ALL MAJOR CHANGES ARE COLOR CODED
<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>DESCRIPTION</th>
<th>REVISION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-S1.1 (000)</td>
<td>SUPERELEVATION, 2 LANE</td>
<td>4 - 6/91</td>
<td>R-1</td>
</tr>
<tr>
<td>R-S1.2 (000)</td>
<td>SUPERELEVATION, MULTI-LANE, UNDIVIDED</td>
<td>6 - 6/91</td>
<td>R-2</td>
</tr>
<tr>
<td>R-S1.3 (000)</td>
<td>SUPERELEVATION, MULTI-LANE, DIVIDED</td>
<td>4 - 6/91</td>
<td>R-3</td>
</tr>
<tr>
<td>R-S2.1 (000)</td>
<td>TYPE 1, 2 AND 3 APPROACH ROADS</td>
<td>5 - 8/82</td>
<td>R-4</td>
</tr>
<tr>
<td>R-S2.2 (000)</td>
<td>TYPE 4 AND TYPE 5 APPROACH ROADS-URBAN DRIVeway LOCATION DETAILS</td>
<td>3 - 3/85</td>
<td>R-5</td>
</tr>
<tr>
<td>R-1.1.1 (206, 207)</td>
<td>STRUCTURE EXCAVATION AND BACKFILL (METHOD OF MEASUREMENT)</td>
<td>4 - 8/82</td>
<td>R-6</td>
</tr>
<tr>
<td>R-1.1.2 (206, 207)</td>
<td>STRUCTURE EXCAVATION AND BACKFILL (METHOD OF MEASUREMENT)</td>
<td>5 - 11/82</td>
<td>R-7</td>
</tr>
<tr>
<td>R-1.1.3 (206, 207)</td>
<td>STRUCTURE EXCAVATION AND BACKFILL (METHOD OF MEASUREMENT)</td>
<td>2 - 12/82</td>
<td>R-8</td>
</tr>
<tr>
<td>R-1.1.4 (206, 207)</td>
<td>STRUCTURE EXCAVATION AND BACKFILL (METHOD OF MEASUREMENT)</td>
<td>2 - 4/82</td>
<td>R-9</td>
</tr>
<tr>
<td>R-1.1.5 (206, 207)</td>
<td>STRUCTURE EXCAVATION AND BACKFILL (METHOD OF MEASUREMENT)</td>
<td>3 - 7/77</td>
<td>R-10</td>
</tr>
<tr>
<td>R-1.1.6 (603, 604)</td>
<td>CULVERT BEDDING AND ALLOWABLE FILL HEIGHT FOR RCP</td>
<td>6 - 10/85</td>
<td>R-11</td>
</tr>
<tr>
<td>R-1.3.1 (601, 605)</td>
<td>ALLOWABLE FILL HEIGHTS FOR ALUMINUM CULVERTS</td>
<td>- - ---</td>
<td>R-12</td>
</tr>
<tr>
<td>R-1.3.1.2 (600, 604, 606)</td>
<td>ALLOWABLE FILL HEIGHTS FOR STEEL CULVERTS</td>
<td>3 - 11/88</td>
<td>R-13</td>
</tr>
<tr>
<td>R-1.4.1 (203)</td>
<td>DRAINAGE DITCHES AND DIKES</td>
<td>6 - 1/79</td>
<td>R-14</td>
</tr>
<tr>
<td>R-2.1.1 (601-606)</td>
<td>CULVERT INSTALLATION</td>
<td>6 - 1/88</td>
<td>R-15</td>
</tr>
<tr>
<td>R-2.1.3 (604)</td>
<td>SLOTTED CMP DRAIN DETAILS</td>
<td>3 - 11/86</td>
<td>R-16</td>
</tr>
<tr>
<td>R-2.1.4 (601-606)</td>
<td>CULVERT INSTALLATION</td>
<td>5 - 10/85</td>
<td>R-17</td>
</tr>
</tbody>
</table>
# Table of Contents

