Standard Plans

M 21-01

December 7, 2009

Environmental and Engineering Programs
Design Office
Americans with Disabilities Act (ADA) Information

Materials can be provided in alternative formats for persons with disabilities by contacting the ADA Compliance Officer via telephone at 360-705-7097 or by e-mail to Shawn Murinko at murinks@wsdot.wa.gov.

Title VI Notice to Public

It is the Washington State Department of Transportation’s (WSDOT) policy to assure that no person shall, on the grounds of race, color, national origin and sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT’s Office of Equal Opportunity (OEO). For Title VI complaint forms and advise, please contact OEO’s Title VI Coordinator at (360) 705-7098.

Additional copies may be purchased from:

Washington State Department of Transportation
Administrative and Engineering Publications
PO Box 47304
Olympia, WA 98504-7304
Phone: 360-705-7430
Fax: 360-705-6861
E-mail: engrpubs@wsdot.wa.gov
Internet: www.wsdot.wa.gov/publications/manuals/

Get the latest information on updates to WSDOT engineering manuals — sign up for e-mail updates for individual manual updates on our home page: www.wsdot.wa.gov/publications/manuals/
Foreword

This manual contains standard engineering drawings used for road, bridge, and municipal construction. These drawings have been prepared under the direct supervision of a Washington State licensed professional engineer, who is knowledgeable in the specialized field of civil engineering depicted in each drawing. This manual standardizes fabrication, installation, and construction methods for specific items of work, and complements the contract documents and the Standard Specifications for Road, Bridge, and Municipal Construction.

Updating the manual is a continual process and revisions are issued periodically. Questions, comments, and recommendations for changes are welcome.

Contact the Design Standards Team at:

(360) 705-7540 (phone)

designstandards@wsdot.wa.gov (e-mail)

For contact via conventional mail, the Comment Request Form on the reverse side of this page is provided to facilitate routing and prompt delivery. Making a copy will preserve the original form for future use. Attach a copy of the form as a cover sheet when sending comments or sketches made on other documents, such as marked copies of specific Standard Plans. Your questions, comments, and/or recommendations should be sent to:

Design Standards
Transportation Building
Olympia, WA 98504-7329.

Further information, as well as Bentley MicroStation (.dgn) CAD files, Adobe Acrobat (.pdf) files, and some AutoCAD (.dwg) CAD files, can be found on the Design Standards website at:

http://www.wsdot.wa.gov/eesc/design/designstandards

Contact the Engineering Publications Office at (360) 705-7430 if you require additional copies of this manual.

Pasco Bakotich III
State Design Engineer
From: __________________________________________ Date: _______________
_________________________________________ Phone: ____________________
_________________________________________
_________________________________________

To:  Design Standards
     Washington State Department of Transportation
     Transportation Building
     PO Box 47329
     Olympia, WA 98504-7329

Subject: Standard Plans Manual Comment

Comment: □ See attached
## Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A-10.10-00</td>
<td>Survey Stakes</td>
<td>8/7/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-10.20-00</td>
<td>Survey Monument Types 1 and 2</td>
<td>10/5/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-10.30-00</td>
<td>Monument and Cover</td>
<td>10/5/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-20.10-00</td>
<td>Slope Treatment</td>
<td>8/31/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-30.10-00</td>
<td>Concrete Slope Protection</td>
<td>11/8/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-30.15-00</td>
<td>Semi-open Concrete Masonry Slope Protection</td>
<td>11/8/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-30.30-00</td>
<td>Wire Mesh Slope Protection</td>
<td>11/8/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-30.35-00</td>
<td>Slope Protection Anchors</td>
<td>10/12/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-40.00-00</td>
<td>Dowel Bar Baskets</td>
<td>8/11/09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-40.10-01</td>
<td>Cement Concrete Pavement Joints</td>
<td>8/11/09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-40.15-00</td>
<td>PCC Pavement Isolation Joints</td>
<td>8/11/09</td>
<td>2 Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-40.20-00</td>
<td>Bridge Transverse Joint Seals for HMA</td>
<td>9/20/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-40.50-00</td>
<td>Bridge Approach Slab</td>
<td>11/8/07</td>
<td>2 Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-50.10-00</td>
<td>Embankment Widening at Bridge End with Wing Wall</td>
<td>11/17/08</td>
<td>2 Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-50.20-01</td>
<td>Embankment Widening at Bridge End with Curtain Wall</td>
<td>9/22/09</td>
<td>2 Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-50.30-00</td>
<td>Embankment Widening at Bridge End with &quot;L&quot; Shaped Abutment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-50.40-00</td>
<td>Embankment Widening at Bridge End with Sidewalk</td>
<td>11/17/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-60.10-01</td>
<td>Cement Concrete Pavement Repair</td>
<td>10/14/09</td>
<td>2 Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-60.20-01</td>
<td>Dowel Bar Retrofit for Cement Concrete Pavement</td>
<td>8/11/09</td>
<td>2 Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-60.30-00</td>
<td>Bridge Deck Transition for HMA Overlay</td>
<td>11/8/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-60.40-00</td>
<td>HMA Overlay: Further Deck Preparation</td>
<td>8/31/07</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Section A  Roadway Construction

### Section B  Drainage Structures and Hydraulics

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B-5.20-00</td>
<td>Catch Basin Type 1</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-5.40-00</td>
<td>Catch Basin Type 1L</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-5.60-00</td>
<td>Catch Basin Type 1P (for Parking Lot)</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-10.20-00</td>
<td>Catch Basin Type 2</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-10.40-00</td>
<td>Catch Basin Type 2 with Flow Restrictor</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-10.60-00</td>
<td>Catch Basin Type 2 with Baffle Type Flow Restrictor</td>
<td>6/8/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-15.20-00</td>
<td>Manhole Type 1</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-15.40-00</td>
<td>Manhole Type 2</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-15.60-00</td>
<td>Manhole Type 3</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-20.20-01</td>
<td>Drywell Type 1 (for Swale)</td>
<td>11/21/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-20.40-02</td>
<td>Drywell Type 2 (with Pipe Inlet)</td>
<td>6/10/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-20.60-02</td>
<td>Drywell Type 3 (with At-Grade Inlet)</td>
<td>6/10/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-25.20-00</td>
<td>Combination Inlet</td>
<td>6/8/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-25.60-00</td>
<td>Concrete Inlet</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-30.10-00</td>
<td>Rectangular Frame (Reversible)</td>
<td>6/8/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-30.20-01</td>
<td>Rectangular Solid Metal Cover</td>
<td>11/21/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-30.30-00</td>
<td>Rectangular Vaned Grate</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-30.40-00</td>
<td>Rectangular Bi-Directional Vaned Grate</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-30.50-00</td>
<td>Rectangular Herringbone Grate</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-30.70-01</td>
<td>Circular Frame (Ring) and Cover</td>
<td>8/31/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-30.80-00</td>
<td>Circular Grate</td>
<td>6/8/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-30.90-01</td>
<td>Miscellaneous Details for Drainage Structures</td>
<td>9/20/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-35.20-00</td>
<td>Grate Inlet Type 1 (Cast-In-Place)</td>
<td>6/8/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-35.40-00</td>
<td>Grate Inlet Type 2</td>
<td>6/8/06</td>
<td>2 Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-40.20-00</td>
<td>Welded Grates for Grate Inlet</td>
<td>6/1/06</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-40.40-00</td>
<td>Frame and Dual Vaned Grates for Grate Inlet</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-45.20-00</td>
<td>Drop Inlet Type 1</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-45.40-00</td>
<td>Drop Inlet Type 2</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-50.20-00</td>
<td>Grates for Drop Inlet</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-55.20-00</td>
<td>Pipe Zone Bedding and Backfill</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-60.20-00</td>
<td>Connection Details for Dissimilar Culvert Pipe</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-60.40-00</td>
<td>Coupling Bands for Corrugated Metal Pipe</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-65.20-00</td>
<td>Animal/Pedestrian Underpass</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-65.40-00</td>
<td>Equipment Underpass</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-70.20-00</td>
<td>Beveled End Sections (for Culverts 30&quot; Diameter or Less)</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-70.60-00</td>
<td>Flared End Sections</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-75.20-01</td>
<td>Headwalls for Culvert Pipe and Underpass</td>
<td>6/10/08</td>
</tr>
<tr>
<td>B-75.50-01</td>
<td>Type 1 Safety Bars for Stepped Culvert Pipe or Pipe Arch</td>
<td>6/10/08</td>
</tr>
<tr>
<td>B-75.60-00</td>
<td>Type 2 Safety Bars for Culvert Pipe or Pipe Arch (On Cross Road)</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-80.20-00</td>
<td>Tapered End Section with Type 3 Safety Bars</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-80.40-00</td>
<td>Tapered End Section with Type 4 Safety Bars (On Cross Road)</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-82.20-00</td>
<td>Residential Storm Drain, Under Sidewalk</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-85.10-01</td>
<td>Vertical Connection (for Sanitary Sewer Use)</td>
<td>6/10/08</td>
</tr>
<tr>
<td>B-85.20-00</td>
<td>Side Sewer Connection (for Sanitary Sewer Use)</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-85.30-00</td>
<td>Standing Side Sewer Connection (for Sanitary Sewer Use)</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-85.40-00</td>
<td>8 Inch Sewer Clean-Out (for Sanitary Sewer Use)</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-85.50-01</td>
<td>Drop Connections (for Sanitary Sewer Use)</td>
<td>6/10/08</td>
</tr>
<tr>
<td>B-90.10-00</td>
<td>Hydrant Setting Types A and B</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-90.20-00</td>
<td>2 Inch Blowoff Assembly</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-90.30-00</td>
<td>Combination Air Release / Air Vacuum Valve Assembly</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-90.40-00</td>
<td>Concrete Thrust Block</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-90.50-00</td>
<td>Concrete Thrust Block for Convex Vertical Bends</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-95.20-01</td>
<td>Median Barrier Drainage Installation</td>
<td>2/3/09</td>
</tr>
<tr>
<td>B-95.40-00</td>
<td>Inlet Placement at Bridge End</td>
<td>6/8/06</td>
</tr>
</tbody>
</table>

Section C  Traffic Barrier

| C-1       | Beam Guardrail Types 1 ~ 4 (W-Beam)                                        | 2/10/09 2 Sheets         |
| C-1a      | Beam Guardrail (Thrie Beam)                                                 | 1/4/09   |
| C-1b      | Beam Guardrail Posts and Blocks                                              | 10/31/13 2 Sheets        |
| C-1c      | Beam Guardrail                                                             | 5/30/97  |
| C-1d      | Thrie Beam Guardrail Reducer Section                                        | 10/31/03  |
| C-2       | Guardrail Placement (Cases 1, 2 & 3)                                        | 6/6/00   |
| C-2a      | Guardrail Placement (Cases 4, 5 & 6)                                        | 6/21/06  |
| C-2b      | Guardrail Placement (Cases 7 & 8)                                           | 6/21/06  |
| C-2c      | Guardrail Placement, Median Bull Nose (Cases 9A, 9B & 9C)                   | 6/21/06  |
| C-2d      | Guardrail Placement (Cases 10A, 10B & 10C)                                  | 6/21/06  |
| C-2e      | Guardrail Placement (Cases 11A, 11B & 11C)                                  | 6/21/06  |
| C-2f      | Guardrail Placement, Weak Post Intersection Design                          | 3/14/97  |

(8' - 6" Max. Radius) (Cases 12AC, 12AD, 12BC & 12BD)
<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-2g</td>
<td>Guardrail Placement, Weak Post Intersection Design (35' Max. Radius) (Cases 13AC, 13AD, 13BC &amp; 13BD)</td>
<td>7/27/01</td>
</tr>
<tr>
<td>C-2h</td>
<td>Guardrail Placement (Case 14)</td>
<td>3/28/97</td>
</tr>
<tr>
<td>C-2i</td>
<td>Guardrail Placement (Case 15)</td>
<td>3/28/97</td>
</tr>
<tr>
<td>C-2j</td>
<td>Guardrail Placement (Cases 16, 17 &amp; 18)</td>
<td>6/12/98</td>
</tr>
<tr>
<td>C-2k</td>
<td>Guardrail Placement 12&quot; - 6&quot; Span (Cases 19A &amp; 19B)</td>
<td>7/27/01</td>
</tr>
<tr>
<td>C-2n</td>
<td>Guardrail Placement 18&quot; - 9&quot; Span (Case 20)</td>
<td>7/27/01</td>
</tr>
<tr>
<td>C-2o</td>
<td>Guardrail Placement 25' Span (Case 21)</td>
<td>7/13/01</td>
</tr>
<tr>
<td>C-2p</td>
<td>Guardrail Placement, Strong Post Intersection Design (Cases 22AC, 22AD, 22BC &amp; 22BD)</td>
<td>10/31/03</td>
</tr>
<tr>
<td>C-3</td>
<td>Beam Guardrail Transition Sections (Types 1, 1A, &amp; 1B)</td>
<td>10/4/05</td>
</tr>
<tr>
<td>C-3a</td>
<td>Beam Guardrail Transition Sections (Types 2, 4, 5, &amp; 6)</td>
<td>10/4/05</td>
</tr>
<tr>
<td>C-3b</td>
<td>Beam Guardrail Transition Sections (Types 10 ~ 15)</td>
<td>10/4/05</td>
</tr>
<tr>
<td>C-3c</td>
<td>Beam Guardrail Transition Sections (Types 16, 17, &amp; 18)</td>
<td>6/21/06</td>
</tr>
<tr>
<td>C-4b</td>
<td>Beam Guardrail Flared Terminal</td>
<td>6/8/06</td>
</tr>
<tr>
<td>C-4e</td>
<td>Beam Guardrail Non-Flared Terminal</td>
<td>2/20/03</td>
</tr>
<tr>
<td>C-4f</td>
<td>Beam Guardrail Bull Nose Terminal</td>
<td>6/30/04</td>
</tr>
<tr>
<td>C-5</td>
<td>Guardrail Connection to Bridge Rail or Concrete Barrier</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-6</td>
<td>Beam Guardrail Anchor Type 1</td>
<td>5/30/97</td>
</tr>
<tr>
<td>C-6a</td>
<td>Beam Guardrail Anchor Type 2</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-6c</td>
<td>Beam Guardrail Anchor Type 4</td>
<td>1/6/00</td>
</tr>
<tr>
<td>C-6d</td>
<td>Beam Guardrail Anchor Type 5</td>
<td>5/30/97</td>
</tr>
<tr>
<td>C-6f</td>
<td>Beam Guardrail Anchor Type 7</td>
<td>7/25/97</td>
</tr>
<tr>
<td>C-7</td>
<td>Beam Guardrail End Sections</td>
<td>10/31/03</td>
</tr>
<tr>
<td>C-7a</td>
<td>Thrie Beam End Sections</td>
<td>10/31/03</td>
</tr>
<tr>
<td>C-8</td>
<td>Concrete Barrier Type 2</td>
<td>2/10/09</td>
</tr>
<tr>
<td>C-8a</td>
<td>Concrete Barrier Type 4 and Transition Section</td>
<td>7/25/97</td>
</tr>
<tr>
<td>C-8b</td>
<td>Concrete Barrier Light Standard Section</td>
<td>2/10/09</td>
</tr>
<tr>
<td>C-8e</td>
<td>Precast Concrete Barrier Anchor ~ Type 3 (Permanent)</td>
<td>2/21/07</td>
</tr>
<tr>
<td>C-8f</td>
<td>Concrete Barrier Transition, Type 2 to Bridge F-Shape</td>
<td>6/30/04</td>
</tr>
<tr>
<td>C-10</td>
<td>Box Culvert Guardrail Steel Post</td>
<td>7/31/98</td>
</tr>
<tr>
<td>C-13</td>
<td>Single Slope Concrete Barrier (Pre-Cast)</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-13a</td>
<td>Single Slope Concrete Barrier (Pre-Cast)Transition Section</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-13b</td>
<td>Single Slope Concrete Barrier (Pre-Cast) Vertical Back</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-13c</td>
<td>Single Slope Concrete Barrier (Pre-Cast) Terminal</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-14a</td>
<td>Single Slope Concrete Barrier (Cast-in-Place) Dual Faced</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-14b</td>
<td>Concrete Barrier Transition, Type 2 to Single Slope</td>
<td>7/26/02</td>
</tr>
<tr>
<td>C-14c</td>
<td>Single Slope Concrete Barrier (Cast-in-Place) Terminal</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-14d</td>
<td>Single Slope Concrete Barrier (Cast-in-Place) Trans. Section</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-14e</td>
<td>Single Slope Concrete Barrier (Cast-in-Place) Vertical Back</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-14h</td>
<td>Single Slope Concrete Barrier Light Standard Foundation</td>
<td>2/10/09</td>
</tr>
<tr>
<td>C-14i</td>
<td>Single Slope Concrete Barrier Sign Bridge Foundation</td>
<td>2/10/09</td>
</tr>
</tbody>
</table>

**Standard Plans for Road, Bridge, and Municipal Construction**

*Effective December 7, 2009*
<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-14j</td>
<td>Single Slope Concrete Barrier Transition for Monotube Sign Support</td>
<td>12/2/03</td>
</tr>
<tr>
<td>C-14k</td>
<td>Single Slope Concrete Barrier Cantilever Sign Structure Fdn.</td>
<td>2/10/09</td>
</tr>
<tr>
<td>C-15a</td>
<td>Single Slope Concrete Barrier Placement (Split)</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-15b</td>
<td>Single Slope Concrete Barrier Placement (Wrap)</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-16a</td>
<td>Traffic Barrier Shoulder Widening ~ for Shoulders 8.0’ and Wider</td>
<td>11/8/05</td>
</tr>
<tr>
<td>C-16b</td>
<td>Traffic Barrier Shoulder Widening ~ for Shoulders Less Than 8.0’ Wide</td>
<td>11/8/05</td>
</tr>
<tr>
<td>C-20.14-01</td>
<td>Beam Guardrail Type 31: Placement (Cases 1-31, 2-31, &amp; 3-31)</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-20.15-00</td>
<td>Beam Guardrail Type 31: Placement (Cases 4-31 &amp; 5-31)</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-20.18-00</td>
<td>Beam Guardrail Type 31 Placement (Cases 10A-31, 10B-31 and 10C-31)</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-20.19-00</td>
<td>Beam Guardrail Type 31 Placement (Cases 11A-31, 11B-31 and 11C-31)</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-20.40-01</td>
<td>Beam Guardrail Type 31: Placement ~ 12'-6&quot;, 18'-9&quot;, or 25'-0&quot; Span</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-20.42-01</td>
<td>Guardrail Placement Strong Post ~ Type 31 Intersection Design</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-22.14-00</td>
<td>Beam Guardrail Type 1 Buried Terminal Type 2</td>
<td>2/3/09</td>
</tr>
<tr>
<td>C-22.16-00</td>
<td>Beam Guardrail Type 31 Buried Terminal Type 2</td>
<td>2/3/09</td>
</tr>
<tr>
<td>C-22.40-01</td>
<td>Beam Guardrail Type 31: Non-Flared Terminal</td>
<td>10/5/07</td>
</tr>
<tr>
<td>C-23.60-01</td>
<td>Beam Guardrail (Type 31) Anchor Type 10</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-25.18-01</td>
<td>Beam Guardrail (Type 31) Transition Section Type 20</td>
<td>9/20/07</td>
</tr>
<tr>
<td>C-25.20-04</td>
<td>Beam Guardrail (Type 31) Transition Section Type 21</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-25.22-03</td>
<td>Beam Guardrail (Type 31) Transition Section Type 22</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-25.26-01</td>
<td>Beam Guardrail (Type 31) Transition Section Type 23</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-25.80-01</td>
<td>Beam Guardrail Type 31 to Beam Guardrail Type 1 Adapter</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-28.40-00</td>
<td>Beam Guardrail Type 31</td>
<td>2/6/07</td>
</tr>
<tr>
<td>C-40.14-00</td>
<td>Barrier Placement Cable to Thrie Beam Bull Nose Connection</td>
<td>2/3/09</td>
</tr>
<tr>
<td>C-40.16-00</td>
<td>Barrier Placement ~ Cable to W-Beam Shielding for Redirectional Landform</td>
<td>2/3/09</td>
</tr>
<tr>
<td>C-40.18-01</td>
<td>Barrier Placement ~ Cable Barrier Shielding for Redirectional Landform</td>
<td>10/14/09</td>
</tr>
<tr>
<td>C-90.10-00</td>
<td>Impact Attenuator Inertial Barrier Configurations</td>
<td>7/3/08</td>
</tr>
</tbody>
</table>

Section D  Retaining, Noise Barrier, and Geosynthetic Walls

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-2.02-00</td>
<td>Noise Barrier Wall Type 1 (CIP Conc. on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.04-00</td>
<td>Noise Barrier Wall Type 2 (CIP Conc. on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.06-01</td>
<td>Noise Barrier Wall Type 3 (… on Offset Spread Footing)</td>
<td>1/6/09</td>
</tr>
<tr>
<td>D-2.08-00</td>
<td>Noise Barrier Wall Type 4 (CIP Conc. on Shaft Foundation)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>Plan No.</td>
<td>Plan Title</td>
<td>Publication Approval Date</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>D-2.10-00</td>
<td>Noise Barrier Wall Type 5 (CIP Conc. with Traffic Barrier on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.12-00</td>
<td>Noise Barrier Wall Type 5SS (CIP Conc. w/ Single Slope Traffic Barrier on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.14-00</td>
<td>Noise Barrier Wall Type 6 (CIP Conc. with Traffic Barrier on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.16-00</td>
<td>Noise Barrier Wall Type 6SS (CIP Conc. w/ Single Slope Traffic Barrier on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.18-00</td>
<td>Noise Barrier Wall Type 7 (CIP Conc. with Traffic Barrier on Shaft Foundation)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.20-00</td>
<td>Noise Barrier Wall Type 7SS (CIP Conc. w/ Single Slope Traffic Barrier on Shaft Fdn.)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.30-00</td>
<td>Noise Barrier Wall Type 8 (Precast Conc. on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.32-00</td>
<td>Noise Barrier Wall Type 9 (Precast Conc. on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.34-01</td>
<td>Noise Barrier Wall Type 10 (… on Offset Spread Footing)</td>
<td>1/6/09</td>
</tr>
<tr>
<td>D-2.36-02</td>
<td>Noise Barrier Wall Type 11 (… on Shaft Foundation)</td>
<td>1/6/09</td>
</tr>
<tr>
<td>D-2.38-00</td>
<td>Noise Barrier Wall Type 12 (Precast Conc. with Traffic Barrier on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.40-00</td>
<td>Noise Barrier Wall Type 12SS (Precast w/ Single Slope Traffic Barrier on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.42-00</td>
<td>Noise Barrier Wall Type 13 (Precast Conc. with Traffic Barrier on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.44-00</td>
<td>Noise Barrier Wall Type 13SS (Precast w/ Single Slope Traffic Barrier on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.46-00</td>
<td>Noise Barrier Wall Type 14 (Precast Conc. w/ Traffic Barrier on Shaft Foundation)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.48-00</td>
<td>Noise Barrier Wall Type 14SS (Precast Conc. w/ Single Slope Traffic Barrier on Shaft Fdn.)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.60-00</td>
<td>Noise Barrier Wall Type 16 (Masonry on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.62-00</td>
<td>Noise Barrier Wall Type 17 (Masonry on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.64-01</td>
<td>Noise Barrier Wall Type 18 (Masonry on Offset Spread Ftg.)</td>
<td>1/6/09</td>
</tr>
<tr>
<td>D-2.66-00</td>
<td>Noise Barrier Wall Type 19 (Masonry on Shaft with Grade Beam Foundation)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.68-00</td>
<td>Noise Barrier Wall Type 20 (Masonry on Shaft Foundation)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.78-00</td>
<td>Noise Barrier Wall Type 15 (Timber Panel on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.80-00</td>
<td>Noise Barrier Wall Access Door Type 1 (Cast-In-Place)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.82-00</td>
<td>Noise Barrier Wall Access Door Type 2 (Cast-In-Place)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.84-00</td>
<td>Noise Barrier Wall Access Door Type 3 (Precast)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.86-00</td>
<td>Noise Barrier Wall Access Door Type 4 (Precast)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.88-00</td>
<td>Noise Barrier Wall Access Door Type 5 (Masonry)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.92-00</td>
<td>Noise Barrier Wall Access Door &amp; Frame</td>
<td>11/10/05</td>
</tr>
</tbody>
</table>
## Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-3</td>
<td>Permanent Geosynthetic Wall: Types 1 ~ 6</td>
<td>7/13/05</td>
<td>3</td>
</tr>
<tr>
<td>D-3a</td>
<td>Permanent Geosynthetic Wall: Fascia and Facing</td>
<td>12/2/08</td>
<td></td>
</tr>
<tr>
<td>D-3b</td>
<td>Permanent Geosynthetic Wall: Single Slope Barrier</td>
<td>6/30/04</td>
<td></td>
</tr>
<tr>
<td>D-3c</td>
<td>Permanent Geosynthetic Wall: F-Shape Barrier</td>
<td>6/30/04</td>
<td></td>
</tr>
<tr>
<td>D-4</td>
<td>Backfill and Drainage for Retaining Walls</td>
<td>12/11/98</td>
<td></td>
</tr>
<tr>
<td>D-6</td>
<td>Gabions</td>
<td>6/19/98</td>
<td></td>
</tr>
<tr>
<td>D-10.10-01</td>
<td>Reinforced Concrete Retaining Wall Type 1 and 1 SW</td>
<td>12/2/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.15-01</td>
<td>Reinforced Concrete Retaining Wall Type 2 and 2 SW</td>
<td>12/2/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.20-00</td>
<td>Reinforced Concrete Retaining Wall Type 3 and 3 SW</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.25-00</td>
<td>Reinforced Concrete Retaining Wall Type 4 and 4 SW</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.30-00</td>
<td>Reinforced Concrete Retaining Wall Type 5</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.35-00</td>
<td>Reinforced Concrete Retaining Wall Type 6</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.40-01</td>
<td>Reinforced Concrete Retaining Wall Type 7</td>
<td>12/2/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.45-01</td>
<td>Reinforced Concrete Retaining Wall Type 8</td>
<td>12/2/08</td>
<td>2</td>
</tr>
<tr>
<td>D-15.10-01</td>
<td>Traffic Barrier Details for Reinforced Concrete Retaining Walls</td>
<td>12/2/08</td>
<td>2</td>
</tr>
<tr>
<td>D-15.20-01</td>
<td>Traffic Barrier Details for Reinforced Concrete Retaining Walls</td>
<td>1/6/09</td>
<td>2</td>
</tr>
<tr>
<td>D-15.30-01</td>
<td>Traffic Barrier Details for Reinforced Concrete Retaining Walls</td>
<td>12/2/08</td>
<td>2</td>
</tr>
</tbody>
</table>

### Section E  Bridges and Trestles

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1</td>
<td>Date Numeral Placement on Bridge Traffic Barrier</td>
<td>2/21/07</td>
<td></td>
</tr>
<tr>
<td>E-2</td>
<td>Pile or Frame Detour Bridge with Asphalt Overlay</td>
<td>5/29/98</td>
<td>2</td>
</tr>
<tr>
<td>E-4</td>
<td>Precast Prestressed Concrete Piles</td>
<td>8/27/03</td>
<td></td>
</tr>
<tr>
<td>E-4a</td>
<td>Precast Prestressed Concrete Piles: Handling &amp; Capping</td>
<td>8/27/03</td>
<td></td>
</tr>
</tbody>
</table>

### Section F  Curbs, Sidewalks, and Driveways

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-10.12-00</td>
<td>Cement Concrete Curbs</td>
<td>12/20/06</td>
<td></td>
</tr>
<tr>
<td>F-10.16-00</td>
<td>Cement Concrete Curb and Gutter Pan</td>
<td>12/20/06</td>
<td></td>
</tr>
<tr>
<td>F-10.40-01</td>
<td>Extruded Curb Placement</td>
<td>7/3/08</td>
<td></td>
</tr>
<tr>
<td>F-10.42-00</td>
<td>Extruded Curb</td>
<td>1/23/07</td>
<td></td>
</tr>
<tr>
<td>F-10.62-01</td>
<td>Precast Concrete Sloped Mountable Curb</td>
<td>9/5/07</td>
<td>2</td>
</tr>
<tr>
<td>F-10.64-02</td>
<td>Precast Concrete Dual Faced Sloped Mountable Curb</td>
<td>7/3/08</td>
<td></td>
</tr>
<tr>
<td>F-30.10-00</td>
<td>Cement Concrete Sidewalk</td>
<td>1/23/07</td>
<td></td>
</tr>
<tr>
<td>F-40.10-01</td>
<td>Sidewalk Ramp Type 1, with Layouts</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>F-40.12-00</td>
<td>Sidewalk Ramp Type 2, with Layout</td>
<td>2/7/07</td>
<td></td>
</tr>
<tr>
<td>F-40.14-00</td>
<td>Sidewalk Ramp Type 3A, with Layout</td>
<td>2/7/07</td>
<td></td>
</tr>
<tr>
<td>F-40.15-00</td>
<td>Sidewalk Ramp Type 3B, with Layout</td>
<td>2/7/07</td>
<td></td>
</tr>
<tr>
<td>F-40.16-00</td>
<td>Sidewalk Ramp Type 4A, with Layout</td>
<td>2/7/07</td>
<td></td>
</tr>
<tr>
<td>F-40.18-00</td>
<td>Sidewalk Ramp Type 4B, with Layout</td>
<td>2/7/07</td>
<td></td>
</tr>
<tr>
<td>F-40.20-00</td>
<td>Sidewalk Ramp Type 4C, with Layout</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>F-42.10-00</td>
<td>Sidewalk Ramp Type 5, with Layout</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>F-80.10-00</td>
<td>Cement Concrete Driveway Entrance: Types 1, 2, 3, &amp; 4</td>
<td>1/23/07</td>
<td>2</td>
</tr>
</tbody>
</table>

### Section G  Signs and Sign Supports

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-10.10-00</td>
<td>Milepost</td>
<td>9/20/07</td>
<td></td>
</tr>
<tr>
<td>G-20.10-00</td>
<td>Ground Mounted Sign Placement</td>
<td>9/20/07</td>
<td></td>
</tr>
<tr>
<td>G-22.10-01</td>
<td>Timber Sign Support</td>
<td>7/3/08</td>
<td>3</td>
</tr>
</tbody>
</table>

---

*Standard Plans for Road, Bridge, and Municipal Construction*

*Effective December 7, 2009*
<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-24.10-00</td>
<td>Steel Sign Support Type AP, Installation Details</td>
<td>11/8/07</td>
<td></td>
</tr>
<tr>
<td>G-24.20-00</td>
<td>Steel Sign Support Type AS, Installation Details</td>
<td>11/8/07</td>
<td></td>
</tr>
<tr>
<td>G-24.30-00</td>
<td>Steel Sign Support, Types PL, PL-T, &amp; PL-U, Inst. Det.</td>
<td>11/8/07</td>
<td>2</td>
</tr>
<tr>
<td>G-24.40-01</td>
<td>Steel Sign Support, Types SB-1, SB-2 &amp; SB-3 Installation Details</td>
<td>12/2/08</td>
<td>2</td>
</tr>
<tr>
<td>G-24.50-00</td>
<td>Steel Sign Support, Types ST-1 ~ ST-4, Installation Details</td>
<td>11/8/07</td>
<td></td>
</tr>
<tr>
<td>G-24.60-00</td>
<td>Steel Sign Support, Types TP-A &amp; TP-B, Installation Details</td>
<td>11/8/07</td>
<td>2</td>
</tr>
<tr>
<td>G-25.10-01</td>
<td>Steel Sign Support Foundation Details</td>
<td>1/6/09</td>
<td></td>
</tr>
<tr>
<td>G-30.10-00</td>
<td>Sign Installation on Signal and Light Standards</td>
<td>11/8/07</td>
<td>2</td>
</tr>
<tr>
<td>G-50.10-00</td>
<td>Sign Bracing</td>
<td>11/8/07</td>
<td>2</td>
</tr>
<tr>
<td>G-60.10-00</td>
<td>Cantilever Sign Structure (Truss-Type)</td>
<td>8/31/07</td>
<td>4</td>
</tr>
<tr>
<td>G-60.20-00</td>
<td>Cantilever Sign Structure (Truss-Type) Foundation Type 1</td>
<td>8/31/07</td>
<td>2</td>
</tr>
<tr>
<td>G-60.30-00</td>
<td>Cantilever Sign Structure (Truss-Type) Fdn., Types 2 &amp; 3</td>
<td>8/31/07</td>
<td>2</td>
</tr>
<tr>
<td>G-70.10-00</td>
<td>Sign Bridge (Truss-Type)</td>
<td>10/5/07</td>
<td>4</td>
</tr>
<tr>
<td>G-70.20-00</td>
<td>Sign Bridge (Truss-Type) Foundation Type 1</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>G-70.30-00</td>
<td>Sign Bridge (Truss-Type) Foundation Types 2 &amp; 3</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>G-90.10-00</td>
<td>Overhead Sign Bracing and Lighting Placement</td>
<td>1/6/09</td>
<td></td>
</tr>
<tr>
<td>G-90.20-00</td>
<td>Overhead Sign Mounting (Monotube Structure)</td>
<td>1/6/09</td>
<td></td>
</tr>
<tr>
<td>G-90.30-00</td>
<td>Overhead Sign Mounting (Truss Structure)</td>
<td>1/6/09</td>
<td></td>
</tr>
<tr>
<td>G-90.40-01</td>
<td>Overhead Sign Lighting Details</td>
<td>10/14/09</td>
<td></td>
</tr>
<tr>
<td>G-95.10-00</td>
<td>Maintenance Walkway for Sign Bridges</td>
<td>11/8/07</td>
<td>3</td>
</tr>
<tr>
<td>G-95.20-01</td>
<td>Maintenance Walkway Mounting for Monotube Sign Bridge</td>
<td>7/10/08</td>
<td>3</td>
</tr>
<tr>
<td>G-95.30-01</td>
<td>Maintenance Walkway Mounting for Truss-Type Sign Bridge</td>
<td>7/10/08</td>
<td>2</td>
</tr>
</tbody>
</table>

Section H  Roadside and Site Development

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-10.10-00</td>
<td>Tree and Shrub Planting Details</td>
<td>7/3/08</td>
<td></td>
</tr>
<tr>
<td>H-10.15-00</td>
<td>Live Stake Installations</td>
<td>7/3/08</td>
<td></td>
</tr>
<tr>
<td>H-30.10-00</td>
<td>Crest Gage</td>
<td>10/12/07</td>
<td></td>
</tr>
<tr>
<td>H-32.10-00</td>
<td>Automated Ground Water Monitoring Well</td>
<td>9/20/07</td>
<td></td>
</tr>
<tr>
<td>H-60.10-01</td>
<td>Bollard Type 1</td>
<td>7/3/08</td>
<td></td>
</tr>
<tr>
<td>H-60.20-01</td>
<td>Bollard Type 2</td>
<td>7/3/08</td>
<td></td>
</tr>
<tr>
<td>H-70.10-00</td>
<td>Mailbox Support Type 1</td>
<td>9/5/07</td>
<td>2</td>
</tr>
<tr>
<td>H-70.20-00</td>
<td>Mailbox Support Type 2</td>
<td>9/5/07</td>
<td>2</td>
</tr>
<tr>
<td>H-70.30-01</td>
<td>Mailbox Support Type 3</td>
<td>11/17/08</td>
<td>2</td>
</tr>
</tbody>
</table>

Section I  Site Preservation and Erosion Control

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-10.10-01</td>
<td>High Visibility Fence</td>
<td>8/11/09</td>
<td></td>
</tr>
<tr>
<td>I-30.10-01</td>
<td>Silt Fence with Backup Support</td>
<td>8/11/09</td>
<td></td>
</tr>
<tr>
<td>I-30.15-00</td>
<td>Silt Fence</td>
<td>8/11/09</td>
<td></td>
</tr>
<tr>
<td>I-30.20-00</td>
<td>Erosion Control At Culvert Ends</td>
<td>9/20/07</td>
<td></td>
</tr>
<tr>
<td>I-30.30-00</td>
<td>Wattle Installation On Slope</td>
<td>9/20/07</td>
<td></td>
</tr>
<tr>
<td>I-30.40-00</td>
<td>Compost Sock</td>
<td>10/12/07</td>
<td></td>
</tr>
<tr>
<td>I-30.50-00</td>
<td>Straw Bale Barrier</td>
<td>11/14/07</td>
<td></td>
</tr>
</tbody>
</table>
## Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-40.10-00</td>
<td>Temporary Silt Fence for Inlet Protection In Unpaved Areas</td>
<td>9/20/07</td>
</tr>
<tr>
<td>I-40.20-00</td>
<td>Storm Drain Inlet Protection</td>
<td>9/20/07</td>
</tr>
<tr>
<td>I-50.10-00</td>
<td>Geotextile Encased Check Dam Installation</td>
<td>9/20/07</td>
</tr>
<tr>
<td>I-50.20-00</td>
<td>Check Dams</td>
<td>8/31/07</td>
</tr>
<tr>
<td>I-60.10-00</td>
<td>Erosion Control Blanket Placement On Slope</td>
<td>8/31/07</td>
</tr>
<tr>
<td>I-60.20-00</td>
<td>Erosion Control Blanket Placement In Channel</td>
<td>8/31/07</td>
</tr>
<tr>
<td>I-80.10-01</td>
<td>Miscellaneous Erosion Control Details</td>
<td>8/11/09</td>
</tr>
</tbody>
</table>

## Section J  Illumination, Signals, and ITS

| J-1f       | Timber Light Standards                              | 6/23/00                   |
| J-3        | Type A, B, and C Service Lighting Details           | 8/1/97, 2 Sheets          |
| J-3b       | Service Cabinet Type B Modified (0 - 200 Amp Type, 120/240 Single Phase) | 3/4/05, 2 Sheets          |
| J-3c       | Service Cabinet Type D (0 - 200 Amp Type, 120/240 Single Phase) | 6/24/02                   |
| J-3d       | Service Cabinet Type E (0 - 200 Amp Type, 240/480 Single Phase) | 11/5/03                   |
| J-6c       | Cabinet Foundation Details                           | 4/24/98                   |
| J-7c       | Strain Pole Standards Type IV and V                 | 6/19/98                   |
| J-7d       | Span Wire Installation                              | 4/24/98                   |
| J-8a       | Type 1 Induction Loop                                | 5/20/04                   |
| J-8b       | Type 2 Induction Loop                                | 5/20/04, 2 Sheets         |
| J-8c       | Type 3 Induction Loop                                | 5/20/04, 3 Sheets         |
| J-8d       | Induction Loop Details                               | 5/20/04, 2 Sheets         |
| J-9a       | Typical Grounding Details                            | 4/24/98                   |
| J-10       | Electrical Conduit Placement                         | 7/18/97                   |
| J-11b      | Heavy Duty Junction Box, Types 4, 5, & 6             | 9/2/05, 2 Sheets          |
| J-12       | Sign Post-Mounted Junction Box                       | 2/10/09, 2 Sheets         |
| J-16a      | Junction Box, Traffic Barrier Mounted                | 3/4/05                    |
| J-16b      | Conduit Installation in Traffic Barrier on Retaining Wall | 2/10/09                   |
| J-16c      | Conduit Installation in Single Slope Conc. Barrier (Dual Face) | 2/10/09                   |
| J-18       | Permanent Traffic Recorder Site Installations        | 2/10/09, 2 Sheets         |
| J-19       | Weigh-In-Motion Site Installation                    | 2/10/09                   |
| J-20       | Permanent Traffic Recorder and Weigh-In-Motion Details | 9/2/05, 3 Sheets          |
| J-20.10-00 | Pedestrian Push Button Post and Foundation           | 10/14/09, 2 Sheets        |
| J-20.15-00 | Breakaway Pedestrian Push Button Post (PPB)          | 10/14/09                  |
| J-20.16-00 | Pedestrian Signal Standard Details                   | 10/14/09                  |
| J-20.20-00 | Pedestrian Signal Standard Electrical Details        | 10/14/09                  |
| J-20.26-00 | Pedestrian Push Button (PPB) Details                 | 10/14/09                  |
| J-21.10-00 | Type PS, Type 1 RM and FB Signal Standard Foundation Details | 10/14/09, 2 Sheets        |
| J-21.15-00 | Type 1 Signal Standard Details                       | 10/14/09                  |
| J-21.16-00 | Flashing Beacon Type 1 Signal Standard Details       | 10/14/09                  |
| J-21.17-00 | Flashing Beacon Type 1 Signal Standard Electrical Details | 10/14/09                  |
## Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-21.20-00</td>
<td>Type 1 Signal Standard Electrical Details</td>
<td>10/14/09</td>
</tr>
<tr>
<td>J-22.15-00</td>
<td>Ramp Meter Signal Standard Details</td>
<td>10/14/09</td>
</tr>
<tr>
<td>J-22.16-00</td>
<td>Ramp Meter Signal Standard Electrical Details</td>
<td>10/14/09</td>
</tr>
<tr>
<td>J-28.10-00</td>
<td>Steel Light Standard</td>
<td>8/7/07</td>
</tr>
<tr>
<td>J-28.22-00</td>
<td>Steel Light Standard: Placement (Slip Base)</td>
<td>8/7/07</td>
</tr>
<tr>
<td>J-28.24-00</td>
<td>Steel Light Standard: Placement (Fixed Base)</td>
<td>8/7/07</td>
</tr>
<tr>
<td>J-28.26-01</td>
<td>Steel Light Standard: Placement ~ Miscellaneous</td>
<td>12/2/08</td>
</tr>
<tr>
<td>J-28.30-01</td>
<td>Steel Light Standard: Foundation Types A &amp; B</td>
<td>10/14/09</td>
</tr>
<tr>
<td>J-28.40-01</td>
<td>Steel Light Standard: Base Mounting</td>
<td>10/14/09</td>
</tr>
<tr>
<td>J-28.42-00</td>
<td>Steel Light Standard: Anchor/Slip Plate for Slip Base</td>
<td>8/7/07</td>
</tr>
<tr>
<td>J-28.45-00</td>
<td>Steel Light Std.: Elbow Mounting on Bridge &amp; Retaining Wall</td>
<td>8/7/07</td>
</tr>
<tr>
<td>J-28.50-00</td>
<td>Steel Light Standard: Pole Base and Hand Hole Details</td>
<td>8/7/07</td>
</tr>
<tr>
<td>J-28.60-00</td>
<td>Steel Light Standard: Barrier Mounted Base</td>
<td>8/7/07</td>
</tr>
<tr>
<td>J-28.70-00</td>
<td>Steel Light Standard: Wiring Details</td>
<td>11/8/07</td>
</tr>
<tr>
<td>J-40.10-01</td>
<td>Locking Lid Standard Junction Box Types 1 &amp; 2</td>
<td>10/14/09</td>
</tr>
<tr>
<td>J-40.30-01</td>
<td>Locking Lid Standard Duty Junction Box Type 8</td>
<td>1/6/09</td>
</tr>
<tr>
<td>J-75.10-00</td>
<td>Signal Head Mounting Details Pole and Post Top Mountings</td>
<td>2/10/09</td>
</tr>
<tr>
<td>J-75.20-00</td>
<td>Signal Head Mounting Details Mast Arm and Span Wire Mountings</td>
<td>2/10/09</td>
</tr>
<tr>
<td>J-75.30-00</td>
<td>Miscellaneous Signal Details</td>
<td>2/10/09</td>
</tr>
<tr>
<td>J-75.40-00</td>
<td>Overhead Sign Electrical Details (Monotube Structure)</td>
<td>10/14/09</td>
</tr>
<tr>
<td>J-75.45-00</td>
<td>Overhead Sign Electrical Details (Truss Structure)</td>
<td>10/14/09</td>
</tr>
<tr>
<td>J-90.10-00</td>
<td>Pull Box</td>
<td>2/10/09</td>
</tr>
<tr>
<td>J-90.20-00</td>
<td>Cable Vault</td>
<td>2/10/09</td>
</tr>
</tbody>
</table>

