APPROACH END GUARD RAIL TRANSITION AT SLOPED PARAPET [32' Height]

NOTES

1. Approach End Guard Rail Treatment shall be provided at both the Approach and Trailing Ends of Structure Parapets on two lane facilities with two way traffic. On four lane divided highways guard rail is not required at trailing ends of parapets unless warranted by other obstructions.

2. This length of the Rubbing Rail is not to be included as part of the Type 2-W Guard Rail and should be incidental to the Type 2-S Guard Rail pay item.
NOTE:

1. All materials shall conform to the requirements of Form 408.

2. The 3 3/8 x 2 1/8 cold formed channel post, 33 x 5.7 post and aluminum alloy post may be bid as alternatives for Type I Weak Post Guard Rail System. However, mixing of different posts will not be acceptable within a project.
**Type I Weak Post Guard Rail**

**Commonwealth of Pennsylvania**

**Department of Transportation**

**Bureau of Design**

**Notes**

1. The following criteria shall apply for arrangement of Spring Cable End Assemblies and Turnbuckle Cable End Assemblies:

   - Length of Cable Run:
     - Up to 1000'—Use Compensating Device on one end, and Turnbuckle on the other end of each individual cable.
     - Over 1000' to 2000'—Use Compensating Device & Turnbuckle on each end of each individual cable.
     - Over 2000'—Start new sketch of overlapping end parallel post (See Typical Layout Sketch).

2. Fittings: All fittings shall be so designed and be of such sectional sizes to develop the full strength of a single cable or cable assemblies, as the case may be.

   - Single Cable End Assembly—Min. Tensile Strength—25,000 Lbs

   - All fittings shall be galvanized according to ASTM-A53.

3. Material indicated as “Cast Steel” shall comply with AASHTO-M103, or ASTM A27, that indicated as “Malleable Iron” shall conform to AASHTO-M106 or ASTM A47. Reference shall be made to Form 405 for details.

4. Designs for a combination or single unit compensating device and turnbuckle assembly may be submitted for approval.

5. Hook bolts, as installed, shall develop an ultimate pull-out strength of from 500 lbs. to 1000 lbs. in a direction normal to the longitudinal axis of the post.

6. At all locations where the cable is connected to a cable anchor with a wedge type connection, one wire of the wire rope shall be crimped over the base of the wedge to hold it firmly in place.

7. Compensating device must have a spring rate of 450 to 500 lbs per inch and a total available “throw” of 6 in at the following positions:

   - Temp. range: 10°F to 80°F
   - Spring Compressor: 20 lb per inch
   - Spring: 100 lb

8. The cable tension shall be controlled by the following table:

<table>
<thead>
<tr>
<th>Temp. range</th>
<th>0°F</th>
<th>10°F</th>
<th>20°F</th>
<th>30°F</th>
<th>40°F</th>
<th>50°F</th>
<th>60°F</th>
<th>70°F</th>
<th>80°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring Compressor</td>
<td>20 lb</td>
<td>20 lb</td>
<td>20 lb</td>
<td>20 lb</td>
<td>20 lb</td>
<td>20 lb</td>
<td>20 lb</td>
<td>20 lb</td>
<td>20 lb</td>
</tr>
</tbody>
</table>

9. Alternate designs may be submitted for approval.

10. Installation of delineator assemblies shall be done under a separate pay item or contract. See Traffic Standard TC-7704, sheet 5 l & 4.

11. Guard Rail over underground structures shall be constructed as shown on RC-53, sheet 1 of 2.
NOTES

1. All materials shall conform to the requirements of Form 408.
2. The 3\(\frac{3}{8}\) x 2\(\frac{1}{4}\) cold-formed channel post, 5\(\frac{3}{8}\) x 5.7 post and aluminum alloy post may be bid as alternatives for Type I Weak Post Guard Rail System. However, mixing of different posts will not be acceptable within a project.

TYPICAL INSTALLATION

DETAIL A

\(\frac{3}{8}\) HOOK BOLT

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE I WEAK POST
GUARD RAIL
NOTES

1. The following criteria shall apply for arrangement of Spring Cable End Assemblies and Turnbuckle Cable End Assemblies:

   Length of Cable Runs:
   - Ty 1200'- Use Compensating Device on one end, and Turnbuckle on other end of each individual cable. Over 3000'- Use Compensating Device & Turnbuckle on each end of each individual cable. Over 2000'- Start Stretch by overlapping at last parallel post (See Typical Post Sketch).

2. Fittings: All fittings shall be so designed and be of such sections as to develop the full strength of a single cable or cable assembly, as the case may be.

3. Single Cable End Assembly: Min. Tensile Strength=25,000 Lbs.

   All fittings shall be ginned according to ASTM A493.

4. Material indicated as "Cast Steel" shall conform to AASHTO-M103, or ASTM A370 that indicated as "Malleable Iron" shall conform to AASHTO-M104 or ASTM A55. Reference should be made to form 409 for details.

5. Designs for a combination or single unit compensating device and turnbuckle assembly may be submitted for approval.

6. Hook bolts, as installed, shall develop an ultimate pull open strength of from 300 Lbs. to 2000 Lbs. applied in a direction normal to the longitudinal axis of the post.

7. Compensating devices must have a spring rate of 4500 50 lbs per inch and a total available "throw" of 4" min.

8. The cable tension shall be controlled by the following table:

<table>
<thead>
<tr>
<th>Tensile Strength</th>
<th>400</th>
<th>600</th>
<th>800</th>
<th>1000</th>
<th>1200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension, Lbs.</td>
<td>450</td>
<td>650</td>
<td>850</td>
<td>1050</td>
<td>1250</td>
</tr>
</tbody>
</table>

   NO. 5: From unloaded position in each spring

9. Alternate designs may be submitted for approval.

10. Installation of delineator assemblies shall be done under a separate site item or contract. See Traffic Standard TC-7709, sheet 3 of 3.

11. Guard Rail over underground structures shall be constructed as shown on RC-53, sheet 1 of 3.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE I WEAK POST

GUARD RAIL
Bracket to Post Bolt, see detail, RC-52, sheet 3 of 6.

Rubbing Rail, see detail, RC-52, sheet 2 of 6.

5⅝" Cold Formed C-Post Details

### TYPE 2-S & 2-SC GUARD RAIL

<table>
<thead>
<tr>
<th>POST SIZING</th>
<th>TYPE 2-S Special 8</th>
<th>2-SC Special Guard Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'-3&quot;</td>
<td>3'-1½&quot;</td>
<td>6'-3&quot;</td>
</tr>
<tr>
<td>3'-3&quot;</td>
<td>3'-1½&quot;</td>
<td>3'-1½&quot;</td>
</tr>
</tbody>
</table>

5⅝" Cold Formed C-Post Details

2-SC Modified Guard Rail

Wherever a W6 x 9 steel shape is designated for guard rail, a W6 x 6.5 steel shape may be used.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST GUARD RAIL

Recommended Joint/End Improved

Director, Bureau of Design
Deputy Chief Hvy. Engr.

RC-52
Offset Bracket

TYPICAL SECTION
OFFSET BRACKET POST & OFFSET BRACKET

Offset Bracket

TYPE 2-S & 2-SC GUARD RAIL

NOTES
1. All materials shall conform to the requirements of Form 408.
2. Details other than those shown for the 2-S Special, 2-SC Special, 2-S Modified, and 2-SC Modified shall conform to the details of the 2-S and 2-SC Guard Rail, but without rubbing rail.
3. The 5/8" Cold Formed C-Posts, W6 x 8.5 Posts and Wood Posts with matching offset brackets may be used in situations for the Strong Post Guard Rail Systems. However, mixing of different posts and offset brackets will not be acceptable within a project.

POST SPACING
2-S Special
2-SC Special
3'-11/2"
6'-3"

POST DETAILS

5/8" COLD FORMED C-POST DETAILS

8"x6" WOOD POST DETAILS

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST GUARD RAIL

Designated: January 1974
Approved: January 1975
Rev. 1: 07.14
Revisited: December 1974

Director, Bureau of Design
Deputy Chief Engr.