## Roadway Design Index

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>REVISION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-2.2.1 (604)</td>
<td>2 - 6/81</td>
<td>R-18</td>
</tr>
<tr>
<td>METAL END SECTIONS, 12&quot; CMP TO 84&quot; CMP, 17&quot; X 13&quot; CMP TO 83&quot; X 57&quot; CMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.3.1 (603)</td>
<td>1 - 12/82</td>
<td>R-19</td>
</tr>
<tr>
<td>R.C.P. END SECTIONS, 12&quot; RCP TO 54&quot; RCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.3.1.1 (601)</td>
<td>1 - 11/88</td>
<td>R-20</td>
</tr>
<tr>
<td>CULVERT END SAFETY GRATE 30&quot;-60&quot; CMP OR RCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.4.1 (502)</td>
<td>- - ----</td>
<td>R-21</td>
</tr>
<tr>
<td>CULVERT HEADWALLS, 12&quot; CMP TO 42&quot; CMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.4.2 (502)</td>
<td>- - ----</td>
<td>R-22</td>
</tr>
<tr>
<td>CULVERT HEADWALLS, 48&quot; CMP TO 72&quot; CMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.5.1 (502)</td>
<td>- - ----</td>
<td>R-23</td>
</tr>
<tr>
<td>CULVERT HEADWALLS, 12&quot; RCP TO 36&quot; RCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.5.2 (502)</td>
<td>- - ----</td>
<td>R-24</td>
</tr>
<tr>
<td>CULVERT HEADWALLS, 42&quot; RCP TO 72&quot; RCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.6.1 (502)</td>
<td>- - ----</td>
<td>R-25</td>
</tr>
<tr>
<td>CULVERT HEADWALLS, 17&quot; X 13&quot; CMP TO 83&quot; X 57&quot; CMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.7.1 (502)</td>
<td>- - ----</td>
<td>R-26</td>
</tr>
<tr>
<td>CULVERT HEADWALLS, 23&quot; X 14&quot; OVAL RCP TO 60&quot; X 38&quot; OVAL RCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.7.2 (502)</td>
<td>- - ----</td>
<td>R-27</td>
</tr>
<tr>
<td>CULVERT HEADWALLS, 68&quot; X 43&quot; OVAL RCP TO 91&quot; X 58&quot; OVAL RCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.8.1 (604)</td>
<td>1 - 7/80</td>
<td>R-28</td>
</tr>
<tr>
<td>COUPLING BAND DETAILS, CMP &amp; PIPE ARCHES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2.8.2 (604)</td>
<td>1 - 10/85</td>
<td>R-29</td>
</tr>
<tr>
<td>CMP COUPLING BAND DETAILS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-3.1.2 (608)</td>
<td>2 - 8/83</td>
<td>R-30</td>
</tr>
<tr>
<td>EMBANKMENT PROTECTOR (TYPE 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-3.1.3 (608)</td>
<td>2 - 8/83</td>
<td>R-31</td>
</tr>
<tr>
<td>EMBANKMENT PROTECTOR (TYPE 5-2G)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-3.1.4 (608)</td>
<td>2 - 5/89</td>
<td>R-32</td>
</tr>
<tr>
<td>STANDARD RIPRAP BASIN &amp; GABIONS LACING DETAIL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-4.1.2 (609)</td>
<td>- - ----</td>
<td>R-33</td>
</tr>
<tr>
<td>PIPE RISER INLET (TYPE 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-4.2.1 (609)</td>
<td>5 - 10/90</td>
<td>R-34</td>
</tr>
<tr>
<td>TYPE 2 &amp; 2A DROP INLETS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-4.3.1 (609)</td>
<td>1 - 10/90</td>
<td>R-35</td>
</tr>
<tr>
<td>TYPE 3 DROP INLET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-4.6.1 (609)</td>
<td>2 - 5/80</td>
<td>R-36</td>
</tr>
<tr>
<td>TYPE 7 AND 8 DROP INLETS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-4.6.1.2 (609)</td>
<td>1 - 7/78</td>
<td>R-37</td>
</tr>
<tr>
<td>DROP INLET TYPE 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHEET NO.</td>
<td>DESCRIPTION</td>
<td>REVISION</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>R-4.6.2 (609)</td>
<td>TYPE 11 DROP INLET</td>
<td>-</td>
</tr>
<tr>
<td>R-4.7.1 (609)</td>
<td>TYPE 1 &amp; 2 &amp; TYPE 1 &amp; 2 MODIFIED MANHOLES</td>
<td>-</td>
</tr>
<tr>
<td>R-4.7.2 (609)</td>
<td>TYPE 4 MANHOLE</td>
<td>1 - 11/86</td>
</tr>
<tr>
<td>R-5.1.1 (613)</td>
<td>CURB AND GUTTERS</td>
<td>5 - 10/90</td>
</tr>
<tr>
<td>R-5.1.1.1 (613)</td>
<td>SIDEWALKS, DRIVEWAYS &amp; WHEELCHAIR RAMPS</td>
<td>1 - 10/90</td>
</tr>
<tr>
<td>R-5.1.2</td>
<td>CONDUIT INSTALLATION FOR FUTURE WATER LINES</td>
<td>2 - 11/82</td>
</tr>
<tr>
<td>R-6.1.1 (724)</td>
<td>FENCE DETAILS</td>
<td>6 - 10/85</td>
</tr>
<tr>
<td>R-6.1.2</td>
<td>BARBED WIRE FENCE, NV (4-WIRE X 16'-6&quot;)</td>
<td>2 - 11/88</td>
</tr>
<tr>
<td>R-6.1.3 (616)</td>
<td>GATE &amp; FENCE DETAILS</td>
<td>3 - 11/82</td>
</tr>
<tr>
<td>R-6.1.4 (616)</td>
<td>HIGH TENSILE 8-WIRE RANGE FENCE</td>
<td>-</td>
</tr>
<tr>
<td>R-6.2.1 (616-630)</td>
<td>BENCH FENCE &amp; CATTLE PASS FENCING</td>
<td>2 - 11/82</td>
</tr>
<tr>
<td>R-6.3.1 (616)</td>
<td>FENCE DETAILS-CHAIN LINK WITH C-TYPE POST</td>
<td>1 - 5/80</td>
</tr>
<tr>
<td>R-6.3.2 (616)</td>
<td>FENCE DETAILS SWING GATES FOR VARIABLE HEIGHT CHAIN LINK 3B FENCE</td>
<td>1 - 11/82</td>
</tr>
<tr>
<td>R-6.3.3 (616)</td>
<td>FENCE DETAILS SWING GATES FOR 72&quot; CHAIN LINK FENCE</td>
<td>1 - 11/82</td>
</tr>
<tr>
<td>R-7.1.1 (617)</td>
<td>STEEL CATTLE GUARD, 12' TO 20' ROADBED</td>
<td>5 - 1/88</td>
</tr>
<tr>
<td>R-7.1.2 (617)</td>
<td>STEEL CATTLE GUARD, 26' TO 40' ROADBED</td>
<td>4 - 1/88</td>
</tr>
<tr>
<td>R-7.1.3 (617)</td>
<td>STEEL CATTLE GUARD (TYPE B)</td>
<td>1 - 10/85</td>
</tr>
<tr>
<td>R-7.1.4 (617)</td>
<td>STEEL CATTLE GUARD (TYPE C)</td>
<td>3 - 10/85</td>
</tr>
<tr>
<td>R-7.1.5 (617)</td>
<td>STEEL CATTLE GUARD, TIMBER FOUNDATION</td>
<td>1 - 6/80</td>
</tr>
<tr>
<td>R-7.1.6 (617)</td>
<td>PRECAST CATTLE GUARD</td>
<td>-</td>
</tr>
<tr>
<td>R-7.1.7 (617)</td>
<td>PRECAST CATTLE GUARD - SECTIONS &amp; DETAILS</td>
<td>-</td>
</tr>
<tr>
<td>R-7.1.8 (617)</td>
<td>PRECAST CATTLE GUARD - SECTIONS &amp; DETAILS</td>
<td>-</td>
</tr>
<tr>
<td>R-8.1.1 (618)</td>
<td>GALVANIZED GUARDRAIL ELEMENTS</td>
<td>7 - 5/89</td>
</tr>
<tr>
<td>R-8.1.4 (618)</td>
<td>TYPICAL INSTALLATIONS GUARDRAIL FLARES</td>
<td>4 - 10/90</td>
</tr>
<tr>
<td>SHEET NO.</td>
<td>DESCRIPTION</td>
<td>REVISION</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>R-8.1.5 (618)</td>
<td>TYPICAL GUARDRAIL - TRANSITION INSTALLATIONS</td>
<td>3 - 5/89</td>
</tr>
<tr>
<td>R-8.1.5.1 (618)</td>
<td>TYPICAL GUARDRAIL INSTALLATION</td>
<td>- - ----</td>
</tr>
<tr>
<td>R-8.1.6 (618)</td>
<td>BREAKAWAY CABLE TERMINAL</td>
<td>5 - 1/88</td>
</tr>
<tr>
<td>R-8.1.7 (618)</td>
<td>GALVANIZED GUARDRAIL (TRIPLE CORRUGATION)</td>
<td>3 - 11/86</td>
</tr>
<tr>
<td>R-8.2.2 (618)</td>
<td>GALVANIZED GUARDRAIL ('W' BEAM)</td>
<td>4 - 11/86</td>
</tr>
<tr>
<td>R-8.2.3 (618)</td>
<td>GUARDRAIL-BRIDGE RAIL CONNECTIONS (&quot;W&quot; BEAM)</td>
<td>2 - 5/89</td>
</tr>
<tr>
<td>R-8.2.3.1 (618)</td>
<td>GUARDRAIL-BARRIER RAIL CONNECTIONS (&quot;W&quot; BEAM)</td>
<td>2 - 5/89</td>
</tr>
<tr>
<td>R-8.2.4 (618)</td>
<td>GUARDRAIL-BRIDGE RAIL CONNECTIONS (TRIPLE CORRUGATIONS)</td>
<td>2/11/88</td>
</tr>
<tr>
<td>R-8.2.4.1 (618)</td>
<td>GUARDRAIL-BARRIER RAIL CONNECTIONS (TRIPLE CORRUGATIONS)</td>
<td>1 - 11/88</td>
</tr>
<tr>
<td>R-8.3.1 (502)</td>
<td>CONCRETE BARRIER RAIL</td>
<td>13 - 10/90</td>
</tr>
<tr>
<td>R-8.3.3 (502)</td>
<td>PORTABLE PRECAST CONCRETE BARRIER RAIL</td>
<td>4 - 11/86</td>
</tr>
<tr>
<td>R-9.1.1 (619)</td>
<td>GUIDE POSTS</td>
<td>6 - 10/90</td>
</tr>
<tr>
<td>R-9.2.1 (619, THRU 621)</td>
<td>OBJECT MARKERS, RIGHT-OF-WAY MARKERS, SURVEY MONUMENTS AND REFERENCE MONUMENTS</td>
<td>4 - 1/88</td>
</tr>
<tr>
<td>R-9.2.2 (618-619)</td>
<td>REFLECTORS</td>
<td>- - ----</td>
</tr>
<tr>
<td>R-10.1.1 (409)</td>
<td>CONCRETE &amp; ASPHALT PAVEMENT DETAILS</td>
<td>11 - 11/88</td>
</tr>
<tr>
<td>SHEET NO.</td>
<td>LIGHTING AND SIGNALS</td>
<td>REVISION</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>T-30.1.1 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>2</td>
</tr>
<tr>
<td>T-30.1.2 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>8</td>
</tr>
<tr>
<td>T-30.1.3 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>2</td>
</tr>
<tr>
<td>T-30.1.4 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>1</td>
</tr>
<tr>
<td>T-30.1.5 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>4</td>
</tr>
<tr>
<td>T-30.1.6 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>1</td>
</tr>
<tr>
<td>T-30.1.7 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>3</td>
</tr>
<tr>
<td>T-30.1.8 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td></td>
</tr>
<tr>
<td>T-30.1.9 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>5</td>
</tr>
<tr>
<td>T-30.1.10 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>1</td>
</tr>
<tr>
<td>T-30.1.11 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>1</td>
</tr>
<tr>
<td>T-30.1.12 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>1</td>
</tr>
<tr>
<td>T-30.1.13 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>3</td>
</tr>
<tr>
<td>T-30.1.14 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>1</td>
</tr>
<tr>
<td>T-30.1.15 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>1</td>
</tr>
<tr>
<td>T-30.1.16 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>5</td>
</tr>
<tr>
<td>T-30.1.17 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>13</td>
</tr>
<tr>
<td>T-30.1.18 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td></td>
</tr>
<tr>
<td>T-30.1.19 (623)</td>
<td>LIGHTING AND SIGNALS</td>
<td>1</td>
</tr>
<tr>
<td>SHEET</td>
<td>REVISION</td>
<td>PAGE</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>T-31.1.1 (627)</td>
<td>12 - 11/88</td>
<td>T-20</td>
</tr>
<tr>
<td>GROUND MOUNTED SIGN SUPPORTS (ROUND METAL POSTS)</td>
<td>12 - 11/88</td>
<td>T-20</td>
</tr>
<tr>
<td>T-31.1.2 (627)</td>
<td>11 - 5/81</td>
<td>T-21</td>
</tr>
<tr>
<td>GROUND MOUNTED SIGN SUPPORTS (ROUND METAL POSTS)</td>
<td>11 - 5/81</td>
<td>T-21</td>
</tr>
<tr>
<td>T-31.1.3 (627)</td>
<td>- - ---</td>
<td>T-22</td>
</tr>
<tr>
<td>GROUND MOUNTED SIGN SUPPORTS (ROUND METAL POSTS)</td>
<td>- - ---</td>
<td>T-22</td>
</tr>
<tr>
<td>T-31.1.4 (627)</td>
<td>5 - 1/76</td>
<td>T-23</td>
</tr>
<tr>
<td>GROUND MOUNTED SIGN SUPPORTS (ROUND METAL POSTS)</td>
<td>5 - 1/76</td>
<td>T-23</td>
</tr>
<tr>
<td>T-31.1.5 (626)</td>
<td>6 - 12/90</td>
<td>T-26</td>
</tr>
<tr>
<td>GROUND MOUNTED SIGN SUPPORTS (TIMBER POSTS)</td>
<td>6 - 12/90</td>
<td>T-26</td>
</tr>
<tr>
<td>T-31.1.6 (627)</td>
<td>1 - 1/83</td>
<td>T-25</td>
</tr>
<tr>
<td>GROUND MOUNTED GORE SIGN (TIMBER SUPPORTS)</td>
<td>1 - 1/83</td>
<td>T-25</td>
</tr>
<tr>
<td>T-31.1.7 (627)</td>
<td>3 - 10/90</td>
<td>T-26</td>
</tr>
<tr>
<td>GROUND MOUNTED SIGN SUPPORTS (SQUARE METAL POSTS)</td>
<td>3 - 10/90</td>
<td>T-26</td>
</tr>
<tr>
<td>T-31.1.8 (627)</td>
<td>2 - 7/83</td>
<td>T-27</td>
</tr>
<tr>
<td>GROUND MOUNTED SIGN SUPPORTS FLANGED CHANNEL STEEL POSTS</td>
<td>2 - 7/83</td>
<td>T-27</td>
</tr>
<tr>
<td>T-31.1.9 (627)</td>
<td>- - ---</td>
<td>T-28</td>
</tr>
<tr>
<td>ALTERNATE MOUNTING DETAIL</td>
<td>- - ---</td>
<td>T-28</td>
</tr>
<tr>
<td>T-31.1.10 (627)</td>
<td>- - ---</td>
<td>T-29</td>
</tr>
<tr>
<td>GROUND MOUNTED SIGN SUPPORTS</td>
<td>- - ---</td>
<td>T-29</td>
</tr>
<tr>
<td>T-35.1.1 (625)</td>
<td>1 - 1/88</td>
<td>T-30</td>
</tr>
<tr>
<td>TYPICAL ROAD CONSTRUCTION SIGNING</td>
<td>1 - 1/88</td>
<td>T-30</td>
</tr>
<tr>
<td>T-35.1.2 (625)</td>
<td>5 - 1/88</td>
<td>T-31</td>
</tr>
<tr>
<td>TYPICAL LANE CLOSURE SIGNING</td>
<td>5 - 1/88</td>
<td>T-31</td>
</tr>
<tr>
<td>T-35.1.3 (625-626)</td>
<td>6 - 1/88</td>
<td>T-32</td>
</tr>
<tr>
<td>TYPICAL 2 LANE TO 4 LANE CONNECTION SIGNING (RURAL)</td>
<td>6 - 1/88</td>
<td>T-32</td>
</tr>
<tr>
<td>T-35.1.4 (625)</td>
<td>6 - 1/88</td>
<td>T-33</td>
</tr>
<tr>
<td>TYPICAL ROAD CONSTRUCTION SIGNING</td>
<td>6 - 1/88</td>
<td>T-33</td>
</tr>
<tr>
<td>T-35.1.5 (625)</td>
<td>1 - 4/88</td>
<td>T-34</td>
</tr>
<tr>
<td>TYPICAL TRAFFIC CONTROL FOR RAMP WORK</td>
<td>1 - 4/88</td>
<td>T-34</td>
</tr>
<tr>
<td>T-35.1.6 (625)</td>
<td>1 - 1/88</td>
<td>T-35</td>
</tr>
<tr>
<td>TYPICAL TRAFFIC CONTROL FOR HAUL ROADS</td>
<td>1 - 1/88</td>
<td>T-35</td>
</tr>
<tr>
<td>T-35.1.6.1 (625)</td>
<td>2 - 1/91</td>
<td>T-36</td>
</tr>
<tr>
<td>TYPICAL ONE LANE SIGNING TYPICAL DROP OFF SIGNING (2 LANE ROAD) TYPICAL HAUL ROAD SIGNING (2 LANE ROAD)</td>
<td>2 - 1/91</td>
<td>T-36</td>
</tr>
<tr>
<td>T-35.1.7 (625-626)</td>
<td>- - ---</td>
<td>T-37</td>
</tr>
<tr>
<td>BARRICADES</td>
<td>- - ---</td>
<td>T-37</td>
</tr>
<tr>
<td>T-35.1.8</td>
<td>1 - 12/90</td>
<td>T-38</td>
</tr>
<tr>
<td>SPECIAL SIGN DETAILS</td>
<td>1 - 12/90</td>
<td>T-38</td>
</tr>
<tr>
<td>T-35.1.9</td>
<td>- - ---</td>
<td>T-39</td>
</tr>
<tr>
<td>SPECIAL SIGN DETAILS</td>
<td>- - ---</td>
<td>T-39</td>
</tr>
<tr>
<td>T-35.2</td>
<td>1 - 10/90</td>
<td>T-40</td>
</tr>
<tr>
<td>RAILROAD SIGN &amp; MARKING DETAILS</td>
<td>1 - 10/90</td>
<td>T-40</td>
</tr>
<tr>
<td>SHEET</td>
<td>DESCRIPTION</td>
<td>REVISION</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>T-36.1.1 (627)</td>
<td>OVERHEAD SIGNS INSTRUCTIONS AND EXAMPLES</td>
<td>2 - 1/74</td>
</tr>
<tr>
<td>T-36.1.2 (627)</td>
<td>OVERHEAD SIGNS-SINGLE POST TYPES II THRU VIII</td>
<td>3 - 2/79</td>
</tr>
<tr>
<td>T-36.1.3 (627)</td>
<td>OVERHEAD SIGNS-TWO POST TYPES I-S THRU VII-S</td>
<td>2 - 2/79</td>
</tr>
<tr>
<td>T-36.1.4 (627)</td>
<td>OVERHEAD SIGNS-SINGLE POST STRUCTURAL</td>
<td>4 - 2/79</td>
</tr>
<tr>
<td></td>
<td>FRAME MEMBERS</td>
<td></td>
</tr>
<tr>
<td>T-36.1.5 (627)</td>
<td>OVERHEAD SIGNS - TWO POST STRUCTURAL FRAME</td>
<td>- - ---</td>
</tr>
<tr>
<td></td>
<td>MEMBERS</td>
<td></td>
</tr>
<tr>
<td>T-36.1.6 (627)</td>
<td>OVERHEAD SIGNS STRUCTURAL FRAME DETAILS</td>
<td>2 - 2/79</td>
</tr>
<tr>
<td>T-36.1.7 (627)</td>
<td>OVERHEAD SIGNS FRAME JUNCTURE DETAILS</td>
<td>2 - 2/79</td>
</tr>
<tr>
<td>T-36.1.8 (627)</td>
<td>OVERHEAD SIGNS REMOVABLE SIGN PANEL FRAMES</td>
<td>2 - 2/79</td>
</tr>
<tr>
<td>T-36.1.9 (627)</td>
<td>OVERHEAD SIGNS WALKWAY DETAILS NO. 1</td>
<td>3 - 2/79</td>
</tr>
<tr>
<td>T-36.1.10 (627)</td>
<td>OVERHEAD SIGNS WALKWAY DETAILS NO. 2</td>
<td>3 - 2/79</td>
</tr>
<tr>
<td>T-36.1.11 (627)</td>
<td>OVERHEAD SIGNS WALKWAY SAFETY RAILING</td>
<td>2 - 2/79</td>
</tr>
<tr>
<td></td>
<td>DETAILS</td>
<td></td>
</tr>
<tr>
<td>T-36.1.12 (627)</td>
<td>OVERHEAD SIGNS ALTERNATE PILE FOUNDATION</td>
<td>3 - 4/79</td>
</tr>
<tr>
<td>T-36.1.13 (627)</td>
<td>OVERHEAD SIGNS LIGHTWEIGHT TYPE C</td>
<td>- - ---</td>
</tr>
<tr>
<td></td>
<td>CONNECTION DETAILS</td>
<td></td>
</tr>
<tr>
<td>T-36.1.14 (627)</td>
<td>OVERHEAD SIGNS LIGHTWEIGHT SIGN PANEL</td>
<td>- - ---</td>
</tr>
<tr>
<td></td>
<td>MOUNTING DETAILS</td>
<td></td>
</tr>
<tr>
<td>T-36.1.15 (627)</td>
<td>OVERHEAD SIGNS LIGHTWEIGHT LIGHT FIXTURE</td>
<td>- - ---</td>
</tr>
<tr>
<td></td>
<td>MOUNTING DETAILS</td>
<td></td>
</tr>
<tr>
<td>T-36.1.16 (627)</td>
<td>OVERHEAD SIGNS LIGHTWEIGHT POST DETAILS</td>
<td>- - ---</td>
</tr>
<tr>
<td>T-36.1.17 (627)</td>
<td>OVERHEAD SIGNS LIGHTWEIGHT FOUNDATION</td>
<td>- - ---</td>
</tr>
<tr>
<td>T-37.1.1 (633)</td>
<td>PAVEMENT MARKER</td>
<td>1 - 2/82</td>
</tr>
<tr>
<td>SHEET NO.</td>
<td>REVISION</td>
<td>PAGE</td>
</tr>
<tr>
<td>----------------</td>
<td>------------</td>
<td>------</td>
</tr>
<tr>
<td>B-20.1.1 (502)</td>
<td>RCB CULVERTS, GENERAL NOTES</td>
<td>2 - 3/82</td>
</tr>
<tr>
<td>B-20.1.2 (502)</td>
<td>SINGLE RCB CULVERTS</td>
<td>3 - 3/82</td>
</tr>
<tr>
<td>B-20.1.3 (502)</td>
<td>DOUBLE RCB CULVERTS</td>
<td>3 - 3/82</td>
</tr>
<tr>
<td>B-20.1.3.1 (502)</td>
<td>ADDITIONAL CELLS TO BE USED WITH DOUBLE RCB CULVERTS TO PROVIDE FOR MULTIPLE CELL CULVERTS</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-20.1.4 (502)</td>
<td>RCB CULVERTS TYPE II HEADWALLS</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-20.1.5 (502)</td>
<td>RCB CULVERTS TYPE I HEADWALLS</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-20.1.6 (502)</td>
<td>ESTIMATE OF QUANTITIES TYPE I HEADWALL</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-20.1.7 (502)</td>
<td>METHOD OF EXTENDING RCB CULVERTS</td>
<td>1 - 12/90</td>
</tr>
<tr>
<td>B-20.1.8 (502)</td>
<td>PRECAST CONCRETE BOX CULVERTS</td>
<td>1 - 1/88</td>
</tr>
<tr>
<td>B-21.1.1 (612)</td>
<td>DESIGN DATA FOR METAL RETAINING WALL</td>
<td>1 - 11/78</td>
</tr>
<tr>
<td>B-21.1.2 (612)</td>
<td>CONSTRUCTION DETAILS FOR METAL RETAINING WALL</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-23.1.1 (508)</td>
<td>PRECAST PRESTRESSED CONCRETE PILE DETAIL</td>
<td>1 - 11/78</td>
</tr>
<tr>
<td>B-23.1.2 (508)</td>
<td>CAST-IN-DRILLED HOLE CONCRETE PILE DETAIL</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-23.1.3 (508)</td>
<td>CONCRETE PILE DETAILS</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-23.1.4 (508)</td>
<td>&quot;HP&quot; PILE DETAILS</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-25.1.1 (506)</td>
<td>BRIDGE RAIL, TYPE &quot;AC&quot;</td>
<td>1 - 11/78</td>
</tr>
<tr>
<td>B-25.1.2 (506)</td>
<td>STEEL BRIDGE RAIL, TYPE &quot;H&quot;</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-25.1.3 (506)</td>
<td>ALUMINUM BRIDGE RAIL, TYPE &quot;H&quot;</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-25.1.4 (506)</td>
<td>PEDESTRIAN RAIL, TYPE &quot;M&quot;</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-25.1.5 (506)</td>
<td>PEDESTRIAN RAIL, TYPE &quot;R&quot;</td>
<td>1 - 11/78</td>
</tr>
<tr>
<td>B-26.1.1 (611)</td>
<td>CONCRETE SLOPE PAVING DETAILS</td>
<td>2 - 3/85</td>
</tr>
<tr>
<td>B-27.1.1 (502)</td>
<td>RETAINING WALL TYPE 1 H=4' TO 30'</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-27.1.2 (502)</td>
<td>RETAINING WALL TYPE 1 H=32' TO 36'</td>
<td>- - - ---</td>
</tr>
<tr>
<td>B-27.1.3 (502)</td>
<td>RETAINING WALL TYPE 2 H=6' TO 22'</td>
<td>- - - ---</td>
</tr>
</tbody>
</table>
# Table of Contents

**Bridge Index**

<table>
<thead>
<tr>
<th>Sheet No.</th>
<th>Description</th>
<th>Revision</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-27.1.4 (502)</td>
<td>Retaining Wall Type 3 H=4' to 12'</td>
<td>-</td>
<td>B-25</td>
</tr>
<tr>
<td>B-27.1.5 (502)</td>
<td>Retaining Wall Details Types 1, 2 &amp; 3</td>
<td>1 - 12/90</td>
<td>B-26</td>
</tr>
<tr>
<td>B-28.1.1 (503)</td>
<td>Cast-in-Place Prestressed Girder Details</td>
<td>1 - 12/87</td>
<td>B-27</td>
</tr>
<tr>
<td>B-29.1.1 (502)</td>
<td>Approach Slabs</td>
<td>-</td>
<td>B-28</td>
</tr>
<tr>
<td>B-29.1.2 (502)</td>
<td>Abutment &amp; Wingwall Drainage Details</td>
<td>1 - 12/90</td>
<td>B-29</td>
</tr>
</tbody>
</table>
Super Easement Formulae

<table>
<thead>
<tr>
<th>Rate of Easement</th>
<th>Length in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>E004</td>
<td>10' + 250 4 (C)</td>
</tr>
<tr>
<td>E004</td>
<td>10' + 250 3 (C)</td>
</tr>
<tr>
<td>E004</td>
<td>10' + 250 2 (C)</td>
</tr>
<tr>
<td>E004</td>
<td>10' + 250 1 (C)</td>
</tr>
<tr>
<td>E004</td>
<td>10' + 250 1/2 (C)</td>
</tr>
</tbody>
</table>

WHERE:

S = Full Super Elevation, ft.
C = Crown, ft.
T = Total Length of Transition
L = Transition Length - Plate Angle, ft.
I = Total Length of Super Elevation Runoff
L1 = Length from P.C. to P.T. to Full Super Elevation where Super Rate is 0.23 ft. per ft. or greater
L2 = Length from P.C. or P.T. to Full Super Elevation where Super Rate is less than 0.23 ft. per ft.

1. All curves shall be super-elevated as shown unless otherwise noted on plan.
2. The arc of rotation shall be on the center line of the roadway on outside of the tangent or greater and shall be the inside shoulder on gravel flatter than 1 percent.
3. Super-elevation may cause transition points. Where condition occurs, drainage shall be provided and protection given.
4. Where there is a change in grade, the road shall be designed to provide adequate super-elevation at the beginning and end of the curve.
5. When the tangent between curves is too short to provide maximum desired super-elevation, the transition curve of the easement may be decreased.

Limiting Speed on Horizontal Curves

Super Elevation Rate - Foot per Foot

NOTE: Higher value at the bold dashed line is the proper Super Elevation for indicated Curve Radius.

Table C

<table>
<thead>
<tr>
<th>Design Speed (MPH)</th>
<th>Minimum Radius Using Super Elevation (Feet)</th>
<th>Maximum Radius Using Crown (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>300</td>
<td>0.33</td>
</tr>
<tr>
<td>30</td>
<td>250</td>
<td>0.30</td>
</tr>
<tr>
<td>40</td>
<td>200</td>
<td>0.25</td>
</tr>
<tr>
<td>50</td>
<td>150</td>
<td>0.20</td>
</tr>
<tr>
<td>60</td>
<td>100</td>
<td>0.15</td>
</tr>
</tbody>
</table>

When using a normal crown curve, see Table 10.