### Section K  Work Zone Traffic Control

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-10.20-01</td>
<td>Road Closure, with Diversion</td>
<td>10/12/07</td>
</tr>
<tr>
<td>K-10.40-00</td>
<td>Road Closure, with Off-Site Detour</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-20.20-01</td>
<td>Lane Closure, without Flaggers ~ Low Volume Road</td>
<td>10/12/07</td>
</tr>
<tr>
<td>K-20.40-00</td>
<td>Lane Closure, with Flagger Control</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-20.60-00</td>
<td>Lane Closure, with Pilot Car</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-22.20-01</td>
<td>Lane Shift, onto Passing Lane</td>
<td>10/12/07</td>
</tr>
<tr>
<td>K-24.20-00</td>
<td>Single Lane Closure, with Encroachment</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-24.40-01</td>
<td>Double Lane Closure, on Multilane Roadway</td>
<td>10/12/07</td>
</tr>
<tr>
<td>K-24.60-00</td>
<td>Single Lane Closure, on Multilane Roadway</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-24.80-01</td>
<td>Single Lane Closure, with Temporary Concrete Barrier</td>
<td>10/12/07</td>
</tr>
<tr>
<td>K-26.20-00</td>
<td>Lane Shift, onto Two-way Left Turn Lane</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-26.40-01</td>
<td>Left and Center Lane Closure ~ Two-Way Left Turn Lane</td>
<td>10/12/07</td>
</tr>
<tr>
<td>K-30.20-00</td>
<td>Intersection ~ Lane Shift on 3 Lane Two-Way Left Turn Lane</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-30.30-00</td>
<td>Intersection ~ Lane Shift on 5 Lane Two-Way Left Turn Lane</td>
<td>10/12/07</td>
</tr>
<tr>
<td>K-32.20-00</td>
<td>Intersection ~ Right Lane Closure, Far Side</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-32.40-00</td>
<td>Intersection ~ Left Lane Closure, Far Side</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-32.60-00</td>
<td>Intersection ~ Multiple Lane Closure</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-32.80-00</td>
<td>Intersection ~ Half Road Closure with Lane Shift</td>
<td>2/15/07</td>
</tr>
</tbody>
</table>
## Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-34.20-00</td>
<td>Intersection ~ Pedestrian Detour</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-36.20-00</td>
<td>Intersection ~ Shoulder Work</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-40.20-00</td>
<td>Shoulder Closure ~ High Speed Roadway (45 MPH or Higher)</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-40.40-00</td>
<td>Shoulder Closure ~ Low Speed Roadway (40 MPH or Lower)</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-40.60-00</td>
<td>Shoulder Closure ~ Short Duration</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-40.80-00</td>
<td>Work Beyond the Shoulder</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-55.20-00</td>
<td>Emergency ~ Passable Hazard</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-60.20-02</td>
<td>Speed Zone, Supplemental Signing ~ Chip Seal Project</td>
<td>7/3/08</td>
</tr>
<tr>
<td>K-60.40-00</td>
<td>Motorcycle, Supplemental Signing</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-70.20-00</td>
<td>Temporary Channelization</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-80.10-00</td>
<td>Class A Construction Signing Installation</td>
<td>2/21/07</td>
</tr>
<tr>
<td>K-80.20-00</td>
<td>Type 3 Barricade</td>
<td>12/20/06 2 Sheets</td>
</tr>
<tr>
<td>K-80.30-00</td>
<td>Alternative Temporary Conc. Barrier (F-Shape)</td>
<td>2/21/07</td>
</tr>
<tr>
<td>K-80.35-00</td>
<td>Temporary Conc. Barrier Anchoring</td>
<td>2/21/07</td>
</tr>
<tr>
<td>K-80.37-00</td>
<td>Temporary Conc. Barrier Anchoring ~ Narrow</td>
<td>2/21/07</td>
</tr>
</tbody>
</table>

### Section L  Fence and Glare Screen

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-10.10-00</td>
<td>Wire Fence Types 1 &amp; 2, and Wire Gates</td>
<td>2/21/07 2 Sheets</td>
</tr>
<tr>
<td>L-20.10-00</td>
<td>Chain Link Fence, Types 3 and 4</td>
<td>2/7/07 2 Sheets</td>
</tr>
<tr>
<td>L-30.10-00</td>
<td>Chain Link Gate</td>
<td>2/7/07 2 Sheets</td>
</tr>
<tr>
<td>L-40.10-00</td>
<td>Glare Screen Type 1, Design A</td>
<td>2/21/07 2 Sheets</td>
</tr>
<tr>
<td>L-40.15-00</td>
<td>Glare Screen Type 1, Design B</td>
<td>2/21/07</td>
</tr>
<tr>
<td>L-40.20-00</td>
<td>Glare Screen Type 2 (Chain Link with Slats)</td>
<td>2/21/07</td>
</tr>
<tr>
<td>L-70.10-01</td>
<td>Access Control Gate</td>
<td>5/21/08</td>
</tr>
<tr>
<td>L-70.20-01</td>
<td>Access Control Double Gate</td>
<td>5/21/08</td>
</tr>
</tbody>
</table>

### Section M  Roadway Delineation

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-1.20-01</td>
<td>Ramp Channelization: Single Lane</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-1.40-01</td>
<td>Ramp Channelization: Two Lane</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-1.60-01</td>
<td>Ramp Channelization: Collector Distributor Road</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-1.80-02</td>
<td>Ramp Channelization: Parallel On &amp; Weaving Section</td>
<td>8/31/07</td>
</tr>
<tr>
<td>M-2.20-01</td>
<td>Gore Area Marking Layouts</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-2.40-01</td>
<td>Gore Area Supplement w/ Type 2 Raised Pavement Markers</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-2.60-01</td>
<td>Gore Area Substitution with Types 1 &amp; 2 RPM's</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-3.10-02</td>
<td>Left Turn Channelization</td>
<td>2/10/09</td>
</tr>
<tr>
<td>M-3.20-01</td>
<td>Left Turn Channelization: Reduced Tapers</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-3.30-02</td>
<td>Left Turn Channelization: Tee Intersection and Back-to-back Turn Lanes</td>
<td>2/10/09</td>
</tr>
<tr>
<td>M-3.40-02</td>
<td>Two-way Left-Turn and Median Channelalization</td>
<td>2/10/09</td>
</tr>
<tr>
<td>M-3.50-01</td>
<td>Double Left Turn Channelization</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-5.10-01</td>
<td>Right Turn Channelization</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-7.50-01</td>
<td>High Occupancy Vehicle (HOV) Lane Symbol Layout</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-9.50-01</td>
<td>Bicycle Lane Symbol Layout</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-9.60-00</td>
<td>Shared - Use Path Markings</td>
<td>2/10/09</td>
</tr>
<tr>
<td>Plan No.</td>
<td>Plan Title</td>
<td>Publication Approval Date</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>M-11.10-01</td>
<td>Railroad Crossing Layout</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-15.10-01</td>
<td>Crosswalk Layout</td>
<td>2/6/07</td>
</tr>
<tr>
<td>M-17.10-02</td>
<td>Parking Space Layouts</td>
<td>7/3/08</td>
</tr>
<tr>
<td>M-20.10-01</td>
<td>Longitudinal Marking Patterns</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-20.20-01</td>
<td>Profiled and Embossed Plastic Lines</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-20.30-02</td>
<td>Longitudinal Marking Supplement with Raised Pavement Markers (RPM's)</td>
<td>10/14/09</td>
</tr>
<tr>
<td>M-20.40-01</td>
<td>Longitudinal Marking Supplement with RPM's ~ Turn Lanes</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-20.50-01</td>
<td>Longitudinal Marking Substitution with RPM's</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-24.20-01</td>
<td>Symbol Markings: Traffic Arrows for High Speed Roadways</td>
<td>5/31/06</td>
</tr>
<tr>
<td>M-24.40-01</td>
<td>Symbol Markings: Traffic Arrows for Low Speed Roadways</td>
<td>5/31/06</td>
</tr>
<tr>
<td>M-24.60-02</td>
<td>Symbol Markings: Miscellaneous</td>
<td>2/6/07</td>
</tr>
<tr>
<td>M-40.10-00</td>
<td>Guide Posts and Barrier Delineators</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-40.20-00</td>
<td>Guide Post Placement: Interchanges</td>
<td>10/12/07</td>
</tr>
<tr>
<td>M-40.30-00</td>
<td>Guide Post Placement: Grade Intersections</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-40.40-00</td>
<td>Guide Post Placement: Horizontal Curves</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-40.50-00</td>
<td>Guide Post Placement: Bridges</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-40.60-00</td>
<td>Guide Post Placement: Miscellaneous</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-60.10-00</td>
<td>Shoulder Rumble Strip Type 1, for Divided Highways</td>
<td>9/5/07</td>
</tr>
<tr>
<td>M-60.20-01</td>
<td>Shoulder Rumble Strip, Types 2, 3, and 4, for Undivided Highways</td>
<td>2/3/09</td>
</tr>
<tr>
<td>M-65.10-01</td>
<td>Center Line Rumble Strip</td>
<td>5/21/08</td>
</tr>
<tr>
<td>M-80.10-00</td>
<td>Traffic Letter and Numeral Applications</td>
<td>6/10/08</td>
</tr>
<tr>
<td>M-80.20-00</td>
<td>Traffic Letters and Numerals (High Speed Roadways)</td>
<td>6/10/08</td>
</tr>
<tr>
<td>M-80.30-00</td>
<td>Traffic Letters and Numerals (Low Speed Roadways)</td>
<td>6/10/08</td>
</tr>
</tbody>
</table>
ALIGNMENT STAKE
Stake every 100 feet on tangents, every 25 feet on curves.

CLEARING/GRUBBING (C&G) LATH
Stake at each full station, 100 feet on tangents, every 25 feet on curves. No hub necessary.

SIDE SLOPE RATIO (4H:1V)
BACK OF DITCH

DISTANCE FROM C TO CATCH (BACK OF DITCH) (23.5 FEET)
CUT AT STAKE (2.9 FEET)
DISTANCE FROM C (27.6 FEET)
FILL AT STAKE (1.2 FEET)
DAYLIGHT (D/L) STAKE

SIDE SLOPE RATIO (3H:1V)
BACK OF DITCH

DISTANCE FROM C TO CATCH (BACK OF DITCH) (25.7 FEET)
FILL (0.1 FEET)
SIDE SLOPE TO A 2% ROADWAY SLOPE (50H:1V)
DISTANCE FROM C (16.2 FEET)
CUT AT CATCH POINT (2.2 FEET)
SIDE SLOPE RATIO (4H:1V)
LINE STATIONING
HUNDRED FOOT INCREMENTS
OFFSET FROM SLOPE STAKE CATCH (1.8 FEET)
FILL AT STAKE (13.3 FEET)
CUT AT CATCH POINT (BACK OF DITCH)
DISTANCE FROM C TO CATCH POINT (2.2 FEET)
SIDE SLOPE RATIO (4H:1V)
BACK OF DITCH

OFFSET FROM SLOPE STAKE CATCH (7.6 FEET)
CUT AT STAKE (2.1 FEET)
DISTANCE FROM C TO CATCH (BACK OF DITCH) (24.8 FEET)
SIDE SLOPE RATIO (4H:1V)
LINE STATIONING
HUNDRED FOOT INCREMENTS

DRAWN BY: ADAM COCHRAN
LATH FOR SLOPE REFERENCES

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
STAKE FOR DITCH CONSTRUCTION

STAKE FOR CURB/GUTTER

STAKE FOR FOUNDATION OF LUMINAIRES, SIGNALS OR SIGN STRUCTURES

SLOPE LATH FOR CURB SECTION

COMPOUND SLOPE LATH

FILL TO SUBGRADE (0.35 FEET)
SLOPE RATIO (2H:1V)
DISTANCE FROM C TO CATCH POINT (28.7 FEET)
SLOPE RATIO (4H:1V)
FILL TO TOP AND BACK EDGE OF CURB (0.90 FEET)
OFFSET (10 FEET)
PLAN SHEET NUMBER (4)
STRUCTURE NOTE NUMBER (15)
OFFSET (3 FEET)
LINE DESIGNATION
HUNDRED FOOT INCREMENTS

LUMINAIRE NUMBER (23)
LINE DESIGNATION
AND STATIONING
HUNDRED FOOT INCREMENTS

FILL FROM CATCH POINT TO BEGINNING OF SECOND SLOPE (2.8 FEET)
SLOPE RATIO (2H:1V)
FILL TO SUBGRADE SHOULDER (2.25 FEET)
SLOPE RATIO (4H:1V)
DISTANCE FROM C TO CATCH POINT (28.7 FEET)
SLOPE RATIO (4H:1V)
FILL TO TOP OF CONCRETE BASE (1.1 FEET TO TOP OF FOUNDATION)
OFFSET TO CENTER OF BASE (10 FEET)
DITCH SECTION ALIGNMENT STATIONING
DRAINAGE ALIGNMENT STATIONING 25' INCREMENTS
OFFSET (10 FEET)
CUT TO FLOW LINE (1.26 FEET)
DISTANCE FROM C TO CATCH POINT (28.7 FEET)
FILL FROM CATCH POINT TO BEGINNING OF SECOND SLOPE (3.8 FEET)
DISTANCE FROM C TO CATCH POINT (14.3 FEET)
SLOPE RATIO (2H:1V)
SLOPE RATIO (4H:1V)
DITCH CUTOFF TO BOTTOM OF DITCH (2.4 FEET)
SIDE SLOPE RATIO (4H:1V)
DISTANCE FROM CATCH POINT TO BOTTOM OF DITCH (2.4 FEET)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

DRAWN BY: ADAM COCHRAN

DATE: 08-07-07

STATE DESIGN ENGINEER
Washington State Department of Transportation

SHEET 2 OF 2 SHEETS
APPROVED FOR PUBLICATION
NOTES

1. The Brass Disc will be furnished by the State.
2. The text in the shaded area (see TOP VIEW) shall be 3/16" high and will be stamped by WSDOT personnel prior to setting the cap. Only the assigned identification letters and numbers are to be placed on the Brass Disc.
3. The hole shall be 32" minimum in depth or 6" below the deepest recorded frost line. All loose material shall be removed from the bottom of the hole so that the concrete is placed on firm undisturbed earth.
4. The top of the concrete shall be troweled smooth and the Brass Disc set in the center with top flush and level. The top of the monument may be recessed or protruding, depending on conditions.
5. The Brass Disc shall be rotated so it can be read while the observer is facing north.
6. When the concrete is set, cover the entire monument with moist earth and leave for three days.
7. To replace a Public Land Survey System (PLSS) corner, consult a licensed Professional Land Surveyor (PLS).

INSTALL FERROUS MATERIAL SEGMENT -- I.E., #4 IRON ROD OR EQUIVALENT, 6" LONG MIN.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
MONUMENT CASE AND COVER

STANDARD PLAN A-10.30-00

SECTION A

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

NOTES
1. Dimensions may vary according to manufacturer.
2. Base to be placed on a well-compacted foundation.
3. Monument case to be installed by contractor.

APPROXIMATE WEIGHTS

<table>
<thead>
<tr>
<th>CASE</th>
<th>80 LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVER</td>
<td>18 LBS</td>
</tr>
<tr>
<td>TOTAL</td>
<td>98 LBS</td>
</tr>
</tbody>
</table>

CONCRETE BASE

SECTION OF LETTER

DIMENSIONS MAY VARY ACCORDING TO MANUFACTURER.

BASE TO BE PLACED ON A WELL COMPACTED FOUNDATION.

MONUMENT CASE TO BE INSTALLED BY CONTRACTOR.

SEE STANDARD PLAN A-10.20 FOR MONUMENT (BRASS DISC) TYPE TO PLACE IN 2" O.D. GALVANIZED PIPE.

SOIL PASCO BAKOTICH III 10-05-07

GROUT

Dimensions may vary according to manufacturer.

Base to be placed on a well compacted foundation.

Monument case to be installed by contractor.

See Standard Plan A-10.20 for Monument (brass disc) type to place in 2" O.D. galvanized pipe.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Slope treatment shall be constructed simultaneously with the roadway excavation. Hand trimming will not be required if satisfactory results are obtained with mechanical equipment.

Slope treatment is used to provide a transition between the existing ground and the cut slope. The intended purpose is to eliminate the abrupt edge and give the area a more natural appearance. The dimensions shown are approximate and can vary to achieve this purpose.

### Typical Section

<table>
<thead>
<tr>
<th>Cut Slope (H:V)</th>
<th>Ground Line (H:V)</th>
<th>Class A</th>
<th>Class B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:5</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>4:1</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>6:1</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>1:2</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>2:1</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>3:1</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>4:1</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>6:1</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**NOTES**

1. Slope treatment shall be constructed simultaneously with the roadway excavation. Hand trimming will not be required if satisfactory results are obtained with mechanical equipment.

2. Slope treatment is used to provide a transition between the existing ground and the cut slope. The intended purpose is to eliminate the abrupt edge and give the area a more natural appearance. The dimensions shown are approximate and can vary to achieve this purpose.
Notes:

1. The design and shape of the semi-open concrete masonry unit shown is only one example of the products that may be used.

2. The Curb Section shall be used only when the lower roadway cross section requires a curb.

The Curb Section shall be used only when the lower roadway cross section requires a curb.
MAXIMUM LENGTH OF TOP HORIZONTAL SUPPORT ROPE = B

MAXIMUM ANCHOR SPACING = A (SEE NOTE 1)

24" DIAM. 6 x 19 IWRC GALVANIZED WIRE ROPE

LENGTH VARIES

3" FABRIC OVERLAP

3" SPACING

9 GAGE (MIN.) GALVANIZED LACING WIRE WOVEN THROUGH EACH CELL (SEE NOTE 3)

8 GAGE (MIN.) GALVANIZED LACING WIRE OR HIGH TENSILE STEEL FASTENERS EVERY CELL (SEE NOTE 3)

4" GALVANIZED, WELDLESS STEEL RING WITH A MINSIMUM SINGLE PULL WORKING LIMIT OF 10,000 LBS. (TYP.)

3/4" DIAM. 6 x 19 IWRC GALVANIZED TOP HORIZONTAL SUPPORT ROPE

TO BE DETERMINED BY ENGINEER

WIRE ROPE CLIP (TYP.) 12" FOLD OVERLAPPED SEAM WITH FASTENERS

THIMBLE WIRE ROPE CLIP (TYP.)

MAXIMUM ANCHOR SPACING = A (SEE NOTE 1)

MAXIMUM LENGTH ~ TOP HORIZONTAL SUPPORT ROPE

SECTION VIEW

MAXIMUM ANCHOR SPACING = A (SEE NOTE 1)

MAXIMUM LENGTH ~ TOP HORIZONTAL SUPPORT ROPE

NOTES

1. Maximum anchor spacing (A) for debris and impact loads required as per table for a minimum allowable anchor capacity of 20,000 lbs. Systems subjected to snow loads may require narrower maximum spacing.

2. Hexagonal mesh must meet minimum requirements of ASTM A 975 for gabions.

3. U-Section of wire rope clips must be applied to the dead end of the rope as shown.

4. 8 × 10 TYPE DOUBLE TWISTED HEXAGONAL WIRE MESH FABRIC. (SEE NOTE 2)

9 GAGE (MIN.) GALVANIZED LACING WIRE WOVEN THROUGH EACH CELL

LENGTH ~ AS SHOWN IN THE PLANS

SEAM ALTERNATIVES

SEAM ALTERNATIVES

OVERLAPPED BEAM WITH FASTENERS

OVERLAPPED BEAM WITH FASTENERS

OVERLAPPED BEAM WITH LACING

OVERLAPPED BEAM WITH LACING

SLOPE PROTECTION ANCHOR  ~ SEE STD. PLAN 30.35.00.

LENGTH ~ AS SHOWN IN THE PLANS

WIRE MESH SLOPE PROTECTION

STANDARD PLAN A-30.30-00

INCHES EXPIRES NOVEMBER 8, 2007

Pasco Bakotich III 11-8-07

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. The "U" shape or "V" shape are both acceptable.
2. Wire size shown are minimum required.
3. All wire intersections are to be sealed.
4. Basalt must be firmly attached to existing or new base.
5. Dowels and Tie Bars shall be held firmly in the above welded assembly.
6. Do not clip Spreader Wires.
NOTES

1. Use the 1/2" joint details for bridges with a length less than 100' and for bridges with L type abutments. Use the 1" joint details for other applications. Use DETAIL 8 on steel trusses and timber bridges with concrete deck panels.

2. Sawcut shall be filled with hot-poured compound in accordance with Standard Specification 9-04.2(1) and sealed in accordance with Standard Specification 5-05.3(8B).

3. The contractor shall avoid sawing existing concrete. The construction tolerance to locate the saw cut is 35/64" (0 min. to 1/4" max.) from the existing concrete (DETAILs 1 and 5).
All edges of the approach slab shall have 1/2" radii except the longitudinal edge of the preceeding pour of a LONGITUDINAL CONSTRUCTION JOINT.

Longitudinal joints shall be placed on lane lines and shall be constructed and sealed in accordance with Standard Specification Section 5-05.3(8). Joints may be either a sawcut crack control joint or a construction joint. Basalt joints shall terminate 1' - 0" before reaching edge of slab and must be saw cut as soon as possible after placement of concrete.

(A) Approach slabs less than 40' wide -- no joint is required.
(B) Approach slabs wider than 40' -- one or more joints are required to divide the slab into approximately 24' wide sections.

INERT DOWELS PARALLEL TO CENTER LINE ALONG TRANSVERSE CONSTRUCTION JOINT.

CRUSHED SURFACING BASE COURSE
0.2' MIN. COMPACTED DEPTH

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
ELEVATION

TYPE 21 TRANSITION SHOWN

ELEVATION

BEAM GUARDRAIL TYPE 21
TRANSITION SECTION TYPE 21
- SEE STANDARD PLAN A-60.10-08

PLAN

BEAM GUARDRAIL TYPE 1
BEAM GUARDRAIL TRANSITION TYPE 1
- SEE STANDARD PLAN A-4

PLAN

EDGE OF EMBANKMENT
YIELDING

BEAM GUARDRAIL CONNECTION TO BRIDGE TRAFFIC BARRIER

EMBANKMENT WIDTHING AT BRIDGE END WITH WING WALL
STANDARD PLAN A-60.10-08

BEAM GUARDRAIL TYPE 1

EDGE OF EMBANKMENT
YIELDING

BEAM GUARDRAIL CONNECTION TO BRIDGE TRAFFIC BARRIER

EMBANKMENT WIDTHING AT BRIDGE END WITH WING WALL
STANDARD PLAN A-60.10-08
EMBANKMENT WIDENING AT BRIDGE END WITH "L" SHAPED ABUTMENT
STANDARD PLAN A-60.10-09

CONCRETE BARRIER CONNECTION TO BRIDGE TRAFFIC BARRIER
NOTES

1. A typical bridge overlay will remove 0.07 feet of Asphaltic Concrete Pavement (ACP) and place 0.15 feet of new Hot Mixed Asphalt (HMA). Depth of removal and placement will vary for each bridge. Total depth of HMA on the bridge shall not exceed 0.25 feet, unless shown otherwise in the plans.

2. If the existing depth of asphalt on the bridge deck is 0.25 feet, then the overlay will remove 0.15 feet of ACP and place 0.15 feet of new HMA. The existing bridge grade will remain unchanged.

3. FINAL GRADE TRANSITION: The maximum longitudinal taper slope to transition an increase in roadway grade to the new or existing bridge grade will be at least 1 inch rise to 40 feet run (1V:480H or flatter) (0.2% maximum). If several overlays are present, accelerated taper lengths shall be required to maintain the transition slope (1V:480H or flatter) (0.2% maximum).

4. If the ACP and membrane is to be removed from the bridge deck, see GSP 023106 for deck preparation before placing new membrane.

5. In accordance with Standard Specification 5-05.3(12), when pavement abuts bridges, the finished pavement parallel to centerline shall be uniform to a degree that no variations greater than 1/8-inch are present when tested with a 10-foot straightedge.

ELEVATION VIEW

HMA OVERLAY WITHOUT BRIDGE APPROACH SLAB

ELEVATION VIEW

HMA OVERLAY WITH BRIDGE APPROACH SLAB
1. If a zone has rebar section loss or full depth repairs, then the concrete deck repair in each zone shall achieve 3,000 PSI before progressing to the adjacent zone.

2. Remove all concrete 3/4" minimum clearance around all exposed reinforcement bars in accordance with Standard Specification 6-09.3(6).

3. For tension zones of continuous structures, when a longitudinal reinforcement bar has greater than 20% section loss (or damage), remove concrete a minimum of 3’ - 6” on each side of section loss and place 2 supplemental reinforcement bars adjacent and parallel to the deficient bar, extending 3’ - 0” beyond each side having 30% section loss. Mechanical splices may be used to facilitate placement of the new reinforcement bars.

4. For typical rebar repairs, when the reinforcement has greater than 20% section loss (or damage), remove concrete a minimum of 2’ - 0” on each side of section loss, and replace with new supplemental reinforcement, same diameter as original, adjacent and parallel to the deficient bar, extending 2’ - 3” beyond each end of section having 20% section loss.
NOTES

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.

2. The knockout diameter shall not be greater than 20". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

3. The maximum depth from the finished grade to the lowest pipe invert shall be 5'.

4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.

5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.

6. The opening shall be measured at the top of the precast base section.

7. All pickup holes shall be grouted full after the basin has been placed.
**NOTES**

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.

2. The knockout diameter shall not be greater than 26". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

3. The maximum depth from the finished grade to the lowest pipe invert shall be 5'.

4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.

5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.

6. The opening shall be measured at the top of the precast base section.

7. All pickup holes shall be grouted full after the basin has been placed.

---

**PIPE ALLOWANCES**

<table>
<thead>
<tr>
<th>PIPE MATERIAL</th>
<th>MAXIMUM INSIDE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>REINFORCED OR PLAIN CONCRETE</td>
<td>18&quot;</td>
</tr>
<tr>
<td>ALL METAL PIPE</td>
<td>21&quot;</td>
</tr>
<tr>
<td>CPSSP # (STD. 8/12G. 0-08.20)</td>
<td>18&quot;</td>
</tr>
<tr>
<td>SOLID WALL PVC (STD. 8/12G. 0-08.12(1))</td>
<td>21&quot;</td>
</tr>
<tr>
<td>PROFILE WALL PVC (STD. 8/12G. 0-08.12(2))</td>
<td>21&quot;</td>
</tr>
</tbody>
</table>

* CORRUGATED POLYETHYLENE STORM SEWER PIPE

---

**FRAME AND VANED GRATE**

- One #3 bar hoop for 8" height
- Two #3 bar hoops for 12" height

**RECTANGULAR ADJUSTMENT SECTION**

- Two #3 bar hoops

**REINFORCED SECTION**

- #3 bar each corner
- #3 bar each way

**REDUCING SECTION**

- #3 bar each corner
- #3 bar each way

**FRAME AND VANED GRATE**

- One #3 bar hoop for 8" height
- Two #3 bar hoops for 12" height

**FRAME AND VANED GRATE**

- One #3 bar hoop for 8" height
- Two #3 bar hoops for 12" height

---

**CATCH BASIN TYPE 1L**

**STANDARD PLAN B-5.40-00**

Sheet 1 of 1 Sheet

Approved for publication: Harold J. Peterfeso 06-01-06

Washington State Department of Transportation

EXPIRES JULY 1, 2007
1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.

2. The knockout diameter shall not be greater than 18". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

3. The maximum depth from the finished grade to the lowest pipe invert shall be 5'.

4. The frame may be cast into the adjustment section.

5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.

6. The opening shall be measured at the top of the precast base section.

7. All pickup holes shall be grouted full after the basin has been placed.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. No steps are required when height is 4' or less.

2. The bottom of the precast catch basin may be sloped to facilitate cleaning.

3. The rectangular frame and grate may be installed with the flange up or down.

4. Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

CATCH BASIN DIMENSIONS

<table>
<thead>
<tr>
<th>CATCH BASIN DIAMETER</th>
<th>WALL THICKNESS</th>
<th>BASE REINFORCING STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INCHES</td>
<td># FEET 0&quot;</td>
</tr>
<tr>
<td></td>
<td>INCHES</td>
<td>2&quot;</td>
</tr>
<tr>
<td>48</td>
<td>2, 3</td>
<td>2, 3</td>
</tr>
<tr>
<td>24</td>
<td>4</td>
<td>2, 3</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>2, 3</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>2, 3</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>2, 3</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>2, 3</td>
</tr>
</tbody>
</table>

PIPE ALLOWANCES

<table>
<thead>
<tr>
<th>CATCH BASIN DIAMETER</th>
<th>PIPE MATERIAL WITH MAXIMUM INSIDE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CONCRETE</td>
</tr>
<tr>
<td></td>
<td>24&quot;</td>
</tr>
<tr>
<td></td>
<td>30&quot;</td>
</tr>
<tr>
<td></td>
<td>36&quot;</td>
</tr>
<tr>
<td></td>
<td>42&quot;</td>
</tr>
<tr>
<td></td>
<td>48&quot;</td>
</tr>
<tr>
<td></td>
<td>54&quot;</td>
</tr>
</tbody>
</table>

CATCH BASIN TYPE 2

STANDARD PLAN B-10.20-00

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:

1. The pipe supports and the flow restrictor shall be constructed of the same material and be anchored at a maximum spacing of 36". Attach the pipe supports to the manhole with 5/8" stainless steel expansion bolts or embed the supports into the manhole wall 2".

2. The vertical rear stem of the flow restrictor shall be the same diameter as the horizontal outlet pipe with a minimum diameter of 8".

3. The flow restrictor shall be fabricated from one of the following materials:
   - 0.060" Corrugated Aluminum Alloy Drain Pipe
   - 0.064" Corrugated Galvanized Steel Drain Pipe with Treatment 1
   - 0.064" Corrugated Aluminum Alloy Drain Pipe
   - 0.060" Aluminum alloy flat sheet, in accordance with ASTM B 209, 5052 H32 or EPS High Density Polyethylene Storm Sewer Pipe

4. The frame and ladder or steps are to be offset so that the shear gate is visible from the top; the climb-down space is clear of the riser and gate; the frame is clear of the curb.

5. The multi-orifice elbows may be located as shown, or all placed on one side of the riser to assure ladder clearance. The size of the elbows and their placement shall be specified in the Contract.

6. Restrictor plate with orifice as specified in the Contract. The opening is to be cut round and smooth.

7. The flow restrictor shall be made of aluminum alloy in accordance with ASTM B 26 and ASTM B 275, designation 2024A; or cast iron in accordance with ASTM A 48, Class 30B.

8. The lift handle shall be made of a similar metal to the gate (to prevent galvanic corrosion), it may be of solid rod or hollow tubing, with adjustable hook as required.

A neoprene rubber gasket is required between the riser mounting flange and the gate flange.

Install the gate so that the level-line mark is level when the gate is closed.

The mating surfaces of the lid and the body shall be machined for proper fit.

All shear gate bolts shall be stainless steel.

The shear gate maximum opening shall be controlled by limited hinge movement, a stop tab, or some other device.

Alternative shear gate designs are acceptable if material specifications are met and flange bolt pattern matches.
1. See Contract for size and location of all pipes and orifices.
2. Baffle wall shall have #4 Bar at 12" spacing each way.
3. Precast baffle shall be keyed and grouted in place.
4. Bottom orifice plate shall be galvanized steel with a minimum thickness of 1/4". Attach orifice with 1/2" stainless steel bolts.
5. Upper flow orifice plates and elbows shall be aluminum, aluminized steel or galvanized steel. Galvanized steel shall have Treatment 1.
**NOTE**

Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum.

<table>
<thead>
<tr>
<th>DIAM</th>
<th>WALL THICKNESS</th>
<th>BASE THICKNESS</th>
<th>MAXIMUM KNOCKOUT SIZE</th>
<th>MINIMUM DISTANCE BETWEEN KNOCKOUTS</th>
<th>BASE REINFORCING STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>48&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>36&quot;</td>
<td>5&quot;</td>
<td>0.23</td>
</tr>
<tr>
<td>54&quot;</td>
<td>4.5&quot;</td>
<td>5&quot;</td>
<td>42&quot;</td>
<td>5&quot;</td>
<td>0.18</td>
</tr>
<tr>
<td>60&quot;</td>
<td>5&quot;</td>
<td>6&quot;</td>
<td>48&quot;</td>
<td>5&quot;</td>
<td>0.28</td>
</tr>
</tbody>
</table>

**MANHOLE TYPE 1**

**STANDARD PLAN B-15.20-08**

Sheet 1 of 1 sheet

**EXPIRES JULY 1, 2007**

**APPROVED FOR PUBLICATION**

Harold J. Peterfreem 06-01-08

Washington State Department of Transportation
**MANHOLE DIMENSION TABLE**

<table>
<thead>
<tr>
<th>DIAM. (IN.)</th>
<th>WALL THICKNESS (IN.)</th>
<th>BASE THICKNESS (IN.)</th>
<th>MAXIMUM KNOCKOUT SIZE (IN.)</th>
<th>MINIMUM DISTANCE BETWEEN KNOCKOUTS (IN.)</th>
<th>BASE REINFORCING STEEL Φ &amp; N. IN EACH DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>6</td>
<td>8</td>
<td>96</td>
<td>12</td>
<td>SEPARATE BASE: 0.24, INTEGRAL BASE: 0.24</td>
</tr>
<tr>
<td>84</td>
<td>6</td>
<td>12</td>
<td>72</td>
<td>12</td>
<td>SEPARATE BASE: 0.26, INTEGRAL BASE: 0.26</td>
</tr>
<tr>
<td>96</td>
<td>6</td>
<td>12</td>
<td>84</td>
<td>12</td>
<td>SEPARATE BASE: 0.28, INTEGRAL BASE: 0.28</td>
</tr>
</tbody>
</table>

**NOTE:**

Knockout shell have a wall thickness of 2" minimum to 2.5" maximum.

---

**MANHOLE TYPE 2**

**STANDARD PLAN B-15.40-09**

**Sheet 1 of 1 sheet**

**APPROVED FOR PUBLICATION**

Harold J. Pietrzak 06-01-06

Washington State Department of Transportation

EXPIRES: JULY 1, 2007
NOTE

Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum.

MANHOLE TYPE 3

48", 54", 60", 72", 84" OR 96"  

6"  

1" MIN.  

2.5" MAX.

28" MAX.

12"  

MANHOLE DIMENSION TABLE

<table>
<thead>
<tr>
<th>DIAM.</th>
<th>WALL THICKNESS</th>
<th>BASE THICKNESS</th>
<th>MAXIMUM KNOCKOUT SIZE</th>
<th>MINIMUM DISTANCE BETWEEN KNOCKOUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>48&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>42&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>54&quot;</td>
<td>4.5&quot;</td>
<td>6&quot;</td>
<td>42&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>60&quot;</td>
<td>5&quot;</td>
<td>6&quot;</td>
<td>48&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>72&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>60&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>84&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>72&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>96&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>84&quot;</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>

BASE REINFORCING STEEL (TYP.)

INTEGRAL BASE

SEPARATE BASE

0.23

0.19

0.25

0.36

0.19

0.25

0.24

0.20

0.20

0.16

0.20

0.20

0.20
1. The asymmetry of the Combination Inlet shall be considered when calculating the offset distance for the catch basin. See SECTION A.

2. The dimensions of the Frame and Hood may vary slightly among different manufacturers. The Frame may have cast features intended to support a grate guard. Hood units shall mount outside of the Frame. The methods for fastening the Safety Bar / Debris Guard Rod to the Hood may vary. The top of the Hood may be cast with a pattern.

3. Attach the Hood to the frame with two 3/4" x 2" hex head bolts, nuts, and oversize washers. The washers shall have diameters adequate to assure full bearing across the slots.

4. When bolt-down grates are specified in the contract, provide two holes in the frame that are vertically aligned with the grate slots. Tap each hole to accept a 5/8" x -11 NC x 2" allen head cap screw. Location of bolt-down holes varies among different manufacturers. See BOLT-DOWN DETAIL, Standard Plan B-30.10.

5. Only ductile iron Vaned Grates shall be used. See Standard Plans B-30.30 and B-30.40 for grate details. Refer to Standard Specification 8-05.18(2) for additional requirements.

6. This plan is intended to show the installation details of a manufactured product. It is not the intent of this plan to show the specific details necessary to fabricate the castings shown on the drawing.
NOTES

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.

2. The knockout diameter shall not be greater than 16". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide at least 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

3. The maximum depth from the finished grade to the lowest pipe invert shall be 5'.

4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.

5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.

6. The opening shall be measured at the top of the precast base section.

7. All pickup holes shall be grouted full after the inlet has been placed.
NOTES

1. This frame is designed to accommodate 20" × 24" grates or covers as shown on Standard Plans B-30.20, B-30.30, B-30.40 and B-30.50.

2. When bolt-down grates or covers are specified in the Contract, provide two holes in the frame that are vertically aligned with the grate or cover slots. Tap each hole to accept a 5/8" - 11 NC × 2" allen head cap screw. Location of bolt down holes varies among different manufacturers.

3. Refer to Standard Specification 9-05.15(2) for additional requirements.

RECTANGULAR FRAME
(REVERSIBLE)

STANDARD PLAN B-30.10-00

This frame is designed to accommodate 20" × 24" grates or covers as shown on Standard Plans B-30.20, B-30.30, B-30.40 and B-30.50.

When bolt-down grates or covers are specified in the Contract, provide two holes in the frame that are vertically aligned with the grate or cover slots. Tap each hole to accept a 5/8" - 11 NC × 2" allen head cap screw. Location of bolt down holes varies among different manufacturers.

Refer to Standard Specification 9-05.15(2) for additional requirements.
NOTES

1. When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

2. Alternative reinforcing designs are acceptable in lieu of the rib design.

3. Refer to Standard Specification 9-05.15 for additional requirements.

4. For frame details, see Standard Plan B-30.10.

BOLT-DOWN SLOT DETAIL

SEE NOTE 1

When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

Alternative reinforcing designs are acceptable in lieu of the rib design.

Refer to Standard Specification 9-05.15 for additional requirements.

For frame details, see Standard Plan B-30.10.

NOTES

1. When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

2. Alternative reinforcing designs are acceptable in lieu of the rib design.

3. Refer to Standard Specification 9-05.15 for additional requirements.

4. For frame details, see Standard Plan B-30.10.

BOLT-DOWN SLOT DETAIL

SEE NOTE 1

When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

Alternative reinforcing designs are acceptable in lieu of the rib design.

Refer to Standard Specification 9-05.15 for additional requirements.

For frame details, see Standard Plan B-30.10.

NOTES

1. When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

2. Alternative reinforcing designs are acceptable in lieu of the rib design.

3. Refer to Standard Specification 9-05.15 for additional requirements.

4. For frame details, see Standard Plan B-30.10.

BOLT-DOWN SLOT DETAIL

SEE NOTE 1

When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

Alternative reinforcing designs are acceptable in lieu of the rib design.

Refer to Standard Specification 9-05.15 for additional requirements.

For frame details, see Standard Plan B-30.10.
NOTES

1. When bolt-down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

2. Refer to Standard Specification 9-05.15(2) for additional requirements.

3. For Frame details, see Standard Plan B-30.10.

When bolt-down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers. Refer to Standard Specification 9-05.15(2) for additional requirements. For Frame details, see Standard Plan B-30.10.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. When bolt-down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

2. Refer to Standard Specification 0-06-1625 for additional requirements.

3. For frame details, see Standard Plan B-30.40.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:

1. When bolt-down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

2. Refer to Standard Specification 0-06 (62) for additional requirements.

3. For frame details, see Standard Plan B-30.40.

4. The thickness of the grate shall not exceed 1 1/8".

When bolt-down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

Refer to Standard Specification 0-06 (62) for additional requirements.

For frame details, see Standard Plan B-30.40.

The thickness of the grate shall not exceed 1 1/8".
The gasket and groove may be in the seat (frame) or in the underside of the cover. The gasket may be "T" shaped in section. The groove may be cast or machined.

2. For bolt-down manhole ring and covers that are not designated "Watertight", the neoprene gasket, groove and washer are not required.

3. Washer shall be neoprene (Detail "B").

4. In lieu of blind pick notch for storm sewer manhole covers, drill three 1" diameter holes at 120° spacing.

5. Proprietary manhole covers without bottom ribs are acceptable.

6. For clarity, the vertical scale of the Cover Section has been exaggerated, it is 1.5 times the horizontal scale (1H:1.5V).

The gasket and groove may be in the seat (frame) or in the underside of the cover. The gasket may be "T" shaped in section. The groove may be cast or machined.

2. For bolt-down manhole ring and covers that are not designated "Watertight", the neoprene gasket, groove and washer are not required.

3. Washer shall be neoprene (Detail "B").

4. In lieu of blind pick notch for storm sewer manhole covers, drill three 1" diameter holes at 120° spacing.

5. Proprietary manhole covers without bottom ribs are acceptable.

6. For clarity, the vertical scale of the Cover Section has been exaggerated, it is 1.5 times the horizontal scale (1H:1.5V).
NOTES

1. For use with Circular Frames (rings) detailed in Standard Plan B-30.70.

2. Slotted Manhole Covers are intended for use with Drywells only. See Standard Plans B-30.80 and B-20.60.

CIRCULAR GRATE

For use with Circular Frames (rings) detailed in Standard Plan B-30.70. Slotted Manhole Covers are intended for use with Drywells only. See Standard Plans B-30.80 and B-20.60.
As an acceptable alternative to rebar, wire mesh having a minimum area of 0.12 square inches per foot may be used for adjustment sections.
NOTES:
1. The Steel Angles shall be set so that each bearing bar of prefabricated grate shall have full bearing on both ends. The finished top of concrete shall be even with the grate surface.
2. All exposed concrete shall be finished with a 1/2" radius.
3. The grade line of the top inside of any pipe shall enter no lower than the grade line of the top inside of the outlet pipe.
4. Pipes may enter through the knockouts on any side at any reasonable angle, provided the outside of the pipe can be contained between two opposite walls.