RC-52
Bracket to Post Bolts, see detail, RC-52, sheet 3 of 5

W6 x 9 Post Details

Offset Bracket

Rubbing Rail, see details, RC-52, sheet 2 of 5

All holes are 1/2" C/ unless otherwise noted.

3/4" Post Bolt, with steel plate and nut, see detail, RC-52, sheet 3 of 5

W-Beam Rail Element, see detail, RC-52, sheet 2 of 5

4 1/2" Post Bolt, see detail, RC-52, sheet 3 of 5

16" Post Bolt, with steel plate and nut, see detail, RC-52, sheet 2 of 5

All holes are 1/2" C/ unless otherwise noted.

TYPE 2-S & 2-SC GUARD RAIL

2-S Special
2-SC Special
2-S Modified
2-SC Modified

POST DETAILING

S'-3"
3'-1 1/2"
6'-3"
3'-1 1/2"
6'-3"
3'-1 1/2"
6'-3"

5 3/4" COLD FORMED C/ POST DETAILS

Notes
1. All materials shall conform to the requirements of Form 408.

2. Details other than those shown for the 2-s Special, 2-SC Special, 2-S Modified and 2-SC Modified shall conform to the details of the 2-s and 2-sc Guard Rail, but without rubbing rail.

3. The 5 3/4" Cold Formed C/ Posts, W6 x 9 Posts and Wood Posts with matching offset brackets may be bid as alternatives for the Strong Post Guard Rail Systems. However, mixing of different posts and offset brackets will not be acceptable within a project.

4. W6 x 8.5 sheet shape may be used.

5. Wherever a W6 x 9 steel shape is designated for guard rail, a W6 x 8.5 sheet shape may be used.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST GUARD RAIL
WOOD POSTS
OVER UNDERGROUND STRUCTURES

All holes to be 1" diameter.

SECTION THRU W-BEAM RAIL ELEMENT

NOTES
1. No separate payment will be made for installation of guard rail over underground structures. Concrete, reinforcement bars, and hardware shall be considered incidental to the guard rail pay item.
2. For rubbing rails installed on small radii, dimensions noted for hole spacing should be adjusted to allow splices to occur every other post.
3. W-Beam and rubbing rails shall be connected to each post. Splices shall only occur at posts and be located in the direction of traffic.
4. The 2" backing plate for the W-Beam Rail Element shall be used at all intermediate posts and shall be the same section as the W-Beam Rail Element.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST
GUARD RAIL

Director, Bureau of Design
Deputy Chief Hwy. Engr.

RC-52
WOOD POSTS
OVER UNDERGROUND STRUCTURES
All other details shall be as in the Steel Posts Over Underground Structures details. See Note 1, this sheet.

STEEL POSTS
OVER UNDERGROUND STRUCTURES
See Note 1, this sheet.

NOTES
1. No separate payment will be made for installation of guard rail over underground structures. Concrete, reinforcement bars, and hardware shall be considered incidental to the guard rail pay item.
2. For rubbing rails installed on small radii, dimensions noted for hole spacing should be adjusted to allow splices to only occur at posts.
3. W-Beam and rubbing rails shall be attached to each post. Splices shall only occur at posts and be located in the direction of traffic.
4. The 12" Bocking Plate for the W-Beam Rail Element shall be used at all intermediate posts and shall be the same section as the W-Beam Rail Element.
**DETAIL A**

All holes to be 1" diameter.

**WOOD POSTS OVER UNDERGROUND STRUCTURES**

All other details shall be as in the Steel Posts Over Underground Structures details. Angles to be mounted on front and back of posts. See Note 1, this sheet.

**DETAIL B**

Thickness is ¾"

All holes 1/2" unless otherwise noted. See beam base plate details for 5 ½" Cord Formed C-Post and 6 x 6 Post.

**SECTION THRU W-BEAM RAIL ELEMENT**

- 6" x 3" x 10 GA. COLD FORMED CHANNEL
- RUBBER RAIL

**NOTES**

1. No separate payment will be made for installation of guard rail over underground structures. Cement, reinforcement bars, and hardware shall be considered incidental to the guard rail pay item.

2. For rubbing rails installed on small radii, dimensions noted for hole spacing should be adjusted to allow splices to only occur at posts.

3. W-Beam and rubbing rails shall be attached to each post. Splices shall only occur at posts and not be capped in the direction of traffic.

4. The 12" Blocking Plate for the W-Beam Rail Element shall be used at all intermediate posts and shall be the same section as the W-Beam Rail Element.
The bridge connection terminal modification may be fabricated as one piece to eliminate welding.

**TERMINAL SECTION BRIDGE CONNECTION**

- Splice bolts shall be provided in a single piece or welded and shall be galvanized only as to a point that will allow guard rail to be free to move.
- Splice bolts shall be centered in the slotted holes. See BC Standard Drawings for attachment details.

**NOTES**

1. Splice bolts shall develop the design strength of the rail element.
2. Post bolts shall withstand a 5000 pound side pull in either direction without rupture.
3. Rail element in connection will be secured to eliminate Terminal Sections Bridge Connection with welded plates for flared walls.
4. The round heads of the Splice Bolts may be slightly chamfered or countersunk to provide for recess.
5. All terminal sections shall be 12 gauge galvanized steel.

---

**Commonwealth of Pennsylvania**

DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

**TYPE 2 STRONG POST GUARD RAIL**

**Director, Bureau of Design**
**Deputy Chief Hwy. Engr.**

Approved: \[Signature\]

\[Date\]
The bridge connection terminal modification may be fabricated as one piece to eliminate welding.

**DETAIL "A"**

The bridge connection terminal modification may be fabricated as one piece to eliminate welding.

**TERMINAL SECTION BRIDGE CONNECTION**

- Splice bolts shall be provided with a lock nut or double nut and shall be tightened prior to a point that will allow guard rail to be free to move.
- Splice bolts shall be centered in the slotted holes. See B.C. Standard Drawings for attachment details.

**TERMINAL TO BE PLACED ON BACK OF RAIL ELEMENT**

**TERMINAL TO BE PLACED ON FACE OF RAIL ELEMENT**

**ALTERNATE TERMINAL SECTIONS (SINGLE)**

**NOTES**

1. Splice bolts shall develop the design strength of the rail element.
2. Post bolts shall withstand a 5000 pound side pull in either direction without rupture.
3. Additional compensation will be allowed for providing Terminal Section Bridge Connection with welded plate for flared walls.
4. The round heads of the Post and Splice Bolts may be slightly notched to provide for wrench.
5. All terminal sections shall be 12 gauge galvanized steel.

---

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF DESIGN**

**TYPE 2 STRONG POST GUARD RAIL**

**DATE**

Director, Bureau of Design

Deputy Chief Hwy. Engr.

**RC-52**
**Typical Type 2 Strong Post Guard Rail**

**Steel Posts**

- **15° Position**
- **30° to 75° Positions**

**Wood Posts**

- **15° Position**
- **30° to 75° Positions**

**Rotating Bracket Requirements**

- 6'-3" C-Post
- 5'-8" W-Beam Post

**Positioning of Rotating Bracket on Posts**

**Height of Post**

<table>
<thead>
<tr>
<th>Rotation Angle</th>
<th>15°</th>
<th>30°</th>
<th>45°</th>
<th>60°</th>
<th>75°</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-S, 2-S Modified, 2-SC, 2-SC Modified</td>
<td>-1&quot;</td>
<td>-1&quot;</td>
<td>-2'-2&quot;</td>
<td>10'-8&quot;</td>
<td>5'-9&quot;</td>
</tr>
<tr>
<td>2-S Special, 2-SC Special</td>
<td>-1&quot;</td>
<td>-1&quot;</td>
<td>-2'-2&quot;</td>
<td>11'-8&quot;</td>
<td>8'-3&quot;</td>
</tr>
</tbody>
</table>

**Notes**

1. Payment for Type 2 Strong Post End Treatment shall include the last 3'-6" of sloping rail, terminal sections, hardware, and concrete.
2. Length of sloping rail is not to be included in the end treatment and shall not be included in the guardrail pay item.
3. Installation of delineator assemblies shall be done under a separate pay item or contract. For additional details, see Traffic Standard TC-7709.
4. The drawing depicts only the necessary dimensions for uniformity and interchangeability of rotating brackets. It does not show details of the rotating bracket for supporting the rotated portion of the end treatment. Only rotating brackets which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.
5. All offsets are measured from the projected front face of the guardrail to the face of the post.