Super Elevation Formula

E = 3600 / (2 * R * T)

- E = Super Elevation
- R = Radius in Feet
- T = The Point in Miles per Hour of the Roadway

State of Nevada
Department of Transportation

Super Elevation 2-Lane

Chief Road Design Engr. [Signature]
Adopted: [Date]
### TABLE C

<table>
<thead>
<tr>
<th>Design Speed (MPH)</th>
<th>Minimum Radius Using Normal Crown (Feet)</th>
<th>Minimum Radii Using 0.2% Super</th>
<th>Super on Low Speed Urban (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>180</td>
<td>110</td>
<td>87</td>
</tr>
<tr>
<td>30</td>
<td>150</td>
<td>95</td>
<td>75</td>
</tr>
<tr>
<td>35</td>
<td>125</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>40</td>
<td>100</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>45</td>
<td>75</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>60</td>
<td>25</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

When using a normal crown curve, see Table "C".

### SUPER EASEMENT FORMULAE

WHERE:
- S = 1000 x V x C / R
- S1 & S2 = (1000 x V x C) / R
- T = Total Length of Transition
- T1 = Total Length of Transition and Super-elevation Runoff
- L = Total length of Super-elevation Runoff
- L1 = Length from P.C. or P.T. to Full Super-elevation

<table>
<thead>
<tr>
<th>OUTSIDE LANE</th>
<th>INSIDE LANE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HoE of Easement</td>
<td>Length in Feet</td>
</tr>
<tr>
<td>.005</td>
<td>L=000</td>
</tr>
<tr>
<td>.005</td>
<td>L=000 + S1</td>
</tr>
<tr>
<td>.005</td>
<td>L=000 + S2</td>
</tr>
</tbody>
</table>

### GENERAL NOTES

1. All curves shall be super-elevated as shown, unless otherwise noted on plans.
2. Super-elevation may cause drainage pockets where easement is devoid of water. Drainage of water shall be provided and devices utilized to control runoff to the extent that it does not cause erosion at the crown or affect other utilities.
3. Short vertical curves shall be doted by the adjustment of 25 feet at beginning and end of easement.
4. When the tangent between curves is too short to permit easement length shown, the transition may be extended onto the curve of the easement length may be decreased.

### LIMITING SPEED ON HORIZONTAL CURVES

<table>
<thead>
<tr>
<th>CURVE RADIUS - FEET</th>
<th>CURVE LENGTH - FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>0.6</td>
<td>0.7</td>
</tr>
<tr>
<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td>0.8</td>
<td>0.9</td>
</tr>
</tbody>
</table>

### SUPER-ELEVATION RATE - FOOT PER FOOT

Note: Higher value at the bold dashed line is the desired super-elevation for the curve radius.

### SUPER-ELEVATION FORMULA

<table>
<thead>
<tr>
<th>Speed (MPH)</th>
<th>Friction Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>0.16</td>
</tr>
<tr>
<td>40</td>
<td>0.16</td>
</tr>
<tr>
<td>50</td>
<td>0.16</td>
</tr>
<tr>
<td>60</td>
<td>0.16</td>
</tr>
<tr>
<td>70</td>
<td>0.16</td>
</tr>
<tr>
<td>80</td>
<td>0.16</td>
</tr>
<tr>
<td>90</td>
<td>0.16</td>
</tr>
</tbody>
</table>

### STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**SUPER-ELEVATION**

MULTI-LANE, DIVIDED

CHIEF ROAD DESIGNER: [Signature]

APPROVED: [Signature]

REVISED: 5/10
Amended: 4/1/81
### Table: Limits of Excavation

<table>
<thead>
<tr>
<th>Small Scale</th>
<th>Large Scale</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limits of Structure Excavation</td>
<td>Limits of Structure Excavation</td>
<td></td>
</tr>
</tbody>
</table>

#### OUTSIDE DIAMETER IS 6 FEET OR LESS

<table>
<thead>
<tr>
<th>Depth of Excavation</th>
<th>Perimeter</th>
<th>Limit of Structure Excavation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 to 3</td>
<td>3.36</td>
<td></td>
</tr>
<tr>
<td>3 to 5</td>
<td>3.65</td>
<td></td>
</tr>
</tbody>
</table>

#### OUTSIDE DIAMETER IS GREATER THAN 6 FEET

<table>
<thead>
<tr>
<th>Depth of Excavation</th>
<th>Perimeter</th>
<th>Limit of Structure Excavation</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 to 10</td>
<td>3.60</td>
<td></td>
</tr>
<tr>
<td>9 to 12</td>
<td>3.60</td>
<td></td>
</tr>
</tbody>
</table>

### Approximate Angle of Repose

For sloping of sides of excavation

#### General Notes

1. *Excavation work within 2 feet deep shall be removed and disposed of the area of disposal for disposal.*
2. *Excavation work shall be removed and disposed of the area of disposal for disposal.*
3. *Excavation work shall be removed and disposed of the area of disposal for disposal.*
4. *Excavation work shall be removed and disposed of the area of disposal for disposal.*
5. *Excavation work shall be removed and disposed of the area of disposal for disposal.*
6. *Excavation work shall be removed and disposed of the area of disposal for disposal.*
7. *Excavation work shall be removed and disposed of the area of disposal for disposal.*
8. *Excavation work shall be removed and disposed of the area of disposal for disposal.*
9. *Excavation work shall be removed and disposed of the area of disposal for disposal.*
10. *Excavation work shall be removed and disposed of the area of disposal for disposal.*

### Legend

- Structure Excavation
- Drainage Excavation
- Backfill
- Median Embankment or Barrier

### State of Nevada Department of Transportation

**Structure Excavation and Backfill**

**Method of Measurement**

**Appointed by the Director**

**Adopted by the Board of Directors**

**Effective Date**

**Revised Date**
CLASS A BEDDING
Payment for Excavated Area below the Bottom of the Pipe Grade to be Included in the Unit Bid Price Per Cubic Yard of Concrete.

CLASS B BEDDING
Bedding Shall be Carefully Shaped to Fit Pipe Prior to Installation. No Direct Payment for Shaping the Trench.

CLASS C BEDDING

GENERAL NOTES
1. Minimum Depths as Specified in "Culvert Installation With Un-Reinforced Bedding" as shall be shown in "Culvert Installation With Un-Reinforced Bedding" of Sheet R-113.
2. Exception For Multiple Pipes or RCP Installations Exceeding 12 Feet in Width Shall Be Paid For as Channel Excavation or Roadway Excavation.

BEDDING FOR CONCRETE CULVERT

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>CLASS II</th>
<th>CLASS III</th>
<th>CLASS IV</th>
<th>CLASS V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>24&quot;</td>
<td>22</td>
<td>14</td>
<td>11</td>
<td>30</td>
</tr>
<tr>
<td>30&quot;</td>
<td>22</td>
<td>14</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>36&quot;</td>
<td>22</td>
<td>14</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>42&quot;</td>
<td>22</td>
<td>14</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>48&quot;</td>
<td>22</td>
<td>14</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>54&quot;</td>
<td>22</td>
<td>14</td>
<td>12</td>
<td>32</td>
</tr>
<tr>
<td>60&quot;</td>
<td>22</td>
<td>14</td>
<td>12</td>
<td>33</td>
</tr>
<tr>
<td>66&quot;</td>
<td>22</td>
<td>14</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>72&quot;</td>
<td>22</td>
<td>15</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>78&quot;</td>
<td>22</td>
<td>15</td>
<td>14</td>
<td>33</td>
</tr>
</tbody>
</table>

BEDDING FOR CMP OR CMAP

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
CULVERT BEDDING & ALLOWABLE FILL HEIGHT FOR R.C.P.
### 2.25" x 1/2" Round Corrugated Aluminum Pipe

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Minimum Plate Thickness</th>
<th>Maximum Fill Heights Above Top of Pipe in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td>Inches</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>24</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>30</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>36</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>42</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>48</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>54</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>60</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>66</td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>72</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

### 3" x 1/2" Round Corrugated Aluminum Pipe

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Minimum Plate Thickness</th>
<th>Maximum Fill Heights Above Top of Pipe in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td>Inches</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>12</td>
<td>33</td>
</tr>
<tr>
<td>30</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>36</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>42</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>48</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>54</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>60</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>66</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

### 6" x 1" Round Corrugated Aluminum Pipe

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Minimum Plate Thickness</th>
<th>Maximum Fill Heights Above Top of Pipe in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td>Inches</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>16</td>
<td>41</td>
</tr>
<tr>
<td>54</td>
<td>18</td>
<td>37</td>
</tr>
<tr>
<td>60</td>
<td>18</td>
<td>32</td>
</tr>
<tr>
<td>66</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

### Maximum Height Cover for Structural Aluminum Plate Pipe

<table>
<thead>
<tr>
<th>Maximum Height Cover for Structural Aluminum Plate Pipe Arch</th>
<th>9.25/24 Corrugation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Diameter</td>
<td>Minimum Cover</td>
</tr>
<tr>
<td>Inches</td>
<td>Inches</td>
</tr>
<tr>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>36</td>
<td>18</td>
</tr>
<tr>
<td>42</td>
<td>18</td>
</tr>
<tr>
<td>48</td>
<td>20</td>
</tr>
<tr>
<td>54</td>
<td>20</td>
</tr>
<tr>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>66</td>
<td>24</td>
</tr>
<tr>
<td>72</td>
<td>24</td>
</tr>
</tbody>
</table>

### Equivalent Base Thicknesses

<table>
<thead>
<tr>
<th>Base Thickness in Inches</th>
<th>Nominal Thickness (in inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.064</td>
<td>0.085</td>
</tr>
<tr>
<td>0.079</td>
<td>0.097</td>
</tr>
<tr>
<td>0.118</td>
<td>0.144</td>
</tr>
<tr>
<td>0.166</td>
<td>0.194</td>
</tr>
<tr>
<td>0.238</td>
<td>0.270</td>
</tr>
</tbody>
</table>

**Notes:**
- Riveted or Welded Fabrication
- Top Of Pipe To Top Of Finished Grade
- Use Shoulder Line For 2 Tons Per Sq Ft
- 

### State of Nevada Department of Transportation

**Allowable Fill Heights for Aluminum Culverts**

<table>
<thead>
<tr>
<th>Span Ft</th>
<th>0</th>
<th>1.5</th>
<th>2</th>
<th>2.5</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- To determine proper metal thickness for a given span or in an arch, locate the span in the left column that is next larger to that of structure required. If you need to increase span or arch, use the next size for that span or arch.
**ROUND CORRUGATED STEEL PIPE**

- **Pipe Diameter**: 2 1/2" x 1/2" Corrugations

<table>
<thead>
<tr>
<th><strong>Pipe Diameter</strong></th>
<th><strong>Min. Cover</strong></th>
<th><strong>Pipe Thickness in Inches</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>15</td>
<td>0.064</td>
</tr>
<tr>
<td>14</td>
<td>18</td>
<td>0.064</td>
</tr>
<tr>
<td>16</td>
<td>21</td>
<td>0.064</td>
</tr>
<tr>
<td>18</td>
<td>24</td>
<td>0.064</td>
</tr>
</tbody>
</table>

**CORRUGATED STEEL PIPE ARCH**

- **3" x 1" Corrugations

<table>
<thead>
<tr>
<th><strong>Pipe Diameter</strong></th>
<th><strong>Min. Cover</strong></th>
<th><strong>Crossbolt DIA.</strong></th>
<th><strong>Thickness</strong></th>
<th><strong>Max. Cover for Corner Pressure in Tons Per 50 Ft</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MAXIMUM HEIGHT OF COVER**

- **3" x 1" Corrugations

<table>
<thead>
<tr>
<th><strong>Pipe Diameter</strong></th>
<th><strong>Min. Cover</strong></th>
<th><strong>Crossbolt DIA.</strong></th>
<th><strong>Thickness</strong></th>
<th><strong>Max. Cover for Corner Pressure in Tons Per 50 Ft</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>12</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EQUIVALENT GAGE NUMBERS**

- **Corrugated Steel Pipe**

<table>
<thead>
<tr>
<th><strong>Equivalent Gage Numbers</strong></th>
<th><strong>Thickness in Inches</strong></th>
<th><strong>Steel</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>0.006</td>
<td></td>
</tr>
</tbody>
</table>

**EQUIVALENT GAGE NUMBERS**

- **Corrugated Steel Pipe Arch**

<table>
<thead>
<tr>
<th><strong>Equivalent Gage Numbers</strong></th>
<th><strong>Thickness in Inches</strong></th>
<th><strong>Steel</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>0.006</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**

1. Round Corrugated Steel Pipe
2. Corrugated Steel Pipe Arch
3. Corrugated Steel Pipe Arch for 3" x 1" Corrugations are identical.
PLAN

DRAINAGE DITCHES

FILL SECTION

GUT SECTION

Excavation to be drifted to construct dike

\[ h = \text{Depth of ditch or height of dike as indicated on the plans or as directed by the Engineer.} \]

\[ W = \text{Width of ditch as indicated on the plans or as directed by the Engineer.} \]

FLAT BOTTOM DITCH AND DIKE

DIKE DETAIL

\[ h = \text{Depth as ordered by the Engineer (2'-0" Min.)} \]

\[ H = \text{Height as ordered by the Engineer (2'-0" Min.)} \]

SECTION

BITUMINOUS TURNOUT DITCH

(Plantmix or Roadmix with Seal Coat)

CULVERT INSTALLATION

(PREFERRED)

INLET, OUTLET, AND MEDIAN DITCH DETAILS

V TYPE DITCH

To be used for surface ditches and where ordered by the Engineer.

NOTE: DIMENSIONS RELATING TO EXCAVATION DITCHES OR EMBANKMENT DITCHES SHALL BE DESIGNATED AS \( W \) (WIDTH), \( H \) (HEIGHT OR DEPTH), \( X \) (LENGTH).

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

DRAINAGE DITCHES
AND DICHES

ADOPTED 8/69 (C-76)
MULTIPLE INSTALLATIONS WITHOUT HEADWALLS

MULTIPLE INSTALLATIONS WITH END SECTIONS

SINGLE CULVERT WITH END SECTIONS

SINGLE CULVERT WITH HEADWALLS

MULTIPLE CULVERT WITH END SECTIONS

LIMITS OF REMOVAL

FIELD STRUTTING CMP

TABLE OF SEPARATION FOR MULTIPLE INSTALLATIONS

---

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT INSTALLATION

CONCRETE COLLAR

CMP to RCP or Vitrified Clay Pipe Extensions

---

FOR ADDITIONAL INFORMATION SEE R-11.2
**MINIMUM CULVERT INSTALLATION**

- If possible, use 6" where possible. If minimum cover is restrictive, compensate by utilizing higher class pipe or selective bedding, as recommended by the Hydraulic Section.
- Aluminum culverts: see Standard Sheet R-13.1.2
- **For informational purposes only**

---

**SAFETY CULVERT INSTALLATION**

(To provide obstruction clearance)

**NOTE:**
- If after extending the culvert and/or raising the fill slope for safety and/or aesthetics, the extension does not fulfill the requirements for a clean roadway recovery area, then vehicular traffic may be protected by some other means, such as guardrail, barrier rail, or another acceptable safety feature.
- Normal structure excavation and backfill limits.
GENERAL NOTES:
1. CLASS AND TYPE OF CONCRETE SHALL BE AS SPECIFIED FOR CROSSRIDGE CONCRETE PIPING.
2. STRUCTURAL DESIGN OF END SECTION SHALL COMPLY WITH CODE OF STANDARD PRACTICE CONCRETE CULVERT PIPING.
3. LENGTHS OF TYPE BENDS OF EXTEND MAY NOT EXCEED CONNECTOR SECTION (LENGTH C).

PLAN

END VIEW

SECTION A-A

CROSS SECTION VIEW
18" RCP TO 54" RCP

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
RCP END SECTION
12" RCP TO 54" RCP

[Signature]

CERF Engineer Design
[Redacted]
GENERAL NOTES:

1- CONCRETE SHALL BE CLASS A OR AA.
2- REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 2/16" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BARS END SHALL BE KEPT 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3- FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSATURATED OR LIABLE TO SLOUGH.
4- CULVERT PIPES TO BE SET ON A SKEW SHALL BE MITERED WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE MITERED EXCEPT IN OVERFLOW SECTION.
5- FOR ESTIMATING HEADWALL QUANTITIES ON SKewed CULVERTS: O° TO 15° USE QUANTITIES FOR O° SKEW, 15° TO 55° USE QUANTITIES FOR 15° SKEW, 55° TO 67° USE QUANTITIES FOR 45° SKEW.

OVER 90° - CALCULATE QUANTITIES REQUIRED.

