FOREWORD TO 2001 METRIC STANDARD PLANS

All significant changes to each sheet are shown in red. The next revision for the Standard Plans will be revised for the year 2003, since revisions are made every other year.

The re-written MUTCD 2000 Edition was not available at the time this document was being published, so changes will be implemented via other formats.

Modified Sheets
B-20.1.1, B-20.1.2, B-20.1.4, B-20.1.4.1, B-20.1.7, B-29.1.1

R-1.1.5, R-2.1.3, R-3.1.2, R-3.1.3, R-4.1.2, R-4.2.1, R-4.3.1, R-4.6.1, R-4.6.1.2, R-4.6.2, R-5.2.1, R-5.2.2, R-5.2.3, R-5.3.3, R-6.1.2.2, R-6.1.3, R-6.3.1, R-6.3.2.1, R-7.1.6, R-7.1.8, R-8.2.1, R-8.4.1, R-8.4.2, R-8.4.3, R-8.6.2, R-8.7.1, R-8.7.2, R-8.8.2, R-9.1.1, R-9.2.1, R-10.1.3, R-12.1.1, R-12.1.3


New Sheets
R-2.2.2, R-8.1.3, R-8.2.3, R-8.6.3, R-8.6.4, R-10.1.4, R-10.1.5, T-30.1.2.1, T-37.1.3, T-38.1.3

Conditional use of a sheet
Various labels such as “do not use”, “to be phased out”, and/or some other restriction to use a particular sheet are presented here. See R-8.5.2(Guardrail-Bridge Rail Connections W-Beam), R-8.5.3(Guardrail Barrier Rail Connections W-Beam), R-8.7.2(PPCBR), R-8.8.2(Temporary Traffic Screen), T-30.1.3.3(Flash Warning Sign School Zone Flasher) and T-35.1.7(Barricades).

This edition is part of an continuous process to update the Standard Plans. Updates to Standard Plans will reflect the impetus of NCHRP Report 350 requirements, however approved products are shown in the Qualified Products List, QPL, included within each advertised project’s Special Provisions. If you find an error or want to make a comment, make a copy of that sheet marked with your comments and mail to Robert L. Kvam, P.E., Senior Designer, Standards and Manuals, 1263 S. Stewart Street, Carson City, Nevada 89712, call to 775-888-7598, 775-888-7620 fax, or by email at rkvam@dot.state.nv.us.

Printed copies or a CD version of the Standard Plans can be obtained from Administrative Services, 1263 S. Stewart Street, Carson City, Nevada 89712. For information call 775-888-7070 or fax to 775-888-7401.
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**CULVERT IN EMBANKMENT**

- **CMP OR CMAP CULVERTS**
- **CONCRETE PIPE CULVERT IN EMBANKMENT**
  - **METHOD A**
  - **Excavation Depth is Less than 1.2 m**
  - **RCP OVER 500 mm OVAL RCP OVER 950 mm X 600 mm**
  - **W-21 for RCP**
  - **D-21 for RCP**

**CULVERT IN EMBANKMENT**

- **Excavation Depth is Less than 12 m**
- **30°-but not to exceed**
- **D-30 cm/RCP**
- **L-30 cm/RCP**

**CULVERT IN EMBANKMENT**

- **Excavation Depth is Less than 12 m**
- **30°-but not to exceed**
- **D-30 cm/RCP**
- **L-30 cm/RCP**

**CULVERT INSTALLATION IN ROUGH TERRAIN**

- **Excavation Depth to be paid below subgrade and within designated limits.**
- **Embankment to be constructed to lineout prior to installation.**
- **Backfill embankment to be paid from baseline to the designated maximum limits.**
- **Roadway Excavation to be paid to subgrade.**

**CULVERT INSTALLATION WITH UNSUITABLE FOUNDATIONS**

- **Grade to this elevation prior to installation.**

**TYPE 7 DROP INLET**

- **Type 7 Drop Inlet**

**TYPE 8 DROP INLET**

- **Type 8 Drop Inlet**

**GENERAL NOTES:**

1. Excavation for Multiple Pipes
   - Installations 20 m or more in width
   - Will be Paid as Channel or Roadway Excavation.
1. Trenches more than 1.2 m deep shall be shored, leg back to at least the angle of repose for earth and excavated material, or some other means of protection shall be provided.

2. If hazardous field conditions indicate ground movement may be expected, trenches less than 0.75 m deep shall be protected as indicated in note 1.

3. For the purpose of payment, structure excavation and backfill quantities are based on these standard sections. No additional payment will be made for shoring.

4. If shoring is used, payment will be made for the actual shoring and backfill above or below these standard sections. No additional payment will be made for shoring.

5. French Drainage shown Shallow Drains.

6. The quantity of structure excavation and backfill shown is the actual volume of cubic meters excavated minus any excavation limits which overlap.

7. The limits of structure excavation and backfill shown are those which shall be used for the method of measurement and payment only. There shall be no additional compensation for any additional excavation or backfill required for excavations to meet other requirements.
GENERAL NOTES:

1. Trenches more than 1.2 meters deep shall be shored, and backfilled, by at least the angle of repose for granular backfill earth. Other means of protection shall be prescribed.

2. If hazardous field conditions indicate ground movement or excessive settlement, trenches shall be cut shallower and protection provided as indicated in Note 1.

3. For the purpose of payment, structure excavation and backfill quantities are based on those therefore indicated on the standard plans. No additional payment will be made for shoring.

4. If shoring is used, payment will be made for structure excavation and backfill as indicated on the standard plans. No additional payment will be made for shoring.

5. French or Bernard shoring shall comply to OSHA Requirements (29CFR Part 1926, Subpart P, appendix C).

6. The quantity of structure excavation and backfill measured for payment shall be the number of cubic meters calculated minus any duplication of units which overlaps.

7. The limits of structure excavation and backfill shown herein shall be used for the method of measurement and payment only; there shall be no additional excavation or backfill required for excavation to meet OSHA regulations.

8. See Sheet E-10.18 for excavation and backfill for present concrete box culverts.
GENERAL NOTES:

1. Trenches more than 1.2 m deep shall be shored, tied back to at least the angle of repose for existing soil conditions, or some other means of protection shall be provided.

2. If hazardous field conditions indicate ground movement may be expected, trenches less than 1.2 m deep shall also be protected as indicated in note 1.

3. For the purpose of payment, structure excavation and backfill quantities are based on these standard drawings and no additional payment will be made for shoring.

4. If shoring is used, payment will be made for structure excavation and backfill based on these standard drawings, and no additional payment will be made for shoring.

5. Trench Excavation shoring shall conform to OSHA Regulations 29 CFR Part 1926, Subpart P, Appendix C.

6. The quantity of structure excavation and backfill measured for payment shall be the number of cubic meters calculated minus any duplication of limits which overlap.

7. If diameter is 1800 mm or less, granular backfill shall be placed for a minimum depth of 150 mm above the top of the pipe for the width of the trench. Complete the trench backfill with granular backfill or roadway embankment. If diameter is greater than 1800 mm, granular backfill shall be placed for a maximum depth of 150 mm above the top of the pipe for the width of the trench. Complete the trench backfill with roadway embankment.

8. The limits of structure excavation and backfill shown herein shall be used for the method of measurement and payment only. There shall be no additional compensation for any additional excavation or backfill required for excavations to meet OSHA regulations.

LEGEND:

- Structure Excavation
- Granular Backfill
- Roadway Embankment

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STRUCTURE EXCAVATION
AND BACKFILL
(METHOD OF MEASUREMENT)

METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED

P.L.55
ADAPTED 7/19
REVISION 04/20/04

CHEF ROAD DESIGN ENGINEER
CLASS A BEDDING
Payment for excavated area below the bottom of pipe line, to be included in the unit bid price per cubic meter 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 MUKWALL FOUNDATIONS ON SHEET 02-C. PIPES TO BE PLACED IN ELABORATE CONDITIONS.
2. CONCRETE SHALL BE CLASS A OR AA.

BEDDING FOR CONCRETE CULVERT

ALLOWABLE FILL HEIGHT IN METERS FOR REINFORCED CONCRETE PIPE 605 mm to 2100 mm

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<th>CLASS C</th>
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BEDDING FOR C.M.P. OR C.M.A.P.
### 68 mm x 15 mm Round Corrugated Aluminum Pipe

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<tr>
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### 75 mm x 25 mm Round Corrugated Aluminum Pipe

<table>
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<th>PIPE DIAMETER</th>
<th>MINIMUM COVER</th>
<th>PLATE THICKNESS in mm</th>
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<tr>
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<td>1.5</td>
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<td>750</td>
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<td>360</td>
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### 150 mm x 25 mm Round Corrugated Aluminum Pipe

<table>
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<th>MINIMUM COVER</th>
<th>PLATE THICKNESS in mm</th>
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<tr>
<td>19</td>
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<td>22</td>
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### Corrugated Aluminum Alloy Pipe Dimensions

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>MINIMUM COVER</th>
<th>PLATE THICKNESS in mm</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1.5</td>
<td>1.9</td>
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<tr>
<td>750</td>
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<td>60</td>
<td>6.4</td>
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<td>45</td>
<td>5.6</td>
</tr>
<tr>
<td>360</td>
<td>30</td>
<td>5.2</td>
</tr>
</tbody>
</table>
**WITHOUT HEADWALL**

1. **LENGTH OF CULVERT SHALL BE INCREASED AS FOLLOWS:**
   - Consider each side separately. Measure pipe from road centerline to the intersection of pipe flow line and fill slope. To this dimension add 0.6 m when cover at shoulder is 0.3 m to 3.0 m and an additional 150 mm for each succeeding 1.5 m of cover or portion thereof.

**WITH CONCRETE HEADWALL**

2. **LENGTH OF CULVERTS SHALL BE INCREASED AS FOLLOWS:**
   - Consider each side separately. Measure pipe from road centerline to the intersection of the top of pipe and fill slope plus headwall thickness. To this dimension add 0.3 m when cover at shoulder is 1.5 m to 5.0 m and an additional 150 mm for each succeeding 1.5 m of cover or portion thereof.

**PRECAST CONCRETE END SECTION**

3. **LENGTH OF CULVERT SHALL BE INCREASED AS FOLLOWS:**
   - Consider each side separately. Measure pipe from road centerline to the intersection of the top of pipe and fill slope. To this dimension add 0.3 m when cover at shoulder is 0.3 m to 3.0 m and an additional 150 mm for each succeeding 1.5 m of cover or portion thereof.

**MINIMUM CULVERT INSTALLATION**

- USE 450 mm MIN. WHERE POSSIBLE. IF MINIMUM COVER IS RESTRICTIVE, COMPENSATE BY UTILIZING HIGHER CLASS PIPE OR SELECTIVE BISING AS RECOMMENDED BY THE HYDRAULICS SECTION.
- ALUMINUM CULVERTS: SEE STANDARD SHEET H-1.3.1.
- STEEL CULVERTS: SEE STANDARD SHEET H-1.3.1.2.

**METAL END SECTION**

**METHOD OF CONTINUING OVER CULVERTS**

1. IF AFTER EXTENDING THE CULVERT AND/OR WARPING THE FILL SLOPE FOR SAFETY AND/OR AESTHETICS, THE EXTENSION DOES NOT FULFILL THE REQUIREMENTS FOR A CLEAR ROADSIDE RECOVERY AREA, THEN VEHICULAR TRAFFIC MAY BE PROTECTED BY A SAFETY BARRIER OR BY SOME OTHER MEANS, SUCH AS GUARDRAIL, BARRIER RAIL, OR ANOTHER ACCEPTABLE SAFETY FEATURE.

2. NORMAL STRUCTURE EXCAVATION AND BACKFILL LIMITS.

**SECTION A-A**

**SAFETY CULVERT INSTALLATION**

(TO PROVIDE OBSTRUCTION CLEARANCE)

**NOTE:**

- 0.3 m CULVERT BIB.
- 0.0 m SHEET METAL

**CORRIDOR OR ROADWAY EXC.**

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

**CULVERT INSTALLATION**

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
### GENERAL NOTES:

1. PLAN AND TYPE OF CONCRETE SHALL BE AS SPECIFIED FOR REINFORCED CONCRETE PIPE.
2. STRUCTURAL DESIGN OF END SECTION SHALL CONFORM TO THAT OF STANDARD REINFORCED CONCRETE CULVERT PIPE.
3. LENGTH OF PIPE SHOWN ON THE DESIGNED PLANS DOES NOT INCLUDE CONNECTION SECTION (LENGTH CT).
4. CONTACT HYDRAULICS ENGINEER FOR SIZES NOT LISTED.

### Table:

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C+ (mm)</th>
<th>L (mm)</th>
<th>W (mm)</th>
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<tbody>
<tr>
<td>450</td>
<td>205</td>
<td>105</td>
<td>295</td>
<td>205</td>
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<td>1800</td>
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<td>555</td>
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</table>

* For Reference Only.

**PLAN**

**END VIEW**

**SECTION A-A**

**CROSS SECTION VIEW**

450 mm RCP TO 1350 mm RCP
### General Notes:

1. Concrete shall be Class A or AA.
2. Reinforcing steel shall be deformed bars with maximum spacing of 400 mm GFR 60 mm clear of surface of concrete.
3. Footing shown are of minimum width and shall be extended if soil is unsuitable or liable to settle.
4. Culvert pipes to be set on a skew shall be pitched when necessary and if not constructed the pipe shall not be pitched except in overflow section.
5. For estimating headwall quantities or skewed culverts:
   - 20' to 25' - Use quantities for 18' skew.
   - 25' to 40' - Use quantities for 30' skew.
   - 40' to 50' - Use quantities for 47' skew.
   - Over 50' - Calculate quantities required.
   - Culverts should be installed or angle structures where it is feasible.

### Table:

<table>
<thead>
<tr>
<th>CMP</th>
<th>O.t. (SK)</th>
<th>DOUBLE</th>
<th>SINGLE</th>
<th>O.t. (SK)</th>
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</thead>
<tbody>
<tr>
<td>Dia.</td>
<td>Area (in²)</td>
<td>Dia.</td>
<td>Area (in²)</td>
<td>Dia.</td>
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<td>1050</td>
<td>3050.73</td>
<td>20</td>
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<td>1000</td>
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<td>1990.90</td>
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</tr>
<tr>
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<td>3050.73</td>
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<td>3050.73</td>
<td>20</td>
<td>1990.90</td>
<td>20</td>
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</tbody>
</table>

### Diagrams:

- **Plan**: Single CMP
- **Section**: Single CMP 0° Skew, Single CMP 15° to 45° Skew, Double CMP
- **Elevation**: Single CMP 0° Skew, Double CMP 15° to 45° Skew
### General Notes:
1. Concrete shall be Class A or B.
2. Reinforcing steel shall be designated bars with maximum spacing of 400 mm for 60 mm clear of surface of concrete except as noted. Bar ends shall be kept 40 mm clear of surface of concrete. Reinforcing bars may be cut and bent in fields.
3. Footings shown are of minimum depth and shall be extended at soil is unsuitable on either side.
4. Culvert pipes to be set on a skew shall be watered when headwalls are constructed. When headwalls are used constructed the pipes shall not be watered except in overflow section.
5. For estimating headwall quantities on skewed culverts: 45° to 43° use quantities for 0° skew. 43° to 13° use quantities for 45° skew.
6. Over 35°+ calculate quantities required. Culvert should be installed on 3° increments where it is feasible.
7. Dimensions X, Y, L, and H to remain constant regardless of minor variations in wall thickness due to Class of pipe used.

### Quantities Shown Below Are for Two Headwalls.

<table>
<thead>
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<th>RCP Dia.</th>
<th>RCP Dia.</th>
<th>SINGLE RCP</th>
<th>DOUBLE RCP</th>
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<td>545</td>
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</tbody>
</table>

### Quantities Shown Below Are for One Headwall.

<table>
<thead>
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<th>RCP Dia.</th>
<th>SINGLE RCP</th>
<th>DOUBLE RCP</th>
</tr>
</thead>
<tbody>
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<tr>
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</tbody>
</table>

### Diagrams:
- Single RCP
- Double RCP
- Elevation views

### Section:
All dimensions are in millimeters unless otherwise noted.
**Universal Coupling Band for Use on CMP thru 900 mm Inclusive**

**General Notes:**
1. All coupling band connecting hardware shall be galvanized.
2. For pipe arches use same width band as for round pipe of equal periphery.
3. For watertight and spigot joints on alternative annular coupling band, place mastic sealant strip 3 mm thick x 40 mm wide x 125 mm long in lap between bands.
4. For alternative annular coupling band, 2 bar and strap assemblies are required for pipe greater than 1050 mm dia., optional for sizes less than 1050 mm.