**Commonwealth of Pennsylvania**

**Department of Transportation**

**Bureau of Design**

**Type 2 Strong Post Guard Rail**

**Director, Bureau of Design:**

**Deputy Chief Hwy. Engr.:**

**RC-52**

**Approved:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Modified</th>
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</thead>
<tbody>
<tr>
<td>3.0.5</td>
<td>11/80</td>
</tr>
</tbody>
</table>

**Delineator:**

See Note 3

**Rubbing Rail:**

See Note 4

**Terminal Section Bridge Connection:**

See Note 4

**Cone Anchor Block:**

See Note 4

<table>
<thead>
<tr>
<th>Date</th>
<th>Modified</th>
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</thead>
<tbody>
<tr>
<td>3.0.5</td>
<td>11/80</td>
</tr>
</tbody>
</table>
Modified Terminal Section - B.C.T. Bridge Connection, See Detail A, sh. 5 of 6.

Base Plate, top (16 mm), See Detail, RC-52, sh. 3 of 6.

Post Bolt, 2" (51 mm), See Detail, RC-52, sh. 3 of 6.

Top of Slope, Anchor Plate, See Detail, RC-52, sh. 5 of 6.

Top of Slope (B.C.T.)

20'-15" (6.15 m) Post Bolt, See Detail, RC-52, sh. 3 of 6.

Traffic Direction

Approaching guard rail height shall be transitioned as shown where necessary to the 27" (686 mm) height for the Breakaway Cable Terminal End Treatment.

Payment for the Breakaway Cable Terminal End Treatment will include the last 25' (7.620 m) of rail element, posts, Terminal Section - B.C.T., cable assembly, hardware, anchor and bearing plates, excavation, and Class A Cement Concrete.

Breakaway Cable Terminal End Treatment shall be used for Type 2, Type 2S, Type 2SC Special, and Type 2SC Standard Guard Rail, when specified.

Tapered Washer, See Detail, RC-52, sh. 5 of 6.

Base Plate bolts shall be torqued to 155-170 ft-lbs. (210-230 N·m).

Notes

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST GUARD RAIL
BREAKAWAY CABLE TERMINAL END TREATMENT

Revised date: June 1, 1993 (210-230 N·m)
**Terminal Section - B.C.T.**

- See Detail B, RC 52, sheet 3 of 5.
- See Detail A, RC 52, sheet 5 of 5.

---

**Breakaway Cable Terminal End Treatment**

- Pay Limit for Guard Rail
- Breakaway Cable Terminal End Treatment
- End Terminal Post
- See Cable Assembly, RC 52, sheet 5 of 5
- See Plate A, RC 52, sheet 5 of 5
- See Plate B, RC 52, sheet 5 of 5
- See Plate C, RC 52, sheet 5 of 5
- See Plate D, RC 52, sheet 5 of 5
- See Bearing Plate, See Cable, RC 52, sheet 5 of 5

---

**Anchor Plate**

- See Note 3, this sheet

---

**NOTES**

1. Breakaway Cable Terminal End Treatment shall be used for Types 2-S, Type 2-SC, Type 2-S Special, Type 2-SC Special, Type 2-S Modified, and Type 2-SC Modified Guard Rail. Approach guard rail height shall be transitioned as shown where necessary to the 27" (686 mm) height for the Breakaway Cable Terminal End Treatment.

2. Payment for the Breakaway Cable Terminal End Treatment will include the last 25' (7.620 m) of rail element posts, Terminal Section - B.C.T., cable assembly, hardware, anchor and bearing plates, excavation, and Class A Cement Concrete.

3. Base Plate bolts shall be torqued to 155-170 ft.-lbs. (210-230 N·m).
The bridge connection terminal modification may be fabricated as one piece to eliminate welding.

Splice bolts shall develop the design strength of the rail element.

Post bolts shall withstand a 5000 pound side pull in either direction without rupture.

No additional compensation will be allowed for providing Terminal Section Bridge Connections with welded plate for flared walls.

The round heads of the Post and Splice Bolts may be slightly notched to provide for wrench.

All terminal sections shall be 12 gauge galvanized steel.

NOTES

1. Splice bolts shall develop the design strength of the rail element.
2. Post bolts shall withstand a 5000 pound side pull in either direction without rupture.
3. No additional compensation will be allowed for providing Terminal Section Bridge Connections with welded plate for flared walls.
4. The round heads of the Post and Splice Bolts may be slightly notched to provide for wrench.
5. All terminal sections shall be 12 gauge galvanized steel.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST
GUARD RAIL

Approved: June 1978

Listed on: RC-52

Director, Bureau of Design
Deputy Chief Hwy. Engr.
Commonwealth of Pennsylvania  
DEPARTMENT OF TRANSPORTATION  
BUREAU OF DESIGN

TYPE 2 STRONG POST  
GUARD RAIL

NOTE: The height shown does not include the height of the rail above the post.

1. Payment for Type 2 Strong Post End Treatment shall include the following:
   a. Terminal Section, Hard Core, and Concrete
   b. Terminal Section Bridge Connection
   c. Installation of Delineator

2. End treatment may be reduced to accommodate local conditions.

3. All offsets are measured from the projected front face of the guard rail to the face of the post.

4. This standard depicts only the necessary dimensions and interchangeability of rotating brackets. It does not show details of the rotating bracket for supporting the rotated portion of the end treatment. Only rotating brackets which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.

5. Installation of delineator shall be done as a separate item or contract. For additional details, see Traffic Standards TC-7709, sheet 3 of 4.

TYPE 2 STRONG POST END TREATMENT

Recommendaed by:  
Approved by:  
Director, Bureau of Design  
Survey Chief, Engr.

This manual is periodically revised. Please consult the most recent edition.

For the information for Type A post assembly see BC-5 End Drawings.

Plan (see Note 5)
GUARD RAIL OVER UNDERGROUND STRUCTURES

No separate payment will be made for installation of guard rail over underground structures. Concrete, reinforcement bars, and hardware shall be considered incidental to the guard rail installation.

GUARD RAIL OVER UNDERGROUND STRUCTURES

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 WEAK POST GUARD RAIL

TYPICAL INSTALLATION

Notes:
1. All materials shall conform to the requirements of Type 2 Weak Post Guard Rail System, however, mixing of different posts will not be acceptable within a project.
2. Post details for Type 2-W with in parenthesis shall conform to the details as shown, except that the mounting bolt and support bolt holes shall be located on the front and rear flanges.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 WEAK POST GUARD RAIL

TYPICAL INSTALLATION

Notes:
1. All materials shall conform to the requirements of Type 2 Weak Post Guard Rail System, however, mixing of different posts will not be acceptable within a project.
2. Post details for Type 2-W with in parenthesis shall conform to the details as shown, except that the mounting bolt and support bolt holes shall be located on the front and rear flanges.
The minimum unobstructed distance behind the roll element should be:
- 6' for Type 2-W
- 5' for Type 2-WC

If recovery zone is less than 6'-0" and 5'-0" Min. from back of post to edge of slope on the determining factor for placement of guard rail.

A/...A

The end to be chamfered.

Shop bending required to make the End Treatment of Driveways & Openings.

**SHOP CURVED RAIL**

See Details, this sheet.