The Steel Angles shall be set so that each bearing bar of prefabricated grate shall have full bearing on both ends. The finished top of concrete shall be even with the grate surface. All exposed concrete shall be finished with a 1/2" radius. The grade line of the top inside of any pipe shall enter no lower than the grade line of the top inside of the outlet pipe. Pipes may enter through the knockouts on any side at any reasonable angle, provided the outside of the pipe can be contained between two opposite walls. See contract for type of grate specified. See Standard Plan B-40.20 and B-40.40 for grate details.
**PIPE ALLOWANCES**

<table>
<thead>
<tr>
<th>PIPE MATERIAL</th>
<th>MAXIMUM INSIDE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>REINFORCED OR PLAIN CONCRETE</td>
<td>18&quot;</td>
</tr>
<tr>
<td>ALL METAL PIPE</td>
<td>21&quot;</td>
</tr>
<tr>
<td>CPSSP #4 (STD. SPEC. D-4126)</td>
<td>18&quot;</td>
</tr>
<tr>
<td>SOLID WALL PVC (STD. SPEC. P-4400 A(1))</td>
<td>21&quot;</td>
</tr>
<tr>
<td>PROFILE WALL PVC (STD. SPEC. P-4400 C(2))</td>
<td>21&quot;</td>
</tr>
</tbody>
</table>

# CORRUGATED POLYETHYLENE STORM SEWER PIPE

**SECTION A**
- ONE PIECE BASE
- PICKUP HOLE (TYP.)
  - 26" MIN.

**SECTION B**
- ONE PIECE BASE
- PICKUP HOLE (TYP.)
  - 26" MIN.

**NOTES:**
- THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

**DRAWN BY:** ADAM COCHRAN

**EXPIRES JULY 1, 2007**

**STANDARD PLAN B-35.40-09**

**ONE PIECE BASE**

**TWO PIECE BASE**

**TOP VIEW**
- 10' - 6" MAX.

**UNIT "H"**
- 4" MIN.

**UNIT "J" & "K" AS REQUIRED**
- 4" MIN.

**UNIT "H"**
- 2 1/2" MIN.

**UNIT "H"**
- 3 SPACES @ APPROX. 11"
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

1. The Steel Angles shall be set so that each bearing bar of prefabricated grate shall have full bearing on both ends. The finished top of concrete shall be even with the grate surface.

2. Top of inlet grate shall be placed at ground level to present an unobstructed ditch or median section.

3. All exposed concrete edges shall be finished with a 1/2" radius.

4. Pipes may enter through the knockouts on any side at any reasonable angle, provided the outside of the pipe can be contained between two opposite walls.

5. The flow line of the outlet pipe shall be 18" minimum above the inside bottom of the inlet structure.

6. The grade line of the top inside of any inlet pipe shall enter no lower than the grade line of the top inside of the outlet pipe.

7. Unit "H" and optional extension units "J" and "K" shall be grouted in place to the satisfaction of the Engineer.

8. All pickup holes shall be grouted full after the basin has been placed.


GRATE INLET TYPE 2

STANDARD PLAN B-35.40-00

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

DATE

STATE DESIGN ENGINEER

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

Harold J. Peterfeso 06-08-06
WELDED GRATES
FOR GRATE INLET

STANDARD PLAN B-40.20-00

DREW BY: MARK SUJKA

APPROVED FOR PUBLICATION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STANDARD PLAN B-40.20-00

DRAWN BY: MARK SUJKA

ELEVEN EQUAL SPACES

1 3/8"

3/16"

TEN EQUAL SPACES

24 1/8"

46 3/4"

GRATE "A"

(TOP)

(SIDE)

(END)

3/16"

3 1/2" × 3/8" STEEL PLATE (TYP.)

(CROSS BARS ~ 3/8" ROUND, OR RECTANGULAR OR HEXAGONAL BAR OF EQUIVALENT AREA.)

(APPROXIMATE WEIGHT 215 LBS)

GRATE "B"

(TOP)

(SIDE)

(END)

3/16"

3 1/2" × 3/4" STEEL PLATES

(CROSS BARS ~ 3/8" ROUND, OR RECTANGULAR OR HEXAGONAL BAR OF EQUIVALENT AREA.)

(APPROXIMATE WEIGHT 215 LBS)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

EXPIRES JULY 1, 2007
NOTES

1. The Contract may specify a rotated inlet installation. Orient the Grates in the Frame so they intercept flow.

2. When bolt-down grates are specified in the Contract, provide two slots in the grate that are centered with the holes in the Frame. Location of bolt-down slots varies among different manufacturers.

3. Refer to Standard Specification 9-05.15(2) for additional requirements.

FRAME AND DUAL VANED GRATES FOR GRATE INLET
STANDARD PLAN B-40.40-00

Harold J. Peterfeso 06-01-06
Washington State Department of Transportation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. The top of the inlet shall be placed at ground level to present an unobstructed ditch or median section.
2. Bevel or round exposed concrete edges 1/2".
3. Pipes may enter through the knockouts at any reasonable angle provided the outside of the pipe can be contained within the knockout provided.
4. The grade line of the lowest inlet pipe shall enter the structure at an elevation equal to or higher than the grade line of the outlet pipe.
5. All pickup holes shall be grouted full after the inlet has been placed.
6. The steel angles shall be set so that each bearing bar of the grate shall have full seating on both ends. The finished top of concrete shall be even with the grate surface. For grates, see Standard Plan B-50-20.
7. The amount, type, and grade of reinforcing steel is the responsibility of the manufacturer.
8. The inside wall taper for form removal shall not result in any wall section thinner than 6" except in pipe knockout areas.
9. Precast inlets shall be marked with the manufacturer's identification on the inside of the structure in some readily accessible location.

SECTION ON DITCH LINE
DIKE INSTALLATION FOR PREFERRED SLOPE

GRATE SUPPORT DETAIL
(FOUR SUPPORTS REQUIRED)

DROP INLET TYPE 1
STANDARD PLAN B-46.20-00

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. The top of the inlet shall be placed at ground level to present an unobstructed ditch or median section.
2. Bevel or round exposed concrete edges 1/2".
3. Pipes may enter through the knockouts at any reasonable angle provided the outside of the pipe can be contained within the knockout provided.
4. The grade line of the lowest inlet pipe shall enter the structure at an elevation equal to or higher than the grade line of the outlet pipe.
5. All pickup holes shall be grouted full after the inlet has been placed.
6. The steel angles shall be set so that each bearing bar of the grate shall have full seating on both ends. The finished top of concrete shall be even with the grate surface. For grates, see Standard Plan B-50.22.
7. The amount, type, and grade of reinforcing steel is the responsibility of the manufacturer.
8. The inside wall taper for form removal shall not result in any wall section thinner than 6" except in pipe knockout areas.
9. Precast inlets shall be marked with the manufacturer's identification on the inside of the structure in some readily accessible location.

The top of the inlet shall be placed at ground level to present an unobstructed ditch or median section. Bevel or round exposed concrete edges 1/2". Pipes may enter through the knockouts at any reasonable angle provided the outside of the pipe can be contained within the knockout provided. The grade line of the lowest inlet pipe shall enter the structure at an elevation equal to or higher than the grade line of the outlet pipe. All pickup holes shall be grouted full after the inlet has been placed. The steel angles shall be set so that each bearing bar of the grate shall have full seating on both ends. The finished top of concrete shall be even with the grate surface. For grates, see Standard Plan B-50.22. The amount, type, and grade of reinforcing steel is the responsibility of the manufacturer. The inside wall taper for form removal shall not result in any wall section thinner than 6" except in pipe knockout areas. Precast inlets shall be marked with the manufacturer's identification on the inside of the structure in some readily accessible location.
Grates for drop inlet

Standard Plan B-50.20-00

Sheet 1 of 1 Sheet

Approved for Publication

Harold J. Peterfeso 06-01-06

Washington State Department of Transportation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
CONCRETE AND DUCTILE IRON PIPE

TRENCH WIDTH (SEE NOTE 3)

GRAVEL BACKFILL FOR PIPE ZONE BACKFILL (SEE NOTE 1)

FOUNDATION LEVEL

THERMOPLASTIC PIPE

TRENCH WIDTH (SEE NOTE 3)

GRAVEL BACKFILL FOR PIPE ZONE BEDDING (SEE NOTE 2)

FOUNDATION LEVEL

METAL PIPE

TRENCH WIDTH (SEE NOTE 3)

GRAVEL BACKFILL FOR PIPE ZONE BEDDING (SEE NOTE 2)

FOUNDATION LEVEL

NOTES

1. See Standard Specifications Section 7-08.3(3) for Pipe Zone Backfill.
2. See Standard Specifications Section 9-03.12(3) for Gravel Backfill for Pipe Zone Bedding.
4. For sanitary sewer installation, concrete pipe shall be bedded to spring line.

PIPE ZONE BEDDING AND BACKFILL
STANDARD PLAN B-55.30-09

CLEARANCE BETWEEN PIPES FOR MULTIPLE INSTALLATIONS

<table>
<thead>
<tr>
<th>PIPE</th>
<th>SIZE</th>
<th>MINIMUM DISTANCE BETWEEN BARRELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIRCULAR PIPE</td>
<td>12&quot; to 24&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td></td>
<td>30&quot; to 99&quot;</td>
<td>DIA. 12</td>
</tr>
<tr>
<td></td>
<td>102&quot; to 180&quot;</td>
<td>48&quot;</td>
</tr>
<tr>
<td>PIPE ARCH (SPAN)</td>
<td>18&quot; to 36&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>METAL ONLY</td>
<td>48&quot; to 142&quot;</td>
<td>SPAN 33</td>
</tr>
<tr>
<td></td>
<td>148&quot; to 302&quot;</td>
<td>48&quot;</td>
</tr>
</tbody>
</table>

Harold J. Peterfeso
06-01-06
1. The Concrete Collar width shall be one half of the outside pipe diameter of the largest pipe. The minimum Concrete Collar width shall be 12". Concrete Collars may be used with all pipe materials and diameters. The Concrete Collar option shall only be used to extend existing pipes.

2. Steel Welded Wire Fabric shall be in accordance with Standard Specification 9-07.7. Install two wraps for size 6 × 6 W1.4 × W1.4 (10 Gage) Steel Welded Wire Fabric or one wrap for any of the following sizes:
   - 6 × 6 W2.1 × W2.1 (8 Gage)
   - 6 × 6 W2.9 × W2.9 (6 Gage)
   - 4 × 4 W2.9 × W2.9 (6 Gage)
   - 4 × 4 W4.0 × W4.0 (4 Gage)

3. When a Coupling Band connection requires attachment to the bell end of a concrete pipe, the bell end of the pipe shall be removed before the connection is installed.

4. Increase the outside diameter of the metal pipe to match the outside diameter of the concrete pipe by installing 12" wide rubber gaskets, thickness as required (Coupling Band only). The rubber gaskets shall be in accordance with Standard Specification 9-04.4(3).

5. Use a flat Type K Coupling Band. Type K Coupling Bands with dimples are not allowed for the installation detail shown. The Coupling Band option shall only be used for extending existing pipes that have an inside diameter of 36" or less.
NOTES
1. Span and rise dimensions are nominal and are measured to the inside crests of corrugations.
2. Allowable heights of cover shall be within the limits indicated in the table included herein. 
Minimums and maximums are shown.
3. Unless indicated otherwise a 10" depth (over the inside crests of corrugations) of earth shall 
be placed in the invert of the Structural Plate Underpass, Design 1, for its full width and length. 
The earth shall consist of naturally occurring materials available in the vicinity of the structural 
plate underpass installation. See Standard Specification 7-03.3(4).
4. Designed for H-20 live load and maximum allowable soil pressure of 8 kips per square foot.

<table>
<thead>
<tr>
<th>SPAN</th>
<th>RISE</th>
<th>ALLOWABLE HEIGHTS OF COVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'-8&quot;</td>
<td>7'-1&quot;</td>
<td>MIN</td>
</tr>
<tr>
<td>6'-10&quot;</td>
<td>9'-2&quot;</td>
<td>4</td>
</tr>
</tbody>
</table>

INVERT TREATMENT
- SEE NOTE 3
SIDE VIEW - PLACEMENT

MIN. EMBANKMENT SLOPE
MITER PARALLEL TO

INVERT TREATMENT
- SEE NOTES
LENGTH IN A MULTIPLE OF 2

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY 
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON 
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANS-
PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso 06-01-06

ANIMAL/PEDESTRIAN 
UNDERPAS 
STANDARD PLAN B-65.20-00
SHEET 1 OF 1 SHEET
APPROVED FOR PUBLICATION
Washington State Department of Transportation
END SECTION LENGTH SHALL BE AT LEAST SIX TIMES THE DIAMETER OF THE PIPE (SEE STD. SPEC. 7-02.3(1))

1. The culvert ends shall be beveled to match the embankment or ditch slope and shall not be beveled flatter than 4H:1V. When slopes are between 4H:1V and 6H:1V, shape the slope in the vicinity of the culvert end to ensure that no part of the culvert protrudes more than 4" above the ground line.

2. Field cutting of culvert ends is permitted when approved by the Engineer. All field-cut culvert pipe shall be treated with treatment as shown in the Standard Specifications or General Special Provisions.

For culverts 30" diameter or less

THERMOPLASTIC PIPE

CONCRETE PIPE

METAL PIPE

END SECTION LENGTH SHALL BE AT LEAST SIX TIMES THE DIAMETER OF THE PIPE (SEE STD. SPEC. 7-02.3(1))

BEVELED END SECTIONS

STANDARD PLAN B-70.20-00

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso 06-01-06
1. Sockets shall be 3" extra long steel pipe (3 1/2" O.D.). Sockets must be the proper angle and height so that safety bars are parallel with headwall and side slopes, and are easily removable.

2. Safety Bars shall be 4" extra long steel pipe (4 1/2" O.D.) or 4 1/2" O.D. (3/8" wall thickness) steel tubing. Length (30' maximum) shall be the minimum required to submerge anchors. Placement in full depth concrete. When multiple bases are required (see table) place bars at equal spacing (30' apart).

3. Barel culvert pipe to match side slopes.

4. Resin bonded anchors shall be 2" in length (5" embedment).

5. Centerline of headwall shall be normal to roadway centerline.
NOTES
1. D = Inside Diameter of Culvert Pipe, or Pipe Arch Span Width, 36" minimum.
2. The distance between the safety bars, and between the top bar and the culvert crown, shall be equal spaces of no more than 24". The distance may vary 35/64" between bars to facilitate placement.
3. Slope shall match Side Slope; 6H:1V preferred, not steeper than 4H:1V.

STANDARD PLAN B-75.60-00
APPROVED FOR PUBLICATION

DATE

STATE DESIGN ENGINEER
Washington State Department of Transportation

TYPE 2 SAFETY BARS FOR CULVERT PIPE OR PIPE ARCH (ON CROSS ROAD)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Petersen 06-08-06

EXPIRES JULY 1, 2007
THE METAL END SECTIONS FOR CIRCULAR PIPES

<table>
<thead>
<tr>
<th>PIPE ARCH DIAM (IN.)</th>
<th>PIPE ARCH DIAM (IN.)</th>
<th>MINIMUM THICKNESS</th>
<th>DIMENSIONS (IN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>.064</td>
<td>36</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>.064</td>
<td>42</td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>.064</td>
<td>48</td>
</tr>
<tr>
<td>24</td>
<td>24</td>
<td>.064</td>
<td>57</td>
</tr>
<tr>
<td>27</td>
<td>27</td>
<td>.064</td>
<td>64</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>.064</td>
<td>72</td>
</tr>
<tr>
<td>33</td>
<td>33</td>
<td>.064</td>
<td>80</td>
</tr>
<tr>
<td>36</td>
<td>36</td>
<td>.064</td>
<td>89</td>
</tr>
<tr>
<td>39</td>
<td>39</td>
<td>.064</td>
<td>98</td>
</tr>
<tr>
<td>42</td>
<td>42</td>
<td>.064</td>
<td>109</td>
</tr>
<tr>
<td>45</td>
<td>45</td>
<td>.064</td>
<td>118</td>
</tr>
<tr>
<td>48</td>
<td>48</td>
<td>.064</td>
<td>128</td>
</tr>
<tr>
<td>51</td>
<td>51</td>
<td>.064</td>
<td>138</td>
</tr>
<tr>
<td>54</td>
<td>54</td>
<td>.064</td>
<td>148</td>
</tr>
<tr>
<td>57</td>
<td>57</td>
<td>.064</td>
<td>158</td>
</tr>
</tbody>
</table>

THE METAL END SECTIONS FOR ARCHED PIPES

<table>
<thead>
<tr>
<th>PIPE ARCH DIMENSIONS</th>
<th>MINIMUM THICKNESS</th>
<th>DIMENSIONS (IN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>.109</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>.109</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>.109</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>.109</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>.109</td>
</tr>
<tr>
<td>22</td>
<td>22</td>
<td>.109</td>
</tr>
<tr>
<td>24</td>
<td>24</td>
<td>.109</td>
</tr>
<tr>
<td>26</td>
<td>26</td>
<td>.109</td>
</tr>
<tr>
<td>28</td>
<td>28</td>
<td>.109</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>.109</td>
</tr>
<tr>
<td>32</td>
<td>32</td>
<td>.109</td>
</tr>
<tr>
<td>34</td>
<td>34</td>
<td>.109</td>
</tr>
<tr>
<td>36</td>
<td>36</td>
<td>.109</td>
</tr>
<tr>
<td>38</td>
<td>38</td>
<td>.109</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>.109</td>
</tr>
<tr>
<td>42</td>
<td>42</td>
<td>.109</td>
</tr>
<tr>
<td>44</td>
<td>44</td>
<td>.109</td>
</tr>
<tr>
<td>46</td>
<td>46</td>
<td>.109</td>
</tr>
<tr>
<td>48</td>
<td>48</td>
<td>.109</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>.109</td>
</tr>
<tr>
<td>52</td>
<td>52</td>
<td>.109</td>
</tr>
</tbody>
</table>

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Residential Storm Drain, Under Sidewalk

Standard Plan B-22.20-09

CONCRETE CURB — TYPE MAY VARY

ROADWAY

PLANTING STRIP

CONCRETE SIDEWALK

PLAIN JOINT

WIRE MESH REINFORCEMENT
4 x 4 WALL, 10 x 10 WALL, 4 GAGE 36 IN. SQUARE, 6-9 IN. ARMS, 1/2" MINIMUM COVER

INVERT OF DRAIN SHALL BE AT OR ABOVE GUTTER LINE

REINFORCEMENT NOT SHOWN

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso 06-01-06
1. Install sewer saddle with gasket and stainless steel clamps for connection to existing sewers. Install wye or tee sewer fitting with gaskets for new sewer installations.

2. Mark location of sewer stub in accordance with Contracting Agency requirements.
45° BEND

4" OR 6" SEWER PIPE
(SEE CONTRACT)

24" x 24" x 24" CONCRETE BLOCK
OR CONTROLLED DENSITY FILL

STANDING SIDE SEWER
CONNECTION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANS-
PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

STANDARD PLAN B-85.30-00

FOR SANITARY SEWER USE
DROP CONNECTIONS

STANDARD PLAN 0-85-00-01

FOR SANITARY SEWER USE

DUCTILE IRON DROP CONNECTION

CONCRETE ENGAGE DROP CONNECTION

TYPICAL MANHOLE

MORTIER DAM OR PLUG AS REQUIRED BY ENGINEER

All pipes, except ductile iron pipes, shall be concrete encased.

Mortar Fill With Compacted Material As Directed By Engineer

Flexible Joint

Commercial Concrete Block – Poured In Place

D.J.P. 6" Blind Clearance 2"
NOTES
1. Steel tie rods to be heavily coated with asphalt after installation.
2. Restrained joints may be substituted for tie rods.
3. Surface of ground within 36" of hydrant shall be smooth.

Steel tie rods to be heavily coated with asphalt after installation. Restrained joints may be substituted for tie rods. Surface of ground within 36" of hydrant shall be smooth.
NOTES
1. Coat the pipe threads with asphalt after assembly.
2. All piping shall be galvanized steel.
3. Valve and piping to valve shall be 2" unless otherwise noted in the Contract.
4. Locate blowoff outlet near property corner if possible.

Coat the pipe threads with asphalt after assembly.
All piping shall be galvanized steel.
Valve and piping to valve shall be 2" unless otherwise noted in the Contract.
Locate blowoff outlet near property corner if possible.

2 INCH BLOWOFF ASSEMBLY
STANDARD PLAN B-99.22-00
Sheet 1 of 1 Sheet

Harold J. Peterson 06-08-06
Washington State Department of Transportation
The size of the combination air release / air vacuum valve shall be specified in the Contract. The piping and valves shall be the same size as the combination air release / air vacuum valve.

2. Locate at the high point of the main, tap top of main.
NOTES
1. Contractor to provide blocking adequate to withstand full test pressure.
2. Divide thrust by safe bearing load to determine required area (in square
feet) of concrete to distribute load.
3. Areas to be adjusted for other pressure conditions.
4. Provide two 1" minimum diameter rods on valves up through 10" diameter.
   Valves larger than 10" require special tie rod design.

CONCRETE THRUST BLOCK

Contractor to provide blocking adequate to withstand full test pressure.
Divide thrust by safe bearing load to determine required area (in square
feet) of concrete to distribute load. Areas to be adjusted for other pressure conditions.
Provide two 1" minimum diameter rods on valves up through 10" diameter. Valves larger than 10" require special tie rod design.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>TEST PRESSURE (PSI)</th>
<th>THRUST AT FITTINGS IN POUNDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>3,140</td>
<td>2,486</td>
</tr>
<tr>
<td>6&quot;</td>
<td>7,070</td>
<td>2,780</td>
</tr>
<tr>
<td>8&quot;</td>
<td>12,565</td>
<td>4,000</td>
</tr>
<tr>
<td>10&quot;</td>
<td>19,635</td>
<td>7,080</td>
</tr>
<tr>
<td>12&quot;</td>
<td>28,275</td>
<td>12,565</td>
</tr>
<tr>
<td>14&quot;</td>
<td>38,485</td>
<td>19,635</td>
</tr>
<tr>
<td>16&quot;</td>
<td>50,265</td>
<td>28,275</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOIL TYPE</th>
<th>SAFE BEARING LOAD (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUCK, PEAT, ETC.</td>
<td>0</td>
</tr>
<tr>
<td>SOFT CLAY</td>
<td>1,000</td>
</tr>
<tr>
<td>SAND</td>
<td>2,000</td>
</tr>
<tr>
<td>SAND AND GRAVEL</td>
<td>3,000</td>
</tr>
<tr>
<td>SAND AND GRAVEL CEMENTED WITH CLAY</td>
<td>4,000</td>
</tr>
<tr>
<td>HARD SHALE</td>
<td>10,000</td>
</tr>
</tbody>
</table>
Concrete thrust block for convex vertical bends

**Dimension Table**

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Test Pressure (PSI)</th>
<th>Bend Angle (°)</th>
<th>Concrete Volume (cF)</th>
<th>Cure Size (°)</th>
<th>Tie Rod Dia. (⁰)</th>
<th>Tie Rod Embedment</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>0</td>
<td>1.8</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>22.5°</td>
<td>12</td>
<td>2.3</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>45°</td>
<td>23</td>
<td>2.8</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>14</td>
<td>2.4</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>22.5°</td>
<td>57</td>
<td>3.0</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>45°</td>
<td>60</td>
<td>3.7</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>26</td>
<td>2.9</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>22.5°</td>
<td>46</td>
<td>3.6</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>45°</td>
<td>80</td>
<td>4.6</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>38</td>
<td>3.4</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>22.5°</td>
<td>76</td>
<td>4.2</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>45°</td>
<td>150</td>
<td>5.2</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>86</td>
<td>3.8</td>
<td>7/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>22.5°</td>
<td>126</td>
<td>4.8</td>
<td>7/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>45°</td>
<td>200</td>
<td>5.8</td>
<td>7/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>78</td>
<td>4.2</td>
<td>7/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>22.5°</td>
<td>147</td>
<td>5.4</td>
<td>7/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>45°</td>
<td>272</td>
<td>6.6</td>
<td>7/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>96</td>
<td>4.6</td>
<td>7/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>22.5°</td>
<td>182</td>
<td>5.8</td>
<td>7/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>45°</td>
<td>365</td>
<td>7.1</td>
<td>1 1/8&quot;</td>
<td>17&quot;</td>
</tr>
</tbody>
</table>

NOTE:
- Steel tie rods to be heavily coated with asphalt after installation.
- Concrete thrust block for convex vertical bends.
- Standard Plan B-90.50-00

**Diagram**
- Blocking for 11.25° or 22.5° vertical bends
- Blocking for 45° vertical bends
- Two tie rods with turnbuckles
- Four tie rods with turnbuckles

**Expiry Date:** July 1, 2007

**Approval:**
- Harold J. Petersen
- 06-08-06
INLET PLACEMENT AT BRIDGE END

NOTES
1. The beam guardrail type, post type, beam guardrail transition section, connection type, and bridge traffic barrier may vary from that shown on this plan.
2. The Catch Basin or Grate Inlet shall be centered between the Beam Guardrail Posts.
3. With Beam Guardrail Transition Section Types 2, 4, and 5, use Extruded Curb Types 1, 2, 4, 4a, 5, or 5a.
4. With Beam Guardrail Transition Section Types 1, 1A, 1B, 10, 11, and 12, use Extruded Curb Type 2 (Extruded Asphalt Concrete Curb).
5. See Contract Plans for length of Curb.
NOTES

1. When required by the Contract, a Gear Load Post Washer shall be used on the backside of the post (on one of the 1 3/4" Post Bolt Heads) and a Snow Load Rail Washer shall be placed on the face side of Gear Guards Type 1 and 2. Snow Load Rail Washers shall not be installed on terminals.

2. Rail Washers, also called "Snow Load Rail Washers" are not required on new installation except as required in Note 1. Unnecessary Rail Washers must not be removed from existing installations, except those on posts 2 through 8 of a SCT installation shall be removed.

3. Beam Guardrail post spacing for Types 1 through 4 shall be 9" - 9' on centers.

4. Timber blocks shall be toe-nailed to the post with a 16d galvanized nail to prevent block rotation.

5. For post and block details, see Standard Plan C-1b.

6. When "Beam Guardrail Type 1 - 1 3/8" Long Post" is specified in the Contract, the post length shall be stamped with numbers, 1 3/8" high, and 1 1/2" deep, at the location where the letter "L" is shown in the ASSEMBLY DETAIL. After installing the post, it shall be the Contractor's responsibility to ensure that the stamped numbers are still legible and 1 1/2" deep.

7. Existing posts shall not be removed. Replace posts as necessary to achieve required guardrail height.
### Beam Guardrail Posts and Blocks

**Standard Plan C-1b**

#### Beam Guardrail

<table>
<thead>
<tr>
<th>Guardrail Type</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 through 4</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>10 or 11</td>
<td>6'-6&quot;</td>
</tr>
</tbody>
</table>

#### Wood Post

- **W-Beam**: Alternate holes
- **W-Behm**: See Table
- **W6x9**: 1 1/8" for W6x9
- **W6x15**: 1 3/4" for W6x15

#### Steel Post

- **W-Beam**: See Notes 3 and 4
- **W6x9**: 3/4" DIA holes (TYP)
- **W6x15**: 3/4" DIA holes (TYP)

#### Wood Block

- **W-Beam Wood Block for Wood Post**: See Table and Note 6
- **W-Beam Wood Block for Steel Post**: See Notes 2

#### Steel Block

- **Thrie Beam Wood Block for Wood Post**: See Note 6
- **Thrie Beam Wood Block for Steel Post**: See Note 6

**Note**: This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
1. Wood posts for all guardrail placement plans shall be 6x8 except where noted otherwise.

2. Lower hole is for rub rail of Type 2 and Type 3 Beam Guardrail.

3. 6x6 posts and timber blocks are alternates for 6x8 timber posts and blocks. 6x6 posts and timber blocks are alternates for 10x10 timber posts and blocks.

4. Holes shall be located on approaching traffic side of web.

5. When contract requires "Beam Guardrail Type 1, ___ Foot Long Post," the steel post length shall be marked with numbers to ensure permanent identification at the location where the letter "H" is shown on the detail. The marking shall be 1 1/2" MIN height.

6. Soil plate may be welded to foundation tube. If so, holes in soil plate and foundation tube may be omitted.
NOTES
1. For post details see Standard Plan, "Beam Guardrail Posts and Blocks".

DETAIL A

DETAIL B

TYPE 20

TYPE 21

2'-3" 2'-8"

1/2" DIA x 1 1/2" Hex head bolt with hex nut and 1 3/4" square x .135" washer

1/2" DIA x 1 1/2" Hex head bolt with hex nut. Guardrail rests on top of bolt.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Donald K. Nelson
THRIE BEAM GUARDRAIL REDUCER SECTION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

THRIE BEAM GUARDRAIL REDUCER SECTION

TYPE A

型 A (左图所示，右图逆向)

INTERMEDIATE GUARDRAIL POST CONNECTION DETAILS

1. For wood posts, saw top of post and block to 1" above thrie beam guardrail reducer section. For steel posts, drive post down to 1" maximum above the thrie beam guardrail reducer section.

NOTES

1. See Note 1

Harold J. Peterfeso
10-31-03

ADDED 10 GAGE STEEL DESIGNATION; REV. NOTE 1

NOTES

1. For wood posts, saw top of post and block to 1" above thrie beam guardrail reducer section. For steel posts, drive post down to 1" maximum above the thrie beam guardrail reducer section.
1. Type 4 anchor required. For details, see Standard Plan C-6a.

2. Post spacing is 6'-3" unless otherwise shown.

3. For Terminal type and details, see Contract Plan and applicable Standard Plan(s).

4. The slope from the edge of the shoulder into the face of the guardrail should not exceed 10:1 when the face of the guardrail is less than 12'-0" from the edge of the shoulder.

5. For one-way traffic, use Type 4 anchor. For two-way traffic, use Type 1 anchor. See applicable Standard Plan(s) for details.

6. When Beam Guardrail Flared Terminals are used on both ends a minimum of 25'-0" of Beam Guardrail shall be installed.
For terminal type and details, see Contract and applicable
Standard Plan(s).

The slope from the edge of the shoulder into the face of the
guardrail should not be steeper than 10H:1V when the
guardrail is within 12'-0" from the edge of the shoulder.

See Contract for Beam Guardrail Transition Section type and
Connection to Bridge Traffic Barrier or Concrete Barrier.

**Flare Rate Table**

<table>
<thead>
<tr>
<th>Posted Speed (MPH)</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>15:1</td>
</tr>
<tr>
<td>60</td>
<td>14:1</td>
</tr>
<tr>
<td>55</td>
<td>13:1</td>
</tr>
<tr>
<td>50</td>
<td>12:1</td>
</tr>
<tr>
<td>45</td>
<td>11:1</td>
</tr>
<tr>
<td>40 or less</td>
<td>10:1</td>
</tr>
<tr>
<td>35</td>
<td>9:1</td>
</tr>
<tr>
<td>30</td>
<td>8:1</td>
</tr>
</tbody>
</table>

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANS-
PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Varying flare rates and structure widths may require a length of Beam Guardrail Type 1 or 2 between the Beam Guardrail Type 3 or 4 and the transition on one side, and the Beam Guardrail Type 10 on the other. For Beam Guardrail Type 2 or 3, terminate the rub rail (channel rail) at the last 6' - 3" post of the Beam Guardrail Transition Section Type 16, and by tapping it behind the second 6' - 3" post on the Beam Guardrail Type 10 side, or as approved by the Engineer.

2. Use the minimum number of nested 12' - 6" thrie beam sections needed to span the structure. This run may extend past the end of the structure, and an excess of 6' - 3" maximum is acceptable. If the last 12' - 6" section extends more than 6' - 3", but less than 12' - 6", use a nested 6' - 3" thrie beam section in its place.

3. The Beam Guardrail Transition Section Type 16 on this end shall terminate at a 10×10 post. Place nested 6×8 beam with 10×10 posts at 3' - 1 1/2" in place.

4. If full post depth cannot be achieved due to the structure foundation, post length shall be adjusted to the top of foundation. The Beam Guardrail Type 11 post length shall be 2' - 9".

Type 16 ~ Pay Limit (See Note 2)

Type 11 (Wood post and block shown)

Planned for publication

Harold J. Peterfeso

STATE DESIGN ENGINEER

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EXPIRES JULY 24, 2006

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

---

Note: 

- **One-Way Traffic**: 
- **Beam Guardrail**
- **Beam Guardrail Placement**
- **Plan View**
- **Detail**: 
  - 1: One-Way Traffic
  - 2: Normal Rail-Block-Post Attachment
  - 3: Top of Foundation
  - 4: Top of Roadway
  - 5: Beam Guardrail Transition Section
  - 6: Beam Guardrail Type 1 or 2
  - 7: Beam Guardrail Type 3 or 4
  - 8: Beam Guardrail Type 10
  - 9: Beam Guardrail Type 11
  - 10: Rub Rail (Channel Rail)
  - 11: Beam Guardrail Transition Section

---

**Flare Rate Table**

<table>
<thead>
<tr>
<th>POSTED SPEED</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 or Less</td>
<td>10 : 1</td>
</tr>
<tr>
<td>45</td>
<td>9 : 1</td>
</tr>
<tr>
<td>50</td>
<td>11 : 1</td>
</tr>
<tr>
<td>60</td>
<td>14 : 1</td>
</tr>
<tr>
<td>70</td>
<td>15 : 1</td>
</tr>
<tr>
<td>80</td>
<td>16 : 1</td>
</tr>
<tr>
<td>90</td>
<td>17 : 1</td>
</tr>
<tr>
<td>100</td>
<td>18 : 1</td>
</tr>
<tr>
<td>110</td>
<td>19 : 1</td>
</tr>
<tr>
<td>120</td>
<td>20 : 1</td>
</tr>
</tbody>
</table>

---

**Notes**

- **Note 1**: Pay Limit
- **Note 2**: Type 16 ~ Pay Limit
- **Note 3**: Type 16 ~ Pay Limit
- **Note 4**: See Note 4

---

**Case 6**

**Case 7**

**Case 8**
NOTE:
1. CASE 9A: Three Beam Guardrail is used when the distance from the end of the Bullnose Terminal to the beginning of the transition of the Bridge Rail is less than 100 feet.

THREE BEAM GUARDRAIL REDUCER SECTION TYPE B

THREE BEAM GUARDRAIL TERMINAL (DESIGN 2)

BEAM GUARDRAIL (W-BEAM)

THREE BEAM GUARDRAIL

REDUCER SECTION TYPE B

THREE BEAM GUARDRAIL

TRANSITION SECTION TYPE 1

THREE BEAM GUARDRAIL

REDUCER SECTION TYPE B

THREE BEAM GUARDRAIL

TRANSITION SECTION TYPE 1

THREE BEAM GUARDRAIL

REDUCER SECTION TYPE B

THREE BEAM GUARDRAIL

TRANSITION SECTION TYPE 1

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. SRT Terminal shown, for terminal type and details, see Contract or applicable Standard Plan(s).
2. Post spacing is 8'-0" except where noted.
3. Type 4 anchor required. See applicable Standard Plan(s).
4. The slope from the edge of the shoulder into the face of the guardrail should not exceed 10H:1V when the guardrail is within 12'-0" from the edge of the shoulder.

POST SPACING IS 8'-0"

SRT Terminal shown, for terminal type and details, see Contract or applicable Standard Plan(s).
**GUARDRAIL PLACEMENT**

**STANDARD PLAN C-2e**

**NOTES**

1. SRT Terminal shown. For terminal type and details see Contract and applicable Standard Plan(s).
2. Beam Guardrail Anchor Type 4 (W-Beam) or Type 4 (Thrie Beam) required.
3. The slope from the edge of the shoulder into the face of the guardrail should not exceed 10H:1V when the guardrail is within 12' - 0" from the edge of the shoulder.
4. If the distance from end of Beam Guardrail Type 11 to the structure exceeds 6' - 3" using 12' - 6" thrie beam sections, add a 6' - 3" nested section of thrie beam with 10×10 posts, spaced at 3' - 1 1/2" maximum, and begin transition.
5. Guardrail post spacing for Beam Guardrail Type 11 past the end of the structure shall be spaced at 6' - 3" maximum with 6×8 post and standard block.
6. Attach the standard wood block to the rail using two 5/8" × 4" lag bolts.

**CASE 11A**

- Beam Guardrail Placed Terminal - Pay Limit (see Note 1)
- Beam Guardrail, Type 1 - Pay Limit
- Beam Guardrail Transition

**CASE 11B**

- Beam Guardrail, Anchor Type 4
- Beam Guardrail Placed Terminal - Pay Limit (see Note 2)
- Beam Guardrail Placed Terminal - Pay Limit

**CASE 11C**

- Beam Guardrail Type 1 - Pay Limit
- Beam Guardrail Transition
- Beam Guardrail Placed Terminal - Pay Limit (see Note 5)

**REFERENCES**

- DRAWN BY: ELENA BRUNSTEIN
- SHEET 1 OF 1 SHEET
GUARDRAIL PLACEMENT
WEAK POST INTERSECTION DESIGN (8'-6" MAX RADIUS)

NOTES
1. See Contract for guardrail connection to bridge rail and concrete barrier.
2. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.
3. Attach to rail with 5/16" x 9" long bolt, nut and 11/2" washer on back of post.
4. For terminal type and details, see Contract and applicable Standard Plans.
5. Radius dimensions shall be etched into plate replacing the letters "HH", shown on the Identification Plate Detail. Digits shall be 1 1/2"MIN height and 3/4" MAX width. The plate shall be galvanized after etching.
6. The guardrail radius Identification Plate shall be mounted on the back side of the Rail Element using the lowest splice bolt at the P.C. of the guardrail radius.
7. First letter of case designation placement indicates end treatment on side road. Second letter indicates end treatment on main road. For instance, a Type 5 Anchor on the side road and a bridge connection on the main road would be Case 12 AC.
8. For the 8'-6" radius, five CRT posts are required including the CRT post at point B.
9. For CRT post details, see Standard Plan "Beam Guardrail Posts and Blocks".

IDENTIFICATION PLATE
MOUNTING DETAIL
(See Note 7)

CASE 12 _D
(See Note 7)

CASE 12 _C
(See Note 7)

CASE 12 _A
(See Note 8)

SECTION A-A

SCHERED P O I N T

IMPACT RESISTANCE PLATE
(See Note 51)

IDENTIFICATION PLATE
(See Note 7)

IMPACT RESISTANCE PLATE
(See Note 51)
NOTES
1. See Contract Plans for guardrail connection to bridge rail and concrete barrier.
2. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.
3. Fewer CRT posts are required for smaller radius; include CRT Post at Point B. Attach guardrail to post with a 5/16" x 9" long bolt, a 3/8" I.D. x 7 1/2" snug fitting insert, and a 1 1/2" washer with nut on back of post.
4. For terminal types and details, see Contract and applicable Standard Plan(s).
5. Radius dimensions shall be etched into plate replacing the letters "HH", shown on the GUARDRAIL RADIUS IDENTIFICATION PLATE DETAIL. Digits shall be 1 1/2" minimum height and 3/4" maximum width. Plate shall be galvanized after etching.
6. The guardrail radius Identification Plate shall be mounted on the back side of the rail element using the lowest splice bolt nearest the PC of the guardrail radius (See View A).
7. The first letter of the Case Designation indicates the end treatment on the side road. The second letter indicates the end treatment on the main road. For example, a Type 5 Anchor on the side road with a bridge connection on the main road would be Case 13 AC, the combination shown.
8. For CRT post details, see Standard Plan C-1b.

CASE 13 _A_
SEE NOTE 7

CASE 13 _B_
SEE NOTE 7

CASE 13 _C_
SEE NOTE 7

CASE 13 _D_
SEE NOTE 7

rai

1/4" STEEL PLATE
3/4" HOLE
2 3/4" MIN.
2 3/4" MIN.
3/4" HOLE
1 1/2" WASHER
NUT
CRT POST

GUARDRAIL RADIUS IDENTIFICATION PLATE DETAIL

SEE DETAIL

CRT POST

(SEE NOTES 3, 6 & 8)

3/8" I.D., 7 1/2" LONG

5/16" X 9" BOLT

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

DRAWN BY: MARK SUJKA

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
STANDARD PLAN C-2h

GUARDRAIL PLACEMENT

CASE 14

Direction of Traffic

See Note 3

See Note 3

See Note 1

CASE 14

G-2 Post (TYP) (see Note 4)

Type 20 Beam Guardrail

Thrie Beam Guardrail Reducer Section Type B

Type 6 Transition pay limit

Type 1 Beam Guardrail pay limit

0 Spaces MIN

0 Spaces MIN

NOTES

1. For Service Level 1, Weak Post Bridge Rail System, see Contract.

2. SRT Terminal shown. For Terminal type and details, see Contract and applicable Standard Plan(s).

3. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.

4. See Standard Plan "Beam Guardrail Posts and Blocks".
1. SRT Terminal shown. For Terminal Type and details, see Contract and applicable Standard Plans.

2. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.


NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**FLARE RATE TABLE**

<table>
<thead>
<tr>
<th>Note</th>
<th>Posted Speed (MPH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:1</td>
<td>70</td>
</tr>
<tr>
<td>14:1</td>
<td>60</td>
</tr>
<tr>
<td>12:1</td>
<td>55</td>
</tr>
<tr>
<td>11:1</td>
<td>50</td>
</tr>
<tr>
<td>10:1</td>
<td>45</td>
</tr>
<tr>
<td>9:1</td>
<td>40 or less</td>
</tr>
</tbody>
</table>

**NOTES**

1. Type 4 anchor required. For details, see applicable Standard Plan(s).
2. For terminal type and details, see contract and applicable Standard Plan(s).
3. Post spacing is 6'-3" except where noted.
4. For guardrail to bridge rail connection see applicable Standard Plan(s) or Contract.
5. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1 when the guardrail is within 12'-0" from the edge of the shoulder. Beyond 12'-0", the slope shall not be steeper than 6:1.

**GUARDRAIL PLACEMENT**

**STANDARD PLAN C-2j**

**APPROVED FOR PUBLICATION**

Clifford E. Mansfield
Deputy State Design Engineer

EXPIRES MAY 3, 2000
GUARDRAIL PLACEMENT
12'-6" SPAN
STANDARD PLAN C-2k

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

DRAWN BY: MARK SUJKA
CASE 20

ELEVATION

37'-6" NESTED W-BEAM

GROUND LINE

SINGLE W-BEAM RAIL ELEMENT

NESTED W-BEAM RAIL ELEMENT

SECTION A

SECTION B

GUARDRAIL PLACEMENT
18'-9" SPAN

STANDARD PLAN C-2n

DRAWN BY: MARK SUJKA

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. See Standard Plan C-1b for additional details.

2. One-way traffic layouts are identical to the two-way layout with the exception that only the posts trailing the span need to be CRT's with double blocks.

---

STANDARD PLAN C-2o

GUARDRAIL PLACEMENT
25' SPAN

CASE 21

DRAWN BY: MARK SUJKA

APPROVED FOR PUBLICATION

GUARDRAIL PLACEMENT
25' SPAN

STANDARD PLAN C-2o

CASE 21

DRAWN BY: MARK SUJKA

APPROVED FOR PUBLICATION

GUARDRAIL PLACEMENT
25' SPAN

STANDARD PLAN C-2o

CASE 21

DRAWN BY: MARK SUJKA

APPROVED FOR PUBLICATION

GUARDRAIL PLACEMENT
25' SPAN

STANDARD PLAN C-2o

CASE 21

DRAWN BY: MARK SUJKA

APPROVED FOR PUBLICATION

GUARDRAIL PLACEMENT
25' SPAN

STANDARD PLAN C-2o

CASE 21

DRAWN BY: MARK SUJKA

APPROVED FOR PUBLICATION
NOTES
1. See Contract for transition and connection type.
2. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.
3. Guardrail installation shall be Beam Guardrail Type 1 with standard post and block.
4. First letter of case designation indicates end treatment on side road. Second letter indicates end treatment on main road. For instance a terminal on the side road and a bridge connection on the main road would be Case 22 BC.
5. For terminal type and details, see Contract and applicable Standard Plan(s).
6. Radius dimensions shall be etched into plate replacing the letters “HH” shown on the Identification Plate Detail. Digits shall be 1 1/2" MIN height and 3/4" MAX width. Plate shall be galvanized after etching.
7. The guardrail Identification Plate shall be mounted at the lower splice bolt on the back side of the rail element at the PC of the guardrail radius.
NOTE

1. Install a Type 2 Extruded Asphalt Concrete Curb (see Standard Plan F-2b) at face of Guardrail.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
EIGHT SPACES @ 3' - 1 1/2" MAX.
TOTAL LENGTH = 25' - 0"

BEAM GUARDRAIL
PAY LIMIT

6' - 3" POST SPACING
G-2 POST (TYP.)
SEE STD. PLAN C-1b
6' - 0" LONG, 6×8 POST WITH STANDARD BLOCK

FIVE SPACES @ 3' - 1 1/2"
BEAM GUARDRAIL
PAY LIMIT

12' - 6" NESTED W BEAM (12 GAGE)

TYPE 2

1' - 3" MAX.
FOUR SPACES @ 3' - 1 1/2", TWO SPACES @ 2' - 1 1/2".
TOTAL LENGTH = 8' - 0"
TOTAL LENGTH = 8' - 3"

BEAM GUARDRAIL TRANSITION SECTION TYPE 5 ~ PAY LIMIT
6' - 0" LONG, 6×8 POST WITH STANDARD BLOCK (TYP.)