CULVERTS SHOULD BE INSTALLED ON 5° INCREMENTS WHERE IT IS FEASIBLE.
GENERAL NOTES

1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 8" BETWEEN 1/2" CLEAR OF SURFACE OF CONCRETE. EXCEPT AS NOTED, BAR ENDS SHALL BE KEPT 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIABLE TO SLOUCH.
4. CULVERT PIPES TO BE SET ON A SKEW SHALL BE MITERED. WHEN HEADWALLS ARE CONSTRUCTED, WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES MAY NOT BE MITERED EXCEPT IN OVERFLOW SECTION.
5. FOR ESTIMATING HEADWALL QUANTITIES ON SKewed CULVERTS:
   0° TO 10° - USE QUANTITIES FOR 0° SKEW
   11° TO 23° - USE QUANTITIES FOR 10° SKEW
   24° TO 40° - USE QUANTITIES FOR 30° SKEW
   41° TO 55° - USE QUANTITIES FOR 45° SKEW
   OVER 55° - CALCULATE QUANTITIES REQUIRED. CULVERTS SHOULD BE INSTALLED ON 3' INCREMENTS WHERE IT IS FEASIBLE.
6. NO DIRECT PAYMENT FOR ANCHOR BOLTS.

NOTE: Anchor bolts to be installed on seat and only. (See Note 6.)
### Quantities Shown Below Are for Two Headwalls

<table>
<thead>
<tr>
<th>Size/Area</th>
<th>Single RCP</th>
<th>Double RCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>O° Skew</td>
<td>15° Skew</td>
</tr>
<tr>
<td>12&quot;</td>
<td>0.394</td>
<td>1.09</td>
</tr>
<tr>
<td>14&quot;</td>
<td>1.32</td>
<td>1.32</td>
</tr>
<tr>
<td>16&quot;</td>
<td>1.77</td>
<td>1.62</td>
</tr>
<tr>
<td>20&quot;</td>
<td>3.14</td>
<td>2.87</td>
</tr>
<tr>
<td>24&quot;</td>
<td>3.39</td>
<td>2.62</td>
</tr>
<tr>
<td>30&quot;</td>
<td>4.91</td>
<td>3.06</td>
</tr>
<tr>
<td>36&quot;</td>
<td>5.34</td>
<td>3.35</td>
</tr>
</tbody>
</table>

### General Notes

1. Concrete shall be class A or AA.
2. Reinforcing steel shall be deformed bars with maximum spacing of 18" set 2 1/2" clear of surface of concrete except as noted. Bar ends shall be kept 1 1/2" clear of surface of concrete. Reinforcing bars may be cut and bent in field.
3. Footings shown are of minimum depth and shall be extended if soil is unsuitable on abutment slope.
4. Culvert pipes to be set on a skew shall be mitered when headwalls are constructed. When headwalls are not constructed the pipes shall not be mitered except in overflow section.
5. For estimating headwall quantities on skewed culverts: 0° to 10° — use quantities for 0° skew.
   11° to 25° — use quantities for 15° skew.
   26° to 45° — use quantities for 30° skew.
   46° to 55° — use quantities for 45° skew.
   Over 55° — calculate quantities required. Culverts should be installed on 5° increments where it is feasible.
6. Dimensions X, Y, L, and h to remain constant regardless of minor variations in wall thickness due to class of pipe used.

### Plan Section

- **Plan (For All Headwalls)**
- **Elevation Single RCP**
- **Elevation Double RCP**
- **15° to 45° Skew**

### Culvert Headwalls

**12" RCP to 36" RCP**

**State of Nevada**
**Department of Transportation**
GENERAL NOTES

1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 2½" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1½" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIKELY TO SUFFICE.
4. CULVERT PIPES TO BE SET ON A SKEW SHALL BE MITERED WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE MITERED EXCEPT IN OVERFLOW SECTION.
5. DIMENSIONS X, Y, AND h TO REMAIN CONSTANT REGARDLESS OF MINOR VARIATIONS IN WALL THICKNESS DUE TO CLASS OF PIPE USED.
6. FOR ESTIMATING HEADWALL QUANTITIES ON Skewed CULVERTS:
   - If to 10' - USE QUANTITIES FOR 0° SKEW.
   - If to 20' - USE QUANTITIES FOR 30° SKEW.
   - If to 30' - USE QUANTITIES FOR 45° SKEW.
   - OVER 60' - CALCULATE QUANTITIES REQUIRED.
   CULVERTS SHOULD BE INSTALLED ON 5 INCREMENTS WHERE IT IS FEASIBLE.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS
23" x 14" OVAL RCP TO
60" x 38" OVAL RCP

NOTE: For Details of other Reinforcing Bars, See Single Culvert Headwalls.
### Quantities Shown Below Are For Two Headwalls

<table>
<thead>
<tr>
<th>OVAL RCP</th>
<th>OVAL RCP</th>
<th>SINGLE OVAL RCP</th>
<th>DOUBLE OVAL RCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIZE W&amp;B</td>
<td>SIZE W&amp;B</td>
<td>0° SKEW</td>
<td>15° SKEW</td>
</tr>
<tr>
<td>SQ FT</td>
<td>SQ FT</td>
<td>30° SKEW</td>
<td>45° SKEW</td>
</tr>
<tr>
<td>12&quot; x 15&quot;</td>
<td>12&quot; x 15&quot;</td>
<td>12&quot; x 15&quot;</td>
<td>12&quot; x 15&quot;</td>
</tr>
<tr>
<td>20.56</td>
<td>20.56</td>
<td>20.56</td>
<td>20.56</td>
</tr>
<tr>
<td>8.39</td>
<td>8.39</td>
<td>8.39</td>
<td>8.39</td>
</tr>
<tr>
<td>914.9</td>
<td>914.9</td>
<td>914.9</td>
<td>914.9</td>
</tr>
<tr>
<td>1055</td>
<td>1055</td>
<td>1055</td>
<td>1055</td>
</tr>
<tr>
<td>1266</td>
<td>1266</td>
<td>1266</td>
<td>1266</td>
</tr>
<tr>
<td>X</td>
<td>Y</td>
<td>L</td>
<td>h</td>
</tr>
<tr>
<td>18.63</td>
<td>12.07</td>
<td>11.07</td>
<td>11.07</td>
</tr>
<tr>
<td>12.07</td>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
</tr>
<tr>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
</tr>
<tr>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
</tr>
</tbody>
</table>

### Quantities Shown Below Are For One Headwall

<table>
<thead>
<tr>
<th>OVAL RCP</th>
<th>OVAL RCP</th>
<th>SINGLE OVAL RCP</th>
<th>DOUBLE OVAL RCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIZE W&amp;B</td>
<td>SIZE W&amp;B</td>
<td>0° SKEW</td>
<td>15° SKEW</td>
</tr>
<tr>
<td>SQ FT</td>
<td>SQ FT</td>
<td>30° SKEW</td>
<td>45° SKEW</td>
</tr>
<tr>
<td>12&quot; x 15&quot;</td>
<td>12&quot; x 15&quot;</td>
<td>12&quot; x 15&quot;</td>
<td>12&quot; x 15&quot;</td>
</tr>
<tr>
<td>20.56</td>
<td>20.56</td>
<td>20.56</td>
<td>20.56</td>
</tr>
<tr>
<td>8.39</td>
<td>8.39</td>
<td>8.39</td>
<td>8.39</td>
</tr>
<tr>
<td>914.9</td>
<td>914.9</td>
<td>914.9</td>
<td>914.9</td>
</tr>
<tr>
<td>1055</td>
<td>1055</td>
<td>1055</td>
<td>1055</td>
</tr>
<tr>
<td>1266</td>
<td>1266</td>
<td>1266</td>
<td>1266</td>
</tr>
<tr>
<td>X</td>
<td>Y</td>
<td>L</td>
<td>h</td>
</tr>
<tr>
<td>18.63</td>
<td>12.07</td>
<td>11.07</td>
<td>11.07</td>
</tr>
<tr>
<td>12.07</td>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
</tr>
<tr>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
</tr>
<tr>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
<td>11.07</td>
</tr>
</tbody>
</table>

### GENERAL NOTES

1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS MAXIMUM SPACING OF 18" SET 2" CLEAR OF SURFACE OF CONCRETE.
3. POINTING SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSTABLE OR LIABLE TO SLOPE.
4. CULVERT PIPES TO BE SET ON A SKEW SHALL BE METERED.
5. HEADWALLS ARE NOT CONSTRUCTED.
6. FOR ESTIMATING HEADWALL QUANTITIES ON SWING CULVERTS: 0° TO 15° USE QUANTITIES FOR 0° SKEW.
7. 15° TO 25° USE QUANTITIES FOR 15° SKEW.
8. 25° TO 40° USE QUANTITIES FOR 30° SKEW.
9. 40° TO 55° USE QUANTITIES FOR 45° SKEW.

### PLAN

- Bar N
- Bar M
- Bar N

### ELEVATION

- Single Oval RCP
- Double Oval RCP

### STATE OF NEVADA

DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS

68" X 43" SINGLE OVAL RCP TO 91" X 58" OVAL RCP

NOTE: FOR DETAILS OF OTHER REINFORCING BARS, SEE SINGLE CULVERT HEADWALLS
# GENERAL NOTES

1. ALL COUPLING BAND CONNECTION HARDWARE SHALL BE GALVANIZED OR ELECTROPLATED IN ACCORDANCE WITH STANDARD SPECIFICATIONS.

2. FOR PIPE ARMS USE SAME WIDTH BAND AS FOR ROUND PIPE OF EQUAL PERIMETER.

3. TWO PIECE BAND REQUIRED FOR PIPE GREATER THAN 42" DIAMETER.

4. TENSION STRAP MAY BE CONNECTED TO BAND OR SHEET WITH EITHER SPOT WELDS OR FILLET WELDS THAT DEVELOP MINIMUM REQUIRED STRENGTH OF STRAP.

5. USE 1 3/4" GAGE LINE DIMENSION ON ATTACHED ANGLE LEG FOR RIVETS AND SPOT WELDS.

6. BAND THICKNESS SHALL NOT BE LESS THAN 3 STANDARD THICKNESSES LIGHTER THAN THE THICKNESS OF THE PIPE.

7. DIMENSIONS AND THICKNESS SHOWN ARE MINIMUM.

8. ANGLE 2" LONG WITH 0.064" x 2" STRAP.

9. FILLET WELDS OF EQUIVALENT STRENGTH MAY BE SUBSTITUTED FOR SPOT WELDS OR RIVETS.

---

<table>
<thead>
<tr>
<th>COUPLING TYPE</th>
<th>CORRUGATION</th>
<th>PIPE SIZE</th>
<th>W or A PIPE WALL</th>
<th>THICKNESS PIPE WALL</th>
<th>BAR SIZE</th>
<th>BAR THICKNESS</th>
<th>BAR YIELD</th>
<th>BOLTS</th>
<th>BAND STRENGTH</th>
<th>BAND THICKNESS</th>
<th>WEDGE BAND</th>
<th>THICKNESS WEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWO PIECE INTEGRAL FLANGE</td>
<td>1 3/4&quot; x 3/8&quot;</td>
<td>6&quot; Thru 10&quot;</td>
<td>7&quot;</td>
<td>0.064-0.079</td>
<td>0.064</td>
<td>1/4&quot;</td>
<td>7/8&quot;</td>
<td>32,000</td>
<td>2 x 2 x 7/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>5 - 1/8&quot;</td>
</tr>
<tr>
<td>UNIVERSAL</td>
<td>3/4&quot; x 3/8&quot;</td>
<td>Thru 36&quot;</td>
<td>12&quot;</td>
<td>0.064-0.138</td>
<td>0.064</td>
<td>0.079</td>
<td>1/2&quot;</td>
<td>7/8&quot;</td>
<td>32,000</td>
<td>2 x 2 x 7/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>3 - 1/8&quot;</td>
</tr>
<tr>
<td>ANNULAR</td>
<td>3/4&quot; x 3/8&quot;</td>
<td>42&quot; Thru 60&quot;</td>
<td>16 1/4&quot;</td>
<td>0.064-0.168</td>
<td>0.064</td>
<td>Double</td>
<td>0.079</td>
<td>1/2&quot;</td>
<td>7/8&quot;</td>
<td>32,000</td>
<td>2 x 2 x 7/8&quot;</td>
<td>3 - 1/8&quot;</td>
</tr>
<tr>
<td>CHANNEL</td>
<td>3&quot; x 1&quot;</td>
<td>48&quot; Thru 60&quot;</td>
<td>14&quot;</td>
<td>0.109</td>
<td>0.064</td>
<td>0.079</td>
<td>2 x 2 x 7/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>5 - 1/8&quot;</td>
<td>0.079</td>
<td>0.138</td>
</tr>
<tr>
<td></td>
<td>50&quot; Thru 62&quot;</td>
<td>12&quot;</td>
<td>0.064-0.109</td>
<td>0.064</td>
<td>0.079</td>
<td>1/2&quot;</td>
<td>7/8&quot;</td>
<td>32,000</td>
<td>2 x 2 x 7/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>5 - 1/8&quot;</td>
</tr>
<tr>
<td></td>
<td>52&quot; Thru 52&quot;</td>
<td>14&quot;</td>
<td>0.064-0.109</td>
<td>0.064</td>
<td>0.079</td>
<td>1/2&quot;</td>
<td>7/8&quot;</td>
<td>32,000</td>
<td>2 x 2 x 7/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>5 - 1/8&quot;</td>
</tr>
<tr>
<td></td>
<td>48&quot; Thru 52&quot;</td>
<td>12&quot;</td>
<td>0.064-0.109</td>
<td>0.064</td>
<td>0.079</td>
<td>1/2&quot;</td>
<td>7/8&quot;</td>
<td>32,000</td>
<td>2 x 2 x 7/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>3 - 1/8&quot;</td>
<td>5 - 1/8&quot;</td>
</tr>
</tbody>
</table>

---

**Shear Tab Required**

Nominal Dimensions

<table>
<thead>
<tr>
<th>Thickness</th>
<th>For Use With LMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.079&quot; 3/4&quot;</td>
<td>0.088&quot; THICK LIGHTER</td>
</tr>
<tr>
<td>0.109&quot; 1&quot;</td>
<td>0.138&quot; THICKER HEAVIER</td>
</tr>
</tbody>
</table>

---

**SECTION A-A**

**Spiral CMP**

Reformed to Accept Universal, Annular, Channel Couplers
**GENERAL**

1. ALL CONCRETE SHALL BE CLASS A OR AA.

2. REINFORCING BARS SHALL BE 4 BARS WITH MAXIMUM SPACING OF 18" C/C. BARS TO BE EMBEDDED A MINIMUM OF TWO INCHES AND BAR ENDS MUST CLEAR CONCRETE SURFACES BY ONE AND ONE-HALF INCH.

3. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED ONE INCH.

4. STRUCTURAL STEEL WEIGHT INCLUDES THE 2" PIPE AND THE 2 3/4" x 2 3/4" x 7/8" FRAME ANGLES.

**QUANTITIES**

<table>
<thead>
<tr>
<th>Material</th>
<th>Concrete</th>
<th>Rein Steel</th>
<th>Struct. Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.36 Cu. Yd.</td>
<td>23 lbs</td>
<td>170 lbs</td>
<td></td>
</tr>
</tbody>
</table>

*FOR INFORMATION ONLY*

**TYPICAL INSTALLATION**

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

**PIPE RISER INLET**

**(TYPE 3)**

---

*Drawn by:*

*Reviewed by:*

*Approved by:*
GENERAL NOTES
1. All Concrete shall be A or AA.
2. Forming of the Base will not be Required.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
DROP INLET
TYPE 10

CASTINGS:
PROOF GAGE
TYPE COEFF. 70.00

* For Info. Only
**QUANTITIES**

**SECTION A-A**

- Curb Opening
- Curb Supports (See Detail "E")
- Protective Face Angle (See Note No. 2)
- Drainage Gutter Transition Area

**SECTION B-B**

- Curb Opening
- Curb Supports (See Detail "E")
- Protective Face Angle (See Note No. 2)
- Drainage Gutter Transition Area

**SECTION C-C**

**GENERAL NOTES**

1. ALL CONCRETE SHALL BE CLASS A OR A-4.
2. REINFORCING STEEL SHALL BE NO. 4 BARS, EXCEPT AS NOTED, WITH MAXIMUM SPACING AT 4" INTERCEPTS, VERTICAL AT ALL INTERSECTIONS, AND EMBEDDED AT LEAST 1/4" CLEAR OF CONCRETE SURFACE, EXCEPT AS NOTED.
3. EXPOSED FACES OF CONCRETE SHALL BE CHAMFERED ONE INCH.
4. FOR SITE AND FRAME DETAILS, SEE STANDARD PLANS SHEET B-4.3.1 (SHEET TYPE 3 DRAIN INLET).
5. FOR VALUES OF "A" AND "B", SEE STORM DRAIN SCHEDULE.
7. CURB OPENINGS LONGER THAN 7" SHALL HAVE ONE CURB SUPPORT FOR EACH 7" INCENTRAL OR FRACTION THEREOF, EVENLY SPACED.
8. MPP SD CAN BE PLACED IN ANY WALL.
9. ANGLE ANCHORS SHALL BE INSTALLED AT 6" EACH ENTRANCE AND EVENLY SPACED (MAXIMUM SPACING 12").
10. "C" IS MINIMUM COVER FOR PIPE ASSUMING CLS SC PIPE OR 11" GAGE CWP WITH CLASS C BEDDING.
11. FOR DRAIN INLET CONFIGURATIONS WITH 2 PIPPS - REINFORCE CONCRETE ELEVATIONS WITH 6" DEEP CONCRETE INVERT ELEVATIONS.