**FACE OF GUARD RAIL LINE**

Length along beam 15'-6"

Pay Limit Type 2-W End Treatment

Driveways & Openings

**ELEVATION**

**DETAIL B**

ALTERNATE CONCRETE ANCHOR

1/2" hole for 1/2" bolts

Bolts fastened to 1000.00 ft. lbs. after post is driven.

**END POST SUPPORT ANGLES**

NOTES

1. Slope can be varied if warranted.

2. Installation of delineator assemblies shall be done under a separate pay item or contract. See Traffic Standard TC-7709, sheet 3 of 4.

3. Type 2-W End Treatment must be used at approach and trailing ends of Type 2-W Guard Rail.

**CONCRETE ANCHOR**

**DETAIL A**

Recommended:

**TYPE 2 WEAK POST GUARD RAIL**

Director, Bureau of Design

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

Approved:

Director, Bureau of Design

Approved:

Director, Chief Real Property

RC-53
The minimum unobstructed distance behind the rail element should be:
- 8' for Type 2-W
- 8'-6" for Type 2-WC

If recovery area is less than 6'-0" use 1'-0" Min. from top of post to edge of slope as the determining factor for placement of guard rail.

Terminal Section Bridge Connection
See Detail, RC-52, sheet 4 of 4

Torf Recovery Area is less than 8'-0"

Use 1'-0'' Min.

From bottom of post to edge of slope os the determining factor for placement of guard rail.

Edge of Slope

Terminal Section Bridge Connection
See Detail, RC-52, sheet 4 of 4

Partially below ground

Anchor
See Details A/2 and B

3'/2" C.C. for this sheet

Anchor bolts
See Details, RC-52, two holes in rail

This end to be anchored.

Shop bending required to make the End Treatment at Driveways & Openings.

DETAIL N

SHOP CURVED RAIL

See Details A & B, this sheet

End Post Support Angles
See Details, RC-53, detail 1 of 2

End Post Support Angles
See Details, RC-53, detail 1 of 2

Shop bending required to make the End Treatment at Driveways & Openings.

DETAIL A

Concrete Anchor

4' x 3' x 1'-4"

See Detail, RC-53, sheet 4 of 4

Terminal Section Bridge Connection
See Detail, RC-52, sheet 4 of 4

 face of Guard Rail Line

Face of Guard Rail Line

Pay Line - Type 2-W End Treatment

End Post Support Angles - See Detail, RC-53, detail 1 of 2

Concrete Anchor

See Details A & B, this sheet

b) Type 2-W End Treatment must be used at approach and trailing ends of Type 2-W Guard Rail.

NOTES
1. Slope can be varied if warranted.
2. Installation of delineator assemblies shall be done under a separate pay item or contract. See Traffic Standard TC-7709, sheet 2 of 4.
3. Type 2-W End Treatment must be used at approach and trailing ends of Type 2-W Guard Rail.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 WEAK POST
GUARD RAIL

Director, Bureau of Design
Deputy Chief Hwy. Engr.
TREATMENT WHEN EDGE OF SHOULDER TO FACE OF OBSTRUCTION IS 3' OR GREATER WHERE CONTINUOUS GUARD RAIL IS NOT USED

TREATMENT WHEN EDGE OF SHOULDER TO FACE OF OBSTRUCTION IS 3' OR GREATER WHERE CONTINUOUS GUARD RAIL IS USED

TREATMENT WHEN EDGE OF SHOULDER TO FACE OF OBSTRUCTION IS LESS THAN 3'
TREATMENT WHEN EDGE OF SHOULDER TO FACE OF OBSTRUCTION IS 3' OR GREATER WHERE CONTINUOUS GUARD RAIL IS NOT USED

Use the necessary portion of the guard rail types and lengths as specified in Table 2, or Table 1, to provide the required clearance for the obstruction.

TREATMENT WHEN EDGE OF SHOULDER TO FACE OF OBSTRUCTION IS LESS THAN 3'

Type 2-w Guard Rail shall conform to the requirements of Type 2-w with post spacing at 3'-9".

NOTES

1. The treatments shown are for four lane divided highways. The approach end treatment shall be used of both sides of the obstruction on two lane facilities with two way traffic.

2. The length of the Rubbing Rail is not affected. The Type 2-w Guard Rail and Rubbing Rail shall be used in conjunction with the Type 2-w Guard Rail to conform to the standard of 3'-9".

3. This standard has been prepared as a guide for the placement of guard rail on medians and sides of road ways to provide reasonable and practical conditions. Modifications of treatments can be made to fit existing conditions, however they shall follow recommended guide lines.
TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS UP TO 16' WHERE CONTINUOUS BARRIER IS USED

*Details for Type 2-WCC Guard Rail shall conform to the requirements of Type 2-W with post spacing at 3'-1/2".

TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS GREATER THAN 16' WHERE CONTINUOUS BARRIER IS USED

1. This length of the rubber rail is not to be included as part of the Type 2-W Guard Rail and should be incidental to the Type 2-W Guard Rail and posts.
2. This standard has been prepared as a guide for the placement of guard rail and median barrier. It is impractical to provide a standard for all possible conditions. Modifications of treatments can be made to fit existing conditions, however they shall follow recommended guidelines.
3. If 2' minimum clearance is not available, fasten the guard rail to the obstruction and continue offset bracket spacing of 3'-1/2" up to the end of the obstruction.
4. When the guard rail is fastened to a solid obstruction, terminate the rubbing rail at each end and fasten it to the obstruction.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUARD RAIL AND MEDIAN BARRIER PLACEMENT
TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS UP TO 6' WHERE CONTINUOUS BARRIER IS USED

TREATMENT FOR TYPE 2-WM MEDIAN BARRIER CROSS-OVER

TREATMENT AT INTERSECTIONS

NOTES
1. The length of the Rubbing Rail is not to be included as part of the type 2-WM Guard Rail and should be incidental to the type 2-WM Guard Rail used.
2. The standard has been prepared as a guide for the placement of guard rail and median barrier. It is expected to provide a standard for all conditions. Modifications of treatments can be made to fit existing conditions, however, they shall follow recommended guide lines.
3. If Type 2-WM Guard Rail is not available, select the guard rail to the obstruction and continue offset terminal spacing of 3' for an additional 50'.
4. If protection is required, guard rail may be used beyond this point.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUARD RAIL AND MEDIAN BARRIER PLACEMENT

Recommended: John L. Sasse, Director, Bureau of Design
Prepared by J. J. Tardott, Deputy Chief Deputy Chief of Design

RC-54
TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS OF 20' TO 40'
WHERE CONTINUOUS BARRIER IS NOT USED

TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS OF 40' OR
GREATER WHERE CONTINUOUS BARRIER IS NOT USED

PARABOLIC FLARE LAYOUT

MEDIAN TREATMENT AT DUAL STRUCTURES

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUARD RAIL AND
MEDIAN BARRIER PLACEMENT

Recommended
Approve
Director, Bureau of Design
Supervisor, Safety

SECTION A-A
METHODS FOR CONTROLLING MEDIAN DRAINAGE

TYPICAL RAIL SPLICE & POST SPACING

SECTION B.B

Note: Weld or Galvanizing Protrusions not permitted on Top or Bottom Inside Walls in Splice Area.

SECTION B.B

Note: Weld or Galvanizing Protrusions not permitted on Top or Bottom Inside Walls in Splice Area.

ELEVATION VIEW

NOTE

1. Median Barrier over underground structures shall be constructed as shown on RC-39, Sheet 1 of 2.
2. For degree of curves greater than 5° 30', the rail elements shall be shop worked to the required curvature. No separate or additional compensation allowed for this work.
3. Where typical post spacing results in posts being located over cross drains, posts shall be field cut to accommodate the 90° bend in direction to provide maximum clearance between post and cross drain.