**Two Piece Integral Flange Die Formed for Use on 150 mm, 200 mm, and 250 mm HCMP**

**Alternative Annular Coupling Band for HCMP Thru 2100 mm**

**Connection Angle Detail**

**BAR & STRAP DETAIL**

**Detail A**

**Detail B**

**METRIC NDOT**

**State of Nevada Department of Transportation**

**Coupling Band Details CMP and Pipe Arches**

**Diagram:**
- Side View
- Front View
- Top View
- Band Detail
- Dimple Detail
- For Down Drains Install Synthetic Rubber Straps

**Pipe:**
- 13 mm dia carriage bolt with cut washers
- 10 mm dia carriage bolt with cut washers

**Connection Angle Detail:**
- Second angle connection assembly is optional, even if pipe < 600 mm dia. or less, required for pipe greater than 600 mm dia.

**Bar & Strap Detail:**
- Alternative annular coupling band for HCMP thru 2100 mm
- 16 mm thick caly band
- Spot weld loop in strap
- 13 mm x 150 mm calv. bolts

**Universal Coupling Band for Use on 1050 mm thru 1500 mm CMP Inclusive**

**Coupling Band for Helical Weld Seam Only**
## General Notes:

1. All coupling band connection hardware shall be galvanized or electroplated in accordance with standard specifications.
2. Use pipe wrenches to save with band as for regular pipe of equal diameter.
3. Two-piece band is required for pipe greater than 150 mm diameter.
4. Tension strap may be connected to band on site with either butt welds or fillet welds that develop minimum required strength of strap.
5. Use 32 mm gage line dimension on attached angle leg for rivets and spot welds.
6. Band thickness shall not be less than 3 mm standard thickness greater than the thickness of the pipe.
7. Dimensions and thickness shown are minimum.
8. Angle 50 mm long with 16 mm x 50 mm strap.
9. Fillet welds of equivalent strength may be substituted for spot welds or rivets.

## Channel Coupling Band

For use on flanged end CMP.

Channel coupling band shall be two piece.

### Diagram

- **Bolt Sections:**
  - **A-A**

### Nominal Dimensions

- **For use with CMP:**
  - 2.8
  - 2.8 mm thick or heavier
  - 2.8
  - 25.5 mm thick or heavier

### Table

<table>
<thead>
<tr>
<th>Coupling Type</th>
<th>Corrugation</th>
<th>Pipe Size</th>
<th>W or A</th>
<th>Thickness Pipe Wall</th>
<th>Thickness Band</th>
<th>Thickness Strap (Dia)</th>
<th>Bar Yield Strength (ksi)</th>
<th>Dimensions (L</th>
<th>Bolts (Dia) (A)</th>
<th>Rivets Angle to Band</th>
<th>Spots Welds Angle to Band</th>
<th>Thickness Strap</th>
<th>Thickness Wedge</th>
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<tbody>
<tr>
<td>Two Piece Integral Flange</td>
<td>38 x 6.0</td>
<td>150-THRU 250</td>
<td>7.6</td>
<td>1.6 - 2.0</td>
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<td>2.0</td>
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<td>22</td>
<td>220</td>
<td>0.11 x 0.11 x 0.11</td>
<td>3 - 13</td>
<td>3 - 10</td>
<td>3 - 13</td>
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<tr>
<td>Universal</td>
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<td>200-THRU 450</td>
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<td>1.6 - 2.0</td>
<td>1.6</td>
<td>2.0</td>
<td>12</td>
<td>22</td>
<td>220</td>
<td>0.11 x 0.11 x 0.11</td>
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<td>220</td>
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<td>3 - 10</td>
<td>3 - 13</td>
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<td>220</td>
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<td>2.0</td>
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<td>220</td>
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<td>3 - 10</td>
<td>3 - 13</td>
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<td>12</td>
<td>22</td>
<td>220</td>
<td>0.11 x 0.11 x 0.11</td>
<td>3 - 13</td>
<td>3 - 10</td>
<td>3 - 13</td>
<td>5 - 13</td>
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</tbody>
</table>

### See Note:

- See Note 8
NOTES:
1. Hydraulic Section's approval must be obtained prior to incorporation into plans.
2. When no End Section is used, additional riprap shall be as required by the Hydraulic Engineer.
3. For multiple pipe installations, this dimension shall be adjusted according to pipe separation. Information is on drawing R-2.1.1.
GENERAL NOTES:

1. All concrete shall be Class A or AA.
2. Reinforcing bars shall be No. 13 bars with maximum spacing of 450 mm centers. Bars to be embedded a minimum of 50 mm and bar ends must clear concrete surfaces by 40 mm.
3. All exposed concrete edges shall be chamfered 25 mm.
4. Structural steel weight includes the NPS 2 pipe and the 64 mm x 64 mm x 9.5 mm frame angles.
5. NPS = Nominal Pipe Size designator. See ASME A53.
6. Station/Offset distance listed in plans is measured to the center of grate.

<table>
<thead>
<tr>
<th>QUANTITIES</th>
<th>CONCRETE</th>
<th>REINF. STEEL</th>
<th>STRUCT. STEEL</th>
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<tbody>
<tr>
<td></td>
<td>0.27 cu. ft</td>
<td>10 kg</td>
<td>77 kg</td>
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</table>

* For information only
GENERAL NOTES:
1. All concrete shall be class A or AA.
2. Forming of the base will not be required.
3. Station/Offset Distance listed in Plans is measured to curb/floor line.

PLAN VIEW

VIEW C-C

SECTION A-A

SECTION B-B

WEDGE LOCK HOLD DOWN

R-33

75

600

840

EXPANSION JOINT

DEPRESS GUTTER

FLOW LINE OF CURB

EXPANSION JOINT

31 MIN.

6

31 MIN.

150

175

3

40

22

25

3

25 MM DIA. HOLE

COVER

715

640

50

25

300 MIN.

300 MIN.

300 MIN.

400 MIN.

300 MIN.

T - WALL THICKNESS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

DROP INLET
TYPE 10

For information only

METRIC
NDOT

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED

CHIEF ROAD DESIGN ENGINEER: NDOT 7/86
GENERAL NOTES:
1. FOR CAST IN PLACE CONCRETE BASE ALL REINFORCING STEEL TO BE NO. 13 BARS AT 450 mm CENTERS. TIGHTLY WOUND AT ALL INTERSECTIONS AND EMBLEDDLED IN CONCRETE AT LEAST 50 mm AND BAR ENDS MUST CLEAR CONCRETE SURFACES BY 40 mm.
2. ALL CONCRETE SHALL BE CLASS A OR AA.
3. MANHOLE WITH MORE THAN ONE PIPE-INFLOW PIPE INVERT ELEVATIONS SHALL BE ≥ 90 mm ABOVE OUTFLOW PIPE ELEVATION.
4. FOR VALUES OF "h" SEE STORM DRAIN SCHEDULE OR STRUCTURE LIST. "h" IS THE DIFFERENCE IN ELEVATION BETWEEN THE OUTFLOW PIPE INVERT ELEVATION AND THE TOP OF MANHOLE ELEVATION AT STREET GRADING.
5. DO NOT PLACE PIPES IN TAPERED SECTION.
6. MANHOLE COVER SHALL BEAR ENTITY IDENTIFICATION AND SYSTEM FUNCTION (IF APPLICABLE).
7. PRECAST CONCRETE PIPE SECTIONS, TAPERED SECTIONS, 1055 GRADE RINGS, AND STEPS SHALL CONFORM TO AASHTO W-199M (ASTM C-476M).
8. SHAPE FLOWLINE IN MANHOLE TO OUTLET PIPE, AND PROVIDE A 1:10 MINIMUM SLOPE FROM ALL DIRECTIONS TOWARD FLOWLINE.
9. THICKNESS PIPE WALL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
METRIC NDOT
AND TYPE 1 & 2 MODIFIED
MANHOLES

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED

1/1/11
CHIEF ROAD DESIGN ENGINEER
ACCEPTED: 1/9/11
R. J. T. 1
GENERAL NOTES:
1. ALL CONCRETE SHALL BE CLASS A OR CLASS AA.
2. MANHOLES WITH MORE THAN ONE PIPE WITHIN THE INFLOW PIPE INVERT ELEVATIONS SHALL BE GREATER THAN OR EQUAL TO 30 MM ABOVE THE OUTFLOW PIPE INVERT ELEVATION.
3. FOR VALUES OF "h", SEE STORM DRAIN SCHEDULE OR STRUCTURE LIST IN CONTRACT PLAN. "h" IS THE DIFFERENCE IN ELEVATION BETWEEN THE OUTFLOW PIPE INVERT ELEVATION AND THE TOP OF MANHOLE ELEVATION AT STREET GRADE.
4. PRECAST CONCRETE PIPE SECTIONS, TAPERED SECTIONS, LIDS, GRADE RINGS, AND STEPS SHALL CONFORM TO AASHTO M 1294 (ACWF C-470A).
5. MANHOLE COVER SHALL BEAR ENTITY IDENTIFICATION AND SYSTEM FUNCTION (IF APPLICABLE).
6. GRAY FLOWLINE IN MANHOLE TO OUTLET PIPE, AND PROVIDE A 1/10 MINIMUM SLOPE FROM ALL DIRECTIONS TOWARD FLOW LINE.

SECTION A-A
(For Variable Height Situations)

SECTION B-B
(For Minimum Height Situations)

DETAIL "B"
(TOP SLAB REINFORCING)
GENERAL NOTES:
1. THE WEIGHT OF FRAME SHALL BE 65 KG. MINIMUM AND THE WEIGHT OF COVER SHALL BE 55 KG. MINIMUM. TRAFFIC-STRENGTH MANHOLE FRAME & COVER SHALL COMPLY WITH AASHTO M 127, W3-150, W6-150, W9-150, E401-150. MANHOLE FRAMES & COVERS OTHER THAN SHOWN MAY BE USED UPON APPROVAL BY THE ENGINEER.
2. THE FRAME SEAT AND COVER EDGE SHALL BE MACHINED TO A TRUE BEARING SURFACE AT AROUND THE FRAME & COVER Edge SHALL BE COMPATIBLE WITH MANUFACTURER'S SPECIFICATIONS.
3. THE SURFACE SHOWN IS FOR ILLUSTRATION ONLY, ANY SURFACE DESIGN OTHER THAN SMOOTH, MAY BE USED UPON APPROVAL.
4. FRAMES & COVERS SHALL CONFORM TO AASHTO 488, CLASS 275 FOR GRAY IRON CASTINGS.
5. A CAST-IN-PLACE CONCRETE COLLAR SHALL BE PLACED AROUND A MANHOLE FRAME UNLESS OTHERWISE DIRECTED.
6. MANHOLE COVER SHALL BEAR NAME OF ENTITY & SYSTEM FUNCTION (IF APPLICABLE).
7. ALL CONCRETE SHALL BE CLASS A OR AA.
8. CONCRETE COLLARS MAY BE POURED ROUND, OR ANY OTHER APPROPRIATE SHAPE WHEN APPROVED BY THE ENGINEER.
9. COMMERCIAL PREFABRICATED GRADE RINGS FOR MANHOLES SHALL CONFORM TO AASHTO M 1996 (ASTM C-428).
10. MANHOLE COVER & FRAME SHOWN: OTHER SHAPES MAY APPLY TO UTILITY AND VALVE COVERS AND FRAMES.

SECTION B-B
TRAFFIC-STRENGTH MANHOLE FRAME & COVER

SECTION A-A
(SEE NOTE 10.)
TABLE 1-10
Transition Lengths for 1:10 Side Slopes
(For 1:12 See Table 1-12 Sheet R-5.2.2)

<table>
<thead>
<tr>
<th>Grade (F)</th>
<th>&quot;A&quot; to &quot;B&quot; (m)</th>
<th>&quot;A&quot; (m)</th>
<th>&quot;B&quot; (m)</th>
<th>Min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-6 to -5.0</td>
<td>1.22</td>
<td>3.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-5 to -4.0</td>
<td>1.22</td>
<td>3.05</td>
<td></td>
<td></td>
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<td>-4 to -3.0</td>
<td>1.22</td>
<td>2.59</td>
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<td>-3 to -2.0</td>
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<td>2.29</td>
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</tr>
<tr>
<td>-2 to -1.0</td>
<td>1.22</td>
<td>1.98</td>
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<td></td>
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<tr>
<td>-1 to 0</td>
<td>1.68</td>
<td>1.68</td>
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<tr>
<td>0.1 to 1</td>
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<td>1.01 to 2</td>
<td>2.29</td>
<td>1.22</td>
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<td></td>
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<tr>
<td>2.01 to 3</td>
<td>2.59</td>
<td>1.22</td>
<td></td>
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<tr>
<td>3.01 to 4</td>
<td>3.05</td>
<td>1.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.01 to 5</td>
<td>3.81</td>
<td>1.22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GENERAL NOTES:
1. SEE STRUCTURE LIST AND PLAN SHEETS FOR \( \text{A} \) AND \( \text{B} \).
2. GRAVING OR SIMILAR ACCESS ES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDSCAPING.
3. NO UPSTAIRS SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN.
4. PLANT MIX BITUMINOUS OPEN GRADED SURFACE SHALL BE PLACED WITH THE EDGE OF THE CURB RAMP, AND TYPICAL AT 3:12 IN LINE WITH THE CROSSWALK.
5. ROUGH ROAD TEXTURE ON CURB RAMPS AND WINDING TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE SIDEWALK.
6. CURB RAMP WINDS DO NOT HAVE TO BE INSIDE OF THE CROSSWALK.
7. ALL RAMPS SHALL BE AT A 1:12 OR FLATTER.
8. ALL SLOPE RATES ARE RELATIVE TO THE SLOPE.
9. IF THERE ARE NO RESTRICTIONS, SIDEWALK WIDTHS CAN BE REDUCED TO 1.22 m WITH PRIOR APPROVAL FROM ASSISTANT CHIEF ROAD DESIGN ENGINEER. IN THIS INSTANCE A 1.52 m 1.52 m PAVING ZONE IS REQUIRED EVERY 61 m PER ADO Appendix C, Section 4.3.4.
10. CONCRETE SHALL BE CLASS A OR AA.
11. RAISE GUTTER FLOWLINE 50 cm MAXIMUM, SO THAT NO DRAINAGE Pockets WILL EXIST IN THE MIDDLE OF THE RAMPS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
METRO RNDOT

SIEWALKS, CURB RAMPS, CROSS WALK MARKINGS (NEW CONSTRUCTION)
LEGEND:

○ - CROSS WALK

GENERAL NOTES:

1. ALL CURB RAMPS SHALL BE 1% OR FLATTER.
2. SEE PLAN SHEETS FOR W + W = CROSS WALK. MINIMUM WIDTH
   3.0 m.
3. GRATING OR SIMILAR ACCESS SHALL NOT BE LOCATED
   IN AREA AT THE BASE OF THE CURB RAMP OR LANDSCAPING AREA.
4. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE
   TO GUTTER PAN.
5. PLANTMIX ITINERANT OPEN- GRADED SURFACE SHALL BE
   FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA
   OF THE CURB RAMP.
6. ROUGH SURFACE TEXTURE ON CURB RAMPS AND WALKS.
   TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE
   MEDIAN ISLAND.
7. CONCRETE SHALL BE CLASS A OR AA.
8. AVOID DRAINAGE DITCHES IN CROSS WALK AREAS.
GENERAL NOTES:
1. ALL RESIDENTIAL PROPERTIES MAY HAVE ONLY ONE CURB CUT EXCEPT CIRCULAR DRIVEWAYS AS SHOWN.
2. NO DRIVEWAY SHALL BE LOCATED WHOLLY OR PARTIALLY, ON OR OVER A Utility EASEMENT WHICH RUNS PERPENDICULAR TO THE CURB LINE.
3. NO DRIVEWAY SHALL BE LOCATED WITHIN 1.8 m OF A LIGHT POLE, FIRE HYDRANT, MAIL BOX, ABOVE-GROUND ELECTRICAL TRANSFER BOX, BLOCK WALL HIGHER THAN 0.6 m, OR THE CURB RETURN AT A STREET INTERSECTION OR ALLEY.
4. COMMON DRIVEWAY CONSTRUCTION MAY BE PERMITTED AT ANY TWO RESIDENTIAL PROPERTIES OF 18 m IN WIDTH OR LESS. THE WIDTH OF THE JOINT DRIVEWAY SHALL NOT EXCEED A MAXIMUM OF 7.2 m.
5. MULTI-FAMILY RESIDENTIAL AND ALL NON-RESIDENTIAL DRIVEWAYS SHALL CONFORM TO THE COMMERCIAL DRIVEWAY STANDARDS.
6. ALL DRIVEWAY LOCATIONS SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER.
7. FOR CURB RAMPS AND DRIVEWAY APRON DETAIL, SEE STD. DWGS. NO. R-5.2.1 TO R-5.2.2 AND R-5.3.2.
8. DRIVEWAY SPACING, CLEARANCES, AND RETURN RADIUS SHALL BE IN ACCORDANCE WITH THE DEPARTMENT'S ACCESS MANAGEMENT STANDARDS.