**DETAIL "E"**

**STATE OF NEVADA**

DEPARTMENT OF TRANSPORTATION

**TYPE II DROP INLET**

- D, for CMP
- D2 + 6" for RCP 42" or less.
- D2 + 1" for RCP 48" or More.
**SECTION A-A**

- 40" or 6" Grade Rings (One or More as Required)
- Grad Joint to Sulf Grade

**SECTION B-B**

- For Top Slab Reinforcing See Detail "D"
- For Top Slab Reinforcing See Detail "B"

**SECTION A-A (FOR MINIMUM HEIGHT SITUATION)**

Note: Hydraulic Engineer Will Look at Other Options for Extreme Minimum Cover Situation.

**DETAILED "B"**

**TOP SLAB REINFORCING**

**GENERAL NOTES**

1. ALL CONCRETE SHALL BE CLASS A OR AA.

2. MANHOLE WITH MORE THAN ONE PIPE - THE DEPTH OF THE INVERT ELEVATIONS SHALL BE LESS THAN OR EQUAL TO 0.1' ABOVE THE EQUIVALENT HORIZONTAL ELEVATION.

3. FOR GUIDES OF "B" SEE STORM DRAIN SPECIFICATION OR CONTRACT DOCUMENTS.

4. MANHOLE COVER SHALL COMPLY TO AASHTO-standard specification C-476-84 WITH A MINIMUM THICKNESS OF 10" AND A CURANCE DISTANCE FROM THE MANHOLE BOWL. THE LID MUST BE A 10" MINIMUM WIDTH.

5. MANHOLE COVER SHALL BEAR M.D.O.T. IDENTIFICATION AND SYSTEM FUNCTION.

**TYPE 4 MANHOLE**

- For Minimum Height Situation
- Hydraulic Engineer Will Look at Other Options for Extreme Minimum Cover Situation.
NEVADA DEPARTMENT OF TRANSPORTATION

 MEMORANDUM

TO: ALL HOLDERS OF THE STANDARD PLANS

FROM: STANDARDS AND MANUALS ENGINEER

DATE: November 8, 1991

SUBJECT: ERRATA NOVEMBER 1991 STANDARDS FOR ROAD AND BRIDGE CONSTRUCTION

=================================================================

The blue coding of the following sheets was not a part of the original publication. Please replace the affected pages with these replacement sheets:

T-9, B-12, B-13, B-14, B-15, and B-28.
GENERAL NOTES

1. ALL CURVES SHALL BE SUPER-ELEVATED AS SHOWN UNLESS OTHERWISE NOTED ON PLANS.

2. SUPER-ELEVATION MAY CAUSE DRAINAGE POCKETS WHERE EASEMENT OCCURS. DRAINAGE SHALL BE PROVIDED AND DRAINAGE IS TO BE TERMINATED IN CURVE LENGTH WHERE DRAINAGE IS HANDLED, THE AREAS OF ORIGINAL DRAINAGE TO BE RESTORED IN EXTREMELY CIRCUMSTANCES. BY INSTALLING PIPE CONVEYORS.

3. SHORT VERTICAL CURVES SHALL BE INSERTED BY EXC. ADJUSTMENT OF STAGES AT BEGINNING AND END OF EASEMENT.

4. WHEN THE TRANSITION BETWEEN CURVES IS TOO SHORT TO PRODUCE EASEMENT LENGTHS SHOWN, THE TRANSITION MAY BE EXTENDED ON THE CURVE OR THE EASEMENT LENGTH MAY BE DECREASED.

**SUPER-ELEVATION FORMULA**

- **S** = Super-elevation
- **R** = Curve Radius
- **h** = Height of Vertical Curve

**OUTSIDE LANE**

- **Length of Easement**:
  - **Rate of Easement** Length in Feet
  - **Transition Length** (FL)
  - **Super-elevation Runoff** (S)

**INSIDE LANE**

- **Length of Easement**:
  - **Rate of Easement** Length in Feet
  - **Transition Length** (FL)
  - **Super-elevation Runoff** (S)

**SUPER EASEMENT FORMULAE**

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>Minimum Radius (feet)</th>
<th>Super Elevation (feet)</th>
<th>Minimum Radius (feet)</th>
<th>Super Elevation (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>100</td>
<td>0.00</td>
<td>500</td>
<td>0.00</td>
</tr>
<tr>
<td>30</td>
<td>150</td>
<td>0.00</td>
<td>400</td>
<td>0.00</td>
</tr>
<tr>
<td>40</td>
<td>200</td>
<td>0.00</td>
<td>300</td>
<td>0.00</td>
</tr>
<tr>
<td>50</td>
<td>250</td>
<td>0.00</td>
<td>200</td>
<td>0.00</td>
</tr>
<tr>
<td>60</td>
<td>300</td>
<td>0.00</td>
<td>100</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**LIMITING SPEED ON HORIZONTAL CURVES**

- **Curved Road Design**
  - **50 mph**
  - **40 mph**
  - **30 mph**
  - **20 mph**

**SUPER-ELEVATION RATE - FOOT PER FOOT**

- **Notes:** Higher value at the bold edge line is the proper super-elevation for indicated curve radius.

**SUPER-ELEVATION FORMULA**

- **E = \frac{S}{R} \times 1000**
- **F = \frac{E}{F_{factor}}**
- **V = Speed in miles per hour**
- **R = Radius in feet**

**STATE OF NEVADA DEPARTMENT OF TRANSPORTATION**

- **Super-Elevation Multi-Lane, Divided**
  - **B = 0.13 (0001)**
  - **A = 0.19 (0001)**
  - **C = 0.11 (0001)**
  - **D = 0.10 (0001)**
  - **E = 0.08 (0001)**
  - **F = 0.06 (0001)**

**CHECK ROAD DESIGN**

- **A = 0.13 (0001)**
- **B = 0.01 (0001)**
- **C = 0.11 (0001)**
- **D = 0.10 (0001)**
- **E = 0.08 (0001)**
- **F = 0.06 (0001)**
NOTES:

1. SPLICES IN LONGITUDINAL REINFORCEMENT NOT ALLOWED WITHIN UPPER 28 FEET OF PILE.
   MINIMUM LAP SPlice FOR #9 BARS IS 5'-0".

2. LONGITUDINAL PILE REINFORCEMENT EXTENDING INTO THE FOOTING SHALL PROVIDE 3 INCHES OF
   CLEARANCE TO TOP OF FOOTING. A STANDARD 180° HOOK MAY BE USED IN LIEU OF THE 90° HOOK.

3. LAPPED SPLICES IN SPIRITAL REINFORCEMENT SHALL BE LAPPED NO BAR DIAMETERS MINIMUM. ALL SPIRITAL
   REINFORCEMENT AT SPLICES AND AT THEIR ENDS SHALL BE TERMINATED BY A 135° HOOK WITH A 4 INCH
   TAIL HOOKED AROUND A LONGITUDINAL BAR.
TAPERED CAST-IN-PLACE CONCRETE PILE

STEP TAPERED CAST-IN-PLACE CONCRETE PILE

CYLINDRICAL CAST-IN-PLACE CONCRETE PILE

**NOTES**

1. TYPE AND THICKNESS OF STEEL SHELL TO BE SHOWN ON CONTRACT PLANS.

2. A MINIMUM 10 INCH DIAMETER PIPE EXTENSION MAY BE USED AT THE TIP OF A STEP TAPERED PILE WHEN TAPER IS 30 FEET OR MORE IN LENGTH. MINIMUM THICKNESS OF EXTENSION IS .250 INCHES

3. LAPPED SPLICES IN SPIRAL REINFORCEMENT SHALL BE LAPPED 60 DIAMETERS MINIMUM. ALL SPIRAL REINFORCEMENT AT SPLICES AND AT THEIR ENDS SHALL BE TERMINATED BY A 135 DEGREE HOOK WITH 6 INCH TAIL HOOKED AROUND A LONGITUDINAL BAR.

4. PILE REINFORCEMENT EXTENDING INTO A FOOTING SHALL BE NICKED AS REQUIRED TO PROVIDE 3 INCHES OF CLEARANCE TO TOP OF FOOTING.

5. FULL PENETRATION BUTT WELDS SHALL BE USED IN ALL FIELD SPLICES OF STEEL SHELLS, CONFORMING TO THE DETAILS ON SHEET B-25.1.4

6. CONICAL POINTS SHALL CONFORM TO THE REQUIREMENTS OF AS/NZ 4294 GRADE 60-150. CONICAL POINTS SHALL HAVE THE SAME OUTSIDE DIAMETER AS THE SHELL AND BE CONNECTED WITH FULL PENETRATION BUTT WELDS.

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION CAST-IN-PLACE CONCRETE PILE DETAILS B-25.1.3 (509) CHIEF BRIDGE ENG. (ADPTED: 1/8/2008)
HP PILE POINT ATTACHMENT NOTES
1) HP PILE POINT ATTACHMENTS ARE REQUIRED ONLY WHEN SHOWN ON THE PLANS OR IN THE SPECIAL PROVISIONS.
2) THE PILE POINT CONFIGURATION SHALL BE AS SHOWN ON THE PLANS.
3) PILE POINT ATTACHMENTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A27 GRADE 65-35 UNLESS NOTED OTHERWISE.
4) WELDS FOR ATTACHMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

TYPICAL HP PILE POINT DETAIL

COMPLETE JOINT PENETRATION WELD (SEE WELDING DETAILS FOR APPROVED WELDS)

PILE SPLICE NOTES
1) PILE SPLICE WELDS SHALL CONFORM TO AWS D1.1.
2) PILE MUST BE STOPPED AT LEAST 3'-0" ABOVE GROUND PRIOR TO SPlicing

SINGLE VEE-GROOVE BUTT WELD
PERMITTED FOR ALL POSITIONS

SINGLE BEVEL-GROOVE BUTT WELD
PERMITTED IN HORIZONTAL POSITION ONLY

PILE SPLICE WELDING DETAILS
NEVADA DEPARTMENT OF TRANSPORTATION

MEMORANDUM

TO: ALL HOLDERS OF THE STANDARD PLANS
FROM: STANDARDS AND MANUALS ENGINEER
DATE: November 8, 1991
SUBJECT: ERRATA NOVEMBER 1991 STANDARDS FOR ROAD AND BRIDGE CONSTRUCTION

The blue coding of the following sheets was not a part of the original publication. Please replace the affected pages with these replacement sheets:
T-9, B-12, B-13, B-14, B-15, and B-28.
NOTES:

1. SPLICES IN LONGITUDINAL REINFORCEMENT NOT ALLOWED WITHIN UPPER 2% FEET OF PILE.
   MINIMUM LAP SPlice FOR #9 BARS IS 5'-6".
2. LONGITUDINAL PILE REINFORCEMENT EXTENDING INTO THE FOOTING SHALL PROVIDE 3 INCHES OF CLEARSANCE TO TOP OF FOOTING. A STANDARD 180° HOOK MAY BE USED IN LIEU OF THE 50° HOOK.
3. LAPPED SPLICES IN SPIRAL REINFORCEMENT SHALL BE JOINED 60° BAR DIAMETERS MINIMUM. ALL SPIRAL REINFORCEMENT AT SPLICES AND AT THEIR ENDS SHALL BE TERMINATED BY A 135° HOOK WITH A 6 INCH TAIL HOOKED AROUND A LONGITUDINAL BAR.
PILE TIP DETAIL

NOTES

1. TYPE AND THICKNESS OF STEEL SHELL TO BE SHOWN ON CONTRACT PLANS.

2. A MINIMUM 10 INCH DIAMETER PIPE EXTENSION MAY BE USED AT THE TIP OF A STEP TAPERED PILE WHEN TAPER IS 30 FEET OR MORE IN LENGTH. MINIMUM THICKNESS OF EXTENSION IS .250 INCHES.

3. LAPPED SPLICES IN SPIRAL REINFORCEMENT SHALL BE LAPPED 60 DIAMETERS MINIMUM. ALL SPIRAL REINFORCEMENT AT SPLICES AND AT THEIR ENDS SHALL BE TERMINATED BY A 135° HOOK WITH 6 INCH TAIL HOOKED AROUND A LONGITUDINAL BAR.

4. PILE REINFORCEMENT EXTENDING INTO A FOOTING SHALL BE HEADED AS REQUIRED TO PROVIDE 3 INCHES OF CLEARANCE TO TOP OF FOOTING.

5. FULL PENETRATION BUTT WELDS SHALL BE USED IN ALL FIELD SPLICES OF STEEL SHELLS, CONFORMING TO THE DETAILS ON SHEET B-23.1-4.

6. CONICAL POINTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A 27 GRADE 60-35. CONICAL POINTS SHALL HAVE THE SAME DIAMETER AS THE SHELL AND BE CONNECTED WITH FULL PENETRATION BUTT WELDS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
CAST-IN-PLACE
CONCRETE PILE DETAILS

B-23.1.3 (5DB)
CAST IN PLACE
CONCRETE PILE
HP PILE POINT ATTACHMENT NOTES
1) HP PILE POINT ATTACHMENTS ARE REQUIRED ONLY WHEN SHOWN ON THE PLANS OR IN THE SPECIAL PROVISIONS.
2) THE PILE POINT CONFIGURATION SHALL BE AS SHOWN ON THE PLANS.
3) PILE POINT ATTACHMENTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A27 GRADE 65-35 UNLESS NOTED OTHERWISE.
4) WELDS FOR ATTACHMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

TYPICAL HP PILE POINT DETAIL

COMPLETE JOINT PENETRATION WELD (SEE WELDING DETAILS FOR APPROVED WELDS)

FLAME CUT DIA. HOLES

HP PILE SPLICING DETAIL

HP PILE ANCHORAGE DETAIL

SINGLE VEE-GROOVE BUTT WELD
PERMITTED FOR ALL POSITIONS

SINGLE BEVEL-GROOVE BUTT WELD
PERMITTED IN HORIZONTAL POSITION ONLY

PILE SPLICING WELDING DETAILS
NEVADA DEPARTMENT OF TRANSPORTATION

MEMORANDUM

TO: ALL HOLDERS OF THE STANDARD PLANS

FROM: STANDARDS AND MANUALS ENGINEER

DATE: November 8, 1991

SUBJECT: ERRATA NOVEMBER 1991 STANDARDS FOR ROAD AND BRIDGE CONSTRUCTION

The blue coding of the following sheets was not a part of the original publication. Please replace the affected pages with these replacement sheets:

T-9, B-12, B-13, B-14, B-15, and B-28.
GENERAL NOTES
1. CONCRETE: ALL CONCRETE IN PRECAST Prestressed Piles shall be Class FFA CONCRETE EXCEPT THE MIX SHALL CONTAIN NOT LESS THAN 8 SACKS OF CEMENT PER CUBIC YARD. ALL ENTRAINMENT SHALL BE OK TO 42 MINIMUM ULTIMATE COMPRESSIVE STRENGTH SHALL BE:
   P'2 AT TRANSFER - 4000 PSI
   P'2 AT 28 DAYS - 6000 PSI
2. FINAL FORCE: THE FORCE REMAINING IN THE PILE AFTER ALL LOSSES IN THE PRESTRESSING STEEL SHALL BE NO MORE THAN 70% OF THE STRESS. TOTAL LOSSES IN PRESTRESSING STEEL SHALL BE TAKEN AS 40 KSI.
4. REINFORCEMENT: ALL REINFORCEMENT STEEL SHALL BE ASTM A36 GRADE B.

CONSTRUCTION NOTES
1. LAPPED SPLICES IN SPIRAL REINFORCEMENT SHALL BE 10 DIAMETERS MINIMUM. ALL SPIRAL REINFORCEMENT AT SPLICES AND AT ENDS OF THE PILE SHALL BE TERMINATED BY A 120° HOOK WITH A 6 INCH TAIL HOOKED AROUND A LONGITUDINAL BAR OR STRAND.
2. LOCATION AND TYPE OF LIFTING DEVICES SHALL BE APPROVED BY THE ENGINEER.
3. MAXIMUM CUT-OFF LENGTH AT THE TOP OF PILE IS 15 FT.
4. PRECAST Prestressed CONCRETE Piles shall be supplied full length. Splines shall not be allowed.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
PRECAST Prestressed CONCRETE PILE DETAILS
NOTES:

1. SPLICES IN LONGITUDINAL REINFORCEMENT NOT ALLOWED WITHIN UPPER 25 FEET OF PILE. MINIMUM LAP SPLICE FOR #9 BARS IS 5'-5".