Commonwealth of Pennsylvania
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BUREAU OF DESIGN

TYPE 3 weak post
MEDIAN BARRIER

Director, Bureau of Design

[Diagram and details of rail splice, box beam, end plate, and various details related to median drainage and barrier construction.]
METHODS FOR CONTROLLING MEDIAN DRAINAGE

TYPICAL RAIL SPlice & POST SPACING

END PLATE DETAIL

POSt PLATE DETAIL

BOX BEAM END PLATE DETAIL

ALUMINUM ALLOY POST

TYPE 3-WM END TREATMENT - NARROW MEDIAN

NOTE S

1. Median barrier over underground structures shall be constructed as shown on RC-53, sheet 1 of 2.
2. For degree of curves greater than 30°, the rail elements shall be shop molded to the required curvature. No separate or additional compensation will be allowed for this work.
3. Where typical post spacing results in posts being located over cross drains, posts shall be shifted 1'-0" in direction to provide minimum clear space between post and cross drain.

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TYPE 3 WEAK POST MEDIAN BARRIER

ELEVATION SIDE

3 3/4 x 2 3/4 COLD FORMED
CHANNEL POST

TYPE 3-WM GUARD RAIL POSTS
In lieu of monolithic construction a joint and dowels may be used as shown in Detail A.

CONCRETE MEDIAN BARRIER WITHOUT JOINT CONTINUITY

(See Note 2):

The longitudinal joint shall be a maximum width of 1/4" on both sides of barrier and shall be sealed with an approved joint sealer. (See Note 7)

Detailed A

NOTES

- Barrier joints, alignment, surface texture, and other construction details shall be in accordance with Section 623, Form 408.
- The concrete median barrier shown may be constructed using slip forming, cast in place, or precast units. Modifications or deviations from the standards will require special details to be submitted for approval. Only precast barriers which have been approved by the Pennsylvania DOT will be permitted.
- For sections that are designated as removable sections, a bond breaker such as bituminous paper or polyethylene shall be used where required to ensure removability. Lifting holes will be required and shall be plugged with removable plastic or other approved type plugs.
- The materials used for the plates in the joints shall conform to the requirements of AASHTO Designation M183 or ASTM A36, structural steel. Plates shall be galvanized in accordance with AASHTO Designation M211, or coated in accordance with Sec. 714.1, Form 408.
- Concrete median barrier construction on existing pavement will require special details to be shown on the construction drawings.
- Premolded Joint Material shall be used at all construction joints. For precast units on curved sections a maximum of 1/2" joint on one side will be permitted. For curves greater than 9° 30', 30° barrier lengths must be shortened to meet longitudinal joint tolerances.
The longitudinal joint shall be a maximum width of 1/4" on both sides of barrier and shall be sealed with an approved joint sealer. (See Note 7)

NOTES
1. Barrier joints, alignment, surface texture, and other construction details shall be in accordance with Section 623, Form 408.
2. Any barrier may be constructed using either slip forming, cast-in-place, or precast units. Modifications or deviation from the standards will require special details to be submitted for approval. Only precast barriers which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.
3. For sections that are designated as removable sections, a bond breaker such as bituminous paper or polyethylene shall be used where required to ensure removability. Lifting strips will be required and shall be plugged with removable plastic or other approved type plugs.
4. The material used for the plates in the joints shall conform to the requirements of AASHTO Designation M 183 or ASTM A36, structural steel. Plates shall be galvanized in accordance with AASHTO Designation M 111.
5. Concrete median barrier construction on existing pavement will require special details to be shown on the construction drawings.
6. 1/2" premolded joint material shall be used on construction joints.
7. For precast units on curved sections a maximum 1/16" joint on one side will be permitted. For curves greater than 2° 30', barriers must be adjusted to minimize longitudinal joint tolerances.

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CONCRETE MEDIAN BARRIER
**Contraction Joints**

(See Note 1, RC-57, sheet 1 of 2)

Structure

- 12'-6"
- 24"
- 30'
- 36'
- 50'-1" Taper
- 50'-6" Taper

- 1/4" Expansion Joint Material

**Median Barrier Transition Detail**

- See RC-57, sheet 1 of 2, for other approved foundation alternates.

**Concrete Median Barrier Treatment at Piers**

1. No additional compensation will be allowed for transitions in the concrete median barrier at piers or structures.
2. At hazardous locations, impact attenuators such as Hydro Cushion, G.R.E.A.T. System, or Texas Barrels, should only be considered for installations after all alternative protective methods have been ruled out.
3. See Bridge Construction Standard Drawings for details of concrete median barrier across structures.

**Notes**

Commonwealth of Pennsylvania
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CONCRETE MEDIAN BARRIER

CONCRETE MEDIAN BARRIER END TRANSITION

INLET PLACEMENT AT CONCRETE MEDIAN BARRIER
1. All material and workmanship shall be in accordance with Notes 3 Right-of-Way fence.

2. If depressions greater than 3" (76mm) are filled with rocks or compacted earth to prevent animals from going under the Right-of-Way fence, no reinforced concrete footings shall be provided.

3. All footings shall be constructed to support concrete footings for all Right-of-Way fence. See details, RC-60.

4. Place Pull Posts at angles points in vertical alignment, at maximum 500 feet (152.4 m) intervals between end or corner posts in level terrain, and/or where directed.

5. Anchor restraints shall be shown in parentheses for all plane intersections.

NOTES

1. All material and workmanship shall be in accordance with Notes 3 Right-of-Way fence.

2. If depressions greater than 3" (76mm) are filled with rocks or compacted earth to prevent animals from going under the Right-of-Way fence, no reinforced concrete footings shall be provided.

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Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
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NOTES

1. All material and workmanship shall be in accordance with Notes 3 Right-of-Way fence.

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RIGHT-OF-WAY FENCE

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RIGHT-OF-WAY FENCE

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RIGHT-OF-WAY FENCE

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RIGHT-OF-WAY FENCE

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**R/W FENCE TREATMENT AT STUB ABUTMENTS**

**R/W FENCE TREATMENT AT HIGH WALLED ABUTMENT**

**R/W FENCE TREATMENT AT CULVERTS**

**DRIVE ANCHOR ORIENTATION**

**DRIVE ANCHOR DETAILS FOR POST BRACES ON TYPE 2 AND TYPE 5 R/W FENCE**

---

**Commonwealth of Pennsylvania**

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**BUREAU OF DESIGN**

**RIGHT-OF-WAY FENCE**

---

**Deputy Chief Hwy, Engr. RC-60**
Removable Fence Section of Structures as shown on the drawings. See RC-61 for details.

HIGHWAY OVER CROSSROAD
If the roadway has dual structures, the right-of-way fence shall be erected to close off the median area.

HIGHWAY UNDER CROSSROAD
If the roadway is within 15' (4.572 m) or less than the projected face of the abutment, the fence shall be placed as shown.
If right-of-way is greater than 15' (4.572 m) from the projected face of the abutment, the fence shall be angled into the abutment as shown.

Drive Anchor may be used as an alternate to cement concrete footings for all Types of Right-of-Way Fence.
Panel length varies with required length of barricade.

Alternate Red and White stripes, traffic side only, see Note 1, this sheet.

Extruded Aluminum Channel, see detail, this sheet.

Extruded Aluminum Channel with Class I or Class II reflective material applied. See Note 1, this sheet.

Panel length varies with required length of barricade.

Alternate Red and White stripes, traffic side only, see Note 1, this sheet.

Extruded Aluminum Channel, see detail, this sheet.

Wood Post - Steel Posts

Butt splice as necessary at posts.

Extruded Aluminum Channel

Butt splice as necessary at posts.

ALUMINUM PANEL - STEEL POSTS

ALUMINUM PANEL - WOOD POSTS

Post Clip, see detail, this sheet.

Post Clip Bolt, see detail, this sheet.

EXTRUDED ALUMINUM CHANNEL

Dimensions for panels may vary depending upon manufacturing company's design.

SECTION A-A

SECTION A-A

SECTION B-B

NOTES

1. Only Class I or Class II reflective sheeting material supplied by an approved supplier as stated in Bulletin No. 15 shall be permitted.

