**SUBJECT:**

**DATE:** November 1, 2001

**INFORMATION AND SPECIAL INSTRUCTIONS:**
Incorporate the attached revisions into the April 2000 Edition of the Standards for Roadway Construction. These revisions should be adopted as soon as practical on all new and existing designs without affecting any letting schedules. PS & E submissions to Central Office after February 1, 2002, should include these revisions.

The following represents a listing of the major changes or addition to each standard drawing. Only revised sheets are listed. Remaining sheets of the same standard show new dates only.

<table>
<thead>
<tr>
<th>RC</th>
<th>Sheet #</th>
<th>Change Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC - 20M</td>
<td>(1 of 3)</td>
<td>Revised Details A, B, Type E Joint, Alternate Type P Joint to eliminate the 3 (1/8) or 6 (1/4) radius. Eliminated the Type G Joint Details. Revised Note 7 and 11.</td>
</tr>
<tr>
<td>RC - 21M</td>
<td>(1 of 3)</td>
<td>Revised note 11 and added note 12.</td>
</tr>
<tr>
<td>RC - 22M</td>
<td>(1 of 3)</td>
<td>Revised note 3.</td>
</tr>
<tr>
<td>RC - 23M</td>
<td>(1 of 3)</td>
<td>Eliminated tooled edges in Detail A and Detail A (Alternate).</td>
</tr>
<tr>
<td>RC - 24M</td>
<td>(1 of 1)</td>
<td>Modified to add Superpave, Binder course, and Wearing course.</td>
</tr>
<tr>
<td>RC - 25M</td>
<td>(1 of 5)</td>
<td>Added 'Type 1-SP Shoulder' to drawing caption.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Modified to add Superpave, Binder course, Wearing course, and Base course. Changed Note 6 and 7.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added 'Type 6-SP Shoulder' to drawing caption.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Modified to add Superpave, Binder course, Wearing course, and Base course. Changed Note 8.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Revised Note 2 and added Note 4. Changed MSR to rumble strips.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Revised Notes 1, 2, 3, and 4 and added Notes 5 and 6.</td>
</tr>
<tr>
<td>RC - 26M</td>
<td>(1 of 5)</td>
<td>Added Note 5 and eliminated saw cut width in Detail B.</td>
</tr>
<tr>
<td>RC - 27M</td>
<td>(1 of 1)</td>
<td>Added Note 6 and modified Detail B.</td>
</tr>
<tr>
<td>RC - 28M</td>
<td>(1 of 5)</td>
<td>Added Note 4.</td>
</tr>
<tr>
<td>RC - 29M</td>
<td>(1 of 10)</td>
<td>Revised Notes 2 and 5.</td>
</tr>
<tr>
<td>RC - 30M</td>
<td>(1 of 5)</td>
<td>Sheet 5 was added to RC - 30M to provide details and guidelines when flowable backfill is specified as pipe trench backfill.</td>
</tr>
<tr>
<td>RC - 31M</td>
<td>(1 of 10)</td>
<td>Added Note 10.</td>
</tr>
<tr>
<td>RC - 32M</td>
<td>(1 of 10)</td>
<td>Revised Note 2.</td>
</tr>
<tr>
<td>RC - 33M</td>
<td>(3 of 5)</td>
<td>Changed Table B: Bottom Steel Requirements from No. 4 Bars at 6&quot; to No. 4 Bars at 12&quot; C to C or 0.16 in/m WWF 6&quot; maximum spacing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Corrected the metric dimension in Section B-B from 170 mm to 250 mm (0.12 in/ft).</td>
</tr>
<tr>
<td>RC - 34M</td>
<td>(1 of 2)</td>
<td>Revised the spacing in plan view, elevation view and elevation view (WO Inlet Placement) same as BC-739M.</td>
</tr>
<tr>
<td>RC - 35M</td>
<td>(1 of 2)</td>
<td>Revised Note 4.</td>
</tr>
<tr>
<td>RC - 36M</td>
<td>(1 of 7)</td>
<td>In the 2 top left guide rail treatment details, See Note 4 was changed to See Note 5.</td>
</tr>
<tr>
<td>RC - 35M</td>
<td>(1 of 6)</td>
<td>Revised Notes 1 and 11.</td>
</tr>
<tr>
<td>RC - 37M</td>
<td>(3 of 5)</td>
<td>Added Note 4.</td>
</tr>
<tr>
<td>RC - 38M</td>
<td>(1 of 2)</td>
<td>Revised Note 1.</td>
</tr>
<tr>
<td>RC - 39M</td>
<td>(1 of 1)</td>
<td>Revised Note 4.</td>
</tr>
<tr>
<td>RC - 40M</td>
<td>(6 of 6)</td>
<td>Added a new sheet with details for sediment filter bag.</td>
</tr>
<tr>
<td>RC - 41M</td>
<td>(1 of 2)</td>
<td>Revised table 4.</td>
</tr>
<tr>
<td>RC - 42M</td>
<td>(1 of 2)</td>
<td>Request additional copies from:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bureau of Office Services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Publications Sales Office</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P.O. Box 2028</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middletown, PA 17120</td>
</tr>
</tbody>
</table>

CANCEL THE FOLLOWING:

REQUEST ADDITIONAL COPIES FROM:

APPROVED FOR ISSUANCE BY:
Bradley L. Mallory
Secretary of Transportation

Michael M. Ryan, P.E.
Deputy Secretary for Highway Administration
### INDEX OF STANDARDS FOR ROADWAY CONSTRUCTION

<table>
<thead>
<tr>
<th>STANDARD DRAWING NUMBER</th>
<th>DRAWING DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EARTHWORK</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC-10M</td>
<td>APR 28, 2000</td>
<td>CLASSIFICATION OF EARTHWORK</td>
</tr>
<tr>
<td>RC-11M (2 Sheets)</td>
<td>APR 28, 2000</td>
<td>CLASSIFICATION OF EARTHWORK FOR STRUCTURES</td>
</tr>
<tr>
<td>RC-12M (2 Sheets)</td>
<td>APR 28, 2000</td>
<td>BACKFILL AT STRUCTURES</td>
</tr>
<tr>
<td>RC-13M</td>
<td>APR 28, 2000</td>
<td>PAY LIMIT OF SUBBASE</td>
</tr>
<tr>
<td><strong>PAVEMENTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*RC-20M (3 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>CONCRETE PAVEMENT JOINTS</td>
</tr>
<tr>
<td>RC-21M</td>
<td>APR 28, 2000</td>
<td>REINFORCED CONCRETE PAVEMENT</td>
</tr>
<tr>
<td>*RC-23M (3 Sheers)</td>
<td>NOV. 1, 2001</td>
<td>BRIDGE APPROACH SLAB</td>
</tr>
<tr>
<td>*RC-24M</td>
<td>NOV. 1, 2001</td>
<td>PAVEMENT RELIEF JOINT</td>
</tr>
<tr>
<td>*RC-25M (5 Sheers)</td>
<td>NOV. 1, 2001</td>
<td>SHOULDERS</td>
</tr>
<tr>
<td>*RC-26M (5 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>CONCRETE PAVEMENT REHABILITATION</td>
</tr>
<tr>
<td>*RC-27M</td>
<td>NOV. 1, 2001</td>
<td>PLAIN CONCRETE PAVEMENT</td>
</tr>
<tr>
<td>RC-28M</td>
<td>APR 16, 2001</td>
<td>OVERLAY TRANSITIONS AND PAVING NOTCHES</td>
</tr>
<tr>
<td><strong>DRAINAGE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*RC-30M (4 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>SUBSURFACE DRAINS</td>
</tr>
<tr>
<td>RC-31M (3 Sheets)</td>
<td>APR 16, 2001</td>
<td>ENDWALLS</td>
</tr>
<tr>
<td>RC-32M</td>
<td>APR 28, 2000</td>
<td>SLOPE PIPE FITTINGS, PIPE CONNECTORS AND CONCRETE COLLAR FOR PIPE EXTENSION</td>
</tr>
<tr>
<td>RC-33M (2 Sheets)</td>
<td>APR 28, 2000</td>
<td>END SECTIONS FOR PIPE CULVERTS</td>
</tr>
<tr>
<td>*RC-34M (10 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>INLETS</td>
</tr>
<tr>
<td>RC-35M</td>
<td>APR 28, 2000</td>
<td>DRAINAGE DIKE</td>
</tr>
<tr>
<td>RC-36M</td>
<td>APR 28, 2000</td>
<td>SPRING BOXES</td>
</tr>
<tr>
<td>*RC-35M (5 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>STANDARD MANHOLEYS</td>
</tr>
<tr>
<td>RC-40M</td>
<td>APR 28, 2000</td>
<td>SLOPE PROTECTION</td>
</tr>
<tr>
<td>RC-43M</td>
<td>APR 28, 2000</td>
<td>GABIONS</td>
</tr>
<tr>
<td><strong>GUIDE RAIL AND MEDIAN BARRIER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*RC-50M (2 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>GUIDE RAIL TRANSITION AT END OF STRUCTURE</td>
</tr>
<tr>
<td>RC-51M</td>
<td>APR 16, 2001</td>
<td>TYPE 2 STRONG POST GUIDE RAIL</td>
</tr>
<tr>
<td>*RC-53M (2 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>TYPE 2 WEAK POST GUIDE RAIL</td>
</tr>
<tr>
<td>*RC-54M (17 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>BARRIER PLACEMENT AT OBSTRUCTIONS</td>
</tr>
<tr>
<td>RC-55M</td>
<td>APR 28, 2000</td>
<td>TYPE 2 WEAK POST MEDIAN BARRIER</td>
</tr>
<tr>
<td>*RC-57M (6 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>CONCRETE MEDIAN BARRIER</td>
</tr>
<tr>
<td>*RC-58M (2 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>SINGLE FACE CONCRETE BARRIER</td>
</tr>
<tr>
<td>*RC-59M (2 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>CONCRETE GLARE SCREEN</td>
</tr>
<tr>
<td><strong>FENCES AND CURBS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC-60M (13 Sheets)</td>
<td>APR 28, 2000</td>
<td>RIGHT-OF-WAY FENCE</td>
</tr>
<tr>
<td>RC-61M</td>
<td>APR 28, 2000</td>
<td>RIGHT-OF-WAY GATES AND REMOVABLE FENCE SECTIONS</td>
</tr>
<tr>
<td>*RC-62M (2 Sheets)</td>
<td>APR 28, 2000</td>
<td>PERMANENT BARRIERS</td>
</tr>
<tr>
<td>RC-63M</td>
<td>APR 28, 2000</td>
<td>CURBS AND GUARDERS</td>
</tr>
<tr>
<td>*RC-65M (5 Sheers)</td>
<td>NOV. 1, 2001</td>
<td>CONCRETE MOUNTABLE CURBS</td>
</tr>
<tr>
<td>RC-66M</td>
<td>APR 16, 2001</td>
<td>CONCRETE TRAFFIC SEPARATOR</td>
</tr>
<tr>
<td>RC-67M (2 Sheets)</td>
<td>APR 28, 2000</td>
<td>CURB RAMPS</td>
</tr>
<tr>
<td><strong>POLLUTION CONTROL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*RC-70M (16 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>EROSION AND SEDIMENT POLLUTION CONTROL</td>
</tr>
<tr>
<td><strong>HIGHWAY LIGHTING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC-80M (12 Sheets)</td>
<td>APR 28, 2000</td>
<td>HIGHWAY LIGHTING-FOUNDATIONS</td>
</tr>
<tr>
<td>RC-81M</td>
<td>APR 16, 2001</td>
<td>HIGHWAY LIGHTING-JUNCTION BOXES-LIGHT DUTY</td>
</tr>
<tr>
<td>*RC-82M (10 Sheets)</td>
<td>APR 16, 2001</td>
<td>HIGHWAY LIGHTING-JUNCTION BOXES-HEAVY DUTY</td>
</tr>
<tr>
<td>RC-83M (2 Sheets)</td>
<td>NOV. 1, 2001</td>
<td>HIGHWAY LIGHTING-LIGHTING POLE DETAILS</td>
</tr>
<tr>
<td>RC-84M</td>
<td>APR 28, 2000</td>
<td>HIGHWAY LIGHTING-LIGHTING AND ELECTRICAL DETAILS</td>
</tr>
<tr>
<td><strong>ROADSIDE DEVELOPMENT AND PLANTING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC-91M (2 Sheets)</td>
<td>APR 28, 2000</td>
<td>BRACING AND PLANTING DETAILS</td>
</tr>
</tbody>
</table>

April, 2000 Edition
Change #1 April 16, 2001
Change #2 November 1, 2001
1. Place an approved tube over the lubricated end of all dowel bars used in Type E joints and provide a minimum 2½ (1") clearance pocket assured by means of a positive spacing device.

2. Cut expansion joint filler material to conform to the cross section of the pavement and furnish in strips equal to the width of the pavement slab. Make the top surface smooth and make holes or grooves for the dowel bars so that they snugly fit without loss in thickness of the material.

3. Construct all transverse joints perpendicular to the centerline.

4. Use minimum No. 38 x 450 (1½" x 18") long dowel bars for pavement depths 250 (10") or less and minimum No. 36 x 450 (1½" x 18") long dowel bars for pavement depths greater than 250 (10") approved alternate dowel bars having equivalent properties to conventional round dowel bars may be used.

5. Place dowel bars parallel to the centerline and surface of the slab.

6. Use only approved neoprene seals, as listed in Bulletin 15. Install neoprene seals at a uniform depth with the top of the seal not less than 1½ (3.8 cm) nor more than 10 (25.4 cm) below the surface. Make the top edges of the contact surfaces on both sides of the seal at the same elevation.

7. Make the top of the joint seal material no less than 3 (7.6 cm) nor more than 6 (15.2 cm) below the surface of the pavement.

8. The initial saw cut for Type D joint is not required for construction joints.

9. Saw depths of neoprene seals:
   - Seal size: saw cut depths
     - 25 (1") 50 (2"")
     - 30 (1½") 60 (2½")
     - 35 (2") 80 (3"")

10. Adjust the width of the second saw cut according to the seal size and pavement surface temperature at the time of sawing, as follows:

11. When silicone joint sealing material, as specified in Publication 40B, Section 705.4(1), is specified for use in transverse joints (Type E only) or transverse shoulder joints, use the same joint sealing material as in the longitudinal joints.

12. All dimensions are given in millimeters unless otherwise noted. U.S. Customary units in () parentheses.

13. Provide materials and workmanship in accordance with the requirements of Publication 40B.

**Note:** Either all metric or all English values must be used on plans, metric and English values shown may not be mixed.
1. Specify 16 (#5) tie bars 750 ±6 (30 ±¼") long, spaced 750 (30") center to center, maximum place perpendicular to and centered over the longitudinal joint. The longitudinal joint is cut 3/16" wide. Embossed tie bars 0.22 0.225 ±0.015 or 0.025 ±0.015, whichever is greater, except for concrete construction joints, for joints with less than 0.025 ±0.015, where the joint is wider than the tie bar, cut 3/16" wide. The tie bar must be adjusted to an uneven pavement or shoulder depth. 3 is the maximum depth of the tie bar. See Figure 2.10. The minimum pull-out resistance specified in Publication 408, Section 501.3(1).