2. LONGITUDINAL PILE REINFORCEMENT EXTENDING INTO THE FOOTING SHALL PROVIDE 3 INCHES OF CLEARANCE TO TOP OF FOOTING. A STANDARD 180° HOOK MAY BE USED IN LIEU OF THE 90° HOOK.

3. LAPPED SPLICES IN SPIRAL REINFORCEMENT SHALL BE APPLIED TO BAR DIAMETERS MINIMUM. ALL SPIRAL REINFORCEMENT AT SPLICES AND AT THEIR ENDS SHALL BE TERMINATED BY A 150° HOOK WITH 1/4 INCH TAIL HOOKED AROUND A LONGITUDINAL BAR.
**NOTES**

1. TYPE AND THICKNESS OF STEEL SHELL TO BE SHOWN ON CONTRACT PLANS.

2. A MINIMUM 10 INCH DIAMETER PIPE EXTENSION MAY BE USED AT THE TIP OF A STEP TAPERED PILE WHEN TAPER IS 30 FEET OR MORE IN LENGTH. MINIMUM THICKNESS OF EXTENSION IS 0.250 INCHES.

3. LAPPED SPLICES IN SPIRITAL REINFORCEMENT SHALL BE LAPPED 60 DIAMETERS MINIMUM. ALL SPIRITAL REINFORCEMENT AT SPLICES AND AT THEIR ENDS SHALL BE TERMINATED BY A 135° HOOK WITH 6 INCH TAIL HOOKED AROUND A LONGITUDINAL BAR.

4. PILE REINFORCEMENT EXTENDING INTO A FOOTING SHALL BE HOOKED AS REQUIRED TO PROVIDE 3 INCHES OF CLEARANCE TO TOP OF FOOTING.

5. FULL PENETRATION BUTT WELDS SHALL BE USED IN ALL FIELD SPLICES OF STEEL SHELLS, CONFORMING TO THE DETAILS ON SHEET B-23-1.4.

6. CONICAL POINTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A37 GRADE 60-55. CONICAL POINTS SHALL HAVE THE SAME OUTSIDE DIAMETER AS THE SHELL AND BE CONNECTED WITH FULL PENETRATION BUTT WELDS.

---

**CAST-IN-PLACE CONCRETE PILE DETAILS**

**STATE OF NEVADA DEPARTMENT OF TRANSPORTATION**

Sheet 20/209 DRAFT版 REVISION

Dated: 5/23/09
HP PILE POINT ATTACHMENT NOTES
1) HP PILE POINT ATTACHMENTS ARE REQUIRED ONLY WHEN SHOWN ON THE PLANS OR IN THE SPECIAL PROVISIONS.
2) THE PILE POINT CONFIGURATION SHALL BE AS SHOWN ON THE PLANS.
3) PILE POINT ATTACHMENTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A27 GRADE 65-35 UNLESS NOTED OTHERWISE.
4) WELDS FOR ATTACHMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

TYPICAL HP PILE POINT DETAIL

COMPLETE JOINT PENETRATION WELD (SEE WELDING DETAILS FOR APPROVED WELDS)

PILE SPLICE NOTES
1) PILE SPLICE WELDS SHALL CONFORM TO AWS D1.1.
2) PILE MUST BE STOPPED AT LEAST 3'-0" ABOVE GROUND PRIOR TO SPLICING

SINGLE VEE-GROOVE BUTT WELD
PERMITTED FOR ALL POSITIONS

SINGLE BEVEL-GROOVE BUTT WELD
PERMITTED IN HORIZONTAL POSITION ONLY

PILE SPLICE WELDING DETAILS
GENERAL NOTES
1. Minimum 30" Cover Over Top Of Conduit At Shoulder Line.
2. 12 Gauge Bare Copper Detention Wire To Lay In Trench Adjacent To Conduit And Atch To Location Marker At Each End.
3. Location Marker Shall Be 2" PVC or 50" Steel Fence Posts.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
CONDUIT INSTALLATION FOR FUTURE WATER LINES
GENERAL NOTES
1. FENCE POSTS AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF STATE REGULATIONS AND STANDARDS.
2. FENCING SHALL BE (A) CHAINLINK, (B) BARBED WIRE, (C) SPLIT RAILS, OR (D) TIMBER FENCES.
3. BARRED WIRE FENCES SHALL BE DESIGNED TO RESIST WIND LOADS.
4. FENCING MATERIALS SHALL BE SECURED TO THE FRAMEWORK OF THE FENCE.
5. STAKE-IN WIRE FENCE TYPE (B) SHALL BE DESIGNED TO RESIST WIND LOADS.

BLM, NDOE WIRE FENCE DESIGN

INTERMEDIATE BRACED POST
TYPE B FENCE

INTERMEDIATE BRACED POST
TYPE C FENCE

INTERMEDIATE BRACED POST
TYPE A FENCE

TYPICAL DETAIL OF WOVEN WIRE & BARBED WIRE FENCE APPLICABLE TO TYPE A, B & C FENCING
SINGLE

**METAL DRIVE GATES**

**MISSOURI GATE**

**WALK GATE**

**TRUSS TIGHTENER**

**DETAIL A**

**DETAIL B**

**DETAIL C**

**GENERAL NOTES**

1. **DETAIL**:
   - Gate and fence details are as noted on layouts.
   - Gate and fence details are as noted on layouts.
   - Gate and fence details are as noted on layouts.

2. **MATERIALS**:
   - All materials are as noted on layouts.
   - All materials are as noted on layouts.
   - All materials are as noted on layouts.

3. **FINISHES**:
   - All finishes are as noted on layouts.
   - All finishes are as noted on layouts.
   - All finishes are as noted on layouts.

4. **ASSEMBLY**:
   - Assemble gates and fences as noted on layouts.
   - Assemble gates and fences as noted on layouts.
   - Assemble gates and fences as noted on layouts.

5. **CHECKS**:
   - Check all dimensions and details as noted on layouts.
   - Check all dimensions and details as noted on layouts.
   - Check all dimensions and details as noted on layouts.

6. **EQUIPMENT**:
   - All equipment is as noted on layouts.
   - All equipment is as noted on layouts.
   - All equipment is as noted on layouts.

7. **EROSION CONTROL**:
   - Erosion control measures are as noted on layouts.
   - Erosion control measures are as noted on layouts.
   - Erosion control measures are as noted on layouts.

**STATE OF NEVADA**
**DEPARTMENT OF TRANSPORTATION**
**GATE AND FENCE DETAILS**

**R-48-1006**
BENCH FENCE (630)

END POST

LINE POST

LINE BRACE

DETAIL A

W'W's 5/8" Flat Galvanized Stretcher Bar with Not Less than 7 Galvanized Clamps per Post

6'-0" Chain Link - 2" Mesh No. 6 Sage Wire (Galvanized)

6'-0" x 6'-0" Square Concrete Block

U-Bolt Clips

W'W's 6" x 7" Galvanized Iron, Regular Lay Fiber Core Ropes

Cut Braces and Weld to Line Post (head up)

See Detail B

Use standard turnbuckles for 3/4" bolts (1/2" hex up)

DETAIL B

1/2'-6" x 7" Galv. Iron Reg. Lay Fiber Core Ropes

1/2'-6" x 4" Galv. Iron Eye Bars for Line & B bottom huckbacks, 1/4'-2" Galv. Iron Eye Bars for center huckbacks

U-Bolt Clips

DETAIL C

METHOD OF ATTACHING FENCE TO RCB WINSWALL (OPTIONAL)

Pipes shall be fastened to the Winswall with 1/2" x 6" Galvanized Rod.

Use Galv. Nuts & Washers Both Sides at Pipe.

Method of Attaching Fence Wire to Pipe. Steel shall be Approved by the Engineer.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

BENCH FENCE AND CATTLE PASS FENCING

PLAN

CATTLE PASS FENCING (616)

SECTION A-A

Shape as shown & Grade to fit RCB Flow Line

SECTION B-B

Alternate Installation

RCB Winswall

SECTION C-C

Alternate Installation

RCB & Ditch

SECTION D-D

Note: Fence Attachment and/or Alternate Installation Performed at the Direction of the Engineer. (7' Min. from Outer End of Winswall.)

END POST

LINE POST

LINE BRACE

1/2'-6" x 7" Galvanized Iron, Regular Lay Fiber Core Ropes

Cut Braces and Weld to Line Post (head up)

See Detail A

Use standard turnbuckles for 3/4" bolts (1/2" hex up)

DETAIL A

1/2'-6" x 7" Galv. Iron Reg. Lay Fiber Core Ropes

1/2'-6" x 4" Galv. Iron Eye Bars for Line & B bottom huckbacks, 1/4'-2" Galv. Iron Eye Bars for center huckbacks

U-Bolt Clips

DETAIL B

Pipes shall be fastened to the Winswall with 1/2" x 6" Galvanized Rod.

Use Galv. Nuts & Washers Both Sides at Pipe.

Method of Attaching Fence Wire to Pipe. Steel shall be Approved by the Engineer.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

BENCH FENCE AND CATTLE PASS FENCING

PLAN

CATTLE PASS FENCING (616)

SECTION A-A

Shape as shown & Grade to fit RCB Flow Line

SECTION B-B

Alternate Installation

RCB Winswall

SECTION C-C

Alternate Installation

RCB & Ditch

SECTION D-D

Note: Fence Attachment and/or Alternate Installation Performed at the Direction of the Engineer. (7' Min. from Outer End of Winswall.)
DOUBLE SWING GATE

FRAME CONSTRUCTION GATES THRU 20'-0" OPENING

FRAME CONSTRUCTION GATES OVER 20'-0" OPENING

HINGE FOR ROLL FORM POST & 3'-0" OD POST

LOCK KEEPER

LOCK KEEPER GUIDE

HINGE FOR 4'-0" OD & LARGER TUBULAR POSTS

C PLUNGER ROD CAP

SINGLE SWING GATE

FRAME CONSTRUCTION GATES THRU 10'-0" OPENING

FRAME CONSTRUCTION GATES OVER 10'-0" OPENING

GATE POST

<table>
<thead>
<tr>
<th>FENCE HEIGHT</th>
<th>GATE WIDTH</th>
<th>NOMINAL</th>
<th>WT/FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'-6&quot; OR LESS</td>
<td>UP THRU 6'</td>
<td>2½&quot;</td>
<td>5.79</td>
</tr>
<tr>
<td></td>
<td>OVER 6' THRU 12'</td>
<td>4&quot;</td>
<td>10.79</td>
</tr>
<tr>
<td></td>
<td>OVER 12' THRU 18'</td>
<td>5&quot;</td>
<td>16.62</td>
</tr>
<tr>
<td></td>
<td>OVER 18' THRU 24' MAX</td>
<td>6&quot;</td>
<td>18.97</td>
</tr>
<tr>
<td>OVER 5'-0&quot;</td>
<td>UP THRU 6'</td>
<td>3&quot;</td>
<td>7.58</td>
</tr>
<tr>
<td></td>
<td>OVER 6' THRU 12'</td>
<td>5&quot;</td>
<td>16.62</td>
</tr>
<tr>
<td></td>
<td>OVER 12' THRU 18'</td>
<td>6&quot;</td>
<td>18.97</td>
</tr>
<tr>
<td></td>
<td>OVER 18' THRU 25' MAX</td>
<td>8&quot;</td>
<td>20.35</td>
</tr>
</tbody>
</table>

NOTE: DIAMETERS AND WEIGHTS LISTED ABOVE ARE MINIMUMS. LARGER SIZES MAY BE USED ON APPROVAL OF THE ENGINEER.
ALTERNATE ARMOR DETAIL

Note: The above alternate armor detail is not

subject to the 3.5' x 4.5' armor angles by the

curved edges upward.

TYPICAL CATTLE GUARD INSTALLATION ON CROWNED ROADWAYS

NOTE: All cattle guards illustrated on crowed roadways shall

be restrained using 1½" chains or by one or more

bolts as indicated in these notes.

METHOD OF PATCHING AT PRECAST CATTLE GUARDS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PRECAST CATTLE GUARD
SECTIONS & DETAILS

P-7-06 (07)

REvised MARCH 2010

ADOPTED 08/08

NOTE: MATERIAL LIST IS FOR INFORMATION ONLY.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PRECAST CATTLE GUARD
SECTION & DETAILS

P-7-06 (07)

REvised MARCH 2010

ADOPTED 08/08

NOTE: MATERIAL LIST IS FOR INFORMATION ONLY.
**METHOD 1**

- Varies
- Concrete Footings (Wood Posts Only)
- Posts at 6'-3" intervals Ctr. to Ctr.
- Greater Than 3'-0"
- Posts at 6'-3" intervals Ctr. to Ctr.
- "6"x8"x5'-4" Wood Posts With 6"x8"x1'-2" Wood Blocks (Typ)
- Face of Guardrail

**METHOD 2**

- Varies
- Concrete Footings (Wood Posts Only)
- Posts at 6'-3" intervals Ctr. to Ctr.
- Greater Than 3'-0"
- Posts at 6'-3" intervals Ctr. to Ctr.
- "6"x8"x5'-4" Wood Posts With 6"x8"x1'-2" Wood Blocks (Typ)
- Face of Guardrail

**METHOD 3**

- Varies
- Concrete Footings (Wood Posts Only)
- Posts at 6'-3" intervals Ctr. to Ctr.
- Greater Than 3'-0"
- Posts at 6'-3" intervals Ctr. to Ctr.
- "6"x8"x5'-4" Wood Posts With 6"x8"x1'-2" Wood Blocks (Typ)
- Face of Guardrail

**METHOD 4**

- Varies
- Concrete Footings (Wood Posts Only)
- Posts at 6'-3" intervals Ctr. to Ctr.
- Greater Than 3'-0"
- Posts at 6'-3" intervals Ctr. to Ctr.
- "6"x8"x5'-4" Wood Posts With 6"x8"x1'-2" Wood Blocks (Typ)
- Face of Guardrail

**DETAILS**

- FOR POSTS WITH LESS THAN STANDARD LENGTH
- *W-Beam Wood Posts are shown. When Triple Corrugated Guardrail is Used, Substitute Appropriate Posts and Blocks Listed Below.

**W-BEAM GUARDRAIL**

- Normal Installation
- Acceptable Alternatives

- Post: 6"x8"x5'-4" Wood
  - W8 x 85 (or 90) x 6'-0" Steel
  - or 4 5/8" x 5 5/8" x 6'-0" C Steel
- Block: 6"x8"x1'-2" Wood
  - W8 x 85 (or 90) x 1'-2" C Steel
- TRIPLE CORRUGATED GUARDRAIL

- Post: 6"x8"x6'-0" Wood
  - W6 x 85 (or 90) x 6'-0" Steel
  - or 4 5/8" x 5 5/8" x 6'-0" C Steel
- Block: 6"x8"x1'-10'2" Wood
  - W6 x 85 (or 90) x 1'-10'2" C Steel

**STATE OF NEVADA DEPARTMENT OF TRANSPORTATION**

**TYPICAL GUARDRAIL TRANSITION INSTALLATIONS**

**ELEVATION**

- 5'-0" Max (Special Design for Greater Depth)
- For Design Only (See Special Design)

- 5'-0" Wall (Special Design for Greater Depth)
- For Design Only (See Special Design)

**DESIGNER:**

- **ACKNOWLEDGED:**

**DRAFTSMAN:**

- **ACCEPANTED:**

**APPRAOVED:**

- **REVISION:**

**DATE:**

- **DRAWING NUMBER:**

**INCHES:**

- **MILLIMETERS:**

**SCALE:**

- **UNIT:**

**SPEC ALLOC:**
TYPICAL GUARDRAIL INSTALLATION

GENERAL NOTES

MINIMUM INSTALLATION:
- Guardrail - Bridgessim Connector: 12.5'
- Nested Beam Section: 12.5'
- Thire Beam Section: 12.5'
- Transition Panel: 6.25'
- "W" Beam Guardrail: 23.0'
- Breakaway Cable Terminal: 12.5'
- 81.25'

MINIMUM LENGTH: Any other variation that reduces the minimum length shall require approval of Chief Road Design Engineer.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL GUARDRAIL INSTALLATION

R-01.5.1 (6/88)
ADOPTED: 1/1/89
REVISION
DETAILED "C" NESTED BEAMS

PLAN

GUARD RAIL—BRIDGE RAIL CONNECTION

ELEVATION

SECTION A-A

SECTION B-B

SECTION C-C

SPACER BLOCK DETAIL

END VIEW

TERMINAL CONNECTOR

TABLE E

<table>
<thead>
<tr>
<th>SPACER BLOCK</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot; x 6&quot; x 7&quot;</td>
<td>6&quot;</td>
<td>3&quot;</td>
<td>5&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>6&quot; x 6&quot; x 7&quot;</td>
<td>6&quot;</td>
<td>3&quot;</td>
<td>5&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>4½&quot; x 4½&quot; x 7&quot;</td>
<td>3½&quot;</td>
<td>1½&quot;</td>
<td>4½&quot;</td>
<td>7&quot;</td>
</tr>
</tbody>
</table>