2. Wood posts may be mechanically driven. In areas where posts cannot be driven mechanically, the use of concrete footings shall be required.

3. See RC-52, sheet 2 of 5 for mounting of either wood or steel posts on concrete pavement.

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PERMANENT BARRICADES

ALUMINUM PANEL

Recommended by: H. E. Chipman, Deputy Chief Hwy. Engr.

Approved by: F. Depuy, Chief, Bureau of Design

Revised: May 20

RC-63
Expansion joint material required at structures.

Joint Sealer

3/4" premolded expansion joint material shall be cut to conform to the cross sectional area and be placed at structures and at the end of a day's work.

PLAIN CEMENT CONCRETE CURB GUTTER

The width of gutter used in computing the pay rates is indicated by

The gutters shall be reinforced when indicated on the drawings or specified.

PLAIN CEMENT CONCRETE CURB

1 1/2" Rod. 8" 1 Rod. 12"

Cem. Cone.

Pavement 6 1/2" 1 1/2"

Curb face may be constructed vertical as permitted for

PLAIN CEMENT CONCRETE INTEGRAL CEMENT CONCRETE CURB

CURB GUTTERS

SAWED JOINT DETAILS

The top, the slope for a depth of 12 inches and the back for a depth of 4 inches, as indicated, shall be plane-sawed finished.

The bottom of curb may have a tolerance of 1 inch less or 2 inches more than the specified width.

Joints shall not exceed 1/4-inch in width for a distance of 12 inches below the top of curb and 1/2-inch for the remainder of the joint.

STONE CURB - TYPES A & B

NOTES

1. All items shall conform to the requirements of Form 408.
Expansion joint material required at structures.

Plain cement concrete curb

Integral cement concrete curb

Sawed joint details

Stone curb - Types A & B

NOTES

1. All items shall conform to the requirements of Form 408.
CONCRETE MOUNTABLE CURBS

**CONCRETE MOUNTABLE CURBS ON EXISTING CONCRETE PAVEMENT AND BRIDGE DECKS**

- Joints for Mountable Curbs shall conform to the requirements of specifications Form 4/6.
- Inlets installed with Mountable Curbing shall be located as shown on the drawing and utilize a Type M Inlet.

**Typical Construction**

- Concrete Mountable Curb
- Existing Pavement or Bridge Deck

**Recommended/Approved**

Director, Bureau of Design, Deputy Chief Hwy. Engr.
**CONCRETE MOUNTABLE CURBS**

**TYPE A**

**TYPE B**

---

**CONCRETE MOUNTABLE CURB ON EXISTING CONCRETE PAVEMENT AND BRIDGE DECKS**

Plans may provide for a deeper face of curb when on overlay is placed on the existing pavement, however the exposed final face of curb shall be 2" Max.

---

**NOTES**

1. Joints for Mountable Curbs shall conform to the requirements of specifications Form 40A.
2. Inlets installed with Mountable Curbing shall be located as shown on the drawing and utilize a Type M Inlet.

---

**SECTION A-A**

**SECTION B-B**

---

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**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF DESIGN**

**CONCRETE MOUNTABLE CURBS**

**TREATMENT FOR CONCRETE MOUNTABLE CURBS AT INLETS**
NOTES

1. Contraction joints shall be spaced at approximately 20' (6.096m) intervals and shall be placed in line with adjacent pavement joints. They may be either hand-formed or sawed joints, but shall be \( \frac{5}{8} \) (15.875mm) wide and the depth equal to one-half of the pavement thickness.

2. The contraction joints and corrugations may be constructed in a skew to match the pavement joints.

CONCRETE TRAFFIC SEPARATOR
1. Contraction joints shall be spaced in uniform lengths or sections of 15.5' and shall be placed in line with adjacent pavement contraction joints. They may be either hand-formed or sawed joints, but shall be 3/16" wide and the depth equal to 1/4 of the pavement depth.

2. Concrete traffic separator shall conform to Section 629, Form 628.
**Type A Installation on Type 2-WM Median Barrier**

The mesh openings shall have the following nominal dimensions:

- **Diamond Size**: 1.33" x 0.50" (center to center of diamonds)
- **Bridge Size**: 0.625" minimum width
- **Strand Size**: 0.050" nominal thickness, excluding 0.047" (aluminum panels)
- **Panel Size**: 2' x 6.5' x 7.0' x 4.5' x 6.5' finished height

**Mesh Size and Tolerances**

- **Tension Wire**: approx. 3 turns around Ferrule (Typ.)
- **Compression Wire**: approx. 3 turns around Ferrule (Typ.)

**Line Post Details**

- **No.9 Gage Steel 6.0 x 0.75" Ferrule (Typ.)**
- **No.12 Gage Channel**
- **Hog Rings**, spaced approx. 2' apart.

Commonwealth of Pennsylvania
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BUREAU OF DESIGN

ANTI-GLARE SCREEN

**Director, Bureau of Design**

**Deputy Chief Hwy. Engr.**

RC-67
SECTION
TYPE B-INSTALLATION ON TYPE 3-WM MEDIAN BARRIER

ELEVATION

INSTALLATION ON CONCRETE MEDIAN BARRIER

TYPE B

Notes:
For a split concrete median barrier on a structure fasten the line posts to either side of the barrier.

Cross bracing or diagonal bracing may be provided at each panel of anti-glare screen to stop vibrations at critical locations like bridges.

Use double support brackets to fasten every third post for installation on curves with curvature greater than 31 and all end posts.

Use double washer spacers at top of posts.

Drill concrete to receive ¥\(\frac{1}{4}\) in. dia. ¥\(\frac{3}{4}\) in. long expansion bolt of the skin-fastening system type or in two ¥\(\frac{1}{4}\) in. holes, or an approved equal.
ROCK LINING

SECTION B-B

ROCK BASIN

SECTION A-A

When bottom of ditch width is less than 36", a single staggered row of stones or blocks shall be used on the bottom of the ditch.

SECTION D-D

PAVED ENERGY DISSIPATOR

ROCK ENERGY DISSIPATOR

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL
PLAN SECTION 8-8

S, L, R, W as shown on the drawings or as directed by the engineer.

Finished ground line of ditch or channel.

-6'6" Min.

"S1" or as directed.

SECTION A-A

ROCK BASIN

Rock for Rock Basins

Filter blanket, 6" depth

-6'

Stones or blocks to be staggered.

PLAN A-A

4" to a"

-6" deep scoring concrete sealed with joint sealing material.

SECTION D-D

RAISED ENERGY DISSIPATOR

Filter blanket, 6" depth

SECTION E-E

SECTION F-F

ROCK ENERGY DISSIPATOR

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EROSION & SEDIMENT CONTROL

Department of Transportation
Bureau of Design
Erosion & Sediment Control

Erosion Control
Waterway Design
1974

Director, Bureau of Design
Chief, Structural Design
 signage.

**Notes:**
- S, L, R, W as shown on the drawings or as directed by the engineer.
- Finished ground line of ditch or channel.
- Stones or blocks to be staggered.
- Filter blanket, 6" depth.
- Raised energy dissipator.
- Rock energy dissipator.

**Scale:**
- Plan A-A: 4" to a" - 6" deep scoring concrete sealed with joint sealing material.
- Plan D-D: Finished ground line of ditch or channel.
- Plan E-E: Filter blanket, 6" depth.
- Plan F-F: Filter blanket, 6" depth.

**Construction Details:**
- Transition into existing drainage channel.
- Original ground.
- Rock lining.
Temporary Slope Pipe Drain

Length of transverse berm shall be required to contain surface drainage and direct it into temporary slope drain. The transverse berm will not be required where the drain is located at a low point.

Suggested Min. Sizes

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Smooth Pipe</th>
<th>Corrugated Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>4&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>3-6</td>
<td>6&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>6-10</td>
<td>8&quot;</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

Top of embankment during construction.

BRUSH BARRIER

A bale is to be placed perpendicular to the slope at 200 foot intervals. A bale is to be placed perpendicularly on approx. 200 foot intervals.