RESIDENTIAL DRIVEWAY GEOMETRICS

INDUSTRIAL, COMMERCIAL, AND MULTI-FAMILY DRIVEWAY GEOMETRICS
GENERAL NOTES:

1. SPACING OF NO. 13 BARS LESS THAN 450 mm TO MEET LOCAL CODES SHALL BE NOTED IN THE STRUCTURE LIST.
2. WHEN CONSTRUCTING DRIVEWAYS WHERE CURB AND GUTTER EXISTS, COMPLETELY REMOVE EXISTING SECTIONS DRIVEWAY MAY BE POURED MONOLITHIC TO A.C. LINE, IN WHICH CASE THE BARS SHALL BE CONTINUOUS. IF OPTIONAL SECTIONAL POUR IS USED, EXPANSION JOINTS AND REDR LND CLEARANCE SHALL APPLY AS SHOWN.
3. CONCRETE SHALL BE CLASS A OR AA.
4. CURB RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DRAWINGS R-5.2.1 TO R-5.2.2 AND R-5.3.1.
5. FOR GRADE CHANGES GREATER THAN 3%, VERTICAL CURVES AT LEAST 3.0 m MUST BE USED.
6. DRIVEWAY GEOMETRICS SHALL GO TO THE P.C.
7. FOR ACTUAL DIMENSIONS SEE STRUCTURE LIST.
8. SEE TABLE R-12, ON DRAINAGE R-5.2.2, FOR "A" AND "B".
9. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.
GENERAL NOTES:
1. MINIMUM 900 mm COVER OVER TOP OF CONDUIT AT SHOULDER LINE.
2. 2.6 mm BARE COPPER DETECTION WIRE TO LAY IN TRENCH ADJACENT TO CONDUIT AND ATTACH TO LOCATION MARKER AT EACH END.
3. LOCATION MARKER SHALL BE 50 mm P.V.C. OR 1.5 m STEEL FENCE POSTS.
GENERAL NOTES:
1. STRESS PANELS SHALL BE PLACED EVERY 400 m ON TANGENTS.
2. STRESS PANELS SHALL BE PLACED EVERY 200 m ON CURVES.
3. END PANELS SHALL BE USED WHEREVER A BREAK IN THE FENCE OCCURS.
   I.E. GATES, CATTLE GARDS AND AT THE BEGINNING AND ENDING OF ALL CURVES.
4. SEE TABLE A FOR WOOD POST SPACING ON CURVES.
5. BARBED WIRE SHALL BE USED FOR BOTTOM STRAND WHEN REQUIRED
   BY N.D. DEPT. OF WILDLIFE OR BUREAU OF LAND MANAGEMENT.
6. WIRES ARE TO BE TIED OFF AT STRETCH POINTS. HANG AND SPACE TO SELF
   WITH AT LEAST 4 TURN ON OPPOSITE END OF PANELS.
7. WOOD POSTS SHALL BE 155 mm HIGH VERTICAL CENTER.
8. ADDITIONAL STRAND OF BARBED WIRE AND/OR A ROCK BEACON (MAX. 40 WIRE)
   WHEN SPACE BETWEEN BOTTOM WIRE AND GROUND EXCEEDS 500 mm
9. STEEL POST BEACON DRIVER APPROXIMATELY 1 m INTO GROUND MAY BE USED
   IN LIEU OF ROCK BEACON.

---

TABLE A: WOOD POST SPACING ON CURVED FENCE LINES

<table>
<thead>
<tr>
<th>Radius of Curve</th>
<th>Post Style</th>
<th>Post Spacing (m)</th>
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<tr>
<td>R &lt;= 300</td>
<td>3.1</td>
<td>5</td>
</tr>
<tr>
<td>300 to 749.9</td>
<td>4.1</td>
<td>7</td>
</tr>
<tr>
<td>750 to 1500.9</td>
<td>7.1</td>
<td>10</td>
</tr>
<tr>
<td>1500 to 3000</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>&gt; 3000</td>
<td>15</td>
<td>TREAT CURVE AS TANGENT</td>
</tr>
</tbody>
</table>

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METRIC NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NEVADA 4-WIRE FENCE PANEL DETAILS

(TYPE C-NV-4B)

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STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

REVISED 8/98

4-POST CORNER PANEL

5-POST CORNER PANEL
GENERAL NOTES:
1. HINGE POST SHALL BE 2.4 m IN LENGTH AND SHALL BE BURIED 1 m IN GROUND.
2. BARRIED WIRE SHALL BE USED FOR BOTTOM STRAND WHEN REQUIRED.
3. WIRE STANDS TO BE TIED OFF AT STRETCH POINTS AND SPLICED TO THE WIRE AT LEAST 4 TIMES AT OPPOSITE END OF PANEL.
4. HINGE POST SHALL BE 150 mm MINIMUM DIAMETER.
5. ADDITIONAL STANDAB WIRE AND/OR A ROCK PROPPED IN THE END OF PANEL.
6. WHEN SPACE BETWEEN BOTTOM WIRE AND GROUND EXCEEDS 500 mm, A STEEL POST DECKED UP TO 2.5 m INTO GROUND MAY BE USED IN LIEU OF ROCK PROPPED.
7. STEEL LINE POSTS AT 3.5 m SPACING TO MAINTAIN BOTTOM WIRE CLEARANCE.
SINGLE METAL DRIVE GATES 150x200 Post

MISSOURI GATE

GENERAL NOTES:
1. STANDARD GATES, CHAIN LINK GATES, AND WALK GATES SHALL BE CONSTRUCTED AS SPECIFIED IN THE STANDARD SPECIFICATIONS.
2. BRACED photo AND BRACES SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.
3. LUMBER USED IN THE CONSTRUCTION OF TIMBER GATES SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.
4. CONCRETE SHALL BE CLASS A OR AA.

METAL DRIVE GATE IN TIMBER FENCE

DETAIL "C"
UP TO 1.83 m CHAIN LINK FENCE

CHAIN LINK FABRIC
3.1 mm - 0.9 mm Hapax Twist Top & KRAUCK Bottom Settlers

HOG RINGS
(600 mm Max. Spacing)

RAIL CONNECTION AT CORNER POSTS

BRACE RAIL
LINE POST
TYPE II TERMINAL POST

GENERAL NOTES:
1. FENCE POSTS AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF STANDARD Specifications AND SUPPLEMENT.
2. CHAIN LINK FENCING SHALL CONSIST OF CHAIN LINK FENCING ON STEEL POSTS (TUBULAR OR CYLINDRICAL).
3. ALL POSTS SHALL BE SET IN GRADE AND CONCRETE.
4. BRACE RAILS, 1.56 M (60 INCH) APART, SHALL BE ATTACHED TO POSTS AT 1.2 M (48 INCH) HEIGHT.
5. ALL FITTINGS SHALL BE BURLED IN BURIAL VALLEYS, FACING CONCRETE, OR SMALL CONCRETE.
6. ALL FITTINGS SHALL BE BURLED IN BURIAL WELDING WELDS AND BURIED RAILS WITH 600MM SPACING.
7. FOR URBAN POST AND BRACE RAIL DETAILS, SEE SHEET NO. R-6.5.1.
**Section A-A**

- **WIRE LUGS 6 X 200MM ST/ST**
- **FULL LENGTH OF POST TYP**
- **13 mm DIA. + 76 mm BOLTS TYP**
- **13 mm DIA. + 97 mm BOLTS TYP**
- **50 mm x 50 mm x 2175 mm TYP**
- **3.5 mm TUBING END SECTION TYP**
- **50 mm x 50 mm x 100 mm STEEL STRIP**
- **6.4 mm x 100 mm x 2350 mm FLAT CROSSARM (TYPE)**

**Section B-B**

- **50 mm x 50 mm x 1000 mm TUBING**
- **75 mm x 75 mm RAL**
- **50 mm x 7.8 mm**
- **20 mm DIA. + 265 mm PLATE CLIP (TYP)**
- **ANCHOR BOLT**
- **4 PER EACH SIDE**

**Details C & D**

- **8.4 mm x 100 mm x 2350 mm STRAPS ON 1200 mm CTPS**
- **16 mm DIA. x 25 mm**
- **SLOTTED HOLES IN 2504 x 17.1**

**Detail H**

- **16 mm DIA. Holes in 44 mm x 4.8 mm FLAT CROSSARM**
- **16 mm DIA. Holes with 44 mm DIA. x 97 mm BOLTS TYP**
- **50 mm x 50 mm x 3.5 mm TUBING**
- **6 mm DIA. WIRE LUG TYP**

**Detail A**

- **16 mm SLOTTED HOLES IN 44 mm x 4.8 mm FLAT CROSSARM**
- **16 mm DIA. Holes with 13 mm DIA. x 127 mm BOLTS TYP**
- **75 mm x 75 mm x 2175 mm POST**

**Detail I**

- **75 mm x 75 mm x 4.8 mm TUBING BASE WELDED TO 2504 x 26.6 BEAM AS SHOWN (SEE DETAIL I)**

**Plan View**

- **16 mm SLOTTED HOLES IN 44 mm x 4.8 mm FLAT CROSSARM**
- **16 mm DIA. Holes with 13 mm DIA. x 127 mm BOLTS TYP**
- **75 mm x 75 mm x 2175 mm POST**

**Notes**

- **THIS DESIGN IS NOT FOR USE ON MAINLINES, RAMPS, OR CROSSROADS**

**General Notes**

1. **ALL CONCRETE SHALL BE CURED AS PER ADEQUATES SPECIFICATIONS**
2. **DESIGN LOADING CAPACITY MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL IN PLACE OF A 75 mm x 75 mm x 4.8 mm TUBING**
3. **DRYING SMOOTHLY**
4. **STEEL STRIP**

**Detail G**

- **6.4 mm x 200 mm x 2390 mm**

**Material List**

- **METRIC NDOT STEEL CATTLE GUARD (TYPE B)**

**Bill of Materials**

- **FRAME SIZE**
- **LENGTH (ft)**
- **WIDTH (in)**
- **THICKNESS (in)**
- **WEIGHT (lbs)**

**Structural Steel**

- **STREET**
- **UNIT**
- **NO. OF PCS**
- **DESCRIPTION**
- **WEIGHT (lbs)**

**Material List for All Sizes**

- **STREET**
- **UNIT**
- **NO. OF PCS**
- **DESCRIPTION**
- **WEIGHT (lbs)**

**Material List for Welding**

- **STREET**
- **UNIT**
- **NO. OF PCS**
- **DESCRIPTION**
- **WEIGHT (lbs)**

**Note**

- **ALL MATERIAL LISTS ARE FOR INFORMATION ONLY**

**State of Nevada Department of Transportation**

**Steel Cattle Guard (Type B)**

**Metric NDOT**
GENERAL NOTES
1. FOR END TREATMENTS NOT SHOWN, REFER TO MANUFACTURER'S DRAWINGS.
2. THESE AREAS MAY REQUIRE PAVING IF SHOULDERS, DIKES AND/OR DRAIN DRAINS ARE USED.
3. SEE STANDARD DRAWING R-8.2.2 FOR DETAILS NOT SHOWN.
4. GALVANIZED GUARDRAIL (TRIPLE CORRUGATIONS) SEE STANDARD DRAWING R-84.1.
5. CRASH CUSHION OR TANGENT END TREATMENT (BI-DIRECTIONAL) CAN BE FLARED AT 1150 TAPER.
6. RECOVERABLE SLOPES REQUIRED BEHIND GATING PORTION OF END TREATMENT OR CRASH CUSHION.
7. ON RETROFIT INSTALLATIONS WHEN DISTANCE BETWEEN BACK OF POST AND HINGE POINT IS LESS THAN 0.6 M, THE POST SHALL BE LENGTHENED 0.3 M MIN.
8. GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE GOVERNED BY FINAL SURFACING HEIGHT.
9. REFERENCE: AASHO ROADSIDE DESIGN GUIDE, 1996 EDITION.
10. CLEAR ZONE SHOULD BE BASED ON 20 YEAR TRAFFIC DESIGN.
11. RECOVERABLE SLOPES ARE 1:4 OR FLATTER.
12. APPROACH GUARDRAIL TERMINALS SHALL BE "NHCRP 350", FHWA, AND NEVADA DOT APPROVED.

LEGEND
- PAVED AREAS

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION
TYPICAL GUARDRAIL INSTALLATION
METHOD A
GUARDRAIL TERMINAL (TANGENTIAL)

TABLE 1

<table>
<thead>
<tr>
<th>Method</th>
<th>Terminal Ends</th>
<th>W (Flare)</th>
<th>X (Widening)</th>
<th>Y (Sky)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>390 mm</td>
<td>2.22 m</td>
<td>0.6 m</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>390 mm</td>
<td>1.61 m to</td>
<td>0 to 0.2 m</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>390 mm to</td>
<td>2.22 m to</td>
<td>0.6 m</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>390 mm to</td>
<td>2.22 m to</td>
<td>0.6 m</td>
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</tr>
<tr>
<td></td>
<td>1500 mm</td>
<td>3.03 m</td>
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</tr>
</tbody>
</table>

GENERAL NOTES:
1. For typical guardrail installation, see R-8.1.1.
2. For details not shown, including heights of posts for soil tube installation on posts (1) and (2), see manufacturer's drawings.
3. Approach and trailing end guardrail terminals shall be "NCHRP Report 350" Test Level 3 (TL-3), FHWA, and Nevada DOT approved.
4. "R" is to the center of post, excluding Posts (1) and (2). Use Table 1 for breakaway posts with blocks, excluding Posts (1) and (2).
W-BEAM INSTALLATION

NOTES
1. TO BE USED ONLY WITH SPECIAL GUARDRAIL INSTALLATION.
   SEE STANDARD PLAN SHEET R-81.3.
2. OUTSIDE NUT SHALL BE TIGHTENED AGAINST INSIDE
   NUT A MINIMUM OF 136 N.m.
3. ENSURE PLATE AT CORNERS WITH 12D NAILS.
4. SEE STANDARD PLAN SHEET R-81.3 FOR DETAILS.
   NOT SHOWN.