1 Wood Spacer Blocks If the proper dimensions may be substituted For the Galvanized Steel Bar.
<table>
<thead>
<tr>
<th>NEW</th>
<th>EXISTING</th>
<th>DESCRIPTION</th>
<th>NEW</th>
<th>EXISTING</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Luminare</td>
<td>[</td>
<td></td>
<td>Pull Box</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electrician</td>
<td>[</td>
<td></td>
<td>Controller Cabinet (Door Swing as Shown)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Undercross Luminare</td>
<td>[</td>
<td></td>
<td>Service (20-240 VAC Unless Otherwise Specified)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic Signal Head, 3 Section, 12&quot; Red, Yellow and Green Sections (Unless Indicated Otherwise)</td>
<td>[</td>
<td></td>
<td>Transformer Pad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic Signal Head with All Sections Lowered</td>
<td>[</td>
<td></td>
<td>Power Source</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic Signal Head with Back Plate</td>
<td>[</td>
<td></td>
<td>Conduit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic Signal Head, Programmed Visibility, 12' Green-Arrow, 9'/2' Solid Yellow and Red Sections, with Back Plate (Unless Shown Otherwise)</td>
<td>[</td>
<td></td>
<td>Conduit (Jacketed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic Signal Head with 12&quot; Green, Yellow and Red Arrow Sections, with Back Plate</td>
<td>[</td>
<td></td>
<td>Pole Designation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mast Arm Signal with Back Plate</td>
<td>[</td>
<td></td>
<td>Conduit Run</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Combination Traffic Signal Standard with Luminare and Signal Mast Arms and Attached Signal Heads, with Back Plate, PPS=Pedestrian Push Button and Sign</td>
<td>[</td>
<td></td>
<td>Junction Box</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pedestrian Signal (Walk-Don't Walk)</td>
<td>[</td>
<td></td>
<td>Wood Power Pole</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vehicle Detector - Inductive Loop</td>
<td>[</td>
<td></td>
<td>Floating Bumps &quot;R&quot; indicates Red Lens, &quot;Y&quot; indicates Yellow Lens.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unless Otherwise Indicated (See Sheet T-30.44 for Information on Identification/Configuration)</td>
<td>[</td>
<td></td>
<td>Special Junction Cabinet (For Interconnect Cable)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quadrupole Detector Loop (See Sheet T-30.1.4)</td>
<td>[</td>
<td></td>
<td>M-6 (Cluster Type Head) (See Sheet T-30.1.2)</td>
</tr>
</tbody>
</table>

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

LIGHTING AND SIGNALS

TRAFFIC SIGNAL AND LIGHTING SYMBOLS

DEPT. TRAFFIC ENGINEER ADAPTED: 12/79  P 11-86
25' AND SMALLER RADIUS CURB RETURN AND MEDIAN LOCATION

30' AND LARGER RADIUS CURB RETURN AND MEDIAN LOCATION
DETAIL "B"
POLE BASE

DETAIL "D"
LUMINAIRE ARM CONNECTION

SECTION G-G
SIGNAL TENON ATTACHMENT

SPECIAL DETAIL
FOR MOUNTING SIGNAL HEAD

SECTION A-A
"CONSTRUCTION TO COMPLY AM ENFORCEMENT FOR LOCATION OF CONSTRUCTION AND STYLES, Use"
DETAIL "A"  
FIXTURE MOUNTING ON  
CONTINUOUS SLOT CHANNEL

LIGHTING FIXTURE DATA

<table>
<thead>
<tr>
<th>Length of Panel</th>
<th>Height of Panel</th>
<th>Number of Fixtures</th>
<th>Number of Conduits</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'6&quot; (160 cm)</td>
<td>4'-7&quot; (140 cm)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6'0&quot; (180 cm)</td>
<td>3'-5&quot; (105 cm)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5'6&quot; (168 cm)</td>
<td>3'-0&quot; (90 cm)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5'0&quot; (150 cm)</td>
<td>2'-11½&quot; (90 cm)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4'6&quot; (135 cm)</td>
<td>2'-6½&quot; (75 cm)</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4'-0&quot; (120 cm)</td>
<td>2'-0&quot; (60 cm)</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>3'-11½&quot; (120 cm)</td>
<td>1'-7½&quot; (55 cm)</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>3'-6½&quot; (105 cm)</td>
<td>1'-1½&quot; (45 cm)</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>3'-1&quot; (90 cm)</td>
<td>1'-1&quot; (45 cm)</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

FORMULA:  
Length of Panel (in inches) + Height of Panel (in inches) x Number of Fixtures = Number of Conduits

DETAILS OF TYPICAL WIRING & SIGN SWITCH INSTALLATION

SECTION
LIGHTING FIXTURE (72" FLUORESCENT)

GENERAL NOTES
1.Where steel is indicated, part shall be hot-dipped GALVANIZED.
2. At all connections, laps shall be fabricated using matching hot-dipped GALVANIZED wire. 
3. After fabrication, laps shall be fabricated using matching hot-dipped GALVANIZED wire. 
4. A minimum of 30% STEEL RODS shall be used to secure wiring, fixture, and conduit connections. 
5. A minimum of 30% STEEL RODS shall be used to secure wiring, fixture, and conduit connections. 
6. All wire shall be neatly and securely fastened with wire ties. 
7. All conduits shall be neatly and securely fastened with wire ties. 

STATE OF NEVADA  
DEPARTMENT OF TRANSPORTATION  
LIGHTING AND SIGNALS  
SIGN INSTALLATION
TYPE "A" UNDERPASS LUMINAIRE

TYPE "C" UNDERPASS LUMINAIRE

TYPE "B" UNDERPASS LUMINAIRE

PENDANT INSTALLATION (TYPE "C" UNDERPASS LUMINAIRE)

JUNCTION BOX DETAIL

DETAIL "B"
Plan:
1. Weld in field or other pre-assembly of other components in shop.
2. Tack weld at one 3/8 inch increment, after one-half (1/2") inch diameter hole alignment, of security tab and pivot base plate.

Typical Sign Support:
- 7/16" Dia.
- 3/16" x 7/16" Dia. Plate (See Sign Support Post)
- 1/16" x 1/16" Dia. Hole (Typ.)

Security Tab Detail:
- 1/8" x 7/16" Dia. Plate (See Sign Mounting Pipe Detail)
- 1/16" x 7/16" Dia. Plate (See Sign Mounting Pipe Detail)
- 1/8" x 1/8" Dia. Hole (Typ.)

Section "A" - "A":
- 1/4" x 1/4" Dia. Plate (See Sign Mounting Pipe Detail)
- 1/16" x 1/16" Dia. Hole (Typ.)
- 1/8" Dia. Hole

Section "B" - "B":
- 1/8" x 1/8" Dia. Hole
- 1/16" x 1/16" Dia. Hole
- 1/8" x 1/8" Dia. Hole

Sign Mounting Pipe Detail:
- 3/16" Dia.
- 5/32" Dia. Hole
- 1/32" Dia.

State of Nevada Department of Transportation
Ground Mounted Sign Supports (Sign Pivot Details)

[Sign Support Post]
[Security Tab Detail]
[Cap Detail]

[Detail "A" (Pivot Pipe & Base Plate)]
[Detail "B" (Handle Mounting Cap)]
NOTE: TO BE USED FOR STORAGE OF VEHICLES ONLY WHEN PERMANENT CLOSURES OF RAMPS ARE ANTICIPATED.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR RAMP WORK

RETURN TO THIS SHEET FOR EXPLANATION OF BLOCKS EXCEPT WHERE SPECIFIED ON SHEET.

SCHEDULE OF SPEED LIMIT AND CHANNELIZING DEVICE SPACING

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>SPEED LIMIT (MPH)</th>
<th>CHANNELIZING DEVICE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>00</td>
<td>GE 25</td>
</tr>
<tr>
<td>20-40</td>
<td>02</td>
<td>GE 25</td>
</tr>
<tr>
<td>40-60</td>
<td>04</td>
<td>GE 25</td>
</tr>
<tr>
<td>60-80</td>
<td>06</td>
<td>GE 25</td>
</tr>
</tbody>
</table>

TYPICAL TRAFFIC CONTROL FOR RAMP WORK

RETURN TO THIS SHEET FOR EXPLANATION OF BLOCKS EXCEPT WHERE SPECIFIED ON SHEET.

SCHEDULE OF SPEED LIMIT AND CHANNELIZING DEVICE SPACING

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>SPEED LIMIT (MPH)</th>
<th>CHANNELIZING DEVICE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>00</td>
<td>GE 25</td>
</tr>
<tr>
<td>20-40</td>
<td>02</td>
<td>GE 25</td>
</tr>
<tr>
<td>40-60</td>
<td>04</td>
<td>GE 25</td>
</tr>
<tr>
<td>60-80</td>
<td>06</td>
<td>GE 25</td>
</tr>
</tbody>
</table>

TYPICAL TRAFFIC CONTROL FOR RAMP WORK

RETURN TO THIS SHEET FOR EXPLANATION OF BLOCKS EXCEPT WHERE SPECIFIED ON SHEET.

SCHEDULE OF SPEED LIMIT AND CHANNELIZING DEVICE SPACING

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>SPEED LIMIT (MPH)</th>
<th>CHANNELIZING DEVICE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>00</td>
<td>GE 25</td>
</tr>
<tr>
<td>20-40</td>
<td>02</td>
<td>GE 25</td>
</tr>
<tr>
<td>40-60</td>
<td>04</td>
<td>GE 25</td>
</tr>
<tr>
<td>60-80</td>
<td>06</td>
<td>GE 25</td>
</tr>
</tbody>
</table>

TYPICAL TRAFFIC CONTROL FOR RAMP WORK

RETURN TO THIS SHEET FOR EXPLANATION OF BLOCKS EXCEPT WHERE SPECIFIED ON SHEET.

SCHEDULE OF SPEED LIMIT AND CHANNELIZING DEVICE SPACING

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>SPEED LIMIT (MPH)</th>
<th>CHANNELIZING DEVICE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>00</td>
<td>GE 25</td>
</tr>
<tr>
<td>20-40</td>
<td>02</td>
<td>GE 25</td>
</tr>
<tr>
<td>40-60</td>
<td>04</td>
<td>GE 25</td>
</tr>
<tr>
<td>60-80</td>
<td>06</td>
<td>GE 25</td>
</tr>
</tbody>
</table>

TYPICAL TRAFFIC CONTROL FOR RAMP WORK

RETURN TO THIS SHEET FOR EXPLANATION OF BLOCKS EXCEPT WHERE SPECIFIED ON SHEET.

SCHEDULE OF SPEED LIMIT AND CHANNELIZING DEVICE SPACING

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>SPEED LIMIT (MPH)</th>
<th>CHANNELIZING DEVICE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>00</td>
<td>GE 25</td>
</tr>
<tr>
<td>20-40</td>
<td>02</td>
<td>GE 25</td>
</tr>
<tr>
<td>40-60</td>
<td>04</td>
<td>GE 25</td>
</tr>
<tr>
<td>60-80</td>
<td>06</td>
<td>GE 25</td>
</tr>
</tbody>
</table>

TYPICAL TRAFFIC CONTROL FOR RAMP WORK

RETURN TO THIS SHEET FOR EXPLANATION OF BLOCKS EXCEPT WHERE SPECIFIED ON SHEET.

SCHEDULE OF SPEED LIMIT AND CHANNELIZING DEVICE SPACING

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>SPEED LIMIT (MPH)</th>
<th>CHANNELIZING DEVICE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>00</td>
<td>GE 25</td>
</tr>
<tr>
<td>20-40</td>
<td>02</td>
<td>GE 25</td>
</tr>
<tr>
<td>40-60</td>
<td>04</td>
<td>GE 25</td>
</tr>
<tr>
<td>60-80</td>
<td>06</td>
<td>GE 25</td>
</tr>
</tbody>
</table>

TYPICAL TRAFFIC CONTROL FOR RAMP WORK

RETURN TO THIS SHEET FOR EXPLANATION OF BLOCKS EXCEPT WHERE SPECIFIED ON SHEET.

SCHEDULE OF SPEED LIMIT AND CHANNELIZING DEVICE SPACING

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>SPEED LIMIT (MPH)</th>
<th>CHANNELIZING DEVICE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>00</td>
<td>GE 25</td>
</tr>
<tr>
<td>20-40</td>
<td>02</td>
<td>GE 25</td>
</tr>
<tr>
<td>40-60</td>
<td>04</td>
<td>GE 25</td>
</tr>
<tr>
<td>60-80</td>
<td>06</td>
<td>GE 25</td>
</tr>
</tbody>
</table>

TYPICAL TRAFFIC CONTROL FOR RAMP WORK

RETURN TO THIS SHEET FOR EXPLANATION OF BLOCKS EXCEPT WHERE SPECIFIED ON SHEET.

SCHEDULE OF SPEED LIMIT AND CHANNELIZING DEVICE SPACING

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>SPEED LIMIT (MPH)</th>
<th>CHANNELIZING DEVICE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>00</td>
<td>GE 25</td>
</tr>
<tr>
<td>20-40</td>
<td>02</td>
<td>GE 25</td>
</tr>
<tr>
<td>40-60</td>
<td>04</td>
<td>GE 25</td>
</tr>
<tr>
<td>60-80</td>
<td>06</td>
<td>GE 25</td>
</tr>
</tbody>
</table>
INSTRUCTIONS TO FABRICATOR

FORMAT SHEET SHOWS:
1. Structure location.
2. Length of structure frame.
3. Panel size and locations on structure.
4. Post type and height to bottom of frame.
5. Slope of frame.
6. Footing elevation or location of alternate pier foundation.
7. Photograph cell location if required.

REFER TO THE FOLLOWING SHEETS FOR DETAILS NOT SHOWN ON FORMAT SHEET:
T.56.1.1 - Instructions and examples.
T.56.1.2 - Pier types and locations.
T.56.1.3 - Post type 6.0 thru 16.0.
T.56.1.4 - Structural frame members (single post type).
T.56.1.5 - Structural frame members (two post type).
T.56.1.6 - Structural frame details.
T.56.1.7 - Frame, column details.
T.56.1.8 - Removable sign panel frames.
T.56.1.9 - Walkway details no. 1, no. 2.
T.56.1.10 - Walkway safety railing details.
T.56.1.11 - Alternatives piers construction.

GENERAL NOTES

SPECIFICATIONS:
DESIGN - AASHTO Specifications for the design and construction of structural supports for roadway signs dated 1968.

CONSTRUCTION - Standard Specifications for Road and Bridge Construction, Current Edition and Supplements.

LOADING - Wind Loading: Normal to face of sign, 30 P.S.F. Transverse to face of sign, 0.5 of normal force.

WALKWAY LOADING - Dead load 5000 lbs. concentrated live load.

UNIT STRESSES:
STRUCTURAL STEEL: Fx = 20,000 P.S.I.
REINFORCED CONCRETE: Fx = 20,000 P.S.I., Fy = 4000 P.S.I.
FOOTING SOIL PRESSURE: 1.4 tons/ft.

MINIMUM CLEARANCE - Vertical roadway clearance 16'-0".

WELDING - All welds continuous unless otherwise noted on the plans. All welding to be done in accordance with the standards for road and bridge construction.

FINISH - All steel parts to be hot-dipped galvanized after fabrication except as shown on plans or as called for in special provisions.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
INSTRUCTIONS & EXAMPLES

EXAMPLE NO. 1

UNBALANCED SINGLE POST TYPE

EXAMPLE NO. 2

CANTILEVER SINGLE POST TYPE

EXAMPLE NO. 3

TWO POST TYPE WITH CANTILEVER
(PART DOUBLE-FACED)
See Table XII

PLAN

45° Typical except as noted.

Note: For Details see "Structural Frame Details" Sheet.

SPAN

Upper Chord (near B & for sides)

Diagonal A (near & for sides)

Lower Chord (near B & for sides)

For details of post see "Post Types 1-5 thru 32-37" sheet.

ELEVATION

Forway brackets not shown. Locate first interior bracket 1'-3" min. to 2'-0" max. from B of nearest post to sign panel group.

TABLE XII

<table>
<thead>
<tr>
<th>45° Panel</th>
<th>90° Panel</th>
<th>135° Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>Depth</td>
<td>Depth</td>
</tr>
<tr>
<td>20&quot;</td>
<td>20&quot;</td>
<td>20&quot;</td>
</tr>
<tr>
<td>25&quot;</td>
<td>25&quot;</td>
<td>25&quot;</td>
</tr>
<tr>
<td>30&quot;</td>
<td>30&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>35&quot;</td>
<td>35&quot;</td>
<td>35&quot;</td>
</tr>
</tbody>
</table>

TABLE XIII

RANGE OF STRUCTURE SIZES

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
OVERHEAD SIGNS - TWO POST STRUCTURAL FRAME MEMBERS

TABLE XI

T - 36.5" - (627) CHP TRAFFIC SIGN - ADOPTED 7/22

Add 6" to frame width for Post Type X-S & XI-S; Add 10" to frame width for Post Type X-X.