TOE OF SLOPE CONDITION

BALED STRAW BARRIER

To be used where the existing ground slopes away from the embankment as shown on drawings or as directed by the engineer.
TRASH RACK AND ANTI-VORTEX DEVICE

The transsectional area of the pipe must be at least 1.5 times the transsectional area of the conduit. The top 2/3 of the riser pipe will be perforated with 1/8" dia. holes spaced 8" vertical and 10" to 12" horizontal.

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

SEDIMENTATION POND - TYPE 1

NOTES:

- An emergency spillway with a non-bottom width of 16 must be provided for every Sedimentation Pond - Type 1.
- The emergency spillway must be placed in undisturbed ground and cannot be placed in embankment areas. The emergency spillway can go over the embankment if Rock Lining is used.
- The elevation of the emergency spillway must be such that the spill is at least 12" above the maximum design flow of the spillway.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

CHARGE 3

Receivables: 131, 131, 131, 131

Director, Bureau of Design

Dep. Chief Engg.

Plan View of an Emergency Spillway Cut into Existing Ground
2" x 6" wooden support

Notes:
 Upon establishment of suitable soil stabilization and at the direction of the engineer, the Endwall Standboxes shall be removed and shall become the property of the Contractor.

The basin and/or area upstream from the Standbox shall be cleaned periodically and the sediment and debris drained of from an area approved by the engineer.

Drill holes 2" deep in concrete endwall and fill with non-sloping, non-shrinking Mortar in accordance with section 705.50 of the 40S.

Commonwealth of Pennsylvania
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EROSION & SEDIMENT CONTROL

Director, Bureau of Design
Deputy Chief, Hyd Egy

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Deputy Chief, Hyd Egy
NOTES:
A- Anchor bolts required (see table).
B- Top of forms shall be level in both directions.
C- All anchor bolt nuts, steel spring lock washers and top 6" of anchor bolts shall be galvanized.
D- Ground rod 5/8" x 5' max., copper clad steel. Max. resistance to earth ground shall be 25 ohms.
E- See FC- 63 for pole details.
F- For lighting pole anchorages on bridges, see bridge construction standard drawings.
G- Leave 30 inches of No. 4 ground wire coiled above foundation. (Wire extends through center of foundation.)
H- Type FC foundations are designed for 30 ft. maximum arm length, (see table).
I- Minimum bend radius to be six times conduit diameter, unless otherwise specified.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
HIGHWAY LIGHTING FOUNDATIONS
CONVENTIONAL LIGHTING POLE

TYPE - FC
(Note h)

For Fill Section

For Cut or Level Section
Conduit for Ground Wire connected to pole.

Plan

4' Dia.

Ground Conductor connected to pole.

Ground Wire, see note 2, this sh.

Anchor Bolt Assembly

Tack Weld

2' Rad. Min. (Typ.)

Finished Grade

To be backfilled with compacted embankment material

Exothermic weld or bronze connector for 3/4" x 10" min. Ground Rod

Chamfer (Typ.)

class "A" Concrete, to be poured against unbackfilled earth.

To slips: min. 30" dia. or equivalent

VERTICAL STEEL

Class "A" Concrete, to be poured against unbackfilled earth.

To slips: min. 30" dia. or equivalent

NOTES

1. The materials and workmanship shall be in accordance with Forms 408 and 409.

2. A 30" length of #4 ground wire shall be left coiled above foundation. The wire extends through the 1" conduit in the center of the foundation.

3. The size of pedestal or drilled caisson shown is adequate to accommodate the preassembled anchor bolt assembly, supplied by the manufacturer, for bolt circle diameters up to and including 34". For bolt circle diameters greater than 34", the pedestal or drilled caisson will have to be modified accordingly.

4. For reinforcement, see Bridge Construction Standard Drawings.

CHART I

POLE HEIGHTS VERTICAL STEEL

<table>
<thead>
<tr>
<th>POLE HEIGHTS</th>
<th>VERTICAL STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>80'</td>
<td>16&quot;-9</td>
</tr>
<tr>
<td>90'</td>
<td>16&quot;-9</td>
</tr>
<tr>
<td>100'</td>
<td>16&quot;-9</td>
</tr>
<tr>
<td>110'</td>
<td>16&quot;-9</td>
</tr>
<tr>
<td>120'</td>
<td>16&quot;-9</td>
</tr>
</tbody>
</table>

DRILLED CAISSON FOUNDATION

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING FOUNDATIONS
HIGH MAST LIGHTING POLE

Recommended by: [Signature]
Approved by: [Signature]

Director, Bureau of Design
Deputy Sec'y for Highway Admin.
**Notes:**

1. The materials and workmanship shall be in accordance with Penn DOT Forms 408, 409, 410, 412, 413, 420, 426, and 429. A 30" length of #4 ground wire shall be left coiled above foundation. The wire extends through the #4 conduit in the center of the foundation.

2. The size of pedestal or drilled caisson shown is adequate to accommodate the preassembled anchor bolt assembly, supplied by the manufacturer, for bolt circle diameters up to and including 34". For bolt circle diameters greater than 34", the pedestal or drilled caisson will have to be modified accordingly.

3. For reinforcement bar fabrication details see Bridge Construction Standard Drawings.

4. For reinforcement for fabrication details see Bridge Construction Standard Drawings.

**Chart 1**

<table>
<thead>
<tr>
<th>Pole Height (ft.)</th>
<th>Vertical Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>16-3</td>
</tr>
<tr>
<td>90</td>
<td>16-3</td>
</tr>
<tr>
<td>100</td>
<td>16-3</td>
</tr>
<tr>
<td>110</td>
<td>16-3</td>
</tr>
<tr>
<td>120</td>
<td>16-3</td>
</tr>
</tbody>
</table>

**Drilled Caisson Foundation**

- 3" CL (Typ.)
- 4" Min. Wash

**Spreader Footing Foundation**

- 3" CL (Typ.)
- 4" Min. Wash

**Elevation**

- Insulated Grounding Bushing
- Base Plate
- Nonshrink Grout
- Drain thru Grout
- 2" Conduit - as required

**Typical High Mast Pole Elevation**

- Number of Luminaires varies with design
- Wood Frame and Luminaire Ring Assemblies
- Anchor Bolt Assembly
- Base Plate and corresponding Anchor Bolt Assembly
- Foundation
- High Mast Pole
- High Most Pole

**Highway Lighting Foundations**

**High Mast Lighting Pole**

- Note: The materials and workmanship shall be in accordance with Penn DOT Forms 408, 409, 410, 412, 413, 420, 426, and 429. A 30" length of #4 ground wire shall be left coiled above foundation. The wire extends through the #4 conduit in the center of the foundation.

**Materials and Workmanship:**

- The materials and workmanship shall be in accordance with Penn DOT Forms 408, 409, 410, 412, 413, 420, 426, and 429. A 30" length of #4 ground wire shall be left coiled above foundation. The wire extends through the #4 conduit in the center of the foundation.

**Reinforcement Details:**

- For reinforcement bar fabrication details see Bridge Construction Standard Drawings.

**Reinforcement for Fabrication Details:**

- For reinforcement bar fabrication details see Bridge Construction Standard Drawings.
Checkered Steel Cover Plate

Flat Head Bronze Machine Screws; Countersunk each corner and Mid-Point each side.

Welded Corners Mitered

REINFORCED PLASTIC MORTAR

Notes:
JB-1 and JB-2 shall be used in locations where they will be subject to loads no heavier than pedestrian traffic.

For other locations use JB-11 or JB-12 shown in RC-82.

Equivalent approved precast concrete junction boxes may be substituted for JB-1 and JB-2 shown.

After installation, all exposed steel shall be painted with one coat of red lead and one coat approved bituminous paint.

See concrete Type details, this sheet, for required drainage aggregate.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING

JUNCTION BOXES—LIGHT DUTY

Approved by:

Deputy Sec. for Highway Affairs

RC-81
Checkered Steel Cover Plate 234 x 237 x 0.059 Thick

Class A Cem. Cone. 6" / 8" / 10"

Fl Dt Head Bronze Machine Screws; Countersunk each corner and Mid-Point each side.