ANCHOR TERMINAL - ELEVATION

ANCHOR PLATE - ELEVATION

ANCHOR CABLE

ANCHOR POST ASSEMBLY

THREE BEAM INSTALLATION

THREE BEAM GUARDRAIL

END SECTION (THREE BEAM) (SEE NOTE 1)

ANCHOR RAIL WASHER
(45 x 75)
4.27 mm THICKNESS

END SECTION

ANCHOR TERMINAL PAY LIMIT

THREE BEAM INSTALLATION

ANCHOR PLATE

ANCHOR TERMINAL PAY LIMIT

ANCHOR RAIL WASHER
(45 x 75)
4.27 mm THICKNESS

END SECTION

THREE BEAM INSTALLATION

ANCHOR POST ASSEMBLY

END SECTION
GENERAL NOTES:
2. A "NCHRP 350", FHWA, and Nevada DOT approved guardrail terminal should be used if the one way facility is to be used as a two way detour. The terminal should be left in place once the detour is removed.
3. For details of triple corrugated guardrail see Standard Plan Drawing R-8.4.1
5. If guardrail system is not satisfactory, use concrete barrier rail. 
   Check for vehicle rollangle (top of taller vehicles hitting the obstructions).
6. Spacer material may be "I" beam, wood block or formed structural tubing by prior approval of the Engineer. For details of a spacer block see Standard Plan Drawing R-6.4.1. Spacing distance can be adjusted upward to fit the spacer block.
GENERAL NOTES:
1. THESE DETAILS ARE TO BE USED ONLY WHEN GUARDRAIL POST CANNOT BE INSTALLED TO AVOID UNDERGROUND OBSTRUCTIONS WITH GUARDRAIL POSTS.
2. SEE SHEET R-8.4.1 FOR DETAILS ON GALVANIZED GUARDRAIL (TRIPLE CORRUGATIONS) NOT SHOWN.
3. GUARDRAIL LENGTHS OF NEED SHALL BE BASED ON DESIGN YEAR TRAFFIC VOLUMES. SEE ASHTEO ROADSIDE DESIGN GUIDE FOR DETAILS.
4. CHECK FEASIBILITY OF REMOVING HAZARD OR EXTENDING CULVERT OUTSIDE CLEAR ZONE VISUS COST OF GUARDRAIL.
5. IF THE GUARDRAIL SPICE OCCURS ON THE POSTS WHERE THE GUARDRAIL POSTS THEN THREE CORRUGATIONS LONG ARE REQUIRED, WITH THE MIDDLE SECTION BEING CENTERED AT THE LOCATION OF THE MISSING POST.
**Blockout change: Add 8.5 lb/ft Post W150 x 13**

**GENERAL NOTES:**
1. Wood spacer blocks (of the proper dimensions) may be substituted for the detailed steel blocks.
2. NPS = Nominal Pipe Size designator. See ASTM A 53.

**SPACER BLOCKABLE**

<table>
<thead>
<tr>
<th>SPACER BLOCK</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<tr>
<td></td>
<td>105</td>
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<td>90</td>
<td>30</td>
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<tr>
<td></td>
<td>55</td>
<td>20</td>
<td>20</td>
<td>55</td>
</tr>
</tbody>
</table>

**DETAIL "C"**

**PLAN**

- **W150 x 13.5 Post**

  - Blockout M360 X 25.6
  - w/o Notch

**ELEVATION**

- **Galvanized Guardrail (Triple Corrugation)**

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

**ISOMETRIC**

**SIDE VIEW**

- **No. 13 Rebar (Typ.)**
  - See Sheet R-8.6.1 For Details

- **Neutral Axis**
  - 6.4 mm Steel

**spacer blocks 2 and 3 detail**

**DETAIL "A"**

**DETAIL "B"**

- **50 mm**

**METHOD OF TOPLING BARRIER RAIL FOR GUARDRAIL CONNECTIONS**

**GUARDRAIL-BARRIER RAIL CONNECTION (TRIPLE CORRUGATION)**

**METRIC NDOT**

- **STATE OF NEVADA**

- **DEPARTMENT OF TRANSPORTATION**

- **ALL DIMENSIONS ARE IN METERS**

- **UNLESS OTHERWISE NOTED**

- **R-8.6.1**

- **ADAPTED 9/98**
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR AA.
2. MEDIAN BARRIER RAIL SHALL BE SCORED 5mm DEEP VERTICALLY EVERY 4.5 m.
3. ALL CONTACT JOINTS SHALL BE AT PLANNED RECEIVED JOINT LOCATIONS.
4. ALL JOINTS AND OTHER LOCATIONS NEEDING SEALING SHALL FOLLOW REQUIREMENTS SET IN DRAWING R-8.6.1.
5. FOR IMPACT ATTENUATOR ATTACHMENT DETAILS, SEE MANUFACTURER'S DRAWINGS. MEDIAN END TREATMENTS SHALL BE BI-DIRECTIONAL.
6. REFER TO THE 1996 ROADSIDE DESIGN GUIDE FOR FURTHER DESIGN INFORMATION NOT SHOWN HERE.
7. EXPANSION JOINTS AT ALL STRUCTURES. JOINTS IN BARRIER RAIL OVER A STRUCTURE SHALL BE AT THE SAME LOCATION AND OF THE SAME DIMENSIONS AS THOSE IN THE STRUCTURE. JOINT FILLER NOT REQUIRED IN EXPANSION JOINT IN BARRIER RAIL.
8. SEE CONTRACT PLANS FOR EXACT DIMENSIONS.
9. THESE 1070 mm BARRIER RAILS ARE CONSIDERED INNOVATIVE.
10. DEPTH OF 150 mm BASE SHALL BE CHECKED AND INCREASED AS NECESSARY FOR FOUNDATION STABILITY. WHEN BARRIER RAIL SITS ON PAVEMENT, THE BASE CAN BE ELIMINATED. BARRIER RAIL END ANCHORS SHALL BE REQUIRED. SEE DRAWING R-8.6.1.
11. THE 1070 mm TYPE FA BARRIER RAIL MAY ALSO BE CONSIDERED ON THE OUTSIDE CURVES NEXT TO SENSITIVE AREAS SUCH AS SCHOOLS, HOUSING DEVELOPMENTS, AND PROBLEM AREAS THAT NEED EXTRA PROTECTION.
12. FOR DETAILS NOT SHOWN SEE TYPE FA.
13. NTS = NOT TO SCALE.
14. Varies = 2/18 x H = 305
15. FOR TRANSITIONS FOR HEIGHTS, SEE STANDARD PLAN SHEET R-8.6.3.
General Notes:

1. CONCRETE SHALL BE CLASS A OR AA.

2. THE HEIGHT OF THE BARRIER RAIL SHALL BE MEASURED FROM THE TOP OF THE PLANT MIX/INHOMOGENOUS SURFACE OR THE TOP OF CONCRETE PAVEMENT.

3. RUSHED CONTACT FACE OF EXISTING RAIL TO 6 mm RELIEF PRIOR TO POURING NEW RAIL TRANSITION.

4. AT THE INDICATED REINFORCING LOCATIONS, DRILL 19 mm HOLES IN CONTACT FAINT OF EXISTING RAIL TO A MINIMUM DEPTH OF 500 mm AND INSTALL 3 DEGREES FROM THE HORIZONTAL SECURE #:3 REINFORCING BARS IN THE DRILLED HOLES WITH AN ENSURING CONFORMING TO SECTION 7.2 OF THE STANDARD SPECIFICATIONS.

5. PLACE STRIGHT AND OR BENT #:3 REINFORCING BARS IN RAIL TRANSITIONS AS INDICATED. SPANS IN REINFORCING STEEL AT TRANSITION ENDS ARE PERMITTED MINIMUM 500 mm LAP LENGTH.

6. FOR DETAILS NOT SHOWN, SEE R-9.6.1 TO R-9.6.2.

SECTION A-A (EXISTING TYPE A)

SECTION B-B

SECTION C-C (TYPE FA)
General Notes:
1. Concrete shall be Class A or AA.
2. The height of the barrier rail shall be measured from the top of the plane of bituminous surface on the top of concrete pavement.
3. Roughen contact face of existing rail to 6 mm relief prior to pouring new rail transition.
4. At the indicated reinforcing locations, drill 10 mm holes in contact face of existing rail to a minimum depth of 300 mm. 300 mm rebar is required. 
5. Place straight end/or bent #13 reinforcing bars in rail transitions as indicated, splice in reinforcing steel at transitions (bars are permitted minimum 300 mm lap length).
6. For details not shown see R-6.11 to R-6.22.
TYPICAL F SHAPE

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

FORGED OPTION

ELEVATION VIEW o RODS

GENERAL NOTES:

1. Reinforcing steel shall be Grade 425.

2. Hot-dip galvanized after fabrication.

3. Washer shall be 0.50 mm (Typ.) from vertical.

4. For dimensions not shown, see TYPICAL F SHAPE.

5. 15 mm Dia. loop bar shown partially in place.

6. Use "BARRIER ROD DETAIL" for both Section C-C and Section D-D.

7. 50 mm  x 3 mm stirrup bars.

8. Stirrup bars at 2400 mm (Typ.) spacing.

9. NPS 9/4 holes for 25 mm rod.

10. Measurement of BARRIER ROD DETAIL.

11. Rectangular pockets may be used in lieu of conical pockets.

12. Drilling 25 mm diameter holes, after placement of rail, for barrier rods through the pavement. Drilling operation is not to damage the pavement.

13. When used as a permanent installation, all sections shall be pinned, except in medians wider than 3.0 m.
PORTABLE PRECAST BARRIER RAIL "F"-SHAPES

GENERAL NOTES:
1. Straight holes 40 mm in diameter of the depth shown may be used in lieu of the tapered holes.
2. Rein caps sole-type anchorage devices may be substituted for threaded rods.
3. Place screen on work area side of temporary railing where traffic will only be on one side of the temporary railing. The screen may be placed on either side of the pipe support where traffic will be on both sides of the temporary railing.
4. Clinched box or may be substituted for screws. The nails should be clinched on the work area side of the screen where traffic will only be on one side of the temporary railing.
5. 6 mm u-bolts may be substituted for 6 mm diameter bolts.
6. Openings in the screen area of 1 m should be provided at 60 m intervals.
7. NPS = Nominal Pipe Size.

SCREEN ANCHORAGE DETAILS

ANCHOR PLATE DETAIL (ALTERNATIVE "A")
GENERAL NOTES:

1. ALL REFLECTORS SHALL BE SELECTED & INSTALLED PURSUANT TO
   THE PROJECT PLANS & SPECIFICATIONS OR AT THE DIRECTION OF
   THE ENGINEER. THE DEPICTED REFLECTORS ARE FOR MOUNTING
   LOCATION INFORMATION ONLY.

2. SPACING: SEE "RELECTOR PLACEMENT ON GUARDRAIL" NOTES AND
   TABLE "A", OF THIS SHEET.

3. REFLECTORS SHALL BE MOUNTED AT THE ANGLE SPECIFIED BY THE
   MANUFACTURER OR AS DIRECTED BY THE ENGINEER.

4. COLOR: SHALL COMPLY WITH THE GUIDELINES ESTABLISHED
   BY THE M.U.T.C.O.D., 1988 EDITION AND REVISIONS THEREO.

REFLECTOR PLACEMENT SPACING ON GUARDRAIL/BARRIER RAIL

SPACING SHALL BE:

(a) 15 Meter on Tangents and on Curves of 90 Meter
    Radius or Greater. If less than 90 Meter Radius
    See Table "A".

(b) Reflectors shall be omitted on the flared sections
    of Guardrail.

(c) No direct payment for reflectors on barrier rail.

<table>
<thead>
<tr>
<th>Radius of Curve</th>
<th>Reflector</th>
<th>Spacing</th>
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<tbody>
<tr>
<td>5</td>
<td>15</td>
<td>6 m</td>
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<tr>
<td>45</td>
<td>5 m</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>11 m</td>
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<tr>
<td>75</td>
<td>12 m</td>
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<tr>
<td>90</td>
<td>15 m</td>
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</tr>
</tbody>
</table>

GUARDRAIL-GUIDE POST INSTALLATION

FOR DETAILS NOT SHOWN SEE SHEET R-9.1.1

NORMAL EDGE OF PAVEMENT

0.9 m

2.06 m

0.6 m

TYPICAL GUARDRAIL-GUIDE POST

CONTRACT MAY SPECIFY EITHER FLEXIBLE OR RIGID POST

STATE OF SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

REFLECTORS
GUARDRAIL-GUIDE POST

150 mm MIN.
TYP.

ACCEPTABLE RANGE FOR
GUIDEPPOST PLACEMENT

FACE OF GUARDRAIL

GUARDRAIL-GUIDE POST LOCATION

TRAFFIC

METRIC
NDAR

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED.

NDOT

R-36
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR AA.
2. MONUMENTS SHALL BE SET TO ASSIST IN REESTABLISHMENT OF THE CENTERLINE FOR FUTURE USE AND SHALL BE SET AT THE BEGINNING AND END OF EACH PROJECT, AT BEGINNING AND END OF EACH CURVE, AT ALL ANGLE POINTS, AND APPROXIMATELY 800 METERS APART ON LONG TANGENTS.
3. MONUMENTS MAY BE POURED SQUARE OR ROUND
4. MONUMENT STAMPING SHALL INCLUDE DESCRIPTION, ANGLE AND OFFSET.
GENERAL NOTES:
1. All weakened plane joints shall be sawn diagonally as shown, except as indicated in the end anchor and staggered approach details. When only one lane is being constructed alongside existing lanes, joints shall be sawn either diagonally or as directed by the engineer offset is 1 ft. 5 in. and shown counterclockwise.
2. Spacing of weakened plane joints shall be successive 4.5, 5.5, 6.5, 7.5, 8.5, 9.5, and 10.5 m and repeat, except for the first joint at pavement end anchor and at reinforced structure approaches.
3. Transverse contact joints shall be constructed at least 1 ft. from any transverse weakened plane joint.
4. Longitudinal weakened plane joints shall be cut at all lane and shoulder lanes except where lane plus adjacent shoulder width is less than or equal to 4.5 m.
5. All transverse contact joints shall be sawn and joint sealed per respective transverse contact joint detail this sheet.
6. All tie bars to be epoxy coated except in Clark Co., tie bars to be placed in middle 1/3 of slab thickness.
7. Transverse contact joints with dowel bars shall be used at all construction joints and elsewhere if ordered by the engineer.
8. Pavement end anchors shall be constructed as the terminal panels of all pavement not abutting existing concrete pavements or structures, and ordered by the engineer.
9. Dowel bars shall be placed within 25 mm of the planned transverse and depth location and within 50 mm of the planned longitudinal location.
10. The dowel bars shall be parallel to the pavement surface and centerline within a tolerance of 13 mm in 400 mm.
11. Dowel bars shall not be placed within 300 mm of longitudinal joints.
12. D = slab thickness.
WEAKENED PLANE JOINTS LOCATION
(DOWELED PAVEMENT ONLY)

(Warning strips shall not be used in urban areas)
For details not shown See Standard Plan Drawing R-10.1.2

GENERAL NOTES CONCRETE:
1. Shoulder transverse joints shall be the same pattern as main roadway.
2. See typical section for width of shoulder and longitudinal weakened plane joint location.
GENERAL NOTES:

1. Rumble strips shall be used on all outside shoulders that are 1.2 m. wide or wider on both rural and rural divided highways. Rumble strips shall be used on all the inside shoulders of rural divided highways with shoulder width of 600 mm or more.

2. Rumble strips will not be placed in urban locations, nor on ramp shoulders, bridges, or bridge approach slabs, unless specifically designated in the plans.

3. Rumble strips may be continuous through all minor approaches, but shall be omitted across principal intersecting roadways.

4. Rumble strips can be placed on existing rolled in rumble strips if present.

5. For ramps and structures, see standard plan sheet R-10.1.5.

6. On concrete pavements, due to transverse joints, rumble strips will require a special detail.

LEGEND:

- PLANTMIX BITUMINOUS SURFACE

SHOULDER SECTION

RUMBLE STRIP DETAIL

RUMBLE STRIP CORRUGATIONS

SECTION A-A

TYPICAL RUMBLE STRIP PLACEMENT
GENERAL NOTES:
1. RUMBLE STRIPS SHALL BE USED ON ALL OUTSIDE SHOULDERS THAT ARE 1.2 m WIDE OR WIDER ON BOTH RURAL AND RURAL DIVIDED HIGHWAYS. RUMBLE STRIPS SHALL BE USED ON ALL THE INSIDE SHOULDERS OF RURAL DIVIDED HIGHWAYS WITH SHOULDER WIDTH OF 600 mm OR MORE.
2. RUMBLE STRIPS WILL NOT BE PLACED IN URBAN AREAS, NOR ON RAMP SHOULDERS, BRIDGES, OR BRIDGE APPROACH SLABS, UNLESS SPECIFICALLY DESIGNATED IN THE PLANS.
3. RUMBLE STRIPS MAY BE CONTINUOUS THROUGH ALL MINOR APPROACHES, BUT SHALL BE OMITTED ACROSS PRINCIPAL INTERSECTING ROADS.
4. RUMBLE STRIPS CAN BE PLACED ON EXISTING ROLLED RUMBLE STRIPS IF PRESENT.
5. FOR RURAL NON-FREeways HIGHWAYS, SEE STANDARD PLAN SHEET R-10.14.
6. ON CONCRETE PAVEMENT, DUE TO TRANSVERSE JOINTS, RUMBLE STRIPS WILL REQUIRE A SPECIAL DETAIL.