2. Epoxy coat tie bars as specified in Publication 408, Section 709.11. Epoxy coat or galvanize tie bolts and threaded sleeve nuts, excluding threads, as specified in Publication 408, Section 705.11 or Section 705.01.1 respectively.

3. Straighten deformed bent tie bars so that the angle made with the longitudinal joint is at least 60 degrees.

4. Make threaded sleeve nut from steel pipe or hexagonal steel bar 24 x 0.16 0.165 ±0.015 long or high strength steel bar 24 x 0.50 0.505 ±0.015 long.

5. Securely fasten the key to the steel form. The contractor shall have a method acceptable to the engineer, of temporarily securing the tie bolt to the key form or form during placement of the concrete.

6. Only form keys for pavement depths greater than 250 (10") form only female keyways.

7. Place tie bolts at 750 (30") center to center maximum spacing embossed tie bolts cut 3/16" wide or 0.025 ±0.015 width greater. Tie bolts are not necessary when the joint is wider than the tie bar, cut 3/16" wide. The tie bar must be adjusted to an uneven pavement or shoulder depth. 3 is the depth of the tie bar. Screw tie bars until snug. For 150, 150, and 200 kips. 7 7 7 and 1/8"

8. Only form female keyways for pavement depths greater than 250 (10") form only female keyways.

9. Use an approved epoxy anchoring material to withstand the necessary minimum pull-out resistance specified in Publication 408, Section 501.3(1). The epoxy anchoring material must be approved by the manufacturer's recommendation. Use rotary hammer drill to avoid impacting fins into hole.

10. Place tie bolts at 750 (30") center to center maximum spacing embossed tie bolts cut 3/16" wide or 0.025 ±0.015 width greater. Tie bolts are not necessary when the joint is wider than the tie bar, cut 3/16" wide. The tie bar must be adjusted to an uneven pavement or shoulder depth. 3 is the depth of the tie bar. Screw tie bars until snug. For 150, 150, and 200 kips. 7 7 7 and 1/8"

11. When concrete joint sealing material, as specified in Publication 408, Section 705.4(a), is selected for use in transverse joints (type A or C) only or transverse shoulder joints, use the same joint sealing material in the longitudinal joints (alternate type A or C and alternate transverse shoulder joints). Make the top of the joint sealing material from 3 3/4" to 6 1/4" below the pavement surface.

NOTE: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
TYPICAL LOAD TRANSFER ASSEMBLY

NOTES

1. THIS STANDARD DEFINES THE DIMENSIONS REQUIRED FOR UNIFORMITY AND COOPERATION IN THE生產 AND INSTALLATION OF CONCRETE PAVEMENT JOINTS. AS PAVED PAVEMENT JOINTS ARE MANUFACTURED, INSTALLATION REQUIREMENTS MUST BE FOLLOWED.

2. PROVIDE ANCHOR STAKES TO SECURE UNIT FROM MOVEMENT INCLUDING UPLIFT.

3. PROVIDE STAKES OF SUFFICIENT LENGTH SUCH THAT 483 (15') WILL BE EMBEDDED IF THE TOP COURSE IS OGS, ASPHALT TREATED PERMEABLE BASE COURSE, CEMENT TREATED PERMEABLE BASE COURSE OR 2A. WHEN LANE WIDTH OF LANE VARIES

4. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

5. PROVIDE ANCHOR STAKES TO SECURE UNIT FROM MOVEMENT INCLUDING UPLIFT.

6. DOEFL BAR KEEPERS MAY BE USED IN LIEU OF TIE WIRES OR SHIPPING WIRES IN PLACE, REMOVED AND REPLACED. FOR FABRICATION, ALLOWABLE ALLOWANCE SIZE AS FOLLOWING:

7. THIS STANDARD DEFINES THE DIMENSIONS REQUIRED FOR UNIFORMITY AND COOPERATION IN THE production AND INSTALLATION OF CONCRETE PAVEMENT JOINTS. AS PAVED PAVEMENT JOINTS ARE MANUFACTURED, INSTALLATION REQUIREMENTS MUST BE FOLLOWED.

8. PROVIDE ANCHOR STAKES TO SECURE UNIT FROM MOVEMENT INCLUDING UPLIFT.

9. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

10. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

11. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

12. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

13. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

14. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

15. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

16. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

17. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

18. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

19. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

20. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

21. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

22. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

23. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

24. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

25. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

26. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

27. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

28. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

29. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

30. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

31. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

32. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

33. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

34. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

35. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

36. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

37. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

38. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

39. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

40. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

41. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

42. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

43. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

44. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

45. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

46. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

47. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

48. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

49. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

50. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

51. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

52. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

53. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

54. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

55. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

56. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

57. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

58. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

59. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

60. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

61. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

62. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

63. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

64. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

65. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

66. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

67. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

68. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

69. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

70. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

71. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

72. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

73. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

74. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

75. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

76. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

77. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

78. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

79. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

80. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

81. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

82. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

83. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

84. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

85. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

86. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

87. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

88. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

89. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.

90. PROVIDE DOWELS AND ASSEMBLY DETAILS THAT CONFORM TO PUBLICATION 408.
1. Construct in accordance with this standard drawing or as indicated on the structure drawings.

2. The Type E joint does not apply when approach slab is constructed in conjunction with a pavement relief joint or with a flexible pavement. See RC-24M.

3. When construction involves more than 2 lanes, connect additional lanes required to standard 2 lane bridge approach slab using Type L construction joints, as shown on RC-20M, Sheet 2.

4. Install neoprene compression seals to a uniform depth with top of the seal not less than 6 (1/4") nor more than 10 (3/4") below the level of the pavement surface. Make the top edges of the contact surfaces on both sides of the seal at the same elevation.

5. Determine "d" by adding 20 (3/4") to the maximum compressed height of the neoprene compression seal. See manufacturer's information.

6. Construct the bridge approach slab after the bridge deck is constructed.

7. Provide reinforcement bars, epoxy coated in accordance with Publication 408, Section 709.

8. All dimensions are in millimeters unless otherwise noted. U.S. customary units in () parenthesis.

NOTE: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
430 (17") DEEP ADJACENT COMPOSITE BOX BEAMS WITH 230 (9") DEEP APPROACH SLAB NOTCH

280 (11") MINIMUM FOR JOINT DETAILS, SEE SHEET 1. TILT HOOK TO MAINTAIN PROPER CLEARANCE.

Prestressed Box Beam, 2-PLY Bit. Paper Depth and Over

535 (21") TO 1220 (4'-0") DEEP ADJACENT COMPOSITE BOX BEAMS WITH 280 (11½") DEEP APPROACH SLAB NOTCH

NOTES

1. 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 410 (16") BRIDGE APPROACH SLAB.

2. AT BEAM ENDS, BURN OFF REINFORCEMENT PROTRUDING INTO APPROACH SLAB NOTCH.

3. INCREASE IN FIELD, PROVIDING OVERHANG, IF REQUIRED.

4. PROVIDE REINFORCEMENT BARS, EPOXY COATED, IN ACCORDANCE WITH PUBLICATION 408, SECTION 709.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES:

1. Trowel smooth and apply one coat asphalt paint on top of polyethylene sheeting as bond breaker.

2. Orient the edge of the approach slab parallel to the integral abutment for bridge skew less than 15° degrees. L. E. 1:6 (6:1) slope to the perpendicular to the direction of traffic.

3. For larger bridge skew, orient the edge of the approach slab at a slope of 1:14 (1:7) to the perpendicular to the direction of traffic.

4. Determine the required expansion gap opening at the time of construction and the movement requirements of the expansion joint at the end of the approach slab in accordance with design manual Part 4 Art. 6 C.

5. Make the top of the joint sealing material no less than 3 1/8" or more than 6 1/8" below the surface of the pavement.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

NOTES: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. PAVEMENT RELIEF JOINTS ARE APPLICABLE FOR ALL CEMENT CONCRETE PAVEMENTS.

2. USE CLASS AA CONCRETE IN SUBSLAB. AT CONTRACTOR'S OPTION, SUBSLAB CONCRETE MAY BE HES.

3. INCLUDE PORTIONS OF REINFORCING BARS WHICH ARE LOCATED OUTSIDE THE INDICATED PAY LINES IN BID PRICE FOR PAVEMENT RELIEF JOINT.

4. WHEN THE PAVEMENT GRADE CAUSES DRAINAGE TOWARDS THE BRIDGE, PLACE A SUBGRADE BRUSH IN LESS THAN 300 MM UNDER THE 150 MM PORTION OF THE SUBSLAB. MEASURE AND PAY FOR AS SPECIFIED IN PUBLICATION 408, SECTION 412.

5. WHERE BRIDGES ARE LOCATED LESS THAN 300 M (900') APART, AS MEASURED FROM THE FACE OF THE NEAREST ABUTMENTS, DO NOT USE A RELIEF JOINT BETWEEN THE BRIDGES.

6. WHERE BRIDGES ARE LOCATED BETWEEN 300 M (900') AND 450 M (1350') APART, AND THE PAVEMENT STRUCTURE IS CEMENT CONCRETE, PLACE ONE RELIEF JOINT MIDWAY BETWEEN THE BRIDGES. IN THESE CASES, PROVIDE THE SUBSLAB AS A UNIFORM 150 MM THICK AND 2.1 M WIDE.

7. FOR JOINT DETAILS ON NEW CONSTRUCTION, SEE RC-20M. FOR JOINT DETAILS ON RECONSTRUCTION, SEE RC-26M.

8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. ALL CUSTOMARY UNITS IN PARENTHESES.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF DESIGN

PAVEMENT RELIEF JOINT
1. Construct aggregate base as specified in Publication 489, Section 350.3 and consider as part of the shoulder.

2. Consider the payment for this area of subbase material incidental to the shoulder.

3. Make depth of shoulder the combined depth of surface and base course.

4. Slope shoulder at 4.0:1 for effective shoulder widths ≤ 2.4 m (8'), slope shoulder at 6.0:1 for effective shoulder widths > 2.4 m (8').

5. For effective shoulder widths 1.0 m (3' 3") and less, pave out-to-out of shoulders with full depth roadway pavement.

6. For shoulders that specify rumble strips installations, use only bituminous wearing course, 10-2 or 10-3, or Superpave, 9.5 mm or 12.5 mm, HMA wearing course, 40 (1½") depth minimum.

7. When installing rumble strips on a Type 1-1 or Type 1-SP shoulder, construct the pavement/shoulder joint at the beginning of the effective shoulder, or pave full depth into the effective shoulder far enough so that the rumble strips are not constructed over the longitudinal joint.

8. All dimensions are in millimeters unless otherwise noted.

9. See Sheets 4 and 5 for rumble strips details.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
FOR TYPE 4 AND TYPE 6 SHOULDERS PROPERLY PREPARE SURFACE BY EITHER SHAPING AND/OR SCARIFYING AND/OR COMPACTING. 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, COMPLETE THE WORK BY EITHER ADDING ADDITIONAL AGGR BASE CASE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 350 OR MILLED BITUMINOUS MATERIAL. THE ADDITIONAL MATERIAL IS INCIDENTAL TO THE SHOULDER ITEM.

3. FOR TYPE 7 SHOULDERS PROPERLY PREPARE EXISTING PAVED SHOULDER BY CLEANING AND PATCHING.

4. REMOVE UNSUITABLE MATERIAL AS DIRECTED, EXCAVATE, AND BACKFILL WITH MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 350, MEASURE AND PAY FOR SHOULDER EXCAVATION AND BACKFILL IN ACCORDANCE WITH PUBLICATION 408, SECTIONS 654 AND 656. (CROSS SECTIONS ARE NOT REQUIRED.)

5. CONSIDER GRADING INCIDENTAL TO THE SHOULDER PAY ITEM. WHERE THERE IS INSUFFICIENT GRADED MATERIAL FROM THE GRADING OPERATION TO COMPLETE THIS OPERATION, USE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 350 AND PAY FOR AS TONNES OF SELECTED BORROW EXCAVATION. WHERE THERE IS AN EXCESS OF MATERIAL FROM THE SHOULDER EXCAVATION OR GRADING OPERATION, REMOVE THIS MATERIAL AS SOON AS POSSIBLE AND CONSIDER AS INCIDENTAL TO THE SHOULDER PAY ITEM.

6. PROVIDE BITUMINOUS TAPER SHOULDER WEDGE 250 (10") TO 300 (12") UP CUT SLOPE WHEN INDICATED ON THE PLANS AND CONSIDER AS INCIDENTAL TO THE SHOULDER PAY ITEM.

7. "LUMP SUM" ITEMS INCLUDE ALL MATERIALS AND OPERATIONS OF WORK NECESSARY TO COMPLETE THAT ENTIRE ITEM WHETHER TABULATED OR NOT.

8. FOR SHOULDERS THAT SPECIFY RUMBLE STRIP INSTALLATIONS, USE ONLY BITUMINOUS WEARING COURSE, ID-2 OR ID-3, OR SUPERPAVE, 9.5mm OR 12.5mm HMA WEARING COURSE, 40 (1½") DEPTH MINIMUM.

9. SEE SHEETS 4 AND 5 FOR RUMBLE STRIP DETAILS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
CONCRETE SHOULDERS ADJACENT TO PLAIN CONCRETE PAVEMENT FOR COLLECTORS AND LOCAL ROADS

CONCRETE SHOULDERS ADJACENT TO RCC PAVEMENT AND PCC PAVEMENT FOR INTERSTATE AND OTHER LIMITED ACCESS FREeways, ARTeRIALS AND RAMPS

SECTION A-A

CONCRETE SHOULDER EXPANSION JOINTS

SECTION B-B

SHOULDER RELIEF JOINTS

NOTES:
1. SPECIFY THE AGGREGATE BASE AS IN PUBLICATION 408 SECTION 350.1.3 AND CONSIDER INCIDENTAL TO THE SHOULDER.
2. SEAL ALL SHOULDER JOINTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 302.1.1.3.
3. FOR JOINT DETAILS, SEE RC-20M.
4. ALIGN SHOULDER TRANSVERSE JOINTS TO ADJACENT PAVEMENT JOINTS.
5. SEE RC-24M SHEET 1, FOR SHOULDER MOLDING DETAIL
either side of intermediate shoulder joints adjacent to RCC PAVEMENTS.
6. AT THE CONTRACTOR'S OPTION, TYPE 2 CONCRETE SHOULDERS MAY BE CONSTRUCTED ON A TAPER, WITH A 150 6" MINIMUM DEPTH, OR AT THE SAME DEPTH AS THE PAVEMENT, AT NO ADDITIONAL EXPENSE TO THE DEPARTMENT.
7. TYPICALLY, DO NOT PLACE TIE BARS OR TIEBOLTS ON EITHER SIDE OF INTERMEDIATE SHOULDER JOINTS ADJACENT TO RCC PAVEMENTS.
8. WHEN THE SHOULDER IS STRUCTURALLY PART OF A PARAPET MOMENT RESISTANCE SLAB, SEE BC-799 SHEET 3 FOR REQUIRED MINIMUM SPACING OF THE TRANSVERSE SHOULDER JOINTS.
9. SEE SHEETS 4 AND 5 FOR RUMBLE STRIP DETAILS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SHOULDER (CONCRETE)

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
ACCELERATION LANE DETAIL FOR RUMBLE STRIP INSTALLATION

DECCELERATION LANE DETAIL FOR RUMBLE STRIP INSTALLATION

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. Milled or formed shoulder rumble strips for free access highways are considered on a project by project basis as indicated on the construction plans.