Checkered Steel Cover Plate 274 x 274 x 0.059 Thick

Welded Corners Minimized

2" x 3" x 0.062 Frame

Top & Thread holes in L (top)

**Notes:**
- JB-1 and JB-2 Shall be used in locations where they will be subject to loads heavier than pedestrian traffic.
- For other locations use JB-1 or JB-2 shown in RC-62.
- Equivalent approved pressure treatment boxes may be substituted for JB-1 and JB-2 shown.
- After installation, all exposed steel shall be painted with one coat of red lead and one coat approved bituminous paint.
ROUND ALUMINUM and STEEL POLES
AND OCTAGONAL STEEL POLES
FLAT OR FLUTED

Where steel standards are used, all fabricated joints on exposed side of pole and top crossing plates are to be covered with aluminum approved gray mastic type, meeting test requirements of the Federal Specification TT-C-598(2). Identification plates will be provided for all poles.

1. Identification tag detail

2. Where steel standards are used, all exposed faces of pole shall be covered with aluminum approved gray mastic type, meeting test requirements of the Federal Specification TT-C-598(2).

3. Anchor Bolt:

4. Longitudinal weld beads of multi-sectional pole shall be 1/4" over all lap.

5. Alternate:

6. Non-AASHTO requirements shall be met by the Federal Highway Administration to meet AASHTO requirements for breakaway supports. Breakaway bases include slip bases, breakaway couplings, frangible bases, riveted sleeve, anchor clips, etc.

GENERAL NOTES:

1. See RS: 80 for details on pole foundations.

2. Manufacturer certification of compliance with load tests outlined in Form 408 is required for all poles.

3. Where steel or aluminum bases are in contact with concrete, a caulking compound shall be used which will be an approved silicon impregnated gray mastm type, meeting the test requirements of the Federal Specification TT-C-598(2).

4. Identification plates shall be provided for all poles.

5. Approved Materials for Pole:

Aluminum and steel as per Form 408.

6. Type "C" poles shall be certified by the Federal Highway Administration to meet latest AASHTO requirements for breakaway supports. Breakaway bases include slip bases, breakaway couplings, floating bases, netted bases, netted sleeves, anchor clips, etc.
Terminal Box DISC Control Switch
on 10' (3.048 m) cord
Plug for direct power at 240 Volts

Power Supply 240 / 480 Volts

AWG #4 Bare Copper to Ground Rod

Power Cable
Support Cable (3 Pressed)
Cable Terminator
Power Cable Connector
Guide Cable
Wrench
Wrench Cable
Safety Cables - Two Req'd.
when pole is furnished without locking device.

Solid Neutral Bar isolatd from Ground

NEMA 4, Cold Steel
U.B. Terminal Box
Mounted on Luminaire Lowering Ring

Lightning Arrester

Head Frame
Luminaire Ring
J.B. Mounted on Lowering Ring

NOTES
1. Head frame and luminaire connection shall be completely sealed to prevent intrusion of bird life.
2. Circuit breaker disconnect shall be 2 pole, rated for 240/480 volt system, and in NEMA I enclosure.
3. The lightning rod grounding conductor shall be grounded directly on the pole shaft with lug provided by the manufacturer of lightning rod.
4. All miscellaneous hardware shall be stainless steel.
5. Wiring from J.B. to luminaire shall be in armway provided in luminaire ring or in separate flexible conduit.
6. Pole identification tag as detailed on RC-83, sheet 1 of 2, shall be affixed to each high mast pole.
ROUND ALUMINUM and STEEL POLES
AND OCTAGONAL STEEL POLES (FLAT OR FLUTED)

Provide protection for cable connection.

Where Type-10 foot arm is used, the joint shall be made with 2½" x 2½" x 1/4" tubing with 1½" flange.

Transformer Base (See Details A, C, D)

POLE BASES

GENERAL NOTES

1. See RC-80 for details on pole foundations and transformer bases.
2. Aluminum Poles - Shaft base diameter may vary from 6"-14" and shaft wall thickness from 0.188"-0.312" depending on mounting height and arm length.
3. Steel Poles - Shaft base diameter may vary from 7.5"-10.0". Nominal shaft wall thickness is 11 or 13 gauge. (Does not apply to Sectional Steel Poles.)
4. Manufacturers certification of compliance with load tests outlined in Form 408 is required for steel poles.
5. When all steel and aluminum poles or transformer bases are in contact with concrete, a caulking compound shall be used which will be an approved aluminum impre9nated gray elastic type, meeting the test requirements of the Federal Specification TT-C598(2).
6. Identification plates must be provided for all poles.
7. Bolt template for anchor base or transformer base furnished by manufacturer.
8. Approved Materials for Poles: Aluminum and Steel per Form 408.

DAVIT-TYPE POLES

GUARD RAIL CLEARANCE

SECTIONAL STEEL POLES

TERMINOLOGY

CIRCUIT CHARACTERS

POLE NO.

IDENTIFICATION TAG DETAIL

Material:

Thick brass plate

TERMINOLOGY

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

Highway Lighting
Lighting Pole Details

Revised May 1974
Approved March 1974

Detail A
Detail B
Type A
Type B

Director, Bureau of Design

Chief Head Ceg
TYPICAL TERMINAL POLE EQUIPMENT ARRANGEMENT

- Photoelectric control device
- Transformer
- Cable or conduit to pole
- Clamping conduit to pole
- Type "L" or "E" for antisway
- Rubber molded "thru" connector may be used for use in anchor base poles
- SSTC: Rubber molded connectors optional for use in anchor base poles

LUMINAIRES FOR MERCURY LAMPS

- Ballast housed in luminaire
- Controls
- Photoelectric (2)
- Optional:
  - (Number of luminaire) 1111
  - (2) luminaire to accommodate 250, 400, 700 & 1000-Watt Mercury Lamps, in power supply

CRITICAL DIMENSIONS:

- Top of conduit
- Outside conduit
- Conduit on for type "LB" conduit
- Side of conduit
- Metal conduit
- Conduit on for type "LB" conduit

CONDUIT & CONDUIT MARKER

- Type "L" or "E" for antisway
- Ground wire
- Type "L" or "E" for antisway
- Ground wire

NOTE: Rubber molded connectors optional for use in anchor base poles

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
HIGHWAY LIGHTING
LIGHTING & ELECTRICAL DETAILS

Reapproved: Jan., 1976
Approved: June, 1972

Director, Bureau of Design
Secretary, Dept. of Transp.
TYPE A TREE WALL

1. TREE GRATES SHALL BE USED WHERE DESIGNATED.
2. TREE DRIP LINE SHALL BE DEFINED AS THE FURTHEREST EXTENSION OF THE TREES BRANCHES.
3. NON-CIRCULAR TYPE A TREE WALLS MAY BE ARRANGED AS DIRECTED IN ORDER TO PROTECT CLOSE GROUPINGS OF TREES OR TREE ROOT AREAS NOT ENTIRELY COVERED WITH EMBANKMENT.

AGGREGATE LAYER TABLE

<table>
<thead>
<tr>
<th>AGGREGATE LAYER</th>
<th>AMOUNT OF EMBANKMENT AROUND TREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
<td>LESS THAN 6 INCHES</td>
</tr>
<tr>
<td>4 INCHES</td>
<td>6 INCHES TO 1 FOOT</td>
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<tr>
<td>6 INCHES</td>
<td>FOOT TO 3 FEET</td>
</tr>
<tr>
<td>12 INCHES</td>
<td>GREATER THAN 3 FEET</td>
</tr>
</tbody>
</table>

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TREE WALLS & MISC. DETAILS FOR ROADSIDE REST AREAS

Recommended: June 10, 1974
Revision: July 10, 1974
Director, Bureau of Design
Chairman, PennDOT Board

RC-90