LEGEND:
- PLANTMIX BITUMINOUS SURFACE

RUMBLE STRIP CORRUGATIONS
SECTION A-A

DIVIDED HIGHWAY LAYOUT AT BRIDGE STRUCTURE
* IF NO APPROACH SLAB THEN 1000 mm FROM BACK FACE OF STRUCTURE

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
RUMBLE STRIPS
RAMP/STRUCTURES

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

METRIC
NDOT

R-500 (MAXIMUM)
135
175
13 MINIMUM TO 10 MAXIMUM

DRAWN: DRAFTED: REVIEWED: ADOPTED:
MAILBOX TURNOUT

SUGGESTED GUIDELINES FOR LATERAL PLACEMENT OF MAILBOXES

<table>
<thead>
<tr>
<th>HIGHWAY TYPE AND TRAFFIC CONDITIONS</th>
<th>WIDTH (m) OF ALL-WEATHER SURFACE OF TURNOUT OR AVAILABLE SHOULDER AT MAILBOX</th>
<th>DISTANCE (m) ROADSIDE FACE OF MAILBOX TO BE OFFSET BEHIND EDGE OF TURNOUT OR AVAILABLE SHOULDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL HIGHWAY</td>
<td>Preferred (m)</td>
<td>Minimum (m)</td>
</tr>
<tr>
<td>ADT= OVER 10000 vpd</td>
<td>3.6</td>
<td>3.0</td>
</tr>
<tr>
<td>ADT= 1,500 TO 10,000 vpd</td>
<td>3.6</td>
<td>2.4</td>
</tr>
<tr>
<td>ADT= 100 TO 1,500 vpd</td>
<td>3.0</td>
<td>2.4</td>
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<tr>
<td>RURAL ROAD</td>
<td></td>
<td></td>
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<tr>
<td>ADT= UNDER 100 vpd</td>
<td>2.4</td>
<td>1.8</td>
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<tr>
<td>NON-RESIDENTIAL STREET</td>
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<tr>
<td>CURVED</td>
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</table>

**GENERAL NOTES:**

2. Mailboxes within the clear zone shall be the types shown in sheets R-12.1.2 and R-12.1.3 or an approved equal.
3. ADT = Average Daily Traffic, vpd = Vehicles per Day
4. For mailbox spacing and variable length see sheets sheets R-12.1.2 and R-12.1.3.
GENERAL NOTES:

1. FOR FURTHER INFORMATION ON MAILBOXES SEE AASHTO "A GUIDE FOR ERECTING MAIL BOXES ON HIGHWAYS", 1994 EDITION.

2. INSTALLATION OF TYPE C MAILBOX ASSEMBLIES SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

3. THE DIRECTION OF THE MAILBOX OPENING IN RELATION TO THE TRAVEL LINES SHALL OR SET BY THE UNITED STATES POSTAL SERVICE.

4. 75 mm x 200 mm white reflective sheeting shall be placed facing traffic from ground on all mailbox support structures.

5. LIGHTWEIGHT NEWSPAPER BOXES MAY BE MOUNTED BELOW THE MAILBOX ON THE MAILBOX SUPPORT.

6. HEAVY GAUGE STEEL MAILBOXES (55 Ib) ARE NOT ALLOWED ON HIGH-SPEED HIGHWAYS.
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<td><img src="image" alt="Symbol" /></td>
<td><img src="image" alt="Symbol" /></td>
<td>Light Pole, Type 7</td>
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<td>Light Pole, Type 14</td>
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<td><img src="image" alt="Symbol" /></td>
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<td>High Mast Light Pole, No. of Lamps Indicated on Panel</td>
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<td><img src="image" alt="Symbol" /></td>
<td><img src="image" alt="Symbol" /></td>
<td>Overhead Sign Light, 350 Watt Lamp</td>
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<td><img src="image" alt="Symbol" /></td>
<td><img src="image" alt="Symbol" /></td>
<td>Underpass Luminaires</td>
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<td><img src="image" alt="Symbol" /></td>
<td><img src="image" alt="Symbol" /></td>
<td>Traffic Signal Head, 3 Section, 300 mm, Red, Yellow, and Green</td>
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<tr>
<td><img src="image" alt="Symbol" /></td>
<td><img src="image" alt="Symbol" /></td>
<td>Traffic Signal Head With Back Plate</td>
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<td><img src="image" alt="Symbol" /></td>
<td><img src="image" alt="Symbol" /></td>
<td>Traffic Signal Head With 300 mm Green, Yellow and Red Arrows Sections, With Back Plate</td>
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<tr>
<td><img src="image" alt="Symbol" /></td>
<td><img src="image" alt="Symbol" /></td>
<td>Traffic Signal Head With Optical/Electronic Unit</td>
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<td><img src="image" alt="Symbol" /></td>
<td><img src="image" alt="Symbol" /></td>
<td>M-3 (Cluster Type Head) 300 mm Green, Yellow and Red Dots with 300 mm Green and Yellow Arrows.</td>
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<td>Internally Illuminated Sign</td>
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<td><img src="image" alt="Symbol" /></td>
<td><img src="image" alt="Symbol" /></td>
<td>Pedestrian Signal</td>
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<td>Flashing Signal Flashers (&quot;R&quot; indicates Red Lens)</td>
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<td><img src="image" alt="Symbol" /></td>
<td>Flashing Signal Flashers (&quot;Y&quot; indicates Yellow Lens)</td>
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<td><img src="image" alt="Symbol" /></td>
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<td>Pull Box</td>
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<td>Controller Cabinet</td>
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<td>Electrical Cabinet</td>
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<td>Service (100-240 V.A.C. Unless Otherwise Specified)</td>
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<td>Transformer Pad</td>
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<td>Power Source</td>
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<td>Conduit</td>
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<td>Conduit (Wocked)</td>
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<td>Junction Box</td>
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<td>Signaor Light Pole</td>
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<td><img src="image" alt="Symbol" /></td>
<td>Special Junction Cabinet (for Interconnect Cabinet)</td>
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<td>Vehicle Detector Inductive Loop Unles otherwise Indicated</td>
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<td><img src="image" alt="Symbol" /></td>
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<td>Quadrupole Detector Loop</td>
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<td>Video Detection Camera</td>
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<td>Video Surveillance Camera</td>
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<td>Note Designation</td>
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<td>Conduit Run</td>
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<td><img src="image" alt="Symbol" /></td>
<td>Portable Traffic Signal (Trailer Mount)</td>
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<td>Traffic Signal/Silt</td>
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<td>8888</td>
<td>8888</td>
<td>Pedestrian Push Button</td>
</tr>
</tbody>
</table>
SIGNAL STANDARDS

1. For Pedestrian Push Button and Sign See Sheet 1-30.1.3
2. For Foundation Details See Sheet 30.1.16
3. Mounting Heights of Signal and Pedestrian Heads and Pedestrian Push Button shall be applicable to installations on Poles Types 2, 5 & 10.

TYPE 1-A

TYPE 1-B

TERMINAL COMPARTMENTS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 1A AND 1B POLES,
OPTICAL MOUNT AND
TERMINAL COMPARTMENTS

T-30.1.2
4/93

1/96
REVISION 10/96

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED
1 x THICKNESS
TRENCHING DETAIL

1. Remove and replace existing surface, new surface material shall be from an approved commercial source.
2. Seal and sand new surface. (As directed by the Engineer)
3. Two sack slurry mix cement.
4. Recompact existing base.
5. All new surface and concrete material shall be approved by Engineer.
6. New material and trenching shall not be paid for directly but included in the price for the conduit.
7. Sand backfill.
8. 2 conduit diameters min.
9. Saw cut as directed by Engineer.
MAST ARM MOUNTINGS

VEHICULAR SIGNALS AND MOUNTINGS

REAR VIEW

NOTE: No background sight to show between plate and head. All mast arm backplates shall be louvered.

BACKPLATE

T - THICKNESS

SPECIAL DETAIL FOR MOUNTING SIGNAL HEAD

See detail for mounting signal head on Standard Plan Drawing T-30,115

M-2 SIDE MOUNT

NOTE:
1. ALL SIGNAL HEADS SHALL HAVE BACKPLATES.
2. ALL SIGNAL HEADS SHALL HAVE HOODS. HOODS SHALL BE TUNNEL TYPE, OPEN AT THE BOTTOM.

PEDESTRIAN SIGNAL - INTERNATIONAL SYMBOL

(To be used unless otherwise specified)

PEDESTRIAN SIGNAL - INTERNATIONAL SYMBOL

(To be used only when specified)

CLAM SHELL MOUNTING HARDWARE (CS)

POLE PLATE

TERMINAL COMPARTMENT
Pedestrian push button (See Detail "C")

Note: Conduit shall protrude 50 mm Max. above finished surface or foundation

Base cover (See Detail "B")

16 mm Dia. x 300 mm anchor Bolts x 4 required

PEDESTRIAN PUSH BUTTON POST

DETAIL "C"

Saddle or casting shaped to fit curvature of post

10 x 0.75 x 15 stainless steel vandal proof fasteners

Plunger type button 50 mm Min. Dia.

DETAIL "B"

Note:
1. Arrow to be left or right or both as required.
2. Porcelain encased, 230 mm x 300 mm sign, black symbols on white background.
3. NPS = Nominal Pipe Size Designator. See ASTM A53

SECTION A-A WITH PIPE

DETAIL "E"

Type 1 - Position pedestrian push buttons on signal pole when the width of the pole allows (2) pedestrian heads to be at the same mounting height.

Type 2 - Position pedestrian push buttons on signal pole when the width of the pole does not allow (2) pedestrian heads to be mounted at the same height.

PUSH BUTTON POSITIONING DETAIL
GENERAL NOTES:

1. All fasteners and associated hardware shall be stainless steel.

2. Two (2) No. 12 AWG conductors shall be installed between the internally illuminated street name sign and the pole luminaire. The phase electric (PE) conductor for the luminaire or electrical service will operate the internally illuminated sign.

3. The ballast will be, high output, "Valmont No. 60.3934W" or equivalent. Ballasts shall be enclosed and potted.

4. Fluorescent lighting will be provided by 2-800/3W standard lamps. Fluorescent sockets will be a-drip, snap-in type sockets with a rubber gasket on the lamp mating surface to prevent possible water damage.

5. Wire connections will be made with insulated compression wire nuts.

6. Street name sign wiring to run through two (2) water-tight 90° fittings with flexible conduit. Use drip loop sufficient enough to allow sign movement. Use watertight rubber grommet or bushing at pole entry.
SCHOOL ZONE FLASHER

1W1C - 300 mm amber beacon (2 per installation)

600 mm x 1200 mm Standard Highway Sign No. 55-1.

80 mm round metal sign post (4 m shaft length)
Multi-directional slip base, See Standard Plan Drawing T-31.3.2

Height varies

No. 3-1/2 pullbox

Concrete footing shall be Class A or AA

7.6 m (Min)

Roadway surface

1.0 m (if guardrail or barrier rail)

Sign No. NWF-1

Type 30 Pole

FLASHER WARNING SIGN DETAIL

Locate NWF-1 signal sign vertically on mast arm no lower than 5.6 m from the roadway surface. Distance is measured from the bottom edge of the sign to the actual traveled surface. Locate the sign horizontally on mast arm 7.6 m from pole. Distance is measured from the middle of the sign to the perimeter of the Type 30 Pole.
TRAFFIC DETECTOR LOOP

SECTION A-A

NO. 5 PULL BOX

CONCRETE LOCATION (SEE GENERAL NOTES 1 AND 2)

PAVEMENT JOINT CROSSING DETAILS

NO DIRECT PAYMENTS

INSTALLATION NOTES

1. EACH LOOP SHALL BE 1.0 M X 1.0 M WITH 2 TYPICAL
2. DEPTH OF SAW CUT SHALL BE 62 MM MIN. TO 75 MM MAX.
3. LOOPS SHALL BE CENTERED IN ALL TRAVEL LANE LINES.
4. LOOP WIRE SHALL BE STRANDED #4X4.1.
5. EACH INDIVIDUAL CONDUCTOR SHALL BE A CONTINUOUS RUN WITH NO SPLICEDS AND SHALL BE LABELED AT EACH END WITH THE LANE ASSIGNMENT.
6. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO ASCERTAIN THAT THE LOOP PLACEMENT IS NOT IN CONFLICT WITH OTHER ITEMS OF WORK.
7. PRIOR TO PLACEMENT OF LOOP DETECTORS, THE RESIDENT ENGINEER SHALL NOTIFY THE TRAFFIC SECTION OF THE PLANNING DIVISION (890-9493) FOR ASSISTANCE IN ESTABLISHING THE EXACT LOCATION.
8. DETECTORS SHALL BE INSTALLED AFTER BULK GRADE PAVING OR PAVEMENT LANE IS ESTABLISHED.
9. LOOP LOCATION SHALL BE MARKED ON THE EDGE OF THE PAVEMENT BY PAVING THE WORD "LOOP" IN WHITE.
10. FOR DIAGONAL SLOT AT CORNERS DETAIL SEE STANDARD DET. T-30-1-4.

GENERAL NOTES:
1. ALL PULL BOXES SHALL BE NO. 5
   SEE SHEET T-30-1-8 FOR DETAILS NOT SHOWN
2. PAYMENT SHALL BE MADE UNDER THE FOLLOWING ITEMS:
   50 MM DIAMETER CONDUCTOR
   NO. 5 PULL BOX
   1.0 M X 1.0 M DETECTOR LOOPS
3. WHERE DETECTOR LOOPS ARE CUT INTO PAVEMENT, 1.8 M ROUND LOOPS MAY BE USED IN LIEU OF 1.0 M X 1.0 M SQUARE LOOP DETECTORS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METRIC NDOT

TRAFFIC DETECTOR LOOP

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED

T-30-1-4

CHIEF TRAFFIC ENGR.
APPROVED: 9/77
DATE: 9/77
INSTALLATION NOTES

1. EACH LOOP SHALL BE 1.8 m x 1.8 m WITH 4 TURNS.
2. DEPTH OF LOOP SAW CUT SHALL BE 82 mm MIN. TO 150 mm MAX.
3. LOOPS SHALL BE CENTERED IN ALL TRAVEL AND TURN LANES.
4. LOOP WIRE SHALL BE STRAIGHT 15 mm WIDE.
5. EACH INDIVIDUAL CONDUCTOR SHALL BE A CONTINUOUS RUN WITH NO SPlices AND SHALL BE LABELLED AT EACH END WITH THE LANE ASSIGNMENT.
6. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ASSESS THAT THE LOOP PLACEMENT IS NOT IN CONFLICT WITH OTHER ITEMS OF WORK.
7. PRIOR TO PLACEMENT OF LOOP DETECTORS THE RESIDENT ENGINEER SHALL NOTIFY THE TRAFFIC SECTION OF THE PLANNING DIVISION AND FISHING DIVISION OF THE LOCATION OF THE DETECTORS.
8. DETECTORS SHALL BE INSTALLED BEFORE OPEN GRADED PAVING OR EAGLE RAIL IS ESTABLISHED.
9. LOOP LOCATION SHALL BE MARKED ON THE EDGE OF THE PAVING BY PAVING THE MOST "LOOP" IN WHITE.
10. FOR DIAGONAL SLOT AT CORNERS DETAIL SEE STANDARD SHEET T-30.1.4,

AVC DETECTOR LOOP PLACEMENT DETAIL (OPPOSITE LANE LOOPS NOT SHOWN FOR CLARITY)

GENERAL NOTES:
1. PAINT SHALL BE MADE UNDER THE FOLLOWING ITEMS:
   a. DETECTORS
   b. 15 mm WIDE WHITE ELECTRIC DETECTORS AND TWO 1.8 m x 1.8 m LOOPS.
   c. SPECIAL CONDUCTORS TO INCLUDE CONDUCTORS.
2. PAINT SHALL BE MADE UNDER THE FOLLOWING ITEMS:
   a. DETECTORS
   b. 15 mm WIDE WHITE ELECTRIC DETECTORS AND TWO 1.8 m x 1.8 m LOOPS.
3. PIEZOELECTRIC DETECTOR SHALL INCLUDE ALL CONDUCTORS AND SAW CUTTING NECESSARY FOR INSTALLATION.
4. IF GUARDRAIL/HARNESS RAIL IS PROVIDED, THE CABINET SHALL BE PLACED A MINIMUM OF 600 mm BEYOND RAIL.
5. 30 mm FOR PIEZOELECTRIC SENSOR LEADS.
6. SEE SHEET T-30.1.4 FOR PAVEMENT JOINT DETAILS.
7. WHERE DETECTOR LOOPS ARE CUT INTO PAVEMENT, 1.8 m ROUND LOOPS MAY BE USED IN LIEU OF 1.8 m X 1.8 m SQUARE LOOP DETECTORS.
LEGEND