2. Construct rumble strip in accordance with Publication 408, Section 660.

3. Do not mill or form shoulder rumble strips across a joint.

4. 300 ±13 (12") ±½") for left medians/shoulders, 450 ±13 (18") ±½") for right shoulders 2.4 m (8') wide. For right shoulders less than 2.4 m (8') wide, see construction plans for offset dimension.

5. If there is no actual pavement shoulder joint, measure the offset from the pavement shoulder traffic line.

6. Rumble strips on concrete shoulders may be milled or formed.

NOTE: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
TYPICAL PAVEMENT PATCHING JOINT

SECTION A-A

LEGEND

NOTE

1. WHEN ANY PAVEMENT PATCH REPLACES AN EXISTING EXPANSION JOINT AND THE EXISTING EXPANSION JOINT IN AN ADJACENT LANE REMAINS IN PLACE, INSTALL EXPANSION JOINT MATERIAL IN THE PATCHING JOINT OR NEW PAVEMENT JOINT NEAREST TO THE REMAINING EXPANSION JOINT. PLACE AN APPROVED TUBE HAVING A MINIMUM 25 (1") CLEARANCE POCKET OVER THE LUBRICATED END OF ALL DOWEL BARS IN THE NEW EXPANSION JOINT.

2. USE 32 C 1 1/4 (2 1/4") X 305 C 12 (12") LONG DOWEL BARS FOR PAVEMENT DEPTHS 250 (100") OR LESS AND 38 C 1 1/2 (2 1/2") X 450 C 18 (18") LONG DOWEL BARS FOR PAVEMENT DEPTHS GREATER THAN 250 (100").

3. PLACE DOWEL BARS PARALLEL TO THE CENTERLINE AND SURFACE OF THE SLAB. THE VERTICAL OR HORIZONTAL SKEW FROM ONE END OF THE DOWEL BAR TO THE OTHER END IS NOT TO EXCEED 6 (Y4 ").

4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN PARENTHESES.

5. MAKE THE TOP OF THE JOINT SEALING MATERIAL NO LESS THAN 3 (1/2") OR MORE THAN 6 (2") BELOW THE SURFACE OF THE PAVEMENT.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE PAVEMENT REHABILITATION
(PATCHING)

Saw cuts for lift out method

† MAKE FULL DEPTH SAWCUT TO FACILITATE OPENING A TRENCH ACROSS THE SLAB TO RELIEVE COMPRESSION IN PAVEMENT PRIOR TO LIFTING OUT FAILED AREA. SAWCUT MAY BE OMITTED PROVIDED NO SPALLING OCCURS ON SURFACE OR UNDERSIDE OF REMAINING CONCRETE PAVEMENT OCCURS. IF SPALLING OCCURS, MAKE THIS SAWCUT ON SUBSEQUENT PATCHES. SAWCUTS FOR COMPRESSION RELIEF NEED NOT BE AT PATCH EDGES. AT CONTRACTOR'S OPTION, MAKE ADDITIONAL SAWCUTS INSIDE REPAIR LIMITS TO FACILITATE REMOVAL.

Saw cuts for lift out method

† MAKE FULL DEPTH SAWCUT TO FACILITATE OPENING A TRENCH ACROSS THE SLAB TO RELIEVE COMPRESSION IN PAVEMENT PRIOR TO LIFTING OUT FAILED AREA. SAWCUT MAY BE OMITTED PROVIDED NO SPALLING OCCURS ON SURFACE OR UNDERSIDE OF REMAINING CONCRETE PAVEMENT OCCURS. IF SPALLING OCCURS, MAKE THIS SAWCUT ON SUBSEQUENT PATCHES. SAWCUTS FOR COMPRESSION RELIEF NEED NOT BE AT PATCH EDGES. AT CONTRACTOR'S OPTION, MAKE ADDITIONAL SAWCUTS INSIDE REPAIR LIMITS TO FACILITATE REMOVAL.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE PAVEMENT REHABILITATION
(PATCHING)

Saw cuts for lift out method

† MAKE FULL DEPTH SAWCUT TO FACILITATE OPENING A TRENCH ACROSS THE SLAB TO RELIEVE COMPRESSION IN PAVEMENT PRIOR TO LIFTING OUT FAILED AREA. SAWCUT MAY BE OMITTED PROVIDED NO SPALLING OCCURS ON SURFACE OR UNDERSIDE OF REMAINING CONCRETE PAVEMENT OCCURS. IF SPALLING OCCURS, MAKE THIS SAWCUT ON SUBSEQUENT PATCHES. SAWCUTS FOR COMPRESSION RELIEF NEED NOT BE AT PATCH EDGES. AT CONTRACTOR'S OPTION, MAKE ADDITIONAL SAWCUTS INSIDE REPAIR LIMITS TO FACILITATE REMOVAL.

Saw cuts for lift out method

† MAKE FULL DEPTH SAWCUT TO FACILITATE OPENING A TRENCH ACROSS THE SLAB TO RELIEVE COMPRESSION IN PAVEMENT PRIOR TO LIFTING OUT FAILED AREA. SAWCUT MAY BE OMITTED PROVIDED NO SPALLING OCCURS ON SURFACE OR UNDERSIDE OF REMAINING CONCRETE PAVEMENT OCCURS. IF SPALLING OCCURS, MAKE THIS SAWCUT ON SUBSEQUENT PATCHES. SAWCUTS FOR COMPRESSION RELIEF NEED NOT BE AT PATCH EDGES. AT CONTRACTOR'S OPTION, MAKE ADDITIONAL SAWCUTS INSIDE REPAIR LIMITS TO FACILITATE REMOVAL.
1. Construct pavement patches in adjacent lanes, with lengths that are within 1.8 m (6') of each other, to the same length. This length is the length of the larger pavement patch. If the patch lengths differ by more than 1.8 m (6'), then construct to the required lengths.

2. Do not leave less than 1.8 m (6') of original pavement in place between patches or between joints.

3. When performing single lane pavement patching, or patching one lane at a time, place a 1.8 m (6') full depth, polystyrene board bond breaker in the longitudinal joint of all patches under 150 m (500') in length, prior to placing the new concrete in the patch area.

4. When patching adjacent to an existing joint, remove a minimum of 1.8 m (6') of pavement in the next slab to avoid the existing seam band.

5. When replacing one full slab length and the deterioration extends more than 600 m (200') into the next slab, remove a minimum of 1.8 m (6') and install a new pavement joint in the same position as the original joint.

6. When performing multilane patching, and the patches are greater than two slab lengths and less than or equal to 150 m (500'), the joint spacing of the area being patched is to conform to RC-9M or RC-17M for the specific type of pavement being placed (i.e., RC or PLC).

7. These drawings are provided as examples to show certain patching criteria. They may not cover every field situation.

8. When only one lane is being patched, do not make removals more than 1.5 m (5') into next slab. If more than 1.5 m (5') is required, remove a minimum of 1.8 m (6') and provide new pavement joint at original joint location. For exception, see Note 6.

Note: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
DETAIL A

Patching Joint Details

LEGEND

- Maintain existing edge clearance.
- Existing rebars
- New rebars

1. Use the following table to determine development length.

<table>
<thead>
<tr>
<th>Bar Size (in)</th>
<th>Development Length (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>10</td>
</tr>
<tr>
<td>5/32</td>
<td>12</td>
</tr>
<tr>
<td>3/32</td>
<td>14</td>
</tr>
<tr>
<td>1/8</td>
<td>16</td>
</tr>
</tbody>
</table>

NOTE 1: When the joint spacing is 15 or less, 
make joint sealing material 3 1/2" to 6 below the pavement surface.

NOTE 2: Either all metric or all English values 
must be used on plans. Metric and 
English values shown may not be mixed.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
CONCRETE PAVEMENT REHABILITATION
(R.C.R Patching)

SHR - 3 OP 3

Director, Bureau of Design
November 30, 2001

RC-26M
HOLE PATTERNS FOR PAVEMENT SLAB STABILIZATION

NOTE
1. DRILL NEW HOLES FOR REGROUTING 150 (6") CLOSER TO JOINT OR CRACK.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE PAVEMENT REHABILITATION
(PATCHING)
NOTES

1. EXISTING STEEL PLATE IS EITHER 2.01 THICK (14 GAUGE) WITH LAPPED TOP OR FLAT PLATE 3 1/4" THICK.

2. WHEN EXISTING JOINT SPACING IS LESS THAN 15 M (50'), W = 19 3/4", WHEN EXISTING JOINT SPACING IS 15 M (50') OR MORE, W = 25 1/4".

3. REMOVE THE STEEL PLATE WITHIN THE SEALANT RESERVOIR.

4. MAKE THE TOP OF THE JOINT SEALING MATERIAL NO LESS THAN 3 1/4" OR MORE THAN 6 1/4" BELOW THE SURFACE OF THE PAVEMENT.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. FOR JOINT DETAILS, SEE RC-20M.
2. CONSTRUCT TYPE D JOINTS ON INTERSTATE EXPRESSWAY, ARTERIAL AND RAMP PAVEMENTS.
3. WHEN RAMP OR LANE WIDTH EXCEEDS 4.2 m (14'), A TYPE L JOINT IS REQUIRED AT THE MIDPOINT.
4. CONSTRUCT ACCELERATION AND DECELERATION PORTION OF RAMPS WITH THE SAME PAVEMENT STRUCTURE AS THE MAINLINE PAVEMENT TO THE FIRST TRANSVERSE JOINT BEYOND THE SHOULDER GORE.
5. ON COLLECTORS AND LOCAL ROADS, CONSTRUCT TYPE P JOINTS, AS INDICATED.
6. A 4.5 m (15') JOINT SPACING IS TO BE USED ON ALL PAVEMENTS LESS THAN 250 (10") THICK. A 6.0 m (20') JOINT SPACING IS TO BE USED ON ALL PAVEMENTS EQUAL TO OR GREATER THAN 250 (10") THICK.
7. FOR ALTERNATE JOINTS, SEE RC-20M, SHEETS 1 AND 2.
8. ON CURVES, THE JOINT SHALL BE CONSTRUCTED PERPENDICULAR TO THE TANGENT ON THE LONG RADIUS SIDE OF THE CURVE.
9. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESIS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PLAIN CONCRETE PAVEMENT

INTERSTATE AND OTHER LIMITED ACCESS
FREeways, ARTERIALS AND RAMPS
TAMPED SOIL OR SUBBASE

VARIABLE EXTRA DEPTH PIPE UNDERDRAIN

CLASS f'

GEOTEXTILE MATERIAL, WHEN INDICATED.

1:1 BATTER, BOTH SIDES

NO. 57 COARSE AGGREGATE (TAMPED)

NET 50 FLF (2") MIN

CLASS 1

FILTER BLANKET (TAMPED)

PLACE IN LAYERS OF NO. 8 COARSE AGGREGATE AND CEMENT THOROUGHLY TAMPED.

EXCAVATION OVER 90 (36") DEPTH AND FOR A MAXIMUM WIDTH OF 90 (36") IS PAYABLE AS CLASS 4 EXCAVATION.

OUTLETS FOR ALL PIPE UNDERDRAIN AND PAVEMENT BASE DRAINS.

LATURES OF SATISFACTORY EMBANKMENT MATERIAL, 100 (36") THICK, THOROUGHLY TAMPED

BASE COURSE OR PAVEMENT

SHOULDER OR CURB GUTTER

OPEN GRADED SUBBASE

SUBGRADE

CLASS 1 GEOTEXTILE MATERIAL

PIPE OUTSIDE DIAMETER PLUS 100 MIN W1N

TYPICAL PLACEMENT (OPEN GRADED SUBBASE)

TYPICAL PLACEMENT (STANDARD SUBBASE)

PAVEMENT BASE DRAIN

TYPICAL PLACEMENT

(OPEN GRADED SUBBASE)

PAVEMENT BASE DRAIN

TYPICAL PLACEMENT

(standard subbase)

PAVEMENT BASE DRAIN

NOTES

1. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 408M (408/2000), SECTION 610 FOR PIPE UNDERDRAIN AND PAVEMENT BASE DRAIN.

2. PROVIDE BURNT MUD PAPE WHEN GEOTEXTILE MATERIAL IS NOT INDICATED.

3. FOR THE SUBSURFACE DRAIN OUTLET PROVIDE MATERIALS MEETING THE REQUIREMENTS OF PUBLICATION 408M, SECTION 615. A MINIMUM OF 50 FLF (2") OF RED CLAY IS PAYABLE AS CLASS 4 EXCAVATION, OR WITH THE SAME MATERIAL AS THE UNDERDRAIN OR PAVEMENT BASE DRAIN.

4. USE THE WIRE MESH SHIELD IN AREAS NOT SUBJECT TO MOWING OR DAMAGE BY EQUIPMENT OR VEHICLES. REFER TO RC-31M FOR CONSTRUCTION OF ENDWALLS FOR OUTLET PROTECTION.

5. LONGITUDINAL BASE DRAINS MAY RUN CONTINUOUSLY THROUGH TWO (2) OUTLETS. SEE A "W" SHOWN ON THE TYPICAL PLAN OF SUBSURFACE DRAIN OUTLETS.

6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SUBSURFACE DRAINS

RECOMMENDED NOTE (2001)
RECOMMEND NO. (2001)
SHT 1 OF 5

RC-30M

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 610 FOR PAVEMENT BASE DRAIN, SECTION 612 FOR SUBGRADE DRAIN AND SECTION 604 FOR COMBINATION STORM SEWER AND UNDERDRAIN.