TYPE 4
FOR 45 MPH AND BELOW

SEE CONTRACT PLANS FOR SPECIFIED CONNECTION

SEE CONTRACT PLANS FOR SPECIFIED CONNECTION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.
A COPY MAY BE OBTAINED UPON REQUEST.
1. If the distance from the end of the bridge to the end of the thrie beam bridge rail section exceeds 6' – 3" using 12' – 6" thrie beam sections, add a 6' – 3" section of thrie beam bridge rail to reduce the length to less than 6’ – 3".

2. When thrie beam is installed at the face of the bridge curb, install a Type 2 Extruded Asphalt Concrete Curb (see Standard Plan F-2b) at face of Guardrail. Match the height of existing bridge curb with a 20:1 transition.

3. When thrie beam is installed at the face of rigid bridge rail, an HMA ramp is required from the roadway surface to the top of the bridge curb or sidewalk. The slope of the ramp shall be 20:1 or flatter.

Type 10 Approach End
Three Beam Installed at Face of Bridge Curb

Type 11 Trail End
Three Beam Installed at Face of Bridge Curb

Type 12 Trail End
Three Beam Installed at Face of Bridge Curb

Notes:
- THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. See Contract for the number of thrie beam sections for Beam Guardrail Type 11.
2. If the distance from the end of the Beam Guardrail Type 11 to the column/structure exceeds 5'-3" using 12'-6" thrie beam sections, add a 6'-3" nested section of thrie beam to reduce the distance in less than 6'-3".
3. Install a Type 2 Extruded Asphalt Concrete Curb (see Standard Plan F-2b) at face of Guardrail.
4. Attach the standard block to the rail using two 5/8" × 4" lag bolts.

See Contract for the number of thrie beam sections for Beam Guardrail Type 11.
If the distance from the end of the Beam Guardrail Type 11 to the column/structure exceeds 5'-3" using 12'-6" thrie beam sections, add a 6'-3" nested section of thrie beam to reduce the distance in less than 6'-3".
Install a Type 2 Extruded Asphalt Concrete Curb (see Standard Plan F-2b) at face of Guardrail.
Attach the standard block to the rail using two 5/8" × 4" lag bolts.
1. Unless otherwise indicated in the Contract, the SRT - 350 (12.5, 8 Post) as manufactured by Trinity Industries, Inc., or a FLEAT 350 as manufactured by Road Systems Inc., shall be installed per manufacturer's recommendations. If specified in the Contract, the FLEAT TL2 as manufactured by Road Systems, Inc. shall be installed per manufacturer's recommendations.

2. When terminal is placed on a curve, and post offsets would result in the rail encroaching onto the shoulder (e.g., the inside of a curve), the posts shall be installed so that the face of the rail is at the edge of the shoulder.

3. When snow load post washers and snow load rail washers are called for in the Contract, the snow load rail washers must be omitted within the terminal limits.

4. Offset distances:
   - FLEAT 350: 4'-0"
   - FLEAT TL2: 1'-8" minimum

Offset distances:
- 20H:1V SLOPE MAX. (RELATIVE TO GRADE)
- 6H:1V SLOPE MAX. (RELATIVE TO GRADE)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. An ET-PLUS (TL3) as manufactured by Trinity Industries, Inc. or an SKT-350 as manufactured by Road Systems Inc. shall be installed according to manufacturer's recommendations. When a TL2 terminal is specified in the contract an ET-PLUS (TL2) as manufactured by Trinity Industries, Inc. or an SKT-TL2 as manufactured by Road Systems, Inc. shall be installed according to manufacturer's recommendations.

2. A reflectorized object marker shall be installed according to manufacturer's recommendations.

3. When snow load post washers and snow load rail washers are required by the contract, the snow load rail washers must not be installed within the terminal limits.

4. Terminal shall be installed at a taper, ensuring that piece is entirely off shoulder.

5. Length for ET-PLUS (TL3) and SKT-350 is 50'. Length for ET-PLUS (TL2) and SKT-TL2 is 25'.

6. A reflectorized object marker shall be installed according to manufacturer's recommendations.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
SLOTTED THREE BEAM RAIL ELEMENT #1
SEE STD PLAN C-1a FOR RAIL ELEMENT DETAILS
(RAIL DIMENSIONS SHOWN ARE BEFORE BENDING TO RADIUS SHOWN IN PLAN)

SPLICE BOLT SLOT

SLOTTED THREE BEAM RAIL ELEMENT #2
SEE STD PLAN C-1a FOR RAIL ELEMENT DETAILS
(RAIL DIMENSIONS SHOWN ARE BEFORE BENDING TO RADIUS SHOWN IN PLAN)

SPLICE BOLT SLOT

SLOTTED THREE BEAM RAIL ELEMENT #3
SEE STD PLAN C-1a FOR RAIL ELEMENT DETAILS

SPLICE BOLT SLOT

POST BOLT SLOT

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
2. If the last guardrail post is 3" or less from the end of the bridge barrier, this attachment and blockout is not necessary.
3. This case is also applicable for F-shapes and vertical faces with no curve.
4. When B-connection is used with Type 1A Transition, the vertical spacing between bulb is 6" - 8".
5. See bridge plans for additional connection details.
NOTES

1. Anchor plate may be constructed from 1/4" plates welded to equal strength and dimensions as shown.

2. For end section details see Standard Plan "Beam Guardrail End Sections".

3. For post details, see Standard Plan "Beam Guardrail Posts and Blocks".

4. Eight 5/8" x 1 1/2" machine bolts with hex nut and washer. Place washer on face side of rail.

5. Outside nut shall be torqued against inside nut a minimum of 100 ft-lbs.

6. Toenail bearing plate with 10d nail at corners to prevent turning.

7. Anchor pay limit does not apply when anchor is included in a Beam Guardrail Terminal.
BEAR PLATE

3"

7/8 

11/16 

2" 

2"

B

B

1/4 

3"

35^

1 15/16 

-

1"

3/8 

5 1/16 

Swage

6'-6"

ELEVATION

SECTION B-B

(See Note 1)

See Note 4

31/32 

16"

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

OLYMPIA, WASHINGTON

STANDARD PLAN C-6

DATE

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

Sheet 2 of 2 Sheets

BEAM GUARDRAIL ANCHOR

TYPE 1

ANCHOR CABLE

ANCHOR RAIL WASHER

ANCHOR PLATE

(See Note 2)

BEARING PLATE

3/8 " Hole (eight required)

3" x 2 1/2" x 1/2" End plate

1 1/2 " Stud x 7" threaded full length (TYP)

BEAM GUARDRAIL ANCHOR

TYPE 1

STANDARD PLAN C-6

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:
1. Roll section and W8 x 18 steel post shall be fabricated to receive 5/8" hex head bolts as shown.
2. All bolts shall be high strength 5/8" hex head bolts with anchor nail washers.
NOTES
1. For details, see Standard Plan C-6.
2. For end section details see Standard Plan C-7 or C-7a.
3. For details, see Standard Plan C-1b.
4. Outside nut shall be torqued against inside nut a minimum of 300 R-lbs.
5. Post and block shall match beam guardrail posts.

12/99
1. Attach W-beam to steel pipe with 5/8" x 1 1/4" button head bolt with no washer. No connection to the post is required.

2. For end section details see Standard Plan, "Beam Guardrail End Sections".

3. For details see Standard Plan, "Beam Guardrail Anchor Type 1".

4. For details see Standard Plan, "Beam Guardrail Posts".

5. Outside nut shall be torqued against inside nut a minimum of 100 ft-lbs.

NOTES:

1. Attach W-beam to steel pipe with 5/8" x 1 1/4" button head bolt with no washer. No connection to the post is required.

2. For end section details see Standard Plan, "Beam Guardrail End Sections".

3. For details see Standard Plan, "Beam Guardrail Anchor Type 1".

4. For details see Standard Plan, "Beam Guardrail Posts".

5. Outside nut shall be torqued against inside nut a minimum of 100 ft-lbs.
NOTES

1. For details, see Standard Plan, "Beam Guardrail Anchor Type 1".

2. The rail element is to be included in the "Beam Guardrail" pay item. The "Anchor" pay item includes the anchor post, anchor plate, anchor cable, bearing plate, nuts and washers.

3. For details, see Standard Plan, "Beam Guardrail Posts and Blocks".

4. Post shall match beam guardrail posts.

TYPE 7 ANCHOR
NOTES
1. End Section Design G shall be used except where noted on the plans or contract.
2. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification S-25 (4)) with thin wall ferrule inserts or resin bonded anchors. See the Contract Plans.
3. A single piece having similar dimensional shape to Design G and mating with the W-beam guardrail is an alternate.
4. In cases where Design "F" end section is lapped on the outside of the guardrail, a galvanized 1" ID, 2" OD, 0.134" thick, narrow Type A Plain Washer or a anchor rail washer shall be placed under the splice bolt heads.

ATTACH GUARDRAIL TO BRIDGE RAIL OR CONCRETE BARRIER WITH 7/8" DIAMETER HIGH STRENGTH BOLTS (STANDARD SPECIFICATION S-25 (4)) WITH THIN WALL FERRULE INSERTS OR RESIN BONDED ANCHORS. SEE THE CONTRACT PLANS.

1. End Section Design G shall be used except where noted on the plans or contract.
2. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification S-25 (4)) with thin wall ferrule inserts or resin bonded anchors. See the Contract Plans.
3. A single piece having similar dimensional shape to Design G and mating with the W-beam guardrail is an alternate.
4. In cases where Design "F" end section is lapped on the outside of the guardrail, a galvanized 1" ID, 2" OD, 0.134" thick, narrow Type A Plain Washer or a anchor rail washer shall be placed under the splice bolt heads.
1. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification 6-03:06) with thin slab ferrule inserts or open bonded anchors. See the Contract Plans.

2. In cases where Design F End Section is lapped on the outside of the guardrail, a galvanized 1" ID, 2" OD, 0.134" thick, narrow Type A Plain Washer or an anchor nail washer will be placed under the splice bolt heads.

NOTES

1. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification 6-03:06) with thin slab ferrule inserts or open bonded anchors. See the Contract Plans.

3. In cases where Design F End Section is lapped on the outside of the guardrail, a galvanized 1" ID, 2" OD, 0.134" thick, narrow Type A Plain Washer or an anchor nail washer will be placed under the splice bolt heads.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Wire rope loops shall be 3'-6" long, except for the top loop of the Barrier Terminal, which shall be 2'-0" long.

2. Except for the locations of the wire rope loops, the dimensions shown in END VIEW "A" are typical for both ends of a Barrier Section or opposing ends of Barrier Terminals.

3. Connecting and Drift Pins head designs vary among different manufacturers. Pin designs that are shaped differently than those shown in the detail are acceptable, if the bonding surfaces is within the minimum and maximum width specified.

4. The vertical spacing of the Wire Rope Loops in a Barrier Terminal is determined by the end of the Barrier Segment to which it is being connected. See BARRIER CONNECTION DETAIL (Sheet 3).

CONCRETE BARRIER
TYPE 2
STANDARD PLAN C-8
SHEET 1 OF 2 SHEETS

Michael S. Flecking
President
Flecking Engineering

Peekee Balog热点 M 02-10-08
Washington State Department of Transportation

APPROVED FOR PUBLICATION
Concrete Barrier Type 4

**INTERMEDIATE PLAN**

- Face of concrete at C of barrier
- Lifting notches: 3" x 3" x 7 1/2"
- Bar A: One #5 Bar (Bar B)

**INTERMEDIATE ELEVATION**

- Lifting notches: 3" x 3" x 7 1/2"

**TRANSITION PLAN**

- Wire rope loop (TYP) or alternate bar loop (TYP)
- Two #5 Bars (Bar B)

**TRANSITION ELEVATION**

- Wire rope loop (TYP) or alternate bar loop (TYP)
- Two #5 Bars (Bar B)

**SECTION A-A**

- TYPE 4
- Bevel or round edges (3/4" MAX)

**SECTION B-B**

- Wire rope loop (TYP)
- Two #5 Bars (Bar B)

**NOTE:**

1. For details on wire rope loop, connecting pin and end notches see Standard Plan "Concrete Barrier Type 2."
NOTES:
1. This plan shall be used for 47 and 50 Light Standards with 16' max. length double mast area.
2. See Standard Plan C-51 for details on barrier end, Wire Rope Loops, and Connecting Poles.
3. See the Contract Plans for concrete placement.
4. Concrete shall be Class 4000.

CONCRETE BARRIER LIGHT STANDARD SECTION

STANDARD PLAN C-91

SHEET 1 OF 2 SHEETS

EFFECTIVE: DECEMBER 7, 2009 TO AUGUST 1, 2010
NOTES

1. The intended use of this plan is for the permanent anchoring of Precast Concrete Barrier Type 2 (see Standard Plan C-8) on hot mix asphalt pavement.

2. Remove the Type 3 Anchors by first driving the steel pins down through the barrier further into the pavement to allow lifting the barrier without interference, then remove the pins from the pavement.

3. After removing the Type 3 Anchors, clean the pin holes and fill them with sealant according to Standard Specification 9-04.2.

The intended use of this plan is for the permanent anchoring of Precast Concrete Barrier Type 2 (see Standard Plan C-8) on hot mix asphalt pavement.

Remove the Type 3 Anchors by first driving the steel pins down through the barrier further into the pavement to allow lifting the barrier without interference, then remove the pins from the pavement.

After removing the Type 3 Anchors, clean the pin holes and fill them with sealant according to Standard Specification 9-04.2.
The vertical locations of the Wire Rope Loops at one end compose a set that shall not vary; however, which set is applied to an end is determined by the end to which it is being connected. A set with loops 1' - 5" apart connects to a set with loops 1' - 8" apart. See Standard Plan C-8, BARRIER CONNECTION DETAIL.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
BOX CULVERT GUARDRAIL STEEL POST TYPE 1
(6" to 36" ground cover)

See Base Plate Detail

$\frac{3}{4}''$ Grout pad

See Post Base Plate Detail

Center line of W6x35

$\frac{3}{4}''$ x 2'' Bolt with hex nut and washer (TYP)

See Base Plate Detail

Post base plate (See detail sheet 2)

Varies 6'' to 10''

Tack weld nut to plate

W6x9

See Cover Plate Detail

$\frac{3}{4}''$ Grout pad

See Post Bearing Plate Detail

BOX CULVERT GUARDRAIL STEEL POST TYPE 2
(3'' to 6'' ground cover)

See Base Plate Detail

$\frac{3}{4}''$ Grout pad

See Post Base Plate Detail

Center line of W6x9

$\frac{3}{4}''$ x 2'' Bolt with hex nut and washer (TYP)

See Base Plate Detail

Post base plate (See detail sheet 2)

Varies 6'' to 10''

Tack weld nut to plate

W6x35

See Cover Plate Detail

$\frac{3}{4}''$ Grout pad

See Post Bearing Plate Detail

BOX CULVERT GUARDRAIL STEEL POST
STANDARD PLAN C-10
SHEET 1 OF 2 SHEETS

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
OLYMPIA, WASHINGTON
APPROVED FOR PUBLICATION
DEPUTY STATE DESIGN ENGINEER
DATE
REVISION
BY
DATE

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Length of W8x35 and W6x9 shall be determined by measurement from top of ground to top of grout pad. This distance shall be verified by the contractor.

2. Attach guardrail post to box culvert with ¾" high strength bolts with resin bonded anchors.

3. Drill 1 ¼" diameter hole in concrete slab for ¾" high strength bolts. Length of bolt is determined by top slab of box culvert thickness which shall be verified by the contractor.

4. For details of post attachment to double box culvert see Standard Plan "Guardrail Placement," Case 15.
HIGH PERFORMANCE BARRIER

SECTION A

4 - 5' BARREER FOR USE WITH A 1 FT TO 2 FT MAX. GRADE SEPARATION (SEE NOTE 4)

SECTION A

4 - 10' BARREER FOR USE WITH A GREATER THAN 3 FT TO 6 FT MAX. GRADE SEPARATION (SEE NOTE 5)
1. The Terminal is used only on the trailing end of a barrier, unless otherwise shown in the Contract.

2. See Standard Plans C-14a, Sheet 1, for EXPANSION JOINT and DUMMY JOINT details.

3. When High Performance Concrete Barrier is specified in the Contract, use the dimensions given in the HP row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 6", and a minimum embankment of 3'.

**DIMENSION TABLE**

<table>
<thead>
<tr>
<th>BARRIER HEIGHT</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>HORIZONTAL BARRIER (CY')</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTD</td>
<td>3'-6&quot;</td>
<td>5&quot;</td>
<td>2'-0&quot;</td>
<td>3' - 6&quot;</td>
<td>1' - 0&quot;</td>
<td>10</td>
</tr>
<tr>
<td>HPI</td>
<td>4'-0&quot;</td>
<td>0'-0&quot;</td>
<td>2'-0&quot;</td>
<td>1' - 0&quot;</td>
<td>4' - 0&quot;</td>
<td>10</td>
</tr>
</tbody>
</table>

**NOTES**

- Plan Dimension - See Note 2.
- Isometric View
- Reinforcing Steel Bend Diagram - See Note 2.
1. The Vertical Back barrier is used only in the configurations shown in Standard Plan C-14a and C-14b, and when placed against a retaining wall.

2. See Standard Plan C-14a, Sheet 1, for EXPANSION JOINT and DUMMY JOINT details. Modify as shown in EXPANSION JOINT MODIFICATION.

3. Reinforcing steel dimensions and details are shown for stationary barrier construction. When slippable construction is used, increase reinforcing steel dimensions to the outside surface of the barrier to 2.12" and adjust steel dimensions as required.

4. When High Performance Concrete Barrier is specified in the Contract, use the dimensions given in the HP row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 0" and a minimum embedment of 3'.
SINGLE SLOPE
CONCRETE BARRIER
SIGN BRIDGE FOUNDATION
STANDARD PLAN C-141

POZIT Taguchi 05-10-08
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EFFECTIVE: DECEMBER 7, 2009 TO AUGUST 1, 2010
**NOTES**

1. Use the barrier type, precast or cast-in-place, as specified in the Contract.

2. For Single Slope Concrete Barrier details, see Standard Plan series C-15 (Precast) or C-14 (cast-in-place).

**SINGLE SLOPE CONCRETE BARRIER PLACEMENT (SPLIT)**

**SECTION A**

- **Tapered End:**
  - Choose the appropriate taper rate for the barrier type.
  - Ensure proper drainage and clearance.

- **Select Borrow:**
  - Include haul.

- **Concrete Cap:**
  - Dimensions should be verified according to the contract specifications.

- **Steel Welded Wire Fabric:**
  - Comply with the contract's requirements.

- **Berm:**
  - A suffix of 0-0'-0" indicates the Berm width.

- **Concrete Barrier:**
  - Single slope concrete barrier dual-faced.

- **Top of Roadway:**
  - Dimensions and details should be confirmed in the contract.

**SECTION B**

- **Berm to Drain:**
  - Dimensions and details should be confirmed in the contract.

- **Commercial Concrete:**
  - Dimensions and details should be confirmed in the contract.

- **3-4' Chamfer (Typ.)**
  - Ensure proper alignment and transition.

- **Select Borrow:**
  - Include haul.

**ISOMETRIC VIEW**

- **DUAL FACED:**
  - Dimensions and details should be confirmed in the contract.

- **Concrete Cap:**
  - Dimensions and details should be confirmed in the contract.

**PLAN**

- **Rotation Rate:**
  - Dimensions and details should be confirmed in the contract.

- **Concrete Cap:**
  - Dimensions and details should be confirmed in the contract.

**DUAL FACED:**

- **Concrete Cap:**
  - Dimensions and details should be confirmed in the contract.

**VERTICAL BACK:**

- **Concrete Cap:**
  - Dimensions and details should be confirmed in the contract.

**SELECT BORROW:**

- **Include Haul:**
  - Dimensions and details should be confirmed in the contract.
SINGLE SLOPE CONCRETE BARRIER PLACEMENT (WRAP)
STANDARD PLAN C-16b

1. Use the barrier type, paint or cast-in-place, as specified in the Contract.
2. For Single Slope Concrete Barrier details, see branded Plan series C-16 (paint) or C-14 (cast-in-place).
TRAFFIC BARRIER SHOULDER WIDENING - FOR SHOULDERS 5.0' AND WIDER

STANDARD PLAN C-16a

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso 11-08-05
NOTES

1. An additional width for shy distance is required when the existing roadway is to be widened.

2. The additional width for shy distance may be less than 2.0', when it combined with the existing shoulder width, totals 2.0' or more.

3. The additional width for shy distance is required when the existing roadway is to be widened.

The additional width for shy distance may be less than 2.0' when it combined with the existing shoulder width, totals 2.0' or more.
NOTES:

1. For details, see Standard Plan C-22.40.

2. The slopes from the edge of the shoulder into the face of the guardrail should not be steeper than 100:1 when the guardrail is within 12'-0" from the edge of the shoulder.

3. See Contract for Beam Guardrail Transition Section type and Connection to Bridge Traffic Barrier or Concrete Barrier. See Standard Plan C-8 for details.
NOTES:

1. See Contract for transition and connection type.

2. For additional installation requirements for Non-Flared Terminal placement see Standard Plan C-25.49.

3. Guardrail installation shall be Beam Guardrail Type 31 with standard post and block.

4. The first letter of case designation indicates the end treatment on the side road. The second letter indicates the end treatment on the main road. For instance, a terminal on a side road and a bridge connection on the main road would be Case 23C-31.

5. The radius dimension shall be etched into the plate as shown in the example on the Identification Plate Detail. Numebrals shall be 1/2" high minimum, and 3/4" wide maximum. Plaques shall be galvanized after coating.

6. The guardrail Identification Plate shall be mounted at the lower notice bolt on the back side of the rail element at the PC of the guardrail radius.
NOTES

1. An ET-PLUS 31 as manufactured by Trinity Industries, Inc. or an SKT-MGS as manufactured by Road Systems Inc. shall be installed according to manufacturer's recommendations.

2. A reflectorized object marker shall be installed according to manufacturer's recommendations.

3. When snow load post washers and snow load rail washers are required by the contract, the snow load rail washers shall not be installed within the terminal limits.

4. Terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

5. While these terminals do not require an offset at the end, a flare is recommended so that the end piece does not protrude into the shoulder. A maximum flare of 25:1 over the system length of the terminal is allowed for either the ET-PLUS 31 or the SKT-MGS.

6. The terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

7. An ET-PLUS 31 as manufactured by Trinity Industries, Inc. or an SKT-MGS as manufactured by Road Systems Inc. shall be installed according to manufacturer's recommendations.

8. A reflectorized object marker shall be installed according to manufacturer's recommendations.

9. When snow load post washers and snow load rail washers are required by the contract, the snow load rail washers shall not be installed within the terminal limits.

10. Terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

11. While these terminals do not require an offset at the end, a flare is recommended so that the end piece does not protrude into the shoulder. A maximum flare of 25:1 over the system length of the terminal is allowed for either the ET-PLUS 31 or the SKT-MGS.

12. The terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

13. An ET-PLUS 31 as manufactured by Trinity Industries, Inc. or an SKT-MGS as manufactured by Road Systems Inc. shall be installed according to manufacturer's recommendations.

14. A reflectorized object marker shall be installed according to manufacturer's recommendations.

15. When snow load post washers and snow load rail washers are required by the contract, the snow load rail washers shall not be installed within the terminal limits.

16. Terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

17. While these terminals do not require an offset at the end, a flare is recommended so that the end piece does not protrude into the shoulder. A maximum flare of 25:1 over the system length of the terminal is allowed for either the ET-PLUS 31 or the SKT-MGS.

18. The terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

19. An ET-PLUS 31 as manufactured by Trinity Industries, Inc. or an SKT-MGS as manufactured by Road Systems Inc. shall be installed according to manufacturer's recommendations.

20. A reflectorized object marker shall be installed according to manufacturer's recommendations.

21. When snow load post washers and snow load rail washers are required by the contract, the snow load rail washers shall not be installed within the terminal limits.

22. Terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

23. While these terminals do not require an offset at the end, a flare is recommended so that the end piece does not protrude into the shoulder. A maximum flare of 25:1 over the system length of the terminal is allowed for either the ET-PLUS 31 or the SKT-MGS.

24. The terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

25. An ET-PLUS 31 as manufactured by Trinity Industries, Inc. or an SKT-MGS as manufactured by Road Systems Inc. shall be installed according to manufacturer's recommendations.

26. A reflectorized object marker shall be installed according to manufacturer's recommendations.

27. When snow load post washers and snow load rail washers are required by the contract, the snow load rail washers shall not be installed within the terminal limits.

28. Terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

29. While these terminals do not require an offset at the end, a flare is recommended so that the end piece does not protrude into the shoulder. A maximum flare of 25:1 over the system length of the terminal is allowed for either the ET-PLUS 31 or the SKT-MGS.

30. The terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

31. An ET-PLUS 31 as manufactured by Trinity Industries, Inc. or an SKT-MGS as manufactured by Road Systems Inc. shall be installed according to manufacturer's recommendations.

32. A reflectorized object marker shall be installed according to manufacturer's recommendations.

33. When snow load post washers and snow load rail washers are required by the contract, the snow load rail washers shall not be installed within the terminal limits.

34. Terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

35. While these terminals do not require an offset at the end, a flare is recommended so that the end piece does not protrude into the shoulder. A maximum flare of 25:1 over the system length of the terminal is allowed for either the ET-PLUS 31 or the SKT-MGS.

36. The terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.
NOTES
1. For use on the end of guardrail runs when a connection to a rail is not required.
2. For additional details not shown, see Standard Plan C-6a.
3. For end section details, see Standard Plans C-7 and C-19a.
4. For Anchor Post Assembly details, see Standard Plan C-19b. Use detail on this plan for Wood Breakaway Post. (No block on this post).
5. Fasten the Anchor Cable using two 1" nuts and washers, at both ends of cable. Outside nut shall be torqued against malleable nut a minimum of 100 ft-lbs.
6. Posts shall match those of connecting runs. Timber or Steel.
This guardrail transition is for connection to a vertical concrete shape or single slope barrier and cannot be connected directly to a concrete safety shape.

Do not bolt nested W-Beam or rubrail W-Beam to posts and blocks on posts 1, 2, 3 and 5. Bolt tapered blocks directly to posts.

The rubrail W-Beam can be shop bent to facilitate installation.

Posts 1, 2, 4 and 6 require an additional hole to attach tapered blocks and/or rubrail.

Posts 1 and 2 are 10×10 timber or W8×13 steel posts ~ 7’ - 6” long. Posts 3 through 9 are 6×8 timber or W6×9 steel posts ~ 6’ - 0” long.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. See Standard Plan C-1b, C-35.30 and C-35.40 for rail elements and thru beam block details.

2. When a transition is required on the trailing end of the bridge, use a mirror image of this plan.

3. For additional alternatives not shown, see Contract Plans.
**TYPICAL SECTION ~ WITHOUT CURB**

- 14" ~ SEE TABLE

**TYPICAL SECTION ~ WITH CURB**

- 7" MAX.
- 6" MAX.

**TYPICAL ELEVATION**

- Mid Span
- Splice
- 6' - 3"
- 3' - 1 1/2"

**BEAM GUARDRAIL TYPE 31**

**TYPICAL RAIL ELEMENT**

- 4 1/4" (TYP.)
- 3/4" × 2 1/2" SLOT (TYP.)
- 3' - 1 1/2" 6' - 3"

**NOTES**

1. Refer to Standard Plan C-1 and C-11a, for additional details not shown on this plan.
2. All posts for any standard barrier run shall be of the same type: Timber or Steel.
3. See Contract for type of curb required.
5. Use a single or combination of blocks to achieve the actual 12" offset. See Standard Specifications 8-16.3 (2).
6. On steel posts, attach blockouts using bolt holes on approaching traffic side of post web.

**SLOPE EMBANKMENT TABLE**

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>2.5' MIN.</th>
<th>4.0' MIN.</th>
</tr>
</thead>
</table>

**TYPICAL SECTION ~ WITHOUT CURB**

- 14" ~ SEE TABLE

**TYPICAL SECTION ~ WITH CURB**

- 7" ~ SEE TABLE

- 1 3/16" (TYP.)
- 1" (TYP.)
- 1/4" DIAM. HOLE FOR ANTI-ROTATION NAIL (16d) (TYP.)

**NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.**
NOTES:
1. The Design Layout Line shall intersect the Cable Barrier at a point that is at least 12 feet (perpendicular) from the opposite Edge of Travelled Way.

LEGEND
— Design Layout Line
NOTES

1. Approved Inertial Barrier System (steel barrel assembly) are listed in the Qualified Products List and shall be installed in accordance with the manufacturer's recommendations. When product not listed on the Qualified Products List are considered, a Request of Approval of Materials (RAAM) form is required.

2. For temporary installations, the inertial barriers may be made of wood barrels that are 4' or less in height.

EXAMPLE CONFIGURATION

ATTENUATOR CONFIGURATIONS (NUMBERS INSIDE BARRELS INDICATE LINK)

EDFECTIVE: DECEMBER 7, 2009 TO AUGUST 1, 2010
NOTES

1. Wall to be designated Noise Barrier Wall Type 1A, 1B, 1C, or 1D. The Contract specifies actual wall designation.
2. For intermediate wall heights, use the next higher H.
3. Panels shall have at least 3 feet of level ground on each side.
4. Construction joints in the trench footing shall be spaced at 120 feet maximum.
5. The Contract specifies actual foundation requirements D1 or D2.

CAST-IN-PLACE CONCRETE WALL ON TRENCH FOOTING

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Walls to be designated Noise Barrier Wall Type 2A, 2B, 2C, or 2D. The Contract specifies actual wall designations.

2. For intermediate wall heights not listed, use the next higher H.

3. Panels shall have at least 3 feet of level ground on each side.

4. Construction joints in the footing shall be spaced at 120 feet maximum.

Panels shall have at least 3 feet of level ground next higher H.

For intermediate wall heights not listed, use the next higher H.

Construction joints in the footing shall be spaced at 120 feet maximum.

Panels shall have at least 3 feet of level ground next higher H.
FOOTING WIDTH TRANSITION DETAIL
FOR LOCATIONS WITHOUT FOOTING STRIP

CAST-IN-PLACE CONCRETE WALL ON OFFSET SPREAD FOOTING

NOISE BARRIER WALL TYPE 3
STANDARD PLAN D-2.06-01

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

PREPARED FOR PUBLICATION
Pamela Baskich IN 01-06-00

SHEET 2 OF 3 SHEETS
NOTES:
1. Wall to be designated Noise Barrier Wall Type 4A, 4B, 4C or 4D. The contract specifies actual wall designations.
2. For intermediate wall heights, see next higher H.
3. Panels shall have at least 5 feet of level ground on each side.
4. Construction joints in the shell cap shall be spaced at 12 ft minimum.
5. The Contract specifies actual foundation requirements D1 or D2.

CAST-IN-PLACE CONCRETE WALL ON SHAFT FOUNDATION

**NOISE BARRIER WALL TYPE 4**

**STANDARD PLAN D-2.08-00**

**APPROVED FOR PUBLICATION**

Harold L. Peterson
11-10-05

The Engineer and approved for publication, is kept on file. A copy may be obtained upon request.

**APPROVED FOR PUBLICATION**

Washington State Department of Transportation
<table>
<thead>
<tr>
<th>WALL HT</th>
<th>TYPE 5SSA</th>
<th>TYPE 5SSB</th>
<th>TYPE 5SSC</th>
<th>TYPE 5SSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8' - 0&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
</tr>
<tr>
<td>10' - 0&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
</tr>
<tr>
<td>12' - 0&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
</tr>
<tr>
<td>14' - 0&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
</tr>
<tr>
<td>16' - 0&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
</tr>
<tr>
<td>18' - 0&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
</tr>
<tr>
<td>20' - 0&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
</tr>
<tr>
<td>22' - 0&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
<td>84 @ 10&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOIL TYPE</th>
<th>ANGLE OF INTERNAL FRICTION (DEGREES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>35</td>
</tr>
<tr>
<td>D2</td>
<td>50</td>
</tr>
</tbody>
</table>

**NOTES**

1. Wall to be designated Noise Barrier Wall Type 5SSA, 5SSB, 5SSC, or 5SSD. The Contract specifies actual wall designations.
2. For intermediate wall heights, use the next higher H.
3. Panels shall have at least 3 feet min. of level ground on each side.
4. Construction joints in the footing shall be spaced at 120 feet max.
5. The Contract specifies actual foundation requirements D1 or D2.

**Construction Joints in the Footing**

- Spaced at 120 feet max.
- Bar "B" ~ CENTERED

**Bending Diagram**

- Joint and Corner Detail
- Cast-in-Place w/ Single Slope Traffic Barrier on Trench Footing

**Approved for Publication**

Harold J. Petersen
Washington State Department of Transportation

Date: 11-10-05

**Effective:** December 7, 2009 to August 1, 2010
WALL HT

<table>
<thead>
<tr>
<th>WALL HT</th>
<th>TYPE</th>
<th>W</th>
<th>SPIRAL</th>
<th>BAND</th>
<th>BAR &quot;A&quot;</th>
<th>BAR &quot;B&quot;</th>
<th>BAR &quot;C&quot;</th>
<th>BAR &quot;D&quot;</th>
<th>BAR &quot;E&quot;</th>
<th>BAR &quot;F&quot;</th>
<th>BAR &quot;G&quot;</th>
<th>BAR &quot;H&quot;</th>
<th>BAR &quot;I&quot;</th>
<th>BAR &quot;J&quot;</th>
<th>BAR &quot;K&quot;</th>
<th>BAR &quot;L&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>24'-0&quot;</td>
<td>9D</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>11&quot;</td>
<td>5&quot;</td>
<td>15&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>22'-0&quot;</td>
<td>9C</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>11&quot;</td>
<td>5&quot;</td>
<td>15&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>20'-0&quot;</td>
<td>9B</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>11&quot;</td>
<td>5&quot;</td>
<td>15&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>18'-0&quot;</td>
<td>9A</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>11&quot;</td>
<td>5&quot;</td>
<td>15&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>16'-0&quot;</td>
<td>8D</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>11&quot;</td>
<td>5&quot;</td>
<td>15&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>14'-0&quot;</td>
<td>8C</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>11&quot;</td>
<td>5&quot;</td>
<td>15&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>12'-0&quot;</td>
<td>8B</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>11&quot;</td>
<td>5&quot;</td>
<td>15&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>10'-0&quot;</td>
<td>8A</td>
<td>7&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>11&quot;</td>
<td>5&quot;</td>
<td>15&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
<td>5&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

NOTES:

1. Wall to be designated Noise Barrier Wall Type 9A, 9B, 9C or 9D. The Contract specifies actual wall designation.
2. For intermediate wall heights, use the next higher height.
3. Panels shall have at least 3' - 0" of level ground on each side.
4. Construction joints in the footing shall be spaced at 120 feet maximum.
5. All joints shall be in full contact and sealed.

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

11-10-05
**Joint and Corner Detail**

- **Corner Panel**: Reinforced per limited wall height reinforcement table.
- **Traffic Side**: Traffic side.
- **Panel**: Panel.
- **W/2**: W/2.
- **Footings**: Footings.
- **Fill Void with Grout**: Fill void with grout.
- **BAR "D"**: BAR "D".
- **BAR "G" Spiral**: BAR "G" Spiral.
- **Joint Hole**: Joint hole - 2" ID with rebar surface, or rigid post-tensioned duct, or corrugated steel pipe.
- **Joint and Corner Detail**: Joint and corner detail.
- **Transverse Bars Not Shown**: Transverse bars not shown.

**Precast Concrete Wall on Spread Footing**

- **Noise Barrier Wall Type 9**
- **Standard Plan D-2.33-00**
- **Filled Joint Hole**: Filled joint hole with grout (4%).
- **Ducts**: Ducts shall be located on panel face opposite traffic.

**NOTE**: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

**EXPED AUGUST 23, 2006**

**Prepared By**: ADAM COCHRAN

**Harold J. Peterson 11-10-05**
NOTES

1. Wall to be designated Noise Barrier Wall Type 12SSA, 12SSB, and 12SSD. The Contract specifies actual wall designation.

2. For intermediate wall heights, use the next higher H.

3. Compaction of trench height differential shall not exceed 1 foot.

4. Panels shall have at least 3 feet of level ground on each side.

5. All joints shall be in full contact and sealed.

6. The Contract specifies actual foundation requirements D1 or D2.

See Table for Reinforcement Requirements

Wall to be designated Noise Barrier Wall Type 12SSA, 12SSB, 12SSC

- The Contract specifies actual wall designation.

- For intermediate wall heights, use the next higher H.

- Compaction of trench height differential shall not exceed 1 foot.

- Panels shall have at least 3 feet of level ground on each side.

- All joints shall be in full contact and sealed.

- See Table for Reinforcement Requirements

- The Contract specifies actual foundation requirements D1 or D2.

See Table for Noise Barrier Wall Type 12SS

- Wall to be designated Noise Barrier Wall Type 12SSA, 12SSB, 12SSC

- The Contract specifies actual wall designation.

- For intermediate wall heights, use the next higher H.

- Compaction of trench height differential shall not exceed 1 foot.

- Panels shall have at least 3 feet of level ground on each side.

- All joints shall be in full contact and sealed.

- See Table for Reinforcement Requirements

- The Contract specifies actual foundation requirements D1 or D2.
1. Wall to be designated Noise Barrier Wall Type 14A, 14B, 14C or 14D. The Contract specifies actual wall designations.
2. For intermediate wall heights, use the next higher H.
3. Parapet shall have at least 3 feet level ground on each side.
4. All joints shall be in full contact and eased.
5. Anchor Bolts, Nuts, Washers, Base Plate, and Bar "B" shall have a Preparative Coating of one of the following: Hot Dipped Galvanizing AASHO M 232 for Hardware, AASHO M 111 for Washers and Plates; Mechanical Galvanizing AASHO M 226 CL 88, or Zinc Rich Paint. Paint threads and nuts after installation.
6. The bottom 9" of Bar "B" shall be painted with one coat of Formula A-8-86 Zinc Dust Oxide Primer OR, one coat of Formula A-11-99 Primer.
7. The Contract specifies actual foundation requirements D1 or D2.

The Contract specifies actual foundation requirements D1 or D2. 

For intermediate wall heights, use the next higher H. 

Anchor Bolts, Nuts, Washers, Base Plate, and Bar "B" shall have a Preparative Coating of one of the following: Hot Dipped Galvanizing AASHO M 232 for Hardware, AASHO M 111 for Washers and Plates; Mechanical Galvanizing AASHO M 226 CL 88, or Zinc Rich Paint. Paint threads and nuts after installation.

The bottom 9" of Bar "B" shall be painted with one coat of Formula A-8-86 Zinc Dust Oxide Primer OR, one coat of Formula A-11-99 Primer.

The Contract specifies actual foundation requirements D1 or D2. 

For intermediate wall heights, use the next higher H. 

Anchor Bolts, Nuts, Washers, Base Plate, and Bar "B" shall have a Preparative Coating of one of the following: Hot Dipped Galvanizing AASHO M 232 for Hardware, AASHO M 111 for Washers and Plates; Mechanical Galvanizing AASHO M 226 CL 88, or Zinc Rich Paint. Paint threads and nuts after installation.

The bottom 9" of Bar "B" shall be painted with one coat of Formula A-8-86 Zinc Dust Oxide Primer OR, one coat of Formula A-11-99 Primer.

The Contract specifies actual foundation requirements D1 or D2. 

For intermediate wall heights, use the next higher H. 

Anchor Bolts, Nuts, Washers, Base Plate, and Bar "B" shall have a Preparative Coating of one of the following: Hot Dipped Galvanizing AASHO M 232 for Hardware, AASHO M 111 for Washers and Plates; Mechanical Galvanizing AASHO M 226 CL 88, or Zinc Rich Paint. Paint threads and nuts after installation.

The bottom 9" of Bar "B" shall be painted with one coat of Formula A-8-86 Zinc Dust Oxide Primer OR, one coat of Formula A-11-99 Primer.

The Contract specifies actual foundation requirements D1 or D2. 

For intermediate wall heights, use the next higher H. 

Anchor Bolts, Nuts, Washers, Base Plate, and Bar "B" shall have a Preparative Coating of one of the following: Hot Dipped Galvanizing AASHO M 232 for Hardware, AASHO M 111 for Washers and Plates; Mechanical Galvanizing AASHO M 226 CL 88, or Zinc Rich Paint. Paint threads and nuts after installation.

The bottom 9" of Bar "B" shall be painted with one coat of Formula A-8-86 Zinc Dust Oxide Primer OR, one coat of Formula A-11-99 Primer.
ANGLE POINT PLAN

ADJUST REINFORCEMENT AS NECESSARY TO ACCOMODATE ANGLE POINT

LIMITS OF TRANSVERSE BARRIER REINFORCEMENT (TYP)

BLOCK-OUT OF LOADS - BASE PLATE & BLOCK-OUT W/ GROUT AFTER FINAL ALIGNMENT OF WALL PANEL.

BASE PLATE DETAIL

TAPERED HOLE FOR #8 BAR (TYP.) ~ SEE BAR "B"

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso
11-10-05

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

PRECAST CONCRETE WALL W/ TRAFFIC BARRIER ON SHAFT FOUNDATION

NOISE BARRIER WALL

TYPE 14

STANDARD PLAN D-2.46-00

Sheet 2 of 2 SHEETS

APPROVED FOR PUBLICATION

DATE

STATE DESIGN ENGINEER

Washington State Department of Transportation

November 4, 2005

EXPIRES AUGUST 23, 2006

DRAWN BY: ADAM COCHRAN

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso
11-10-05

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

PRECAST CONCRETE WALL W/ TRAFFIC BARRIER ON SHAFT FOUNDATION

NOISE BARRIER WALL

TYPE 14

STANDARD PLAN D-2.46-00

Sheet 2 of 2 SHEETS

APPROVED FOR PUBLICATION

DATE

STATE DESIGN ENGINEER

Washington State Department of Transportation

November 4, 2005

EXPIRES AUGUST 23, 2006

DRAWN BY: ADAM COCHRAN
The Contract specifies actual foundation requirements. All masonry shall be laid in a horizontal manner using a form or bond beam. All concrete masonry units (CMUs) shall be filled with grout. All masonry is to be specially inspected. For intermediate wall heights, the next higher H shall be used. Panels shall have at least 3 feet of level ground on each side. Reinforcing bars or bond beam units shall be filled with grout. All masonry is to be specially inspected. For locations 8", 9", 10", 11", and 12" but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file. A copy may be obtained upon request.
TYPICAL EXPANSION JOINT

EXPANSION JOINT FILLED PLACED IN SASH BLOCK RECESSES.