1. 200 amp meter socket with supports
2. 200 amp breaker and distribution
3. Lighting contactors
4. Ground fault receptacles

Note: 200 amp service to include 200 amp meter socket with test bypass and 200 amp breaker.
See wiring diagram and General Notes on Standard Plan Drawing 1-30-16.
GENERAL NOTES:
1. Barrier posts are to be used only where pad mounted transformers are installed in areas subject to damage by vehicular traffic. The contractor shall coordinate installation with the serving utility company to determine the exact number of posts required.
2. Footings to be drilled holes, as shown, and filled with Class A or AA concrete.
3. Post constructed of 150 mm Standard Pipe (Well Casing), primed and painted yellow, and concrete filled.
GENERAL NOTES:
1. The Ultimate Concrete Compressive Strength Shall be 70 ± 25 MPa
2. All Reinforcing Steel Shall be ASTM A615
   Grade 40. All Reinforcing Steel Shall Be No. 13 Metric Bars @ Equal Spacing.
3. Anchor Bolts Shall be ASTM A325 Grade C. Adjust The Reinforcing Steel If There Is A Conflict Between The Anchor Bolts and The Reinforcing Steel.
7.5 m AND SMALLER RADIUS CURB RETURN AND MEDIAN LOCATION

>7.5 m AND LARGER RADIUS CURB RETURN AND MEDIAN LOCATION

GENERAL NOTES:

1. ISLANDS SHALL BE PLACED ONLY ON SLOPES GREATER THAN 1:10.
2. WHEN USING SAFETY BASES, THE TOP OF THE FOUNDATION SHALL BE PLACED FLUSH WITH THE TOP OF THE FOUNDATION ISLAND.
3. CONCRETE SHALL BE CLASS A OR AA.
4. WHERE DETECTOR LOOPS ARE CUT INTO PAVEMENT, 1.8 m ROUNDED LOOPS MAY BE USED IN LIEU OF 1.8 m SQUARE LOOP DETECTORS.
**GENERAL NOTES:**

1. FOR POLE FOUNDATION SEE SHEET T-30-1.16
2. FOR LUMINATE ARM CONNECTION & LUMINATE TENSION DETAIL SEE SHEET T-30-1.10
3. THE DISTANCE FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE MAST ARM SIGNAL HEAD SHALL BE 3.1 m

**SECTION A-A**

**ALL DRAWINGS AND FOUNDATIONS MUST BE SUBMITTED FOR APPROVAL FOR LONGER MAST ARMS**

**DETAILED “D”**

HANDHOLE AND COVER
LOCATED 60° OPPOSITE MAST ARM

**DETAILED “C”**

SIGNAL ARM CONNECTION

* 25 mm Δ FOR 6.1 m SIGNAL ARM
  32 mm Δ FOR 12.2 m SIGNAL ARM

**DETAILED “B”**

POLE BASE
GENERAL NOTES:

1. Shop drawings and structural calculations shall be submitted and approved before poles may be utilized on project.

2. If indicated in the plans, all poles shall be prime painted by manufacturer and finish painted by contractor. See Standard Specification Sec. 714.03.01.

3. The distance from the roadway surface to the bottom of the most arm signalheads shall be 5.1 m.


POLE TYPE 30 (MAST ARMS ≤ 13.72 m)
POLE TYPE 30-A (MAST ARMS > 13.72 m)

POLE TYPE 35 (MAST ARMS ≤ 13.72 m)
POLE TYPE 35-A (MAST ARMS > 13.72 m)
No. 13 spiral @ 150 mm pitch, ending with a 180° hook. Laps shaft overlap 1½ turns and end with a 180° hook.

- No. 22 bars equally spaced

**Note:** Concrete shall be Class A or AA.

**SECTION A-A**

**PILE FOUNDATION**

**PILE FOUNDATION TABLE**

<table>
<thead>
<tr>
<th>POLE TYPE</th>
<th>NAST ARM LENGTH</th>
<th>&quot;D&quot;</th>
<th>&quot;E&quot;</th>
<th>ANCHOR BOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A &amp; 1B</td>
<td>0.92 m</td>
<td>810mm</td>
<td>20 x 660 x 100</td>
<td></td>
</tr>
<tr>
<td>7 AND 14</td>
<td>1.52 m</td>
<td>760mm</td>
<td>25 x 95 x 100</td>
<td></td>
</tr>
<tr>
<td>2B</td>
<td>3.65 m</td>
<td>915mm</td>
<td>50 x 167 x 150</td>
<td></td>
</tr>
<tr>
<td>3A AND 35</td>
<td>5.13 m</td>
<td>915mm</td>
<td>45 x 167 x 150</td>
<td></td>
</tr>
<tr>
<td>30A AND 35A</td>
<td>&gt; 13.7 m</td>
<td>915mm</td>
<td>50 x 1675 x 150</td>
<td></td>
</tr>
</tbody>
</table>

**GENERAL NOTES:**

1. All dimensions are nominal.
2. Rubber tapes shall be rolled after application.
3. When PVC tape is used as a final layer, paint finished splice with electrical insulating coating.

**TYPE A SPLICE METHOD**

(TWO FREE ENDS)

1. Completely cover the splice area with an electrical insulating coating and allow to dry.
2. Apply electrical filler compound with minimum thickness of 4 mm.
3. Apply 3 layers of half-lapped PVC tape.

**TYPE B SPLICE METHOD**

(THREE FREE ENDS OR ONE FREE END AND ONE THROUGH CONDUCTOR)

1. Completely cover the splice area with an electrical insulating coating and allow to dry.
2. Apply 2 layers of electrical insulating pad with minimum thickness of 4 mm; each layer or 2 layers; half-lapped, synthetic oil-resistant, self-fusing rubber tape.
3. Apply 3 layers of half-lapped PVC tape.

**CONDUCTOR SPLICING METHODS**
TYPICAL METHOD OF SIGN ATTACHMENT

MAST ARM SIGNAL AND SIGN PLACEMENT
"L" AS SHOWN ON PLANS
GENERAL NOTES:
1. SEAM WELD CONSTRUCTION W/ 5 DIA FILLET WELD OUTSIDE EDGES. TACK WELD CONSTRUCTION FOR INNER FRAME AND ANGLE 6 mm x 18 mm x 127 mm CENTERS.

2. GASKET MATERIAL 3 mm x 50 mm NEOPRENE EPDM AND SBR SPONGE WITH PSA.

3. WHERE CAP SCREWS ARE USED TO ATTACH COVER TO BOX, EITHER OF THE FOLLOWING METHODS OF PROVIDING ADEQUATE THREADING MAY BE USED:
   A. TACK WELD SQUARE NUT TO BOTTOM OF FLANGE (TOTAL 4), OR
   B. TACK WELD A 6 mm x 16 mm x 200 mm BAR BENEATH FLANGE (TOTAL 2).

4. DO NOT CUT OR WELD TO BRIDGE RAIL REINFORCING STEEL.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
BRIDGE / BARRIER RAIL
JUNCTION BOX
TYPE 1 AND 2

INSTALLATION IN SLOPING PARAPETS

SECTION C-C

COVER DETAILS

PULL BOX DETAIL

Material: 3.5 mm Thickness Steel
Hot Dip Galv., After Fabrication

13 mm x 150 mm Hex Bolt
3 Required

13 mm x 150 mm Hex Bolt
3 Required

10 mm Thickness Gasketed Screw Cover Secured W/ 10 mm x 25 mm Flat Head Brass Machine Screws

10 mm x 25 mm FH Brass Machine Screws (6 Pcs.)

13 mm Notch (Typ.)

13 mm x 150 mm Hex bolt (Typ.)

VIEW A-A
GENERAL NOTES:
1. HC should not be less than 1.8 m from the shoulder line. If no shoulder, HC should not be less than 3.6 m from the edge of travelway. In urban areas, a lesser clearance may be used where necessary.

2. For sign panel details, see T-31.1.4

3. All sign supports shall be breakaway design.

4. For double post-braced supports, maintain HC > clear zone width maximum of 9 m, except when protected by guardrail or barrier rail. For clear zone widths, refer to AASHTO Roadside Design Guide 1996 Ed. Chapter 3.

5. Sign islands required when h>4.5 m, or sign slope is steeper than 3%, or when required in contract plans.


7. For sign posts, see Post Selection charts, sheet T-31.1.2.


9. Sign panels to be aluminum sheet construction.

10. CC-Corner clearance

11. Prepaint the exposed portion of fastening hardware on the face of the sign panels with black enamel to match the sign face.
### POST SELECTION CHART

#### SIGN AREA (a)

<table>
<thead>
<tr>
<th>SIGN AREA (m²)</th>
<th>0 &lt; a ≤ 0.6</th>
<th>0.6 &lt; a ≤ 0.8</th>
<th>0.8 &lt; a ≤ 1.0</th>
<th>1.0 &lt; a ≤ 1.2</th>
<th>1.2 &lt; a ≤ 1.4</th>
<th>1.4 &lt; a ≤ 1.6</th>
<th>1.6 &lt; a ≤ 1.8</th>
<th>1.8 &lt; a ≤ 2.0</th>
<th>2.0 &lt; a ≤ 2.3</th>
<th>2.3 &lt; a ≤ 2.6</th>
<th>2.6 &lt; a ≤ 3.0</th>
<th>3.0 &lt; a ≤ 3.6</th>
<th>3.6 &lt; a ≤ 4.2</th>
<th>4.2 &lt; a ≤ 4.5</th>
<th>4.5 &lt; a ≤ 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>AREA (ha)</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

#### GENERAL NOTES:
1. Sign area is total of Major & Secondary signs.
2. Alternate posts must be approved by Traffic Engineering.
3. NPS - Nominal Pipe Size, see ASTM-A-53
4. For double post braced supports, maintain NC 2 clear zone width, minimum of 9 m, except when protected by guardrail or barrier rail. For clear zone widths, refer to AASHTO Roadside Design Guide 1996 Ed. Chapter 3.

### POST SELECTION CHART

<table>
<thead>
<tr>
<th>POST TYPE</th>
<th>DESCRIPTION</th>
<th>REFERENCE SHEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>64 mm Square Metal Post (12.8 mm) - single post</td>
<td>T-31.2.1</td>
</tr>
<tr>
<td>B</td>
<td>64 mm Square Metal Post (13.5 mm) - single post</td>
<td>T-31.2.2</td>
</tr>
<tr>
<td>C</td>
<td>Single Post Unbraced NPS3 Round Metal Post</td>
<td>T-31.3.1 thru T-31.3.2</td>
</tr>
<tr>
<td>D</td>
<td>Double Post Unbraced NPS3 Round Metal Post</td>
<td>T-31.3.1 thru T-31.3.2</td>
</tr>
<tr>
<td>E</td>
<td>Post+NSPS3 Round Metal Post Brace-NPS3 Round Metal Post</td>
<td>T-31.4.1 thru T-31.4.3</td>
</tr>
<tr>
<td>F</td>
<td>Special Design - contact Traffic Engineering</td>
<td></td>
</tr>
</tbody>
</table>

**STATE OF NEVADA**
**DEPARTMENT OF TRANSPORTATION**
**ROADSIDE SIGNS**
**GENERAL POST SELECTION CHARTS**

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

**METRIC NDOT**

T-31.1.2 (627)
2 STRINGER MOUNTING

3 STRINGER MOUNTING

4 STRINGER MOUNTING

NOTE: To obtain desired panel width, max. of 2 panels may be cut less than 1200 mm (450 mm min. each)

SUB PANEL ASSEMBLY & Z BAR BRACING

VERTICAL JOINT CLOSURE STRIP

GENERAL NOTES:
1. Stringers 75 mm x 68 mm x 6.4 mm or 68 mm x 68 mm x 6.4 mm aluminum alloy z-bar.
2. Stringers required on all signs requiring multiple posts.
3. Tubular stiffeners required when W>3.6m
4. Cost for bracing is included in sign.
5. One vertical joint if W exceeds 3500 mm.
   Two vertical joints if W exceeds 7200 mm.
6. For alternate steel tube bracing, see Standard Plan Drawing T-3115.
(STEEL TUBE BRACING ON ROUND METAL POSTS)

**TABLE - 1**
(Tube Sizes) (mm)

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>O.D.</th>
<th>A</th>
<th>B</th>
<th>CLAMPstock</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPS 3</td>
<td>89</td>
<td>132</td>
<td>173</td>
<td>6 x 38</td>
</tr>
</tbody>
</table>

**TABLE - 2**
(Tubing Size)

<table>
<thead>
<tr>
<th>SIGN WIDTH</th>
<th>TUBING SIZE (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2 m or Less</td>
<td>75 x 50 x 4.8</td>
</tr>
<tr>
<td>7.2 m to 8.4 m</td>
<td>100 x 50 x 4.8</td>
</tr>
</tbody>
</table>

**TABLE - 3**

<table>
<thead>
<tr>
<th>POST SIZE</th>
<th>D</th>
<th>BOLT SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 x 100</td>
<td>90</td>
<td>10 Dia. x 150</td>
</tr>
<tr>
<td>100 x 150</td>
<td>140</td>
<td>10 Dia. x 150</td>
</tr>
<tr>
<td>150 x 150</td>
<td>140</td>
<td>10 Dia. x 210</td>
</tr>
<tr>
<td>150 x 200</td>
<td>190</td>
<td>10 Dia. x 260</td>
</tr>
</tbody>
</table>

 **GENERAL NOTES:**

1. For sub-panel assembly & vertical joint closure strip, see Standard Plan Drawing T-31.1.4.

**METRIC NDOT**
**Roadside Signs**
**General Sign Panel Bracing**

(State of Nevada Department of Transportation)

All dimensions are in millimeters unless otherwise noted.

**T-31.1.5**
(Rev.)

**MCCARTHY**
11-18-02

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
ROADSIDE SIGNS
GENERAL SIGN PANEL BRACING

METRIC NDOT
**GENERAL NOTES:**

1. Sign islands to be compacted to 95%.  
2. Payment for sign island will be as noted in contract plans and Special Provisions.  
3. Undivided routes use 9′.  All divided routes use 16.  
4. Use 3′-2″ max for narrow right-of-ways or 16 preferred for others.
GENERAL NOTES:
1. Footings to be drilled holes as shown, & filled with class A or class AA concrete.
2. Anchor post included in cost of sign post.
**GENERAL NOTES:**

1. Anchor post included in cost of sign post.
3. Inner posts are those closest to roadway, and the outer posts are those farthest away.

**DOUBLE POST UNBRACED**

- Sign hardware, bracing, vertical joints,
  vertical joint closure strip & stringers
  as required. See Standard Plan Drawing
  T-31.1.4

- Post length on sign summary sheet
- Post length on outer post

**SINGLE POST**

- Multi-Directional Base and footing
  See Standard Plan Drawing T-31.3.2

- Post length on sign summary sheet
- Multi-Directional Base and footing
  See Standard Plan Drawing T-31.3.2

10 mm x 100 mm round head, square
neck carriage bolt (bolt head colored to
match sign face), hex nut w/ fiber
insert, flat washer through sign & post
(Typ.)
GENERAL NOTE:

1. All parts and hardware shall be galvanized as per Section 715 of the Nevada DOT Standard Specifications, except as noted.

2. Multi-directional slip bases are not required behind concrete barrier rail or behind guardrail where the sign post is greater than 0.8 m from the back side of the guardrail post.

3. NPS = Nominal Pipe Size. Use standard weight pipe for sign post and sleeve. See ASTM A 53.

4. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31-1.1 through T-31-1.6.

ASSEMBLY ELEVATION VIEW

- 16 mm x 30 mm Bolt, Type 1 ASTM A 325 or Type 1 ASTM A 449 (grade 5); each with three USS Through Handed Washers, ASTM F 436M Type T1 and Unalloyed Insert Stop Nut ASTM A 563M DH. All items shall be galvanized as per manufacturer's specifications. Torque within the range of 33 - 39 Nm. See BOLT DETAIL below.