2. PROVIDE BITUMINOUS PAPER WHERE GEOTEXTILE MATERIAL IS NOT INDICATED.

3. PREFABRICATED PAVEMENT BASE DRAIN IS NOT RECOMMENDED UNDER CURBED SECTIONS AND ADJACENT TO WIDENED PAVERMENT.

LEGEND

A  DEPTH BELOW SUBBASE EQUAL TO THE OUTSIDE DIAMETER OF SPECIFIED PIPE PLUS 50 (2")

B  WHEN STORM SEWER IS REQUIRED AND IT INTERFERES WITH PLACEMENT OF PAVEMENT BASE DRAIN, ELIMINATE THE PAVEMENT BASE DRAIN AND USE COMBINATION STORM SEWER AND UNDERDRAIN.

D  SUBBASE DEPTH.

E  IF SLOUGHING OF THE SUBBASE MATERIAL FROM UNDER THE PAVEMENT IS OBSERVED DURING TRENCH EXCAVATION, COMPACT BACKFILL HYDRAULICALLY, AS DIRECTED BY THE ENGINEER.

*  WIDTH IS EQUAL TO 75-125 (3"-5") OF BACKFILL AGGREGATE PLUS 25 (1") FOR THE PREFABRICATED BASE DRAIN.

**  VARY TO MAINTAIN THE NECESSARY SUBGRADE SLOPE. CONSIDER ADDITIONAL AGGREGATE INCIDENTAL TO THE SUBGRADE DRAIN PAY ITEM.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SUBSURFACE DRAINS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 408/2000, SECTION 601 FOR PIPE CULVERTS, SECTION 602 FOR CORRUGATED METAL PIPE-ARCH CULVERTS, AND SECTION 603 FOR METAL PLATE CULVERTS.

2. SHORING OR TRENCH BOX INSTALLATION FOR FLEXIBLE PIPE IS NOT NORMALLY USED. IF SHORING OR TRENCH BOX INSTALLATION IS PERMITTED IN SPECIAL CIRCUMSTANCES, REFER TO PUBLICATION 408/2000, SECTION 601.

3. IN ALL EXCAVATION AREAS FOLLOW OSHA SAFETY REQUIREMENTS.

4. DO NOT COMPACT NO. 8 MATERIAL USED FOR BEDDING UNDER CONCRETE PIPES.

5. ALLOW NO PAYMENT FOR EXCAVATION IN EXCESS OF SPECIFIED LIMITS AND FOR ADDITIONAL BACKFILL MATERIAL REQUIRED.

6. PAYMENT FOR THE BACKFILL ENVELOPE, INCLUDING BEDDING, COARSE AGGREGATE AND SUITABLE MATERIAL UP TO 300 (12") ABOVE THE PIPE IS INCIDENTAL TO THE PIPE.

7. FOR BOTTOM TRENCH WIDTHS > 2.5 m (8'-0"), ALL EXCAVATION IS CLASS 1.

8. FOR INLET OR OUTLET PROTECTION SEE DETAIL A.

LEGEND

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SUBSURFACE DRAINS
PIPE PLACEMENT
EXCAVATION - BEDDING - BACKFILL
PIPE INSTALLATION PROCEDURES

CONSTRUCTION DETAILS BELOW COVER THE FOLLOWING CONDITIONS:

1. Pipe lying on top of the natural ground, rock or compacted (95% SPD Fill).
2. The existing ground is between the top of the proposed pipe and the pipe is to be covered with earth fill.
3. The natural ground is between the top of the proposed pipe and the pipe is to be covered with earth fill.
4. The top of pipe is below the level of the natural ground or is compacted fill, 150 mm (6") to 200 mm (8") to prevent piping.
5. The top of pipe is below the level of the natural ground or is compacted fill, 150 mm (6") to 200 mm (8") to prevent piping.

NOTE: Either all metric or all English values must be used on plans, metric and English values shown may not be mixed.

CONCRETE PIPE

Step 1: Remove topsoil (compressible layer, for example).

Step 2: Construct the embankment to 1200 mm (4'-0") above slope (or top of pipe). For concrete pipe, if this excavation is through rock, the embankment shall not be less than 150 mm (6") deep. The installation of pipes 1800 mm (72") or greater in diameter or span is permitted without placing embankment first.

Step 3: Excavate the trench to the width of the pipe plus 300 mm (12") for special designs, locate see step 6a for metal pipe arch.

Step 4: Excavate the trench to the width of the pipe plus 300 mm (12") for special designs, locate see step 6a for metal pipe arch.

Step 5: Lay the pipe on the prepared shoulder, compact to 95% SPD. Test the backfill material and continue embankment in accordance with section 602.

NOTE:

1. The installation of pipes 1000 mm (32") or greater in diameter or span is permitted without placement of embankment first. The embankment shall not be less than 150 mm (6") deep.
2. The existing ground is between the top of the proposed pipe and the pipe is to be covered with earth fill.
3. Excavate the trench to the width of the pipe plus 300 mm (12") for special designs, locate see step 6a for metal pipe arch.
4. Lay the pipe on the prepared shoulder, compact to 95% SPD. Test the backfill material and continue embankment in accordance with section 602.

THERMOPLASTIC PIPE

Step 6: Place suitable material in a symmetrical manner in lifts 100 mm (4") high, and compact to 95% SPD. Test the backfill material and continue embankment in accordance with section 602.

NOTE:

1. The installation of pipes 1000 mm (32") or greater in diameter or span is permitted without placement of embankment first. The embankment shall not be less than 150 mm (6") deep.
2. The existing ground is between the top of the proposed pipe and the pipe is to be covered with earth fill.
3. Excavate the trench to the width of the pipe plus 300 mm (12") for special designs, locate see step 6a for metal pipe arch.
4. Lay the pipe on the prepared shoulder, compact to 95% SPD. Test the backfill material and continue embankment in accordance with section 602.
FLOWABLE BACKFILL DETAIL

NOTES:
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 601 AND 620.
2. FLOWABLE BACKFILL WILL ENVELOP THE LAST SECTION OF PIPE OR END SECTION. CONSTRUCT DIKE OF FLOWABLE BACKFILL Material AS SPECIFIED IN SPECIAL PROVISION OR PROVIDE FORMWORK TO CONTAIN FLOWABLE BACKFILL.
3. PAYMENT FOR THE BACKFILL ENVELOPE (AGGREGATE, BEDDING AND BACKFILL) OR FLOWABLE BACKFILL MATERIAL) AND SUITABLE MATERIAL UP TO 300 (12") ABOVE THE PIPE IS INCIDENTAL TO THE PIPE.
4. THE FLOWABLE BACKFILL DETAIL REPLACES STEPS 6A, 6B, 6C AND 6D ON SHEET 4 WHEN FLOWABLE BACKFILL IS SPECIFIED.

FLOWABLE BACKFILL DETAIL

NOTES: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. CONSTRUCTION REQUIREMENTS:
A. CONSTRUCT IN ACCORDANCE WITH PUBLICATION 408, SECTIONS 605, 606 AND 7141.
B. MINIMUM CONCRETE CLASS:
   CAST-IN-PLACE CLASS A
   PRECAST CLASS AA
C. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE WITH
   PUBLICATION 408, SECTION 7141.
D. CLEAN COVER FOR STEEL:
   WALLS: 300 (12") MIN.
   FOOTINGS: CAST-IN-PLACE: 400 (15/16") TOP BARS
            40 (1 1/2") BOTTOM BARS
            PRECAST: 40 (1 1/2") TOP BARS
            40 (1 1/2") BOTTOM BARS
   SLABS: CAST-IN-PLACE: 60 (2 1/2") TOP & BOTTOM BARS
          PRECAST: 60 (2 1/2") TOP & BOTTOM BARS

2. THIS SHEET DEPICTS THE VARIOUS COMPONENTS REQUIRED FOR COMPLETE INLET ASSEMBLIES. FOR INSTRUCTIONS AND OTHER SPECIFIC DETAILS, SEE THE FOLLOWING:
   SHEET 2 OF 10 FOR CONCRETE TOP UNITS.
   SHEET 3 & 4 OF 10 FOR GRATES AND GRADE ADJUSTMENT RINGS.
   SHEET 5 OF 10 FOR STANDARD INLET BOXES (CAST-IN-PLACE).
   SHEET 6 OF 10 FOR STANDARD INLET BOXES (PRECAST).
   SHEET 7 OF 10 FOR MODIFIED INLET BOXES (CAST-IN-PLACE).
   SHEET 10 OF 10 FOR TYPE D-H INLET.

3. EACH TYPE OF INLET SHOWN IS SUITABLE FOR A PARTICULAR SITUATION AS FOLLOWS:
   TYPE C INLET IS DESIGNATED FOR INSTALLATION IN SHOULDER SWALE AREAS.
   TYPE S INLET IS DESIGNATED FOR INSTALLATION IN MEDIAN AREAS AND MOUNTABLE CURBS.
   TYPE M INLET IS DESIGNATED FOR INSTALLATION IN SHOULDER SWALE AREAS.

4. THE SELECTION OF COMPONENTS TO ACHIEVE A SPECIFIED INLET ASSEMBLY IS THE CONTRACTOR'S RESPONSIBILITY.

5. USE PRECAST CONCRETE OR STEEL GRADE ADJUSTMENT RINGS WHEN REQUIRED. FOR REHABILITATION PROJECTS.

6. FOR WALL REINFORCEMENT, BOTH DIRECTIONS, USE 5/8 (16) BAR W/Mxl 4 BAR MAX. SPACING.

7. FOR FOOTING REINFORCEMENT, TOP AND BOTTOM, USE .31 (1/10) BARS AT 420 (17") SPACING OR .39 (1/4) BARS AT 300 (12") SPACING.

8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN () PARENTHESIS.

9. PROVIDE KEY HOLES ON INLET BOXES WHEN REQUIRED.

10. PIPES MAY BE CONNECTED TO DRAINAGE STRUCTURES / PRECAST INLETS, ETC. WITH WORMAN OR WATERTIGHT RUBBER FLEXIBLE CONNECTORS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
INLET ASSEMBLIES

DIRECTOR, BUREAU OF DESIGN & ENGR., DEPARTMENT OF TRANSPORTATION

RC-34M
1. THIS SHEET DEPICTS THE SHAPE AND DIMENSIONS REQUIRED FOR UNIFORMITY AND COMPATIBILITY. PERMIT ONLY TOP UNITS SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. FOR DEVIATIONS OR MODIFICATIONS OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

2. CAST-IN-PLACE TOP UNITS MAY BE MONOLITHIC WITH THE INLET BOX.

3. PROVIDE ANGLES EMBEDDED IN THE CONCRETE AS A BEARING AREA FOR THE GRATE FOR ALL TOP UNITS WHICH SEAT THE GRATE DIRECTLY WITHIN THE UNIT.

4. PLACE A TYPE W INLET ADJACENT TO THE BACK SIDE OF THE CURB, FLUSH WITH THE PAVEMENT SURFACE, WHEN REQUIRED WITHIN A CONCRETE MOUNTABLE CURB SECTION.

5. DOWEL TYPE C INLET TOP UNITS WITH 2-#25 DOWEL BARS AND PLACE PREMOLDED EXPANSION JOINT FILLER B (1/4") WIDE, WHEN CONNECTING TO ADJACENT CURB SECTIONS.

6. THE PLACEMENT OF THE TYPE S INLET IS DEPENDENT ON THE RATE OF BACK SLOPE. FOR BACK SLOPES GREATER THAN 1/2 " (1.25), LOCATE THE INLET WHERE THE BACK SLOPE LINE INTERSECTS THE BACK TO THE OUTER CORNER OF THE INLET. FOR BACK SLOPES LESS THAN 1/2 " (1.25), LOCATE THE INLET WHERE THE BACK SLOPE LINE INTERSECTS THE EDGE OF THE INLET GRATE.

7. TAPERS MAY BE PROVIDED ON INSIDE VERTICAL FACES OF PRECAST INLET TOPS TO FACILITATE FORM STRIPPING. TAPERS WILL RESULT IN INTERNAL BOTTOM DIMENSIONS THAT VARY TO A MAXIMUM OF 25 " (1 ").

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. THIS SHEET DEPICTS THE DIMENSIONS REQUIRED FOR UNIFORMITY AND INTERCHANGEABILITY. IT DOES NOT INCLUDE DETAILS REQUIRED FOR FABRICATION OR MANUFACTURING. PERMIT ONLY GRATES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. FOR DEVIATIONS OR MODIFICATIONS OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

2. NAIL STRUCTURAL STEEL GRATES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 409, SECTION 1105.03(1). 

3. PROVIDE TRANSVERSE BARS MEETING THE REQUIREMENTS OF PUBLICATION 408.

4. PROVIDE BICYCLE-SAFE, STRUCTURAL STEEL OR CAST IRON VANES FOR INSTALLATION WHERE BICYCLE TRAFFIC IS ANTICIPATED, SUCH AS CURBED ROADWAYS IN URBAN AREAS OR ROADWAYS SPECIFICALLY ESTABLISHED AND SIGNS AS BIKEWAYS OR HAVING BIKE LINES. ALTERNATE BICYCLE-SAFE GRATE DESIGNS SHALL REQUIRE A SHOP DRAWING SUBMISSION, AS SPECIFIED IN NOTE 1, AND SHALL CONFORM TO THE DIMENSIONAL REQUIREMENTS FOR PROPER INSTALLATION WITH THE CURRENT CONCRETE TOP UNITS.

5. FABRICATE SLOTS BY BURNING, DRILLING, SHEARING OR PUNCHING. HAVE THE BOTTOM OF ALL BURNED OR DRILLED SLOTS CONFORM TO THE SHAPE OF THE ROD.

6. PROVIDE STRUCTURAL STEEL GRATES WITH THE GRATE SPACERS LOCATED FLUSH ALONG THE TOP SURFACE OF THE GRATE.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. THIS SHEET DEPICTS THE DIMENSIONS REQUIRED FOR UNIFORMITY AND INTERCHANGEABILITY. IT DOES NOT INCLUDE DETAILS REQUIRED FOR MANUFACTURE OR INSTALLATION. GRATES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15 FOR DEVIATIONS OR MODIFICATIONS OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

2. PROVIDE BICYCLE-SAFE, STRUCTURAL STEEL OR CAST IRON VANE GRATES FOR INSTALLATION WHERE BICYCLE TRAFFIC IS ANTICIPATED, SUCH AS CURBED ROADWAYS IN URBAN AREAS OR RADIALS SPECIFICALLY DESIGNATED AS BICYCLE LINES. ALTERNATE BICYCLE-SAFE GRATE DESIGNS SHALL REQUIRE A SHOP DRAWING SUBMISSION, AS SPECIFIED IN NOTE 1, AND SHALL CONFORM TO THE DIMENSIONAL REQUIREMENTS FOR PROPER INSTALLATION WITH THE CURRENT CONCRETE TOP UNITS.