TRAFFIC SIDE

#5 (TYP.)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso

11-10-05
FOOTING WIDTH TRANSITION DETAIL

NOTE: TRANSVERSE BARS NOT SHOWN

PLAN VIEW

EXPANSION JOINT AT WIDTH STEP

BOND BEAM DETAIL

BOND BEAM DETAILS

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT

BATCHER ROCK

POLYURETHANE SEALANT

BACKER ROD

TYPICAL BOTH SIDES OF WALL

NOISE BARIER WALL

TYPE 17

STANDARD PLAN D-3.62-00

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

REF. DETAIL A

DETAIL A

TYPICAL EXPANSION JOINT

MASONRY WALL ON SPREAD FOOTING

EXPIRES AUGUST 23, 2006

DRAWN BY: ADAM COCHRAN

NOTE: TRANSVERSE BARS NOT SHOWN

Harold J. Peterfeso 11-10-05

SHEET 3 OF 2 SHEETS

APPROVED FOR PUBLICATION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

NOISE BARRIER WALL

TYPE 17

STANDARD PLAN D-3.62-00

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

APPROVED FOR PUBLICATION

Harold J. Peterfeso 11-10-05

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
SHAFT LENGTH FOR PAYMENT

#4 @ 1'-0"

MULTIPLES OF 8"

STEP DETAIL 3'-0"

NOISE BARRIER WALL TYPE 19

MASONRY WALL ON SHAFT W/ GRADE BEAM FOUNDATION

EXPANSION JOINT FILLER PLACED IN SASH BLOCK RECESSES.

TYPICAL BOTH SIDES OF WALL

#5 (TYP.)

TYPICAL EXPANSION JOINT

PLAN VIEW

EXPANSION JOINT AT WIDTH STEP

PLAN VIEW

BOND BEAM DETAIL

TYPICAL BOND BEAM OF WALL

BOND BEAM LIMITS

BOND BEAM CONCRETE LIMIT

BARRIER ROD

POLYURETHANE SEALANT

BACKER ROD

DETAIL B

DEEP 6"

CUT-OUT 4"

BAR "P" AT EQUAL SPACING (FOR TOTAL NUMBER SEE REINFORCEMENT SCHEDULE)

EXPANSION JOINT FILLER PLACED IN SASH BLOCK RECESSES.

#5 (TYP.)

PLAN VIEW

EXPANSION JOINT AT WIDTH STEP

PLAN VIEW

TYPICAL BOND BEAM OF WALL

BOND BEAM LIMITS

BOND BEAM CONCRETE LIMIT

BARRIER ROD

POLYURETHANE SEALANT

BACKER ROD

DETAIL B

DEEP 6"

CUT-OUT 4"

BAR "P" AT EQUAL SPACING (FOR TOTAL NUMBER SEE REINFORCEMENT SCHEDULE)

EXPANSION JOINT FILLER PLACED IN SASH BLOCK RECESSES.

#5 (TYP.)

PLAN VIEW

EXPANSION JOINT AT WIDTH STEP

PLAN VIEW

TYPICAL BOND BEAM OF WALL

BOND BEAM LIMITS

BOND BEAM CONCRETE LIMIT

BARRIER ROD

POLYURETHANE SEALANT

BACKER ROD

DETAIL B

DEEP 6"

CUT-OUT 4"

BAR "P" AT EQUAL SPACING (FOR TOTAL NUMBER SEE REINFORCEMENT SCHEDULE)

EXPANSION JOINT FILLER PLACED IN SASH BLOCK RECESSES.

#5 (TYP.)
1. Wall to be designated Noise Barrier Wall Type 20A, 20B, 20C, or 20D. The Contract specifies actual wall designs.
2. For intermediate wall heights, use the next higher H.
3. All masonry shall be hollow unit and installed as running bond.
4. All masonry is to be specially inspected.
5. All Concrete Masonry Unit (CMU) cells that have vertical steel reinforcing bars or bond beam units shall be filled with grout.
6. Panels shall have at least 5 feet of level ground on each side.
7. See "Masonry Wall Finishes and Details" sheet for masonry block finishes, special shapes, sizes and layouts.
8. The Contract specifies actual foundation requirements D1 or D2.

#5 @ 32"
#6 @ 32"
#7, #8,
#9 LAP 6' - 3"
#10 LAP 7' - 11"
#4, #5, LAP 2' - 6"
TYPICAL EXPANSION JOINT

PIPE TO #6

1/4" CLEARANCE TO FACE SHELL

SECTION D
CAP ABOVE

SECTION C
1/2" CLEARANCE TO FACE SHELL

SECTION FILL PILASTER W/ CONCRETE
1 1/2" CLR.

STANDARD PLAN D-2.68-00
NOISE BARRIER WALL
TYPE 20
MASONRY WALL ON SHAFT FOUNDATION

NOTE: SPIRAL REINFORCEMENT SHALL BE LAPPED 17" MIN. A 135° HOOK THAT IS HOOKED AROUND A LONGITUDINAL BAR SHALL BE USED TO TERMINATE THE ENDS OF THE SPIRAL REINFORCEMENT AT LAPPED SPLICES AND AT THE TOP AND BOTTOM OF SHAFT.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:
1. Wall to be designated Noise Barrier Wall Type 15A, 15B, 15C or 15D. The Contract specifies actual wall designation.
2. For intermediate wall heights not listed use the next higher H.
3. Panels shall have at least 3 feet of level ground on each side.
4. Plywood and Glulam panels and all lumber shall be pressure preservative treated.
5. The Contract shall specify actual foundation requirements D1 or D2.

SOIL TYPE

- D1
- D2
- B1
- B2

WIND EXPOSURE & VELOCITY

- TYPE 15A
- TYPE 15B
- TYPE 15C
- TYPE 15D

WIND VELOCITY (MPH)

- 15A: 80
- 15B: 90
- 15C: 80
- 15D: 90

SOIL TYPE

- B1
- B2

ANGL OF INTERNAL FRICTION (DEGREES)

- 15A: 32
- 15B: 32
- 15C: 32
- 15D: 32

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. All rebar shall have a minimum 1 1/2" cover.

2. See Standard Plan D-2.06 for wall reinforcement not shown.

3. See Standard Plan D-2.06 for wall reinforcement not shown.

BENDING DIAGRAM

ANCHOR PIN WELDED TO DOOR FRAME (TYP.)

EXPANSION JOINT

FOR CAST-IN-PLACE WALL ON OFFSET SPREAD FOOTING

NOISE BARRIER WALL
ACCESS DOOR TYPE 1

STANDARD PLAN D-2.80-00

Sheet 1 of 1 Sheet

Harold J. Peterson 11-10-05

Washington State Department of Transportation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. All bars shall have a minimum 1 1/2" cover.
2. See Standard Plan 0-2.02 for door and frame details.

Harold J. Peterfeso
11-10-05

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Notes:
1. All rebar shall have a minimum 1 1/2" cover.
3. See Standard Plan D-2.36 for wall reinforcement not shown.
NOTES
1. All rebar shall have a minimum 1 1/2" cover.

Harold J. Peterfeso 11-10-05

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. All rebars shall have a minimum 1 1/2" cover.
3. See Standard Plan D-2.68 for wall reinforcement not shown.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**NOTE:**

All exposed metal surfaces shall be painted with paint conforming to the requirements in the Standard Specifications, Section 9.
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**Geosynthetic Wall, Type 1**

- **Ground Acceleration Coefficient**: A = 0.16g to 0.30g.
- **Horizontal Backslope with 2 ft. Traffic Surcharge**: \( z < (0.7 \times L) \)

**Geosynthetic Wall, Types 2 & 3**

- **Ground Acceleration Coefficient**: A = 0.15g or less.
- **Horizontal Backslope with 2 ft. Traffic Surcharge**: \( z < (0.7 \times L) \)

**Geosynthetic Wall, Type 4**

- **Static Design Only**

**Permanent Geosynthetic Wall**

- **Typical Cross Sections**

**Notes**

1. For the values of \( z \), \( L \), and \( S_v \), see Sheet 2.
2. For Geosynthetic Wall Construction Sequence, see Sheet 3.
3. \( E \) = epoxy coated.
4. Geotextile for underground drainage Class A, Low Survivability (only needed if a geogrid is used for geosynthetic reinforcement).
5. 4' L.D. and Pipe for Weep Hole in Wall Facing - Place between GEOSYNTHETIC LAYERS, depth 12' to 18' horizontal spacing, length to extend to outer surface of specified Wall Facing.

**Drawing by:** Mark Sujka

**Expiry:** July 1, 2007

**Effective:** December 7, 2009 to August 1, 2010
## Geosynthetic Reinforcement Length and Dovels

<table>
<thead>
<tr>
<th>Total Wall Height (HMP) (ft)</th>
<th>Geosynthetic Reinforcement Length (L)</th>
<th>Rows of 24” Dowel Bars Required (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18’-0”</td>
<td>8.5</td>
<td>3</td>
</tr>
<tr>
<td>17’-6”</td>
<td>9.0</td>
<td>3</td>
</tr>
<tr>
<td>17’-0”</td>
<td>9.5</td>
<td>3</td>
</tr>
<tr>
<td>16’-6”</td>
<td>10.0</td>
<td>4</td>
</tr>
<tr>
<td>16’-0”</td>
<td>10.5</td>
<td>4</td>
</tr>
<tr>
<td>15’-0”</td>
<td>11.0</td>
<td>4</td>
</tr>
<tr>
<td>14’-6”</td>
<td>11.5</td>
<td>4</td>
</tr>
<tr>
<td>14’-0”</td>
<td>12.0</td>
<td>4</td>
</tr>
<tr>
<td>13’-6”</td>
<td>12.5</td>
<td>4</td>
</tr>
<tr>
<td>13’-0”</td>
<td>13.0</td>
<td>4</td>
</tr>
<tr>
<td>12’-6”</td>
<td>13.5</td>
<td>4</td>
</tr>
<tr>
<td>12’-0”</td>
<td>14.0</td>
<td>4</td>
</tr>
<tr>
<td>11’-6”</td>
<td>14.5</td>
<td>4</td>
</tr>
<tr>
<td>11’-0”</td>
<td>15.0</td>
<td>4</td>
</tr>
<tr>
<td>10’-6”</td>
<td>15.5</td>
<td>4</td>
</tr>
<tr>
<td>10’-0”</td>
<td>16.0</td>
<td>4</td>
</tr>
<tr>
<td>9’-6”</td>
<td>16.5</td>
<td>4</td>
</tr>
<tr>
<td>9’-0”</td>
<td>17.0</td>
<td>4</td>
</tr>
<tr>
<td>8’-6”</td>
<td>17.5</td>
<td>4</td>
</tr>
<tr>
<td>8’-0”</td>
<td>18.0</td>
<td>4</td>
</tr>
<tr>
<td>7’-6”</td>
<td>18.5</td>
<td>4</td>
</tr>
<tr>
<td>7’-0”</td>
<td>19.0</td>
<td>4</td>
</tr>
<tr>
<td>6’-6”</td>
<td>19.5</td>
<td>4</td>
</tr>
<tr>
<td>6’-0”</td>
<td>20.0</td>
<td>4</td>
</tr>
<tr>
<td>5’-6”</td>
<td>20.5</td>
<td>4</td>
</tr>
<tr>
<td>5’-0”</td>
<td>21.0</td>
<td>4</td>
</tr>
<tr>
<td>4’-6”</td>
<td>21.5</td>
<td>4</td>
</tr>
<tr>
<td>4’-0”</td>
<td>22.0</td>
<td>4</td>
</tr>
<tr>
<td>3’-6”</td>
<td>22.5</td>
<td>4</td>
</tr>
<tr>
<td>3’-0”</td>
<td>23.0</td>
<td>4</td>
</tr>
<tr>
<td>2’-6”</td>
<td>23.5</td>
<td>4</td>
</tr>
<tr>
<td>2’-0”</td>
<td>24.0</td>
<td>4</td>
</tr>
<tr>
<td>1’-6”</td>
<td>24.5</td>
<td>4</td>
</tr>
<tr>
<td>1’-0”</td>
<td>25.0</td>
<td>4</td>
</tr>
</tbody>
</table>

## Geosynthetic Reinforcement Spacing and Strength

<table>
<thead>
<tr>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 4</th>
<th>Type 5</th>
<th>Type 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>1860</td>
<td>1716</td>
<td>1488</td>
<td>1020</td>
<td></td>
</tr>
<tr>
<td>Type 2</td>
<td>1284</td>
<td>1114</td>
<td>1020</td>
<td>1272</td>
<td>1272</td>
</tr>
<tr>
<td>Type 3</td>
<td>1860</td>
<td>1114</td>
<td>1020</td>
<td>1272</td>
<td>1272</td>
</tr>
<tr>
<td>Type 4</td>
<td>1488</td>
<td>1114</td>
<td>1020</td>
<td>1272</td>
<td>1272</td>
</tr>
<tr>
<td>Type 5</td>
<td>1860</td>
<td>1114</td>
<td>1020</td>
<td>1272</td>
<td>1272</td>
</tr>
<tr>
<td>Type 6</td>
<td>1860</td>
<td>1114</td>
<td>1020</td>
<td>1272</td>
<td>1272</td>
</tr>
</tbody>
</table>

## Long-Term Geosynthetic Reinforcement Strength Required

<table>
<thead>
<tr>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 4</th>
<th>Type 5</th>
<th>Type 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>30’</td>
<td>1860</td>
<td>1114</td>
<td>1020</td>
<td>1272</td>
<td>1272</td>
</tr>
<tr>
<td>20’</td>
<td>1860</td>
<td>1114</td>
<td>1020</td>
<td>1272</td>
<td>1272</td>
</tr>
<tr>
<td>10’</td>
<td>1860</td>
<td>1114</td>
<td>1020</td>
<td>1272</td>
<td>1272</td>
</tr>
</tbody>
</table>

## Notes

1. **L** is the distance from the top of wall (or floor) to a geosynthetic layer, and is used to determine the reinforcement strength for that layer.
2. **HMP** is a reference for Standard Plan D-3.

---

**Permanant Geosynthetic Wall Types 1 ~ 6 Standard Plan D-3**

Sheet 2 of 3 Sheets

Approved for Publication

Harold J. Peterfeso

Washington State Department of Transportation

[Signature]

July 1, 2007
1. Set form on completed lift.

2. Unroll geosynthetic and position it so that a 4'-0" wide "tail" drapes over the form. If a geogrid is used for the geosynthetic reinforcement, position geotextile to prevent backfill from spilling through geogrid openings.

3. Place the backfill until the backfill is up to half of the required vertical geosynthetic layer spacing.

4. Place a windrow to slightly greater than full lift height against the form.

5. Place the geosynthetic "tail" over the windrow and lock into place with backfill.

6. Complete backfilling until the completed backfill layer thickness is equal to the required vertical geosynthetic layer thickness.

7. The form may be lifted in place while constructing the next layer. See note 3, otherwise, reset the form and repeat the sequence.

Permanent Geosynthetic Wall
Types 1 ~ 6
Standard Plan D-3
Sheet 3 of 3 Sheets

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
MOMENT SLAB CONSTRUCTION JOINT SPACING @ 120' - 0" MAX.

EXP. JNT.

BARREL EXPANSION JNT. SPACED @ 24' - 0" O.C.

BARREL DUMMY JOINT SPACED @ 9' - 0" O.C.

BARREL EXPANSION JOINT

EXPANSION JOINT (TYP.)

TRAFFIC BARRIER (SEE DETAIL)

ALL DIMENSIONS ARE OUT TO OUT UNLESS OTHERWISE NOTED.

THIS PLAN SHALL BE AASHTO M 31 ALL REINFORCING BARS SHOWN ON PLAN VIEW

REINFORCING STEEL BENDING DIAGRAM

ELEVATION

REINFORCING STEEL BENDING DIAGRAM

DUMMY JOINT DETAIL

RUSTICATION DETAIL

TYPICAL SECTION

SLAB NAME

SLAB LENGTH

DAM WALL

AT GRADE

GREATER THAN 80' - 0"

7' - 0"

8' - 0"

BETWEEN 60' - 0" & 80' - 0"

6' - 0"

8' - 0"

BETWEEN 40' - 0" & 60' - 0"

5' - 0"

7' - 0"

LESS THAN 40' - 0"

4' - 0"

5' - 0"

CONTACT BRIDGE OFFICE

APPROVED FOR PUBLICATION

HAROLD J. PETERFESO

STATE DESIGN ENGINEER

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EXP. MAY 19, 2006

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON ARCHIVAL. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. SEE CONTRACT FOR BACKFILL LIMITS AND GEOTEXTILE CLASS.
TYPICAL GABION

Unit A - 2 cell gabion = 6'
Unit B - 3 cell gabion = 9'
Unit C - 4 cell gabion = 12'

LACING DETAIL

FASTENING ADJACENT BASKETS

CROSS CONNECTING WIRE PLACEMENT, END CELLS

CROSS CONNECTING WIRE PLACEMENT, INTERIOR CELLS OF FRONT GABIONS

TWISTED FABRIC

WELDED FABRIC

Six independent wires encompassed

Three vertical and two horizontal wires encompassed

Clifford E. Mansfield 6/19/98

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. All concrete shall be Class 4000, except as noted.
2. For backfill requirements, see Standard Plan D-4.
3. When Wall Type 15W (select one) is specified, the concrete cover over steel in the front face and the total wall thickness shall be increased by 1/".
4. When Wall Type 15W (select one) is specified, concrete in the table column "Material Quantity" shall be increased by (0.005 x ft^3) CY/LF.
5. Concrete in the 48 foot wall sections shall be placed separately between expansion joints with a minimum 24 hour period before placing concrete in the adjacent section.
6. This wall has been designed in accordance with the requirements of the AASHO LRFD Bridge Design Specifications, 4th Edition 2007 and Interim through 2008. The seismic design of these walls has been completed using an effective PGA of 0.81 g.

VERTICAL FACE WALL DESIGN WITH A 250 PSF SURCHARGE OR TRAFFIC BARRIER

REINFORCED CONCRETE RETAINING WALL TYPE 1 AND 15W
STANDARD PLAN D-16.10-01

APPROVED FOR PUBLICATION
Peace Rockefeller 11-12-10
Washington State Department of Transportation

TYPICAL SECTION
### Footing Reinforcement

<table>
<thead>
<tr>
<th>BAR</th>
<th>#4</th>
<th>MATERIAL</th>
<th>#10</th>
<th>MATERIAL</th>
<th>#16</th>
<th>MATERIAL</th>
<th>#20</th>
<th>MATERIAL</th>
<th>#25</th>
<th>MATERIAL</th>
<th>#32</th>
<th>MATERIAL</th>
<th>#40</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Reinforcement Notes:
1. If trapped rebar is used, add 0.120% CFIP of concrete class 4800 for barrier alternate 1, add 0.138% CFIP of concrete class 4800 for barrier alternate 2, see standard plan D-16.10.
2. Add 25' LF of reinforcing steel for barrier alternate 1 or 10' LF of reinforcing steel for barrier alternate 2, see standard plan D-16.10.

### Steel Reinforcement

<table>
<thead>
<tr>
<th>BAR</th>
<th>#4</th>
<th>MATERIAL</th>
<th>#10</th>
<th>MATERIAL</th>
<th>#16</th>
<th>MATERIAL</th>
<th>#20</th>
<th>MATERIAL</th>
<th>#25</th>
<th>MATERIAL</th>
<th>#32</th>
<th>MATERIAL</th>
<th>#40</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### VERTICAL FACE WALL DESIGN WITH A 225 PSF SURCHARGE OR TRAFFIC BARRIER

#### Reinforced Concrete Retaining Wall

**Type A and 15W**

**Standard Plan D-16.10-01**

**Sheet 2 of 2 Sheets**

Approved for Publication

Pacee B旗舰店 19-02-09

Washington State Department of Transportation
## Reinforcement Factors

**Reinforcement Notes:**

1. If T-tie or barrier is used, add 0.0115 CF of concrete class 4000 for barrier alternate 1, 0.011 CF of concrete class 4000 for barrier alternate 2. See standard plan D-16-10

2. Add 50% of reinforcing steel for barrier alternate 1 or 30% of reinforcing steel for barrier alternate 2. See standard plan D-16-10

### SLOPING FACE WALL DESIGN

WITH A 250 PSF SURCHARGE

---

### Reinforced Concrete Retaining Wall

**Type 2 and 28W**

**Standard Plan D-16-10**

**Sheet 2 of 2 Sheets**

**Approved for Publication**

Pecco Balkrishna 12-03-09

Washington State Department of Transportation
NOTES
1. All concrete shall be Class 4000, except as noted.
2. For budell requirements, see Standard Plan D-4.
3. When Wall Type 35W (millimeter) is specified, the concrete cover over steel in the front face and the total wall thickness shall be increased by 1".
4. When Wall Type 35W (millimeter) is specified, concrete in the table column "Material Quantity" shall be increased by (0.003 x h) CY/lf.
5. Concrete in the 46 foot wall sections shall be placed sequentially between expansion joints with a minimum 24 hour period before placing concrete in the adjacent section.
6. This wall has been designed in accordance with the requirements of the AASHTO LRFD Bridge Design Specifications 4th Edition 2007 and Interim through 2008. The seismic design of these walls has been completed using an effective PGA of 0.15 g.

VERTICAL FACE WALL DESIGN
WITH 2:1 BACKSLOPE

REINFORCED CONCRETE RETAINING WALL
TYPE 3 AND 35W
STANDARD PLAN D-10.20-00

PEACE R. BAKSHI
07-08-00
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

BAR | 04
LOCATION | WALL HEIGHT
9" 4
12" 4
15" 4
18" 4
21" 4
24" 4
27" 4
30" 4
33" 4
36" 4
42" 4
QTY.
4
4
4
4
4
4
4
4
4
4
4
4

TOP OF FOOTING
18" 2
30" 2
30" 2
30" 2

BOTTOM OF FOOTING
18" 12
30" 12
30" 12
30" 12

SPLIT ELEVATION VIEW
(REMOVING SEPARATE REBAR LAYERS)

KEY DETAIL
REQUIRED ON WALLS WHERE H > 18"
### FOOTING REINFORCEMENT

<table>
<thead>
<tr>
<th>WALL</th>
<th>BAR</th>
<th>MATERIAL QUANTITY</th>
<th>MAXIMUM STRESS</th>
<th>FLANGE REINFORCEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-1/2 12D</td>
<td>52.8</td>
<td>107</td>
</tr>
</tbody>
</table>

### VERTICAL FACE WALL DESIGN WITH 2:1 BACKSLOPE

**REINFORCED CONCRETE RETAINING WALL TYPE 3 AND 3SW STANDARD PLAN D-10.20-00**

- **BAR**  
  - **RADIUS**  
  - **MIN. APL.**  
  - **MIN. PREC.**

![Diagram of vertical face wall design with 2:1 backslope](image-url)
SLOPING FACE WALL DESIGN
WITH 2:1 BACKSLOPE

REINFORCED CONCRETE
RETAINING WALL
TYPE 4 AND 48W
STANDARD PLAN D-10.25-00
SHEET 1 OF 5 SHEETS

KEY DETAIL
REQUIRED ON WALL WHERE H > 15'

PHOTO OF WALL

TYPICAL SECTION

OFFSET - SET TOP OF WALL BASIC = T - 12" H = 24" OFFSET = 4 = H + 12" - 2

SPLIT ELEVATION VIEW
(RIGHTING SEPARATE REBAR LAYERS)

BAR QTY
LOCATION WALL HEIGHT

TOP OF
POSTING

BOTTOM OF
POSTING

QTY

5' 1" 4
12' x 18' 4
18' x 32' 4
24' x 32' 4
30' x 32' 4
36' x 32' 4
42' x 32' 4
48' x 32' 4
54' x 32' 4
60' x 32' 4
66' x 32' 4
72' x 32' 4
78' x 32' 4
84' x 32' 4

NOTES
1. All concrete shall be Class 4000, except as noted.
2. For Retaining Wall Type 48W (staywall) is specified, the concrete is specified in the front face and the total wall thickness shall be increased by 1".
3. When Wall Type 48W (staywall) is specified, the concrete in the table column "Material Quantity" shall be increased by (0.005 x H) CULF.
4. Concrete in the 48 foot wall sections shall be placed separately between expansion joints with a minimum 24 hour period before placing concrete in the adjacent section.
5. The wall has been designed in accordance with the requirements of the AASHTO LRFD Bridge Design Specifications 4th Edition 2007 and Interim through 2008. The seismic design of these walls has been completed using an effective PGA of 0.21 g.
### Vertical Face Wall Design with 2:1 Backslope

**REINFORCED CONCRETE RETAINING WALL**  
**TYPE 4 AND 4BW**  
**STANDARD PLAN D-10.25-00**

<table>
<thead>
<tr>
<th>B</th>
<th>G</th>
<th>D</th>
<th>H</th>
<th>L</th>
<th>M</th>
<th>A</th>
<th>B</th>
<th>G</th>
<th>D</th>
<th>H</th>
<th>L</th>
<th>M</th>
<th>A</th>
<th>B</th>
<th>G</th>
<th>D</th>
<th>H</th>
<th>L</th>
<th>M</th>
<th>A</th>
<th>B</th>
<th>G</th>
<th>D</th>
<th>H</th>
<th>L</th>
<th>M</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**RADUS**

- **B**
- **G**
- **D**
- **H**
- **L**
- **M**
- **A**

**VERTICAL FACE WALL DESIGN**

**EFFECTIVE: DECEMBER 7, 2009 TO AUGUST 1, 2010**

**APPENDED FOR PUBLICATION**

**Peace Boulevard SW**

**Washington State Department of Transportation**

**07-05-09**
### Vertical Face Wall Design with 2:1 Backslope

#### Reinforced Concrete Retaining Wall

**Type 5**

**Standard Plan D-10.30-00**

Approved for Publication

**Peace Bakovich M.E.**

[Diagram of vertical face wall design with 2:1 backslope, showing dimensions and reinforcement details.]

---

**Dimensions and Reinforcement Details:**

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bars</th>
<th>Bar Detail</th>
<th>Length</th>
<th>Diameter</th>
<th>Material</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot;</td>
<td>A</td>
<td>1/2&quot;</td>
<td>36&quot;</td>
<td>1/4&quot;</td>
<td>VA</td>
<td>12&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>B</td>
<td>1/2&quot;</td>
<td>48&quot;</td>
<td>3/8&quot;</td>
<td>VA</td>
<td>12&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>C</td>
<td>3/4&quot;</td>
<td>60&quot;</td>
<td>1&quot;</td>
<td>VA</td>
<td>12&quot;</td>
</tr>
<tr>
<td>30&quot;</td>
<td>D</td>
<td>1/2&quot;</td>
<td>72&quot;</td>
<td>1/2&quot;</td>
<td>VA</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>

---

**Notes:**

- Bars A and B are located at the base of the wall.
- Bars C and D are placed at the top of the wall.
- All bars are galvanized and of VA grade.
- Spacing between bars is 12".
### Reinforced Concrete Retaining Wall

#### Type 6

##### Standard Plan D-10.35-00

**Sheet 2 of 2 Sheets**

**Approve for Publication**

**Peune Bakouch / PT-08-00**

**Washington State Department of Transportation**

---

**Dimensions**

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Dimensions</th>
<th>Footing Reinforcement</th>
<th>Stem Reinforcement</th>
<th>Material Quantity</th>
<th>Maximum Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- See Table for RADIUS
- Bar (E) at 1'-6" center
- Bar (F) at 1'-0" center

---

**Sloping Face Wall Design with 2:1 Backslope**

---

**Effective: December 7, 2009 to August 1, 2010**

---

**Effective: December 7, 2009 to August 1, 2010**

---

**Effective: December 7, 2009 to August 1, 2010**
### Reinforcement Notes

1. If trussed bar is used, add 0.110 CY of concrete class 400 for barrier alternate 1.  
   Add 0.112 CY of concrete class 400 for barrier alternate 2.  Use standard plan D-6-10.

2. Add 16 Earl of reinforcing steel for barrier alternate 1 or 23 Earl of reinforcing steel  
   for barrier alternate 2.  Use standard plan D-6-10.

### Sloping Face Wall Design

With a 280 PSF surcharge.

---

### Reinforced Concrete Retaining Wall

**Type 8**

**Standard Plan D-10.48-01**

Sheet 2 of 2 sheets

Approved for publication: 12-22-08

Washington State Department of Transportation

---

### FOOTING REINFORCEMENT

<table>
<thead>
<tr>
<th>Wall</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>A</th>
<th>Footing</th>
<th>Bar</th>
<th>h</th>
<th>Ø</th>
<th>Spacing</th>
<th>Ø</th>
<th>Spacing</th>
<th>Ø</th>
<th>Spacing</th>
<th>Ø</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>48</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>72</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>14</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>84</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>16</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>96</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>18</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>108</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

---

**DIMENSIONS**

- B: Width
- C: Depth
- D: Thickness
- A: Length

**REINFORCEMENT**

- Ø: Diameter
- Spacing: Spacing between bars

**BAR (B) & (D)**

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>D</th>
<th>A</th>
<th>Footing</th>
<th>Bar</th>
<th>h</th>
<th>Ø</th>
<th>Spacing</th>
<th>Ø</th>
<th>Spacing</th>
<th>Ø</th>
<th>Spacing</th>
<th>Ø</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>48</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>72</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>84</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>96</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>108</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

---

**STEM REINFORCEMENT**

- Ø: Diameter
- Spacing: Spacing between bars

---

**MATERIAL QUALITY**

- Maximum size of reinforcement: (PSF)
- Reinforcement: (PSF)
1. All numerals are approx. $3\frac{1}{4}$" wide except numeral "1" which is approx. $\frac{5}{8}$" wide.

2. Spacing between the numeral "1" and any other numeral is $\frac{1}{16}$". Spacing between all other numerals is $\frac{3}{16}$".

3. Traffic Barrier Connections between the bridge and the approaching roadway vary and may consist of concrete barrier extensions. Install the Date Numerals on the traffic barrier of the bridge itself.

Traffic Barrier Connections between the bridge and the approaching roadway vary and may consist of concrete barrier extensions. Install the Date Numerals on the traffic barrier of the bridge itself.

DATE NUMERAL DETAILS

DATE LOCATION DETAIL

DATE NUMERAL PLACEMENT ON BRIDGE TRAFFIC BARRIER

STANDARD PLAN E-1

DATE NUMERAL DETAILS

TYPICAL DATE NUMERALS

TYPICAL SECTION VIEW

NUMERAL "1"

DATE NUMERAL PLACEMENT ON BRIDGE TRAFFIC BARRIER

STANDARD PLAN E-1

DUE TO EXPIRATION OF ORIGINAL

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Dimensions and notations for superstructure are typical for both single lane and two lane bridges.

2. All timber and lumber shall be #2 or better and untreated Douglas fir-larch.

3. All piling shall be untreated Douglas fir and shall be driven to develop a minimum load bearing capacity of 15 tons.

4. Blocking for frame bents shall be proportioned to carry a minimum load of 30 tons per post.

5. All hardware shall be black, ungalvanized.

6. Each deck plate shall be nailed to each stringer with two 7" spikes, number 1 or larger.

7. On 17' spans, stringers shall be 6x16 S1E. On 15' spans, stringers shall be 5x16 S1E. Two-lane bridges shall use thirteen lines of stringers, one-lane bridges shall use seven lines of stringers.

8. Overlay thickness must be sufficient to cover bolts.

NOTES

1. Dimensions and notations for superstructure are typical for both single lane and two lane bridges.

2. All timber and lumber shall be #2 or better and untreated Douglas fir-larch.

3. All piling shall be untreated Douglas fir and shall be driven to develop a minimum load bearing capacity of 15 tons.

4. Blocking for frame bents shall be proportioned to carry a minimum load of 30 tons per post.

5. All hardware shall be black, ungalvanized.

6. Each deck plate shall be nailed to each stringer with two 7" spikes, number 1 or larger.

7. On 17' spans, stringers shall be 6x16 S1E. On 15' spans, stringers shall be 5x16 S1E. Two-lane bridges shall use thirteen lines of stringers, one-lane bridges shall use seven lines of stringers.

8. Overlay thickness must be sufficient to cover bolts.
**PILE DETAILS**

1. Plane lifting loops at the lifting points shown in the PILE HANDLING DIAGRAM, Plan E-4a, for the cases stated in the contract.
2. Spirals shall be spliced either by lapping one full turn and bending the end of the spiral to a 180° arc by welding or by the use of a mechanical connector that develops 100% of the minimum yield strength of the spiral. Welding shall meet the requirements of Standard Specification G-02.32-06.
3. All pullout reinforcing strands are 1/2 in. or 0.8 in. diameter (d_{pu}). Grade 270, uncoated strands. AASHTO M229, jacks to 0.75 Fpu maximum.
4. Strength of concrete shall be 5 ksi at release and 7.0 ksi at final.
5. 2 1/2 in. cover if pile is exposed to salt water.

**NOTE 1**

- 1.5 in. cover.
- 1 1/2 in. CLR.

**NOTE 2**

1.5 in. cover.

**NOTE 3**

1.5 in. cover.

**NOTE 4**

1.5 in. cover.

**NOTE 5**

1.5 in. cover.

**NOTE 6**

1.5 in. cover.

**NOTE 7**

1.5 in. cover.

**NOTE 8**

1.5 in. cover.

**NOTE 9**

1.5 in. cover.

**NOTE 10**

1.5 in. cover.

**NOTE 11**

1.5 in. cover.

**NOTE 12**

1.5 in. cover.

**NOTE 13**

1.5 in. cover.

**NOTE 14**

1.5 in. cover.

**NOTE 15**

1.5 in. cover.

**NOTE 16**

1.5 in. cover.

**NOTE 17**

1.5 in. cover.

**NOTE 18**

1.5 in. cover.

**NOTE 19**

1.5 in. cover.

**NOTE 20**

1.5 in. cover.

**NOTE 21**

1.5 in. cover.

**NOTE 22**

1.5 in. cover.

**NOTE 23**

1.5 in. cover.

**NOTE 24**

1.5 in. cover.

**NOTE 25**

1.5 in. cover.

**NOTE 26**

1.5 in. cover.

**NOTE 27**

1.5 in. cover.

**NOTE 28**

1.5 in. cover.

**NOTE 29**

1.5 in. cover.

**NOTE 30**

1.5 in. cover.
For pile lifting Case 1 and 2, do not allow pile tip to bear on other piling stored in a lower layer.

For pile lifting Case 3 and 4, tilt the pile in the air, do not allow the pile to touch the ground.

The minimum angle between the pile and the lifting strap is 60° when the pile is in the horizontal position.

When directed to remove a lifting loop, cut it off at the bottom of the recess and patch the recess by filling it with 1:2 mortar, finishing it to the level of the pile face. The patch shall be allowed to cure at least 24 hours prior to driving the pile.

For handling and bunking, the Prestressed piles shall have at least the minimum number of strands shown on Std Plan E4.
1. The intent of this design is to facilitate the compaction of Hot Mix Asphalt pavement adjacent to a drainage structure. The centerline of the drainage structure may differ from the centerline of the frame and grate.

2. The centerline of the drainage structure may differ from the centerline of the frame and grate.

The face of the curb matches the roadway slope. The centerline of the frame and grate is not included in the curb and gutter bid item. The drainage structure is not included in the curb and gutter bid item.
NOTES
1. The installation of curbs in areas with existing guardrail would require the removal and reinstallation of the guardrail or its components.
2. Extend shoulder pavement to provide a base for the extruded curbs.
3. Give Credit for exception to distance shown.
4. Type 3 and 5 curbs are not used on roadways with a posted speed greater than 45 mph.
5. Type 3 and 5 are not used under beam guardrail on roadways with a posted speed greater than 60 mph.

EXTRUDED CURB PLACEMENT
STANDARD PLAN F-1040-01
Sheet 1 of 1 Sheet

Approved for publication by
Peace Bakovich
07-03-00
Washington State Department of Transportation
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
This table lists the calculated dimensions for casting blocks suitable for constructing various curb radii. Curved blocks, or blocks with different dimensions may be acceptable with prior approval of the engineer.
NOTE

The dual faced curb may be constructed by using two precast concrete sloped mountable curbs (longitudinal runoff) as long as the installation is consistent with the dimensions shown in this plan.
Cement Concrete Sidewalk

Cement Concrete Sidewalk

Monolithic Cement Concrete Curbs and Sidewalk

Cement Concrete Curb and Sidewalk

Joint and Finish Detail

CONTRACTION JOINT

EXPANSION JOINT

Cement Concrete Curbs

Cement Concrete Sidewalk

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Ken L. Smith 01-23-07

EXPIRES AUGUST 26, 2007
NOTES

1. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.

2. Layouts 1, 2, & 3 require two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 1". The bid item does not include the adjacent Curb (or Curb & Gutter), or Sidewalk.

3. Ramp slopes shall not be steeper than 12H:1V.

4. To the maximum extent feasible, ramp cross slopes shall not exceed 2%.

5. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.

6. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.


DATE: 10-05-07

Pasco Bakotich III
Washington State Department of Transportation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
### STANDARD PLAN F-40.12-00

**NOTES**

1. The bottom of the ramp shall have a level area (not in excess of 2\% in any direction), 4' × 4'.

2. The Type 2 Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 2". The bid item does not include the adjacent Curb or Curb & Gutter, the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.

3. Ramp slopes shall not be steeper than 12H:1V.

4. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.

5. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.


### SECTION 2'

<table>
<thead>
<tr>
<th>RADIUS AT FACE OF CURB</th>
<th>K</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 FEET</td>
<td>10'</td>
<td>6.5'</td>
</tr>
<tr>
<td>30 FEET</td>
<td>11.25'</td>
<td>7.5'</td>
</tr>
<tr>
<td>40 FEET</td>
<td>11.25'</td>
<td>7.5'</td>
</tr>
<tr>
<td>50 FEET</td>
<td>11.25'</td>
<td>7.5'</td>
</tr>
<tr>
<td>60 FEET</td>
<td>11.25'</td>
<td>7.5'</td>
</tr>
<tr>
<td>70 FEET</td>
<td>11.25'</td>
<td>7.5'</td>
</tr>
<tr>
<td>80 FEET</td>
<td>11.25'</td>
<td>7.5'</td>
</tr>
</tbody>
</table>

**DIMENSIONS AT FACE OF CURB**

<table>
<thead>
<tr>
<th>DEPENDENT CURB &amp; GUTTER</th>
<th>(SEE DETAIL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7'-0&quot;</td>
<td>2'-0&quot;</td>
</tr>
</tbody>
</table>

**DETECTABLE WARNING PATTERN DETAIL**

**PLAN**

This pattern area shall be yellow in color.

**ELEVATION**

 THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.

The Type 3A Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 3A". The bid item does not include the adjacent Curb (or Curb & Gutter), the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.

Ramp slopes shall not be steeper than 12H:1V.

Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.

Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

See Std. Plan F-30.10 for sidewalk joint placement and details.
1. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' x 4'.
2. The Type 3B Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 3B". The bid item does not include the adjacent Curb (or Curb & Gutter), the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.
3. Ramp slopes shall not be steeper than 12H:1V.
4. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.
5. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.1 for curb details.
This layout is used to provide access to a single crosswalk parallel to the major street. The bid item "Cement Conc. Sidewalk Ramp Type 4A" does not include the adjacent Curb (or Curb & Gutter), the Sidewalk, or the Cement Conc. Pedestrian Curb.

Ramp slopes shall not be steeper than 12H:1V. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.

Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

See Std. Plan F-30.10 for sidewalk joint placement and details.

The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.

This layout is used to provide access to a single crosswalk parallel to the major street. The bid item "Cement Conc. Sidewalk Ramp Type 4A" does not include the adjacent Curb (or Curb & Gutter), the Sidewalk, or the Cement Conc. Pedestrian Curb.

Ramp slopes shall not be steeper than 12H:1V. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.

Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

See Std. Plan F-30.10 for sidewalk joint placement and details.

The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.
1. This layout is used to provide access to a single crosswalk parallel to the major street. The bid item "Cement Conc. Sidewalk Ramp Type 4B" does not include the adjacent Curb for Curb & Gutter, the Sidewalk, or the Cement Conc. Pedestrian Curb.

2. Ramp slopes shall not be steeper than 1:12:1.

3. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.

4. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-40.12 for curb details.

5. See Std. Plan F-30.10 for sidewalk joint placement and details.

6. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' x 4'.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
ISOMETRIC VIEW

CROSSWALK

DRAWN BY: MARK SUJKA

CEMENT CONCRETE

PEDESTRIAN CURB

(SEE STD. PLAN F-10.12)

RADIUS POINT OF SIDEWALK RAMP AND CURB
RETURN — SEE CONTRACT FOR RADIUS

PLAN VIEW

SIDEWALK RAMP TYPE 4C

LAYOUT 1

MINOR STREET

MAJOR STREET

PLAN VIEW

SIDEWALK RAMP TYPE 4C

LAYOUT 1

MINOR STREET

MAJOR STREET

SECTION

INTERMEDIATE RADIUS CAN BE INTERPOLATED

THE RAMP SHOWN ON THIS PLAN IS IDEAL AND ASSUMES OPTIMAL ROADWAY GEOMETRIC DESIGN. IT ASSUMES A CURB HEIGHT OF 6".

ADJUSTMENTS MUST BE MADE FOR CONDITIONS IN THE FIELD SUCH AS ROADWAY GRADE, CURB HEIGHT, ETC.

1. THE MAXIMUM ALLOWABLE RAMP SLOPE IS 12H:1V (8.34% GRADE). THE FEDERAL HIGHWAY ADMINISTRATION (FHWA) ALONE WILL ACCEPT SIDEWALK RAMPS WITH SLOPES STEEPER THAN 12H:1V. FLATTER RAMP SLOPES ARE PERMISSIBLE. FIELD VERIFY THE FORMS BEFORE POURING CONCRETE.

2. TO THE MAXIMUM EXTENT FEASIBLE, THE RAMPS CROSS SLOPE SHALL NOT EXCEED 2%.

3. THE BOTTOM OF THE RAMP SHOWN HAS A LEVEL AREA NOT IN EXCESS OF 2% IN ANY DIRECTION, 4' X 4'.

4. AUDIT PLACING DRAINAGE STRUCTURES, JUNCTION BOXES OR OTHER OBSTRUCTIONS IN FRONT OF RAMP ACCESS AREAS.

5. LAYOUT 1 IS USED TO PROVIDE ACCESS TO A SINGLE CROSSWALK PARALLEL TO THE MAJOR STREET. THE BID ITEM "CEMENT CONCRETE SIDEWALK RAMP TYPE 4C" DOES NOT INCLUDE THE ADJACENT CURB (OR CURB & GUTTER), THE SIDEWALK, OR THE CEMENT CONCRETE PEDESTRIAN CURB.

6. THE BOTTOM OF THE RAMP SHALL HAVE A LEVEL AREA NOT IN EXCESS OF 2% IN ANY DIRECTION, 4' X 4'.

7. CURB & GUTTER IS SHOWN, SEE THE CONTRACT PLANS FOR THE CURB DESIGN SPECIFIED. SEE STANDARD PLAN F-10.12 FOR CURB DETAILS.