BOLT DETAIL

- n = A typical manufacturer's identification
- Type 1 ASTM A449
- 16 mm x 60 mm bolt

PLAN VIEW

- Top/Bottom plate
- Plate thickness = 16 mm

FOOTING DETAIL

- Slip Base Support
- Ground Line
- 450 mm Dia.
- Drilled And Filled With Class A or AA Concrete
- E4
- 1:00
- 75 Max
- Slip Base Support

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
ROADSIDE SIGNS
ROUND METAL POSTS
MULTI-DIRECTIONAL SLIP BASE

T-31-2.2 (927 TJS)
GENERAL NOTES:
1. Footings to be drilled holes as shown, & filled with Class A or Class AA concrete.
2. Anchor post & bracing included in cost of sign post.
3. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.11 through T-31.16.
4. NPS = Nominal Pipe Size, See ASTM A53.
5. Inner posts are those closest to the roadway, and the outer posts are those farthest away.
GENERAL NOTES:
1. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
2. NPS = Nominal Pipe Size. See ASTM A 53.
GENERAL NOTES:
1. All posts with cross sectional area larger than 100 mm x 100 mm are to be drilled as shown.
2. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.11 through T-31.18.
3. "Z" bars will be used on all signs requiring two posts.
4. For double post installations, inner posts are those closest to roadway, and outer posts are those furthest away.

RECTANGULAR TIMBER POST SELECTION

<table>
<thead>
<tr>
<th>Table of Hole Diameters (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Size (D)</td>
</tr>
<tr>
<td>Hole Dia.</td>
</tr>
</tbody>
</table>

Sign Post Embedments

| Embedment | |
|-----------|
| 0.2H x 0.2W |

See note 3

See note A

Field Drilled Holes

Gain to D= 20 mm

76 mm x 68 mm x 6.4 mm or 68 mm x 68 mm x 6.4 mm aluminum alloy "Z" bar or suitable alternates. Bar length to be W = 200 mm.

6 mm x 20 mm, round head, square neck carriage bolt, hex nut with fiber inserts, at 300 mm spacing.

10 mm hex head nut, with fiber insert and 2 flat washers.

9.5 mm x 32 mm aluminum alloy strap, 13 mm carriage bolt, hex nut with fiber insert, 2 flat washers through signs, post and strap (for W = 500 mm).

DETAILED "A"
GENERAL NOTES:
1. All drilled holes in timber to be 16 mm Dia. unless otherwise noted.
2. Back brace hole in 100 mm x 100 mm post to be drilled and fitted in field. All other holes may be shop drilled in standard position.
3. Footings to be drilled: 450 mm diameter, 1.1 m deep, filled with class A or class A concrete.
4. For details on sign location, post type, penetrator, and sign stand, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
### Speed Conversion

<table>
<thead>
<tr>
<th>mph</th>
<th>km/h</th>
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<tbody>
<tr>
<td>20</td>
<td>32</td>
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<td>25</td>
<td>40</td>
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<tr>
<td>30</td>
<td>48</td>
</tr>
<tr>
<td>35 &amp; 40</td>
<td>60</td>
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<tr>
<td>45</td>
<td>72</td>
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<td>50</td>
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<td>55</td>
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<td>60</td>
<td>100</td>
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<tr>
<td>65 &amp; 70</td>
<td>110</td>
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<tr>
<td>75</td>
<td>120</td>
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### Advance Warning Sign Spacing

<table>
<thead>
<tr>
<th>SPEED (km/h)</th>
<th>DISTANCE BETWEEN SIGNS (m)</th>
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<tbody>
<tr>
<td>0-30</td>
<td>60</td>
</tr>
<tr>
<td>40-50</td>
<td>90</td>
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<tr>
<td>60</td>
<td>120</td>
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<tr>
<td>70-80</td>
<td>180</td>
</tr>
<tr>
<td>90-120</td>
<td>300</td>
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</tbody>
</table>

### Taper Length and Channelizing Device Spacing

<table>
<thead>
<tr>
<th>SPEED (km/h)</th>
<th>LENGTH FOR MERGING TAPER (L)</th>
<th>DEVICE SPACING (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>24</td>
<td>8</td>
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<tr>
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### Buffer Length

<table>
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<tr>
<th>SPEED (km/h)</th>
<th>LENGTH (m)</th>
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<tbody>
<tr>
<td>≤60 km/h</td>
<td>1/2 L</td>
</tr>
<tr>
<td>&gt;70 km/h</td>
<td>1/3 L</td>
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</table>

### Shifting Taper

- WS = Width of Shoulder
- L = Taper Length

### Typical Applications

- NDOT Standard Sheets T-35.1 thru T-35.110 include a variety of traffic control methods, but do not include a layout for every conceivable work situation. Typical applications should be altered, when necessary, to fit the conditions of a particular temporary traffic control zone. Standards presented in Part VI of the 1993 MUTCD and revisions should be given priority over the examples given here.

### Arrow Boards:

- Type A: Speeds of 50 km/h or less
- Type B: Speeds of 60 km/h to 80 km/h
- Type C: Speeds of 90 km/h or more

### Road Work Signs:

- NRW-1: ROAD WORK NEXT X MILES
- G20-2A: ROAD WORK END

### General Notes:

1. R2-1 and R2-5A may be used to reduce existing speed limit to 50 km/h if existing speed limit is 110 km/h thru 120 km/h. Other speed reductions must be approved by the Director. Speed limit may be reduced by 15 km/h min. to 2.5 km/h max. (Additional speed limit signs not shown are required place at 1/2 L.)
2. The W3-1 signs shall be spaced when the recommended speed on a curve is 50 km/h or less. The W1-4 signs shall be spaced when the recommended speed is 60 km/h or greater.
3. The W6-3 and R4-1 signs shall be installed alternately at 0.8 km intervals when the lengths of crossovers exceed 0.8 km.
4. All regulatory signs (R series) shall be black on reflective white.
5. All warning signs (W series) shall be black on reflective orange.
6. Speed is posted speed on 80th percentile, whichever is greater.
7. Channelizing devices shall be drums for multilane facilities and freeways with speeds 100 km/h or greater.
8. Warning signs shall be 900 mm x 900 mm. For speeds of 70 km/h or less, R2-1 and R2-5A shall be 600 mm x 1200 mm.
9. Warning signs shall be 1200 mm x 1200 mm. For speeds of 80 km/h or greater, R2-1 and R2-5A shall be 1200 mm x 1500 mm.
TRUCK MOUNTED ATTENUATOR (OPTIONAL)

LEGEND

- Work Area
- Channelizing Devices
- Arrow Board
- 2-70 km/h
- Optional
- See GENERAL NOTE No. 1.

See T-35.1.1 For TABLES and GENERAL NOTES
See T-35.1.1 For TABLES and GENERAL NOTES

**LEGEND**

- **Area**
- **Channelizing Devices**
- **20 km/h**

**Notes:**
- See GENERAL NOTE No. 1.
- See GENERAL NOTE No. 2.
- See GENERAL NOTE No. 3.

**Units:**
- All dimensions are in Meters unless otherwise noted.

**TYPICAL TRAFFIC CONTROL FOR ROAD CLOSURE DETOUR**
TYPICAL PLACEMENT OF SHOULDER DROP OFF SIGNS
(PLACED WHEN SHOULDER DROP-OFF EXIST DURING NON-WORKING HOURS)

NOTE: NSD-1 SHALL BE USED IN ALL CASES WHERE THERE IS A VERTICAL
DIFFERENCE OF 50 mm OR GREATER AT THE SHOULDER.

TYPICAL PLACEMENT OF UNEVEN LANES SIGNS
(PLACED WHEN UNEVEN LANES EXIST DURING NON-WORKING HOURS)

NOTE: NUL-1 AND NUL-2 SHALL BE USED IN ALL CASES WHERE THERE IS A VERTICAL
DIFFERENCE OF 20 mm TO 75 mm BETWEEN THE TRAVEL LANES.

TYPICAL PLACEMENT OF BUMP SIGNS

TYPICAL PLACEMENT OF LOOSE GRAVEL/DUST HAZARD SIGNS
Markings for barrier rails and vertical panels shall be alternate retroreflective orange and retroreflective white stripes sloping downward at an angle of 45 degrees in the direction of traffic.

**General Notes:**

1. ALL BARRICADES USED MUST COMPLY WITH NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 359.

2. TYPE III B BARRICADES USED FOR TEMPORARY SIGN SUPPORTS, SIGNS SHALL BE MOUNTED 300 mm MIN. FROM GROUND.

3. CABLE(S) THREADED THROUGH ALL PIPES.
SECTION A-A

DETAIL "B"

POST DETAILS

VERTICAL PANEL

TRAFFIC CONES

- 50 mm MAX. NON RETROREFLECTIVE MATERIAL
- 100 mm MIN.- 150 mm MAX. RETROREFLECTIVE MATERIAL

NOTE: DRUMS/Barrels shall have a min. of 2 white and 2 orange retroreflective bands and 450 mm width regardless of orientation.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL
CONES, DRUMS, AND VERTICAL PANELS

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

16.25K
1/10/2011
GENERAL NOTES:

1. SHAPES OF THE SAND FILLED MODULES ARE USED FOR ILLUSTRATION PURPOSES ONLY.

2. AT LOCATIONS WHERE VIBRATIONS AND/OR SURFACE SLOPES MAY CAUSE MODULES TO SHIFT, MODULES SHALL BE ANCHORED TO PREVENT MOVEMENT ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AND AS APPROVED BY THE ENGINEER.

3. IN FREEZING CONDITIONS, SAND HAVING A MOISTURE CONTENT OF 3% OR MORE SHALL BE MIXED WITH 5% ROCK SALT.

4. FOR OTHER SAND MODULE LAYOUTS NOT SHOWN, SEE STANDARD AND MATERIAL ENGINEER.

5. THE LEADING MODULE OF EACH ATTENUATOR SHALL BE DELINEATED. THE BLACK STRIPE SHALL BE SLOPED DOWN TOWARDS THE SIDE WHICH TRAFFIC WILL PASS. THE BACKGROUND SHALL BE RETRO-REFLECTIVE YELLOW. ADDITIONALLY A MARKER PANEL SHALL BE PLACED WITH SHEETING APPROXIMATELY 76 mm SQUARE. THE PANEL IS COVERED WITH YELLOW RETROREFLECTIVE SHEETING WITH BLACK STRIPES 125 mm WIDE. BLACK STRIPES SHALL BE AT 45 DEGREES WITH 100 mm SPACE BETWEEN STRIPES.

6. THE MAXIMUM LATERAL AND LONGITUDINAL SLOPE THAT SAND MODULES MAY BE INSTALLED ON SHALL NOT EXCEED 5%.

7. AN ANGLED CENTERLINE OF THE SAND BARREL ARRAY MAY BE SHIFTED UP TO 5 DEGREES TOWARDS ON-COMING TRAFFIC.

LEGEND:

1. THE CIRCLED NUMBER INDICATES THE MASS IN KILOGRAMS OF THAT SAND FILLED MODULE.

2. PPCBR = PORTABLE PRECAST CONCRETE BARRIER RAIL.

V0 = DESIGN VELOCITY.

DELINATION FOR LEADING MODULE
(USE CORRECT PANEL)
(See Note 5)

TYPICAL LAYOUTS (SEE LEGEND)
**TYPICAL REMOVABLE FRAME**

(1020 mm THRU 6300 mm)

**REMOVABLE FRAME GREATER THAN 6100 mm**

**TYPICAL EXIT PANEL FRAMES**

**TYPICAL JOINT DETAILS**

**FRAME MOUNTING DETAILS**

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

**OVERHEAD SIGNS**

**REMOVABLE SIGN PANEL FRAMES**

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

**NOTE:**

1. Frames Shall Be All-Welded Construction.
2. 13 mm Panel Mounting Holes Shall Be Drilled By Template. Sign Panel May Be Considered a Template.
3. Drilled and Tapped Holes (4.3 mm Min. 10 H.N) May Be Used Where Interference Due To Welds or Structural Members Is Encountered.
4. M10 x 10 bolts shall be flush with faces of frame angles.
5. Mounting Screw Angles Shall Be Tapped 2.5 mm Minimum Parallel To Axis of the Sign, Mounting Screw Angles Shall Be Installed Perpendicular To The Axis of the Sign.
6. Panels Shall Be 610 mm Minimum And 1220 mm Maximum.
ALTERNATIVE CONNECTIONS AT TOP CHORD

SECTION "C" - "C"

SECTION "D" - "D"

NOTES:
2. Minimum Bolt Size is 7 mm. For Cap Angles Welded to Chord Member Or Truss.
3. Minimum Spacing Of Bottom Cap Angle Is 9075 mm.
4. Top Clip Required For Each Vertical Member Or Removable Sign Panel Frame.

STEEL REMOVABLE SIGN PANEL FRAMES

OVERHEAD SIGNS
REMOVABLE SIGN PANEL FRAMES
2795 mm AND 3050 mm SIGN PANELS

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
REMOVABLE SIGN PANEL FRAMES
2795 mm AND 3050 mm SIGN PANELS

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

CHIEF TRAFFIC ENGINEER
APPROVED: 7-96 ROSS

METRIC
NDOT
NOTES:
1. M6x60mm Grub Screw and 32 mm x 3 mm Bearing Bar shall be used.
2. 50 mm Cross Bar is used.
3. All bolts, nuts, washers, etc., shall be galvanized.
4. All dimensions are in millimeters unless otherwise shown.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
OVERHEAD SIGNS
WALKWAY DETAILS NO. 1

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
NOTES:
1. Special Care Shall Be Taken to Ensure That The Completed Hinge and Latch Assembly Will Hold The Safety Railings in a Steady Manner, Free of Wobble When in the Raised Position. Maximum Allowable Displacement from Vertical at Top of Railings When Latched Shall Be 25 mm.
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.
4. NPS = Nominal Pipe Size Designator, see M A53.

END VERTICAL FRAME)

Repair Link

5 mm Eye Bolt W/ 32 mm

ELEVATION

PLAN VIEW - TWO POST HINGE

Bar 91 mm x 10 mm x 103 mm
Bar 32 mm x 10 mm x 38 mm (Tack-welded
in Bar 32 mm x 10 mm x 127 mm
51 Assembly for 10 mm Dia.
Bolt & Brass Lock Nut.
Bolt & 2 mm x 10 mm x 127 mm. Kicker it
Must rotate freely due to its own weight,
Grind to Close.

Pipe Railing: 15 mm Bolt & Brass Lock Nut
Bar 38 mm x 10 mm x 57 mm

PLAN VIEW - CENTER POST HINGE

ELEVATION

WALKWAY SAFETY RAILING DETAILS

METRIC

WALKWAY SAFETY RAILING DETAILS

STATE OF NEVADA

DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS

ALL DIMENSIONS ARE IN MILLIMETERS

UNLESS OTHERWISE SHOWN

ELEVATION

PLAN VIEW - TWO POST HINGE

Bar 127 mm x 6 mm x 203 mm

BAR 38 mm x 38 mm x 57 mm

PLAN VIEW - END POST HINGE

Bar 38 mm x 38 mm x 57 mm

PLAN VIEW - CENTER POST HINGE

Bar 38 mm x 10 mm x 57 mm

END VERTICAL FRAME)

Repair Link

5 mm Cyl. Steel Cyl. Chain.
Approx 12 Links for 300 mm
Length = 1370 mm

SECTION A-A

CHAIN ASSEMBLY

SECTION W-W

6 mm Eye Bolt W/ 64 mm

Repair Link

6 mm Eye Bolt W/ 32 mm
DOUBLE MAST ARM SERIES

TRUSSED MAST ARM SERIES

TYPE C1

TYPE C2

SECTION F-F

SECTION G-G

DETAIL C

DETAIL D

VIEW J-J

POST ANGLES

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POST TO ARM FRAMING DATA

NOTES:
1. For Post Connection To Base Plate See T-36.1.16
2. For Mast Arm Length and Mast Arm To Sign Panel Connections See T-36.1.14
3. WPS = Wood Pipe Size Designator. See ASTM A53.

FOR GENERAL NOTES SEE T-36.1.16

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
LIGHTWEIGHT TYPE C

CONNECTION DETAILS

PHOTOELECTRIC CONTROL UNIT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

METRIC
NDOT

T-36.1.16

U.S. DEPARTMENT OF TRANSPORTATION
SIDE VIEW - SINGLE FACED SIGN TYPES C

LIGHT FIXTURE MOUNTING DETAIL

Note: NPS = Nominal Pipe Size Designator. See ASTM A53.