3. CAST IRON GRATES MAY BE USED AS ALTERNATES TO STRUCTURAL STEEL GRATES PROVIDED THEY ARE SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15 AND APPROVED FOR HS25 LOADING. CAST IRON GRATES NOT APPROVED FOR HS25 LOADING MAY BE USED OUTSIDE OF THE TRAVEL LANES; AT THE EDGE OF OUTSIDE SHOULDER, SWALES, WIDE MEDIAN SWALES AND INFILL AREAS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. Provide materials and construction in accordance with the requirements of Publication 408, Sections 605, 606 and 714. Permit only grates and grade adjustment systems supplied by a manufacturer listed in Bulletin 15. For deviations or modifications of the standards submit shop drawings for approval.

2. Install vane grates with curve vanes facing the direction of flow.

3. Grade adjustment rings:
   A. Custom fabricate each adjustment ring from measurements provided with each order.
   B. Manufacture bar stock and retainer clip from U.S. made carbon steel meeting or exceeding the minimum requirements of ASTM A-36M and AASHTO Table 10.32.1a.
   C. Provide full circumferential welds on both top and bottom rings. Make the inner weld a bevel groove weld finish for proper seating of grate and make the outer weld a fillet weld.
   D. Provide an adjustment ring which is flush with cover and does not allow excessive movement. Provide an adjustment ring which conforms to the shape of the original frame.

4. Provide radius of 3 (3/4") typical for all fillets and rounds, unless noted.

5. Attach steel grade adjustment rings rigidly to the frame and set precast concrete grade adjustment rings on a mortar bed.

6. Cast iron grates may be used as alternates to structural steel grates provided they are supplied by a manufacturer listed in Bulletin 15 and approved for HS25 loading. Cast iron grates not approved for HS25 loading may be used outside of the travel lanes; at the edge of outside shoulders, swales, wide median swales and infield areas.

Commonwealth of Pennsylvania
Department of Transportation
Bureau of Design

Inlet Grates & Grade Adjustment Rings

Note: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
NOTES

1. THIS SHEET DEPICTS THE DIMENSIONS REQUIRED FOR UNIFORMITY AND INTERCHANGEABILITY. IT DOES NOT INCLUDE DETAILS REQUIRED FOR FABRICATION OR MANUFACTURING. PERMIT ONLY FRAMES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. FOR DEVIATIONS OR MODIFICATIONS OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

2. PROVIDE EITHER GRAY, MALLEABLE OR DUCTILE IRON CASTINGS OR STRUCTURAL STEEL FRAMES.

3. WELD STRUCTURAL STEEL FRAMES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 1105,03(1).

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLET FRAMES

SHT 6 OF 10

RC-34M
DETAILS FOR ALTERNATE JOINTS, SEE NOTES A & B.

1. PROVIDE INLET BOXES WITH A 300 [12"] STANDARD OPENING TO ACCOMMODATE THE STANDARD TOP COMPONENTS.

2. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

3. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

4. PLACE #13 (#4) REINFORCEMENT BARS, MINIMUM 300 [12"] LONG, SPACED AT 300 [12"] C TO C AS DOUBLES BETWEEN THE INLET BASE AND WALLS WHEN THE CONCRETE WALLS AND INLET BASE ARE NOT CONSTRUCTED MONOLITHICALLY. THE DOWELS MAY BE ELIMINATED IF AN ALTERNATE JOINT IS CONSTRUCTED AS SHOWN IN DETAILS A & B.

5. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

6. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

7. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

8. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

9. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

10. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

11. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

12. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD INLET BOXES
(CAST-IN-PLACE)

INLETS

NOTES

1. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

2. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

3. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

4. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

5. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

6. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

7. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

8. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

9. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

10. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

11. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

12. PROVIDE INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 405.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD INLET BOXES
(CAST-IN-PLACE)
1. CONSTRUCT INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 714.
2. PERMIT ONLY PRECAST INLET BOXES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. USE CLASS AA CEMENT CONCRETE FOR PRECAST CONCRETE BOXES. FOR DEPARTURES OR MODIFICATIONS OF THE STANDARDS, SUBMIT SHOP DRAWINGS FOR APPROVAL.
3. PROVIDE STANDARD INLET BOXES AND COVER ADJUSTMENT SLABS WITH A 610 x 1150 (24' x 46") OPENING TO ACCOMMODATE STANDARD TOP COMPONENTS.
4. FOR INLETS THAT DEVIATE FROM THE STANDARDS SUBMIT SPECIAL DETAILS AND DESIGN FOR THE INLET WALLS AND BASE TO THE BUREAU OF CONSTRUCTION FOR REVIEW AND APPROVAL. CONSTRUCT INLETS THAT EXCEED 1500 C (5') IN HEIGHT WITH STEPS SIMILAR TO MANHOLES (SEE RC-39M) FOR INLETS OTHER THAN STANDARD INLET BOXES.
5. PROVIDE STANDARD INLET BOXES AND COVER ADJUSTMENT SLABS WITH A 610 x 1150 (24' x 46") OPENING TO ACCOMMODATE STANDARD TOP COMPONENTS.
6. PLATE SUBBASE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 703, IN LEFT, 100 C (4") THICK, COMPARED TO A SENSIBLE SATISFACTION TO THE ENGINEER AND OCCIDENTAL TO THE INLET BASE.
7. PERMIT ONLY PRECAST INLET BOXES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. USE CLASS AA CEMENT CONCRETE FOR PRECAST BOXES. FOR DEPARTURES OR MODIFICATIONS OF THE STANDARDS, SUBMIT SHOP DRAWINGS FOR APPROVAL.
8. PROVIDE CONSTRUCTION JOINTS AS REQUIRED FOR INLET BOXES THAT ARE NOT MONOLITHIC. SEE DETAILS A-B SHEET 7.
9. TAPERS MAY BE PROVIDED ON VERTICAL FACES OF PRECAST INLET BOX BASE UNITS TO FACILITATE FORM STRIPPING. TAPERS WILL RESULT IN INTERNAL CONDITIONS REQUIRE PIPE BLOCKOUTS TO BE FORMED WITHIN 100 MAT 0" FROM THE TOP OF THE INLET BASE. PROVIDE AN ADDITIONAL 25 MAT 1" REINFORCEMENT BAR LOCATED 40 MAT 0" FROM THE INLET FACE. REMOVE ANY VISIBLE PORTION OF THE TAPER DURING INSTALLATION AND PRIOR TO PLACING THE NEXT TAPERED PIPE (c. 900 OD). THE PIPE täglich may be formed "flush" with the inlet base. PIPE BLOCKOUTS MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
10. PROVIDE SUITABLE LIFTING DEVICES FOR HANDLING AND INSTALLATION. GALVANIZED METAL DEVICES AS SPECIFIED IN PUBLICATION 408. sonstlieve, ORANGE CONCRETE BOXES. FOR REINFORCEMENT, TAPERS MAY BE PROVIDED ON VERTICAL FACES OF PRECAST INLET BASE UNITS TO FACILITATE FORM STRIPPING. TAPERS WILL RESULT IN INTERNAL CONDITIONS THAT VARY TO A MAXIMUM OF 25 MAT 1".

NOTE: EITHER METRIC OR ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
INLETS

TYPE D-H INLET
(CAST-IN-PLACE AND PRECAST)

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
CIRCUMFERENTIAL REINFORCEMENT (FULL DEPTH) 250 mm²/VERTICAL METER

CONSTRUCTION JOINT AT 3.0 m (10') C TO C TYP... SEE DETAIL "A".

STEP DETAIL SEE SHEET 3.

FOR TYPICAL

MINIMUM CONCRETE CLASS: CAST-IN-PLACE CLASS A, PRECAST CLASS A, OR PRECAST CLASS AA.

PIPE PLAN VIEW

SECTION B-B OR C-C

TABLE A

BASE SLAB DIMENSIONS

| DEPTH FROM | TOP OF MANHOLE | BOTTOM REINFORCEMENT | SIDE COVER
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>127 (5&quot;)</td>
<td>254 (10&quot;)</td>
<td>254 (10&quot;)</td>
<td>254 (10&quot;)</td>
</tr>
</tbody>
</table>

SECTION A-A

MAX DEPTH FROM

| DEPTH FROM | TOP OF MANHOLE | BOTTOM REINFORCEMENT | SIDE COVER
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 m (10')</td>
<td>2060 (10&quot;)</td>
<td>300 (0.0&quot;)</td>
<td>2060 (10&quot;)</td>
</tr>
<tr>
<td>4.5 m (15&quot;)</td>
<td>2590 (10&quot;)</td>
<td>300 (0.0&quot;)</td>
<td>2590 (10&quot;)</td>
</tr>
<tr>
<td>6.0 m (20&quot;)</td>
<td>360 (1.5&quot;)</td>
<td>2060 (10&quot;)</td>
<td>360 (1.5&quot;)</td>
</tr>
<tr>
<td>7.3 m (25&quot;)</td>
<td>2590 (10&quot;)</td>
<td>300 (1.5&quot;)</td>
<td>2590 (10&quot;)</td>
</tr>
<tr>
<td>9.0 m (30&quot;)</td>
<td>2590 (10&quot;)</td>
<td>300 (1.5&quot;)</td>
<td>2590 (10&quot;)</td>
</tr>
</tbody>
</table>

REINFORCEMENT DETAILS AT OPENINGS

NOTE: APPLICATION OF REINFORCEMENT BAR SIZES FOR ADDITIONAL WALL TYPES IS SHOWN AT EACH OPENING LOCATION. USE NO. 13 (4") BARS AT 480 (18") FOR DEPTHS TO 6.0 m (20') OR 2060 (8") WWF FOR DEPTHS GREATER THAN 6.0 m (20').

FORM A CONCRETE CHANNEL AT THE BOTTOM OF THE MANHOLE CONFORMING TO THE SHAPE OF THE LOWER HALF OF THE INCOMING AND/OR OUTGOING PIPES. PROVIDE A FULL DEPTH "T"-SHAPED CHANNEL WHEN NECESSARY TO REDUCE ENERGY LOSSES.

FOR FOOTING BOTTOM REINFORCEMENT, BOTH DIRECTIONS, USE NO. 13 (4") BARS AT 480 (18") FOR DEPTHS TO 6.0 m (20') OR 2060 (8") WWF FOR DEPTHS GREATER THAN 6.0 m (20').

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF DESIGN

STANDARD MANHOLES
CAST-IN-PLACE MANHOLES

RECOMMENDED 9/1-2001
RECOMMENDED 9/1-2001
REV. 1 OF 1
DESIGNER, BUREAU OF DESIGN
PLAYOUT PROOFREADER

RC-39M
1. FOR CONSTRUCTION REQUIREMENTS SEE NOTE 1, SHEET 1.
2. INCREASE BOX SIZE WHEN REQUIRED TO KEEP WALLS OF MANHOLE SEE NOTE 1, SHEET 1.
3. DESIGN ALL MEMBERS FOR MOMENT, CRACK CONTROL, AND SHEAR AT DISTANCE FROM FACE OF SUPPORT. CALCULATE ALL SPAN LENGTHS FROM THE CENTER OF THE SUPPORTS.
4. PLACE ADDITIONAL BARS IN THE SLAB AT 45° TO THE REACTION OF THE MANHOLE OPENING. SEE SECTION A-A FOR DETAILS.
5. PLACE ADDITIONAL BARS IN THE SLAB AT 45° TO THE REACTION OF THE MANHOLE OPENING. SEE FIGURE 1 FOR DETAILS.
6. PLACE ADDITIONAL BARS IN THE SLAB AT 45° TO THE REACTION OF THE MANHOLE OPENING. SEE FIGURE 2 FOR DETAILS.
7. DESIGN THE "EDGE SEAMS" TO SPAN THE LENGTH OF THE BOX. SEE NOTE 2, SHEET 1.
8. DESIGN THE "EDGE SEAMS" TO SPAN THE LENGTH OF THE BOX. SEE NOTE 2, SHEET 1.
9. PLACE ADDITIONAL BARS IN THE SLAB AT 45° TO THE REACTION OF THE MANHOLE OPENING. SEE SECTION A-A FOR DETAILS.
10. PLACE ADDITIONAL BARS IN THE SLAB AT 45° TO THE REACTION OF THE MANHOLE OPENING. SEE SECTION A-A FOR DETAILS.
11. PLACE ADDITIONAL BARS IN THE SLAB AT 45° TO THE REACTION OF THE MANHOLE OPENING. SEE SECTION A-A FOR DETAILS.
12. PLACE ADDITIONAL BARS IN THE SLAB AT 45° TO THE REACTION OF THE MANHOLE OPENING. SEE SECTION A-A FOR DETAILS.
13. PLACE ADDITIONAL BARS IN THE SLAB AT 45° TO THE REACTION OF THE MANHOLE OPENING. SEE SECTION A-A FOR DETAILS.
610 (24") MIN TO C TO C HOOKED TO THE BASE SLAB REINFORCEMENT IF MESH IS USED AS WALL REINFORCEMENT IN THE BASE SECTION. SEE DETAIL C.

762 (30") MAX ID PROVIDE VERTICAL BARS •13 (#4) AT 405 (16") FOR PIPES 750 (30") INSIDE DIAMETER.

PRECAST MANHOLE

SEE TABLE B FOR BASE SLAB STEEL REQUIREMENTS. PROVIDE WALL REINFORCEMENT DETAILS AT BASE SLAB TYPICAL OF CAST-IN-PLACE MANHOLE. SEE SHEET 1.

ADJUST TO FINAL GRADE WITH PRECAST CONCRETE GRADE RINGS OR BRICK AND CEMENT MORTAR.

54 (12") INSIDE FACE OF MANHOLE

152 (6") INSIDE FACE OF MANHOLE

FOR DETAILS.

8. FOR RISERS OR BASE SECTIONS WITH TWO OR MORE OPENINGS, LOCATED AT A DEPTH GREATER THAN 7.6 m (25'), USE A 254 (10") THICK WALL RISER OR BASE SECTION WITH CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 930 m²/VERTICAL FT. FOR THE HEIGHT OF RISER OR BASE SECTION.

9. PROVIDE ADDITIONAL REINFORCEMENT BARS AROUND OPENINGS AS SHOWN ON REINFORCEMENT DETAILS AT OPENINGS SHEET 1.

10. FOR CHANNEL DETAILS IN PRECAST MANHOLE SEE CAST-IN-PLACE MANHOLE SHEET 1.

11. PROVIDE MANHOLE STEPS MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 714, ALTERNATE CONFIGURATIONS AND DIMENSIONS, AS APPROVED BY THE ENGINEER, MAY BE USED.