8. SEE STANDARD PLAN F-30.10 FOR CEMENT CONCRETE SIDEWALK DETAILS, SECTIONS, ETC.

9. NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
The ramp shown on this plan is ideal and assumes optimal roadway geometric design. A given initial curb height of 6" is first reduced to 4", via the Auxiliary Ramp, staging the final descent to the roadway. Adjustments must be made for conditions in the field such as roadway grade, existing curb height, etc. The dimensions shown are the minimum unless labeled otherwise.

The maximum allowable ramp slope is 12H:1V (8.34% grade). The Federal Highway Administration (FHWA) does not accept sidewalk ramps with slopes steeper than 12H:1V. Flatter ramp slopes are permissible. Field verify the forms before pouring concrete.

The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'. Avoid placing drainage structures, function boxes, or other obstructions in front of ramp access areas.

Layouts 1, 2, & 3 require two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 5". The bid item does not include the adjacent Curb (or Curb & Gutter), or Sidewalk.

Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

See Standard Plan F-30.10 for Cement Concrete Sidewalk details, sections, etc.

NOTES

1. The ramp shown on this plan is ideal and assumes optimal roadway geometric design. A given initial curb height of 6" is first reduced to 4", via the Auxiliary Ramp, staging the final descent to the roadway. Adjustments must be made for conditions in the field such as roadway grade, existing curb height, etc. The dimensions shown are the minimum unless labeled otherwise.

2. The maximum allowable ramp slope is 12H:1V (8.34% grade). The Federal Highway Administration (FHWA) does not accept sidewalk ramps with slopes steeper than 12H:1V. Flatter ramp slopes are permissible. Field verify the forms before pouring concrete.

3. To the maximum extent feasible, ramp cross slopes shall not exceed 2%.

4. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.

5. Avoid placing drainage structures, function boxes, or other obstructions in front of ramp access areas.

6. Layouts 1, 2, & 3 require two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 5". The bid item does not include the adjacent Curb (or Curb & Gutter), or Sidewalk.

7. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

8. See Standard Plan F-30.10 for Cement Concrete Sidewalk details, sections, etc.
NOTES

1. When the driveway width exceeds 18 feet, construct a full depth expansion joint (see Std. Plan F-30.10) with 3/8" joint filler along the driveway centerline. Construct expansion joints parallel with the centerline as required at 15' maximum spacing when driveway widths exceed 30'.

2. See Std. Plan F-30.10 for sidewalk details.

3. Curb and gutter shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

4. Avoid placing drainage structures, junction boxes or other obstructions in front of driveway entrances.

5. When the driveway width exceeds 15 feet, construct a full depth expansion joint (see Std. Plan F-30.10) with 3/8" joint filler along the driveway centerline. Construct expansion joints parallel with the centerline as required at 15' maximum spacing when driveway widths exceed 30'.


7. Curb and gutter shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

8. Avoid placing drainage structures, junction boxes or other obstructions in front of driveway entrances.

2. Provide Supplemental Plaques and install on Mileposts where indicated in the Contract.

3. See the Contract for the width of the Single-Faced Milepost Signs required (10" or 12").

4. For lateral installations behind traffic barrier, 6" high curbs, and ditches, see Standard Plan G-20.10.

5. Install at the locations shown in the Contract. Installation may be moved 20 feet or less (longitudinally) before or after the contract location if obstructions are encountered, or to utilize the post of another sign. Mileposts that cannot be placed within this degree of accuracy shall be omitted entirely.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**GROUND MOUNTED SIGN PLACEMENT**

STANDARD PLAN G-30.10-00

**SIGN INSTALLATION IN FILL SECTION**

**SIGN INSTALLATION ON STEEP FILL SLOPES**

**MULTIPLE SIGN POST INSTALLATION IN FILL SECTION**

**SIGN INSTALLATION IN DITCH SECTION**

**MULTIPLE SIGN POST INSTALLATION IN DITCH SECTION**

**NOTE:**

1. Refer to the Sign Specification Sheet of the Contract for the V and W distances.

2. The minimum vertical distance from the bottom of the sign to the ground shall not be less than 7' for signs located within the Design Clear Zone.

**DRAWN BY:** MARK SUJKA

**EXPIRES AUGUST 9, 2009**

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Dimensions for the parts used to assemble the base connections are intentionally not shown.
Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

For Steel Sign Support Foundation, see Standard Plan G-25.10.

For "H1" refer to the Sign Specification Sheet in the Contract.

Mounting brackets with steel straps shall be the stainless steel one bolt, flared leg bracket and 3/4" wide, 0.030" thick strap "Band-it" products or an approved equal.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP-350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

2. For Steel Sign Support Foundations, see Standard Plan G-25.10.

3. For "H1" refer to the Sign Specification Sheet in the Contract.
Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that use in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

For Steel Sign Support Foundations, see Standard Plan G-25.10.

For "X", "Y", "H1", and "H2", refer to the Sign Specification Sheet in the Contract.

Sign post shall be 2 1/2" nominal I.D. galvanized schedule 80 steel pipe.

Do not tighten any slip plate bolt to the recommended torque before pre-tightening the other bolts. Progressively tighten the three slip plate bolts in 10 ft-lbs increments, alternately, to a final torque of 38 ft-lbs on each bolt.
STEEL SIGN SUPPORT

**TYPES PL, PL-T, & PL-U**

**INSTALLATION DETAILS**

**STANDARD PLAN G-24.30-00**

### Type PL Sign Support

#### Dual Post Installation

<table>
<thead>
<tr>
<th>&quot;X&quot; SIGN WIDTH</th>
<th>6'-0&quot;</th>
<th>7'-0&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1'-0&quot;</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>B</td>
<td>3'-0&quot;</td>
<td>4'-0&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&quot;Y&quot; SIGN HEIGHT</th>
<th>6'-0&quot;</th>
<th>7'-0&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1'-0&quot;</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>B</td>
<td>3'-0&quot;</td>
<td>4'-0&quot;</td>
</tr>
</tbody>
</table>

A, B, C, D, E, F may be interpolated for intermediate sign sizes.

---

### Type PL-U Sign Support

#### Elevation

**SIGN PANEL**

**STEEL PIPE CAP (TYP.)**

**TOP OF SIGN POST**

**SLIP BASE ASSEMBLY**

**BOTTOM OF SIGN**

**FINISHED GROUND LINE**

**U-BAR SIGN SUPPORT**

**SIGN PANEL**

**TOP OF SIGN**

**STEEL PIPE CAP**

---

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
ASSEMBLY NOTES:

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

2. Do not tighten any single Slip Plate Bolt to the recommended torque before pre-tightening the other bolts. Progressively tighten the three Slip Plate Bolts in 10 ft-lb increments, alternating, to a final torque of 45 ft-lb on each.
1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

2. For "H1" refer to the Sign Specification Sheet in the Contract.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

2. For Steel Sign Support Foundations, see Standard Plan G-25.10.


NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPOR TATION. A COPY MAY BE OBTAINED UPON REQUEST.
STEEL SIGN SUPPORT
TYPES TP-A AND TP-B
INSTALLATION DETAILS

STANDARD PLAN G-24.60-00

WIDE FLANGE
STEEL SIGN POST
(UPPER SECTION)

WIDE FLANGE
STEEL SIGN POST
(LOWER SECTION)

SIGN PANEL

"H1" POST HEIGHT
7'-0" MIN.

HINGE
PLATE
(TYP.)

EQUAL SPACING
@ 3'-0" MAX.

SECONDARY SIGN

WINDBEAM

MAJOR SIGN

VARIES
0" TO 3"

"Y" SIGN HEIGHT

"H2" POST HEIGHT

TOP OF SIGN
POST

3/16" RIVET
3" 3/16" ALUM. RIVETS @ 4" STAGGERED SPACING (TYP.)

ALUMINUM WIND BEAM AND TWO POST CLIPS (TYP.) ~ SEE WINDBEAM AND SIGN POST CONNECTION

SEE STD. PLAN G-20.10

SEE NOTE 3

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. Mounting brackets with steel straps shall be a stainless steel band and buckle system product or an approved equal. Mounting brackets shall be universal channel clamps; steel straps shall be 3/4" wide and 0.030" thick.

2. All signs installed on mast arms or standards (poles) require windbeams. All signs shall be installed with horizontal edges level. A skewed windbeam is required only when the sign is mounted within 12" of the mast arm base (see Detail "A").

X = MORE THAN 4'-0" BUT NOT MORE THAN 8'-0"

X/4 - 0" OR LESS

EQUALLY SPACED

6"

SIGNAL STANDARD

STANDARD PLAN G-30.10-00

APPROVED FOR PUBLICATION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Pasco Bakotich 11-8-07 25335 EXPIRES AUGUST 9, 2009
Sign Installation on Signal or Light Standard

Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-0&quot;</td>
<td>9&quot;</td>
</tr>
</tbody>
</table>

B A

Signal or Light Standard

Back of Sign Panel

Level

Signal or Light Standard

Mounting Bracket and Steel Strap ~ See Note 1

3/16" Rivet (Typ.) ~ 4" Max. Spacing

Light Standards

DRAWN BY: ELENA BRUNSTEIN

STANDARD PLAN G-30.10-00

APPROVED FOR PUBLICATION

Pasco Bakotich III 11-8-07

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Mounting brackets with steel straps shall be a stainless steel band and buckle system product or an approved equal. Mounting brackets shall be one bolt, flared leg; steel straps shall be 3/4" wide and 0.030" thick.

2. Sign braces are only installed when specified in the contract.

3. Sign braces are typically necessary on large sign panels that are exposed to high winds, traffic generated wind buffeting, or when snow thrown from plows might impact the sign.

4. A nylon washer shall be placed between the sign and the steel washer when the sign face has Type 3 or 4 sheeting.

**NOTE:** This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
VERTICAL STRUTS AT SPAN END ONLY

VERTICAL "FAR" TRUSS DIAGONAL (TYP.)

VERTICAL "NEAR" TRUSS DIAGONAL (TYP.)

PANEL LENGTH (6' - 8" MAX.) TO BE "CONSTANT THICKNESS" BRIEF

\( X \)

\( X/2 \)

\( Y/2 \)

\( Y = 5' - 0" \) MIN.

1' - 6" MAX.

\( 2' - 0" \) H

\( 1\ 1/4" \) CAPPED NIPPLE

\( 1' - 0" \) MIN.

\( \text{BOTTOM OF BASE PLATE} \)

\( \text{BASE ELEVATION} \)

\( \text{HAND HOLE ON SIDE AWAY FROM TRAFFIC} \)

\( \text{VERTICAL CLEARANCE ~ 17' - 6" MIN.} \)

FROM HIGHEST POINT OF ROADWAY UNDER ASSEMBLY

\( \text{SIGN CENTERLINE MAY VARY FROM TRUSS CENTERLINE TO PROVIDE MINIMUM VERTICAL CLEARANCE.} \)

\( 2 \)

\( 2 \)

\( \text{SIGN & TRUSS CAMBER EACH TRUSS} \)

\( 0.002 \text{ FT/FT FOR DOUBLE CANTILEVER (TYP.)} \)

\( L = 21' - 0" \) MAX.

\( \text{STANDARD PLAN G-60.10-00} \)

\( \text{WASHINGTON STATE DEPARTMENT OF TRANSPORTATION} \)

\( \text{APPROVED FOR PUBLICATION} \)

\( \text{DATE} \)

\( \text{STATE DESIGN ENGINEER} \)

\( \text{SHEET 2 OF 4 SHEETS} \)

\( \text{DRAWN BY: BILL BERENS} \)

\( \text{NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.} \)
HEMISPHERICAL POST FINIAL,
1/8" MIN. THICKNESS. INSTALL
AFTER GALVANIZING

1' - 4 1/2"

CHORD TO POST
CONNECTION DETAIL

ENDS OF DIAGONALS SHALL BE CUT TO FIT
HEATLY AGAINST CHORDS

CANTILEVER
SIGN STRUCTURE
(TRUSS-TYPE)

STANDARD PLAN G-60.10-00

©Pasco Bakotich III 08-31-07
Washington State Department of Transportation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANS-
PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
SEAL

WELD

BASE WELD DETAIL

22°30' (TYP.)

1/8

1/4

SEAL

WELD

TOP

B

C

1"

2 1/2"

3/8"

6 3/4"

1' - 0"

2 1/2"

3/16

1/2" DIAM. STEEL BOLT.

1 1/2" LONG, WITH WASHER

AND NUT FOR GROUND

4"

HAND HOLE

FRAME

SECTION

C

VIEW

REMOVABLE RAIN TIGHT

HAND HOLE COVER WITH GASKET

– FASTEN WITH TWO STAINLESS STEEL

(316L) PAN HEAD SCREWS

2" DIAM. HOLES

FOR ANCHOR BOLTS

HOLE IN POST BASE

(5 IN. DIAMETER)

3" DUAL HOLES

FOR ANCHOR BOLTS

B

C

1" MAX.

B

SECTION

C

VIEW

1/8" BACK-UP BAR

24" O.D. PIPE (t = 0.969) SPLICE WITH
24" O.D. UPRIGHT POST (SEE POST SELECTION TABLE)

1/8" O.D. PIPE (t = 0.700) SPLICE WITH
1/8" O.D. UPRIGHT POST (SEE POST SELECTION TABLE)

BASE WELD DETAIL

POST BASE DETAILS

INSIDE EDGES SHALL BE

ROUND AND SMOOTH

ALL AROUND

DRILL AND TAP FOR

1/4" DIA. CAP SCREW,

ASTM F 593, W/ S.S.

WASHER, SPACING

O.C.

WELDED GALV. CLOTH

1/16" x 7/16" SQ. WRAP

AROUND BASE PLATE

WITH 3" MIN. LAP

REMOVABLE RAIN TIGHT

HAND HOLE COVER WITH GASKET

– FASTEN WITH TWO STAINLESS STEEL

(316L) PAN HEAD SCREWS

2" DIAM. HOLES

FOR ANCHOR BOLTS

HOLE IN POST BASE

(5 IN. DIAMETER)

3" DUAL HOLES

FOR ANCHOR BOLTS

B

C

1" MAX.

B

SECTION

C

VIEW

1/8" BACK-UP BAR

24" O.D. PIPE (t = 0.969) SPLICE WITH
24" O.D. UPRIGHT POST (SEE POST SELECTION TABLE)

1/8" O.D. PIPE (t = 0.700) SPLICE WITH
1/8" O.D. UPRIGHT POST (SEE POST SELECTION TABLE)

BASE WELD DETAIL

POST BASE DETAILS

INSIDE EDGES SHALL BE

ROUND AND SMOOTH

ALL AROUND

DRILL AND TAP FOR

1/4" DIA. CAP SCREW,

ASTM F 593, W/ S.S.

WASHER, SPACING

O.C.

WELDED GALV. CLOTH

1/16" x 7/16" SQ. WRAP

AROUND BASE PLATE

WITH 3" MIN. LAP

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT

BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY

THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON

FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
# Steel Reinforcement Bar Anchorage

## Material Specifications

- **Concrete**
  - Class: 4000

- **Steel Reinforcement Bar**
  - ASTM F 1554 Grade 60

- **Anchor Rods**
  - ASTM A 1034 Grade 105

- **Anchor Nuts**
  - ASTM F 290

- **Anchor Washers**
  - ASTM F 220

- **Anchor Plates**
  - ASTM A 35

## Bar List - Types 2 and 3

<table>
<thead>
<tr>
<th>Mark</th>
<th>Location</th>
<th>Bars per Type</th>
<th>Bars per Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pedestal Hoop</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Foundation Wall Ties</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Foundation Verticals</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>Pedestal Verticals</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Foundation Wall Horizontals at Slope</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Foundation Wall Horizontals</td>
<td>Varied (See Plans)</td>
<td>Varied (See Plans)</td>
</tr>
</tbody>
</table>

## Bending Diagram

- **Values of Z**

<table>
<thead>
<tr>
<th>Foundation Type</th>
<th>Total Sign Area</th>
<th>Allowable Lateral Bearing Pressure (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 2</td>
<td>9'-0&quot;</td>
<td>2500 or Greater</td>
</tr>
<tr>
<td>Type 3</td>
<td>11'-0&quot;</td>
<td>11' - 13'</td>
</tr>
</tbody>
</table>

## Foundation Types 2 & 3

- **Standard Plan G-60.30-00**
- **Sheet 2 of 2 Sheets**

## Comments

- This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.

- Pasco Bakotich III

- Expires November 14, 2008

- NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Horizontal and vertical clearance requirements shall be as shown in Contact Plans. Horizontal diagonals must join chords where vertical diagonals connect (panel points). Interior diagonals shall be placed at panel points, 40' maximum spacing. Locate symmetrically about centerline of span if possible. An interior diagonal is not required at span ends. No post splices permitted in lower third of height, nor closer than 3' - 0" to bottom of chord. No chord shop splices permitted in middle third of span. Maximum of one splice in each end post.

No post splices permitted in lower third of height, nor closer than 3' - 0" to bottom of chord. No chord shop splices permitted in middle third of span. Maximum of one splice in each end post.

Notes:
1. Horizontal and vertical clearance requirements shall be as shown in Contact Plans.
2. Horizontal diagonals must join chords where vertical diagonals connect (panel points).
3. Interior diagonals shall be placed at panel points, 40' maximum spacing. Locate symmetrically about centerline of span if possible. An interior diagonal is not required at span ends.
4. No post splices permitted in lower third of height, nor closer than 3' - 0" to bottom of chord. No chord shop splices permitted in middle third of span. Maximum of one splice in each end post.

Material Specifications:
- Pipe, Chords, Diagonals, Struts and Posts: ASTM A 500 Grade B, Type E or S, or ASTM A 500 Grade B
- Pipe, Plate & Shape: Grade A 36
- Bolt, Nut, Washer: Std. Spec. - Grade 5
- Plate & Shape: ASTM A 36
- Fastener: Std. Spec. - Grade 5

Structure Dimensions:

<table>
<thead>
<tr>
<th>Span Length</th>
<th>Diagonal Length</th>
<th>Top and Bottom Chord</th>
<th>End Truss Diagonals</th>
<th>End Truss Struts and Diagonals</th>
<th>Total Brim Area (Max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50'-0&quot;</td>
<td>4'-0&quot;</td>
<td>1'-10&quot;</td>
<td>1'-10&quot;</td>
<td>1'-10&quot;</td>
<td>1104</td>
</tr>
<tr>
<td>50'-0&quot;</td>
<td>4'-0&quot;</td>
<td>1'-10&quot;</td>
<td>1'-10&quot;</td>
<td>1'-10&quot;</td>
<td>1104</td>
</tr>
<tr>
<td>50'-0&quot;</td>
<td>4'-0&quot;</td>
<td>1'-10&quot;</td>
<td>1'-10&quot;</td>
<td>1'-10&quot;</td>
<td>1104</td>
</tr>
<tr>
<td>50'-0&quot;</td>
<td>4'-0&quot;</td>
<td>1'-10&quot;</td>
<td>1'-10&quot;</td>
<td>1'-10&quot;</td>
<td>1104</td>
</tr>
</tbody>
</table>

All members are pipe. Values shown are nominal pipe size and wall thickness.

Perspective

Sheets 1 of 4 sheets

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Drilled hole in chord at each diagonal and strut shall be 1" diameter for spans 60' or less, diameter shall be 3/4" for spans over 60'.

Interior diagonal shall be cut to fit neatly against chord or post. Fillet weld size to be diagonal tube or pipe thickness plus 1/16".

Interiors shall be wall thickness for half of the chord thickness. End post shop splice required.

Dead load camber

For span lengths not listed, interpolate values of

In order to provide camber, do not camber by using shims between chords at splices.

No post shop permitted in lower third of height, nor closer than 3'-0" to bottom of chord. No chord shop splice permitted in middle third of span. Maximum of one splice in each end post.

Dimension shall equal chord thickness or 3/4", whichever is less.

For span lengths not listed, interpolate values of

Alternate joint detail

Fabricate truss with chords curved to provide camber.

Chord ends shall be cut to fit neatly against chord or post. Fillet weld size to be diagonal tube or pipe thickness plus 1/16".

End post shop splice required.

No post shop permitted in lower third of height, nor closer than 3'-0" to bottom of chord. No chord shop splice permitted in middle third of span. Maximum of one splice in each end post.

Dimension shall equal chord thickness or 3/4", whichever is less.

Alternate joint detail

Fabricate truss with chords curved to provide camber.

Chord ends shall be cut to fit neatly against chord or post. Fillet weld size to be diagonal tube or pipe thickness plus 1/16".

No post shop permitted in lower third of height, nor closer than 3'-0" to bottom of chord. No chord shop splice permitted in middle third of span. Maximum of one splice in each end post.

Dimension shall equal chord thickness or 3/4", whichever is less.

Alternate joint detail

Fabricate truss with chords curved to provide camber.

Chord ends shall be cut to fit neatly against chord or post. Fillet weld size to be diagonal tube or pipe thickness plus 1/16".

No post shop permitted in lower third of height, nor closer than 3'-0" to bottom of chord. No chord shop splice permitted in middle third of span. Maximum of one splice in each end post.

Dimension shall equal chord thickness or 3/4", whichever is less.

Alternate joint detail

Fabricate truss with chords curved to provide camber.

Chord ends shall be cut to fit neatly against chord or post. Fillet weld size to be diagonal tube or pipe thickness plus 1/16".

No post shop permitted in lower third of height, nor closer than 3'-0" to bottom of chord. No chord shop splice permitted in middle third of span. Maximum of one splice in each end post.

Dimension shall equal chord thickness or 3/4", whichever is less.
BOLT CIRCLE

1 1/2" DIAM. HOLE FOR
ANCHOR BOLT (TYP.)

TOP

HANDHOLE
ANCHOR ROD (TYP.)

TOP OF FOUNDATION
1" MIN.

DRILL AND TAP FOR
1/4" DIAM. CAP SCREW,
ASTM F 593, W/ S.S.
WASHER, SPACING
O.C.

WELDED GALV. CLOTH
1/16" x 7/16" SQ. WRAP
AROUND BASE PLATE
WITH 3" MIN. LAP

BASE PLATE HOLE = 8" DIAM.

BASE WELD DETAIL

1/4" BACK-UP BAR

POST BASE DETAILS

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**MATERIAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Shaft Concrete</th>
<th>Class</th>
<th>AASHTO G300</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Other Concrete</td>
<td>Class 4000</td>
<td>AASHTO M240</td>
</tr>
<tr>
<td>Steel Rod Bar</td>
<td>ASTM A 36</td>
<td>AASHTO M31</td>
</tr>
<tr>
<td>Anchor Rod</td>
<td>ASTM F 1554</td>
<td>AASHTO M293</td>
</tr>
<tr>
<td>Anchor Nut</td>
<td>AASHTO M31</td>
<td>AASHTO M291</td>
</tr>
<tr>
<td>Anchor Washer</td>
<td>AASHTO M31</td>
<td>AASHTO M292</td>
</tr>
</tbody>
</table>

**NOTE:**
- All dimensions are OUT TO OUT
- 2" radius, unless otherwise noted
- Determine length from plans

**SECTION:**
- **Foundation Type 1**
- **Standard Plan 0-70.20-00**

**APPROVED FOR PUBLICATION:**
Pasco Bakotich III
10-05-07

**NOTE:**
This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.

**EXPIRES:**
November 14, 2008
NOTES:
1. Install Sign Lighting Luminaire(s) (and Bracket) only when required by the Contract.
2. Windbraces and 3" Z-Bar are aluminum. All nuts, bolts, washers, and other hardware shall be stainless steel, except as noted.
3. See Standard Plan G-08.20 (Monochrome), or G-08.30 (Tru Vue) for additional Overhead Sign Mounting details.
4. Galvanize all non-stainless steel parts.
NOTES

1. U-Bolts, Washers and Nuts shall be stainless steel, except as noted.
2. See standard Plan G-06.19 for Overhead Sign Lighting details.
3. Galvanize all non-stainless steel parts.
NOTES

1. NOT INTENDED FOR USE IN FRONT OF STATIC SIGNS.
2. FOR MOUNTING THE MAINTENANCE WALKWAY TO A MONOTUBE SIGN BRIDGE, SEE STANDARD PLAN G-95.20.
3. FOR MOUNTING THE MAINTENANCE WALKWAY TO A TRUSS-TYPE SIGN BRIDGE, SEE STANDARD PLAN G-95.30.
4. LOCATION OF RAILING SPLICES TO BE DETERMINED BY FABRICATOR. SEE "RAILING SPLICE DETAIL."

PROVIDE A 3/4" DIAM. HOLE IN PIPES, AT PIPE CROSSINGS, FOR GALVANIZING.

FOR MOUNTING THE MAINTENANCE WALKWAY TO A MONOTUBE SIGN BRIDGE, SEE STANDARD PLAN G-95.20.

FOR MOUNTING THE MAINTENANCE WALKWAY TO A TRUSS-TYPE SIGN BRIDGE, SEE STANDARD PLAN G-95.30.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

MATERIAL SPECIFICATIONS

| PIPE          | ASTM A 36 OR ASTM A 53 GRADE B TYPE E OR F, OR ASTM A 500 GRADE B |
| PLAQUE AND SHAPE | ASTM A 36 |
| STRUCTURAL TUBING | ASTM A 500 GRADE B |
| GALVANIZED FOR PIPE PLATE AND SHAPE | AASHTO M 111 |
| HIGH STRENGTH BOLTS | STD SPEC. 9-06.5(3) |
| ALL OTHER BOLTS | STD SPEC. 9-06.5(3) |
| PLATE MATERIAL | AASHTO M 232 |
| STEEL GRATING | ASTM A 36 |

EXPIRES NOVEMBER 14, 2008
Steel Grating Detail

Plan

(Needed Next Section for Clarity)

Cross Bar (Typ.)
1" Min.
3/16" Max.

Bearing Bar, 3/16" Min. Thickness (Typ.)

1/8" Toe Plate

PANEL SPAN (Typ.)

Every Fourth Bearing Bar and Near All Toe Plate Corners

1/4" TOE PLATE

GRAATING FASTENER

SEE DETAIL

1/8" CLEARENCE BETWEEN ENDS OF CROSS BARS

1/4" TOE PLATE

W4 x 13

1" MAX.

CLEAR (Typ.)

3/16" CLEARANCE BETWEEN ENDS OF CROSS BARS

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER SEE DETAIL

GRAATING FASTENER SEE DETAIL

GRAATING FASTENER SEE DETAIL

W4 x 13

1" MAX.

CLEAR (Typ.)

3/16" CLEARANCE BETWEEN ENDS OF CROSS BARS

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTENER DETAIL

GRAATING FASTER
MMAINTENANCE WALKWAY INSTALLED ON MONOTUBE SIGN BRIDGE
(Use with other layouts than shown above.)

NOTES:
2. For maintenance walkway, railing, grating, and toe plate details, see standard plan 0-85.52.
3. Unit two lanyards through intermediate wire rope support.
4. Wire rope with 14 kips break strength. The wire rope shall be installed with 40 lbs. of tension and with 6" of adjustment available in the turnbuckle.

IN ORDER TO OBJECT TO THIS SITE OR ANY PART THEREOF, YOU MUST FILE A PETITION ENSURING THAT ANY DISCHARGE IS MADE IN CONFORMITY WITH THE LAWS OF THE LAND.
LIVE STAKE INSTALLATION IN RIPRAP

LIVE STAKE INSTALLATION IN QUARRY SPALLS

LIVE STAKE INSTALLATION ON SLOPES

NOTES:
1. See Plant Material List for size and type of live stake.
2. Do not use wax or sealing for driving stakes.
3. In hard ground use an iron bar or stake drill to prepare holes for the stakes.
4. Avoid stripping bark or bruising stakes during installation.
5. Fill void around cutting with soil.
1. All Angle Irons and Steel Straps shall be galvanized in accordance with AASHTO M 222.

2. Pipe, Caps, and T-Adapter shall be 1" I.D. white PVC, or Primed Steel, except the water intake pipe shall be white PVC. Pipe shall be Sch. 40. All pipe joints shall be threaded.

3. Gage assembly pipe, fiberglass rod, and angle iron can be extended as needed to fit site requirements. Extra Pipe Clamps shall be added for security.

4. Score the water intake pipe 1/4" deep, 1/32" wide (width of saw blade), every 1/2", alternating cuts on top and bottom for drainage. Place at lowest water level.

5. Water level may vary, depending on season.

6. Pour in approximately 1 tablespoon of cork dust at installation, and after each reading.

**Crest Gage**

**Standard Plan H-30.10-00**

**Section A**

**Notes:**

- Pipe, Caps, and T-Adapter shall be 1" I.D. white PVC, or Primed Steel, except the water intake pipe shall be white PVC. Pipe shall be Sch. 40. All pipe joints shall be threaded.
- Gage assembly pipe, fiberglass rod, and angle iron can be extended as needed to fit site requirements. Extra Pipe Clamps shall be added for security.
- Score the water intake pipe 1/4" deep, 1/32" wide (width of saw blade), every 1/2", alternating cuts on top and bottom for drainage. Place at lowest water level.
- Water level may vary, depending on season.
- Pour in approximately 1 tablespoon of cork dust at installation, and after each reading.
AUTOMATED GROUND WATER MONITORING WELL

STANDARD PLAN H-32.10-00

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

DATE: 09-20-07

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

WEATHER RESISTANT BATTERY COMPARTMENT

WEATHER-PROOF (POTTED) INTERNAL DATA LOGGER

REMOVABLE ADJUSTER CAP

"0" CALIBRATION POINT MARKER

"0" CALIBRATION POINT (FINISHED GRADE)

WELL SCREEN SLOTS BEGIN

WELL SHOWN AT 0' DEPTH

WELL SCREEN SLOTS END

END OF PROBE

MOISTURE-PROOF (POTTED)

BATTERY COMPARTMENT

OPTICAL READER

WEATHER-PROOF (POTTED) INTERNAL DATA LOGGER

REMOVABLE ADJUSTER CAP

"0" CALIBRATION POINT MARKER

"0" CALIBRATION POINT (FINISHED GRADE)

WELL SCREEN SLOTS BEGIN

WELL SHOWN AT 0' DEPTH

WELL SCREEN SLOTS END

END OF PROBE
**Mailbox Support Type 1**

**Wood Post Assembly Detail**
- **3/8” × 4 3/4” Hex Bolt, 2 Washers & Locknut (Typ.)**
- **3/8” × 3/4” Hex Bolt, 2 Washers & Locknut (Typ.)**
- **3/16” × 1” Phillips Head Screw, 2 Washers, and Locknut with Nylon Insert (Typ.)**

**Steel Post Assembly Detail**
- **3/8” × 2 3/4” Hex Bolt, 2 Washers & Locknut (Typ.)**
- **1 7/8” M-Clamp**

**Notes**
1. A socket and wedge anchoring system that meets the HGC-350 crash test criteria may be substituted in lieu of the anti-twist plate designs shown. Anti-twist plates are not required for wood post installations.

2. The platform design shown on this plan features slots that accommodate several types of mailbox supports, only those slots necessary for assembling the type being installed are required. An adjustable platform may be used in lieu of this design, but it must fit the bracket design shown on this plan. Brackets are required for all single-post installations. Field drilling may be necessary.

3. Center the mailbox on the platform to ensure space for the mailbox door to open and to allow space for installing the fasteners (See Alignment Detail, Sheet 2). Spacing of mailbox mounting holes varies among manufacturers. Attachment of the mailbox to the platform may require drilling additional holes through the mailbox to fit the platform.

4. Attach a newspaper box to a steel post with two 1 7/8” Muffler Clamps spaced 4” apart. Field drill 7/16” holes in the newspaper box to fit. Use 2 1/2” × 1/4” lag bolts to attach newspaper boxes to wood posts. Newspaper boxes must not extend beyond the front of the mailbox when the mailbox door is closed.

5. A Type 2 Support (Standard Plan H-70.20) is required when 2 or more mailboxes are to be installed on one support.
The anchoring system shall meet NCHRP 350 crash test criteria. Use a socket and wedge system, or the anchoring system supplied by or recommended by the Type 2 Support manufacturer.

A maximum of 5 mailboxes may be installed on a Type 2 Support.

The Platform design shown in this plan is detailed in the PLATFORM DETAIL, Standard Plan H-70.10, Sheet 2. The design features slots that accommodate several types of mailbox supports; only those slots necessary for assembling the type being installed are required. An adjustable platform may be used in lieu of this platform design. Adjustable platforms must fit the 1 7/8" M-Clamp.

Center the mailbox on the platform to ensure space for the mailbox door to open and to allow space for installing the fasteners (See ALIGNMENT DETAIL).

Spacing of mailbox mounting holes varies among manufacturers. Attachment of the mailbox to the platform may require drilling additional holes through the mailbox to fit the platform.

Attach a newspaper box to a Type 2 Support with two 1 7/8" Muffler Clamps spaced 4" apart. Field drill 7/16" holes in the newspaper box to fit. Newspaper boxes must not extend beyond the front of the mailbox when the mailbox door is closed.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
MAILBOX SUPPORT TYPE 2

STANDARD PLAN H-70.30-60

SNOW GUARD - W/IFU REQUIRED, PLACE ON LEADING END OF SUPPORT (SEE DETAIL)

BOLT - 7/16" DIAM. (TYP.)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Post shall have sufficient strength and durability to support the fence through the life of the project.

HIGH VISIBILITY FENCE

STANDARD PLAN I-10.10-01

Sheets 1 of 1 Sheet

STATE OF WASHINGTON
DEPARTMENT OF TRANSPORTATION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

HIGH VISIBILITY FENCE

STANDARD PLAN I-10.10-01

Sheets 1 of 1 Sheet

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

HIGH VISIBILITY FENCE

STANDARD PLAN I-10.10-01

Sheets 1 of 1 Sheet

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

HIGH VISIBILITY FENCE

STANDARD PLAN I-10.10-01

Sheets 1 of 1 Sheet

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

HIGH VISIBILITY FENCE

STANDARD PLAN I-10.10-01

Sheets 1 of 1 Sheet

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
NOTES

1. Minimize detention of stormwater by placing fences as far away from test of slopes as possible without encroaching on sensitive areas or outside of the clearing boundaries.

2. Install all features along contours.

3. Install the ends of the silt fences to point slightly up-slope to prevent sediment from flowing around the ends of the fences.

4. Perform maintenance in accordance with standard specifications 8.01.3(B)4 and 8.01.3(18).

DURING EXCAVATION, AVOID DISTURBING THE GROUND AROUND THE TRENCH AS MUCH AS IS FEASIBLE. SMOOTH SURFACE FOLLOWING EXCAVATION TO AVOID CONCENTRATING FLOW.

SEE NOTE 6

INSTALL SUPPORT FOR THE GEOTEXTILE

- SEE STANDARD INFRASTRUCTURE SECTION S-4.41, TABLE 4

TYPICAL SPlice

- SEE DETAIL

GEOTEXTILE FOR TEMPORARY SILT FENCE

- SEE STANDARD INFRASTRUCTURE SECTION S-4.41, TABLE 4

INSTALL SUPPORT FOR THE GEOTEXTILE

- SEE STANDARD INFRASTRUCTURE SECTION S-4.41, TABLE 4

TYPICAL SILT FENCE WITH BACKUP SUPPORT

- SEE DETAIL

SILT FENCE SECTIONS SHALL BE CLOSER TOGETHER TO PREVENT SILT LAWN WATER FROM ESCAPING THROUGH THE FENCE AT THE UNERAP. ADJACENT SECTIONS SHALL NOT BE PLACED IN LOW SPOTS OR IN AINAP LOCATIONS.
NOTES

1. Minimize detention of stormwater by placing fence as far away from toe of slope as possible without encroaching on sensitive areas or outside of the clearing boundaries.

2. Install silt fencing along contours.

3. Install the ends of the silt fence in a point slightly upslope to prevent sediment from flowing around the ends of the fence.

4. Perform maintenance in accordance with Standard Specifications 8.01.2(8) and 8.01.3(19).

SECTION A

TYPICAL SPLICE

NOTES

DURING EXCAVATION, MINIMIZE DISTURBING THE GROUND AROUND TRENCH AS MUCH AS IS FEASIBLE AND SMOOTH SURFACE FOLLOWING EXCAVATION TO AVOID CONCENTRATING FLOW.

SILT FENCE

STANDARD PLAN I-10.15-00

SPLICE DETAIL

SPLICED FENCE SECTIONS SHALL BE CLOSE ENOUGH TOGETHER TO PREVENT SILT LADEN WATER FROM PipeING THROUGH THE FENCE AT THE OVERLAP. JOINING SECTIONS SHALL NOT BE PLACED IN LOW AREAS OR IN WIND EROSION.

SPLICE DETAIL
Perform maintenance in accordance with Standard Specification 8-01.3(9)A and 8-01.3(15).

NOTE

SILT FENCE ~ SEE STD. PLAN I-30.10

COMPOST BERM ~ SEE STD. PLAN I-80.10

Disturbed Area

Protected Area

SILT FENCE DESIGN

COMPOST BERM DESIGN

PLACEMENT OF SAND BAGS AS REQUIRED AROUND CULVERT TO PROVIDE SUPPORT FOR Silt FENCE

Place sand bags as required around culvert to provide support for silt fence.

BAGS

EMBED POSTS INTO SAND BAGS AS REQUIRED

Embed posts into sand bags as required.

POST

REMOVABLE POST

FLOW

DRAINAGE Ditch

DISTURBED AREA

Silt Fence Design

Compost Berm Design

Protected Area

Disturbed Area

END TREATMENT VARIES

END TREATMENT VARIES

CULVERT, BOX CULVERT, OR PIPE ARCH

CULVERT, BOX CULVERT, OR PIPE ARCH

- End treatment varies

- End treatment varies

PERFECT AREAS

PERFECT AREAS

NOTE

FLOW

DRAINAGE Ditch

DISTURBED AREA

Silt Fence Design

Compost Berm Design

Protected Area

Disturbed Area

END TREATMENT VARIES

END TREATMENT VARIES

CULVERT, BOX CULVERT, OR PIPE ARCH

CULVERT, BOX CULVERT, OR PIPE ARCH

- End treatment varies

- End treatment varies

PERFECT AREAS

PERFECT AREAS
NOTES
1. Wattles shall be in accordance with Standard Specification 9-14.5(5). Install Wattles along contours. Installation shall be in accordance with Standard Specification 8-01.3(10).
2. Securely knot each end of Wattles. Abut adjacent Wattles tightly, end to end, without overlapping the ends.
3. Pilot holes may be driven through the Wattles and into the soil when soil conditions require.
4. Live stakes may be used for permanent installation and shall be in accordance with Standard Specification 9-14.5(6).
5. Wattles shall be inspected regularly, and immediately after a rainfall produces runoff, to ensure they remain thoroughly entrenched and in contact with the soil.
6. Perform maintenance in accordance with Standard Specification 8-01.3(15).

WATTLE INSTALLATION
ON SLOPE
STANDARD PLAN I-30.30-00
SHEET 1 OF 1 SHEET
APPROVED FOR PUBLICATION

WATTLE SPACING TABLE

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>MAXIMUM SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:1</td>
<td>10&quot; - 0&quot;</td>
</tr>
<tr>
<td>2:1</td>
<td>12&quot; - 0&quot;</td>
</tr>
<tr>
<td>3:1</td>
<td>14&quot; - 0&quot;</td>
</tr>
<tr>
<td>4:1</td>
<td>16&quot; - 0&quot;</td>
</tr>
</tbody>
</table>

STATE OF WASHINGTON
LICENSED LANDSCAPE ARCHITECT
MARK W. MAUER
CERTIFICATE NO. 000598

dRAWN BY: LISA CYFORD

APPROVED FOR PUBLICATION
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
PASCO BAKOTICH III
09-20-07

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Compost Sock shall be in accordance with Standard Specification 9-14.5(6). Compost Sock shall be a minimum of 8" in diameter or sized to suit conditions as specified by the Engineer or Contractor.

2. Compost material to be dispersed on site, as determined by the Engineer.


4. Always install Compost Sock perpendicular to slopes and along contour lines.

5. Remove sediment from the up slope side of the Compost Sock when accumulation has reached 1/2 of the effective height of the Compost Sock.

6. Live stakes can be used in addition to wooden stakes and shall be in accordance with Standard Specification 9-14.11(1). See plans for species selection and spacing.
Bales shall be placed in a row with the ends tightly butting.

Steel, or 2x2 wooden stakes (typ.)

Drive first stake at an angle towards the previous bale to promote a tight fit.

Straw bales should stand vertically.

FINISH PACK every 30" with straw.

Note:
1. See Standard Specification 8-01.31(1)c, for additional information.
2. Perform maintenance in accordance with Standard Specification 8-01.31(12).
Prefabricated units may be used in lieu of the design shown on this plan upon approval of the Engineer.

Structure shall be constructed such that geotextile material shall be fastened to posts creating a seamless joint.

Ensure that ponding height of water does not cause flooding on adjacent roadways or private property.

Perform maintenance in accordance with Standard Specification 8-01.3(16).

1. Prefabricated units may be used in lieu of the design shown on this plan upon approval of the Engineer.

2. Structure shall be constructed such that geotextile material shall be fastened to posts creating a seamless joint.

3. Ensure that ponding height of water does not cause flooding on adjacent roadways or private property.

4. Perform maintenance in accordance with Standard Specification 8-01.3(16).

NOTES:

1. Prefabricated units may be used in lieu of the design shown on this plan upon approval of the Engineer.

2. Structure shall be constructed such that geotextile material shall be fastened to posts creating a seamless joint.

3. Ensure that ponding height of water does not cause flooding on adjacent roadways or private property.

4. Perform maintenance in accordance with Standard Specification 8-01.3(16).

ATTACH WOOD OR METAL CROSS BRACES TO STABILIZE WOOD POST (SEE STD. SPEC. 8-01.3(9)A).

BURY GEOTEXTILE IN TRENCH — SEE STD. SPEC 9-33.2(1), TABLE 6

COMPACTED NATIVE SOIL 2' - 0" MIN.

1' - 0" MIN.

SILT FENCE ~ SEE STD. PLAN I-30.10

FLOW

SILT FENCE ~ SEE STD. PLAN I-30.10

4" 4"

INLET

INLET

GRATE

FASTEN CROSS BRACES TOGETHER WITH SCREWS, NAILS, NYLON TIES OR WIRE

ATTACH WOOD OR METAL CROSS BRACES TO STABILIZE WOOD POST (SEE STD. SPEC. 8-01.3(9)A).

INLET

ISOMETRIC VIEW (ENTIRE FENCE NOT SHOWN FOR ILLUSTRATIVE PURPOSES)

PLAN VIEW

(CROSS BRACES NOT SHOWN)
1. Size the Below Inlet Grate Device (BIGD) for the storm water structure it will service.
2. The BIGD shall have a built-in high-flow relief system (overflow bypass).
3. The retrieval system must allow removal of the BIGD without spilling the collected materials.
4. Perform maintenance in accordance with Standard Specification 8-01.3(15).
Geotextile encased Check Dams shall meet the requirements of Standard Specifications 8-01.3(6)A and 9-14.5(4). Install the sloped ends of the Check Dam a minimum of 3" higher than the top of the check dam in the channel to ensure that water flows over the dam and not around it. Flat bottom ditch design shown, Check Dam installation details are similar for "V" bottom ditches. Perform maintenance in accordance with Standard Specifications 8-01.3(15).
NOTE: ROCK CHECK DAMS SHALL BE PLACED OUTSIDE OF THE CLEAR ZONE, OR BEHIND TRAFFIC BARRIER.

SPACE CHECK DAMS THE DISTANCE APART WHERE POINTS "A" AND "B" ARE THE SAME ELEVATION

WATTLE OR COMPOST SOCK CHECK DAM

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT. A COPY MAY BE OBTAINED UPON REQUEST.
1. More than the minimum of one fastener per square yard may be required due to conditions such as blanket composition, soil type, surface uniformity, and slope steepness.