Detail "A"

- 41 mm x 41 mm x 6.4 mm Continuous-Stand Channel
- 6.4 mm Ø - 20 Threads/25 mm Stainless Steel Nut
- 2 mm Stainless Steel Washer
- Light Fixture (Bottom)
- 41 mm x 35 mm x 6.0 mm or 21 mm x 41 mm x 5.6 mm Continuous-Stand Channel
- 10 mm x 25 mm Long Round Head Machine Screw, Capt Nut, Flat Washer, Beveled Washer & Lock Washer

NOTE: 6x Structural Tubing May be Used in Place of Steel Bar.
CENTER LANE TWO WAY TRAFFIC

CLARK COUNTY
1-50 Saint Rose Pkwy - Lamb Blvd.
1-215-505-505-505.

CLEAR SIDE SHALL FACE
On-coming Traffic.

BROKEN WHITE LINE (URBAN)

PASSING/NO PASSING ZONE

DOUBLE YELLOW CENTER LINE

TWO WAY LEFT TURN LANE

See Plan Sheets for Location

EXIT RAMP GORE STRIPING

BROKEN WHITE LINE (RURAL)

NON-REFLECTIVE & REFLECTIVE MARKERS
Type A - Non-Reflective Yellow Marker
Type B - Non-Reflective White Marker
Type C - One Way Clear Reflective Marker
Type D - Two Way Yellow Reflective Marker
Type E - Red/Clear Reflective Marker

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
PERMANENT RAISED PAVEMENT MARKERS

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED
FOR ARROWS & LEGEND DETAILS SEE SHEET T-38.11

Mark Side Shall Face
Wrong Way Traffic.

Storage Line

Dotted White Lines

Mark Side Shall Face
Wrong Way Traffic.

Dotted White
Auxiliary Lanes, Lane Drop

Mark Side Shall Face
Wrong Way Traffic.

Dotted White--Intersections
Dual Turn Lanes (Cat Tracks)
PLACEMENT OF MERGE ARROWS

TYPICAL LANE REDUCTION
For further details on "LONE REDUCTION" see Part B of the MUTCD.

TYPICAL PARALLEL ACCELERATION LANE
For further details on "PARALLEL ACCELERATION LANE" see Part B of the MUTCD.

MUTCD

BICYCLE

END BROKEN WHITE LINE

TAPER LENGTH

102
(0.26 m²)

1.0 m
(0.51 m²)

NOTE: THESE LEGENDS AS SHOWN ARE FOR BRC LANE USE.

0.6 m

0.3 m

(2.51 m²)

(3.35 m²)

0.9 m

LEFT/STRAIGHT ARROW

LEFT/STRAIGHT/RIGHT ARROW

1.0 m

11 m

0.9 m

0.3 m

(1.11 m²)

(1.44 m²)

EDGE OF PAVEMENT

20°

(3.90 m²)

DIRECTION OF VIEW

0.5 m

0.3 m

0.8 m

0.5 m

0.3 m

(2.88 m²)

STRAIGHT ARROW

EXIT ARROW

(1.01 m²)

(2.56 m²)

WRONG WAY ARROW

(3.07 m²)

TURN ARROW
PERMANENT STORAGE LANE
TURN ARROWS & ONLY'S

NOTE: For TEMPORARY STIRLING Exclude:
PAVEMENT WORDS and SYMBOL MARKINGS
(i.e., TURN ARROWS, ONLY'S, etc.)

TEMPORARY X-WALK

TYPICAL MID-BLOCK X-WALK

600 mm Stop Bar (Typ.)
600 mm X-Walks (Typ.)

Place On Travel Lane Lines,
Shoulder Lines and Centered
Between Travel Lane Lines (Typ.)

PERMANENT TYPICAL X-WALK INTERSECTION

600 mm X-Walks (Typ.)
600 mm Stop Bar (Typ.)

Place On Travel Lane Lines,
Shoulder Lines and Centered
Between Travel Lane Lines (Typ.)
NOTES:

1. NOTES ON ①, ② & ⑦ OF SHEET B-20.1.3 SMALL APPLY.

2. WHEN THE ADDITION OF CELLS CAUSES THE LENGTHS OF THE "a", "f" and "q" bars to exceed 18000 MM, THE BARS WILL REQUIRE SPLICEING. SPLICES FOR THE "f" BARS SHALL BE CENTERED ABOUT THE CENTER LINE OF THE INTERIOR WALLS. SPLICES FOR THE "a" BARS SHALL BE CENTERED ABOUT THE CENTER OF THE CELLS. SPLICES FOR THE "q" BARS SHALL BE DONE AT THE 45 DEGREE LEG AND CONFORM TO THE SPLICE DETAIL SHOWN. SPLICE LOCATIONS SHALL BE ALTERNATED FROM BAR TO BAR. SEE DETAIL SHOWN. SPLICE LENGTHS FOR THE "a" AND "q" BARS SHALL BE AS FOLLOWS:

- No. 13 Bars = 400 mm
- No. 19 Bars = 600 mm
- No. 22 Bars = 800 mm
- No. 25 Bars = 1000 mm

3. FOR DIMENSIONS, BAR SIZES, BAR SPACING, AND ROOF SECTION SPACING DETAILS, SEE SHEET B-20.1.3. FOR GENERAL NOTES, SEE SHEET B-20.1.1.
NOTES:
1. FOR GENERAL NOTES SEE SHEET B-20.1.1
2. FOR QUANTITIES SEE SHEET B-20.1.4.1

ELEVATION

PLAN

SECTION A-A

SECTION B-B
<table>
<thead>
<tr>
<th>SPAN (m)</th>
<th>CUBIC METERS OF CONCRETE AND KILOGRAMS OF REINFORCING FOR TWO TYPE II HEADWALLS</th>
<th>CONCRETE FOR TWO TYPE II HEADWALLS FOR EACH ADDITIONAL CELL (CUBIC METER) ADD THE QUANTITY TO THE QUANTITY FOR A DOUBLE BOX</th>
<th>FOR HEIGHT (H) LESS THAN 3.7 METERS 0.60 (SPAN (m)) + 0.20 CUBIC METER ANGLE</th>
<th>CONCRETE FOR TWO TYPE II HEADWALLS FOR EACH ADDITIONAL CELL (KILOGRAMS) ADD THE QUANTITY TO THE QUANTITY FOR A DOUBLE BOX</th>
<th>FOR HEIGHT (H) LESS THAN OR EQUAL TO 2.3 METERS 25.6 (SPAN (m)) + 0.32 CUBIC METER ANGLE</th>
<th>CONCRETE FOR TWO TYPE II HEADWALLS FOR EACH ADDITIONAL CELL (KILOGRAMS) ADD THE QUANTITY TO THE QUANTITY FOR A DOUBLE BOX</th>
<th>FOR HEIGHT (H) LESS THAN OR EQUAL TO 0.0 METER 36.67 (SPAN (m)) + 0.20 CUBIC METER ANGLE</th>
<th>REINFORCING FOR TWO TYPE II HEADWALLS FOR EACH ADDITIONAL CELL (KILOGRAMS) ADD THE QUANTITY TO THE QUANTITY FOR A DOUBLE BOX</th>
<th>FOR HEIGHT (H) LESS THAN OR EQUAL TO 3.0 METERS 63.79 (SPAN (m)) + 0.20 CUBIC METER ANGLE</th>
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**Note:** All dimensions are in millimeters unless otherwise shown.
## TYPE I HEADWALL DIMENSIONS AND REINFORCING STEEL

### 0° SKEW

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**Note:** For General Notes See Sheet B-20-11.

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**SECTION A**

- 13 Bars @ 300 E.F. into barrel.
- Distance Between Last G Bar and Bend Line Of Horizontal Bars Is 460 mm. Or More.

---

**SECTION WING B**

- Bend Bars On For Face 460 mm into barrel.
- Extent 2-No.13 Bars 600 min. into footing of Each Wing.

---

**PLAN**

- **"A"** - Clone (45° - Skew) For Skews of 0°, 15° & 30°
- **"B"** - Clone (45° - Skew) For Skew of 45°
- **"C"** - Clone (45° - Skew)

**Note:** For General Notes See Sheet B-20-11.
<table>
<thead>
<tr>
<th>CUBIC METERS OF CONCRETE AND KILOGRAMS OF REINFORCING FOR TWO TYPE I HEADWALLS</th>
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<tr>
<td><strong>SINGLE BOX</strong></td>
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<td><strong>0° SKEW</strong></td>
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<td>CONC.</td>
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① - QUANTITIES SHOWN ARE FOR TWO HEADWALLS, ONE AT THE INLET AND ONE AT THE OUTLET.
NOTES:
1. FOR GENERAL NOTES SEE SHEET B-20.11.
2. DOWELLING: DOWEL HOLES SHALL BE DRILLED 300 mm INTO EXISTING CONCRETE. DIAMETER OF HOLE SHALL BE 6 mm LARGER THAN DIAMETER OF BAR. HOLE MAY BE INCLINED NO MORE THAN 5° OFF THE HORIZONTAL. DOWELS SHALL BE EPOXYED INTO CLEAN HOLES. EPOXY SHALL CONFORM TO THE REQUIREMENT OF SECTION 728 OF THE STANDARD SPECIFICATIONS.

NOTE:
Old Headwalls To Remain In Place, Unless Otherwise Noted.

PART LONGITUDINAL SECTION

ELEVATION

PLAN

R.C.B. CULVERT EXTENSION

* - Place Bars In Center Of Walls And Slabs

40 Win. Cl

No. 13 Bent Bar

460

200

No. 13 Bars @ 300 O.C. End Way

No. 13 Bent Bars @ 300 O.C.

75

225

20

150 (Typ.)

SECTION

METHOD OF PLUGGING R.C.B.
NOTE: Width And Height Varies.

R.C.B. CULVERT EXTENSION

METHOD OF EXTENDING R.C.B. CULVERTS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METRIC
NDOT

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

ADOP TED 7/98 REV 7/00

DRAFTED: 7/98

WATER MARK
GENERAL NOTES:

1. CONCRETE: ALL CONCRETE IN PRECAST PRESTRESSED PILES SHALL BE CLASS III CONCRETE, EXCEPT THE MIX SHALL CONTAIN NOT LESS THAN 10.5 SACKS OF CEMENT PER CUBIC METER. AGR ENTRAINMENT SHALL BE 0% TO 4%. MINIMUM ULTIMATE COMPRESSIVE STRENGTH SHALL BE 7.0 AT 28 DAYS - 28 MPa

2. FINAL FORCE: THE FORCE REMAINING IN THE PILES AFTER ALL LOSES IN THE PRESTRESSING STEEL SHALL BE 440 MPa - 3.6 MPA. CONCRETE STRESSES: TOTAL LOSSES IN PRESTRESSING STEEL SHALL BE TAKEN AS 270 MPa.


4. REINFORCEMENT: ALL REINFORCING STEEL SHALL BE ASHDOT M20 GRADE 60 COLD-DRAWN STEEL WIRE FOR SPIRAL REINFORCEMENT SHALL CONFORM TO ASHTO M20.

CONSTRUCTION NOTES:

1. LAPPED SPLICES IN SPIRAL REINFORCEMENT SHALL BE 60 DIAMETERS MINIMUM. ALL SPIRAL REINFORCEMENT AT SPLICES AND AT ENDS OF THE PILE SHALL BE EJENDED BY A 135° HOOK WITH 150 MM TAIL HEADED 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 3000 MM.

4. PRECAST PRESTRESSED CONCRETE PILES SHALL BE SUPPLIED FULL LENGTH. SPLICES SHALL NOT BE ALLOWED.
NOTES:

1. SPLICES IN LONGITUDINAL REINFORCEMENT NOT ALLOWED WITHIN UPPER 1400 MM OF PILE. MINIMUM LAP SPLICE FOR 25 MM BARS IS 1450 MM.

2. LONGITUDINAL PILE REINFORCEMENT EXTENDING INTO THE FOOTING SHALL PROVIDE 75 MILLIMETERS OF CLEARANCE TO TOP OF FOOTING. A STANDARD 18" HOOK MAY BE USED IN LIEU OF THE 30° HOOK.

3. LAPPED SPLICES IN SPIRAL REINFORCEMENT SHALL BE LAPPED 60 MM. MINIMUM LAP SPLICE AT SPLICES AND AT THEIR ENDS SHALL BE TERMINATED BY A 53.5° HOOK WITH 200 MILLIMETERS TAIL WORKED AROUND A LONGITUDINAL BAR.
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 PLANS.
3. PILE POINT ATTACHMENTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A271 GRADE 450-240 UNLESS NOTED OTHERWISE.
4. WELDS FOR ATTACHMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

TYPICAL HP PILE POINT DETAIL

HP PILE SPlice DETAILS

COMPLETE JOINT PenETRATION WELD SIZE, MOUNT DETAILS
FOR APPROVED WELD

PILE SPlice NOTES:
1. PILE SPlice WELDS SHALL CONFORM TO ANSI D1.1.
2. PILE MUST BE STEPPED AT LEAST 1000 mm 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. RAILING TO CONFORM TO VERTICAL AND HORIZONTAL ALIGNMENT.
2. JOINTS TO BE SPACED 12000 mm CENTER TO CENTER. MAX 11000 mm.
3. SLIP JOINTS TO BE PLACED IN PANELS TO MATCH EXPANSION JOINTS IN DECK. THE 6 mm FOR MOVEMENT WILL BE CHANGED TO MATCH ALLOWANCE FOR MOVEMENT IN THE DECK AND CURB.
4. DESIGN WEIGHT: 25.3 kg/PER METER.
5. RAILING ASSEMBLY SHALL BE GALVANIZED AFTER FABRICATION.
6. ALL EXPOSED SURFACES OF RAILING ASSEMBLY SHALL BE PAINTED WHITE.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
STEEL BRIDGE RAIL
TYPE "H"

METRIC
NDOT

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN
2-21-12
ADOPTED TYPE REVISION

130 mm L.R. 90° El Cap End With 6 mm Plate, Weld And Grind Smooth

Shim Post As Required (Typ.)

20 mm Dia. x 300 mm ASTM A-325M Steel Anchor Bolts With Washers & Hex Nuts. (Galvanized)
PART ELEVATION

TYPICAL RAIL & POST CONNECTION STEEL

- 76x5.1x4.8 Steel Posts
- 76x5.1x4.8 Steel Posts

TYPICAL RAIL & POST CONNECTION ALUMINUM

- 76x5.1x4.8 Alum. Posts
- 76x5.1x4.8 Alum. Posts

TOP POST PLATE DETAILS

- Post 150
- 2+3 mm Dia. Plug Welds
- 40 mm Dia. Rod 150 mm Long

SLIP JOINT DETAILS

- 6 mm Slip Joint
- Every Two Posts Min.

GENERAL NOTES:
1. ALL STEEL RAILING ASSEMBLY SHALL BE GALVANIZED AFTER FABRICATION.
2. ALL EXPOSED SURFACES OF STEEL RAILING ASSEMBLY SHALL BE PAINTED WHITE.
3. NPS = NOMINAL PIPE SIZE DESIGNATION. SEE ASTM A53.
END REDWOOD STRIPS AT TOP OF RADIAL SECTION WHEN THEIR INTERMEDIATE DISTANCE FROM EACH OTHER REACHES 1000 MM.

NOTES:
1. SLOPE PAVING IS TO BE DIVIDED INTO EQUALLY SPACED PANELS. THE WIDTH OF EACH PANEL IS TO BE AS NEARLY 1000 MM AS SITE DIMENSIONS WILL PERMIT.
2. THESE DETAILS WILL NOT APPLY IN TOTAL TO ANY ONE SITE, BUT ARE INTENDED TO BE GENERAL ENOUGH TO COVER ALL POSSIBILITIES. TO OBTAIN LIMITS OF SLOPE PAVING FOR A SPECIFIC SITE, CONSULT THE PLAN SHEETS.
3. CONCRETE SHALL BE CLASS A OR AA WITH FIBER REINFORCING.

38X80 Redwood Saw As Shown & Reassemble. Remove Upper Portion After Concrete Cures.

SECTION A-A (WITH SIDEWALK)
SECTION A-A (WITH DITCH)
SECTION A-A (TOE OF SLOPE)
SECTION B-B (AT PIER)
SECTION C-C (AT ABUTMENT)
SECTION D-D (AT WINGWALL)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
CONCRETE SLOPE PAVING DETAILS

METRIC
INDOT

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN
### 2001 METRIC STANDARD PLANS INDEX

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