12. PROVIDE PRECAST MANHOLE SECTION DIMENSIONS AS PER PUBLICATION 408, SECTION 714, ALTERNATE DETAIL SHEeting.

13. MECHANICAL ANCHOR REQUIRED FOR INSTALLATION OF STEPS WITHOUT HOOKS.

14. THE ALTERNATE OPENING REQUIREMENT DETAIL IS NOT DESIRABLE AT DESIGN. USE IT TO MEET EXISTING PIPE ELEVATIONS.

TABLE B

<table>
<thead>
<tr>
<th>PRECAST MANHOLE</th>
<th>TOP STEEL REQUIREMENTS</th>
<th>BOTTOM STEEL REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.O. TO D.H.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10' (0.5 M)</td>
<td>NS. 13 BARS AT 100 C TO C</td>
<td>NS. 13 BARS AT 120 C TO C</td>
</tr>
<tr>
<td>20' (1.0 M)</td>
<td>NS. 13 BARS AT 100 C TO C</td>
<td>NS. 13 BARS AT 120 C TO C</td>
</tr>
<tr>
<td>30' (2.0 M)</td>
<td>NS. 13 BARS AT 100 C TO C</td>
<td>NS. 13 BARS AT 120 C TO C</td>
</tr>
</tbody>
</table>

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

STANDARD MANHOLES PRECAST MANHOLES & MANHOLE STEPS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

DRAWN: 4/1/93  PUBLISHED: 6/1/93

B.S. 5-93  PUBLICATION 408 SHEET 1

SHEET 1 OF 1

RC-39M
RAISED LETTERS, 25 (1") CHECKERED TOP DESIGN

ELEVATION VIEW

PLAN VIEW

CAST IRON MANHOLE COVER (PLATEN COVER)

PLAN VIEW

CAST IRON MANHOLE COVER (STANDARD COVER)

ELEVATION VIEW OF MANHOLE FRAME

MINIMUM BEARING SEAT FOR GRADE ADJUSTMENTS

STORM RISES (1/32")

DETAIL A

GASKET SEALING SYSTEM

PLAN VIEW

ADJUSTMENT RISERS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD MANHOLES
COVERS, FRAMES AND ADJUSTMENT RISERS

NOTE: PROVIDE MANHOLE FRAMES AND COVERS MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 605.2(S). DESIGN MANHOLE FRAMES, COVERS AND ADJUSTMENT RISERS TO HAVE A MINIMUM BEARING SEAT OF 25 (1") FOR COVER. LOCATE TOP OF FRAME OR ADJUSTMENT RISER 3 (1/8") BELOW THE TOP OF ROADWAY SURFACE.

1. PROVIDE MANHOLE FRAMES AND COVERS MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 605.2(S). DESIGN MANHOLE FRAMES, COVERS AND ADJUSTMENT RISERS TO HAVE A MINIMUM BEARING SEAT OF 25 (1") FOR COVER. LOCATE TOP OF FRAME OR ADJUSTMENT RISER 3 (1/8") BELOW THE TOP OF ROADWAY SURFACE.

2. PROVIDE MANHOLE FRAMES, COVERS AND ADJUSTMENT RISERS SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR DEVIATION OR MODIFICATION TO THE STANDARDS, SUBMIT SHOP DRAWINGS FOR APPROVAL.

3. PROVIDE A GASKET SEALING SYSTEM, DOVETAIL GROOVE AND CONTINUOUS GASKET, AS INDICATED IN DETAIL A, TO PREVENT INFLOW AND INFILTRATION. PROVIDE TWO (2) LIFT HOLES AT 90° TO SATISFY SELF-SEALING REQUIREMENTS FOR SELF-SEALING MANHOLE COVERS.

4. PROVIDE ONE LIFT HOLE TO FACILITATE COVER REMOVAL FOR NON-SEALING MANHOLE COVERS.

5. FRAME AND GRADE ADJUSTMENT RISER TO HAVE A MINIMUM BEARING SEAT OF 25 (1") FOR COVER.

6. LOCATE TOP OF FRAME OR ADJUSTMENT RISER 3 (1/8") BELOW THE TOP OF ROADWAY SURFACE.

7. PROVIDE GRADE ADJUSTMENT RISERS MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 606, AND AS MODIFIED HEREIN:

A. CUSTOM FABRICATE EACH ADJUSTMENT RISER FROM MEASUREMENTS PROVIDED WITH EACH ORDER.

B. MANUFACTURE BAR STOCK AND MACHINER TO MEET EXACTING SPECIFICATIONS FOR LENGTH, WIDTH, THICKNESS AND WEIGHT ACCURATELY TO THE TYPICAL RISER SHOWN IN THE SECTIONS.

C. PROVIDE A FABRICATED ADJUSTMENT RISER TO PROVIDE THE PROPER RELATIONSHIP BETWEEN THE MANHOLE FRAME AND THE ADJUSTMENT RISER TO RESIST MOVEMENT.

D. USE REPLACEABLE STUDS TO MEET ENHANCED REQUIREMENTS FOR MULTIPLE PIECE ADJUSTMENT RISERS.

E. PROVIDE THE ADJUSTMENT RISER TO RESIST MOVEMENT WITHTOUGH AND DURABLE PLASTIC CARPET WITH ADJUSTMENT RISER TO REINFORCE THE SHAPE OF THE ORIGINAL MANHOLE FRAME.

F. ATTACH FRAME AND/OR PRECAST CONCRETE GRADE RINGS IN A BED OF CEMENT MORTAR.

G. ATTACH FRAME AND/OR PRECAST CONCRETE GRADE RINGS IN A BED OF CEMENT MORTAR.

H. SET THE BASE OF THE FRAME AND/OR PRECAST CONCRETE GRADE RINGS IN A BED OF CEMENT MORTAR.
1. DESIGN REQUIREMENTS:

2. VERTICAL STEEL:

A. DESIGN SPECIFICATIONS: DESIGN DIVISION 1 OF AASHTO, STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, INCLUDING THE LATEST REVISIONS, 1992 EDITION (INCLUDING LATEST REVISIONS). ASTM C 478M-90, STANDARD SPECIFICATIONS FOR PRECAST CONCRETE MANHOLE SECTIONS.

B. DESIGN HORIZONTAL BEARING PRESSURES BY SERVICE LOAD METHODS.

C. THE SAFE BEARING PRESSURE IS NOT TO EXCEED THE EXISTING LIVE LOADS AS APPROVED BY THE DEPARTMENT.

D. DETERMINE MINIMUM AND MAXIMUM VERTICAL LOAD APPLIED TO MANHOLE AT DEPTH "H".

E. DETERMINE OVERTURNING MOMENT FROM UNBALANCED EARTH PRESSURE.

F. PROVIDE AT LEAST MINIMUM REINFORCEMENT FOR SURFACE AND TEMPERATURE AT ALL CONCRETE FAces WHERE REINFORCEMENT IS NOT REQUIRED BY DESIGN.

G. FOR CONSTRUCTION REQUIREMENTS SEE NOTE 1, SHEET 1.

H. THIS PROCEDURE IS REQUIRED ONLY WHEN A SIGNIFICANT LOADING EXISTS ON ONE SIDE OF THE MANHOLE AND LIMITED SUPPORT IS PROVIDED ON THE OTHER.

I. DETERMINE DIMENSIONS OF DESIGN SECTION TO CARRY MOMENT AS SHOWN IN FIGURE 1.

J. DESIGN REINFORCEMENT IN "COLUMN" TO CARRY AXIAL LOAD AND MOMENT. (USE TOTAL CROSS-SECTION TO CARRY AXIAL LOAD.)

K. CHECK CRACK CONTROL UNDER SERVICE LOAD CONDITIONS.

L. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

M. DETERMINE SERVICE MOMENTS AND AXIAL THRUSTS USING FIGURE 2 AND FIGURE 3. PHH WAS NOT TO BE GREATER THAN ONE-HALF OF PHH 1,1,1.

N. USE WALLS AT 1219 (4'-0") THICK WITH ONE ROW OF REINFORCING, OR USE WALLS AT 254 (10") OR GREATER WITH TWO ROWS OF REINFORCING.

O. USE WALLS AT 1219 (4'-0") THICK WITH ONE ROW OF REINFORCING, OR USE WALLS AT 254 (10") OR GREATER WITH TWO ROWS OF REINFORCING.

P. CHECK CRACK CONTROL UNDER SERVICE LOAD.

Q. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

R. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

S. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

T. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

U. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

V. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

W. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

X. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

Y. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)

Z. SATURATED AT REST EARTH PRESSURE = Ko [0.001] \[\times 10^{11}\] (3.1 MPa)
1. All dimensions are in millimeters unless otherwise noted. U.S. customary units in parentheses.

2. Galv. pipe sleeves for rubbing rail are used in the approach and transition is not required.

3. Provide materials and workmanship in accordance with PUB. 408.

4. W-beam is bolted to all guide rail posts.

5. Use plan dimensions when different from those shown on site standard.

6. Reinforced concrete parapet and embedded inserts are braced.

7. On structures where structure mounted type 2-SC guide rail is used, the approach and transition is not required.

8. Bolt rubbing rail, to post without washer.

9. Posts with rubbing rail attachment require an additional hole.

9a. Terminal section and rubbing rail end must be attached flush with street for the safest. Installation can be facilitated by shop twisting to be consistent with the type of safety grate.

10. See RC-5210 (00) Current Bridge Details.

11. Steel spacer tube, schedule 40 galvanized pipe, 152 (6") x 305 (1.0") x 3.125 connect to the rail elements using splice bolt.

12. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

13. Provide all hardware, guide rail material and rubbing rail, in accordance with PUB. 408, Section 1106.

14. Reinforcement bar sizes are shown for clarity only. Use actual bar designation indicated in the contract drawings.

15. See RC-1520 for details and hardware not noted in the contract drawings.

3. Provide approach end transition, either with or without inlet placement, includes the type 2-IC and curb rail if required, PMS 1010 (1-1/2") sections of W-beam, posts, offset brackets, plastic or wood offset brackets.

4. Posts that are denoted with "*" are bolted to the W-beam.

5. Use plan dimensions when different from those shown on site standard.

6. Reinforcement bar sizes are shown for clarity only. Use actual bar designation indicated in the contract drawings.

7. Post with rubbing rail attachment requires an additional hole.

8. Bolt rubbing rail, to post without washer.

9. Posts with rubbing rail attachment require an additional hole.

9a. Terminal section and rubbing rail end must be attached flush with street for the safest. Installation can be facilitated by shop twisting to be consistent with the type of safety grate.

10. Steel spacer tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

11. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

12. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

13. Provide all hardware, guide rail material and rubbing rail, in accordance with PUB. 408, Section 1106.

14. Reinforcement bar sizes are shown for clarity only. Use actual bar designation indicated in the contract drawings.

15. See RC-1520 for details and hardware not noted in the contract drawings.

16. Provide approach end transition, either with or without inlet placement, includes the type 2-IC and curb rail if required.

17. Provide approach end transition, either with or without inlet placement, includes the type 2-IC and curb rail if required.

18. Steel spacer tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

19. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

20. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

21. Provide all hardware, guide rail material and rubbing rail, in accordance with PUB. 408, Section 1106.

22. Reinforcement bar sizes are shown for clarity only. Use actual bar designation indicated in the contract drawings.

23. See RC-1520 for details and hardware not noted in the contract drawings.

24. Provide approach end transition, either with or without inlet placement, includes the type 2-IC and curb rail if required.

25. Provide approach end transition, either with or without inlet placement, includes the type 2-IC and curb rail if required.

26. Steel spacer tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

27. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

28. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

29. Provide all hardware, guide rail material and rubbing rail, in accordance with PUB. 408, Section 1106.

30. Reinforcement bar sizes are shown for clarity only. Use actual bar designation indicated in the contract drawings.

31. See RC-1520 for details and hardware not noted in the contract drawings.

32. Provide approach end transition, either with or without inlet placement, includes the type 2-IC and curb rail if required.

33. Provide approach end transition, either with or without inlet placement, includes the type 2-IC and curb rail if required.

34. Steel spacer tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

35. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

36. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

37. Provide all hardware, guide rail material and rubbing rail, in accordance with PUB. 408, Section 1106.

38. Reinforcement bar sizes are shown for clarity only. Use actual bar designation indicated in the contract drawings.

39. See RC-1520 for details and hardware not noted in the contract drawings.

40. Provide approach end transition, either with or without inlet placement, includes the type 2-IC and curb rail if required.

41. Provide approach end transition, either with or without inlet placement, includes the type 2-IC and curb rail if required.

42. Steel spacer tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

43. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.

44. Steel splice tube, schedule galvanized pipe, 152 (6") x 305 (1.0") connect to the rail elements using splice bolt.
4. ATTACH W-BEAM RAIL ELEMENT TO EACH POST. SPLICE ONLY AT MID-SPAN AND LAP IN THE DIRECTION OF TRAFFIC. TO ACHIEVE A MID-SPAN SPLICE, THE PREFERRED METHOD IS TO OVERLAP HALF RAIL ELEMENT INSIDE THE OTHER AT THE BEGINNING OF A GUIDE RAIL RUN.

6. USE 12" BACKING PLATES FOR THE W-BEAM RAIL ELEMENTS AT ALL SUPPORTS.

3. DURING ERECTION, USE SUPPORT SOLTS.

2. USE 2-1/2" (6.35 cm) COLD-FORMED CHANNEL POST.

7. PROLONGED INSTALLATION AT END TERMINATION.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2-W GUIDE RAIL POSTS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. **TYPE 2 WEAK POST END TREATMENTS** CAN NOT BE USED TO TERMINATE THE APPROACH END OF ANY GUIDE RAIL. USE CRASHWORTHY END TREATMENTS ON ALL HIGH-SPEED, HIGH-VOLUME ROADWAYS AND ON HIGH-SPEED, HIGH-VOLUME ROUTES WITH TO SPEED LIMITS ABOVE 110 KPH (70 MPH) AND WITH CURRENT TRAFFIC VOLUMES 400 OR MORE VEHICLES PER DAY & ABOVE. ON 2-LANE HIGHWAY GUIDERAILS WHERE CRASHWORTHY END TREATMENTS ARE REQUIRED, USE ONE GUIDE RAIL ELEMENT obl. PRIOR TO THE ATTACHMENT OF A CRASHWORTHY END TREATMENT. REQUIRED, USE ON BOTH THE APPROACH AND TRAILING ENOS.

2. SEE RC-52M, FOR END TREATMENTS BURIED INTO EARTH MOUNDS.

**NOTES**

1. **TYPE 2 WEAK POST END TREATMENTS** CAN NOT BE USED TO TERMINATE THE APPROACH END OF ANY GUIDE RAIL. USE CRASHWORTHY END TREATMENTS ON ALL HIGH-SPEED, HIGH-VOLUME ROADWAYS AND ON HIGH-SPEED, HIGH-VOLUME ROUTES WITH TO SPEED LIMITS ABOVE 110 KPH (70 MPH) AND WITH CURRENT TRAFFIC VOLUMES 400 OR MORE VEHICLES PER DAY & ABOVE. ON 2-LANE HIGHWAY GUIDERAILS WHERE CRASHWORTHY END TREATMENTS ARE REQUIRED, USE ONE GUIDE RAIL ELEMENT obl. PRIOR TO THE ATTACHMENT OF A CRASHWORTHY END TREATMENT. REQUIRED, USE ON BOTH THE APPROACH AND TRAILING ENOS.