Add 6" to frame width for Post Type X-S.

Frame widths shown are nominal. These may be varied by 1/4" to 1/2" to standardize fabrication methods.

Metal Fabricator at 1/4" or less may be varied by 1/4" to 1/2" to standardize fabrication methods.

Fabricators at 1/4" or less may be varied by 1/4" to 1/2" to standardize fabrication methods.

Camber for Fabrication At % Span

<table>
<thead>
<tr>
<th>Span</th>
<th>Camber</th>
</tr>
</thead>
<tbody>
<tr>
<td>40&quot;</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>50&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>60&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>70&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>80&quot;</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>90&quot;</td>
<td>2</td>
</tr>
</tbody>
</table>

Fabricator to approximate symbol. Camber of sign panel arm is 1/4" to 1/2" for arms greater than 12".
**splice notes**

Specifications:
The bolted splice shall conform to general specifications for structural steel using ASTM A 36 Steel. Designed by the Research Council on Reinforced and Bolted Structural Steel of the Engineering Foundation.

Location of Spencer:
The spacers shall be located so as not to interfere with mounting the anti-sway bracket or the sill plates for the support post. The center of the area of the bolted chord splice will be bolted to the chord angles with a 7/16 unthreaded bolt, with nuts and pl. flat washers and lock washers.

Bolts:
The bolts shall be high strength with an interference type bore, when torqued to the required amount as stated in the above specifications.

Filter R:
The plates welded to the angle legs on the inside shall be welded before the bolts plus. They shall be the same length as the angle plates. The splice shall be located at the point of the connection, length from the post. Alternative splice details may be used if approved by the Engineer.
1. Welded-type grating shall have 3/8" x 3/8" bearing bars @ 3 1/2" centers with 1/8" diameter (or equal) cross bars @ 4" centers. See detail (2). If mechanical close grating is used it shall be equal in strength to the welded-type. All welds must be secured for approval.

2. For spacing of lighting fixtures see Table of Spacings on "Framed sign lighting equipment" sheet.

3. Walkway grating and light fixture mounting channels to be continuous (no splices) over as many walkway brackets as practicable consistent with fabrication ease of handling and assembling.

4. Bolts, nuts, washers, etc. to be galvanized.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
WALKWAY DETAILS NO. 1

DETAIL 1
Connection of Splice

DETAIL 14
Special Connection

DETAIL 12
Light Fixture (bottom)

DETAIL 6
Walkway Bracket
Note: Alternative working methods may be used if approved by the Engineer.

1. Special care shall be taken to ensure that the completed hinge and latch assembly will hold the safety railing in a steady manner, free of wobble while in the retracted position. Maximum allowable displacement from vertical at top of railing when latched shall be .

2. Details for bolting hinge base & to walkway bracket may be submitted for approval.

3. Alternative details approved by the Engineer may be substituted for the safety chain connections shown.
SIDE VIEW - SINGLE FACED SIGN TYPES A, B, C
LIGHT FIXTURE MOUNTING DETAIL
SIGNS GREATER THAN 5'-8" IN LENGTH

MOUNTING BEAM SPACING

<table>
<thead>
<tr>
<th>Sign Panel Length</th>
<th>Number Mounting Beams</th>
<th>Sign Panel Overhang</th>
<th>Mounting Beam Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>5'-0&quot;</td>
<td>2</td>
<td>9&quot;</td>
<td>3&quot;-0&quot;</td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>2</td>
<td>12&quot;</td>
<td>4&quot;-0&quot;</td>
</tr>
<tr>
<td>7'-0&quot;</td>
<td>2</td>
<td>15&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>2</td>
<td>18&quot;</td>
<td>8'-0&quot;</td>
</tr>
<tr>
<td>9'-0&quot;</td>
<td>2</td>
<td>21&quot;</td>
<td>10'-0&quot;</td>
</tr>
<tr>
<td>10'-0&quot;</td>
<td>2</td>
<td>24&quot;</td>
<td>12'-0&quot;</td>
</tr>
<tr>
<td>11'-0&quot;</td>
<td>2</td>
<td>27&quot;</td>
<td>14'-0&quot;</td>
</tr>
<tr>
<td>12'-0&quot;</td>
<td>2</td>
<td>30&quot;</td>
<td>16'-0&quot;</td>
</tr>
<tr>
<td>13'-0&quot;</td>
<td>2</td>
<td>33&quot;</td>
<td>18'-0&quot;</td>
</tr>
<tr>
<td>14'-0&quot;</td>
<td>2</td>
<td>36&quot;</td>
<td>20'-0&quot;</td>
</tr>
<tr>
<td>15'-0&quot;</td>
<td>2</td>
<td>39&quot;</td>
<td>22'-0&quot;</td>
</tr>
<tr>
<td>16'-0&quot;</td>
<td>2</td>
<td>42&quot;</td>
<td>24'-0&quot;</td>
</tr>
<tr>
<td>17'-0&quot;</td>
<td>2</td>
<td>45&quot;</td>
<td>26'-0&quot;</td>
</tr>
<tr>
<td>18'-0&quot;</td>
<td>2</td>
<td>48&quot;</td>
<td>28'-0&quot;</td>
</tr>
</tbody>
</table>

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
OVERHEAD SIGNS
LIGHTWEIGHT
LIGHT FIXTURE MOUNTING DETAILS

NOTE:
Square Structural Tubing may be used in place of 2"x2" bar.
Center mount required for signs 10' thru 24'.

Drill C for mounting screws. Provide 3/8" x 2" long machine screws, hex nuts, flat washers and lock washers.

Photoelectric control unit 3-prong, NEMA standard, twist lock plug receptacle.

Top of sign panel, 3/8" blind hole Grooved & countersunk.

1/4" - 20 Stainless Steel Nut
Stainless Steel Lock Washer

Stainless Steel Lock Washer

3/8" x 1" long flat head machine screw, hex nut, flat washer, beveled washer & lock washer.
CENTER LANE TWO WAY TRAFFIC

4" YELLOW CERAMIC MARKER
4" DOUBLE YELLOW REFLECTIVE MARKER

10' 15' 20'

3'-4"

4" WHITE CERAMIC MARKER

LANE LINE

4" YELLOW CERAMIC BUTTONS
4" DOUBLE YELLOW REFLECTIVE MARKERS

DOUBLE YELLOW CENTER LINE

10' 30' 50'

3'-4"

4" YELLOW CERAMIC MARKERS
4" DOUBLE YELLOW REFLECTIVE MARKERS

TWO WAY LEFT TURN LANE

4" YELLOW CERAMIC MARKERS
4" DOUBLE YELLOW REFLECTIVE MARKERS

ONE WAY PASSING ZONE

4" YELLOW CERAMIC MARKERS
4" DOUBLE YELLOW REFLECTIVE MARKERS

In length, the storage line is two thirds of this distance

STORAGE LINE

RED/CLEAR PATTERN (SEE DETAIL "O")

EXIT RAMP GORE STRIPING

NON-REFLECTIVE & REFLECTIVE MARKERS

TYPE I - NON-REFLECTIVE YELLOW MARKER
TYPE II - REFLECTIVE WHITE MARKER
TYPE III - TWO WAY YELLOW REFLECTIVE MARKER
TYPE IV - CLEAR REFLECTIVE MARKER
TYPE V - BRUSH CLEAR REFLECTIVE MARKER

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKER

SHRFF TRAFFIC ENGINE ADOPTED 8/70
NOTE: This plan sheet may be used for Multiple Cell Culverts by making necessary adjustments.
### Cubic Yards of Concrete and Pounds of Reinforcing for Two Type II Headwalls

<table>
<thead>
<tr>
<th>Headwalls</th>
<th>Single Box</th>
<th>Double Box</th>
<th>Triple Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>O Skew</td>
<td>9.8</td>
<td>19.7</td>
<td>39.5</td>
</tr>
<tr>
<td>15° Skew</td>
<td>8.2</td>
<td>16.4</td>
<td>32.9</td>
</tr>
<tr>
<td>30° Skew</td>
<td>6.8</td>
<td>13.4</td>
<td>26.7</td>
</tr>
<tr>
<td>45° Skew</td>
<td>6.1</td>
<td>12.1</td>
<td>24.5</td>
</tr>
<tr>
<td>Triples</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.0</td>
<td>18.0</td>
<td>36.0</td>
</tr>
<tr>
<td></td>
<td>8.5</td>
<td>17.0</td>
<td>34.5</td>
</tr>
<tr>
<td></td>
<td>8.0</td>
<td>16.0</td>
<td>33.0</td>
</tr>
</tbody>
</table>

#### Plan

- **F Bars**
- **1.5H + 1/2" Concrete Skew Angle**

#### Elevation

- **No. 4 Bars @ 18° Near Face**
- **9 Bars For Each**
- **Bars 1'-6" into Bars**

#### Notes

- Extend 2 - No. 4 Bars 1'-0" into Capping
- Stop Alternate 6 Bars @ This Point When H = 8'-0" or More
- General Notes See Sheet B-20.1.1

---

**STATE OF NEVADA DEPARTMENT OF TRANSPORTATION**

**RCB CULVERTS TYPE II HEADWALLS**

**B-20.1.4 (502)**

**ADOPTED (I/C) REVISION**

---

**SECTION A-A**

- 6 Bars F Bars
- See 2-D-11 for Capping Detail
- Size 232, Size 232
- Size 232, Size 232
- Size 232, Size 232

**SECTION B-B**

- G Bars @ Appx.
- Size 232, Size 232
- 5 Bars F Bars
- Size 232, Size 232
- Size 232, Size 232

---

**ELEVATION**

- B - B
- 6 Bars @ 18° Near Face
- 9 Bars For Each
- G Bars For Each
<table>
<thead>
<tr>
<th>SPAN</th>
<th>CONCRETE</th>
<th>REINFORCING</th>
<th>CONCRETE</th>
<th>REINFORCING</th>
<th>CONCRETE</th>
<th>REINFORCING</th>
<th>CONCRETE</th>
<th>REINFORCING</th>
<th>CONCRETE</th>
<th>REINFORCING</th>
<th>CONCRETE</th>
<th>REINFORCING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>10</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>15</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>20</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>25</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>30</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>35</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>40</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>45</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>50</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>55</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>60</td>
<td>56</td>
<td>85</td>
<td>20</td>
<td>37</td>
<td>28</td>
<td>42</td>
<td>0</td>
<td>3</td>
<td>24</td>
<td>37</td>
<td>28</td>
<td>42</td>
</tr>
</tbody>
</table>

ESTIMATE OF QUANTITIES

TYPE I HEADWALLS
-NOTES-

1. For General Notes See Sheet 8-20.1.1.
NOTES:

1. SPLICES IN LONGITUDINAL REINFORCEMENT MAY NOT
   ALLOWED WITHIN UPPER 25 FEET OF PILE.
   MINIMUM LAP SPLICE FOR #9 BARS IS 5'-5".

2. LONGITUDINAL PILE REINFORCEMENT EXTENDING
   INTO THE FOOTING SHALL PROVIDE 3 INCHES OF
   CLEARANCE TO TOP OF FOOTING. A STANDARD 90°
   HOOK MAY BE USED IN LIEU OF THE 90° HOOK.

3. LAPPED SPLICES IN SPIRAL REINFORCEMENT SHALL
   BE LAPPED 60 BAR DIAMETERS MINIMUM. ALL SPIRAL
   REINFORCEMENT AT SPLICES AND AT THEIR ENDS
   SHALL BE TERMINATED BY A 135° HOOK WITH 6 INCH
   TAIL HOOKED AROUND A LONGITUDINAL BAR.
PILE TIP DETAIL

NOTES

1. TYPE AND THICKNESS OF STEEL SHELL TO BE SHOWN ON CONTRACT PLANS.

2. A MINIMUM 10 INCH DIAMETER PIPE EXTENSION MAY BE USED AT THE TIP OF A STEP TAPERED PILE WHEN TAPER IS 30 FEET OR MORE IN LENGTH. MINIMUM THICKNESS OF EXTENSION IS .250 INCHES.

3. LAPPED SPLICES IN SPIRAL REINFORCEMENT SHALL BE LAPPED 60 DIAMETERS MINIMUM. ALL SPIRAL REINFORCEMENT AT SPLICES AND AT THEIR ENDS SHALL BE TERMINATED BY A 135° HOOK WITH 6 INCH TAIL HOODED AROUND A LONITUDINAL BAR.

4. PILE REINFORCEMENT EXTENDING INTO A FOOTING SHALL BE HOOKED AS REQUIRED TO PROVIDE 3 INCHES OF CLEARANCE TO TOP OF FOOTING.

5. FULL PENETRATION BUTT WELDS SHALL BE USED IN ALL FIELD SPLICES OF STEEL SHELLS: CONFORMING TO THE DETAILS ON SHEET B-23.1.4.

6. CONICAL POINTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A27 GRADE 65-35. CONICAL POINTS SHALL HAVE THE SAME OUTSIDE DIAMETER AS THE SHELL AND BE CONNECTED WITH FULL PENETRATION BUTT WELDS.
HP PILE POINT ATTACHMENT NOTES
1) HP PILE POINT ATTACHMENTS ARE REQUIRED ONLY WHEN SHOWN ON THE PLANS OR IN THE SPECIAL PROVISIONS.
2) THE PILE POINT CONFIGURATION SHALL BE AS SHOWN ON THE PLANS.
3) PILE POINT ATTACHMENTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A27 GRADE 65-36 UNLESS NOTED OTHERWISE.
4) WELDS FOR ATTACHMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

HP PILE ANCHORAGE DETAIL

SINGLE VEE-GROOVE BUTT WELD
PERMITTED FOR ALL POSITIONS

SINGLE BEVEL-GROOVE BUTT WELD
PERMITTED IN HORIZONTAL POSITION ONLY

PILE SPLICE WELDING DETAILS

TYPICAL HP PILE POINT DETAIL

HP PILE SPLICE DETAIL

COMPLETE JOINT PENETRATION WELDS (SEE WELDING DETAILS FOR APPROVED WELDS)

PILE SPLICE NOTES
1) PILE SPLICE WELDS SHALL CONFORM TO AWS D1.1.
2) PILE MUST BE STOPPED AT LEAST 3'-0" ABOVE GROUND PRIOR TO SPLICING

FLAME CUT 5/32" DIA HOLES
SPREAD FOOTING SECTION

TABLE OF REINFORCING STEEL

<table>
<thead>
<tr>
<th>Design H ft</th>
<th>4'</th>
<th>6'</th>
<th>8'</th>
<th>10'</th>
<th>12'</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>4'-0&quot;</td>
<td>5'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>9'-6&quot;</td>
</tr>
<tr>
<td>E Spread Fig.</td>
<td>1'-0&quot;</td>
<td>1'-0&quot;</td>
<td>1'-0&quot;</td>
<td>1'-0&quot;</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>Better</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>#4 bars</td>
<td>4'-0&quot;</td>
<td>5'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>9'-6&quot;</td>
</tr>
<tr>
<td>Short</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>#6 bars</td>
<td>4'-0&quot;</td>
<td>5'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>9'-6&quot;</td>
</tr>
<tr>
<td>Total #6 bars</td>
<td>4'-0&quot;</td>
<td>5'-0&quot;</td>
<td>6'-0&quot;</td>
<td>6'-0&quot;</td>
<td>9'-6&quot;</td>
</tr>
<tr>
<td>Case I kips</td>
<td>16.0</td>
<td>22.0</td>
<td>30.0</td>
<td>35.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Case II kips</td>
<td>15.0</td>
<td>21.0</td>
<td>29.0</td>
<td>34.0</td>
<td>34.0</td>
</tr>
<tr>
<td>Case III kips</td>
<td>15.0</td>
<td>21.0</td>
<td>29.0</td>
<td>34.0</td>
<td>34.0</td>
</tr>
<tr>
<td>Case IV kips</td>
<td>20.0</td>
<td>32.0</td>
<td>42.0</td>
<td>53.0</td>
<td>65.0</td>
</tr>
<tr>
<td>Spread Dial (WD)</td>
<td>16</td>
<td>22</td>
<td>36</td>
<td>55</td>
<td>75</td>
</tr>
<tr>
<td>File Conc. (L)</td>
<td>10.9</td>
<td>17.9</td>
<td>20.5</td>
<td>25.5</td>
<td>36.5</td>
</tr>
<tr>
<td>Pile Conc. (L)</td>
<td>11.8</td>
<td>17.8</td>
<td>20.8</td>
<td>25.8</td>
<td>36.8</td>
</tr>
</tbody>
</table>

NOTES

Design Conditions:
Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting the pressure loads listed in table.

Quantity:
Quantities do not include the wall portion above "Gutter Elevation" and are for design purposes only.