2. See Standard Specification 8-01.3(3).
1. More than the minimum of one fastener per square yard may be required due to conditions such as blanket composition, soil type, surface uniformity, and flow velocity.

2. Provide Check Slots per manufacturer's recommendations.

3. Roll ends may be spliced in a check slot.

4. See Standard Specification 8-01.03(9).

NOTE: This plan is not a legal engineering document. Only an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
EFFECTIVE: DECEMBER 7, 2010 TO AUGUST 1, 2010

NOTE
PLACE SEDIMENT TRAP UNDER THE SPIRAL AND SLOPE MELPES. PROVIDE A CONTINUOUS LAYER BETWEEN THE GRAVEL ROCK AND THE NATIVE SUBSTRATE MATERIAL.

SECTION A

TEMPORARY SEDIMENT TRAP

EXISTING ROAD

3'-6" MNL (TYP)

4'-9" QUARRY SPALLS

AS REQUIRED - 10'-0" MNL. EXCEPT MAY BE REDUCED TO 6'-0" MNL. FOR SLOPES WITH LESS THAN 15 DEGREES OR EXPOSED SOIL.

PLACE CONSTRUCTION SEDIMENT TRAP FOR SOIL STABILIZATION AND A MINIMUM OF 0'-6" CHIPPED ROCK UNDER THE SPALLS, FROM THE EDGE OF THE CONSTRUCTION EROSION TO THE ROADSUPER, OR AS DIRECTED BY THE SHERIFF.

MICROSCOPIC VIEW

STABILIZED CONSTRUCTION ENTRANCE

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

APPROVED FOR PUBLICATION

PREPARED BY:

Peanza Balcikin
06-11-04

STATE OF WASHINGTON

ARCHITECTURE BOARD

LAPIDUS'S ARCHITECT

MARK W. MAUSER
CERTIFICATE NO. 50599A

MISCELLANEOUS

EROSION CONTROL DETAILS

STANDARD PLAN I-50.10-01

SHEET 1 OF 1 SHEET
1. Timber luminaire supports are allowed only for temporary installations where breakaway or slip bases are not required.
2. When down guys are required, see Standard Plan J-7a.

NOTES:
1. Timber luminaire supports are allowed only for temporary installations where breakaway or slip bases are not required.

---

**Galvanized steel mast arm - configuration varies with manufacturer**

**Luminaire - see Contract for type and number**

**Mounting height - roadway to luminaire elevation difference 1%, see Contract**

**Wind and length - see Contract**

**5/8" galvanized thimble eyebolt (single or double) with washers and nuts or eyenut**

**Bending jumper**

**Pole and bracket cable**

**Equipment grounding conductor see Standard Plan J-9a.**

**From ground line to 10' above ground, enclose equipment grounding conductor in galvanized steel conduit, code sized. Above 10' from ground, staple equipment grounding conductor to pole. Connect to supplemental ground per Standard Plan J-9a.**

**Service wedge clamp**

**ACSR triplex or quadplex conductors - see Contract**

**Copper split bolt connector**

**Messenger cable**

**Insulating tape for waterproof connection**

**Fused quick disconnect - use 30 amp fuses for high mast supports**

**Weatherhood - size as required**

**Steel conduit**

**8" x 10" plate collar bend to fit pole diameter (8" - 10")**

**5/8" x 10" plate collar bend to fit pole diameter (8" - 10")**

**3/8" x 4" machine bolts (four required) with washers and nuts**

**1/2" lag bolts (six required) - drill 9/16" hole in plate**

**3/4" wire hole 2" from gusset plate, smooth hole edges**

**1" nonmetallic conduit with 3/4" straps at code spacing**

**Distance varies, 35' MIN, 50' MAX, depending on line clearance requirements**

---

**Class 5 timber pole - length sufficient for mounting height and burial depth.**

**Class 2 timber pole - length sufficient for mounting height and burial depth.**

---

**Additional grounding conductor see Standard Plan J-9a.**

**From ground line to 10' above ground, enclose equipment grounding conductor in galvanized steel conduit, code sized. Above 10' from ground, staple equipment grounding conductor to pole. Connect to supplemental ground per Standard Plan J-9a.**

**Supplemental ground - see Standard Plan J-9a.**

**Underground feed**

---

**When down guys are required, see Standard Plan J-7a.**

---

**Supporting information:**

- **Plan View Luminaire Support Bracket:** Galvanize after fabrication.
- **Gusset Detail:**
- **Typical Luminaire Mounting Configurations:**
  - 2 UNITS
  - 3 UNITS
  - 4 UNITS
  - 6 UNITS

---

**TYPICAL LUMINARIE MOUNTING CONFIGURATIONS**

---

**Notes:**

- **This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.**

---

**Revised by:**

- Clifford E. Mansfield

**Date:**

- 6/23/00

**Revised for publication:**

- REPLACED PLAN TITLE REFERENCES WITH PLAN NUMBERS.
- CORRECTED KEY NOTE 5.

---

**State of Washington:**

- Clifford E. Mansfield

**Revised:**

- 6/23/00

---

**For publication only:**

- 24655
1. Metering arrangements may vary with different serving utilities. The contractor shall verify the requirements of the utility prior to installing the service equipment.

2. All service pole conduit shall be secured to the pole with conduit strap at 6' centers.

3. All risers and service equipment shall be installed on side of pole that is away from traffic.

4. Where required by the serving utility, service breakers shall be installed above the meter socket in a separate raintight enclosure.

5. Bend and attach to pole within 6' of enclosure. See Standard Plan "Typical Grounding Details." 

6. All service pole conduit shall be secured to the pole with conduit strap at 5' centers. Bend and attach to pole within 1' of enclosure. See Standard Plan "Typical Grounding Details." 

7. For Type B service wiring diagram, use Standard Plan "Modified Type B Service." For Type C service wiring diagram, use Standard Plan "Type E Service." 

8. See breaker schedule in contract for breaker and contactor sizes.
1. Where pad or pedestal mounts are located in a sidewalk, construct mount top flush with sidewalk grade, omitting ch-mater where top and sidewalk abut.

2. Pad mount design is typical.

3. Place a silicone seal between the cabinet foundation and the cabinet for the pad mount design.

- Anchor bolts and data for spacing to be supplied by cabinet manufacturer.
- Shim to plumb
- See Note 3
- #4 hoops
- #4 bar each corner
- Locate conduits centrally in foundation
- 1'-6" cabinet width
- 1'-6" cabinet depth
- 1'-6" + 2" 2" conduit and caps others as required
STRAIN POLE DIMENSION CHART

<table>
<thead>
<tr>
<th>ITEM</th>
<th>TYPE IV</th>
<th>TYPE V</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>B</td>
<td>3&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>C</td>
<td>1 1/2&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>D</td>
<td>1/2&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>E</td>
<td>1/8&quot;</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>F</td>
<td>1/16&quot;</td>
<td>1/32&quot;</td>
</tr>
</tbody>
</table>

Pole Class (Resultant Horizontal Tension)
- 1900 lb
- 2700 lb
- 3700 lb
- 4800 lb
- 5600 lb
- 6300 lb
- 7200 lb

NOTES
1. 2 1/2" diameter weatherhead may be substituted for the elbow and nipple assembly.
2. Pole shaft shall have 0.14"/ft taper.
4. Handholes may be 6" x 4" oval or rectangle.
TYPE 1 INDUCTION LOOP

STANDARD PLAN J-8a

3'-0" 3'-0"
WIDTH
VEHICLE LANE
SHOULDER

CONDUIT

STOP LINE

TYPE 1 STOP LINE LOOP WIRING DIAGRAM

S1
F1

NOTE
1. For Sections A and B, see Standard Plan J-8d.

CONDUIT
JUNCTION BOX

DETAIL "A"
(SEE STD. PLAN J-8d)

PLAN

STOP LINE

CONDUIT

STOP LINE

CONDUIT

ADVANCE LOOPS

SEE ENTRANCE SAWCUT DETAIL

SEE CORNER SAWCUT DETAIL

SEE  CONTRACT

TWO CONDUCTOR SHIELDED CABLE

SPLICE

CENTER OF LOOP AND VEHICLE LANE

LEAD-IN SAWCUT

LOOP SAWCUT

TRAPPOS PLAN

LOOP SAWCUT

LOOP SAWCUT

REMOVE PAVEMENT TO SAWCUT DEPTH AND FILL WITH SEALANT

ENTRANCE SAWCUT DETAIL

CORNER SAWCUT DETAIL
1. For Sections A and B, see Standard Plan J-8d.
1. All of the loop lead-in wires shall return to the Junction Box.
2. For splice detail, see Standard Plan J-8d.

NOTES

TRAFFIC FLOW

S
T
A
T
E
O
W
H
I
N
G
T
O
R
E
G
I
S
T
E
R
P
R
O
F
E
S
I
O
N
A
L
E
N
G
I
N
E
R
R
S
C
O
T
Z
E
L
E
R

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. All of the loop lead-in wires shall return to the Junction Box.

2. For Splice Detail, see Standard Plan J-8d.

NOTES

1. Traffic Flow

2. Loop Series Number

3. Splice (Typ.)

S = START

F = FINISH

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
TYPE 3 INDUCTION LOOP

STANDARD PLAN J-8a

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
INDUCTION LOOP DETAILS

SECTION A

SECTION B

SECTION C

CONDUIT SIZING TABLE

<table>
<thead>
<tr>
<th>LOOP LEAD PAIRS</th>
<th>1/2</th>
<th>3/8</th>
<th>1/2</th>
<th>5/8</th>
<th>3/4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDUIT SIZE (IN)</td>
<td>1&quot;</td>
<td>1 1/4&quot;</td>
<td>1 1/2&quot;</td>
<td>2&quot;</td>
<td>2 1/2&quot;</td>
</tr>
</tbody>
</table>

SECTION D

SECTION E

NOTES

1. Fill the conduit trench to the top of the existing or new surfacing with CSTC, sand or controlled density fill. See "Standard Specifications" Section 2-09.3(1)E.

2. Minor Regional variation is allowed in the soft pocket closure. Consult with the Engineer or see the Contract for additional requirements.

3. Conductors shall be snug to the bottom of the sawcut. High-temperature backer rod shall be snug to the conductors.

Пожалуйста, обратите внимание, что этот план не является официальным инженерным документом, но электронной копией. Оригинал, подписанной инженером и утвержденной для публикации, хранится в архиве Вашингтонского департамента транспорта. Копия может быть получена по запросу.
**Loop Installation Notes**

1. Install the Junction Box and the lead-in conduit.
2. Sawcut the loop slots and the lead-in slots.
3. Lay out the loop wires starting at the Junction Box, allowing 5' minimum slack.
4. Install the wire in the loop slot as shown.
5. Finish laying out the wire at the Junction Box and identify the leads with the loop number, the "S" for start and the "F" for finish, and the loop series number.
6. Twist each pair of the leads twice per foot from the loop to the Junction Box. Reverse the direction of the twist for each successive pair installed.
7. Construct a supplemental splice containing any series loop connections required in the plans. Supplemental splices are subject to the same requirements shown for the loop lead and the shielded cable splice.
8. Splice the loop leads of supplemental splice leads to the shielded cable as noted in the Contract.
9. Complete installation and test loop circuits or combination loop circuits. See Standard Specifications 8-20.3(14)D.
10. Consult for the loop stubout shall be as required in the Contract.

**Sawcut and Conduit Connection Plan**

![Diagram of loop installation](image)

**Loop Lead-In Wiring Label**

- Loop Number
- Dash "S" or "F"
- Loop Series Number

**Splice Detail**

- Foil Shield
- Clear Conductor
- Plastic Mold
- Two Layer Vinyl Electrical Tape
- Soldered Compression Connection
- Seal both ends with electrical putty and tape if 6 AWG wire from loop to wire.

**Induction Loop Details**

- Standard Plan J-8d
- SHEET 2 OF 2 SHEETS
- APPROVED FOR PUBLICATION
- DATE

**State Design Engineer**

Washington State Department of Transportation

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. If parallel circuits of different sizes are contained in one conduit, the size of the grounding conductor shall be determined on the basis of the largest conductor. Only one grounding conductor is required for each conduit regardless of the number of circuits contained.

2. Service ground per serving utility requirement. If the utility uses aluminum service conductors, an approved Al-Cu pressure type ground connector shall be used to secure the service neutral to the copper neutral bar in the service enclosure. Except for the above, all grounding conductors shall be copper.

3. Equipment grounding conductors and grounding electrode conductors shall be sized in accordance with the National Electric Code (No. 8 minimum).

Supplemental ground required to supplement equipment grounding for luminaire standards with direct burial, aerial feeds, or where required in plans.

Required at all services and separately derived systems.

**KEY**

1. Service Neutral
2. Service Ground
3. Grounding Electrode Conductor
4. Bonding Jumper
5. Grounding Bushing (typ. all conduit terminations)
6. Service Neutral Bus (Copper)
7. Service Enclosure
8. Equipment Grounding Conductor
9. Junction Box
10. Electrical Load Support (luminaire pole)
11. Copper Split Bolt Clamp
12. Galvanized Steel Conduit (GSC)
13. Non-metallic Conduit (NMC)
14. Option A - 10' GSC with Field Bend
   - Approved Adapter Fitting
   - Grounding Bushing
15. Option B - 10' GSC
   - GS Factory Elbows
   - Approved Adapter Fitting
   - GS Coupling
   - Grounding Bushing
16. Ground Rod
17. Edge of Foundation, Pole or Service Support
18. Clamp
19. Junction Box or 8" Drain Tile with Approved Cover
20. Code Sized GSC
21. To Service Neutral Bus
22. To Grounding Terminal or Connection to Equipment Grounding System

**NOTES**

1. If parallel circuits of different sizes are contained in one conduit, the size of the grounding conductor shall be determined on the basis of the largest conductor. Only one grounding conductor is required for each conduit regardless of the number of circuits contained.

2. Service ground per serving utility requirement. If the utility uses aluminum service conductors, an approved Al-Cu pressure type ground connector shall be used to secure the service neutral to the copper neutral bar in the service enclosure. Except for the above, all grounding conductors shall be copper.

3. Equipment grounding conductors and grounding electrode conductors shall be sized in accordance with the National Electric Code (No. 8 minimum).
**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

**OLYMPIA, WASHINGTON**

**STANDARD PLAN J-10**

**DATE**

**STATE DESIGN ENGINEER**

**APPROVED FOR PUBLICATION**

---

**CONDUIT PLACEMENT**

**Conduit reserve area**

**Conduit**

**Conduit reserve area**

**Back of curb**

**1'**

**2'**

**Not Steeper than 2:1**

---

**ELECTRICAL CONDUIT PLACEMENT**

**STANDARD PLAN J-10**

**APPROVED FOR PUBLICATION**

**Clifford E. Mansfield 07-18-97**

**STATE DESIGN ENGINEER**

**Washington State Department of Transportation**

**ADDRESS**

**EXPIRES SEPT 10, 1998**

**NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.**
1. All box dimensions are approximate. Exact configurations vary among manufacturers.
2. All lid thicknesses are minimum. The diamond pattern shall be 3/32" minimum thick.
3. Lid stiffener plates shall bear on frame. Mill to bearing seat and perimeter bar for full even contact after fabrication of frame and lid. Lids and frames with uneven bearing will be rejected.
4. The installed lid frame shall fit with full even contact around the perimeter of a junction box after installation. Care shall be taken to prevent debris accumulation on the contact surfaces.
5. The hinges shall allow the lids to open 180°.
6. A 1/4-20 NC × 3/4" S.S. ground stud shall be welded to the bottom of each lid; include S.S. nut and flat washer.
7. All lid thicknesses are minimum. The diamond pattern shall be 3/32" minimum thick.
NOTES
1. The Junction Box shall be of type 304 stainless steel, welded seam construction: #12 gage backbox with #2B finish, #12 gage cover with #4 finish, and #12 gage mounting tabs.

2. All conduit connections to the Junction Box shall be concrete-tight (wet concrete shall not infiltrate during pour). Field drill or punch the holes in the center of the box end, unless adding additional conduit. (See SECTION "B")

3. Use concrete-tight fittings on the outside of the junction box conduit connection. Use an insulated, grounded end bushing on the inside for GRS conduit. Use an end bell bushing on the inside for PVC conduit.

4. The System Identification letters shall be 1/16" line thickness formed by engraving, stamping, or with a S.S. weld bead. See Detail.

5. Liberally coat the threads of the cover fasteners with anti-seize compound during construction & before final closure.

6. Details shown for box installation in stationary forms.

Details shown for box installation in stationary forms.

JUNCTION BOX TRAFFIC BARRIER MOUNTED

STANDARD PLAN J-16a

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Install a Conduit Deflection (CD) Fitting "A" at the exit from the barrier. Install a Conduit Deflection Fitting "B" to connect conduit ends at each concrete barrier expansion joint. See Standard Plan J-16b for Conduit Deflection Fitting details.

2. Install Galvanized Rigid Steel (GRS) conduit between the Junction Box (Type 1) and the CD Fitting "A". GRS conduit shall also be used from the CD Fitting "A" to the PVC adaptor in the barrier. PVC Conduit may be used only in stationary-form barrier. Connect to GRS using a PVC adaptor.

3. GRS Conduit may be used in stationary-form barrier, but it shall be used in all form barrier.

**Key Notes:**
- Junction Box = 8" x 6" x 10" NEMA 4X in stationary-form barrier, adjustable NEMA 5R in all form barrier (junction box can be recessed up to 1/2"). See Standard Plan J-16a.
- Where conduit is in a structure is varied across a cold joint with continuous monitoring steel, install promolded joint filler and wrap the conduit pipe for 4" to 6" on each side of joint. Pipe-wrap tape shall be 2" wide, 20 mil thick, & installed w/ 1" min overlap.
- 1/2" long section of GRS Conduit.
1. The Traffic Data Collection Loops shall be centered inside lanes without an adjacent shoulder, the loop is 1 lane adjacent to shoulders, including the median shoulder, shall be located 12" from the edge of lane, see Detail "A".

2. Type 3 Advanced Induction Loops may also be used, see Standard Plan J-46.

3. The loop and side band shall be cut in the finish lift of asphalt.

4. For concrete pavement lanes with asphalt shoulders, install all of the Piezo sensor and sleeves in the concrete lane. Also for concrete pavement lanes install the loops 4" to 8" away from the expansion joints.

5. The shoulder notch length along the roadway shall be 4" or the conduit plus 3", whichever is larger. The shoulder notch width perpendicular to the roadway shall be the conduit plus 1.5".

6. After all of the wires are installed, route the end of the conduit with Conduit Repair, see Special Provision in the contract for the materials used to fill the match in the shoulder, or use an asphalt cold-patch.

7. Use Schedule 40 PVC conduit from the junction box to the cabinet. When there are four or more total lanes, use one conduit for each direction of travel. See Standard Specification 8-30 for conduit installation.

8. Use Schedule 80 PVC, HDPE, or steel conduit under the roadway. See Standard Specification 8-30 for conduit installation.

9. An inspector from the Traffic Data Office (TDO) shall be on site during all phases of the traffic monitoring equipment. The contractor shall alert the Engineer 10 days prior to the beginning of any installation activity.

Sawcut Layout

- Home Run Slot (Typ.): 3/4" Slot ~ See Note 2
- 1/4" Slot (Typ.): 4" to 6" min. to shoulder

Edge of Lane

- 3/8" Home Run Slot (Typ.): See Note 3
- 1/4" Wide Sensor Slot (Before Sensor Installation)

- Depth of Sawcut: 2" min., 2 1/2" max.
- Polypropylene Rope or Backer Rod

Section A

- Top of Existing Pavement or Leveling Course of New Pavement

Type 3 Advance Loop Wiring Diagram

- Two Conductor Cable

- Junction Box (Typ.): See Standard Spec. 9-29

Section B

- Upride (Typ.)

Section C

- Home Run Conduit Under the Roadway (Typ.)

- Junction Box Type 1 or 2

These are general installation instructions.

See specific manufacturer's installation instructions in the special provisions of the contract.

1. Using pavement crayons, paint, tape measure and cord, carefully mark the layout of the sensor installation. Measure sensors are placed exactly perpendicular to the flow of traffic and all lines are straight. Verify that the passive cable length is enough to reach the cabinet. Do not splice cable. Leave a 4' minimum cable length inside of the cabinet.

2. Using a wet-cutting pavement saw with a 3/4" diamond blade, wet-cut the slot for the sensor. The slot must be 3/4" wide, +/- 1/16", by 1" minimum deep. Cut the slot 8" longer than the sensor length, including the lead attachment.

3. Cut home run slots for Piezo sensors. Center the home run slot on the sensor slot. Cut the home run slots 2" minimum to 2 1/2" maximum deep and 1/4" minimum wide. Cut the slots wider if installing conduit.

4. Using a power washer with water, remove and collect all the slurry and loose material from the slots. Sweep the slots with a stiff wire bristled brush. Dry all of the slots with a large capacity air compressor (150 CFM minimum). All of the slots and the pavement 1' on either side must be completely dry.
**PERMANENT TRAFFIC RECORDER AND WEIGH-IN-MOTION DETAILS**

**STANDARD PLAN J-20**

---

**INSTRUCTIONS:**

1. Visually inspect the length of the sensor to ensure that it is straight and free of twists or curls. Check passive cable for bare wire. Check lead attachment for cracks or gaps. Check the grate layout to ensure the correct sensor is being installed. Class 1 Piezo Axle sensor for Weigh-in-Motion, and Class 2 Piezo Axle sensor for Permanent Traffic Recorder.

2. Place the sensor in the slot in the road. The end of the sensor should be 3/4" from the end of the slot, and should not touch the bottom of the slot. The lead attachment end should not touch the bottom or the sides of the slot.

3. Place duct tape along length of both sides of the sensor slot. Tape 1/16" away from the slot.

4. Clean the sensor with the grit of a steel wool or emery pad. Wipe it down with isopropyl alcohol and a clean, lint-free cloth.

5. Place the installation bracket on the sensor every 6" for the length of the sensor. Use the 3/4" bracket.

6. Place the sensor in the slot in the road. The end of the sensor should be at least 2" from the end of the slot, and should not touch the bottom of the slot. The lead attachment end should not touch the bottom or the sides of the slot.

7. Place the sensor on the tape next to the slot. Handle the sensor with clean latex (or equivalent) gloves.

8. Clean the sensor with the grit of a steel wool or emery pad. Wipe it down with isopropyl alcohol and a clean, lint-free cloth.

9. Place the installation bracket on the sensor every 6" for the length of the sensor. Use the 3/4" bracket.

10. Place the sensor in the slot in the road. The end of the sensor should be at least 2" from the end of the slot, and should not touch the bottom of the slot. The lead attachment end should not touch the bottom or the sides of the slot.

11. If any of the 3/4" brackets do not fill snugly against the sides of the slot or are loose, replace them with a 1" bracket.

12. Starting at the lead attachment end, position the sensor so that it is parallel to the surface of the road, approximately 3/8" below the surface of the road. At this depth, the installation brackets are 1/16" below the surface of the road.

13. Visually inspect the length of the sensor to ensure that it is at a uniform depth along its length and that it is level (not twisted, centered, or bent).

14. Run the passive wire the length of the home run slot. Place the polypropylene rope under and over the passive cable (inside the slot). This will keep the grout from running out into the deeper home run slot.

15. Pour all of the grout into the sides of the slot. Mix 1/16" away from the slot.

16. Pour all of the grout into the sides of the slot. Mix according to the manufacturer's instructions.

17. Pour the grout into the slot using a small beak. Make sure that the grout flows under the sensor slowly, eliminating air pockets. Start at the end and pour towards the lead attachment. Repeat until the slot is completely full of grout, at least in 2 passes (approximately 1/2" thick each).

18. Pour the grout into the slot using a small beak. Make sure that the grout flows under the sensor slowly, eliminating air pockets. Start at the end and pour towards the lead attachment. Repeat until the slot is completely full of grout, at least in 2 passes (approximately 1/2" thick each).

19. Pour the grout into the slot using a small beak. Make sure that the grout flows under the sensor slowly, eliminating air pockets. Start at the end and pour towards the lead attachment. Repeat until the slot is completely full of grout, at least in 2 passes (approximately 1/2" thick each).

20. Coat the surface of the road. At this depth, the installation brackets are 1/16" below the surface of the road.

21. Pour the grout into the slot using a small beak. Make sure that the grout flows under the sensor slowly, eliminating air pockets. Start at the end and pour towards the lead attachment. Repeat until the slot is completely full of grout, at least in 2 passes (approximately 1/2" thick each).

22. Pour the grout into the slot using a small beak. Make sure that the grout flows under the sensor slowly, eliminating air pockets. Start at the end and pour towards the lead attachment. Repeat until the slot is completely full of grout, at least in 2 passes (approximately 1/2" thick each).

---

**NOTES:**

1. SEE SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS IN THE SPECIAL PROVISIONS OF THE CONTRACT

2. SEE NOTES 16 THRU 21

3. FILL SENSOR SLOT WITH GROUT

4. SEE SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS IN THE SPECIAL PROVISIONS OF THE CONTRACT

5. SEE NOTES 16 THRU 21

6. FILL SENSOR SLOT WITH GROUT

7. SEE SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS IN THE SPECIAL PROVISIONS OF THE CONTRACT

8. SEE NOTES 16 THRU 21

9. FILL SENSOR SLOT WITH GROUT

10. SEE SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS IN THE SPECIAL PROVISIONS OF THE CONTRACT

11. SEE NOTES 16 THRU 21

12. FILL SENSOR SLOT WITH GROUT

13. SEE SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS IN THE SPECIAL PROVISIONS OF THE CONTRACT

14. SEE NOTES 16 THRU 21

15. FILL SENSOR SLOT WITH GROUT

16. SEE SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS IN THE SPECIAL PROVISIONS OF THE CONTRACT

17. SEE NOTES 16 THRU 21

18. FILL SENSOR SLOT WITH GROUT

19. SEE SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS IN THE SPECIAL PROVISIONS OF THE CONTRACT

20. SEE NOTES 16 THRU 21

21. FILL SENSOR SLOT WITH GROUT

22. SEE SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS IN THE SPECIAL PROVISIONS OF THE CONTRACT

---

**END**

---

**DRAWN BY:** MONIQUE GLICK

---

**Washington State Department of Transportation**

---

**APPROVED FOR PUBLICATION**

---

**STANDARD PLAN J-20**

---

**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

---

**APPROVED FOR PUBLICATION**

---

**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

---

**APPROVED FOR PUBLICATION**

---

**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

---

**APPROVED FOR PUBLICATION**

---

**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**
1. The Loop and Piezo leads in all Junction Boxes and Cabinets are to be color-coded. Use colored tape on each specific wire, see table. Wrap the tape on the wires approximately 6" beyond conduit in all Junction Boxes.

2. The maximum load in the Cabinet is 5 Amps.

3. The Cabinet may be pedestal or pad mount, see Standard Plan J-6c for details.


NOTES:
2. Steel shaft shall be inserted either round or tubular, 12 inch (12 in), 1 in. 2-1/4 in. O.D. at slipfit top:
   - Taper shall be 0.4 inches per foot. Pedestrian signal displays installed on an inclined (2 in) traffic signal pole with a pole attachment angle other than 0°, 45°, 90°, 135°, 180°, 225°, 270°, or 315° shall utilize:
     - Type A mounting when two pedestrian heads are installed on the same signal pole.
     - Type B mounting when only one pedestrian signal head is mounted on a signal pole.
3. All pole shafts shall be hot dip galvanized per AASHTO M111.
4. Welding of structures shall be in accordance with the latest edition of the AWS D1.1 Structural Welding Code - Steel. All butt welds shall be ground flush with base metal.
NOTES


2. Steel shaft shall be lapped either round or oblong (12 slats), 11 gauge, 4 1/2” O.D. at outlet end. Taper shall be 0.14 inches per foot.

3. All poles shall be hot dip galvanized per AASHTO M111.

4. Welding of structures shall be in accordance with the latest edition of the ANSI B1.1 Structural Welding Code - Steel. All butt welds shall be ground flush with base metal.


TYPE 1 SIGNAL
STANDARD DETAILS

STANDARD PLAN J-21.15-00

10-14-00
Washington State Department of Transportation

Peaco Bakovich, PE - Structural Engineer

2. Steel shaft shall be tapered either round or diamond (12-sided), 11 gauged. 1 1/2" O.D., all galvanize. Taper shall be 0.14 inches per foot. Pedestrian signal display shall be mounted on an octogonal (8-sided) traffic signal pole with a pole adjustment angle (in degrees) from 0°, 45°, 90°, 135°, 180°, 225°, 270°, or 315° shall be allowed:
   - Type A mounting when two pedestrian heads are installed on the same signal pole.
   - Type B mounting when only one pedestrian signal head is mounted on a signal pole.

3. All poles shall be hot dip galvanized per AASHTO M 111.

4. Welding of structures shall be in accordance with the latest edition of the AWS D1.1 Structural Welding Code - Steel. All built-up steel shall be ground flush with base metal.

5. Nipper shall be 8F Polycarbonate, fully enclosed, flush at bottom to reduce glare on sign. Display shall be of appropriate color needed.


**FLASING BEACON**

**TYPE 1 SIGNAL**

**STANDARD DETAILS**

**STANDARD PLAN J-31.16-00**

**SHEET 1 OF 1 SHEET**

---

**APPROVED FOR PUBLICATION**

Pamela Rumblekist M 10-14-18

Washington State Department of Transportation
NOTES
3. Grounding Conductor shall be non-insulated #4 AWG stranded copper, provide 3' - 6" m. slack. Clamps to steel reinforcing bar with conductor suitable for use embedded in concrete.
4. Heat shrink cap all spares conductors not terminated on a terminal strip.
This plan depicts the Steel Light Standard types and terms commonly referred to in the contract. All Steel Light Standards are fabricated in accordance with the Standard Specifications and the Contract Provisions.

1. The Luminaire Pole height shall not exceed 50' (H1).
2. Slip Bases shall not be installed on 50' (H1) poles with Double Mast Arms, nor on poles weighing more than 1000 lbs.
3. The optimal location of the Luminaire head is over the edge of the traveled way. Based on the placement of the Steel Light Standard foundation, the position of the Luminaire head may vary. See Standard Plan J-28.22.
4. Light Standard mast arm orientation is typically perpendicular to roadway centerline.

Note: This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.

Pasco Bakotich III
08-07-07
STEEL LIGHT STANDARD

STANDARD PLAN J-36.10-00

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

DATE

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

H1

MOUNTING HEIGHT

LIGHT STANDARD BASE

MOUNTED ON BRIDGE

SEE STD. PLAN J-28.45

POLE

MAST ARM LENGTH

= 6.0' (TYP.)

BOLT CONNECTION

LUMINAIRE POLE

BOTTOM OF POLE BASE

EDGE OF TRAVELED WAY

SHOULDER

VARIES WITH OFFSET DISTANCE

POLE BASE

HAND HOLE

BRIDGE MOUNTED

TYPE 1 MAST ARM SHOWN

MEDIAN BARRIER MOUNTED

TYPE 1 MAST ARM SHOWN

POST TOP MOUNTED LUMINAIRE

SLIP BASE SHOWN

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Pasco Bakotich III
08-07-07
NOTES

1. The Steel Light Standard Placement depicted on this plan is only intended for installations where roadside conditions allow its usage. Roadside conditions may require a special design by the Bridge Office, as determined by the Project Engineer.


TAPER NOTE

End Taper (on approach from opposing traffic):

- 20' (longitudinal) = use on one-way roadways, or where the Light Standard is not in the Design Clear Zone of the opposing traffic.
- 6H:1V min. taper = use when the Light Standard is in the Design Clear Zone of the opposing traffic.

Based on Field Conditions, Steel Light Standard Placement Can Be Adjusted

- 35/64, 4.0', When Approved by the Project Engineer.

CULVERT ~ SEE CONTRACT PLANS FOR SIZE AND LOCATION (SEPARATE BID ITEM)

End Taper (on approach from opposing traffic):

- 20' (longitudinal) = use on one-way roadways, or where the Light Standard is not in the Design Clear Zone of the opposing traffic.
- 6H:1V min. taper = use when the Light Standard is in the Design Clear Zone of the opposing traffic.

The Steel Light Standard Placement depicted on this plan is only intended for installations where roadside conditions allow its usage. Roadside conditions may require a special design by the Bridge Office, as determined by the Project Engineer.


End Taper (on approach from opposing traffic):

- 20' (longitudinal) = use on one-way roadways, or where the Light Standard is not in the Design Clear Zone of the opposing traffic.
- 6H:1V min. taper = use when the Light Standard is in the Design Clear Zone of the opposing traffic.

Based on Field Conditions, Steel Light Standard Placement Can Be Adjusted

- 35/64, 4.0', When Approved by the Project Engineer.

CULVERT ~ SEE CONTRACT PLANS FOR SIZE AND LOCATION (SEPARATE BID ITEM)
**Notes**


3. Maximum exposed concrete equals the ratio of the grade of the existing slope times the diameter of the foundation.

4. Provide a 2.0' minimum level grade to prevent build-up of debris around base.

**Drawn By:** Bill Berens

**Effective:** December 7, 2009 to August 1, 2010

**State Design Engineer**

Washington State Department of Transportation

**Standard Plan J-28.24-00**

**Sheet 1 of 1 Sheet**

**Date:** 06-07-07

**Pasco Bakotich III**

**Approval:**

Washington State Department of Transportation
METHOD 1
NO SUBSURFACE FORM

This option is only used when the existing soil in the hole will remain standing and the cement concrete can be placed without causing the soil to collapse. Concrete shall be cast directly against undisturbed soil.

Auger the hole for the foundation. Use paper or cardboard forms to achieve a smooth finish on the final exposed cement concrete. Support the forms as necessary to remain plumb.


Place the concrete foundation.

After concrete has cured, remove the paper or cardboard form portion.

Construct the embankment widening (if required).

METHOD 2
METAL (SUBSURFACE) FORM REQUIRED

When the existing soil will not retain a vertical face, over-excavate the foundation area and install a 20° diameter, corrugated metal (blue) form. The corrugated metal forms shall not extend more than 6" below any portion of the foundation that will remain exposed upon final grading. Continuous form to full height using paper or cardboard form to achieve a smooth finish on final exposed cement concrete. Support the forms as necessary to remain plumb.


Place the concrete foundation.

After concrete has cured, remove the paper or cardboard form portion.

Backfill with controlled-density fill or compacted borrow in accordance with standard specification 8-20.42.

Construct the embankment widening (if required).
1. Use (1) pole with double mast arms or pole weighing in excess of 1000 LBS not be installed on a slip base.
2. Galvanizing shall be in accordance with AASHTO M 111.
4. See Standard Specifications Section 6.05.220(b) and 6.05.2.4 for the torque requirements for all of the Anchor Bolt installations. Install 1-inch diameter Diameter Bolts in all slip bases to a torque of 30 Minimum - 50 Maximum, [104].
5. Do not use gaskets.
6. For Anchor Bolt Damper, ", 20g, see Table, Standard Plan J-28.80.
**NOTES:**

1. 60' (H1) poles with double mast arms or poles weighing in excess of 1000 lbs. shall not be installed on a Slip Base.

2. The Slip and Anchor Plates shall be manufactured from ASTM A572 Grade 50 or ASTM A588. All Slip Plates machined surfaces shall be finished smooth.

3. The Clamping Bolts shall be high strength steel, manufactured from AASHTO M164, with heavy hex nut and hardened washer. Galvanize the Clamping Bolts according to AASHTO M232.


5. Galvanize the Anchor/Slip Plate after fabrication according to AASHTO M 111.

6. Clamping Bolt diameters may vary on existing installations. Replace them with the same size as the originals when repairing or replacing a luminaire pole.

---

**EXPLODED ISOMETRIC VIEW**

**STANDARD PLAN J-28.42-00**
1. Pole Base Plates for a Slip Base design shall be 1 1/4" steel manufactured from ASTM A572 GR. 50 or ASTM A588. Pole Base Plates for a Fixed Base design shall be either 1 1/4" steel manufactured from ASTM A572 GR. 50, ASTM A588, or 1 1/2" manufactured from ASTM A36. All Pole Base Plates notched surfaces shall be finished smooth.


3. Galvanizing shall be in accordance with AASHTO M 111.

4. See Standard Plan C-46, C-44h and J-28.80 for foundation and base plate requirements when steel light standards are mounted on concrete barrier.


6. Conductors shall be attached to the pole as follows:

   - For standard configurations, see Standard Plan J-28.45 for configuration and location of the Hand Hole.
   - Fixed Base: Radius = (D/2 + 1/16") (Typ.) ~ for "D", see Table, Standard Plan J-28.30
   - Slip Base: Radius = 9/16" (Typ.) ~ match Slip Plate, Standard Plan J-28.52
   - Orientation for installation on bridge or retaining wall - see Standard Plan J-28.45

   1. ISOMETRIC VIEW (COVER NOT SHOWN FOR CLARITY)

   2. ELEVATION VIEW (COVER NOT SHOWN FOR CLARITY)

   3. Top View

   4. Section

   5. Details

   6. Notes

   7. Expires November 14, 2008

   8. Approved for publication.

   9. Pasco Bakotich III

   10. Washington State Department of Transportation

   11. Effective: December 7, 2009 to August 1, 2010

   12. This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
NOTES

1. See Standard Plans C-8b and C-14h for foundation and anchor bolt details.
2. Round and smooth all edges around hand hole and along the wire-way to protect the conductors.
4. Install grout after plumbing the pole.

See Standard Plans C-8b and C-14h for foundation and anchor bolt details.
Round and smooth all edges around hand hole and along the wire-way to protect the conductors.

Install grout after plumbing the pole.

REMOVABLE RAINTIGHT HAND HOLE COVER WITH GASKET ~ FASTEN WITH TWO STAINLESS STEEL PLATES (ASTM A 572 GR. 50 OR ASTM A 588)

CONDUCTOR ATTACHMENT DETAIL

CONDUCTOR ATTACHMENT DETAIL

CONDUCTOR ATTACHMENT DETAIL

CONDUCTOR ATTACHMENT DETAIL

BACK-UP RING ~ 1/4" THICK STEEL, 2" WIDE × 4" LONG

CLAMP ~ 1/8" THICK STEEL, 2" WIDE × 3" LONG

CONTINUOUS BACK-UP RING ~ 1/4" THICK STEEL, 2" WIDE × 4" LONG

STEEL PLATE 1 3/4"

(FASTEN WITH 4 #10 OR #12 OR #14 HD. SCREWS)

STEEL PLATE 1 3/4"

(FASTEN WITH 4 #10 OR #12 OR #14 HD. SCREWS)

STEEL PLATE 1 3/4"

(FASTEN WITH 4 #10 OR #12 OR #14 HD. SCREWS)

STEEL PLATE 1 3/4"

(FASTEN WITH 4 #10 OR #12 OR #14 HD. SCREWS)

STEEL PLATE 1 3/4"

(FASTEN WITH 4 #10 OR #12 OR #14 HD. SCREWS)
NOTES

1. Sign sequence is the same for both directions of travel. Adjust for the direction of roadway curves.

2. Flashing Warning Lights (Type B per MUTCD) and/or flags may be used to call attention to the advance Warning Signs.

3. Existing conflicting pavement markings and signs that are no longer applicable shall be removed or obliterated. Temporary pavement markings shall be used to delineate bypass detour.

4. Raised pavement markers and/or temporary guideposts may be used on bypass as directed by the Engineer.

5. Steady Burning Warning Light (Type C per MUTCD) shall be used to mark Channelizing Devices at night.

6. Where advisory speed is 30 mph or less, reverse turn signs should be used. Other curves or turn Warning Signs may be substituted to depict roadway alignment.

7. Temporary barriers and end treatments shall be crashworthy.

8. To improve visibility, consider use of temporary illumination at closure points.


10. Consider using a PCMS for additional advance warning:

For local agency use only.

NOT FOR USE ON STATE ROUTES.
NOTES:
1. Modify Regulatory Traffic Control Devices, as needed, for the duration of the detour.
2. Two Flashing Warning Lights (Type A per MUTCD) may be used to mark each barricade at night.
3. Trail Blazers shall be installed throughout the detour, as appropriate.
4. Signing shown for the one direction only.
5. Coordinate with emergency services.
6. For signs sizes refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M56-06.

All signs are black on orange unless designated otherwise.

1. Drawn by: Elena Brunstein

Ken L. Smith 02-15-07

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

SIGN SPACING = X (1)

RURAL ROADS 40/65 MPH R1-10
RURAL ROADS & URBAN ARTESIALS 25/40 MPH R1-10
RESIDENTIAL & BUSINESS ARESIALS 20/30 MPH R1-10 (2)
URBAN STREETS 20 MPH OR LESS 10X2 (2)

(1) All sign spacing may be adjusted to accommodate at-grade intersections and driveways.
(2) This sign spacing may be reduced in urban areas to fit roadway conditions.

LEGEND

H SIGN LOCATION

BARCODA = TYPE 3 R
BARCODA = TYPE 9 L

ROAD CLOSURE

WITH OFF-SITE DETOUR

STANDARD PLAN K-10.40-00

FOR LOCAL AGENCY USE ONLY

NOT FOR USE ON STATE ROUTES
LONGITUDINAL BUFFER SPACE = B

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>LENGTH B (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 / 40</td>
<td>50</td>
</tr>
<tr>
<td>25 / 50</td>
<td>60</td>
</tr>
</tbody>
</table>

STATE DESIGN ENGINEER
Washington State Department of Transportation

SHEET 1 OF 1 SHEET

ROAD WORK AHEAD

END ROAD WORK

CHANNELIZING DEVICE SPACING

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>IN TAPER (FEET)</th>
<th>IN TANGENT (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 / 40</td>
<td>25</td>
<td>45</td>
</tr>
<tr>
<td>25 / 50</td>
<td>25</td>
<td>60</td>
</tr>
</tbody>
</table>

NOTE: ALL SIGNS ARE BLACK ON ORANGE UNLESS DESIGNATED OTHERWISE

SIGN SPACING = X

LANE CLOSURE
~ LOW VOLUME ROAD

STANDARD PLAN K-30.20-01

FOR LOCAL AGENCY USE ONLY
NOT FOR USE ON STATE ROUTES

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

NOTES
1. This plan is intended for use on roadways when traffic volumes create sufficient gaps for motor vehicles to yield.
2. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark Channelizing Devices at night.
3. Adequate sight distance shall be provided for drivers to see opposing traffic, otherwise use flaggers and/or Temporary Signal.
4. Extend Channelizing Device taper across shoulder ~ recommended.
5. Post mount signs when in place for 3 days or longer.
6. For speed limit 35 mph or higher replace W1-3R with W1-4R.
7. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
8. Consider using a PCMS for additional advance warning.
1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

2. Night work requires additional roadway lighting at flagging stations. See WSDOT Standard Specifications for additional details.

3. Extend Channelizing Device across shoulder ~ recommended.

4. Sign sequence is the same for both directions of travel on the roadway.

5. Channelizing Device spacing for the downstream taper option shall be 20' O.C.

6. For signs also refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

Night work requires additional roadway lighting at flagging stations. See WSDOT Standard Specifications for additional details.

Extend Channelizing Device across shoulder ~ recommended.

Sign sequence is the same for both directions of travel on the roadway.

Channelizing Device spacing for the downstream taper option shall be 20' O.C.

For signs also refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

Night work requires additional roadway lighting at flagging stations. See WSDOT Standard Specifications for additional details.

Extend Channelizing Device across shoulder ~ recommended.