2. SEE RC-52M, FOR END TREATMENTS BURIED INTO EARTH MOUNDS.
OR TYPE 2-S POST ANCHORAGE (SEE DETAILS)

IF TYPE 2-S GUIDE RAIL IS USED

SHOULDER

TYPE 2 STRONG POST END TREATMENT, SEE RC-52M SHT. 3

TYPE 2-S GUIDE RAIL

AS SPECIFIED IN TABLE 1

SOLID OBSTRUCTION

7620

TRAFFIC DIRECTION

SEE NOTE 5

EDGE OF SHOULDER

EDGE OF PAVEMENT

TYPICAL GUIDE RAIL TREATMENT

WHEN THE REQUIRED CLEARANCE TO OBSTRUCTION IS AVAILABLE

TYPE 2 STRONG POST END TREATMENT

TYPE 2-S POST ANCHORAGE

OR TYPE 2-S GUIDE RAIL

AS DETAIL

TYPICAL TYPE 2-SC GUIDE RAIL TREATMENT

TYPICAL GUIDE RAIL TREATMENT

WHEN THE REQUIRED CLEARANCE TO OBSTRUCTION IS AVAILABLE

TYPICAL GUIDE RAIL TREATMENT WHEN THE REQUIRED CLEARANCE TO OBSTRUCTION IS NOT AVAILABLE

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

BARRIER PLACEMENT
AT OBSTRUCTIONS

RECOMMENDED NOV. 3, 2001
SHT. 1 OF 3

BUREAU OF DESIGN
TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS 6.0 m (20') OR LESS WHERE CONTINUOUS BARRIER IS REQUIRED

TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS OF 6.0 m (20') TO 10.0 m (30') WHERE CONTINUOUS BARRIER IS REQUIRED

TREATMENT AT INTERSECTIONS

AND DRIVEWAYS

TABLE 2

<table>
<thead>
<tr>
<th>DESIGN SPEED (km/h)</th>
<th>TYPE 2-SC guide rail</th>
<th>TYPE 2-MC guide rail</th>
<th>TYPE 2-WC guide rail</th>
<th>TYPE 2-WM guide rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>19</td>
<td>20 x 1</td>
<td>15 x 1</td>
<td>15 x 1</td>
</tr>
<tr>
<td>110</td>
<td>18</td>
<td>20 x 1</td>
<td>15 x 1</td>
<td>15 x 1</td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>18 x 1</td>
<td>18 x 1</td>
<td>14 x 1</td>
</tr>
<tr>
<td>90</td>
<td>16</td>
<td>16 x 1</td>
<td>12 x 1</td>
<td>12 x 1</td>
</tr>
<tr>
<td>80</td>
<td>14</td>
<td>14 x 1</td>
<td>11 x 1</td>
<td>11 x 1</td>
</tr>
<tr>
<td>70</td>
<td>13</td>
<td>12 x 1</td>
<td>10 x 1</td>
<td>10 x 1</td>
</tr>
<tr>
<td>60</td>
<td>10</td>
<td>10 x 1</td>
<td>8 x 1</td>
<td>8 x 1</td>
</tr>
<tr>
<td>50</td>
<td>8</td>
<td>8 x 1</td>
<td>7 x 1</td>
<td>7 x 1</td>
</tr>
</tbody>
</table>

NOTES

1. THIS STANDARD HAS BEEN PREPARED AS A GUIDE FOR THE PLACEMENT OF GUIDE 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, FOLLOW RECOMMENDED GUIDELINES IN DESIGN MANUAL, PART 2.

2. PROVIDE SINGLE FACE CONCRETE BARRIER THROUGH THE AREA OF THE OBSTRUCTION. NO MINIMUM BARRIER-TO-OBSTRACTION DISTANCE IS REQUIRED. FOR DETAILS, SEE RC-5BM.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY

BARRIER PLACEMENT AT OBSTRUCTIONS

RECOMMENDED OCT. 1, 2001
RECOMMENDED OCT. 1, 2001
BHT J. OF L.

RC-54M
TRAFFIC DIRECTION FOR APPROPRIATE TYPE END TREATMENT SEE DESIGN MANUAL PART 2, PUB. 13M.

TRAFFIC DIRECTION FOR FLARE RATE, SEE TABLE 2, SHEET 2

SINGLE FACE CONCRETE BARRIER INSTALLED ALONG THE LENGTH OF THE BRIDGE PIERS

EDGE OF PAVEMENT
EDGE OF SHOULDER

TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS GREATER THAN 6.0 m (20'-0") WHERE CONTINUOUS BARRIER IS NOT REQUIRED

EDGE OF PAVEMENT
EDGE OF SHOULDER

TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS GREATER THAN 10.0 m (30'-0") WHERE CONTINUOUS BARRIER IS NOT REQUIRED

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BARRIER PLACEMENT AT OBSTRUCTIONS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BARRIER PLACEMENT AT OBSTRUCTIONS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. THIS STANDARD HAS BEEN PREPARED AS A GUIDE FOR THE PLACEMENT
OF EARTH MOUNDS IN THE MEDIAN. IT IS IMPrACTICAL TO PROVIDE
A STANDARD FOR ALL POSSIBLE CONDITIONS. MODIFICATIONS OF
TREATMENTS CAN BE MADE TO FIT EXISTING CONDITIONS.

2. FOR FLARE RATES, SEE TABLE 2, SHEET 2.

3. CONSIDER EXPANSION JOINT MATERIAL, COARSE AGGREGATE, FILTER
DRAIN AND WEEP HOLES INCIDENTAL TO SINGLE FACE CONC. BARRIER.

4. ALL MATERIALS NECESSARY TO CONSTRUCT EARTH MOUNDS ARE IN
ACCORDANCE WITH APPLICABLE SECTIONS OF PUBLICATION 408.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES
MUST BE USED ON PLANS. METRIC AND
ENGLISH VALUES SHOWN MAY NOT BE MIXED.
GENERAL NOTES:

1. A 1/4:1 back slope is desirable. However, steeper slopes may be used.
2. Height of guide rail may be tapered down to maintain 60° to 45°, minimum 15" from ground elevation to bottom of the rail element.
3. When the guide rail length of need falls near a cut or fill slope, a conventional treatment is to anchor the guide rail to the cut or fill slope.
4. The back slope anchor terminal has been crash tested to NCHRP 350 criteria for a 1:6 (6:1) slope (rehab.) and a 10:1 (1:10) slope (new construction). It can be anchored with a concrete block or a post anchor.
5. Provide 25.0 x 12'-0" minimum from where the guide rail crosses the swale line to the back slope anchor terminal.
6. Back slope anchor terminal pay limit includes the concrete or post anchor, 3610 (12'-6") of rail element and hardware.

NOTE! EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
GENERAL NOTES:

1. A 14'-4'-11" back slope is desirable. However, steeper slopes may be used.

2. The top of the W-beam rail is held constant relative to the roadway grade. A second W-beam rail is required where the distance between the ground and bottom of the top rail exceeds 45'-4" and is increasing. Maximum height of double rails is 4'-4". Rails maintain maximum height. Flare rate for the rail is 12'-3 1/2".

3. Use 2449'-6" long posts for all post locations with a double rail. Posts for the post anchor are 1830'-6" long. Use the contract unit price per linear foot of guide rail. The flare rate for the rail will be measured and paid for at the contract unit price per linear foot of guide rail.

4. When the guide rail length of need falls near a cut to fill slope, the preferred treatment is to anchor the guide rail to the cut slope.

5. The back slope anchor terminal has been crash tested to meet the criteria for A-4'-6" (1'-0") back slope (rehab. projects). It can be anchored with a concrete block or a post anchor.

6. Provide 23'-0" (7'-0") min. from where the guide rail crosses the swale line to the beginning of the hazard along the side of the bridge.

7. Back slope anchor terminal pay limit includes the concrete or post anchor, 3810'-6" of rail element posts and hardware.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. PROVIDE CONCRETE MEDIAN BARRIER MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 623.
   A. MINIMUM CONCRETE CLASS: AAA

2. PROVIDE PRECAST CONCRETE BARRIER SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR DEVIATIONS OR MODIFICATIONS OF THE STANDARDS, SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL.

3. FOR CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION, USE PREMOLDED JOINT MATERIAL AT ALL CONSTRUCTION JOINTS.

4. CONCRETE MEDIAN BARRIER CONSTRUCTION ON EXISTING PAVEMENT REQUIRES SPECIAL DETAILS TO BE SHOWN ON THE CONSTRUCTION DRAWINGS.

5. FOR PERMANENT AND TEMPORARY BARRIER INSTALLATIONS, USE SIDE-MOUNT (BARRIER-MOUNT DELINEATOR) OR TOP-MOUNT DELINEATORS ALONG LONGITUDINAL CENTERLINE OF MEDIAN BARRIER.

6. CONTACT NO. 2A OR NO. OGS MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 350. A LAYER 25 (1") THICK OF NON-SHRINK MORTAR MAY BE USED ON TOP OF THE SUBBASE MATERIAL FOR LEVELING PURPOSES.

7. PROVIDE PRECAST CONCRETE MEDIAN BARRIER FOR USE AS TEMPORARY (MPT) AND PERMANENT INSTALLATIONS. FOR TEMPORARY INSTALLATIONS, EMBEDMENT IS NOT REQUIRED.

8. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.

9. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESIS.

10. FABRICATE REINFORCEMENT BARS ACCORDING TO PENNDOT BRIDGE CONSTRUCTION STANDARD, BC-736M.

11. TO LIMIT LATERAL DISPLACEMENT OF PORTABLE BARRIER WHEN USED IN WORK ZONES, PROVIDE A ROUGH FINISH AT THE BOTTOM SURFACE. BEFORE THE CONCRETE HAS INITIALLY SET, FINISH THE BOTTOM SURFACE WITH STIFF, WIRE BROOM OR SPECIAL TEMPLATE IN A LONGITUDINAL DIRECTION TO PRODUCE SCORES APPROXIMATELY 4 (1/8") IN DEPTH.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER
F-SHAPE

#13 (#4) BARS, FULL LENGTH OF BARRIER, TYP

TYPICAL PRECAST BARRIER
FOR DIMENSIONS AND DETAILS, SEE REMAINING SHEETS OF THIS STANDARD.

TYPICAL CAST-IN-PLACE BARRIER
FOR SLOTTED PLATE CONNECTION DETAILS, SEE SHEET 3.
A TYPICAL END TRANSITION MAY BE USED FOR PERMANENT BARRIER INSTALLATIONS

1. SEE SECTION A-A

END OF PARALLEL RAMPS OR INTERSECTIONS, A 2, 1
AN IMPACT ATTENUATING DEVICE IS NOT REQUIRED IF ANY OF THE FOLLOWING CONDITIONS ARE SATISFIED

A 20° SLOPED END TRANSITION IS ACCEPTABLE FOR PERMANENT INSTALLATIONS WHERE THE LEGAL SPEED LIMIT IS 60 km/h (35 mph) OR LESS. OTHERWISE, USE AN IMPACT ATTENUATING DEVICE ONLY WHEN THE LAST BARRIER SECTION IS LOCATED OUTSIDE THE REQUIRED CLEAR ZONE, AS DETERMINED IN PUBLICATION 13M, DESIGN MANUAL, PART 2, CHAPTER 12.

REFER TO TABLE 1, SHEET 3, FOR FLARE RATE REQUIREMENTS.

(A) THE BARRIER IS EXTENDED AT THE PROPER FLARE RATE UNTIL THE END OF THE BARRIER SYSTEM CAN BE BURIED IN A CUT SECTION.

(B) THE END OF THE BARRIER SYSTEM IS PROPERLY CONNECTED OR OVERLAPPED WITH EXISTING GUIDE RAIL.

CONCRETE MEDIAN BARRIER
F-SHAPE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

ALTERNATE WWF REINFORCEMENT DETAILS
WWF REPLACES THE #13 (#4) FULL LENGTH REBAR USED IN THE MEDIAN BARRIER IN THE ALTERNATE ALL OTHER DIMENSIONS ARE TYPICAL TO THE MEDIAN ALTERNATE.
Delineation of Impact Attenuating Devices

Impact Attenuating Device

Clearance Markers W16-2R

Through Roadway

Detail A

Steel Plate, See Note 1.

Sloped Plate Connection

Table 1

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Maximum Flare Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>km/h</td>
<td>Concrete Barrier</td>
</tr>
<tr>
<td>120</td>
<td>20</td>
</tr>
<tr>
<td>110</td>
<td>20</td>
</tr>
<tr>
<td>100</td>
<td>16</td>
</tr>
<tr>
<td>90</td>
<td>16</td>
</tr>
<tr>
<td>80</td>
<td>14</td>
</tr>
<tr>
<td>70</td>
<td>12</td>
</tr>
<tr>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>50</td>
<td>8</td>
</tr>
</tbody>
</table>

Note: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

Commonwealth of Pennsylvania
Department of Transportation

Concrete Median Barrier
F-Shape

Table of Contents
NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER
F-SHAPE

TYPICAL 810 TO 810 (32" TO 32")
BRIDGE TO HIGHWAY TRANSITION

1. PROVIDE REINFORCEMENT MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 709.
2. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.
3. FOR ALTERNATE WRF REINFORCED BARRIERS, SEE SHEET 2.

RECOMMENDED REE 1.2001
DIRECTOR, BUREAU OF DESIGN

RC-57M
NOTES

1. PROVIDE REINFORCEMENT MEETING THE REQUIREMENTS OF PUBLICATION NO. 1, SECTION 709 WITH A MINIMUM CONCRETE COVER OF 40 (1½") EXCEPT AS SHOWN.
2. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.
3. FOR ALTERNATE W/F REINFORCED BARRIERS, SEE SHEET 2.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER
F-SHAPE

TYPICAL 810 TO 1270 (32" TO 50") HIGHWAY TRANSITION
NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SINGLE FACE CONCRETE BARRIER

NOTE: PROVIDE SINGLE FACE CONCRETE BARRIER MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 623.

2. PROVIDE PRECAST SINGLE FACE CONCRETE BARRIER SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. MODIFICATIONS OR DEVIATIONS FROM THE STANDARD REQUIRE THE SUBMISSION OF SHOP DRAWINGS FOR REVIEW.