Sign sequence is the same for both directions of travel on the roadway.

Channelizing Device spacing for the downstream taper option shall be 20' O.C.

For signs also refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
Channelizing Devices are recommended along centerline to separate traffic from work operation. Devices are required at tapers to shift traffic movement between lanes and to protect all flagging stations. Night work requires additional roadway lighting at flagging stations. See WSDOT Standard Specifications for additional details.

For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-06.

### Buffer Data

**Typical Protective Vehicle with TMA (See Note 1)**

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Loaded Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Yard Dump Truck</td>
<td>Minimum Weight 12,000 Lbs.</td>
</tr>
<tr>
<td>Surfside Truck, Flat Bed, etc.</td>
<td>Maximum Weight Shall be 20' O.C.</td>
</tr>
</tbody>
</table>

**Roll Ahead Stopping Distance = B (Dry Pavement Assumed)**

### Channelizing Device Spacing

<table>
<thead>
<tr>
<th>Posted Speed (MPH)</th>
<th>Minimum Taper Length (FEET)</th>
<th>Minimum Taper Length (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25/30</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>35/40</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>50/70</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

### Sign Spacing = X (1)**

<table>
<thead>
<tr>
<th>Sign Location</th>
<th>Channelizing Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Work Ahead</td>
<td>Protective Vehicle = Recommended</td>
</tr>
<tr>
<td></td>
<td>Portable Changeable Message Sign (PCMS)</td>
</tr>
<tr>
<td></td>
<td>Temporary Traffic Control Devices (MUTCD)</td>
</tr>
</tbody>
</table>
### Road Work Ahead

- **Minimum Weight 15,000 LBS.**
  - (Maximum weight shall be in accordance with manufacturer recommendation)

- **Typical Protective Vehicle with TMA**
  - (See Note 1)

- **Loaded Weight**

- **Roll Ahead Stopping Distance = 30 feet min.**
  - (Dry pavement assumed)

- **Post Speed (MPH)**
  - 45
  - 50
  - 55
  - 60

- **Lane Width (feet)**
  - 25
  - 30
  - 35
  - 40
  - 45
  - 50
  - 55

- **Longitudinal Buffer Space**
  - \( B \)

- **Buffer Data**
  - Typical Protective Vehicle with TMA (See Note 1)

- **Minimum Taper Length = \( L \) (feet)**

- **Minimum Weight (15,000 LBS.)**

- **Channelizing Device Spacing**
  - **POSTED SPEED (MPH)**
    - 80 / 70
    - 40 / 40
  - **IN TAPER (FEET)**
    - 40
    - 30
  - **IN TANGENT (FEET)**
    - 60

- **Sign Spacing = \( X \) (1)**

1. All sign spacing may be adjusted to accommodate interchange ramps, at-grade intersections, and driveways.
2. This sign spacing may be reduced in urban areas to fit roadway conditions.

- **Protection Vehicle ~ Recommended**

- **Legend**
  - **ARROW PANEL**
  - **CHANNELIZING DEVICES**
  - **PORTABLE CHANGEABLE MESSAGE SIGN**

**Notes**
1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.
2. Devices shall not encroach into adjacent lanes.
3. Extend device taper (L/3) across shoulder ~ recommended.
4. Portable Changeable Message Sign (PCMS) ~ recommended.
5. Use Transverse Devices in every 1000 feet ~ recommended.
6. Use Traffic Safety Drums for all tapers on high speed roadway ~ recommended.
7. Channelizing Device spacing for the downstream taper option shall be 20 O.C.
8. For signs also refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
NOTES

1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

2. Devices shall not encroach into adjacent lanes.

3. Extend device taper (L/3) across shoulder ~ recommended.

4. Portable Changeable Message Sign (PCMS) ~ recommended.

5. Use Transverse Devices in closed lane every 1000’ 35/64 ~ recommended.

6. Traffic Safety Drums for all tapers on high speed roadway ~ recommended.

7. Channelizing Device spacing for the downstream taper option shall be 20’ O.C.

8. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
1. Excluding conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used as necessary.

2. Steady-Burn Warning Lights (Type C, MUTCD) shall be used to mark Channelizing Devices at night.

3. Exposed ends of Concrete Barriers shall be tapered outside the other zone or fitted with impact attenuators.

4. Roadside Barrier and End Treatment shall be crashworthy. Refer to Design Manual, Chapter 710 & 720, for barrier and attenuator information.

5. Temporary concrete barrier may be Type 2 (see Standard Plan C-5) or Alternative (see Standard Plan K-80.35). Anchoring may be required (see Standard Plans K-80.36 and K-80.37).

6. For signs etc. refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**LONGITUDINAL BUFFER SPACE = B**

**SIGN SPACING = X**

**MINIMUM TAPER LENGTH = L (FEET)**

**CHANNELIZING DEVICE SPACING**

---

**NOTES**

1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance. Extend device taper (L/3) across shoulder – recommended.

2. For signs refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

---

**LEGEND**

- **PCMS**
- **W20-5R**
- **W1-4**
- **W1-3**
- **W4-2L**
- **W1-5**
- **R4-7B**
- **R1-3**
- **R1-2**

**WORK AREA**

---

**SHEET 1 OF 1 SHEET**

---
**Minimum Weight 15,000 lbs.**

(Maximum weight shall be in accordance with manufacturer recommendation)

Typical Protective Vehicle with TMA (See Note 1)

---

**Minimum Taper Length = L (Feet)**

<table>
<thead>
<tr>
<th>LANE WIDTH (FEET)</th>
<th>POSTED SPEED (MPH)</th>
<th>POSTED SPEED (MPH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>40 / 40</td>
<td>50 / 50</td>
</tr>
<tr>
<td>11</td>
<td>115 / 115</td>
<td>130 / 130</td>
</tr>
<tr>
<td>13</td>
<td>125 / 125</td>
<td>140 / 140</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>IN TAPER (FEET)</th>
<th>IN TAN (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 / 50</td>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

Channelizing Device Spacing

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>IN TAPER (FEET)</th>
<th>IN TAN (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 / 50</td>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

**Road Work Ahead**

W20-1

W20-5L

---

**Notes:**

1. Portable Changeable Message Sign (PCMS) = recommended.

2. Portable Changeable Message Sign (PCMS) = recommended.

3. Prohibit turns as necessary for traffic conditions.

A four sign sequence is required with X 30 100' 35/64 (2)

NOTE:
1. A Protective Vehicle is recommended repetitively if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to assist workers, no specific Roll-Ahead distance.
2. If an existing signal is present, the signal shall be set to "red flash mode" or turned off during flagging operations.
3. Extend device taper (L/3) access shoulder - recommended.
4. Law enforcement officer may be used in lieu of flaggers to control intersection traffic.
5. Closing lane in advance of flagging location when multiple lanes are on approach leg - recommended.
6. Maintain a minimum of one access point for each business within the Work Area limits.
7. Consider using a PCMBL field located in advance of signing, on the five lane roadway.
8. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle ~ recommended.
9. An appropriate standard warning sign reflecting the road condition or work operation may be used in place of the ROADER sign. An acceptable alternative would be to repeat any of the signs from the sequence.
NOTES:
1. If the work space extends across a crosswalk, the crosswalk should be closed (see Standard Plan K-34.20).
2. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a right lane having significant right turning movements, then the right lane may be restricted to right turn only, as shown. This procedure increases the through capacity by eliminating right turns from the open through lane.
3. Prohibit turns as necessary for traffic conditions.
4. Flashing Warning Lights (Type A per MUTCD) should be used, as needed, to mark barricades at night.
5. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark channelizing devices at night.
6. For long term projects, conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used as necessary.
7. For signs sizes refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

SIGN SPACING = X

<table>
<thead>
<tr>
<th>ROAD TYPE</th>
<th>POSTED SPEED</th>
<th>IN TAPER (Feet)</th>
<th>IN TAMPER (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 / 30</td>
<td>25 / 30</td>
<td>25 / 30</td>
<td>25 / 30</td>
</tr>
<tr>
<td>25 / 45</td>
<td>25 / 45</td>
<td>25 / 45</td>
<td>25 / 45</td>
</tr>
<tr>
<td>35 / 64</td>
<td>35 / 64</td>
<td>35 / 64</td>
<td>35 / 64</td>
</tr>
</tbody>
</table>

MINIMUM TAPER LENGTH = L (Feet)

<table>
<thead>
<tr>
<th>LANE WIDTH (Feet)</th>
<th>POSTED SPEED (MPH)</th>
<th>IN TAPER (Feet)</th>
<th>IN TAMPER (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>85 / 105</td>
<td>85 / 105</td>
<td>85 / 105</td>
</tr>
<tr>
<td>11</td>
<td>110 / 180</td>
<td>110 / 180</td>
<td>110 / 180</td>
</tr>
<tr>
<td>12</td>
<td>125 / 190</td>
<td>125 / 190</td>
<td>125 / 190</td>
</tr>
</tbody>
</table>

FOR LOCAL AGENCY USE ONLY
NOT FOR USE ON STATE ROUTES

INTERSECTION - RIGHT LANE CLOSURE
FAR SIDE
STANDARD PLAN K-33.20-80

NOTE:

Ken L. Smith 02-15-07
Washington State Department of Transportation

APPROVED FOR PUBLICATION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. If the work space extends across a crosswalk, the crosswalk should be closed (see Standard Plan K-34.20).

2. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a left turn having significant left-turning movements, then the left lane may be reopened as a turn bay for left turns only, as shown.

3. Prohibit turns as necessary for traffic conditions.

4. Flashing Warning Lights (Type A per MUTCD) should be used, as needed, to mark barricades at night.

5. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark channelizing devices at night.

6. For long term projects, conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used as necessary.

7. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

8. For local agency use only

9. Not for use on state routes
NOTES
1. Prohibit turns as necessary for traffic conditions.
2. Flashing Warning Lights (Type A per MUTCD) should be used, as needed, to mark roadblocks at night.
3. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark channelizing devices at night.
4. For long term projects, conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used as necessary.
5. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-0A.
NOTES
1. No left turn signs are to be used if traffic volumes are too high or there is an operating signal. Close the left turn pocket if there is one on the side street.
2. When turn prohibitions are implemented, two turn prohibition signs should be used, one on the near side and, space permitting, one on the far side of the intersection.
3. If the work space extends a crosswalk, the crosswalk should be closed (see Standard Plan K-34.20).
4. Flank Warning Lights (Type A per MUTCD) should be used, as needed, to mark barricades at right.
5. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark channelizing devices at night.
6. For long term projects conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used.
7. Signs of size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

FOR LOCAL AGENCY USE ONLY
NOT FOR USE ON STATE ROUTES

INTERSECTION
- HALF ROAD CLOSURE
WITH LANE SHIFT

STANDARD PLAN K-33.60-00

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Ken L. Smith 02-15-07
Washington State Department of Transportation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

2. Controls shown are for pedestrian traffic only.

3. Use Warning Lights on barricades.

4. Maintain a minimum width of 3 feet for pedestrian path.

5. For signs refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
NOTES

1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. Where no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

2. For long term projects conflicting pavement markings that are no longer applicable shall be removed. Temporary markings shall be used as necessary and signs shall be post mounted.

3. The sign MOTORCYCLES USE EXTREME CAUTION may be used.

4. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

DATE
STATE DESIGN ENGINEER
Washington State Department of Transportation

SHEET 1 OF 1 SHEET

DRAWN BY:  ELENA BRUNSTEIN

1. ROAD WORK AHEAD

MINIMUM TAPER LENGTH = L (FEET)

<table>
<thead>
<tr>
<th>LANE WIDTH</th>
<th>PORTED SPEED GAPS</th>
<th>TAPER</th>
<th>TIEBACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>30</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>11</td>
<td>115</td>
<td>116</td>
<td>126</td>
</tr>
<tr>
<td>10</td>
<td>125</td>
<td>126</td>
<td>130</td>
</tr>
</tbody>
</table>

SIGN SPACING = X (1)

W20-1

END ROAD WORK

1. ROAD WORK AHEAD

MINIMUM TAPER LENGTH = L (FEET)

<table>
<thead>
<tr>
<th>LANE WIDTH</th>
<th>PORTED SPEED GAPS</th>
<th>TAPER</th>
<th>TIEBACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>30</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>11</td>
<td>115</td>
<td>116</td>
<td>126</td>
</tr>
<tr>
<td>10</td>
<td>125</td>
<td>126</td>
<td>130</td>
</tr>
</tbody>
</table>

SIGN SPACING = X (1)

W20-1

END ROAD WORK

LEGEND

SHOULDER WORK AREA PROTECTION (NOT TO SCALE)

SHOULDER WORK AREA PROTECTION

INTERSECTION ~ SHOULDER WORK

STANDARD PLAN K-35.20-00

FOR LOCAL AGENCY USE ONLY
NOT FOR USE ON STATE ROUTES

Ken L. Smith 02-15-07
Washington State Department of Transportation

APPROVED FOR PUBLICATION
EXPIRES AUGUST 9, 2007
A Protective Vehicle is recommended regardless if a TMA is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

1. Channelizing Device spacing for the downstream taper option shall be 20' O.C.

2. No Encroachment on the traveled lane is permitted. If Encroachment is necessary, the lane shall be closed (see Standard Plan K-24.20).

3. Signs to be post mounted for long term projects.

4. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
### Sign Spacing

<table>
<thead>
<tr>
<th>Type</th>
<th>Speed (MPH)</th>
<th>Channelizing Device Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>35</td>
<td>20' O.C.</td>
</tr>
<tr>
<td>40</td>
<td>35</td>
<td>20' O.C.</td>
</tr>
</tbody>
</table>

#### Notes
1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.
2. Channelizing Device spacing for the downstream taper option shall be 20' O.C.
3. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
NOTES:
1. In those situations where multiple work locations within a limited distance make it
technically practicable to place stationary signs, the distance between the advance Warning
Sign and the Work Area should not exceed 5 miles.
2. In those situations where the distance between the advance signs and the Work
Area is 2 to 5 miles, a Supplemental Distance plaque should be used with the
ROAD WORK AHEAD sign.
3. No encroachment into traffic lane is permitted with this plan.
4. Work vehicle and Shadow vehicle shall use Warning Beacons.
5. Shadow vehicle shall maintain 600' to 1000' of sight distance to approaching traffic.
6. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and
WSDOT Sign Fabrication Manual M55-05.

PROTECTIVE VEHICLE ROLL AHEAD DISTANCE = R

<table>
<thead>
<tr>
<th>VEHICLE TYPE</th>
<th>LOADED WEIGHT</th>
<th>STATIONARY OPERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 YARD DUMP TRUCK, SERVICE TRUCK, FLATBED, ETC.</td>
<td>MINIMUM WEIGHT 14,000 LBS.</td>
<td>30 FEET</td>
</tr>
</tbody>
</table>

ROLL AHEAD DISTANCES VARY AND SHALL BE DETERMINED IN FIELD
BASED ON WORK OPERATION AND SITE SPECIFIC CONDITIONS

* PROTECTIVE VEHICLE MOUNTED

** ROAD WORK AHEAD

† SHOULDER WORK

FOR LOCAL AGENCY USE ONLY
NOT FOR USE ON STATE ROUTES
### NOTES

1. The sign shown is not required in the following cases: the work space is behind a barrier, or more than 2' behind the curb, or more than 15' from the edge of a roadway.

2. For sign size, refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

---

### LEGEND

- **W20-1**: Road Work Ahead
- **ROAD WORK AHEAD**: Sign Location
- **WORK AREA**: See Note 1
- **WSD-1**: The sign shown is not required in the following cases: the work space is behind a barrier, or more than 2' behind the curb, or more than 15' from the edge of a roadway.
- **SIGN LOCATION**: For sign size, refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

---

### TABLE: SIGN SPACING

<table>
<thead>
<tr>
<th>Location</th>
<th>Speed</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Roads</td>
<td>15 / 25 MPH</td>
<td>35/64 (2)</td>
</tr>
<tr>
<td>Rural Roads &amp; Urban Arterials</td>
<td>25 / 40 MPH</td>
<td>35/64</td>
</tr>
<tr>
<td>Rural Roads, Urban Arterials, Residential &amp; Business Districts</td>
<td>25 / 40 MPH</td>
<td>35/64 (2)</td>
</tr>
<tr>
<td>Urban Streets</td>
<td>25 MPH OR LESS</td>
<td>35/64 (2)</td>
</tr>
<tr>
<td>All signs are black on orange unless designated otherwise</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### SIGN SPACING = X (1)

- All sign spacing may be adjusted to accommodate at-grade intersections and driveways.
- This sign spacing may be reduced in urban areas to fit roadway conditions.

---

For local agency use only. Not for use on state routes.
NOTE:

1. Implement this plan when the initial roadway assessment is complete and determined to be passable with caution.


3. Spot hazards shall be marked with barricades or channelizing devices to alert motorists.

4. For signs also refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

2. Motorcycles Use Extreme Caution signs shall be installed when the following roadway conditions exist:
   - Grooved pavement
   - Abrupt lane edge
   - Steel plates
   - Loose gravel of earth

   Specific signs for each of the conditions noted shall be installed along with Motorcycles Use Extreme Caution signs.

3. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

<table>
<thead>
<tr>
<th>Channelizing Device Spacing</th>
<th>Posted Speed (MPH)</th>
<th>In Taper (Feet)</th>
<th>In Taper (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL ROADS</td>
<td>25 / 30 MPH</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>RURAL HIGHWAYS</td>
<td>35 / 40 MPH</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>URBAN STREETS</td>
<td>25 MPH OR LESS</td>
<td>200</td>
<td>350</td>
</tr>
<tr>
<td>ALL SIGNS ARE BLACK ON ORANGE UNLESS DESIGNATED OTHERWISE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) All sign spacing may be adjusted to accommodate interchange ramps, at-grade intersections, and driveways.

(2) This sign spacing may be reduced in urban areas to fit roadway conditions.

Motorcycle Warning Sign (W21-1701) should be installed at 1 mile spacing, throughout the work zone where the condition exists, as part of the sequence of other appropriate standard warning signs on 1 mile spacing.
1. For long term projects conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used as necessary.

2. For Hot Mixed Asphalt Pavement, a temporary striping tape shall be installed in conjunction with DO NOT PASS and "PASS WITH CARE" sign locations.

3. Temporary roadside delineation with Channelization Devices is optional. The appropriate taper length shall be L/2, see Standard Plan K-24.20 for minimum taper length (L).

4. For long term projects a channelization/pavement marking plan should be implemented.

5. Temporary Raised Pavement Marker (TRPM) may be used on a pattern spacing 5' O.C. to simulate a solid line.
**NOTES**

1. For sign installation details, see Std. Plan G- series.
2. In rural areas, the "V" Height can be a minimum of 7 feet for primary signs and 6 feet for the supplemental plaques for greater visibility, as directed by the engineer.
3. The "V" height for signs, with an area of more than 50 square feet and two or more sign supports, is 7 feet in both rural and urban areas.

<table>
<thead>
<tr>
<th>HEIGHT V</th>
<th>TO BOTTOM OF SIGN (NO SUPPLEMENTAL PLAQUE)</th>
<th>TO BOTTOM OF SUPPLEMENTAL PLAQUE (WHEN REQUIRED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL</td>
<td>6' MINIMUM</td>
<td>4' MINIMUM</td>
</tr>
<tr>
<td>URBAN</td>
<td>7' MINIMUM</td>
<td>6' MINIMUM</td>
</tr>
</tbody>
</table>

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. All fasteners may be zinc plated, galvanized or stainless steel. All steel angle and tubular steel shall be hot-rolled, high carbon steel, painted or galvanized.

2. Install one lightweight Type A Low-Intensity flashing warning light on the traffic side of the barricade. Install two Type A Low-Intensity flashing warning lights per barricade when the barricades are used to close a roadway. Attach the light to the barricade according to the manufacturer's recommendations or use the details shown on this plan.

3. Stripes on barricade rails shall be alternating orange and white retroreflective stripes (sloping downward at an angle of 45 degrees in the direction traffic is to pass).

4. The Type 3 barricade design shown on this plan meets the crash test requirements of NCHRP 350. Alternative designs may be approved if they conform to the NCHRP 350 crash test criteria and the MUTCD.

5. When a sign is mounted on the barricade, it shall be securely bolted to at least two plywood panels. The top of the sign shall not be higher than the top panel of the barricade.

6. When sandbags are used in freezing weather, Urea fertilizer shall be mixed with the sand in a quantity to prevent the sand from freezing.

Based on the image and the text provided, the document appears to be a plan for a Type 3 barricade, detailing the components and instructions for installation, including the use of lightweight Type A Low-Intensity flashing warning lights. The plan also includes instructions for installing the barricade, specifying the use of steel angle and tubular steel, and the materials and fasteners to be used. The plan includes notes on the use of retroreflective stripes and considerations for snowfall conditions.
TYPE 3 BARRICADE

BARRICADE PLACEMENT

2' MIN. USEABLE TRAFFIC LANE

AREA CLOSED TO TRAFFIC

TYPE 3L BARRICADE

STRIPES ON THE BARRICADES SHALL SLOPE DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS.

ROAD CLOSURE AT INTERSECTION

ROAD CLOSURE AT OTHER LOCATIONS

TYPE 3R BARRICADE

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
The reinforcing steel details for the NARROW BASE barrier are the same as those shown for the 2' wide barrier except that the bars along the vertical face run vertically with a 1 1/2" clearance.

The vertical dimensions for the slots and loop bar locations on the NARROW BASE barrier are the same as those shown on the END views of the 2' wide barrier.

1/4" DRAFT (TYP.)

**NOTES**

1. The reinforcing steel details for the NARROW BASE barrier are the same as those shown for the 2' wide barrier except that the bars along the vertical face run vertically with a 1 1/2" clearance.

2. The vertical dimensions for the side and loop bar locations on the NARROW BASE barrier are the same as those shown on the END views of the 2' wide barrier.
1. Use Type 1 Anchors when the concrete pavement or bridge deck is 6" or thicker with 2' wide concrete barrier only. Use Type 2 Anchors (Standard Plan K-80.37) with narrower barrier type.

2. Adjust the location of the Type 1 Anchors to avoid the main reinforcing in the deck when drilling holes.

3. Use shims to properly fit the Type 1 Anchors to the barrier and roadway surfaces.

4. Upon removal of the Type 1 Anchors, clean the bolt holes and fill them with grout according to Standard Specification 6.02.32.

5. Remove the Type 3 Anchors by first driving the steel pins down through the barrier further into the pavement to allow lifting the barrier without interference, then remove the pins from the pavement.

6. After removing the Type 3 Anchors, clean the pin holes and fill them with sealant according to Standard Specification 9-04.2.
The intended use of this plan is for the temporary installation of Alternative Temporary Concrete Barrier (F-Shape), Narrow Base (see Standard Plan K-84.30) on cement concrete pavement or bridge deck.

1. Use Class 1 when the concrete pavement or bridge deck is 9" or thicker; use Class 2 when it is 6" or thicker.

2. Adjust the location of the anchors to avoid the main reinforcing in the deck when drilling holes.

3. Use shims to properly fit the anchors to the barrier and roadway surfaces.

4. Upon removal of the anchors, clean the bolt holes and fill them with grout according to Standard Specification 6.02.3(20).
**NOTES**

1. The bracing and pull post details for Wire Fence Type 2 are the same as for Type 1.

2. Attach the wire mesh to the posts using four fasteners. Three additional fasteners per post are required within and at the limits of sag conditions. Use additional fasteners on posts which mark the angle point of any sudden changes in topography.

3. Wood anchors (for wood posts) shall be 2x4 lumber, 12" long minimum, and fastened with three 16d galvanized nails.

**WIRE FENCE TYPES 1 & 2**

**STEEL POSTS AND BRACES**

**INTERMEDIATE BRACING / PULL POST**

**END, CORNER, OR GATE POST**

**GRADE DEPRESSION (SAG) DETAIL**

The bracing and pull post details for Wire Fence Type 2 are the same as for Type 1. Attach the wire mesh to the posts using four fasteners. Three additional fasteners per post are required within and at the limits of sag conditions. Use additional fasteners on posts which mark the angle point of any sudden changes in topography. Wood anchors (for wood posts) shall be 2x4 lumber, 12" long minimum, and fastened with three 16d galvanized nails.
WOOD POSTS AND BRACES

GATE BRACING
(WIRE FENCE TYPE 1 SHOWN)

INTERMEDIATE BRACING / PULL POST
(WIRE FENCE TYPE 1 SHOWN)

CORNER BRACING
(WIRE FENCE TYPE 1 SHOWN)

END BRACING
(FENCE TYPE 1 SHOWN)

FRAME ~ NPC 1" PIPE
TRUSS ROD ~ 3/8" DIAM.

@ 14' - 0" CENTERS

GATE POST (TYP.)
WOOD BRACE (TYP.)
WOOD ANCHOR (TYP.)
~ SEE NOTE 3

INTERSECTION BRACING
(WIRE FENCE TYPE 1 SHOWN)

SINGLE GATE
(STEEL POSTS SHOWN)

DOUBLE GATE
(STEEL POSTS SHOWN)

WOOD BRACE (TYP.)
WOOD ANCHOR (TYP.)
~ SEE NOTE 3

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
All concrete post bases shall be 10" minimum diameter.
Along the top and bottom, using Hog Rings, fasten the Chain Link Fence Fabric to the Tension Wire and Tension Cable within the limits of the first full fabric weave.
Details are illustrative and shall not limit hardware design or post selection of any particular fence type.

Note: This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
NOTES
1. All glare screen posts shall be 1 5/8" × 2 1/4" Galvanized Steel H-Columns.

2. Post Bolts shall be:
   - On Timber Posts: Hex head bolt 6/8-16 UNC × 8" with lock washer.
   - On Steel Posts: Hex head bolt 6/8-16 UNC × 2 1/2" with lock washer.

   Either with hex nut and washer, or eye nut and washer where shown in the plan.
NOTES

1. Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used for supplementing or substituting the painted pavement markings shown hereon. See the Standard Plans for RPM supplement and substitution patterns.

2. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

LEGEND

R = RAMP LANE WIDTH
L = LANE WIDTH

TYPE 5 TRAFFIC ARROW (TYP.)
TRAFFIC ARROW TYPE MAY VARY, SEE CONTRACT FOR TYPE SPECIFIED

MATCH LINE "A"
MATCH LINE "B"
MATCH LINE "C"

R = RAMP LANE WIDTH
L = LANE WIDTH

STOP LINE
WIDE LANE LINE
WIDE LANE LINE

SINGLE LANE ON- CONNECTION

SINGLE LANE OFF- CONNECTION

250' MIN.
225' MIN.

SINGLE LANE OFF- CONNECTION FOR ONE LANE REDUCTION

LANE LINE
WHITE EDGE LINE
DROP LANE LINE
YELLOW EDGE LINE

LANE LINE
WHITE EDGE LINE
YELLOW EDGE LINE

200'
50'
6'
1/2 MILE
300'

RAMP CHANNELIZATION

SINGLE LANE

STANDARD PLAN M-1.20-01

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used for supplementing or substituting the painted pavement markings shown hereon. See the Standard Plans for RPM supplement and substitution patterns.

The channelization shown on this plan assumes optimal geometric design. The dimensions may vary to fit existing conditions. See Contract.

NOTES

1. Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used for supplementing or substituting the painted pavement markings shown hereon. See the Standard Plans for RPM supplement and substitution patterns.

2. The channelization shown on this plan assumes optimal geometric design. The dimensions may vary to fit existing conditions. See Contract.
1. Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used for supplementing or substituting the painted pavement markings shown herein. See the Standard Plans for RPM supplement and substitution patterns.

2. When weaving section is more than 3/4 of a mile in length use lane line.

3. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

LEGEND

L = LANE WIDTH
R = RAMP LANE WIDTH

<table>
<thead>
<tr>
<th>SPEED</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 MPH</td>
<td>3627</td>
</tr>
<tr>
<td>40 MPH</td>
<td>3927</td>
</tr>
<tr>
<td>45 MPH</td>
<td>4327</td>
</tr>
<tr>
<td>50 MPH</td>
<td>5027</td>
</tr>
<tr>
<td>55 MPH</td>
<td>5727</td>
</tr>
<tr>
<td>65 MPH</td>
<td>6527</td>
</tr>
</tbody>
</table>

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Install a minimum of 3 sets of diagonals/chevrons in the gore area.
   A 60' spacing is standard; however, for gore areas shorter than 150'
   use a 25' spacing, and for gore areas greater than 400' a spacing
   of 100' may be used.

2. The acute angle of the diagonals shall always point in the direction
   of mainline traffic.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSM-
PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Install a minimum of 3 sets of diagonals/chevrons in the gore area. A 50' spacing is standard; however, for gore areas shorter than 150' use a 25' spacing, and for gore areas greater than 400' a spacing of 100' may be used.

2. The acute angle of the diagonals shall always point in the direction of mainline traffic.

GORE AREA MARKING LAYOUT WITH DIAGONALS

GORE AREA MARKING LAYOUT WITH CHEVRONS
2. Install a minimum of 3 sets of diagonals/chevrons in the gore area. A 50' spacing is standard; however, for gore areas shorter than 150' use a 25' spacing, and for gore areas greater than 400' a spacing of 100' may be used.

The acute angle of the diagonals shall always point in the direction of mainline traffic.
1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

2. The lane message "ONLY" may be added to the Traffic Arrow Type 2R locations shown, in which case, substitute the Arrow as per the LANE MESSAGE DETAIL.

\[ L = \frac{1}{2}\text{ typical lane width. See Contract for specified lane widths.} \]

**Legend:**
- Type 2R Traffic Arrow
- Type 3L Traffic Arrow

**General Notes:**
- The lane message "ONLY" may be added to the Traffic Arrow Type 2R locations shown, in which case, substitute the Arrow as per the LANE MESSAGE DETAIL.
- The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

**NOTE:** This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
NOTE
When specified in the Contract Plans, the HOV Symbol Marking shall be installed with an offset of 1 foot max. from the lane centerline.
KEY NOTES

1. Bid item "Bicycle Lane Symbol" includes Bike Lane Arrow and Bike Rider Symbol.
2. 2' x 6' White Bike Lane Arrow
3. Bike Rider Symbol

GENERAL NOTE
See contract for location and material requirements.
1. See the Contract Plans for locations of crosswalk centerlines.

2. To the maximum extent possible, curb ramp centerlines should be perpendicular to the crosswalk centerline.

3. To the maximum extent possible, crosswalks should be perpendicular to the centerline of the traveled way.
1. Dotted Extension Line shall be the same color as the line it is extending.
2. Edge Line shall be white on the right edge of traveled way, and yellow on the left edge of traveled way (on one-way roadways). Solid Lane Line shall be white.
3. The distance between the lines of the Double Center Line shall be 12" everywhere, except 4" for left turn channelization and narrow roadways with lane widths of 10 feet or less. Local Agencies (on non-State Routes) may specify a 4" distance for all locations.
4. The distance between the lines of the Double Lane Line shall be 4".
5. Wide Lane Line shall be white.
6. Double Center Line and Double Lane Line shall be white.
7. Center Line and Lane Line shall be white.
8. The distance between the lines of the No-Pass Line & Two-Way Left Turn Center Line shall be 12".
9. The distance between the lines of the Reversible Lane Line shall be 4".
10. The distance between the lines of the Wide Broken Lane Line shall be 4".
11. The distance between the lines of the Drop Lane Line shall be 4".
12. Dotted Extension Line shall be the same color as the line it is extending.
13. Edge Line shall be white on the right edge of traveled way, and yellow on the left edge of traveled way (on one-way roadways). Solid Lane Line shall be white.
14. The distance between the lines of the Double Center Line shall be 12" everywhere, except 4" for left turn channelization and narrow roadways with lane widths of 10 feet or less. Local Agencies (on non-State Routes) may specify a 4" distance for all locations.
15. The distance between the lines of the Double Lane Line shall be 4".
16. Wide Lane Line shall be white.
17. Double Center Line and Double Lane Line shall be white.
18. Center Line and Lane Line shall be white.
19. No-Pass Line & Two-Way Left Turn Center Line shall be white.
20. The distance between the lines of the Reversible Lane Line shall be 4".
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Raised Pavement Markers Types 3VY and 2V4 shall be spaced at 20' intervals along tangents and on horizontal curves with a radius of 5000' or more, and at 40' intervals on horizontal curves having radii of less than 5000'. Center the RPM's in the gaps between the pavement marking line.

2. Type 2V RPM's, when specified, shall be placed outside the left edge line at 60' intervals. See "LEFT EDGE OF LANE PLACEMENT DETAIL".

3. Raised pavement markers, when specified, shall be installed at the locations shown for Type 2V RPM's on multilane one-way roadways, and Type 3VY RPM's on two lanes two-way roadways.

4. The Type 2V RPM's placed on multilane one-way roadways and all RPM's not in lanes shall have an obstruction resistant casing.

**TYPE 2 RPM RAISED FACE COLORS**

- **TYPE 3VY** - YELLOW AND WHITE
- **TYPE 2W** - WHITE - ONE SIDE ONLY
- **TYPE 2Y** - YELLOW - ONE SIDE ONLY

**LONGITUDINAL MARKING SUPPLEMENT WITH RAISED PAVEMENT MARKERS**

**STANDARD PLAN N-30.30-02**

Approved for Publication:

Peck-Ralston, Inc. 10-14-01

Washington State Department of Transportation

**SECTION A**

**RECESSED PAVEMENT MARKER DETAILS**

FOR USE WHERE SPECIFIED IN CONTRACT
NOTES

1. Raised pavement markers shall be installed only when specified in the Contract Plans.

2. See the Standard Plans for marker designation.

3. The portion labeled "OPTIONAL" is only used when the Optional Marked Deceleration Taper (see Standard Plans M-3.10 and M-3.20) is specified in the contract plans.

Raised pavement markers shall be installed only when specified in the Contract Plans. See the Standard Plans for marker designation. The portion labeled "OPTIONAL" is only used when the Optional Marked Deceleration Taper (see Standard Plans M-3.10 and M-3.20) is specified in the contract plans.
1. The NO PASS LINE (when required) is applied parallel to the CENTER LINE, 4" away, with the Type 2yy RPMs aligned (similar to TWO-WAY LEFT-TURN LINE).
NOTE
Use the dimensions shown on this plan for each type Traffic Arrow being placed on roadways with a posted speed limit of 45 mph or higher.
SYMBOL MARKINGS
TRAFFIC ARROWS FOR
LOW SPEED ROADWAYS

STANDARD PLAN M-24.40-01

NOTE
Use the dimensions shown on this plan for each type Traffic Arrow being placed on roadways with a posted speed limit of 40 mph or lower.

Harold J. Peterfeso
05-31-06

MARK SUJKA

DRAWN BY:

SHEET 1 OF 2 SHEETS

MARKING AREA
7.73 SQ.FT.

MARKING AREA
8.03 SQ.FT.

MARKING AREA
7.73 SQ.FT.

MARKING AREA
14.83 SQ.FT.

MARKING AREA
14.83 SQ.FT.

MARKING AREA
12.86 SQ.FT.

SYMMETRICAL ABOUT CENTERLINE

SYMBOL MARKINGS
TRAFFIC ARROWS FOR
LOW SPEED ROADWAYS

STANDARD PLAN M-24.40-01

NOTE
Use the dimensions shown on this plan for each type Traffic Arrow being placed on roadways with a posted speed limit of 40 mph or lower.
SYMBOL MARKINGS

TRAFFIC ARROWS FOR LOW SPEED ROADWAYS

STANDARD PLAN M-24.40-01

SYMBOL & LANE

TYPE 5 TRAFFIC ARROW

SYMBOL & LANE

TYPE 6S TRAFFIC ARROW

SYMMETRICAL ABOUT CENTERLINE

MARKING AREA
19.58 SQ.FT.

MARKING AREA
23.14 SQ.FT.

MARKING AREA
15.94 SQ.FT.

MARKING AREA
15.94 SQ.FT.

DRAWN BY: MARK SUJKA

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

EFFECTIVE: DECEMBER 7, 2009 TO AUGUST 1, 2010

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER

Washington State Department of Transportation

SHEET 2 OF 2 SHEETS

SYMBOL MARKINGS

TRAFFIC ARROWS FOR
LOW SPEED ROADWAYS

STANDARD PLAN M-24.40-01

SYMMETRICAL ABOUT CENTERLINE

MARKING AREA
23.14 SQ.FT.

MARKING AREA
15.94 SQ.FT.

MARKING AREA
15.94 SQ.FT.
NOTES

1. When guardrail runs concurrent, the contractor shall:
   A. Drive the flexible guide post in line with the guardrail posts, or
   B. Mount the shorter flexible guide post onto the guardrail post.

2. Guide posts shall be fastened to the guardrail posts using two 2" × 3/8" lag screws with washers, along centerline of post. Also acceptable is any approved method submitted by the guide post manufacturer.

3. When concrete barrier runs concurrent, the contractor shall mount barrier delineators where guideposts are required.

GUIDE POST TYPE DEFINITIONS ~ REFLECTIVE SHEETING APPLICATIONS

- Type WW
- Type W
- Type Y
- Type YY

GUIDE POSTS & BARRIER DELINEATORS
STANDARD PLAN M-40.10-00

BARREL DELINEATORS

(Colors, dimensions, and locations vary; single slope in medium is shown)

- 6" min.
- 1"

BARREL DELINEATORS

- Reflective Sheeting, or flat plastic reflector lens

- Housing or bracket

- Top Mount per Contract

- Side Mount per Contract

- Reflective Sheeting, or flat plastic reflector lens

- Housing or bracket

- Traffic Face of Barrier

BARREL DELINEATOR NOTES

1. Spacing of Barrel Delineators shall be as shown in the plans.

2. The housing or bracket can be flexible or rigid, molded from a durable plastic or other durable material approved by the engineer, and shall be attached to the barrier with an adhesive recommended by the manufacturer. The attachment point on the barrier surface shall be free of dirt, curing compound, moisture, paint, or any other matter that would adversely affect the adhesive bond.

3. Barrel Delineators shall be one-sided for single direction traffic, or two-sided for bi-directional traffic. Color shall be white on the right of traffic, and yellow on the left of traffic.

4. The reflective surface shall be rectangular or trapezoidal.

5. Reflective Sheeting: 12 square inches minimum surface area; Type III, IV, V, or VI, selected from approved materials listed in the Qualified Products List.

6. Plastic Reflector: 9 square inches minimum surface area; acrylic or polycarbonate conforming to AASHTO M 290. Reflectors shall equal or exceed the following minimum values of Specific Intensity:

<table>
<thead>
<tr>
<th>Combination Angle</th>
<th>Incident Angle</th>
<th>Specific Intensity (cd/ft^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>0°</td>
<td>120</td>
</tr>
<tr>
<td>30°</td>
<td>0°</td>
<td>60</td>
</tr>
<tr>
<td>0°</td>
<td>30°</td>
<td>50</td>
</tr>
</tbody>
</table>

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
2. Guide posts shall be placed at 100' spacing on ramp tangents and tapers.
3. "S" dimension shown on Standard Plan M-40.40 or 100', whichever is smaller.
4. One half of "S" dimension shown on Standard Plan M-40.40 or 50', whichever is smaller.
5. Two spaces at 100'.
6. Three equal spaces when R < 75', four equal spaces when R ≥ 75'.
7. Two equal spaces.

Locate the initial Guide Post so that it does not hinder the visibility of the Bridge Delineator for approaching traffic. The distance between the bridge end and the initial Guide Post shall be 50 feet maximum.
NOTE

THREE EQUAL SPACES WHEN $R < 75'$

FOUR EQUAL SPACES WHEN $R \geq 75'$

187 DECELERATION TAPER

47

47

307 (TYP.)

DIVIDED HIGHWAY

REFLECTIVE SHEETING APPLICATIONS

<table>
<thead>
<tr>
<th>TYPE W</th>
<th>TYPE WW</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHITE</td>
<td>WHITE</td>
</tr>
<tr>
<td>WHITE</td>
<td>WHITE</td>
</tr>
<tr>
<td>WHITE</td>
<td>WHITE</td>
</tr>
</tbody>
</table>

TYPE G1

TYPE G2

LEGEND

○ TYPE W

① TYPE WW

② TYPE Y

SEE TYPE DEFINITIONS, STD. PLAN M-40.10

G2

G1

G2

G1

3" FACING TRAFFIC

3" BACK SIDE

3" FACING TRAFFIC

3" BACK SIDE

4" WHITE

4" GREEN

4" WHITE

4" WHITE

3" FACING TRAFFIC

3" BACK SIDE

3" FACING TRAFFIC

3" BACK SIDE

4" WHITE

4" GREEN

4" WHITE

4" WHITE

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTE 1

1. The first guide post is positioned "S" distance from the beginning of curvature.

2. If the last guide post beyond the curve is 1/2 "S" or more, no additional posts are required.

3. If the last guide post beyond the curve is less than 1/2 "S", one additional post is required.


LEGEND

- TYPE W
- TYPE Y
- TYPE WW

NOTE 2

GUIDE POST SPACING (Feet)

<table>
<thead>
<tr>
<th>Radius</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1,200</td>
<td>120</td>
</tr>
<tr>
<td>1,400</td>
<td>140</td>
</tr>
<tr>
<td>1,600</td>
<td>160</td>
</tr>
<tr>
<td>1,800</td>
<td>180</td>
</tr>
<tr>
<td>2,000</td>
<td>200</td>
</tr>
<tr>
<td>2,200</td>
<td>220</td>
</tr>
<tr>
<td>2,400</td>
<td>240</td>
</tr>
<tr>
<td>2,600</td>
<td>260</td>
</tr>
<tr>
<td>2,800</td>
<td>280</td>
</tr>
<tr>
<td>3,000</td>
<td>300</td>
</tr>
<tr>
<td>4,000</td>
<td>400</td>
</tr>
</tbody>
</table>

NOTE 3

- TYPE T
- TYPE A
- TYPE E

NOTE 4

INTERPOLATE FROM THE TABLE FOR RADII NOT SHOWN.
1. Locate the initial Guide Post so that it does not hinder the visibility of the Bridge Delineator for approaching traffic. The distance between the bridge end and the initial Guide Post shall be 50 feet max.

2. Locate the initial Guide Post so that its visibility is unhindered for traffic departing the bridge. The distance between the bridge end and the initial Guide Post shall be 50 feet max.

NOTE:


NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
SHOULDER RUMBLE STRIP
TYPE 1
FOR DIVIDED HIGHWAYS

PERSPECTIVE VIEW
MULT-LANE DIVIDED HIGHWAY

TYPICAL SHOULDER INSTALLATION

SECTION A

SECTION B
SHOULDER RUMBLE STRIP
FOR DIVIDED HIGHWAYS
STANDARD PLAN M-60.10-00

DRAWN BY: MARK SUJKA

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
SHOULDER RUMBLE STRIP
TYPE 1
FOR DIVIDED HIGHWAYS
STANDARD PLAN M-60.10-00
SHEET 3 OF 4 SHEETS

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
TERMINATE THE SHOULDER RUMBLE STRIPS AT THE BEGINNING OF THE DECELERATION TAPER.

IF A MEDIAN ACCELERATION TAPER IS INCLUDED, START THE RUMBLE STRIP AT THE END OF THE TAPER.

RUMBLE STRIP PLACEMENT AT INTERSECTIONS
NOTES

1. Center Line Rumble Strip installation requires a minimum distance of 12 feet from Center Line to edge of paved shoulder.

2. When directed by the Engineer, Rumble Strips may be installed along the turn pocket taper where there is a history of rear-end collisions in the turn pocket.