3. PROVIDE BARRIER-MOUNT OR REFLECTOR UNIT OELINATORS, AS INDICATED ON SHEET 2.

4. PROVIDE REINFORCEMENT FOR SINGLE FACE CONCRETE BARRIER AS INDICATED ON SHEET 2.

5. PROVIDE END TRANSITIONS OR IMPACT ATTENUATING DEVICES AS INDICATED ON SHEET 2.

6. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.

7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

8. FABRICATE REINFORCEMENT BARS ACCORDING TO PENNDOT BRIDGE CONSTRUCTION STANDARD, BC-736M.

REFERENCE DRAWINGS

RC-58M REINFORCEMENT BAR FABRICATION DETAILS

SIGNATURES
**BARRIER PLAN**

Shown with WWF Alternate on left end of barrier for detailing purposes. Both ends of barrier are typical.

**NOTE:**
- Provide plates meeting the requirements of Publication 408, Section 1105. Galvanize plates as specified in Publication 408, Section 1105. Alternate connections may be used as approved by the Bureau of Design.
- Where single face concrete barrier is specified for use as a retaining wall and drainage treatment is necessary, construct a prefabricated fabric filter drain as indicated and in accordance with Publication 408, Section 610. If the height or slope is increased, provide overturning moment computations with the construction plans.
- Round or chamfer all edges with a radius of 25 (1") except as shown.

**TYPICAL ROUGH ROCK TREATMENT**

**TYPICAL DRAINAGE TREATMENT**

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF DESIGN**

**SINGLE FACE CONCRETE BARRIER**

**F-SHAPE**

**REMARKS**

1. Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
FOR FLARE RATES SEE TABLE 1.

TYPICAL NONCONTINUOUS SINGLE-FACE BARRIER TREATMENT AT PIERS

TYPICAL TREATMENT WHEN CONTINUOUS GUIDE RAIL IS REQUIRED

NOTES
1. PROVIDE SINGLE FACE CONCRETE BARRIER AND GUIDE RAIL MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 620 AND 623.
2. THE TREATMENTS SHOWN ARE FOR FOUR-LANE DIVIDED HIGHWAYS. USE THE APPROACH END TREATMENT ON BOTH SIDES OF THE OBSTRUCTION ON TWO-LANE FACILITIES WITH TWO-WAY TRAFFIC.
3. IF THE PREFERRED TREATMENT IS TO TERMINATE THE CONCRETE BARRIER WITHIN THE CLEAR ZONE, BURY IT INTO THE EXISTING SLOPE, PREFERABLY 1:2:1, ONE FOOT DEEP OTHERWISE, USE AN IMPACT ATTENUATING DEVICE.
4. THIS TRANSITION IS APPROPRIATE FOR CONNECTION TO A VERTICAL CONCRETE SHAPE AND SHOULD NOT BE CONNECTED DIRECTLY TO A CONCRETE SAFETY SHAPE. CONCRETE SAFETY SHAPES SHOULD BE TRANSITIONS TO A VERTICAL SHAPE AT THE GUIDE RAIL CONNECTION.

Table 1

<table>
<thead>
<tr>
<th>Speed (km/h)</th>
<th>Designed Flare Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>10:1</td>
</tr>
<tr>
<td>70</td>
<td>10:1</td>
</tr>
<tr>
<td>80</td>
<td>10:1</td>
</tr>
<tr>
<td>90</td>
<td>10:1</td>
</tr>
<tr>
<td>100</td>
<td>10:1</td>
</tr>
<tr>
<td>110</td>
<td>10:1</td>
</tr>
<tr>
<td>120</td>
<td>10:1</td>
</tr>
</tbody>
</table>

FLARE RATES FOR BARRIER DESIGN

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SINGLE FACE CONCRETE BARRIER
F-SHAPE
PLACEMENT AT SHOULDER PIERS

RC-58M
SECTION A-A

FOR ALTERNATE TAPERED END TREATMENT, SEE NOTE 5.

SECTION B-B

FOR FLARE RATES SEE TABLE 1.

SECTION C-C

FOR FLARE RATES SEE TABLE 1.

SECTION D-D

TYPICAL ALTERNATE BARRIER TREATMENT AT PIERS

NOTES

1. REFER TO BRIDGE STANDARD DRAWINGS (BD-601M) FOR DETAILS OF CONCRETE MEDIAN BARRIER ACROSS STRUCTURES.

2. THE CONCRETE TRANSITIONS AND BARRIER TAPERS AT PIERS ARE INCIDENTAL TO THE MEDIAN BARRIER.

3. CAST ADDITIONAL HOLES IN THE TAPERED END SECTIONS MEETING THE REQUIREMENTS PRESENTED IN SECTION D-D. (10" R)

4. PROVIDE NO. 57 COARSE AGGREGATE THAT MEETS THE REQUIREMENTS OF PUBLICATION 408, SECTION 703.2. ALTERNATE SUITABLE GRANULAR MATERIAL MAY BE USED AS FILLER MATERIAL.

5. TO PREVENT INTRUSION OF COARSE AGGREGATE INTO WEEP HOLES, USE WIRE MESH SCREENING, GEOTEXTILES OR OTHER SUITABLE MATERIAL.

6. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SINGLE FACE CONCRETE BARRIER
F-SHAPE
PLACEMENT AT MEDIAN PIERS

RC-56M
TABLE 2
PLANE RATES
FOR BARRIER DESIGN

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>MAXIMUM FLARE RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>km/h (mph)</td>
<td>CONCRETE BARRIER</td>
</tr>
<tr>
<td>120</td>
<td>20 : 1</td>
</tr>
<tr>
<td>110</td>
<td>20 : 1</td>
</tr>
<tr>
<td>100</td>
<td>18 : 1</td>
</tr>
<tr>
<td>90</td>
<td>16 : 1</td>
</tr>
<tr>
<td>80</td>
<td>14 : 1</td>
</tr>
<tr>
<td>70</td>
<td>12 : 1</td>
</tr>
<tr>
<td>60</td>
<td>10 : 1</td>
</tr>
<tr>
<td>50</td>
<td>8 : 1</td>
</tr>
</tbody>
</table>

NOTES
1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408.
2. ALL MATERIALS NECESSARY TO CONSTRUCT EARTH MOUNDS ARE IN ACCORDANCE WITH APPLICABLE SECTIONS OF PUBLICATION 408.
3. EASTMOUNDS MAY BE USED TO BURY CONCRETE BARRIER ON HIGHWAYS WITH POSTED SPEEDS LESS THAN 10 MPH, 15 MPH AND 25 MPH. EASTMOUNDS CONSTRUCTED OUTSIDE THE CLEAR ZONE ARE DETERMINED IN PUB. 13M, DESIGN MANUAL, PART 2, CHAPTER 12.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. PROVIDE CONCRETE GLARE SCREEN MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 622 AND 714.
   a. minimum concrete class AA

2. FOR INSTALLATION OF GLARE SCREEN ON TOP OF EXISTING CONCRETE MEDIAN BARRIER, PROVIDE PLASTIC PADDLES OR MODULAR SYSTEMS SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15.

3. FOR PRECAST BARRIERS, PROVIDE SLOTTED PLATE CONNECTIONS AS INDICATED ON RC-57M, SHEET 3.

4. PROVIDE PRECAST CONCRETE GLARE SCREEN SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR MODIFICATION OR DEVIATION OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

5. PROVIDE PRECAST CONCRETE GLARE SCREEN FOR USE AS TEMPORARY INSTALLATIONS. FOR TEMPORARY INSTALLATIONS, EMBEDMENT IS NOT REQUIRED.

6. epoxy coated reinforcement is not required when precast concrete glare screen is to be used in temporary installations only, in accordance with section 627, and identified as such, as specified in section 714.1c.

7. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 ± 1") EXCEPT AS SHOWN.

8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
   U.S. CUSTOMARY UNITS IN () PARENTHESIS.

9. FABRICATE REINFORCEMENT BARS ACCORDING TO PENNOOT BRIDGE CONSTRUCTION STANDARD, BC-736M.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE GLARE SCREEN
F-SHAPE

RC-59M
DIRECTOR, BUREAU OF DESIGN
F-SHAPE CONCRETE MEDIAN BARRIER, F-SHAPE

REFERENCE DRAWINGS

REINFORCEMENT BAR FABRICATION DETAILS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
The necessity for glare screen is dependent on geometrics.

For additional details for typical barrier treatment at piers, see RC-58M, Sheet 5.

See Table 1.

NOTE: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

Commonwealth of Pennsylvania
Department of Transportation
Bureau of Design

Concrete glare screen
F-shape
NOTES


2. INSTALL TYPE A OR B WITH CONCRETE MOUNTABLE CURBS AND CONCRETE PAVING AT THE AREA OF THE INLET AS SHOWN.

3. SPACE CONTRACTION JOINTS IN UNIFORM LENGTHS OR SECTIONS AND SEAL AS SPECIFIED IN PUBLICATION 408/2000, SECTION 501.3C.

4. PLACE PREMOLDED EXPANSION JOINT FILLER MATERIAL 20 (¾") THICK ADJACENT TO CURBS AND OTHER STRUCTURES AND AT THE END OF THE WORK DAY. CUT MATERIAL TO CONFORM TO AREA ADJACENT TO CURB OR TO COMFORM TO CROSS SECTIONAL AREA OF CURB.

5. PROVIDE ISLANDS, NOT LESS THAN 1.2 (4') WIDE EXPOSED FINAL FACE OF CURB AT 50 (2") MAXIMUM. PROVIDED ISLANDS, NOT LESS THAN 1.2 (4') WIDE EXPOSED FINAL FACE OF CURB AT 50 (2") MAXIMUM. PROVIDE ISLANDS, NOT LESS THAN 1.2 (4") WIDE EXPOSED FINAL FACE OF CURB AT 50 (2") MAXIMUM. PROVIDE ISLANDS, NOT LESS THAN 1.2 (4") WIDE EXPOSED FINAL FACE OF CURB AT 50 (2") MAXIMUM. PROVIDE ISLANDS, NOT LESS THAN 1.2 (4") WIDE EXPOSED FINAL FACE OF CURB AT 50 (2") MAXIMUM.

6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN () PARENTHESES.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MOUNTABLE CURBS

TYPICAL DIVISOR AREA ROADWAY • TYPE A OR B CURB

PLAN

END DETAILS

SECTION A-A

TREATMENT FOR CONCRETE MOUNTABLE CURBS AT INLETS

CONSTRUCTION JOINTS

PAYABLE MEASUREMENT INDICATED BY ________

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. PROVIDE GEOTEXTILE MATERIAL MEETING THE REQUIREMENTS OF THE DESIGN SPECIFICATIONS, SECTION 735 AND FURNISH AND INSTALL IN ACCORDANCE WITH SECTION 735.
2. PROVIDE GEOTEXTILE MATERIAL ALONG ALL INTERFACE AREAS WITH GROUND CONTACT.
3. ROCK SIZE AS PER DESIGN DRAWINGS. NOMINAL PLACEMENT THICKNESS AS PER PUBLICATION 408/2000, SECTION 850.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN PARENTHESES.

NOTES:

FINISHED SLOPE, AS REQUIRED.

ROCK LINING ELEVATION, SEE NOTE 2.

FINISHED GROUND LINE OF DITCH OR CHANNEL, SEE NOTE 3.

SLOPE 1/11 (1/12) TYPE, OR AS OTHERWISE INDICATED.

CLASS 2 GEOTEXTILE MATERIAL, SEE NOTE 2.

PIECE END TREATMENT, AS REQUIRED.

DIRACTION OF FLOW.

PIECE END TREATMENT, AS REQUIRED.

TRANSITION INTO EXISTING DRAINAGE CHANNEL.

FINISHED SLOPE, AS REQUIRED.

PIECE END TREATMENT, AS REQUIRED.

FINISHED SLOPE, AS REQUIRED.

FINISHED GROUND LINE OF DITCH OR CHANNEL.

SLOPE 1/11 (1/12) TYPE, OR AS SHOWN ON THE DRAWING.

FINISHED SLOPE, AS REQUIRED.

FINISHED GROUND LINE OF DITCH OR CHANNEL.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
TOE OF SLOPE

ANGLE AS REQUIRED

METAL END SECTION, FOR DETAILS, SEE RC-33M.

SUGGESTED MINIMUM SIZES

TYPE OF CLASS 3 NOMINAL MAX POST GEOTEXTILE FABRIC SPACING WITHOUT

HEIGHT MESH SUPPORT MESH SUPPORT

<table>
<thead>
<tr>
<th>CLASS</th>
<th>MIN POST</th>
<th>MAX POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>450</td>
<td>2.4 m (8')</td>
</tr>
<tr>
<td>3B</td>
<td>750</td>
<td>NA</td>
</tr>
<tr>
<td>3C</td>
<td>450</td>
<td>2.4 m (8')</td>
</tr>
<tr>
<td>3D</td>
<td>750</td>
<td>NA</td>
</tr>
</tbody>
</table>

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND
ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION AND SEDIMENT
POLLUTION CONTROL
**SILT BARRIER FENCE FOR INLET PROTECTION**

**NOTES**

- Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

**COMMONWEALTH OF PENNSYLVANIA**  
**DEPARTMENT OF TRANSPORTATION**  
**BUREAU OF DESIGN**

**EROSION AND SEDIMENT POLLUTION CONTROL**

REC: 01-04-01  
SHT: A OF 8  
ARCHITECT: RC-7OM
NOTES
1. CLEAR SITE BUT DO NOT GRUB.
2. INSPECT AREA TO DETERMINE PATH DISCHARGE WATER WILL TAKE. STABILIZE ANY POTENTIALLY ERODABLE AREAS (STEEP SLOPES).
3. CONSTRUCT COURSE AGGREGATE PLATFORM SURFACE LEVEL. PLACE SEDIMENT FILTER BAG ON STABILIZED AREA.
4. USE PUMP WITH A RATING IN GALLONS PER MINUTE NOT TO EXCEED SIZE OF THE MAXIMUM FLOW RATE LISTED ON THE BAG LABEL. DOUBLE CLAMP THE PUMP DISCHARGE HOSE FIRMLY TO THE BAG.
5. MONITOR AND EVALUATE THE ENTIRE PUMPING OPERATION TO ENSURE THAT THE BAG CONTINUES TO FUNCTION PROPERLY. REPLACE THE BAG WHEN THE CONTAINED SILT REDUCES THE BAGS FLOW TO APPROXIMATELY 50% OF THE RATE OF INITIAL DISCHARGE, OR WHEN DIRECTED BY INSPECTOR-IN-CHARGE. DISPOSE OF SEDIMENT IN A MANNER SATISFACTORY TO THE ENGINEER. RESTORE THE AREA AS SPECIFIED IN SECTION 105.14.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS ARE IN () PARENTHESES.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SEDIMENT FILTER BAG